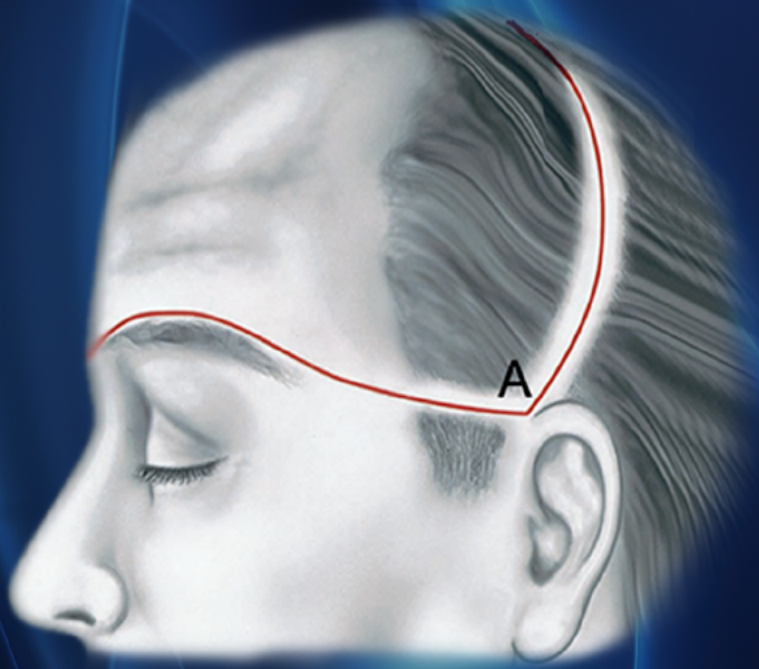
ISSN 1983-5175

Revista Brasileira de Cirurgia Plástica | Brazilian Journal of Plastic Surgery | Volume 35 • Number 2 • April/June 2020

Revista Brasileira de Cirurgia Plástica

Brazilian Journal of Plastic Surgery

Official Journal of Brazilian Society of Plastic Surgery



SOCIEDADE BRASILEIRA DE CIRURGIA PLÁSTICA

FUNDAÇÃO ideaH
INSTITUTO DE ENSINO E AÇÃO HUMANITÁRIA DA SOCIEDADE BRASILEIRA DE CIRURGIA PLÁSTICA

Rev. Bras. Cir. Plást. Volume 35 - Number 2 - April/June 2020

DAS BELEZAS. DO BRASIL.

A beleza está
no Brasil.
Na pluralidade.
Nas diferenças.
Regionais, sociais,
étnicas e culturais.
A beleza são várias.
E todas elas se
encontram aqui.

Somos especialistas
em produtos de silicone
e oferecemos diversas linhas,
tamanhos e formatos.
Para cada tipo
de necessidade.
Para cada tipo
de beleza.

lifesil

IMPLANTES DE SILICONE

lifesil.com | @LifesilSilicone | LifesilSilicone

Os Produtos LIFESIL estão registrados na ANVISA sob os números: 8035982001 FITA GEL DE SILICONE 8035982002 IMPLANTE MAMÁRIO TEXTURIZADO 8035982003 IMPLANTE MAMÁRIO TEXTURIZADO MODELO NATURAL 03062019

SOCIEDADE BrazilEIRA DE CIRURGIA PLÁSTICA

ISSN Online: 2177-1235
ISSN Impresso: 1983-5175

REVISTA BrazilEIRA DE CIRURGIA PLÁSTICA

BRAZILIAN JOURNAL OF PLASTIC SURGERY

Apr/May/Jun - 2020 - Volume 35, Issue 2

REVISTA BrazilEIRA DE CIRURGIA PLÁSTICA
BRAZILIAN JOURNAL OF PLASTIC SURGERY

INSTRUCTIONS TO AUTHORS

The Brazilian Journal of Plastic Surgery is the official publication of the Brazilian Society of Plastic Surgery (BSPS). It is a quarterly journal, and has been regularly published since 1986. The Brazilian Journal of Plastic Surgery is indexed in the Latin American and Caribbean Health Sciences Literature (LILACS) database.

The aim of the Brazilian Journal of Plastic Surgery is to record scientific developments in Reconstructive and Aesthetic Plastic Surgery, to promote research, and to support and inform professionals in this specialty, as well as to report new investigations, surgical experiments, and other original contributions.

Manuscripts submitted for publication in the Brazilian Journal of Plastic Surgery must cover topics related to plastic surgery and related areas. The journal publishes the following types of articles: Editorials, Original Articles, Review Articles, Case Reports, Ideas and Innovations, Special Articles, and Letters to the Editor.

Articles for advertising or commercial purposes will not be accepted.

The authors are responsible for the content and information in their manuscripts. The Brazilian Journal of Plastic Surgery strongly condemns plagiarism and self-plagiarism; such manuscripts will be immediately excluded from the evaluation process.

HOW TO CONTACT THE JOURNAL

Revista Brazileira de Cirurgia Plástica
Rua Funchal, 129, 2º andar - Vila Olímpia
São Paulo - SP - Brazil - Zip Code 04551-060
Tel: 55 11 3044-0000 - Fax: 55 11 3846-8813
E-mail: rbcp@cirurgiaplastica.org.br
Site: www.rbcp.org.br

TYPES OF ARTICLES

Editorial - These are generally articles published in each issue of the Brazilian Journal of Plastic Surgery, selected for their importance to the scientific community. These are written either by the Editorial Board or by renowned specialists in their subject areas. The Editorial Board may consider publishing editorials that are spontaneously submitted.

Original Article - This category includes controlled and randomized trials and observational studies, as well as basic investigations using animal experimentation. Original articles must contain the following sections: Introduction, Objective, Methods, Results, Discussion, Conclusion, References, Summary, and Abstract. The length of the text should not exceed 3,000 words, excluding tables, references, summary, and abstract. The number of references should not exceed 30, and the number of figures or figure parts should be limited to 20. There should be no more than 4 tables.

Review Article - These are critical and organized evaluations of the literature related to a specific subject of clinical importance. Review articles should be limited to 3,000 words, excluding references and tables, and a maximum of 6 figures or figure parts. References should have been recently published, preferably in the last 5 years. The maximum number allowed is 40.

Case Report - These are descriptions of unique patients or situations, especially rare diseases, and innovative methods of diagnosis or treatment. The text consists of: an Introduction, which positions the reader in relation to the importance of the topic and introduces the objectives behind the presentation(s) of the case(s) in question; the Case Report itself; and a Discussion, in which relevant aspects are examined and compared to the literature. The number of words should be at most 1,000, excluding references and tables. The maximum number of references is 10. The recommended limit of figures or figure parts is 8. The body of the article should include the Introduction, Case Report, Discussion, and References.

Ideas and Innovation - These are brief items describing original concepts, not exceeding 1,000 words, 10 references, and 8 figures or figure parts. The body of the article should include the Introduction, Methods, Results, Discussion, Conclusion, and References.

Letter to the Editor - In principle, these should comment on, discuss, or criticize articles published in the Brazilian Journal of Plastic Surgery. However, these can also relate to other topics of general interest. A maximum of 250 words is recommended and up to 5 references may be included. Whenever appropriate and feasible, the response from the authors of the article under discussion will be published along with the letter.

Special Article - These are articles not classified in the categories described above, which the Editorial Board considers particularly relevant to the specialty. The review criteria for these articles are unique, as they do not have a word limit or restrictions on the number of references.

EDITORIAL POLICY

Peer Review

Prior to publication, all articles submitted to the Brazilian Journal of Plastic Surgery undergo a review and arbitration process, in order to ensure quality and appropriateness in the selection of articles to be published. Initially, articles are evaluated by the office secretary, to determine whether they comply with publication standards and are complete. All manuscripts are then submitted to peer review by at least three reviewers, who are selected from among the members of the Editorial Board. Article acceptance is based on originality, significance, and scientific contribution. The reviewers fill out a form that provides a rigorous appraisal of all items of an article. At the end, the reviewers make general comments about the work and express their opinion as to whether it should be published or revised according to recommendations. Based on this information, the editor makes a final decision. In case of discrepancies between the reviewers, an additional opinion may be requested for a better assessment. When reviewers suggest modifications, these are then forwarded to the corresponding author, and a revised manuscript is subsequently sent to reviewers to determine whether suggestions/requirements were met. In exceptional cases, when required by the subject of the manuscript, the Editor can request the opinion of a professional who is not part of the Editorial Board, for an evaluation. This entire process is carried out through the submission and management system for online publication (GNPapers). The evaluation is double-blinded, ensuring anonymity throughout the process. The decision on the acceptance of the article for publication will occur, whenever possible, within 3 months from the date of its receipt. The dates for receiving and approving the manuscript for publication are reported in the article published, in order to respect the priority interests of the authors. The Brazilian Journal of Plastic Surgery asks its reviewers to follow the Committee on Publication Ethics (COPE) Ethical Guidelines for Peer Reviewers, available at: http://publicationethics.org/files/Ethical_guidelines_for_peer_reviewers_0.pdf

Language

Articles should be submitted in either Portuguese or English. Authors must follow current spelling conventions, use straightforward and accurate terminology, and avoid the informality of colloquialisms. When the manuscripts received are not written in English or the Editorial Board deems appropriate, the Journal will provide a translation free of charge to the author(s). If an English version already exists, it should be submitted to streamline the publication process. In the printed version of the Journal, the articles are published in Portuguese. On the website, all articles are published in Portuguese and English, both in HTML and PDF formats.

Research on Humans and Animals

Studies involving human research should comply with the Declaration of Helsinki (http://www.wma.net/en/30publications/10policies/b3/) and Resolution 466/2012 of the National Health Council (http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf). Authors are reminded of the need to complete an informed consent form for all participants in the research. Two copies should be signed, one remaining with the participant and the other with the researcher. Research carried out by consulting medical records or databases requires the written consent of the legally responsible individual or the clinical director of an institution, to obtain documents.

Animal investigations must be carried out in accordance with rules applicable to such procedures, as specified in the Basel Declaration (www.basel-declaration.org) and the Guide for the Care and Use of Laboratory Animals (Institute of Laboratory Animal Resources, National Academy of Sciences, Washington, D.C., USA). The Editorial Board of the Journal may decline articles that do not strictly comply with ethical principles of research, whether involving humans or animals. The authors should accurately identify all drugs and chemicals used, providing the names of active ingredients, dosages, and routes of administration. They should also avoid using commercial or proprietary names.

Policy for the registration of clinical trials

The Brazilian Journal of Plastic Surgery supports the clinical trial registration policies of the World Health Organization (WHO) and International Committee of Medical Journal Editors (ICMJE), recognizing the importance of these initiatives for the international registration and dissemination of information on open access clinical trials. Thus, clinical trials are only acceptable if duly registered before the start of data collection on www.clinicaltrials.gov or an equivalent international repository. The identification number should be recorded at the end of the abstract.

Within this context, the Brazilian Journal of Plastic Surgery adopts the definition of a clinical trial recommended by the WHO, summarized as follows: "any research that prospectively designates humans for one or more interventions aimed at assessing their effects on health-related outcomes. Interventions include drugs, cells and other biological products, surgical procedures, radiological, devices, behavioral therapies, changes in care processes, preventive care, etc".

Authorship Criteria

We suggest that authorship criteria for articles be adopted according to the recommendations of the ICMJE. Thus, only those individuals who have contributed directly to the intellectual content of the work should be listed as authors.

The authors should meet all the following criteria, in order to have public responsibility for the work content:

1. Having conceived and planned the activities that led to the final work, or interpreted the results of these activities, or both;
2. Having written the work or revised successive versions and taken part in the review process;
3. Having approved the final version.

Individuals who do not meet the aforementioned requirements or whose participation consists of purely technical or general support may be mentioned in the Acknowledgments section.

The Journal adheres to the Vancouver Requirements - Uniform Requirements for Manuscripts Submitted to Biomedical Journals, as organized by the *ICMJE* - "Vancouver Group", available at www.icmje.org. Compliance with the instructions is mandatory for the study to be considered for review.

Identification
The manuscript should include the title of the work, written in a concise and descriptive manner, in Portuguese and English, the full names of the authors and their respective titles, as well as the institution where the study was carried out. These should be followed by the name of the corresponding author, along with the author's address, telephone, and e-mail. If the work was presented at a conference, the name of the event, place, and date of the presentation should be mentioned. Potential conflicts of interest and funding sources should be stated.
The maximum number of authors permitted for an article is 8, and the contribution of each author must be specified. Authors are considered those who have: contributed substantially to the design and planning, and/or analysis and interpretation of the data; contributed significantly to the draft or critical review of the content; and participated in the approval of the final version of the manuscript.

Summary or Abstract (only for original articles, special articles, review articles, and case reports).
The abstract of an original article should be structured, with an Introduction, Methods, Results, and Conclusions. The abstract should be written in order to allow understanding of the study without reading the entire text. Similarly, the Abstract must accurately reflect the Summary, and should follow the same structure: Introduction, Methods, Results, and Conclusions. Review articles and Case Reports should also include a Summary and Abstract, but a structured format as above is not required. Neither the Summary nor the Abstract may exceed 250 words. At least 5 keywords should be listed, with a maximum of 10, identifying the subject of the work. The descriptors should be based on the Health Sciences Descriptors (DeCS) published by Bireme, a translation of the Medical Subject Headings (MeSH) of the National Library of Medicine, available at: http://www.decs.bvs.br

Text
Articles should be divided in accordance with the category to which they belong. References should be cited numerically in order of appearance in the text, using superscript numerals.

Introduction - This section should discuss the purpose of the article and the rationale for the study. It must establish the theoretical premise that led the authors to investigate the topic. The Introduction should explain why the topic should be studied, clarifying flaws or inconsistencies in the literature and/or difficulties in clinical practice that make the work interesting to the specialist.

Objective - This section must describe the purpose of the work clearly and objectively in one paragraph.

Methods - This section should clearly describe the basis for selection of observation and experimental elements, such as patients, laboratory animals, and controls. Where appropriate, inclusion and exclusion criteria should be described. This section should provide sufficient detail to allow reproduction and use in other works. Methods that have already been published, but about which little is generally known, must be accompanied by a bibliographical reference; new techniques should be described in detail. Similarly, the time and place of study, statistical methods, and any computer programs should be described.
The authors should state in this section that the study was approved by the Ethics Committee of the institution where the work was carried out, providing the registration number in the text.

Results - Tables and illustrations should be presented in a logical sequence in the text. The information in tables or figures should not be repeated in the text.

Discussion - In this section, the author is expected to demonstrate personal knowledge and critical thinking in relation to the work, by comparing the results obtained with those in the literature. Comments should be related to the scope, position, and correlation of the study with respect to other literature and should include limitations and future prospects.

Conclusions - These should be concise and address only the proposed objectives.

Acknowledgments - If desired, these should be presented at the end of the text, mentioning the names of participants who contributed intellectually or technically in any phase of the work, but did not meet the requirements for authorship. Any funding agency that supported the research that resulted in the published article should also be mentioned.

References
References should be cited when actually consulted, in Arabic superscript numerals and numbered in the order of citation in the text. All authors up to 6 should be cited; if the authors exceed 6, the first 6 should be cited, followed by et al. The presentation should be based on the "Vancouver Style" format and the titles of the journals should be abbreviated according to the style presented in the List of Journals Indexed in Index Medicus, of the National Library of Medicine. The following are some examples of the main types of bibliographic references; other examples can be consulted at the website of the National Library of Medicine (http://www.nlm.nih.gov/bsd/ uniform_requirements.html).

Journal Article
Quintas RC, Coutinho AL. Risk factors for the commitment of surgical margins in basal cell carcinomas resections. Rev Bras Cir Plást. 2008;23(2):116-9.

Book Chapter
D'Assumpção EA. Problems and solutions in rhytidoplasty. In: Melega JM, Baroudi R, eds. Plastic surgery fundamentals and art: cosmetic surgery. Rio de Janeiro: Medsi; 2003. p. 147-65.

Book
Saldanha O. Lipoabdominoplasty. Rio de Janeiro: Di Livros; 2004.

Thesis

Freitas RS. Jaw bone elongation using internal device: quantitative analysis of results [Doctoral thesis]. São Paulo: University of São Paulo, School of Medicine; 2003. 97p.

Events

Carreirão S. Reduction mammoplasty. In: XXXVI Brazilian Conference of Plastic Surgery; 2001 Nov 11-16; Rio de Janeiro, Brazil.

Tables

The numbering of tables should be sequential, using Arabic numerals, in the order in which they are cited in the text. All tables (maximum of 4) should have a title and header for columns and should be cited in the text. The table footer should include the legend for abbreviations and statistical tests used.

The tables should be presented only as necessary for the effective understanding of the work, and should not repeat information already mentioned in the text.

Figures

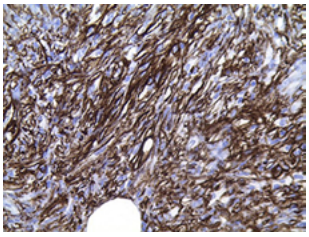
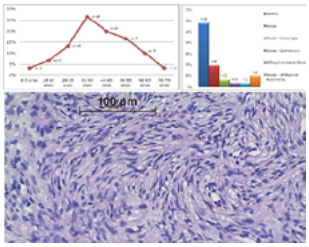
All figures (graphs, photographs, illustrations) should be numbered sequentially, in Arabic numerals, following their order of citation.

The figures must be accompanied by their respective legends, but these should not be included within the image. Abbreviations used in the figures must be spelled out in the legends.

The number of figures must not exceed 20 (twenty) for original articles, and each image attached to the study is considered a figure; for example, Figure 1 (A, B, C, D), will correspond to 4 of the 20 allowed figures.

Photos of patients should have a uniform background, especially when color is used, and without showing any foreign objects, e.g., doorknobs, lamps, etc. The field photographed should be strictly of the area of interest. In pictures of the face, use resources to prevent patient identification; however, if identification is possible, the author should enclose an individual authorization.

The resolution must follow the instructions below:

Type of Image	Description	Example	Recommended Format	Color	Minimum Resolution Mode
Line art	Image consisting of lines and text that does not contain shading or shaded areas		tif, png, jpg	1-bit monochrome or RGB	300 dpi
Medium shade	Continuous photo shade that does not contain text		tif, png, jpg	RGB or grayscale	300 dpi
Combination	Containing halftone image plus text or line-art elements		tif, png, jpg	RGB or grayscale	300 dpi

• Line example taken from: Di Lamartine J, Cintra Junior R, Daher JC, Cammarota MC, Galdino J, Pedroso DB, et al. Reconstrução do complexo areolopapilar com double opposing flap. Rev Bras Cir Plást. 2013;28(2):233-40.

• Shade example taken from: Alves JC, Fonseca RP, Silva Filho AF, Andrade Filho JS, Araujo IC, Almeida AC, et al. Ressecção alargada no tratamento do dermatofibrossarcoma protuberante. Rev Bras Cir Plást. 2014;29(3):395-403.

• Combination example taken from: Alves JC, Fonseca RP, Silva Filho AF, Andrade Filho JS, Araujo IC, Almeida AC, et al Ressecção alargada no tratamento do dermatofibrossarcoma protuberante. Rev Bras Cir Plást. 2014;29(3):395-403.

HOW TO SUBMIT A MANUSCRIPT

Manuscripts must be submitted electronically at www.rbcp.org.br. Authors must register before submitting the work, following the guidelines that appear on the website. Texts, figures, and tables should be inserted in the respective fields in the electronic submission system.

DECLARATIONS AND DOCUMENTS

In accordance with the guidelines of the ICMJE, certain documents and statements from the author(s) are requested for evaluation of a manuscript:

- A cover letter to the Editor-in-chief, containing information about the findings and the most important conclusions of the manuscript, explaining its relevance to the scientific community. The cover letter should also state that the manuscript has not been previously published and has not been submitted for publication in another journal;
- Declaration of potential author conflicts of interest (document generated in the system for submission of manuscripts, prior to the completion of the submission process) - Conflicts of interest include employment, sponsorship, any individual or institute funding, public or private, with interest in the content of the material submitted. If the article is accepted, this information will be published in the final version;
- Approval of the study by the Ethics Committee of the institution in which the work was carried out, enclosing the protocol number and name of the Research Ethics Committee to which the project was submitted;
- Transfer of copyrights (document generated in the system for the submission of manuscripts, prior to the completion of the submission process). All published manuscripts become the permanent property of the Brazilian Journal of Plastic Surgery and cannot be reproduced without the written consent of the publisher. The copyright grants exclusive and unlimited rights to reproduce and distribute works accepted in any form of publication (printed, electronic media, or any other form). The Brazilian Journal of Plastic Surgery has an open access home page.

ARTICLES ACCEPTED FOR PUBLICATION

Once accepted for publication, a sample of the article for publishing (PDF format) will be sent to the corresponding author for evaluation and final approval.

CHECKLISTS

Prior to the submission of a manuscript, the authors should use the checklist corresponding to the category of the article:

- CONSORT (CONsolidated Standards of Reporting Trials) checklist and flowchart for controlled and randomized tests, available at http://www.consort-statement.org/
- STARD (Standards for Reporting of Diagnostic Accuracy) checklist and flowchart for studies of diagnostic accuracy, available at: http://www.stard-statement.org/
- PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) checklist and flowchart for systematic reviews, available at: http://www.prisma-statement.org/
- STROBE checklist for observational studies in epidemiology, available at: http://www.strobe-statement.org/index.php?id=strobe-home

Address

Rua Funchal, 129 - 2º andar - 04551-060 - São Paulo - SP, Brazil
Telefone: 55 11 3044-0000 - Fax: 55 11 3846-8813
rbcp@cirurgiaplastica.org.br / www.rbcp.org.br

GN1
Desktop Publishing and Editorial Consulting: GN1 Sistemas e Publicações Ltda.
Fone: (19) 3633-1624 Site: www.gn1.com.br E-mail: comercial@gn1.com.br

Revista Brazileira de Cirurgia Plástica / Sociedade Brazileira de Cirurgia Plástica. — v.1, (jun. 1986)—.— São Paulo: Fundo Educacional da SBCP, 1986.
v.l: il

Trimestral
ISSN Online 2177-1235
ISSN Impresso 1983-5175

1. Cirurgia Plástica - Publicações periódicas.
I. Sociedade Brazileira de Cirurgia Plástica

CDU 616-089.844
CDD 617.95005

Revista Brazileira de Cirurgia Plástica (Brazilian Journal of Plastic Surgery)
Is indexed in LILACS - Latin-American and Caribbean Literature on Health Scienses

Revista Brasileira de Cirurgia Plástica

Brazilian Journal of Plastic Surgery

Apr/May/Jun - 2020 - Volume 35, Issue 2

EDITORIAL / EDITORIAL

The risks of rapid publications during the Covid-19 pandemic
Os riscos das publicações rápidas durante a pandemia de Covid-19
Dov Goldenberg 140

ORIGINAL ARTICLES / ARTIGOS ORIGINAIS

Fistula after primary palatoplasty: consensus among plastic surgery and Speech-Language Pathology
Fístula após palatoplastia primária: consenso entre profissionais da cirurgia plástica e da fonoaudiologia
Mahyara Francini Jacob; Gabriela Aparecida Prearo; Telma Vidotto de Sousa Brosco; Hagner Lucio de Andrade Silva; Jeniffer de Cassia Rillo Dutka 142

Reconstruction of nasal defects using the Rieger flap
Reconstrução de defeitos nasais utilizando o retalho de Rieger
Filipe Lopes Decusati; Antônio Egidio Rinaldi 149

Comparison of surgical techniques for prominent ear correction: Mustardé versus Converse
Comparação de técnicas cirúrgicas de correção de orelhas proeminentes: Mustardé versus Converse
Marcel Fernando Miranda Batista Lima; Pablo Maricevich; Kelson Kawamura; Priscila da Silva Lopes; Amanda Lucas Freire; Rafael Anlicoara 154

Use of Vaser™ plus liposuction in body contouring surgery
Uso de Vaser® mais lipoaspiração na cirurgia do contorno corporal
William Seidel; Caio Pundek Garcia 161

Modified reduction mammoplasty for optimization of oncological approach: initial results and literature review
Mamoplastia redutora modificada para otimização de abordagem oncológica: resultados iniciais e revisão da literatura
Gabriel Salum D'Alessandro; Alejandro Povedano; Fabiana Midori Takeuchi; Natalia Lima e Silva Crema; João Carlos Sampaio Góes 168

Microbiological profile and antimicrobial resistance profile of patients admitted to the Burn Unit of Hospital Geral "José Pangella" in Vila Penteado, Brazil
Perfil microbiológico e de resistência aos antimicrobianos dos pacientes internados na Unidade de Queimaduras do Hospital Geral "José Pangella" de Vila Penteado
Adriano Fernandes Araújo; Elaine Marlene Tacla 175

Plastic surgery in a medium complexity hospital: prospective cohort with cost and results analysis of the treatment of skin tumors within the scope of the Unified Health System (SUS)
Cirurgia plástica em hospital de média complexidade: coorte prospectiva com análise de custos e dos resultados do tratamento de tumores cutâneos no âmbito do Sistema Único de Saúde (SUS)
Daniele Walter Duarte 182

Perception of patients about professional performance and procedures performed in the pre, intra, and postoperative period of abdominoplasty
Percepção das pacientes sobre a atuação profissional e os procedimentos realizados no pré, no intra e no pós-operatório de abdominoplastia
Natália Ligeiro dos Santos; Iara Gama Esteves-de-Oliveira; Rogério Eduardo Tacani; Cristiano Schiavinato Baldan; Igor Fagioli Bordello Masson; Thiago Saikali Farcic; Aline Fernanda Perez Machado 189

Evaluation of three classification systems for fractures of the distal end of the radius: Frykman, Universal and A.O.
Avaliação de três sistemas de classificação das fraturas da extremidade distal do rádio: Frykman,Universal and A.O.
Henrique Mansur; Leonidas Durval Gripp 198

IDEAS AND INNOVATIONS / IDEIAS E INOVAÇÕES

Use of trichloroacetic acid for closure of lesion by extensors in lobules of ears
Uso de ácido tricloroacético para fechamento de lesão por alargadores em lóbulos de orelhas
Juliana Gulelmo Staut; Diego Ovalle Torres; Juliano Pereira; André CoeWlho Nepomuceno; Carina Padua; Fernando Giovanetti Morano; Rodrigo Pinto Gimenez 203

REVIEW ARTICLE / ARTIGO DE REVISÃO

Fat embolism syndrome secondary to the use of polymethylmethacrylate in bioplasty: a systematic review
Síndrome da embolia gordurosa secundária ao uso de polimetilmetacrilato na bioplastia: uma revisão sistemática
Carina Gabriela Andrade Oliveira; Francisco Rodrigues de Sales; Flávio Almeida Faria; Ricardo Zenóbio Darwich Filho 206

Patient safety in plastic surgery: a systematic review
Segurança do paciente em cirurgia plástica: revisão sistemática
Otto Huasckar Muchinski Saucedo; Elaine Rossi Ribeiro; Juliane Centeno Muller; Izabel Cristina Meister Martins Coelho 212

Microneedling: a review
Microagulhamento: uma revisão
Adriana da Silva Ferreira; Daniella Leiros Aita; Meire Aparecida Muneratto 228

CASE REPORTS / RELATOS DE CASO

Reverse frontal lifting: alternative for the treatment of pachydermoperiostosis
Lifting frontal reverso: alternativa para o tratamento da paquidermoperiostose
Ronaldo Pontes; Amanda Figueira Bussade; Márcia de Queiroz Araújo Gomes; Luis Alejandro Vargas Guerrero; Gisela Hobson Pontes 235

Lyell syndrome in 72% of the body surface
Síndrome de Lyell em 72% de superfície corporal
José Augusto Pupio Reis Júnior; Rita de Cássia Neves Noronha; Carlos Cunha Oliveira; Carla Elvira Araújo da Silva; Rogério de Oliveira Ribeiro 240

Trochanteric dermolipectomy in a patient after bariatric surgery: case report
Dermolipectomia trocantérica em paciente pós-cirurgia bariátrica: relato de caso
Mariana Fernandes; Osvaldo Saldanha; Osvaldo Saldanha Filho; Renato Giannini Neto; Carlos Goyeneche Montoya; Beatriz Yaedu; Rodrigo Inácio Fernandes; Vanessa Ludmilla Moretto 249

Surgical treatment of infantile nasal and labial hemangioma in the involuted phase: a case report
Tratamento cirúrgico de hemangioma infantil nasal e labial na fase involuída: relato de caso
Monique Mendes; Rodolfo Costa Lobato; Luiz Carlos Ishida; Rolf Gemperli 254

LETTER TO THE EDITOR / CARTA AO EDITOR

Increased projection of the nasal tip with "pseudo-flaps" obtained from lateral cephalic excesses of the alar cartilages
Aumento da projeção da ponta nasal com "pseudo-retalhos" obtidos dos excessos cefálicos laterais das cartilagens alares
Fabiano Calixto Fortes Arruda; Paulo Renato Simmons de Paula; Marcelo Prado; Antônio Roberto Bozola .....
.....258

The risks of rapid publications during the Covid-19 pandemic

Os riscos das publicações rápidas durante a pandemia de Covid-19

During Covid-19 pandemic, a number of scientific articles has been submitted in scientific journals. Studies with diverse scientific qualities and levels of evidence have been sent to the most renowned journals, seeking to disseminate original findings, corroborate known premises or reveal to the world potential cures for this new disease.

The need to speed up scientific information regarding diagnosis, treatment, management and outcomes, of Covid-19, has put pressure on scientific journals to accelerate their editorial processes.

Although it can represent a positive opportunity for processing improvement (simplification of processes, agility, improvement of electronic means and speed between submission and publication), a hidden danger emerges and is directly related to publications made withoutpeer review.

In this short period of a few months, it was possible to witness the dissemination of relevant scientific findings - published in journals with a high impact index - subsequently denied after analysis by expert reviewers on the respective subjects.

The danger of skipping stages is well known in the scientific community, and which is why numerous requirements have been created and must be respected, under penalty of summary refusal of a submission. This condition includes the need to submit studies to approval by ethics committees, information on the role of each co-author in the study and the use of consent form in clinical studies. On author's view, scientific security of a study only increases the chances of publication with credibility. So, this is a good thing.

The need of content revision by experienced reviewers without any kind of scientific bias is also a positive point to increase the quality of studies. Reviewers must be exempt, enjoy reading and teaching, helping the progress of science, without negative feelings. The ideal condition for a review is that it is carried out without knowledge of the authorship, by an odd number of reviewers (greater than 1, obviously) offering constructive comments on design, content and conclusions.

The rush to disseminate information cannot overcome scientific dignity. The so-called scientific exceptionalism cannot be ahead of the 5 correct principles of research, as mentioned by London and Kimmelman in a recent article published in the journal Science[1], which are: importance of the study, adequate design, analytical integrity, complete report of the study and viability.

Publication without revision in the so-called pre-print mode has been used to disseminate studies even before their formal acceptance. According to ASAPbio1, an initiative led by scientists in favor of the use of preprints in the life sciences[2], "A preprint is a complete scientific manuscript that is placed by the authors on a public server. The preprint contains complete data and methodologies; it is often the same manuscript that is being submitted to a journal (...). After a brief inspection of quality control to ensure that the work is of a scientific nature, the author's manuscript is published on the Web within approximately one day without undergoing peer review and can be viewed free of charge by anyone in the world ". It is clear that there is a risk in accepting information from these studies as "absolutely reliable". Likewise, publishing without reviewing can cause permanent risks to a scientific journal. In addition to compromise the credibility of important scientific journals, it causes confusion in the recommendations and, as we know, the denial never has the same impact as the first news, and can keep false information permanently. The website *retractionwatch.com*[3], as an example, lists from January to

DOI:10.5935/2177-1235.2020RBCP0024

June 2020, 25 articles published about Covid-19 that had retractions, permanent (22) or temporary (3). These articles included 14 published articles, 9 pre-printed articles, 1 letter and 1 event communication. Some of these publications took place in the most renowned scientific journals worldwide.

There are ethical ways to accelerate the dissemination of clinical research, its ideas and results. The best example is the dissemination in electronic media of articles accepted and not yet addressed to specific issues of a journal. Traditionally known as "ahead of print", they allow a fast appearance in the scientific world with virtually all the relevance of an article already published.

The desire to first publish new information can never go beyond the ethical limits of scientific publication. This is our goal and will always be our rule.

Dov Goldenberg
Editor-In-Chief - BJPS

REFERENCES

1. London AJ, Kimmelman J. Against pandemic research exceptionalism. Science. 2020;368(6490):476-7. DOI: https://doi.org/10.1126/science.abc1731
2. ASAPbio (US). Preprint info center. What is a preprint? [Internet]. San Francisco: ASAPbio; 2016; [acesso em 2017 Feb 16]. Disponível em: http://asapbio.org/preprint-info
3. Retraction Watch (CHN). Retracted coronavirus (COVID-19) papers [Internet]. China: Retraction Watch; 2020; [acesso em 2020 Jul 08]. Disponível em: https://retractionwatch.com/retracted-coronavirus-covid-19-papers/

Original Article

Fistula after primary palatoplasty: consensus among plastic surgery and Speech-Language Pathology

Fístula após palatoplastia primária: consenso entre profissionais da cirurgia plástica e da fonoaudiologia

MAHYARA FRANCINI JACOB [1]
GABRIELA APARECIDA PREARO [2]
TELMA VIDOTTO DE SOUSA BROSCO [1]
HAGNER LUCIO DE ANDRADE SILVA [1]
JENIFFER DE CASSIA RILLO DUTKA [1,2]

■ **ABSTRACT**

Introduction: The identification of complications of primary palatoplasty may vary among professionals from different areas of health due to the lack of standardization of the fistula classification. This study aimed to verify the consensus among professionals of plastic surgery (PC) and Speech-Language Pathology (SLP), regarding the occurrence of fistula, according to what was reported in the same craniofacial service. **Methods:** Analysis of the chart's records of the areas of the PC and SLP of 466 patients with cleft lip and palate was performed about the presence and location of fistula about the presence and location of fistulas, as reported in 466 medical records of patients with a history of unilateral cleft lip and palate. To compare the findings between both areas, a gold standard classification for the occurrence of fistula (GSF) was established by an experienced plastic surgeon. **Results:** The PC area reported that 25% of the 466 patients had a fistula compared to the 37% reported by the SLP, while the GSF indicated fistula in 35% of the cases. The Kappa statistic reveals regular agreement between GSF and PC (r = 0.32) and substantial agreement between GSF and SLP (r = 0.63). **Conclusion:** There was a discrepancy between the areas of Speech-Language Pathology and plastic surgery regarding the occurrence and location of the fistula after primary palatoplasty in the same craniofacial center. The data indicates the need to create and implement a standardized fistula classification system. In this way, craniofacial teams can use it effectively, taking advantage of the scientific evidence that emerges from the results of cleft lip and palate treatment.

Keywords: Cleft palate; Oral fistula; Medical records; Plastic surgery; Speech Therapy.

Institution: Hospital de Reabilitação de Anomalias Craniofaciais, Universidade de São Paulo, Bauru, SP, Brazil.

Article received: June 27, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0025

[1] Hospital de Reabilitação de Anomalias Craniofaciais, Universidade de São Paulo, Bauru, SP, Brazil.
[2] Universidade de São Paulo, Bauru, SP, Brazil.

■ **RESUMO**

Introdução: A identificação de complicações da palatoplastia primária pode variar entre profissionais de diferentes áreas da saúde, devido à falta de padronização da classificação de fístula. Este estudo teve o objetivo de verificar o consenso entre profissionais da cirurgia plástica (CP) e da fonoaudiologia (FGA), quanto à ocorrência de fístula, conforme reportado em um mesmo serviço craniofacial. **Métodos:** Foi realizada uma análise dos registros das áreas da CP e FGA quanto à presença e localização de fístulas, conforme reportado em 466 prontuários de pacientes com história de fissura transforame incisivo unilateral. Para comparar os achados entre ambas as áreas uma verificação padrão ouro da ocorrência de fístula (POF) foi estabelecida por um cirurgião plástico experiente. **Resultados:** A área da CP reportou que 25% dos 466 pacientes apresentaram fístula comparado à 37% reportado pela FGA, enquanto o POF indicou fístula em 35% dos casos. Estatística Kappa revela concordância regular entre POF e CP (r=0,32) e concordância substancial entre POF e FGA (r=0,63). **Conclusão:** Observou-se discordância entre as áreas da fonoaudiologia e da cirurgia plástica quanto à ocorrência e localização da fístula após a palatoplastia primária, em um mesmo centro craniofacial. Os dados apontam para a necessidade da criação e da implementação de um sistema de classificação de fístula padronizado, que possa ser utilizado de forma efetiva por equipes craniofaciais favorecendo evidências científicas dos resultados do tratamento da fissura labiopalatina.

Descritores: Fissura palatina; Fístula bucal; Registros médicos; Cirurgia plástica; Fonoaudiologia.

INTRODUCTION

Among the complications after primary palatoplasty, one of the most discussed in the literature, is the formation of oronasal fistulas[1-6]. In the literature, it is observed that the occurrence of palate fistula is widely variable, ranging from authors who report the absence of these complications (0%) to those that indicate a 78% occurrence of palate fistula after primary palatoplasty[7,8]. The wide variation in the occurrence of fistula reflects the diversity of protocols for primary surgical correction of the clef lip and palate. However, it can also be related to the lack of consensus regarding terminology and the classification of fistula according to what is reported by professionals from different areas of health[9].

The terminology found in the literature to classify fistula is quite varied. Studies report that fistulas located on the primary palate (anterior to the incisive foramen), for example, can be called palate fistula, anterior palate fistula, labial alveolar fistula, lingual alveolar fistula and also vestibular fistula[5,10-12]. Fistulas located on the secondary palate (or posterior to the incisive foramen), in turn, can also be called palate fistulas, observing variation in terminology according to the affected region (hard palate fistula, transition fistula between the hard palate and soft palate, soft palate fistula)[2,3,5,12,13].

Fistula classification systems involving a systematic approach to document the occurrence and location of the fistula have been described in the international literature[4,14]. An acceptable level of agreement between evaluators in identifying fistula, however, can be challenging to achieve even when a standardized protocol is implemented[12]. Characterizing aspects where there is a lack of consensus among evaluators during fistula identification is essential for the development of a standardized classification protocol, and that it can be implemented in Brazilian craniofacial services in order to provide a systematic documentation of the results of primary palatoplasty[11].

OBJECTIVE

This study aimed to verify the consensus among plastic surgery (PC) and Speech-Language Pathology (SLP) professionals regarding the occurrence of fistula in the same craniofacial service.

METHODS

The study was approved by the institution's Human Research Ethics Committee under number 1,337,917. This study involved an analysis of the presence and location of fistulas in data in the medical records of 466 patients. The medical records studied belonged to patients with unilateral cleft lip and palate, without syndromes or associated malformations, of both sexes, who underwent primary palatoplasty in a single stage by the surgical techniques of von Langenbeck or Furlow. The primary palatoplasties of the studied group were performed between 1996 and 2004. The reports of the occurrence of fistula of interest for this study were obtained during the clinical evaluation and recorded in the post-surgical evaluation protocols in the patients' medical records, as is routinely performed at the research institution in the areas of PC and SLP. For this study, records of fistula up to three years after primary palatoplasty were included. (by the PC area, by the SLP area or by both areas).

In this work, dehiscence records (partial or total) were treated as a fistula. The survey of data contained in the post-surgical evaluation forms of plastic surgery gave rise to the registration of the occurrence of fistula by the PC area. However, the survey of the data contained in the speech therapy assessment protocol gave rise to the registration of the occurrence of fistula by the area of the SLP.

Clinical record of fistula by plastic surgery

The post-surgical evaluation protocol in the area of plastic surgery, in force during the period studied, was applied by the plastic surgeon who performed a face-to-face assessment based on an oral inspection of the areas of the hard and soft palate after primary palatoplasty. The oral inspection was performed with the use of a flashlight to illuminate the evaluated area and a spatula to lower the tongue and allow visualization of the entire soft palate. When observing on the palate a region suggestive of false fistula (false-bottom) or hidden fistula, the diagnostic tests performed by the professional included: a) lighting with the flashlight to check the projection of the light in the nasal area; b) palpation/manipulation of the irregular area of the palate, seeking to verify false-bottom in recesses of tissue; c) use of air injection in the area (using dental equipment) to check the passage of air to the nostrils through the patient's report or observation of bubble.

Data were recorded in person by the plastic surgeon in the post-surgical evaluation protocol for plastic surgery, including the following observations: registration of the method for closing the anterior palate and the soft palate (relaxing incisions; vomerian flap, pharyngeal flap, others); transoperative complications (flap fraying, suture under tension; review of hemostasis and others) and postoperative complications (fistula or dehiscence; infection and others). In cases of fistula, the evaluation protocol also requested an indication of the affected area and the drawing of the occurrence in a diagram of the palate (as shown in the evaluation form). From the post-surgical evaluation protocol for the PC area, therefore, the presence and location of the fistula in the palate for the present study are identified.

Clinical record of fistula by Speech-Language Pathology

The speech therapy evaluation protocol, in effect during the period studied, was applied by a speech therapist on the same day that the post-surgical PC evaluation protocol was applied. For inclusion in the study, therefore, all patients had their PC and SLP assessments performed in person on the same day, independently for each area.

During the evaluation, the speech therapist performed an inspection of the areas of the hard and soft palate using a flashlight to illuminate the evaluated area and a spatula to lower the tongue in order to visualize the entire soft palate, including the uvula. In cases of identification of an area suggestive of a false or hidden fistula, the Speech-Language Pathologist referred the patient for diagnostic testing of lighting, palpation, and/or air injection by the plastic surgeon.

The data were recorded in person by the Speech-Language Pathologist. The evaluation protocol included the following information regarding the fistula: absent; vestibular on the right; vestibular on the left; on the hard palate; on the soft palate; in the transition region from the hard palate to the soft palate. In the SLP area assessment protocol; therefore, the registration of the presence and location of the fistula was identified for the present study.

Gold standard classification for the occurrence of fistula (GSF)

Once the data of the protocols of the areas of the PC and the SLP were collected, there was a divergence in the records between the areas, and it was decided to apply a gold standard assessment of the occurrence of fistula (GSF). For the GSF assessment, a fistula was defined as a failure of healing or a rupture of the suture, observed after primary repair of the palate. That is, after an attempt to repair the tissues in the area of the cleft palate, the unwanted opening of the sutures occurred.

The GSF evaluation was performed by a single professional in the field of plastic surgery, with over

30 years of clinical experience in surgical correction of the palate and in the post-palatoplasty evaluation. The GSF was not performed in person and was based on the analysis of all records documented in the medical records about fistula and also on the analysis of photographic images of the fistula, when existing. It should be noted, however, that at the time of the post-surgical evaluation of the studied cases, the photographic records of the fistulas, although indicated, were not made in a standardized way and were not obtained for all cases. The photographs in the institutional collection were taken by the institution's photographer and not by professionals from the areas of PC and SLP, and these images were used in a complementary way to the survey of fistula records in the medical record.

In the medical record, all existing documentary protocols were consulted where the occurrence of fistula could be registered. That is, in addition to the consultation carried out in the PC and SLP protocols (objects of this work), documentation from other areas (nursing, pediatrics and dentistry) was analyzed. For the analysis of the photographs, the plastic surgery professional who performed the GSF evaluation used the incisive foramen (IF) as an anatomical landmark[1] and grouped the fistulas according to their location concerning the IF, indicating, therefore, if the occurrences were before or after the IF.

The findings obtained from the analysis of all documentary records in the medical record plus the findings from the analysis of existing photographs were combined to establish the gold standard assessment of the occurrence of fistula (GSF). GSF was the tool used as a reference for interpreting the findings recorded individually in the protocols of the areas of PC and SLP, allowing researchers to corroborate and compare the findings of this study. According to the GSF, 466 patients were grouped into four categories regarding the existence and location of a fistula after primary palatoplasty, including Group 1: patients who did not present a fistula (N = 302; 65%); Group 2: patients with fistulas located in the area anterior to the incisive foramen (N = 91, 20%); Group 3: patients with fistulas located in the area posterior to the incisive foramen (N = 43; 9%); Group 4: patients with fistulas covering the area before and after the incisive foramen (N = 30; 6%). That is, while the majority of patients did not have a fistula (65%), a total of 164 (35%) patients had some type of fistula on the palate, as indicated in the GSF. Of the 164 fistulas identified in the GSF assessment, 78 (17%) occurred in patients who received the Furlow procedure, and 86 (18%) occurred in patients who received the von Langenbeck procedure. However, it should be noted that data on the transversal amplitude of the fissure, on the surgical technique, and the surgeon in primary palatoplasty was not the object of this study.

The data presented below include the percentages of occurrence of fistula reported by the areas of PC, ST, and GSF. The concordance between the findings was verified with Kappa statistics.

RESULTS

When analyzing the data obtained in the records of the PC area, it was observed that the surgeons reported that 275 patients (59%) did not present fistulas, 117 patients (25%) presented some type of fistula and 74 patients (16%) did not present records about the presence or absence of fistula (no data). Of the 117 patients who had fistula reported by the PC, 48 patients (10%) did not indicate the location (incomplete data), 31 patients (7%) had fistulas in the region before the IF, 32 patients (8%) had a fistula in the region after IF and six patients (1%) presented fistulas involving both regions, before and after IF.

The same analysis was done for the records in the area of the SLP, observing that the speech therapists reported 295 patients (63%) without fistulas and 171 patients (37%) with some type of fistula. Of the 171 patients who presented a fistula, 69 patients (15%) did not indicate the location (incomplete data), 73 patients (15.6%) were fistulas in the region before the IF, 27 patients (6%) were fistulas in the posterior region at IF, and two patients (0.4%) were fistulas involving the two regions, anterior and posterior to IF.

As shown in Table 1, the gold standard assessment of the occurrence of fistula (GSF) identified fistula in 164 patients (35% of the cases studied), differing from the area of speech therapy and plastic surgery, which reported 171 (37%) and 117 (25%) cases with fistula, respectively. That is, when the findings reported in the specific protocol for plastic surgery were considered, the occurrence of fistula was 10% less than the occurrence observed in GSF. Furthermore, when considering the findings reported in the specific speech therapy protocol, the occurrence of fistula was 2% higher than the occurrence observed in GSF.

It was also observed that the indication of the location of the fistula (before or after the IF) was not possible for 48 cases evaluated by the PC due to incomplete data. That is, 10% of the fistulas identified by the PC did not indicate the place of occurrence (incomplete data). Also, analyzing the findings of PC, it was found that 74 patients (16%) had no record regarding the absence or presence of fistula (no data). The data collected in the SLP protocols, in turn, did not allow the identification of the location of the fistula for 69 (15%) cases due to incomplete data. There was no

Table 1. Presence and location of fistulas in the records of professionals in plastic surgery (PC), Speech-Language Pathology (SLP), and in the gold standard assessment of the occurrence of fistula (GSF).

N=466	Without Fistula	Total Fistula	Fistula anterior to the IF	Fistula posterior to the IF	Anterior and posterior IF	Incomplete Data	No Data
PC	275 (59%)	117 (25%)	31 (6%)	32 (7%)	6 (2%)	48 (10%)	74 (16%)
SLP	295 (63%)	171 (37%)	73 (16%)	27 (5%)	2 (1%)	69 (15%)	0
GSF	302 (65%)	164 (35%)	91 (20%)	43 (9%)	30 (6%)	0	0

IF: Incisive foramen; PC fistula: 31 + 32 + 6 + 48 = 117; SLP fistulas: 73 + 27 + 2 + 69 = 171; GSF fistulas: 91 + 43 + 30 = 164.

case without information about the presence or absence of a fistula in the evaluation of the SLP.

The agreement and disagreement between the GSF, PC, and SLP findings were presented in percentages and compared with Kappa statistics. The data reported in Table 2 indicate that the findings regarding the identification and location of fistula reported in the medical records by plastic surgeons agreed with the GSF assessment in 59.7% of the cases. In comparison, the records of speech therapists agreed with the GSF assessment in 79.6% % of cases. According to the Kappa statistic, there was a regular agreement between the GSF and the reports in the PC area (r = 0.32) and a substantial agreement between the GSF and the reports in the SLP area (r = 0.63).

It is noted that the highest percentage of agreement between professionals in the areas of PC and SLP with GSF, was observed for cases where there was no fistula, with 77.2% for the PC area and 94.4% for the SLP area. The highest percentage of disagreement with the GSF was for the group of fistulas that involved both the anterior and posterior areas of the IF, 83.3% for the PC area, and 96.6% for the SLP area.

DISCUSSION

The data in the present study reflect disagreement between the areas of plastic surgery and speech therapy, in the same craniofacial center, when reporting the occurrence and location of a fistula after primary palatoplasty. The difficulty in interpreting data from medical records and the lack of information regarding the occurrence or location of a fistula justified these findings and was mentioned in other studies [4,5,10,11,13,15,16].

Comparing the findings about the occurrence of fistula observed in this study with the findings reported in the literature is a complex task, since, according to the area of PC, a total of 25% of the 466 patients had a fistula, and according to the area of the SLP a total of 37% had a fistula. The GSF evaluation, in turn, suggested that a total of 35% of the cases had a fistula. This disagreement can be explained both by the lack of data and by the incomplete data aggravated by the disagreement as to the terminology to indicate the location of the fistula.

Since these are patients with transforamenal cleft, it was expected that the highest incidence of fistula would occur in the pre-foramen incisor region, which was documented in this study by the SLP area and the GSF assessment. The area of PC, in turn,

Table 2. Percentage of agreement and disagreement between the findings of plastic surgery (PC), Speech-Language Pathology (SLP), and the gold standard assessment of the occurrence of fistula (GSF).

Areas GSF	Plastic surgery (r=0,32)		Speech-Language Pathology (r=0,63)	
	PC Agree	PC Disagree	SLP Agree	SLP Disagree
Without Fistula (N=302)	233 (77.2%)	69 (22.8%)	285 (94.4%)	17 (5.6%)
Fistula anterior to the IF (N=91)	19 (20.9%)	72 (79.1%)	65 (71.4%)	26 (28.6%)
Fistula posterior to the IF (N=43)	21 (48.8%)	22 (51.2%)	20 (46.5%)	23 (53.5%)
Anterior and posterior IF (N=30)	5 (16.7%)	25 (83.3%)	1 (3.3%)	29 (96.6%)
Total	278 (59.7%)	188 (40.3%)	371 (79.6 %)	95 (20.4%)

IF: Incisive Foramen; *r: Kappa.*

does not always consider the pre-foramen fistula to be a surgical complication, since the "intentional fistula" may be the result of a clinical decision taken at the time of surgery depending on the width of the cleft palate and the surgical procedure performed, which justifies, in part, the absence of data for 74 patients observed in the protocols completed by the PC area. It should be noted, even when the pre-foramen fistula affects only the vestibular region, the inspection exam and intraoral photographs may not be sufficient for the correct identification of this type of fistula. A standardized, systematic, and consecutive documentation of the results of the surgeries, therefore, must be established by the interdisciplinary team, as it is essential and necessary for the identification of surgical complications.

The task force known as "Task Force Beyond Eurocleft"[17], reports the importance of multicentric studies (national and international) to document the results of the management of cleft lip and palate, so that scientific evidence can be established to substantiate the use of treatment protocols with acceptable results worldwide. The absence of a standardized and validated protocol for documenting complications after primary surgeries in cleft lip and palate in Brazil, in some way, justifies the existence of conflicting reports. Also, it makes the performance of comparative studies between different craniofacial centers a complicated task.

The gold standard assessment of the occurrence of fistula used as a tool to compare the findings of this study should be considered with caution, since, in addition to not being an assessment performed in person, it considered data from various areas of the medical record (in addition to the PC and ST) combined with the photo analysis findings. It should also be noted that intraoral photographs were not obtained for all cases (with a fistula and also without a fistula). That is, all 466 cases should have intraoral photographic images obtained using a standardized protocol and with quality control. The lack of a single terminology and a standardized post-surgical evaluation protocol and used in consensus by the areas of PC and ST, therefore, justifies the divergence found in this study.

In addition to the methodological limitations concerning photographic images that were not obtained for all 466 cases and the fact that the GSF assessment was not performed in person, it is also noted that information on the transversal width of the fissure and the surgeon in the primary palatoplasty was not the subject of this study.

Regardless of the limitations existing in the methodology implemented in the present study, the present data showed the lack of consensus regarding the reports of fistula, suggesting that a systematic and adequate documentation of the results of the primary palatoplasty will only be possible based on a reliable record of the clinical findings registered interprofessionally, in person and also with photographic images registration. It is suggested, therefore, the need to establish and validate a fistula classification protocol, which can be applied both during the face-to-face oral inspection and from the analysis of intraoral photographs (which must be obtained for all cases: with and without fistula).

CONCLUSION

In this study, there was a discrepancy between the areas of speech therapy and plastic surgery regarding the occurrence and location of the fistula after primary palatoplasty in the same craniofacial center. The data point to the need for adjustments in the evaluation protocols that take into account the terminology and location of the fistula.

It is suggested to be essential to create and implement a standardized fistula classification system, which can be used effectively, consecutively and systematically, by craniofacial teams, in order to provide multicenter studies that can establish scientific evidence of the results of the treatment of the cleft lip and palate.

COLLABORATIONS

MFJ Analysis and/or data interpretation, conception and design study, data curation, final manuscript approval, formal analysis, methodology, project administration, writing - original draft preparation, writing - review & editing.

GAP Analysis and/or data interpretation, data curation, final manuscript approval, writing - original draft preparation, writing - review & editing.

TVSB Analysis and/or data interpretation, data curation, final manuscript approval, writing - original draft preparation, writing - review & editing.

HLAS Analysis and/or data interpretation, data curation, final manuscript approval, methodology, writing - review & editing.

JCRD Analysis and/or data interpretation, conception and design study, final manuscript approval, formal analysis, project administration, supervision, writing - original draft preparation, writing - review & editing.

REFERENCES

1. Williams WN, Seagle MB, Pegoraro-Krook MI, Souza TV, Garla L, Silva ML, et al. Prospective clinical trial comparing outcome measures between Furlow and von Langenbeck palatoplasties for UCLP. Ann Plast Surg. 2011 Feb;66(2):154-63.
2. Deshpande GS, Campbell A, Jagtap R, Restrepo C, Dobie H, Keenan HT, et al. Early complications after cleft palate repair: a multivariate statistical analysis of 709 patients. J Craniofac Surg. 2014 Sep;25(5):1614-8.
3. Hardwicke JT, Landini G, Richard BM. Fístula incidence after primary cleft palate repair: a systematic review of the literature. Plast Reconstr Surg. 2014 Oct;134(4):618e-27e.
4. Smith DM, Vecchione L, Jiang S, Ford M, Deleyiannis FW, Haralam MA et al. The Pittsburgh fistula classification system: a standardized scheme for the description of palatal fistulas. Cleft Palate Craniofac J. 2007 Nov;44(6):590-4.
5. Winters R, Carter JM, Givens V, SLP Hilaire H. Persistent oronasal fístula after primary cleft palate repair: minimizing the rate via a standardized protocol. Int J Pediatr Otorhinolaryngol. 2014 Jan;78(1):132-4.
6. Muzaffar AR, Byrd HS, Rohrich RJ, Johns DF, LeBlanc D, Beran SJ, et al. Incidence of cleft palate fístula: an institutional experience with two-stage palatal repair. Plast Reconstr Surg. 2001 Nov;108(6):1515-8.
7. Xu JH, Chen H, Tan WQ, Lin J, Wu WH. The square flap method for cleft palate repair. Cleft Palate Craniofac J. 2007 Nov;44(6):579-84.
8. Mak SY, Wong WH, Or CK, Poon AM. Incidence and cluster occurrence of palatal fistula after furlow palatoplasty by a single surgeon. Ann Plast Surg. 2006 Jul;57(1):55-9.
9. Bykowski MR, Naran S, Winger DG, Losee JE. The rate of oronasal fistula following primary cleft palate surgery: a meta-analysis. Cleft Palate Craniofac J. 2015 Jul;52(4):e81-7.
10. Eberlinc A, Koželj V. Incidence of residual oronasal fistulas: a 20-year experience. Cleft Palate Craniofac J. 2012 Nov;49(6):643-8.
11. Passos VAB, Carrara CFC, Dalben GS, Costa B, Gomide MR. Prevalence, cause, and location of palatal fistula in operated complete unilateral cleft lip and palate: retrospective study. Cleft Palate Craniofac J. 2014 Mar;51(2):158-64.
12. Richardson S, Agni NA. Palatal fistulae: a comprehensive classification and difficulty index. J Maxillofac Oral Surg. 2014 Sep;13(3):305-9.
13. Diah E, Lo LJ, Yun C, Wang R, Wahyuni LK, Chen YR. Cleft oronasal fistula: a review of treatment results and a surgical management algorithm proposal. Chang Gung Med J. 2007 Nov/Dec;30(6):529-37.
14. Fayyaz GQ, Gill NA, Ishaq I, Aslam M, Chaudry A, Ganatra MA, et al. Pakistan comprehensive fistula classification: a novel scheme and algorithm for management of palatal fístula/dehiscence. Plast Reconstr Surg. 2019 Jan;143(1):140e-51e.
15. Phua YS, Chalain T. Incidence of oronasal fistulae and velopharyngeal insufficiency after cleft palate repair: an audit of 211 children born between 1990 and 2004. Cleft Palate Craniofac J. 2008 Mar;45(2):172-8.
16. Ahmed MK, Maganzini AL, Marantz PR, Rousso JJ. Risk of persistent palatal fistula in patients with cleft palate. JAMA Facial Plast Surg. 2015 Mar/Apr;17(2):126-30.
17. Semb G. International Confederation for cleft lip and palate and related craniofacial anomalies task force report: beyond Eurocleft. Cleft Palate Craniofac J. 2014 Nov;51(6):e146-55.

***Corresponding author:** **Jeniffer de Cassia Rillo Dutka**
Rua Silvio Marchione, nº3-20 - Vila Nova Cidade Universitária, Bauru, SP, Brazil
Zip Code: 17012-900
E-mail: jdutka@usp.br

Original Article

Reconstruction of nasal defects using the Rieger flap

Reconstrução de defeitos nasais utilizando o retalho de Rieger

FILIPE LOPES DECUSATI [1]*
ANTÔNIO EGIDIO RINALDI [1]

■ **ABSTRACT**

Introduction: the reconstruction of skin defects in the distal part of the nose is always a challenge. The dorsal nasal flap, initially described by Gillies, was unveiled when Rieger, in 1967, described the use of a modified rotation flap that used the redundant skin of the glabella to repair full-thickness defects of the lower half of the nose of equal or greater size of 2 cm, allowing reconstruction in a single surgical time. **Methods:** A retrospective study was carried out, selecting patients who had basal cell carcinoma, in the middle and/or lower third of the nose, who were treated at the Plastic Surgery outpatient clinic of the Plastic Surgery Service Prof. Dr. Oswaldo de Castro, in the period from 2017 to 2019. **Results:** The total number of patients was six, with ages ranging from 64 to 95 years, with an average of 80.67 years. Five of these patients were male, with only one female. There were no complications during or after the procedures. Also, there were no cases of infection, bleeding, hematoma, dehiscence, or necrosis of the flap. **Conclusion:** the Rieger flap is a good option for cases of reconstruction of defects located in the lower half of the nose; it is performed in a single moment, is easy to perform, and has a high level of patient satisfaction. It provides an adequate result aesthetics of the reconstructed area, in texture and color, through the use of specific tissues for the nasal covering.

Keywords: Surgical flaps; Nose; Reconstructive surgical procedures; Nose neoplasms; Carcinoma, Basal cell.

Institution: Instituição: Clínica Plastiquè, Tatuapé, São Paulo, SP, Brazil.

Article received: December 10, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0026

[1] Serviço de Cirurgia Plástica Prof. Dr. Oswaldo de Castro, Cirurgia Plástica, São Paulo, SP, Brazil.

■ **RESUMO**

Introdução: A reconstrução de defeitos cutâneos na porção distal do nariz sempre é um desafio. O retalho de dorso nasal, originalmente descrito por Gillies, ficou conhecido quando Rieger, em 1967, descreveu o uso de um retalho de rotação modificado que utilizava a pele redundante da glabela para reparar defeitos de espessura total da metade inferior do nariz com tamanho igual ou menor a 2cm, permitindo a reconstrução em somente um tempo cirúrgico. **Métodos:** Um estudo retrospectivo foi realizado, selecionando pacientes que foram atendidos no ambulatório de Cirurgia Plástica do Serviço de Cirurgia Plástica Prof. Dr. Oswaldo de Castro, no período de 2017 a 2019, que apresentavam carcinoma basocelular, em região de terço médio e/ou inferior do nariz. **Resultados:** O número total de pacientes foi de seis, com idade variando entre 64 a 95 anos, com média de 80,67 anos. Cinco destes pacientes eram do sexo masculino, sendo somente uma do sexo feminino. Não houve intercorrências durante ou após os procedimentos. Ainda, não ocorreram casos de infecção, sangramento, hematoma, deiscência ou necrose do retalho. **Conclusão:** O retalho de Rieger é uma boa opção para casos de reconstrução de defeitos localizados em metade inferior do nariz, sendo realizado em tempo único, de fácil execução e com alto nível de satisfação dos pacientes, fornecendo um adequado resultado estético da área reconstruída, em textura e cor, por utilizar tecidos próprios da cobertura nasal.

Descritores: Retalhos cirúrgicos; Nariz; Procedimentos cirúrgicos reconstrutivos; Neoplasias nasais; Carcinoma basocelular.

INTRODUCTION

Reconstructing skin defects on the distal portion of the nose is always a challenge. Irregularities in color, texture, skin thickness and contour are easily noticeable[1,2]. The dorsal nasal flap, initially described by Gillies in 1920[3], became known when Rieger in 1967[4] described the use of a modified rotation flap that used the redundant skin of the glabella to repair full-thickness defects of the lower half of the nose 2 cm or less, allowing reconstruction in a single surgical time[2,4]. Initially, the flap was randomized; however, Marchac, 1970[5], modified it, creating an axial pattern based on angular artery perforators. Several other authors published modifications to the technique, allowing its refinement.

OBJECTIVE

The objective of this work is to demonstrate a series of six cases of reconstruction of nasal defects using the Rieger flap, performed by Prof. Dr. Oswaldo de Castro Plastic Surgery Service, during the period from 2017 to 2019.

METHODS

A retrospective study was carried out, selecting medical records of patients who had basal cell carcinoma in the region of the middle and/or lower nose and who were treated at the private office of Plastic Surgery of the Prof. Dr. Oswaldo de Castro, under the coordination of Dr. Antônio Egidio Rinaldi, in the period from 2017 to 2019.

The term of free and informed consent was applied to all patients, including authorization for the dissemination and use of images for academic purposes. The study followed the principles of the Declaration of Helsinki and Resolution 466/2012 of the National Health Council.

After resection of the nasal tumor, a rotation flap is made with its pedicle laterally based on the branches of the angular artery, with a relaxation line. From the created defect, a curvilinear line is drawn that passes at the transition between the nasal wall of the nose and the cheek, then extends superiorly to the region of the glabella. The glabellar extension should correspond approximately 1 ½ times the vertical height of the defect (Figure 1).

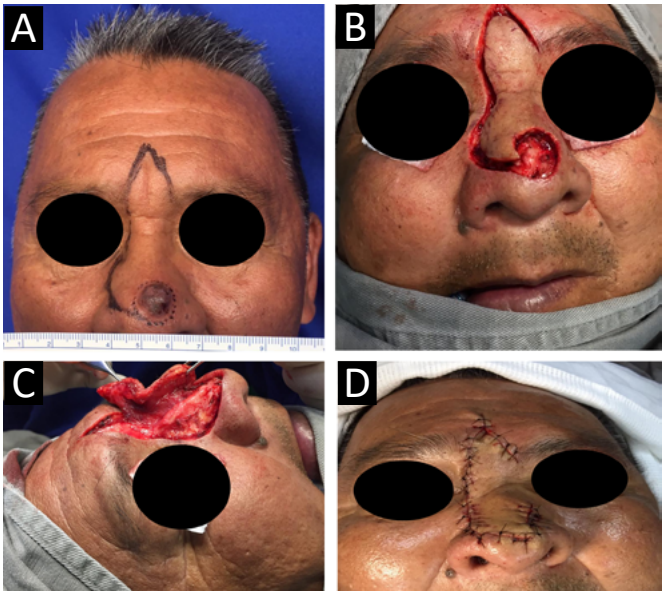


Figure 1.A. Patient 2: 1 cm diameter nasal tip lesion with a Rieger flap design, which is a modified nasal dorsal flap based on the branches of the angular artery. **B.** Resected skin tumor and flap release.**C.** Elevated flap: the glabellar portion is dissected in the subcutaneous plane and the nasal portion in the submuscular plane. **D.** Immediate postoperative result after flap rotation and fixation.

After infiltrating a local anesthetic solution containing 2% lidocaine plus epinephrine at a concentration of 1: 200,000 IU, the flap area in the glabellar region is elevated in the subcutaneous plane and the others in the submuscular plane. After release and rotation, it is essential to check for differences in skin thickness and significant distortions in the wings and nasal tip. Simple stitches with mono nylon 5- 0 are used to secure the flap, and the donor area in the glabella is closed by primary suturing, and a V-Y advance may be necessary. The sutures are removed after seven days.

RESULTS

The total number of patients was six, with ages ranging from 64 to 95 years, with an average of 80.67 years. Five of these patients were male, with only one female (Table 1).

The size of the defects varied from 1.5 to 3 cm, with an average of approximately 2.0 cm. Patient 2 presented an injury that extended beyond the lower third of the nose, which involved the entire lower half, requiring a nasogenian flap to complement the closure of the defect superiorly (Figure 2). Furthermore, patient 3 presented a lesion in the right malar region, where the open area was closed with an advancement flap (Figure 3).

There were no complications during or after the procedures. Besides, there were no cases of infection, bleeding, hematoma, dehiscence, or necrosis of the flap. Even so, all the pathological examinations showed surgical margins free of neoplasia. No case required a second surgical procedure for refinement. The patients, without exception, were satisfied with the aesthetic result, a question asked during each postoperative consultation (Figures 4, 5 and 6).

DISCUSSION

The nose is the most exposed aesthetic unit of the face, with the lower part of the nose being the most vulnerable to ultraviolet radiation and trauma. Any irregularities in the color, texture, thickness, and contour of the skin in this region are easily noticed. Furthermore, the intense activity of the sebaceous glands in these areas produces an increase in scar tissue. Therefore, the defects located in this region, the nasal tip and the alar region, are the most difficult during reconstruction[1,6,7].

The Rieger flap is a modified rotation flap that uses the redundant skin of the glabella, with its pedicle laterally based on the medial corner of the eye, allowing reconstruction by recruiting adjacent tissues that have similar characteristics, easily and fast. It is also performed in a single surgical time, lasting approximately 30 to 50 minutes, and only local anesthesia can be used, with a high level of patient satisfaction, being an alternative to the paramedian flap[2,8].

The Rieger flap is better indicated in elderly patients who have greater skin laxity, both in the glabella and nasal skin, since it ensures better rotation

Table 1. Characteristics of the patients.

Patient	Age (years)	Gender	Tumor location (aesthetic subunits of the nose)	Defect (cm)
1	93	M	nasal tip	1.0
2	95	F	lower back. left side. left nasal wing	3.0
3	78	M	lower back. right nasal wing	1.5
4	64	M	nasal tip	2.5
5	82	M	nasal tip	2.0
6	72	M	nasal tip	1.0
Média	80.67			1.8

Legend: M: Male; F: Female.

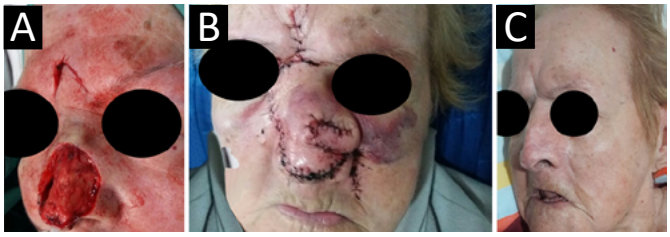


Figure 2. A. Patient 2: Lesion on the 3cm nasal tip, occupying the lower dorsal region, the left side, and the left nasal wing, requiring a nasogenian flap to allow the closure of the entire defect area.**B.** Seven days after surgery, still showing areas with much edema. **C.** 12 months postoperative.

Figure 3.A. Patient 3: Preoperative image showing a 1.5cm lesion on the lower back and right nasal wing. **B. P**ostoperative with 14 days of evolution. **C.** Postoperative period of 6 months.

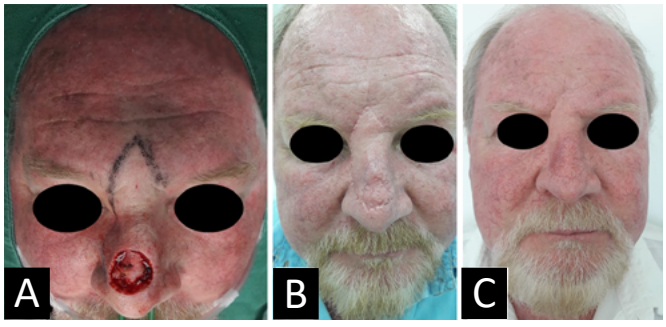


Figure 4. A. Patient 4: Intraoperative image showing 2.5cm nasal tip lesion. **B.** Postoperative with 30 days of evolution. **C.** 12 months postoperative.

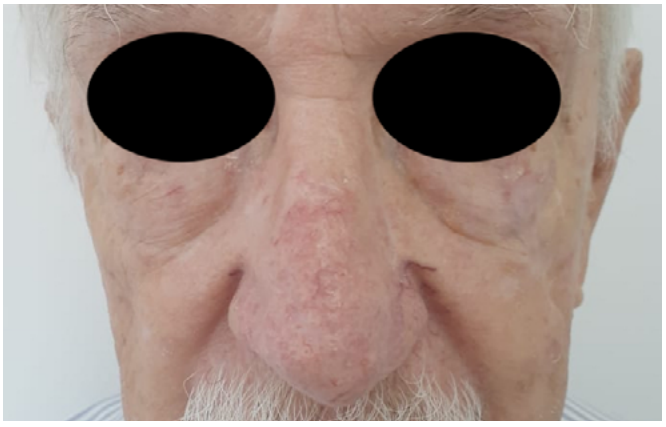


Figure 5. Patient 5: Late postoperative with more than two years and six months of resection of a lesion on the nasal dorsum with 2 cm in diameter.

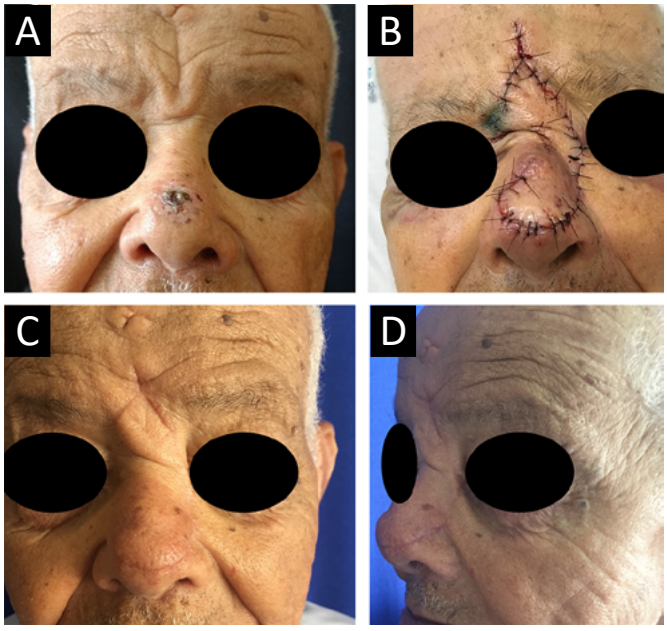


Figure 6. A. Patient 6: Lesion on the nasal tip of 1 cm in diameter. **B.** Immediate postoperative. **C.** Images of 5 months postoperatively. **D.** Images of 5 months postoperatively.

of the flap, in addition to making the glabellar scar hidden in the rhytids. The technique is best used in the correction of skin defects located centrally in the nasal tip; however, it is possible to use this flap to correct injuries in regions of the back and also of the lateral nasal wall[2,9].

It is important to emphasize that, although the Rieger flap was initially described for use in partial-thickness lesions, up to 2 cm, even defects higher than 2 cm can be corrected with this flap, at the expense of greater head displacement of the margin, the nostril and the nasal tip. Therefore, we should always try to respect the 1 cm distance from the wing margin to avoid problems in the function of the external nasal valve, as well as significant distortions[1,2]. In 2010, Wentzell[8] demonstrated that the dorsal nasal flap could be used for full-thickness defects, without the need for cartilage grafts or mucosa flaps.

CONCLUSION

The Rieger flap is a good option for cases of reconstruction of defects located in the lower half of the nose, since it is performed in a single moment, is easy to execute and has a high level of patient satisfaction, providing a satisfactory aesthetic result of the reconstructed area, in texture and color, to use specific tissues for the nasal covering.

COLLABORATIONS

FLD Analysis and/or data interpretation, conception and design study, conceptualization, data curation, final manuscript approval, formal analysis, funding acquisition, investigation, methodology, project administration, realization of operations and/or trials, resources, supervision, validation, visualization, writing - original draft preparation, writing - review & editing.

AER Analysis and/or data interpretation, conception and design study, conceptualization, data curation, final manuscript approval, formal analysis, investigation, methodology, project administration, realization of operations and/or trials, resources, supervision, validation, visualization, writing - original draft preparation, writing - review & editing.

REFERENCES

1. Eren E, Beden V. Beyond Rieger's original indication; the dorsal nasal flap revisited. J Craniomaxillofac Surg. 2014 Jul;42(5):412-6. DOI: https://doi.org/10.1016/j.jcms.2013.05.031
2. Baker SR. Retalhos de rotação. In: Baker SR. Retalhos locais em reconstrução facial. Rio de Janeiro: Di Livros; 2009. p. 109-33.
3. Gillies HD. Plastic surgery of the face. London: Oxford Medical Publishers; 1920.
4. Rieger RA. A local flap for the repair of the nasal tip. Plast Reconstr Surg. 1967;40:147-9.
5. Marchac D. Lambeau de rotation fronto-nasal. Ann Chir Plast Esthet. 1970;15:44-9.
6. Raschke GF, Rieger UM, Bader RD, Kirschbaum M, Eckardt N, Schultze-Mosgau S. Evaluation of nasal reconstruction procedures results. J Craniomaxillofac Surg. 2012;40(8):732-49. DOI: https://doi.org/10.1016/j.jcms.2012.01.023
7. Yong HK, Hyung WY, Seum C, Yoon KC. Reconstruction of cutaneous defects of the nasal tip and alar by two different methods. Arch Craniofac Surg. 2018 Dec;19(4):260-3. DOI: https://doi.org/10.7181/acfs.2018.02271
8. Wentzell MJ. Dorsal nasal flap for reconstruction of full-thickness defects of the nose. Dermatol Surg. 2010 Jul;36(7):1171-8. DOI: https://doi.org/10.1111/j.1524-4725.2010.01603.x
9. Redondo P, Bernad I, Moreno E, Ivars M. Elongated dorsal nasal flap to reconstruct large defects of the nose. Dermatol Surg. 2017 Aug;43(8):1036-41. DOI: https://doi.org/10.1097/DSS.0000000000001149

***Corresponding author:** **Filipe Lopes Decusati**
Praça Santa Terezinha, nº 20 - Tatuapé, São Paulo, SP, Brazil
Zip Code 03308-070
E-mail: decusati@gmail.com

Original Article

Comparison of surgical techniques for prominent ear correction: Mustardé versus Converse

Comparação de técnicas cirúrgicas de correção de orelhas proeminentes: Mustardé versus Converse

MARCEL FERNANDO MIRANDA BATISTA LIMA [1]*
PABLO MARICEVICH [1]
KELSON KAWAMURA [1]
PRISCILA DA SILVA LOPES [1]
AMANDA LUCAS FREIRE [1]
RAFAEL ANLICOARA [1]

Institution: Hospital das Clínicas da Universidade Federal de Pernambuco, Recife, PE, Brazil.

Article received: September 30, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0027

ABSTRACT

Introduction: prominent ears, popularly called "flappy ears," represent the most common congenital deformity of the external ear, affecting approximately 5% of the population. **Methods:** Primary, prospective and intervention study comparing the results of patients undergoing the surgical procedure to correct prominent ears using the Converse and the Mustardé techniques, performed at the Plastic Surgery Service of the Hospital das Clínicas, Federal University of Pernambuco (HC) -UFPE). **Results:** Twenty patients were evaluated, 10 with the Converse technique, and 10 with the Mustardé technique, from June 2016 to December 2017. Both groups showed a decrease in auricular mastoid distances at the end of the observation period, ranging from 6.67 to 14.6 mm, depending on the surgical technique and the evaluation point, but without statistical significance. Regarding the average auricular mastoid distances at the end of the observation period, a difference of a maximum of 6.3 mm was observed between the evaluated groups, but without statistical significance. Regarding the symmetry of the ears within the same group, the maximum mean level of asymmetry in the Mustardé and Converse groups was 0.9 mm and 0.5 mm, respectively. However, the percentage of loss of correction of the measures obtained surgically during the observation period in both groups ranged between 15 and 19%, without statistical significance. Regarding complications, there was 1 (10%) case of hematoma in the Mustardé group. **Conclusion:** Converse and Mustardé techniques did not show statistical differences in the results.

Keywords: Auricular Cartilage; Plastic surgery; Auricle; Outer ear; Otopathies.

[1] Hospital das Clínicas da Universidade Federal de Pernambuco, Recife, PE, Brazil.

■ **RESUMO**

Introdução: As orelhas proeminentes, popularmente chamadas de "orelhas em abano", representam a deformidade congênita mais comum da orelha externa, atingindo cerca de 5% da população. **Métodos:** Estudo primário, prospectivo e de intervenção comparando os resultados de pacientes submetidos ao procedimento cirúrgico de correção de orelhas proeminentes por meio da técnica de Converse e de Mustardé, realizado no Serviço de Cirurgia Plástica do Hospital das Clínicas da Universidade Federal de Pernambuco (HC-UFPE). **Resultados:** Foram avaliados 20 pacientes, 10 por meio da técnica de Converse e 10 por meio de Mustardé, no período de junho de 2016 a dezembro de 2017. Ambos os grupos mostraram diminuição das distâncias mastoideas auriculares ao final do período de observação, variando de 6.67 a 14.6 mm, a depender da técnica cirúrgica e do ponto de avaliação, mas sem significância estatística. Quanto às distâncias mastoideas auriculares médias ao final do período de observação, observou-se diferença de no máximo 6.3mm entre os grupos avaliados, mas sem significância estatística. Em relação a simetria das orelhas dentro do mesmo grupo, o nível máximo de assimetria média nos grupos Mustardé e Converse foi de respectivamente 0.9mm e 0.5mm. A porcentagem da perda de correção das medidas obtidas cirurgicamente ao longo do período de observação em ambos os grupos variaram de 15-19%, no entanto, sem significância estatística. No que se refere as complicações, houve 1 (10%) caso de hematoma no grupo Mustardé. **Conclusão:** As técnicas de Converse e Mustardé demostraram não ter diferença estatística nos resultados.

Descritores: Cartilagem articular; Cirurgia plástica; Orelha externa; Pavilhão auricular; Otopatias.

INTRODUCTION

Prominent ears, popularly called "flappy ears," represent the most common congenital deformity of the outer ear, affecting approximately 5% of the population[1]. Both sexes are affected in the same proportion, and in approximately 60% of cases, this deformity can be diagnosed at birth, which is most evident in the first years of life[2,3].

People with prominent ears have facial and aesthetic harmony problems, which can lead to psychic disorders related to social interaction, especially during childhood and adolescence[3,4,5]. The outer ear reaches 85% of its final size around three years of age, reaching adult size around 6 to 7 years[6]. Therefore, the ideal age for surgical correction would be between 4 and 6 years, since it also coincides with the beginning of the individual's school/social life[4,7].

The most common cause of ear prominence is erasure or absence of the antihelix, present in two-thirds of cases, resulting in lateral projection of the helix[6]. However, other changes may also be present in combination or not, namely: hypertrophy of the shell, increase in the cephaloconcal angle (> 90°) and protrusion of the lobe[1,8].

Otoplasty techniques have been developed using different antihelix treatment methods, such as sutures, repositioning, incision and excision of cartilage[3,9]. In general, the antihelix treatment can be divided into two categories: incisional/abrasive and cartilage saving[10]. The first aesthetic otoplasties were described by Ely, in 1881[11] and Luckett, in 1910[12], being examples of incisional techniques[13,14].

After several reports of techniques published in the literature, Converse, in 1963[15,16], associated the incision of cartilage with sutures in order to produce a more natural result to the antihelix and avoiding failures common to previous techniques[10]. In 1963, Mustardé[17] was the first surgeon to describe the recreation of the antihelix fold with only multiple horizontal sutures, thus being a technique classified as cartilage-sparing[13].

Since then, several studies published in the literature have evaluated the postoperative results

obtained with different surgical techniques. However, no published studies are comparing the results of different surgical techniques for the treatment of prominent ears.

OBJECTIVE

This study proposes to make a comparison between two surgical techniques for antihelix treatment used in the correction of prominent ears: The Converse and Mustardé techniques, evaluating the surgical results, and observing if there is superiority between them.

METHODS

Primary, prospective and intervention study comparing the results of patients undergoing the surgical procedure to correct prominent ears using the Converse technique and that of Mustardé, performed at the Plastic Surgery Service of the Hospital das Clínicas of the Federal University of Pernambuco (HC -UFPE).

Patients were randomly selected into two different groups of surgical techniques to correct the antihelix, the Mustardé technique, and the Converse technique. Patients who spontaneously sought service with the desire to correct prominent ears and who had absence or underdevelopment of the antihelix were included. Patients who had already undergone previous auricular surgical procedures, patients with congenital or acquired auricular deformities, smokers, patients with chronic systemic diseases, and users of chronic medications were excluded.

The imposed data were: sex, age, presence of erasure of anti-helix, shell hypertrophy, lobe protrusion, increased cephalocaudal angle, laterality, auricular mastoid distance in three sites of the ear external, complementary surgical treatment performed and complications.

The auricular mastoid distances were measured from the mastoid region to the lateral edge of the helix, with the head in a neutral position, measured with the aid of an analog pachymeter in the upper, middle and lower regions, bilaterally, which correspond respectively to the bifurcation of the antihelix in upper and lower branches, the upper edge of the ear canal and the most caudal segment of the intertragic notch (Figure 1). The evaluation times were: preoperative, 1, 3, and 6 months postoperative, with the necessary photographic documentation.

Surgical technique

All patients underwent the surgical procedure under local anesthesia and propofol sedation. After removal of a retroauricular skin spindle, detachment of the skin with adequate exposure of the posterior region of the auricular cartilage, one of the following procedures is followed:

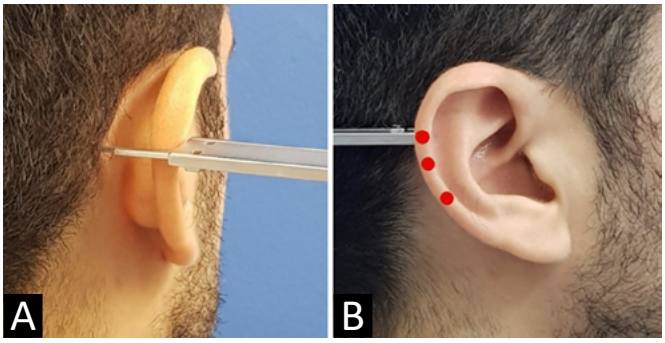


Figure 1. A. Measurements made with the aid of an analog caliper; **B.** Auricular mastoid distances were measured from the mastoid region to the lateral edge of the helix, in the upper, middle and lower regions.

Mustardé technique

It is performed the bidigital anterior maneuver of the scapha with the thumb and forefinger, transfixed in 3 places along the antihelix, which was pronounced, with the help of a 0.45x13mm needle dyed in bright green to make the "tattoo" of the posterior face of the cartilage. Suture with 4-0 mononylon, about 1 cm laterally, the previous markings for the formation of a new antihelix (Figure 2).

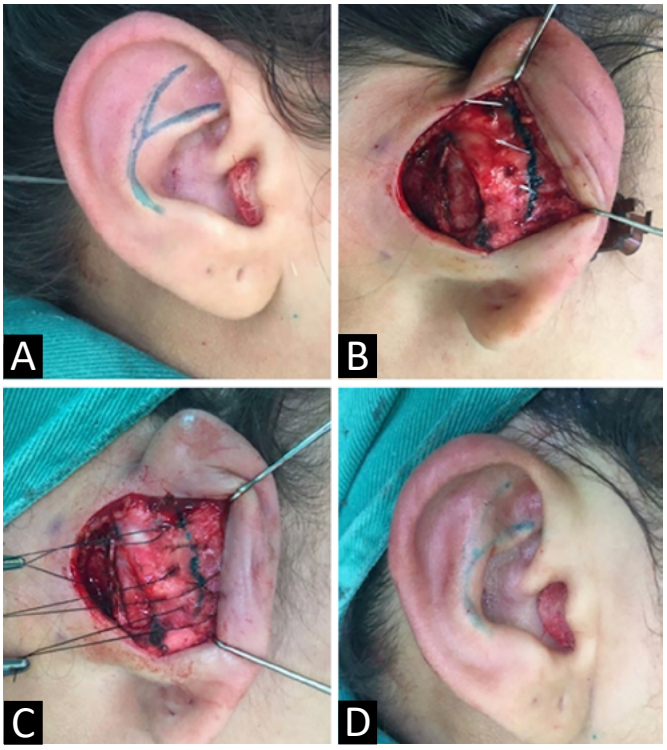


Figure 2. A. Previous marking; **B.** Complete subcutaneous detachment, exceeding the guide points; **C.** Suture with 4-0 mononylon, about 1 cm laterally to previous markings; **D.** Immediate postoperative with the formation of a new anti-helix.

Converse technique

It is performed the bidigital anterior maneuver of the scapha with the thumb and forefinger, and it is transfixed in 3 points along the antihelix, which was pronounced with the help of a 0.45x13 mm needle dyed in bright green to make the "tattoo" of the posterior cartilage. An incision is made with a scalpel blade 15, bilaterally, joining the previous markings. Subsequently, the internal/external edges are sutured with mono nylon 4-0 in 3 places to form a new antihelix (Figure 3).

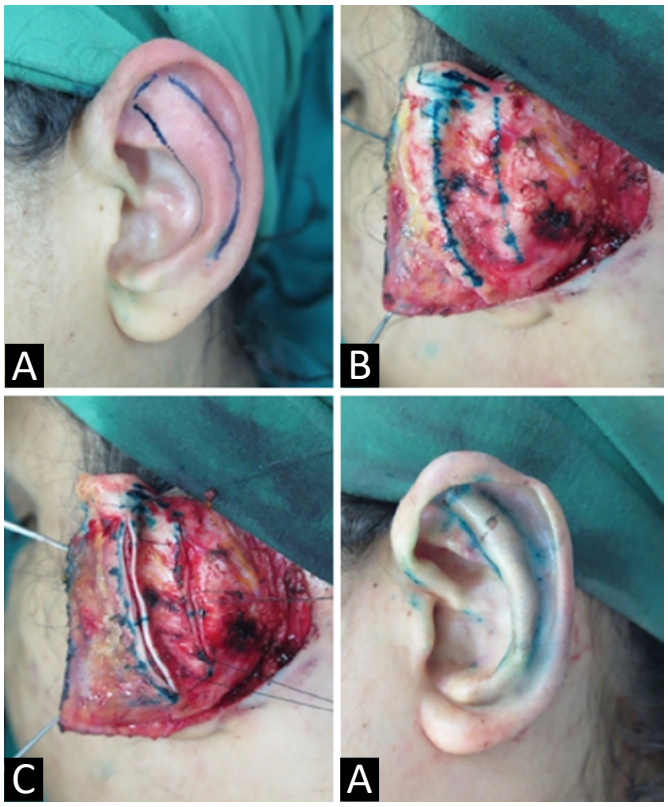


Figure 3. A. Previous Marking; **B.** Marking of the posterior face of the cartilage in the projection of the anti-helix; **C.** Incision with a scalpel blade 15, bilaterally associated with suture with 4-0 mononylon in 3 locations; **D.** Immediate postoperative.

After performing the surgical technique of each group, it is then followed for the other treatments: Furnas stitches and lobe repositioning, if necessary, and the skin is closed with 4-0 mono nylon.

The research followed the principles of the Declaration of Helsinki, revised in 2000, and Resolution 196/96 of the National Health Council. It was also submitted to the institution's Ethics and Research Committee (CEP), being approved with CAAE 64223417.9.0000.5208 and Opinion 2,019,499. The data were grouped in a Microsoft Office Excel 2015 spreadsheet, analyzed by SPSS software version 2.0 R version 3.4.3.

The non-parametric statistical test used was Wilcoxon's, considering a value of $p < 0.05$.

RESULTS

Twenty patients were evaluated, 10 using the Converse technique and 10 using Mustardé, from June 2016 to December 2017. Males represented 30% of both groups, the mean age in the Converse and Mustardé group was 18.9 and 22.3 years, respectively. All patients in the study had erasure of the antihelix, increased cephaloconchal angle, and bilateral abnormalities. Conchal hypertrophy and lobe protrusion were present in 19 (95%) and 6 (30%) patients, respectively. The treatment of the concha using the Furnas technique and the treatment of the lobe was performed in all patients who presented these changes.

Both groups showed a decrease in auricular mastoid distances at the end of the observation period, ranging from 6.67 to 14.6 mm, depending on the surgical technique and the evaluation point, however, in comparison, there was no significant p-value between the group results Regarding the average auricular mastoid distances at the end of the observation period, a difference of a maximum of 6.3 mm was observed between the results obtained, but also with a negligible p-value (Table 1).

Regarding the symmetry of the ears within the same group, the maximum mean level of asymmetry in the Mustardé and Converse groups was 0.9 mm and 0.5 mm, respectively (Table 2). When evaluating the percentage of loss of correction of the measures obtained surgically during the observation period, both groups ranged between 15-19%, however, in comparison with each other, there were no significant differences between the results (Table 3). Regarding complications, there was 1 (10%) case of hematoma in the Mustardé group.

DISCUSSION

The Mustardé and Converse techniques described, respectively, in 1955 and 1963, have their uses spread throughout the world; however, like all surgical tactics, they present their positive and negative points. The Converse technique, considered incisional, has as a positive point the fact that the cartilaginous incision provides a loss of local resistance for the manufacture of the new antihelix, decreasing the tension in the suture, supposedly decreasing recurrence rates, however as a negative point, this

Table 1. Auricular mastoid distance during the observation period and mean decrease.

Measurement locations	Means						Significance
	Mustardé		Decrease	Converse		Decrease	*p*-valor
Evaluation time	Preoperative	6 Months		Preoperative	6 Months		
Upper/right third	29.60	15	14.60	29.10	15.27	13.83	0.726
Upper/left third	29.60	15.50	14.10	28.80	15.77	13.03	0.9523
Middle/right third	28.60	15.60	13	27.30	15.13	12.17	0.7648
Middle/left third	27.10	15.50	11.60	26.40	15.50	10.90	0.6232
Lower/right third	19.90	12.10	7.80	20.10	12.73	7.37	0.2931
Lower/left third	21.70	13	8.70	19.40	12.73	6.67	0.6808

Table 2. Mean asymmetry (in mm) between the ears.

Measurement locations	Mustardé			Converse		
	Right	Left	Asymmetry	Left	Left	Asymmetry
Upper third	15	15.50	0.50	15.27	15.77	0.50
Middle third	15.60	15.50	0.10	15.13	15.50	0.37
Lower third	12.10	13	0.90	12.73	12.73	0

Table 3. Rate of loss of measures surgically reached at the end of the evaluation period.

Measurement locations	Means		Significance
	Mustardé	Converse	*p*-value
Upper/right third	18%	19%	0.726
Upper/left third	19%	18%	0.9523
Middle/right third	16%	17%	0.7648
Middle/left third	17%	17%	0.6232
Lower/right third	15%	15%	0.2931
Lower/left third	16%	15%	0.6808

incision can provide visible contour irregularities to the anti-helix[6,18].

On the contrary, the Mustardé technique, considered cartilage-sparing, has the advantage of providing a smooth contour for the antihelix, on the other hand, due to the lack of weakening of the cartilage, there is supposed to be a tendency for the cartilage returns to its abnormal position, which can cause an increase in recurrence rates[6,18].

In general, in order to achieve the best results, the following aspects described by McDowell, in 1968[19], must be observed and fulfilled: 1) the helix must be seen entirely behind the antihelix in the frontal view; 2) smooth and regular helix; 3) final scar must be located in the retroauricular groove and without distortion; 4) difference in measurements between the operated sides of a maximum of 3mm; and, 5) the distance from the helix to the mastoid, at the upper, middle and lower points, should vary between 10-12mm, 16-18mm and 20-22mm[18] respectively.

It was observed that both groups reached all the above criteria during the observation period, except for the proposed distances, however, McDowell does not describe in his article how such measurements were determined, which hinders a reliable comparison[9]. However, the final measurements of the present study comply with that established by Adamson et al., in 1991[20], which determines an auricular mastoid distance from the upper-middle segment of the ear between 15 and 20 mm as aesthetically desirable[20] (Table 4). When comparing the final averages of the auricular mastoid distances, between the two surgical techniques evaluated, there was a difference of 6.3 mm maximum between the results obtained, but with an unimportant p-value, that is, both techniques provided similar auricular positions (Table 1).

Both groups showed a decrease in auricular mastoid distances at the end of the observation period ranging from 6.67 to 14.6 mm, very similar to that found in the literature, as the studies by Adamson et al., in 1991[20], Schneider and Side, in 2018[21] and Foda, in 1999[22], obtained average rates of auricular medialization, respectively, of 5.9 mm, 14 mm and 17 mm, depending on the place and time of the evaluation. As for the symmetry between the ears within the same surgical technique, the asymmetry varied from 0 to 0.9 mm, that

Tabela 4. Comparação das medidas observadas no presente estudo com as encontradas na literatura.

Locais de mensuração	Médias			
	Grupo Mustardé	Grupo Converse	Adamson, 1991	McDowell, 1968
Terço superior/direito	15	15.27	15-20	10/dez
Terço superior/esquerdo	15.50	15.77		
Terço médio/direito	15.60	15.13		16-18
Terço médio/esquerdo	15.50	15.50		
Terço inferior/direito	12.10	12.73	Não definido	20-22
Terço inferior/esquerdo	13	12.73		

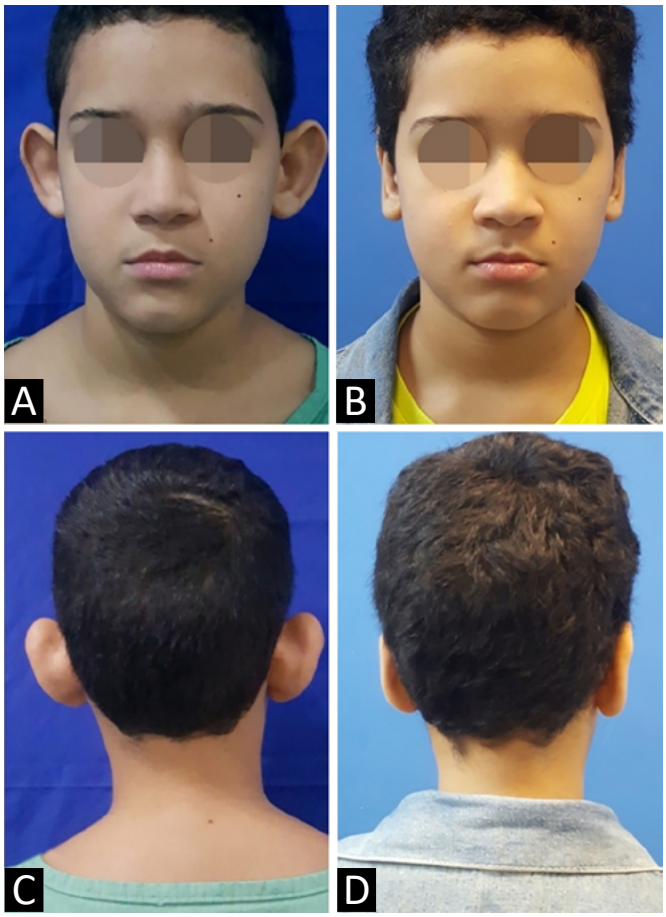


Figura 4. A e **C:** Aspecto pré-operatório; **B** e **D:** Aspecto pós-operatório.

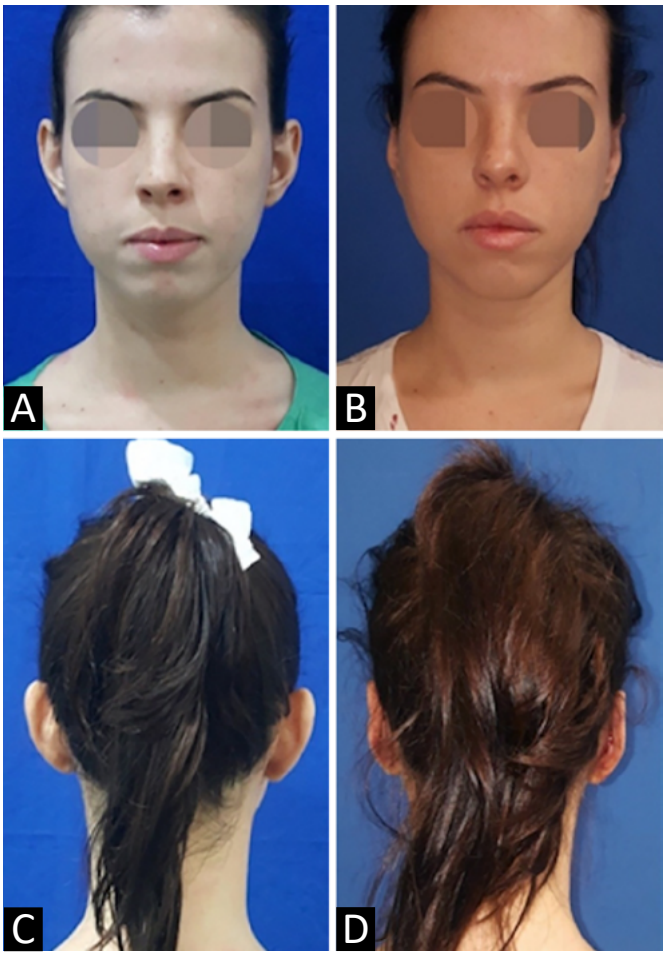


Figura 5. A e **C:** Aspecto pré-operatório; **B** e **D:** Aspecto pós-operatório.

is, both groups remained within the maximum of 3 mm recommended in the literature[18,21] (Table 2). Despite being a subjective criterion, the surgical team and all patients were satisfied with the results obtained at the end of the observation period[20] (Figures 4 and 5).

Regarding the percentages of loss of correction, these would vary from 15 to 19% in both groups, depending on the follow-up evaluated. These values are lower than those found in the literature, such as that of Foda, in 1999[22], in which the average was 32%; however, this one had a follow-up of 28.4 months, that is, we could observe a higher percentage in more extended monitoring period. Another point to highlight would be that the difference between the groups was a maximum of 1%, but with an unimportant p-value compared to each other, which suggests an equivalence of the rates of correction loss between the surgical techniques (Table 3).

As for complications, Elliott divides complications into early and late. The precocious ones would be a hematoma, infection, chondritis, pain, bleeding, itching, and skin necrosis. Late ones would be visible scarring, patient dissatisfaction, suture-related problems, and dysesthesias[6]. We observed only one case of hematoma in the Mustardé group; however, the literature shows

complication rates ranging from 0% to 47.3%, that is, the index found in this research remained within the expected range[23,24]. The treatment was performed with simple outpatient drainage and a compressive dressing with adequate resolution of the case.

It is noteworthy that no studies were found in the literature comparing surgical techniques to reposition the antihelix using a standardized and objective measurement protocol. Another positive point, Tables 1 and 3, which show, respectively, the means of the final measurements of the points evaluated between the groups and the percentages of the means of recurrence, did not obtain the p-value at the 5% level with the test. Wilcoxon. In other words, the sample size did not influence the comparison of results between the Mustardé and Converse techniques. Furthermore, therefore, the sample size used in the research was sufficient to conclude that the lack of difference in the results between the treatments evaluated was not due to the number of participants, but to the similarity of the results of the techniques.

On the other hand, a possible bias in this study was the 6-month follow-up period, as there are studies with periods of up to 6.25 years[9]. That is, we could then experience higher rates of correction loss, complications, and even recurrence of prominent ears.

CONCLUSION

The Converse and Mustardé techniques showed no statistical difference in the results, when compared to each other.

COLLABORATIONS

MFMBL	Analysis and/or data interpretation, final manuscript approval.
PM	Conception and design study, methodology, project administration, supervision, writing - review & editing.
KK	Analysis and/or data interpretation, data curation, final manuscript approval, formal analysis, methodology, project administration.
PSL	Analysis and/or data interpretation, data curation, project administration, writing - review & editing.
ALF	Analysis and/or data interpretation, data curation, final manuscript approval, project administration.
RA	Supervision.

REFERENCES

1. Rosique RG, Rosique MJF. Refinamento da técnica de Mustardé para tratamento de orelhas proeminentes. Rev Bras Cir Plást. 2014;29(4):490-6.
2. Alencar EC, Lucena JRS, Carvalho Filho RAS, Oliveira KPF, Almeida CLA. Correção cirúrgica de orelhas proeminentes: associação da técnica de Furnas e Mustardé. Rev Bras Cir Plást. 2015;30(3):439-45.
3. Hornos A. Correção de orelha de abano por técnica combinada: análise de resultados e alteração da qualidade de vida. Rev Bras Cir Plást. 2013;28(3):406-15.
4. Toplu Y, Sapmaz E, Toplu SA, Deliktas H. Otoplasty: results of suturing and scoring techniques. Eur Arch Otorhinolaryngol. 2013 Jul;271(7):1885-9.
5. Bradbury ET, Hewison J, Timnons MJ. Psychological and social outcome of prominent ear correction in children. Br J Plast Surg. 1992 Feb/Mar;45(2):97-100.
6. Janis JE, Rohrich RJ, Gutowski KA. Otoplasty. Plast Reconstr Surg. 2005;115(60e):60-72.
7. Haytoglu S, Haytoglu TG, Muluk NB, Kuran G, Arikan OK. Comparison of two incisionless otoplasty techniques for prominent ears in children. Int J Pediatr Otorhinolaryngol. 2015 Apr;79(4):504-10.
8. Jinguang Z, Leren H, Hongxing Z. Experience of correction of prominent ears. J Craniofac Surg. 2010 Sep;21(5):1578-80.
9. Calderoni DR, Motta MM, Kharmandayan P. Development and implementation of an anthropometric protocol to evaluate results of otoplasty. Rev Bras Cir Plást. 2016;31(1):66-73.
10. Peterson RS, Friedman O. Current trends in otoplasty. Curr Opin Otorhinolaryngol Head Neck Surg. 2008;16(4):352-8.
11. Ely et.al. An operation for prominence of the auricles. Arch Otolaryngol. 1881;10:97.
12. Luckett W. A new operation for prominent ears based on the anatomy of the deformity. Surg. Gynec. & Obst. 1910;10:635-7.
13. Nuara MJ, Mobley SR. Nuances of otoplasty: a comprehensive review of the past 20 years. Facial Plast Surg Clin North Am. 2006 May;14(2):89-102.
14. Nazarian R, Eshraghi AA. Otoplasty for the protruded ear. Semin Plast Surg. 2011 Nov;25(4):288-94.
15. Naumann A. Otoplasty – techniques, characteristics and risks. Curr Opin Otorhinolaryngol Head Neck Surg. 2007;6(1):1-14.
16. Converse JM, Wood-Smith D. Technical details in the surgical correction of the lop ear deformity. Plast Reconstr Surg. 1963 Feb;31(2):118-28.
17. Mustardé JC. The correction of prominent ears using simple mattress sutures. Br J Plast Surg. 1963 Apr;16:170-8.
18. Gümus N, Yilmaz S. Otoplasty with an unusual cartilage scoring approach. J Blast Sure Hand Surg. 2016;50(1):19-24.
19. McDowell AJ. Goals in Otoplasty for Protruding Ears. Plast Reconstr Surg. 1968 Jan;41(1):17-27.
20. Adamson PA, McGraw BL, Trooper GJ. Otoplasty: critical review of clinical results. Laryngoscope. 1991 Aug;101(8):883-8.
21. Schneider AL, Side DM. Cosmetic otoplasty. Facial Plast Surg Clin North Am. 2018 Feb;26(1):19-29.
22. Foda HMT. Otoplasty: a graduated approach. Aesth Last Surg. 1999;23:407-12.
23. Handler EB, Song T, Shih C. Complications of otoplasty. Facial Plast Surg Clin North Am. 2013 Nov;21(4):653-62.
24. Maricevich JPR, Amorim NFG, Duprat R, Freitas F, Pitanguy I. Island technique for prominent ears: an update of the Ivo tangy clinic experience. Aesthet Surg J. 2011 Aug;31(6):622-33.

***Corresponding author:** **Marcel Fernando Miranda Batista Lima**
Rua Barão de Itamaracá, nº78 - apto 1203 - Espinheiro, Recife, PE, Brazil
Zip Code: 52020-070
E-mail: marcelflima@hotmail.com

Original Article

Use of Vaser™ plus liposuction in body contouring surgery

Uso de Vaser® mais lipoaspiração na cirurgia do contorno corporal

WILLIAM SEIDEL [1]
CAIO PUNDEK GARCIA [2]*

■ **ABSTRACT**

Introduction: Body contouring surgery is among the most requested surgical procedures in cosmetic surgery. Mentz was the first to perform superficial liposuction to define the abdominal muscles in male patients. However, Scuderi first popularized the use of continuous ultrasound to produce fat fragmentation in lipoplasty. Ultrasound, when applied internally to adipose tissue using a probe or metal cannula, breaks cells through three mechanisms: cavitation, thermal effect, and direct mechanical effect. **Methods:** Since November 2018, 50 patients with an indication for body liposuction performed the procedure with the help of the third-generation ultrasound equipment (VASER). **Results:** During the period between November 2018 and March 2019, 50 patients with a surgical indication underwent body contour liposuction using third-generation VASER technology. Of this universe of patients, 96% were women (47), with patients with an average age of 35 years (21-54). **Conclusion**: The association of VASER with liposuction is a safe and reproducible technique that has the advantage of improving the result of liposculpture. Good aesthetic results were achieved, with an athletic and more natural contour.

Keywords: Lipectomy; Fat body; Subcutaneous fat; Surgery, Plastic; Ultrasonography; Adipose tissue.

Institution: Private clinic..

Article received: June 3, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0028

[1] Clínica Vivva, Florianópolis, Florianópolis, SC, Brazil.
[2] Hospital Universitário, Cirurgia Plástica e Queimados, Florianópolis, SC, Brazil.

■ **RESUMO**

Introdução: A cirurgia de contorno corporal está entre os procedimentos cirúrgicos mais solicitados em cirurgia estética. Mentz foi o primeiro a realizar lipoaspiração superficial para definição da musculatura abdominal de pacientes masculinos. Todavia, o uso de ultrassom contínuo para produzir fragmentação de gordura em lipoplastia foi popularizado, pela primeira vez, por Scuderi. O ultrassom, quando aplicado internamente ao tecido adiposo por uma sonda ou cânula metálica, realiza a quebra das células por meio de três mecanismos: cavitação, efeito térmico e efeito mecânico direto. **Métodos:** A partir de novembro de 2018, 50 pacientes com indicação de lipoaspiração corporal realizaram o procedimento com a assistência do equipamento de ultrassom de terceira geração (VASER). **Resultados:** Durante o período de novembro de 2018 a março de 2019, 50 pacientes com indicação cirúrgica foram submetidos à lipoaspiração de contorno corporal com uso da tecnologia VASER de 3a geração. Desse universo de pacientes, 96% eram mulheres (47), apresentando os pacientes idade média de 35 anos (21-54). **Conclusão:** A associação do VASER na lipoaspiração é uma técnica segura e reprodutível, com a vantagem de melhorar o resultado das lipoesculturas. Bons resultados estéticos foram atingidos, com um contorno atlético e mais natural.

Descritores: Lipectomia; Gordura abdominal; Gordura subcutânea; Cirurgia plástica; Ultrassom; Tecido adiposo.

INTRODUCTION

The body contour surgery is among the most requested surgical procedures in aesthetic plastic surgery. Since the beginning of body contouring surgery, several authors around the world described significant advances in technique, with their cultural changes and scientific developments[1].

In 2017, according to data from the International Society of Aesthetic Plastic Surgery (ISAPS), 1,573,630 liposuction procedures were carried out worldwide, with more than 210,000 procedures performed in Brazil[2].

The introduction of lipoplasty into the surgical arsenal by Illouz, in 1985[3] and 1989[4], produced many changes in body contouring procedures with the use of white cannulas with holes for grease suction.

However, in 1993[5], Mentz was the first to perform a superficial liposuction to define the abdominal muscles of male patients, which he called abdominal etching. Regarding the treatment of the superficial layer in specific anatomical regions, this author says in his conclusions that it would be a technique for specific patients who want to have a muscular abdomen, with a need for results above the norm.

In 2007[6], Hoyos and Millard published the association of VASER (Vibration Amplification of Sound Energy at Resonance Lipo System) with high definition liposculpture. With his later work, Hoyos, in 2012[7] and 2018[8], consolidated the high definition liposuction with concrete results, creating standards and parameters for its correct performance.

However, it was Scuderi for the first time, in 1987[9], who popularized the use of continuous ultrasound to produce fat fragmentation in lipoplasty. The ultrasound, when it is applied internally to the adipose tissue using a probe or a metal cannula, breaks the cells by three mechanisms: cavitation, thermal effect, and direct mechanical effect[10,11].

Sound Surgical Technologies LLC (Lafayette, CO) developed the VASER™ device, a surgical ultrasound system for the fat emulsion. This system uses solid probes of small diameter (i.e. 2.9mm and 3.7mm) with grooves around the point to increase fragmentation and efficiency. The rigid design of the probe redistributes the ultrasound energy, transferring part of the energy vibration from the point to a region near the point of the device.

OBJECTIVE

Therefore, the objective of the present study is to present our casuistry and body contouring experience with the aid of the VASER equipment.

METHODS

The study took place in 2 surgical centers in Florianópolis/SC, from November 2018 to March 2019.

As of November 2018, 50 patients with an indication for body liposuction underwent the procedure with the help of a third-generation ultrasound equipment (VASER™).

The surgeries were performed by the same medical team, in different locations, using a standardized procedure sequence. During the postoperative visits, the photos of the evolution were taken, as well as the anamnesis and the physical examination for complications.

All patients signed the surgical consent form. This study was conducted following the Helsinki declaration.

Surgical technique

The preoperative marks of the liposuction areas were made with the patients in the orthostatic position. The muscular region is better defined with the active contraction performed by the patient. The authors use topographic marking in an attempt to present the places of highest projection and the presence of subcutaneous tissue. The topographic lines reinforce the places of greatest need for liposuction in the recumbent patient.

For infiltration, a super-wet anesthetic solution was prepared with lidocaine (2%) and adrenaline (1: 1,000,000). Due to the need for a humid environment to use the VASER™, 4 liters of solution are prepared. The cutaneous opening points for the technique do not differ from the opening sites for classic liposuction; there is no need to enlarge the incision. The surgical irrigator (Faga™) is used to infiltrate the super-wet anesthetic solution, in an attempt to compensate for the additional time generated by the use of ultrasound equipment.

The surgeon determined the selection of the VASER™ probe, the amplitude, and the pulse mode versus the continuous mode, according to the characteristics of the patient's localized fatty deposits, which were individualized by physical examination. In the places where the equipment was introduced, a skin protector was used in an attempt to avoid skin damage by friction or thermal action of the device.

The protocol of the equipment employs the following parameters of the ultrasound of the third generation: for abdomen, 70% and time of use of 12 minutes; for the back, 70% and time of use of 12 minutes; y, for arms, 50% y time of use of 4 minutes. The additional time generated by using the device is approximately 30 minutes. The movement performed with the VASER™ tip is smooth and continuous, a movement very similar to that performed with the liposuction cannula.

Initially, the VASER™ is applied in a superficial fat plane, in an attempt to produce anatomical drawings of body structures, in women: mid/white line, semi-lunar lines and inguinal line. In the semi-lunar lines, we must mark the meeting point with the rib cage, where we will liposuction more superficially in an attempt to create local fatty depression. In men, in addition to the markings mentioned above, we can produce the design of the metamers of the rectus abdominis muscle. After covering the fatty superficial plane with the ultrasonic equipment, it is carried out in the entire area of deep liposuction. Only after completing the VASER, we start the liposuction of the fat solution.

The complete treatment (VASER™ + Liposuction) is performed in the initial position of decubitus, for the subsequent change of decubitus and the continuity of the procedure. Only dorsal and ventral decubitus is used, with the choice of initial decubitus based on surgical planning, especially when there is a need to obtain fat for gluteal fat grafting.

After using the VASER™, it is performed liposuction of the fat solution, with the help of a pneumatic vibration equipment (Vibrolipo™) associated with the use of continuous aspiration equipment (LipoCoelho™). Superficial liposuction (anatomical drawing) is performed first, to complement the patient's deep liposuction then.

All patients underwent a Portovac™ drainage placement with orientation for extraction on medical return in 1 week.

A local bandage was applied, and the patient remained with a compression mesh associated with 360º abdominal foam for one month after the operation. Lymphatic drainage began in the first postoperative week.

RESULTS

During the period between November 2018 and March 2019, 50 patients with a surgical indication underwent body contour liposuction using third-generation VASER™ technology.

Of this universe of patients, 96% were women (47), with patients with an average age of 35 years (21-54).

Among the associated procedures we had: 29 of gluteal fat grafting (58%), 24 of abdominoplasty (48%), 14 of mastopexy with prostheses (28%), 10 of augmentation prostheses (20%) and 6 of mastopexy without prosthesis (12%). For gluteal fat grafting, we performed it at the subcutaneous level, with the use of liposuction fat from where VASER™ was used.

The average postoperative drainage explained by Portovac™ was 300 ml/day, with drainage elimination in 1 week (2 liters average in one week). We present patients photos for the comparison of pre and postoperative (Figures 1 to 5).

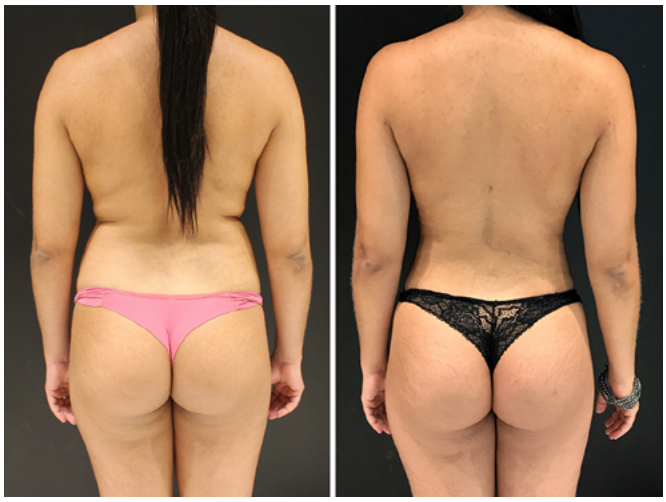


Figure 1. Female patient, 25 years old. A. Preoperative; B. postoperative liposuction 4 months. Associated with gluteal fat grafting and breast augmentation.

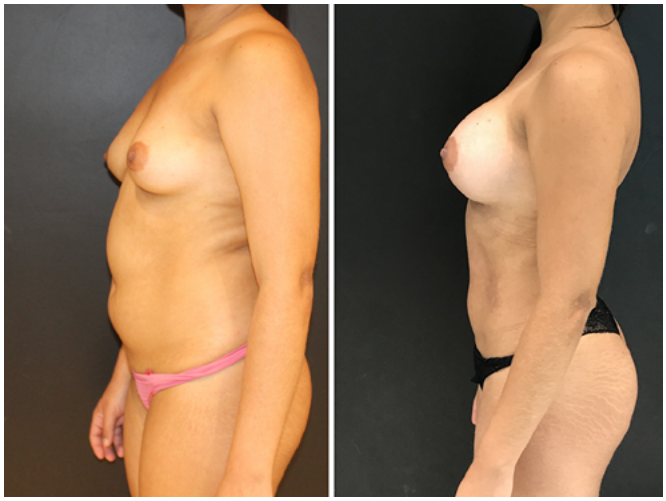


Figure 2. Female patient, 25 years old. A. Preoperative; B. postoperative liposuction 4 months. Associated with gluteal fat grafting and breast augmentation.

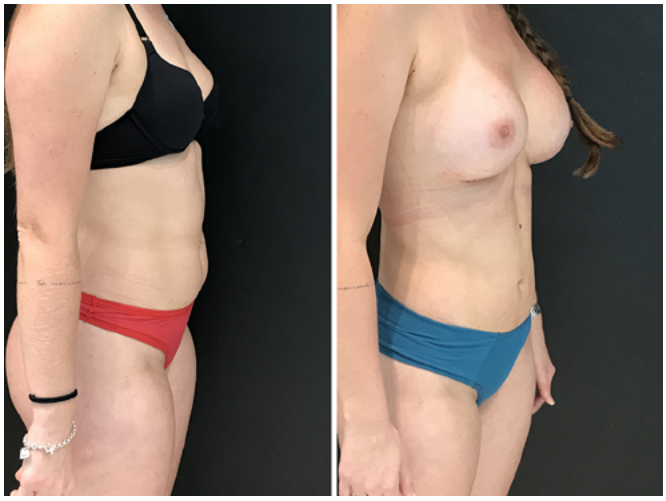


Figure 3. Female patient, 25 years old. A. Preoperative; B. postoperative liposuction 4 months. Associated with augmentation mammoplasty

Figure 4. Female patient, 38 years old. A. Preoperative; B. postoperative liposuction 4. Associated with gluteal fat grafting.

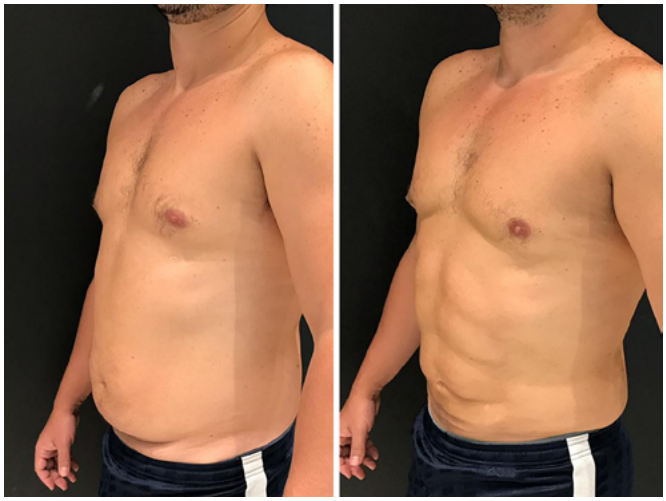


Figure 5. Male patient, 37 years old. A. Preoperative; B. postoperative liposuction 4 months.

There were no postoperative complications, such as seroma, induration, altered sensitivity, portal burns, infections, skin necrosis, and dyschromia.

DISCUSSION

The refinement of surgical techniques in search for better results is a trend in plastic surgery. Numerous published studies contribute to a complete compilation of the vascular anatomy of the entire abdominal unit and back, providing critical directions for more advanced techniques[12,13].

In liposuction, a relatively recent technique, the search for increasingly safer and aesthetically pleasing procedures is no different. The most recent publications and scientific events in plastic surgery have highlighted high definition liposuction or Lipo HD[3,4].

Previous authors[6,13] have already discussed and presented their results for VASER™ assisted high definition liposculpture: satisfaction in 84% of patients. There was a seroma in 6.5% of the cases that were solved with punctures. The use of drains was standardized for 48 to 72 hours. Of the 306 cases, 3.92% had a loss of definition.

One of the great fears about the use of ultrasound technology for the fragmentation of adipose tissue would be related to burns and necrosis caused by the energetic heat. We did not find this complication in our studio. In 2007[6], Hoyos and Millard, presented in their case series a burn of the liposuction portal during their learning curve, a complication that no longer appeared after the use of the portal infiltration associated with the skin protector[14]. The technology associated with the protocol brought security to the use. In the study by Danilla et al., in 2019[15] with 417 operated patients, the most frequent complication was hyperpigmentation (66%), followed by seroma (30%) and nodular fibrosis (20%), with the complications being transient in almost all of their entirety.

The work in superficial layers for the abdominal definition has always provoked discussions in the medical field. The aggression to the dermis can cause serious problems, such as dyschromia, fibrosis, adhesions, irregularities, retractions, and the dreaded epidermolysis and necrosis. The use of ultrasound technology in superficial layers is another advantage of the technique. In these layers, it detaches the most proximal fat from the dermis and makes the removal safer and less aggressive, with better conservation of the skin texture. There is a need for less movement of the liposuction cannula, after the use of VASER™, to remove the same amount of fat as classic liposuction, causing less mechanical trauma to the patient's dermis.

The use of third-generation ultrasound combined with the design of low trauma in cannulas allows us to achieve better results on the abdominal lateral surface and deep liposuction, creating a defined waist and lateral skin retraction[6].

The use of VASER™ causes a better suction of fat by detaching it from attached tissues, facilitating its removal with less physical effort by the operator. The subsequent suction causes less bleeding, which can be checked by the color pattern of the liposuction in the collector (less blood). By facilitating the extraction of fat, it is possible to remove a higher amount of fat volume, and, by bleeding less, we can remove larger volumes, without decreasing the patient's hematocrit/hemoglobin.

The increase in surgical time for the application of VASER™ is compensated by the decrease in the time required for liposuction associated with the use of surgical irrigator. Even so, the surgeon must plan to increase his surgical time with the use of technology, especially when implementing the technique, when the team's processes are not well standardized. A large number of associated procedures in our study indicate that it is possible to optimize the use of technology to the point that combined surgeries do not exceed the programmed and recommended anesthetic time.

In the study by Nagy and Vanek, in 2012[16], the VASER™-assisted lipoplasty method demonstrated a 53% improvement (17x11) in the retraction of the skin per cubic centimeter of aspirate removed compared to traditional suction-assisted lipoplasty and a reduction an average of 26% in blood loss compared to suction-assisted lipoplasty. Swanson in 2012[17], questioned the calculation methods of the study by Nagy and Vanek[16], which had an N of 20 patients. In his own calculations, Swanson[17] indicated that a difference of 6% would need a sample of 199 patients, concluding that it is a weak study in methodology and with conflicts of interest. Matarasso, in 2012[18], also questioned the results of the study by Nagy and Vanek[16], noting that the likely great advantage of VASER™ would be to facilitate the removal of fat for the surgeon, especially in those with some degree of fibrosis due to previous liposuction.

Even with the discussions of quantitative evaluation of the VASER™ cutaneous retraction in liposuction, it is sure that it reduces skin flaccidity in the postoperative period and, in borderline cases, in which we have to choose a skin resection (abdominoplasty) or only liposuction, the use of ultrasound technology helps in deciding for a procedure with less scarring and a pleasant aesthetic result, with a uniform adherence to deep tissues, especially in young patients. When the procedure of choice is an abdominoplasty, the use of VASER™ produces less traumatic fat removal from the abdominal flap tissue, decreasing the chances of complications associated with lipoabdominoplasty[19].

In order to assess the quality of fatty liposuction for fat grafting, Duscher et al., In 2016[20,21] and 2017[22], proved that the use of VASER™ does not impair the viability of the adipocyte derived from the stromal cell, vital information to increase graft retention. Therefore, all fat grafting performed in the technique is done with liposuction from the area where the VASER™ was used. The only process we use in the fat solution before grafting is a simple decanting.

We did not see any difference in graft integration or different fat reabsorption rate with the use of the technique. The fat grafted has a smaller diameter compared to the fat coming from a classic liposuction, which theoretically would facilitate its integration, as

pointed out by the study by Eto et al., in 2012[23], who identified the size of the fatty tissue survival zone after its grafting as smaller than 300microns, so fat grafts greater than 600microns already have a regeneration zone and possibly a central necrosis zone.

We always recommend the subcutaneous plane for grafting, with large diameter cannulas, syringe, and supragluteal portals, thus reducing the chances of complications[24,25].

In the postoperative period, we noticed a less traumatic evolution for the patient. Due to less aggression and less bleeding, we have a recovery with fewer symptoms and faster return of the patient to work activity.

As the postoperative period progressed, we did not have a patient with post-procedure weight recovery. However, given the use of a technology that facilitates fat removal, the possible results with the gain of new adipose tissue will be similar to those found with classical liposuction. The use of the protocol to create extremely athletic results, with an aspect of muscular hypertrophy, has its specific indication, being essential to inform the patient about possible unwanted aesthetic results in case of a significant weight gain.

CONCLUSION

The association of VASER™ in liposuction is a safe and reproducible technique, with the advantage of improving the result of liposculpture.

COLLABORATIONS

WS Conception and design study, Data Curation, Final manuscript approval, Writing - Original Draft Preparation, Writing - Review & Editing

CPG Analysis and/or data interpretation, Conceptualization, Final manuscript approval, Project Administration, Writing - Review & Editing

REFERENCES

1. Danilla S. Rectus Abdominis Fat Transfer (RAFT) in lipoabdominoplasty: a new technique to achievefitness body contour in patients that requi re tummy tuck. Aesthetic Plast Surg. 2017 Dec;41(6):1389-99.
2. International Society of Aesthetic Plastic Surgery (ISAPS). ISAPS International Survey on Aesthetic/Cosmetic Procedures Performed in 2018 [Internet]. Hanover: ISAPS; 2018; [access in 2019 mar 31]. Available from: https://www.isaps.org/wp-content/uploads/2019/12/ISAPS-Global-Survey-Results-2018-new.pdf
3. Illouz YG. Surgical remodeling of the silhouette by aspiration lipolysis or selective lipectomy. Aesthetic Plast Surg. 1985;9(1):7-21.
4. Illouz YG. Body sculpturing by lipoplasty. New York: Churchill-Livingstone; 1989.
5. Mentz H, Gilliland M, Patronella C. Abdominal etching: differential liposuction to detail abdominal musculature. Aesthetic Plast Surg 1993;17(4):287-90.
6. Hoyos A, Millard JA. VASER-assisted high-definition liposculpture. Aesthet Surg J. 2007 Nov/Dec;27(6):594-604.
7. Hoyos A, Perez M. Dynamic-definition male pectoral reshaping and enhancement in slim, athletic, obese, and gynecomastic patients through selective fat removal and grafting. Aesthetic Plast Surg. 2012 Oct;36(5):1066-77.
8. Hoyos A, Perez ME, Guarin DE, Montenegro A. A report of 736 high- definition lipoabdominoplasties performed in conjunction with circumfer ential VASER liposuction. Plast Reconstr Surg. 2018 Sep;142(3):662- 75.
9. Scuderi N, Devita R, D'Andrea F, Vonella M. Nuove prospettive nella liposuzione la lipoemulsificazone. Giorn Chir Plast Ricostr ed Estetica. 1987;2(2):33-9.
10. Jewell ML, Fodor PB, Pinto EBS, Al Shammari MA. Clinical application of VASER-assisted lipoplasty: a pilot clinical study. Aesthetic Surg J. 2002;22:131-46.
11. Graf R, Auersvald A, Damasio RCC, Araújo LRR, Rippel R, Graça Neto L, et al. Lipoaspiração ultra-sônica - análise de 348 casos. Rev Bras Cir Plást. 2002;17(3):37-46.
12. Patronella CK. Redefining abdominal anatomy: 10 key elements for restoring form in abdominoplasty. Aesthet Surg J. 2015 Nov;35(8):972- 86.
13. Trussler AP, Kurkjian TJ, Hatef DA, Farkas JP, Rohrich RJ. Refinements in abdominoplasty: a critical outcomes analysis over a 20-year period. Plast Reconstr Surg. 2010 Sep;126(3):1063-74.
14. Motta RP. Lipoaspiração laser-assistida de alta definição. Rev Bras Cir Plást. 2018;33(1):48-55.
15. Danilla S, Babaitis RA, Jara RP, Quispe DA, Andrades PR, Erazo CA, et al. High-definition liposculpture: what are the complications and how to manage them?. Aesthetic Plast Surg. 2019 Aug.
16. Nagy MW, Vanek Junior PF. A multicenter, prospective, randomized, single-blind, controlled clinical trial comparing VASER-assisted lipoplasty and suction-assisted lipoplasty. Plast Reconstr Surg. 2012 Apr;129(4):681e-9e.
17. Swanson E. Improved skin contraction after Vaser-assisted lipoplasty: is it a change we can believe in?. Plast Reconstr Surg. 2012 Nov;130(5):754e-6e.
18. Matarasso A. Discussion: a multicenter, prospective, randomized, single- blind, controlled clinical trial comparing VASER-assisted lipoplasty and suction-assisted lipoplasty. Plast Reconstr Surg. 2012 Apr;129(4):690e-9e.
19. Garcia CP, Mattiello CM, Rendon NB, Zanol F, Vasconcellos ZAA, Ely JB. Lipoabdominoplastia HD: marcação e técnica. Rev Bras Cir Plást. 2019;34(0):128-31.
20. Duscher D, Atashroo D, Maan ZN, Luan A, Brett EA, Barrera J, et al. Ultrasound-assisted liposuction does not compromisse the regenerative potential of adipose-derived stem cells. Stem Cells Transl Med 2016;5(2):248-57.
21. Duscher D, Luan A, Rennert RC, Atashroo D, Maan ZN, Brett EA, et al. Suction assisted liposuction does not impair the regenerative potential of adipose derived stem cells. J Transl Med. 2016 May;14(1):126.
22. Duscher D, Maan ZN, Luan A, Aitzetmüller MM, Brett EA, Atashroo D, et al. Ultrasound-assisted liposuction provides a source for functional adipose-derived stromal cells. Cytotherapy. 2017 Dec;19(12):1491-1500.
23. Eto H, Kato H, Suga H, Aoi N, Doi K, Kuno S, et al. The fate of adipocytes after nonvascularized fat grafting: evidence of early death and replacement of adipocytes. Plast Reconstr Surg. 2012 May;129(5):1081- 92.

24. Bayter-Marin JE, Cárdenas-Camarena L, Aguirre-Serrano H, Durán H, Ramos-Gallardo G, Robles-Cervantes JA. Understanding fatal fat embolism in gluteral lipoinjection: a review of the medical records and atopsy reports of 16 patients. Plast Reconstr Surg. 2018 Nov;142(5):1198-208.

25. Alvarez-Alvarez FA, González-Gutiérrez HO, Ploneda-Valencia CF. Safe gluteal fat graft avoiding a vascular or nervous injury: an anatomical study in cadavers. Aesthet Surg J. 2019 Jan;39(2):174-84.

***Corresponding author:** **Caio Pundek Garcia**
Av. Osvaldo Reis, 3385, Sala 501 Praia Brava, Itajaí, SC, Brazil.
Zip Code: 88306-773
E-mail: caio_pgarcia@hotmail.com

Original Article

Modified reduction mammoplasty for optimization of oncological approach: initial results and literature review

Mamoplastia redutora modificada para otimização de abordagem oncológica: resultados iniciais e revisão da literatura

GABRIEL SALUM D'ALESSANDRO [1]*
ALEJANDRO POVEDANO [1]
FABIANA MIDORI TAKEUCHI [1]
NATALIA LIMA E SILVA CREMA [1]
JOÃO CARLOS SAMPAIO GÓES [1]

■ **ABSTRACT**

Introduction: Breast cancer is the second most common cancer among women. Constant scientific evolution has allowed increasingly less invasive surgical approaches, reducing treatment-related morbidity without cancer damage. The objective of this article is to show the surgical results and the versatility of reduction mammoplasty with the modified Pitanguy technique to optimize the immediate reconstruction associated with cancer surgery. **Methods:** We present the cases of three patients who underwent the proposed technique. Marking of the breast diagnosed with cancer is planned following the principles of reduction mammoplasty described by Pitanguy. However, the inferolateral resection triangle is transposed into the supratumoral area. It can be placed from the junction of the lateral quadrants (JLQ) to the superolateral quadrant (SLQ) of the oncological breast. **Results:** the three patients underwent the described technique associated with contralateral symmetrization mammoplasty with the Pitanguy technique. All were submitted to adjuvant radiation therapy, associated or not with chemotherapy. Two patients progressed without incident and one had a small necrosis of 1x1 cm at the flaps lower junction in the breast with cancer, which was treated conservatively without delaying the adjuvant treatment. All were satisfied with the aesthetic result. **Conclusion:** The described technique proved to be a good alternative for tumors located between the JLQ and the SLQ of the oncological breast. It provides broader resections and thus expands the indication for conservative surgery and reduces the need for radical surgery, with better aesthetic results without impairment of the cancer outcome

Keywords: Breast neoplasms; Mammoplasty; Mama; Segmental mastectomy; Breast diseases.

Institution: Instituto Brasileiro de Controle do Câncer (IBCC), Serviço de Cirurgia Plástica, São Paulo, SP, Brazil.

Article received: December 22, 2019.
Article accepted: March 2, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0029

[1] Instituto Brasileiro de Controle do Câncer (IBCC), Serviço de Cirurgia Plástica, São Paulo, SP, Brazil.

■ **RESUMO**

Introdução: O câncer de mama é a segunda neoplasia mais comum entre as mulheres. A constante evolução científica tem permitido abordagens cirúrgicas cada vez menos invasivas, diminuindo a morbidade relacionada ao tratamento sem prejuízo oncológico. O objetivo deste artigo é mostrar os resultados cirúrgicos e a versatilidade da mamoplastia redutora com a técnica de Pitanguy modificada, para otimização da reconstrução imediata associada à cirurgia oncológica. **Métodos:** Apresentamos os casos de três pacientes submetidas à técnica proposta. A marcação da mama com diagnóstico de câncer é planejada seguindo os princípios da mamoplastia redutora descrita por Pitanguy. Porém, o triângulo de ressecção inferolateral é transposto para a área supratumoral. Ele pode ser posicionado da junção dos quadrantes laterais (JQL) até o quadrante superolateral (QSL) da mama oncológica. **Resultados:** As três pacientes foram submetidas à técnica descrita associada à mamoplastia de simetrização contralateral com a técnica de Pitanguy. Todas realizaram radioterapia adjuvante, associada ou não à quimioterapia. Duas pacientes evoluíram sem intercorrências e uma apresentou pequena necrose de 1x1cm na junção inferior dos retalhos na mama com câncer, que foi tratada de maneira conservadora sem atrasar o tratamento adjuvante. Todas seguem satisfeitas com o resultado estético. **Conclusão:** A técnica descrita mostrou-se uma boa alternativa para tumores localizados entre a JQL e o QSL da mama oncológica, proporcionando ressecções mais amplas e dessa forma ampliando a indicação de cirurgia conservadora e reduzindo a necessidade de cirurgia radical, com melhores resultados estéticos sem prejuízo do desfecho oncológico.

Descritores: Neoplasias da mama; Mamoplastia; Mama; Mastectomia segmentar; Doenças mamárias.

INTRODUCTION

Breast cancer is the most common cancer among women after skin tumors. According to data from the National Cancer Institute (INCA), the estimate of new cases in Brazil is 57,900 for 2018, which corresponds to 29% of all diagnosed neoplasms. Statistics indicate a progressive increase in its incidence, which represents 24.2% of the total number of female cancer cases in the world in 2018. It is the fifth leading cause of cancer death overall (626,679 deaths) and the most frequent cause of death from cancer in women[1].

Malignant breast cancer has different histological types and diverse molecular profiles, allowing for increasingly individualized therapeutic approaches.

The constant scientific evolution, which generates a better understanding of breast cancer, has allowed surgical approaches that are less and less invasive, reducing treatment-related morbidity without cancer damage.

The first effective treatment for breast cancer was the radical mastectomy described by Halsted, in 1894[2], which was characterized by the resection of the breast (skin and gland), the two pectoral muscles and the three levels of the axillary lymph nodes in monoblock, obtaining low rates of local recurrence and good overall survival.

In 1948, Patey and Dyson[3] published a series of cases of radical mastectomies with pectoralis major muscle preservation, obtaining results similar to classical radical surgery with less morbidity.

Later, in 1965, Madden[4] published a study advocating the preservation of both pectoral muscles and obtained similar oncological results, with lower complication rates.

With their classic studies, begun in the 1970s, Veronesi et al., in 1981[5] and Fisher et al., in 1985[6], changed the paradigm of radicalism in breast cancer treatment. They noted that, in selected cases, breast-conserving (BCS) surgeries associated with radiation therapy provided oncological outcomes similar to those of radical surgeries and with a significant reduction in morbidity.

The main objective of BCS is the tumor resection with adequate margins, achieving favorable aesthetic

results. Good aesthetic results are associated with a better quality of life for women with breast cancer[7].

However, the main limitation of BCS is the relationship between the tumor resection area and the breast size. When this relationship is unfavorable, the observed surgical results are often unpleasant[8].

Therefore, in this unfavorable scenario, the association between oncological resection technique and mammoplasty becomes an effective alternative to avoid radical surgery. This technical association allows breast resections of 20-40% without cosmetic damage[9-11].

OBJECTIVE

In this article, we aim to show the surgical results and the versatility of the reduction mammoplasty recommended by Pitanguy, modified to optimize the immediate oncological approach and associated with the contralateral breast symmetrization.

METHODS

This is an observational, retrospective study, with a description of a series of consecutive clinical cases, carried out by reviewing medical records of patients operated and followed on an outpatient basis at the Brazilian Institute of Cancer Control (IBCC), São Paulo/SP.

It was approved by the Ethics Committee of the Research Institute and registered in the Brazil Platform (CAAE: 26068219.8.0000.0072). It was requested and accepted that patients' Free and Informed Consent (ICF) should not be asked, as it is an observational and retrospective study.

Data were collected from 3 patients who underwent modified reduction mammoplasty for oncological optimization, associated with the contralateral breast symmetrization, during the period from August 2018 to July 2019.

Surgical planning

Surgical planning is performed with a multidisciplinary approach, that is, with the interaction between oncological resection performed by the mastology team and breast reconstruction with local tissues associated with contralateral breast symmetrization, performed by the plastic surgery team. Marking of the breast diagnosed with cancer is planned following the principles of reduction mammoplasty described by Pitanguy. However, the inferolateral resection triangle is transposed into the supratumoral area. The exact location of this transposed triangle is not fixed and is individually adapted for each patient, according to the location of the lesion, for the technique optimization. It can be placed from the junction of the lateral quadrants (JLQ) to the superolateral quadrant (SLQ) of the oncological breast (Figure 1).

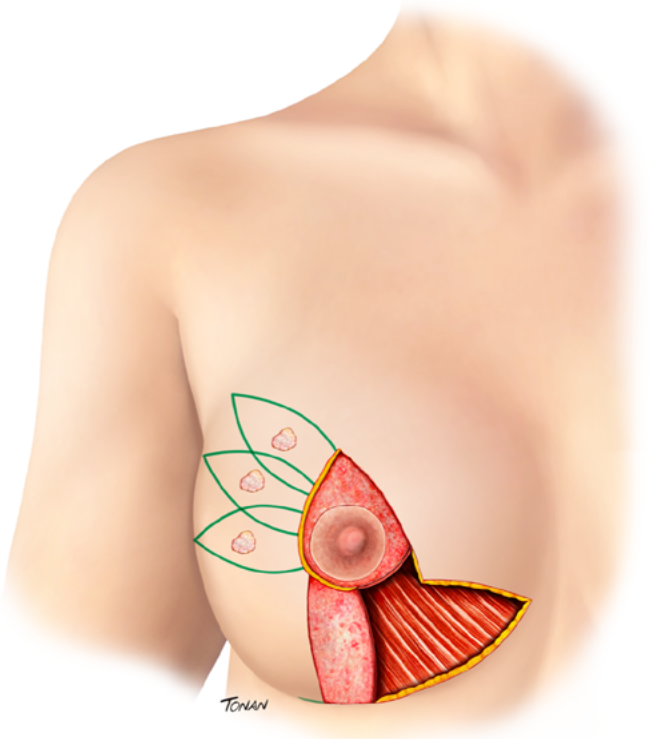


Figure 1. Surgical planning of the oncological breast.

The preferred pedicle to reposition the nipple-areola complex (NAC) is the superomedial one, since it does not interfere with oncological resection, even in lesions that reach the central region (CR) of the breast (Figure 1).

In lesions that achieve CR, wider resections are generally required to obtain satisfactory cancer margins. In these cases, to avoid an excessive reduction in breast volume, a de-epidermized flap of the lower breast region can be performed, with the objective of adequate volumetric replacement of the resected CR (Figure 1).

In lesions that reach the CR, broader resections are usually necessary to obtain satisfactory oncological margins. In these cases, to avoid excessive reduction in breast volume, a de-epidermized flap from the lower breast region can be performed, aiming at the adequate volumetric replacement of the resected CR (Figure 1).

The axillary approach, either to perform a sentinel node biopsy (SNB) or an axillary lymphadenectomy (AL), is performed through the same incision. Axillary access occurs through the transposed triangle end.

Symmetrization mammoplasty is performed following the principles of reduction mammoplasty described by Pitanguy, paying particular attention

to leaving the oncological breast with a volume 10% greater than the contralateral breast, since adjuvant radiotherapy, mandatory in conservative surgeries, reduces approximately 10% of this breast volume.

At the end of the procedure, the tumor bed is trimmed to help plan for adjuvant radiation therapy. Four radiopaque clips are applied to the cardinal points. The resulting scar in the oncological breast varies according to the supratumoral resection triangle position (Figure 2).

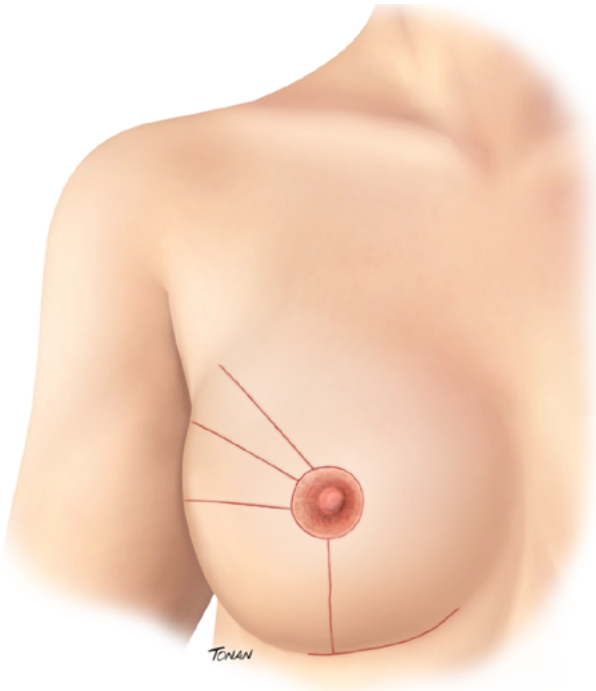


Figure 2. Resulting scars after performing the described technique.

RESULTS

The clinical, oncological and surgical data of the cases described are shown in Table 1.

Case 1

SDLF, 53 years old, diagnosed with invasive ductal carcinoma (IDC) of the right breast, pT2 pN1a, hybrid luminal subtype. Physical examination revealed breasts with grade 2 ptosis. The described technique was performed, with the transposed triangle placed at approximately 11 am on the right breast. The NACs were bilaterally repositioned with a superomedial pedicle. She underwent chemotherapy and adjuvant radiation therapy. The patient evolved without incident and was satisfied with the aesthetic result. Also, she was submitted to adjuvant radiation therapy. Photographic documentation with one year postoperative (Figure 3).

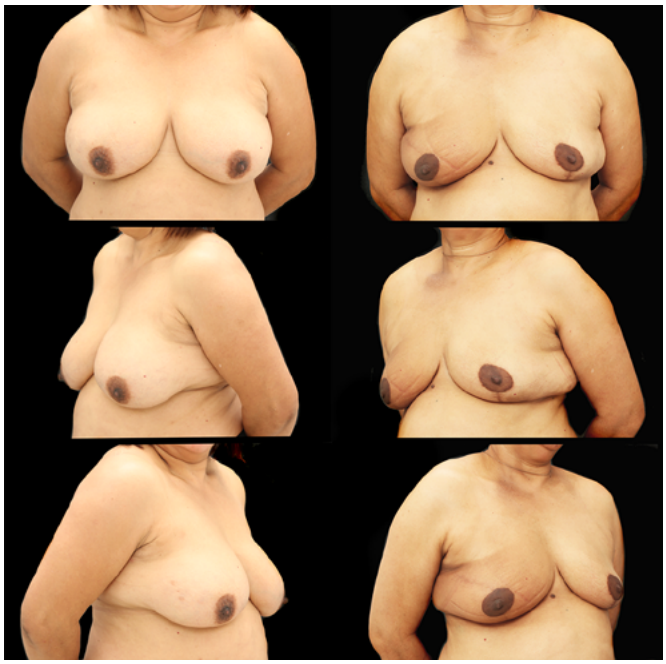


Figure 3. Results of the first case 1 year after the operation.

Table 1. Surgical and oncological characteristics of the cases treated with the described technique.

	Case 1	Case 2	Case 3
Age (years)	44	53	64
BMI (kg/m^2)	27.7	31.6	33
Breast cancer surgery	ROLL	ROLL	2 ROLL + 1 Needling
Axillary Surgery	SNB	SNB	SNB
Right breast weight (g)	470	380	390
Left breast weight (g)	540	435	460
Tumor size (mm)	26	29	13 e 10
Tumor Site	2h ME	11h MD	9H MD
Histological type	IDC	IDC + IDCS	
Molecular subtype	Negative Triple	Luminal B HER2+	Luminal B

SNB (Sentinel Lymph Node Biopsy). ROLL (Radioguided occult lesion localization). IDC (Invasive Ductal Carcinoma); IDCS (Invasive Ductal Carcinoma In Situ).

Case 2

CAGS, 44 years old, diagnosed with IDC of the left breast, triple-negative, cT2 cN0. Physical examination revealed breasts with grade 3 ptosis. She underwent neoadjuvant chemotherapy with carboplatin + paclitaxel, followed by doxorubicin + cyclophosphamide, which showed a complete pathologic response. Oncogenetic evaluation performed without evidence of pathological genetic mutations related to hereditary breast cancer. The described technique was performed, with the transposed triangle placed at approximately 2 am in the left breast. The NACs were bilaterally repositioned with a superomedial pedicle. Adjuvant radiotherapy was performed. The patient evolved without incident and was satisfied with the aesthetic result. Photographic documentation with one year postoperative (Figure 4).

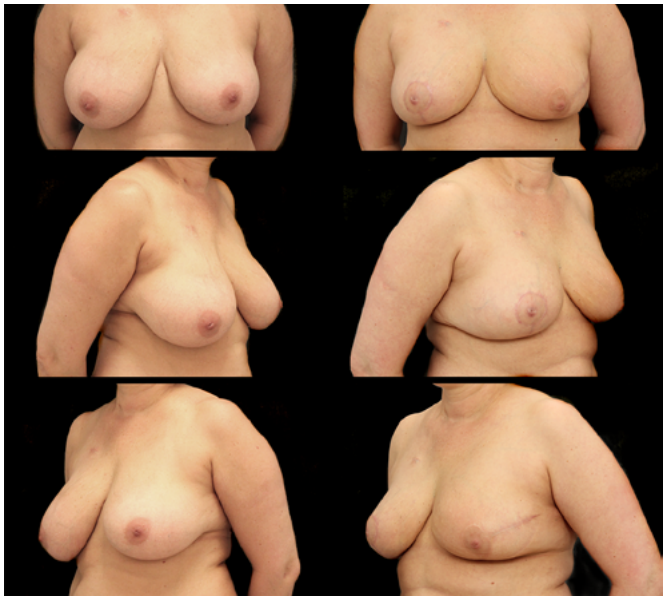


Figure 4. Results of the second case 1 year after the operation.

Case 3

MCLPF, 64 years old, diagnosed with multicentric IDC, pT1 (m) pN0 (ls), luminal subtype B, associated with sclerosing intraductal papilloma in the right breast. Physical examination revealed breasts with grade 3 ptosis. Preoperative planning included 3 vacuum aspiration biopsy clips in the surgical resection area (Figure 5):

1. Previous third of JLQ, periareolar (vacuum biopsy with IDC result);
2. Middle third of SLQ (vacuum biopsy with IDC result);
3. Posterior third of JLQ (vacuum biopsy resulting from sclerosing intraductal papilloma).

It was performed the described technique with the placement of the transposed triangle at approximately 9 a.m. on the right breast. In this case, due to the oncology need, surgical resection was extended to the CR, and the epidermis flap of the lower region was used for volumetric optimization of the reconstruction (Figures 6 and 7). The NACs were bilaterally repositioned with a superomedial pedicle.

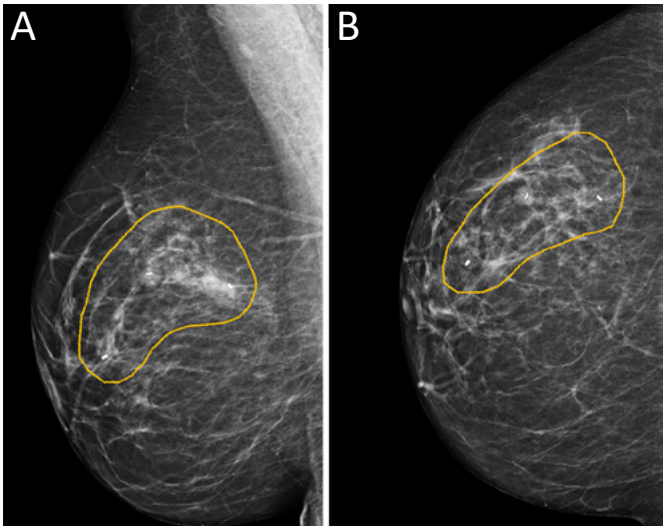


Figure 5. Mammography for preoperative planning showing 3 vacuum aspiration biopsy clips were included in the surgical resection area.

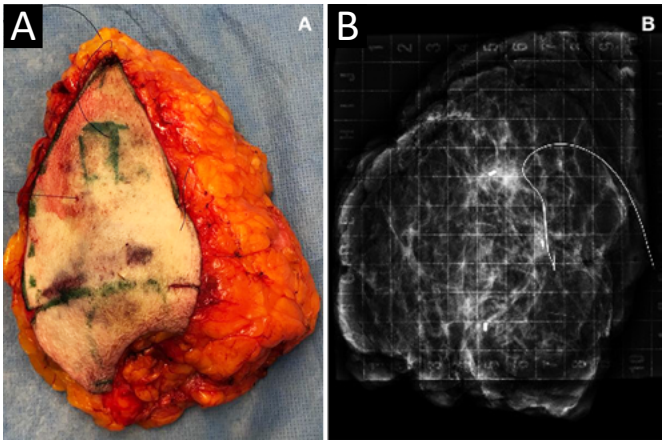


Figure 6. Surgical specimen and mammogram of the same specimen showing the effective resection of the area containing the 3 clips.

The patient evolved with a small necrosis of 1x1 cm at the junction of the lower flap, in the right breast, which was treated conservatively, with good evolution. The patient evolved satisfied with the aesthetic result. Photographic documentation two months after surgery, before adjuvant radiotherapy (Figure 8).

DISCUSSION

Classically, breast-conserving surgery (BCS) is indicated for women with unilateral breast cancer, up to 5 cm (T1 or T2) or tumors whose breast resection does not exceed 20 to 25% of the volume.

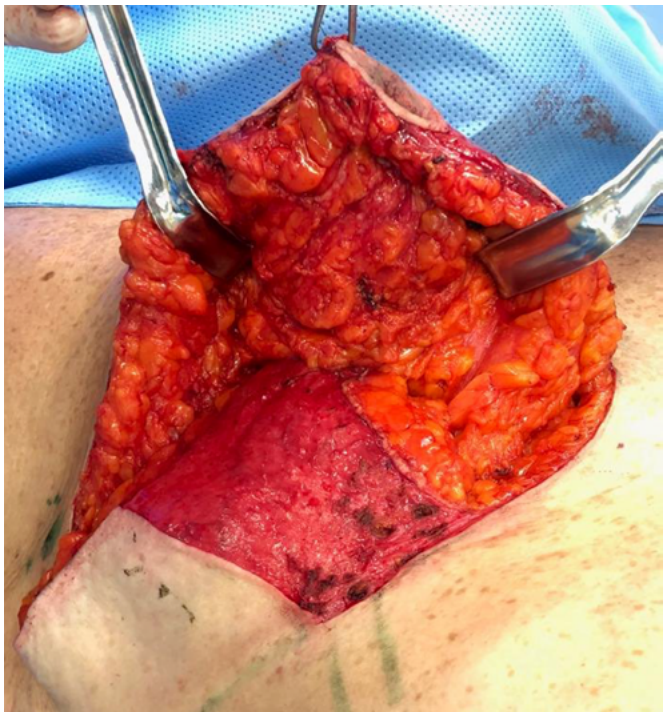


Figure 7. Breast reconstruction with placement of the de-epidermised flap from the lower region for volumetric optimization.

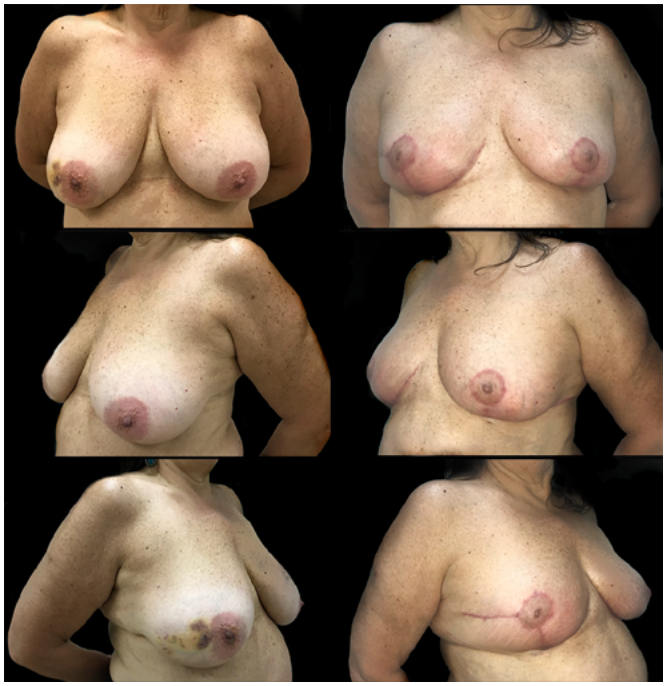


Figure 8. Results of the third case 2 months after surgery, before radiotherapy.

Conservative breast surgeries that require more extensive resections are associated with residual cosmetic deformities in up to 30% of cases[12,13]. In general, these changes have a significant impact on the quality of life of these women and result in enormous challenges for the correction or secondary aesthetic improvement of the breast due to technical difficulties and the risk of tissue mobilization in the irradiated breasts.

Thus, the oncological approaches associated with mammoplasty techniques, named as oncoplastic breast surgery (OBS), have as one of their main indications, the decrease in the rates of aesthetic dissatisfaction with conservative surgery associated with major breast resections[14].

In addition to this vital indication, other practical applications of OBS are the technical possibility of performing breast-conserving surgery in multifocal, multicentric lesions and tumors larger than 5 cm (T3) or requiring breast resection greater than 25% of the breast volume, without aesthetic damage[14]. Classically, these cases would be indications for radical surgery.

In a recent literature review article, breasts showing aesthetically favorable surgical results were observed in 90.2% of patients who underwent OBS[8]. In women who underwent traditional BCS, the rates were 60 to 80%[14,15].

Concerning oncological aspects, OBS presents results similar to BCS; that is, they present the same oncological safety. However, there is the advantage of providing lower repair rates due to inadequate surgical margins in OBS[8].

Classically, the inverted "T" reduction mammoplasty technique, described in our country by Pitanguy, in 1967[16], is an excellent alternative for OBS when the oncological area to be resected is located in the area of the classic marking of the technique, generally at the lower breast pole. When this area is outside the mark, it is often necessary to make skin flaps, sometimes extensive, to access the desired location. This fact increases the risk of complications such as skin flaps necrosis, steatonecrosis, and dehiscence of the surgical wound.

Immediate repairs of tumors located in the superolateral quadrants of voluminous breast were addressed by Carramaschi et al., in 1991[17]. The technique illustrated in this article was described by Ching et al., in 1997[18], it was presented in the II Latin American Convention of the European School of Oncology. In 2015[19,20], Silverstein et al., disseminated the technique on an international bibliographic base, calling it " Oncoplastic Split Reduction."

In the described technique, the inferolateral resection area was transposed to the breast superolateral region, more precisely from 9 to 11 a.m. in the right breast or from 1 to 3 a.m. in the left breast (Figure 1). We have to remember that approximately 50% of breast carcinomas occur in this location.

This modification of the reduction mammoplasty for the oncological approach allows a surgical technique with less breast devascularization, with easy access to the tumor region without the need to perform wide skin flaps. Besides, it has the possibility of supratumoral

skin resection when it is oncologically indicated, which allows access to the axillary region without the need for an additional incision.

This technique results in surgical procedures with less risk of complications, a fact of extreme importance in cancer surgery, to reduce the risk of delay in the start of adjuvant treatment.

In the small series of cases presented, we observed that it is a safe, oncologically effective, versatile procedure for various tumor locations and with a high rate of patient satisfaction.

CONCLUSION

The described technique proved to be a good alternative for tumors located between the JLQ and the SLQ of the oncological breast, providing ample and safe resections.

ACKNOWLEDGMENT

To the medical illustrator Rodrigo Tonan, who masterfully created the figures used in the article.

COLLABORATIONS

GSD	Analysis and/or data interpretation, conception and design study, conceptualization, data curation, final manuscript approval, formal analysis, funding acquisition, investigation, methodology, project administration, realization of operations and/or trials, resources, software, supervision, validation, visualization, writing - original draft preparation, writing - review & editing.
AP	Final manuscript approval.
FMT	Data curation, final manuscript approval, writing - original draft preparation.
NLSC	Data curation, final manuscript approval, writing - original draft preparation.
JCSG	Final manuscript approval.

REFERENCES

1. Instituto Nacional José de Alencar Gomes da Silva (INCA). Estimativa 2018: incidência do câncer de mama no Brasil [Internet]. Rio de Janeiro (RJ): INCA; 2018; [acesso em 2019 setembro 30]. Disponível em: http://www1.inca.gov.br/rbc/n_64/v01/pdf/15-resenha-estimativa-2018-incidencia-de-cancer-no-brasil.pdf
2. Halsted WS. I. the results of operations for the cure of cancer of the breast performed at the johns hopkins hospital from June, 1889, to January, 1894. Ann Surg. 1894 Nov;20(5):497-555.
3. Patey DH, Dyson WH. The prognosis of carcinoma of the breast in relation to the type of operation performed. Br J Cancer. 1948 Mar;2(1):7-13.
4. Madden JL. Modified radical mastectomy. Surg Gynecol Obstet. 1965 Dec;121(6):1221-30.
5. Veronesi U, Saccozzi R, Del Vecchio M, Banfi A, Clemente C, Delena M, et al. Comparing radical-mastectomy with quadrantectomy, axillary dissection, and radiotherapy in patients with small cancers of the breast. N Engl J Med. 1981 Jul;305(1):6-11.
6. Fisher B, Bauer M, Margolese R, Poisson R, Pilch Y, Redmond C, et al. Five-year results of a randomized clinical-trial comparing total mastectomy and segmental mastectomy with or without radiation in the treatment of breast-cancer. N Engl J Med. 1985 Mar;312(11):665-73.
7. Rowland JH, Desmond KA, Meyerowitz BE, Belin TR, Wyatt GE, Ganz PA. Role of breast reconstructive surgery in physical and emotional outcomes among breast cancer survivors. J Natl Cancer Inst. 2000 Sep;92(17):1422-9.
8. Papanikolaou IG, Dimitrakakis C, Zagouri F, Marinopoulos S, Giannos A, Zografos E, et al. Paving the way for changing perceptions in breast surgery: a systematic literature review focused on oncological and aesthetic outcomes of oncoplastic surgery for breast cancer. Breast Cancer. 2019 Jul;26(4):416-27.
9. Rainsbury RM. Training and skills for breast surgeons in the new millennium. ANZ J Surg. 2003 Jul;73(7):511-6.
10. Baildam AD. Oncoplastic surgery of the breast. Br J Surg. 2002;89(5):532-3.
11. Rew DA. Towards a scientific basis for oncoplastic breast surgery. Eur J Surg Oncol. 2003 Mar;29(2):105-6.
12. Curran D, van Dongen JP, Aaronson NK, Kiebert G, Fentiman IS, Mignolet F, et al. Quality of life of early-stage breast cancer patients treated with radical mastectomy or breast-conserving procedures: results of EORTC trial 10801. Eur J Cancer. 1998 Feb;34(3):307-14.
13. Kronowitz SJ, Feledy JA, Hunt KK, Kuerer HM, Youssef A, Koutz CA, et al. Determining the optimal approach to breast reconstruction after partial mastectomy - reply. Plast Reconstr Surg. 2006 Sep;118(3):813-4.
14. Losken A, Dugal CS, Styblo TM, Carlson GW. A meta-analysis comparing breast conservation therapy alone to the oncoplastic technique. Ann Plast Surg. 2014 Feb;72(2):145-9.
15. Tenofsky PL, Dowell P, Topalovski T, Helmer SD. Surgical, oncologic, and cosmetic differences between oncoplastic and nononcoplastic breast conserving surgery in breast cancer patients. Am J Surg. 2014 Mar;207(3):398-402.
16. Pitanguy I. Surgical treatment of breast hypertrophy. Br J Plast Surg. 1967 Jan;20(1):78-85.
17. Carramaschi F, Yamaguchi C, Herson M, Alonso N, et al. Immediate breast reconstruction after quadrantectomy. Rev Soc Bras Cir Plast. 1991;6(3):73-7.
18. Ching AW, Tietnens M, Garcia EB, Huffembaucher R, Carramaschi F, et al. Breast reconstruction in the upper-external quadrantectomy associated eith eight reduction mammaplasty. In: II Convenção Latino-Americana do European School of Oncology - ESO. São Paulo, Brasil. São Paulo (SP): Comitê Brasileiro da ESO; 1997. p. 22.
19. Silverstein MJ, Savalia N, Khan S, Ryan J. Extreme oncoplasty: breast conservation for patients who need mastectomy. Breast J. 2015 Jan/Feb;21(1):52-9.
20. Silverstein MJ, Savalia NB, Khan S, Ryan J, Epstein M, DeLeon C, et al. Oncoplastic split reduction with intraoperative radiation therapy. Ann Surg Oncol. 2015;22(10):3405.

***Corresponding author:** **Gabriel Salum D'Alessandro**
Av. Alcântara Machado, nº 2576 - Mooca, São Paulo, SP, Brazil
Zip Code 03102-002
E-mail: gsdalessandro@yahoo.com.br

Original Article

Microbiological profile and antimicrobial resistance profile of patients admitted to the Burn Unit of Hospital Geral "José Pangella" in Vila Penteado in Vila Penteado, Brazil

Perfil microbiológico e de resistência aos antimicrobianos dos pacientes internados na Unidade de Queimaduras do Hospital Geral "José Pangella" de Vila Penteado

ADRIANO FERNANDES ARAÚJO [1]*
ELAINE MARLENE TACLA [1]

■ **ABSTRACT**

Introduction: Burns are responsible for about 180,000 deaths per year worldwide and about 1,000,000 accidents, more than 100,000 hospital admissions and 2,500 deaths per year in Brazil. Among the causes of morbidity and mortality of burn patients, infections stand out. Knowledge of the microbiological profile and appropriate treatment of infection cases impact on the decrease in morbidity and mortality rates. The Objetive is to analyze the microbiological profile and antimicrobial resistance profile of patients admitted to the Burn Unit of the General Hospital "José Pangella" of Vila Penteado from 2011 to 2018. **Methods:** This is a retrospective study and surveyed all microbiological examinations of patients hospitalized for burns at the "José Pangella" Burns Unit of Vila Penteado General Hospital, located in the city of São Paulo, from January 2011 until the end of December 2018. **Results:** 495 microorganisms were isolated, being 436 bacteria (88,080%) and 59 fungi (11,919%). Among the samples analyzed, the highest prevalence was *Staphylococcus sp*., followed by Pseudomonas sp., *Klebsiella sp*., *Candida sp*. and *Acinetobacter sp*. **Conclusion:** Handling burn patients remains a major challenge for burn treatment centers. Identifying the pathogens responsible for patients infections may result in optimal treatment, with an effective antibiotic choice and reducing the morbidity and mortality of these patients, as well as significantly reducing hospitalization time and costs.

Keywords: Burn units; Burns; Microbial sensitivity tests; Indicators of morbidity and mortality; Bacterial infections and mycoses; Bacterial infections.

Institution: Hospital Geral "José Pangella" de Vila Penteado, Departamento de Cirurgia Plástica e Queimaduras, São Paulo, SP, Brazil.

Article received: October 20, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0030

[1] Hospital Geral "José Pangella" de Vila Penteado, Departamento de Cirurgia Plástica e Queimaduras, São Paulo, SP, Brazil.

■ **RESUMO**

Introdução: As queimaduras são responsáveis por cerca de 180.000 mortes por ano no mundo e cerca de 1.000.000 de acidentes, mais de 100.000 internações hospitalares e 2.500 mortes por ano no Brasil. Dentre as causas de morbidade e mortalidade do paciente queimado, destacam-se as infecções. O conhecimento do perfil microbiológico e o adequado tratamento dos casos de infecção impactam na diminuição nas taxas de morbimortalidade. O objetivo é analisar o perfil microbiológico e de resistência aos antimicrobianos dos pacientes internados na Unidade de Queimaduras do Hospital Geral "José Pangella" de Vila Penteado, durante o período de 2011 a 2018. **Métodos:** O estudo é retrospectivo e levantou todos os exames microbiológicos dos pacientes internados por queimaduras na Unidade de Queimaduras do Hospital Geral "José Pangella" de Vila Penteado, localizado na cidade de São Paulo, durante o período de janeiro de 2011 até o final de dezembro de 2018. **Resultados:** Foram isolados 495 microrganismos, sendo 436 bactérias (88,080%) e 59 fungos (11,919%). Entre as amostras analisadas, a maior prevalência foi do *Staphylococcus sp*., seguido por Pseudomonas sp. e Klebsiella sp., destacando-se, ainda, Candida sp. e Acinetobacter sp. **Conclusão:** O manuseio dos pacientes vítimas de queimaduras continua sendo um grande desafio para os centros de tratamento de queimaduras. Identificar os patógenos responsáveis pelas infecções dos pacientes pode acarretar em uma otimização do tratamento, com a escolha de um antibiótico eficaz, e, dessa forma, acarretar na redução da morbimortalidade desses pacientes, além de diminuir tempo de internação e custos utilizados de maneira significativa.

Descritores: Unidades de queimados; Queimaduras; Testes de sensibilidade microbiana; Indicadores de morbimortalidade; Infecções bacterianas e Micoses; Infecções bacterianas.

INTRODUCTION

Burns are considered a public health problem due to their high prevalence[1]. They are responsible for around 180,000 deaths per year worldwide[2] and are classified as the fourth most common type of trauma, second only to traffic accidents, falls, and interpersonal violence [3]. They mainly affect low-income and developing countries, where mortality is up to 11 times higher than in developed countries[3]. The United States has the highest burn victim mortality rate among industrialized countries. In Brazil, according to the *Sociedade Brasileira de Queimaduras* (SBQ Brazilian Burns Society), burns are responsible for approximately 1,000,000 accidents, more than 100,000 hospitalizations, and 2,500 deaths per year[4-7].

Among the causes of morbidity and mortality of burned patients, infections stand out (the leading cause of mortality in Brazil and worldwide)[8]. Therefore, 75% of deaths in patients with 40% or more surface area body burns are due to secondary infections[9].

It is inferred, therefore, that knowledge of the microbiological profile responsible for infections in this group of patients and the choice of the most effective antibiotics in their treatment, would result in a decrease in morbidity and mortality rates and a shorter hospital stay and a lower number of interventions, thus resulting in a reduction in public spending.

OBJECTIVE

To analyze the microbiological and antimicrobial resistance profile of patients admitted to the Burns Unit of the General Hospital "*José Pangella*" in *Vila Penteado*, during the period from 2011 to 2018.

METHODS

The study was submitted to the Ethics and Research Committee of the General Hospital of *Grajaú - Associação Congregação de Santa Catarina* (Opinion Number: 3,635,831) and, after its approval (CAAE

23032719.9.0000.5447), we were given access to the clinical records of patients admitted to the Burns Unit.

This one is a retrospective, cross-sectional study, through the analysis of all microbiological exams of patients hospitalized for burns at the Burn Unit of the General Hospital "*José Pangella*" in *Vila Penteado*, located in the city of São Paulo, from January 2011 to the end of December 2018.

All patients were submitted to the Free and Informed Consent Form (FICF) and agreed with it.

Patients of both sexes, aged between 8 and 91 years, were evaluated. The burned body surface varied according to each patient.

The patients were admitted to the burn unit in the period analyzed, according to the following admission criteria: partial-thickness burns> 10% of the burned body surface (BBS); burns in particular regions (face, hands, feet, genitals, perineum, neck, or large joints); partial or full-thickness deep burns at any age; circumferential burns at any age; electrical, chemical burns, suspected of inhalation injury, associated with trauma or concomitant disease; In addition to critically ill patients who needed intensive care[10].

Four hundred twenty-six culture exams of a total of 250 patients admitted to the unit in the specified period were analyzed. Such samples were collected during the entire period of hospitalization of the patient, both at the time of admission and at times with an infectious clinic.

Cultures of blood samples (247 samples), urine (31 samples), tracheal discharge (2 samples), vaginal discharge (1 sample), anal swab (12 samples), axillary swab (2 samples), oral swab (1), nasal swab (2 samples), discharge from the lesion (77 samples) and catheter tip (51 samples) were analyzed. All the samples were collected following the collection rules of the Hospital Infection Control Center (CCIH) of the hospital, so that there was no contamination, and they were sent and processed by the laboratory of the *Associação Fundo de Incentivo à Pesquisa* (AFIP Incentive Association for Research), located in the city of Sao Paulo The collected samples were seeded in specific culture media (blood agar, chocolate agar, and MacConkey agar) and were identified after growth.

In addition to counting the microorganisms present, their sensitivity to the antibiotics currently used in the corresponding groups was also verified, reading their respective antibiograms. These antibiograms, as well as the cultures, were also analyzed and released by the laboratory of the *Associação Fundo de Incentivo à Pesquisa* (AFIP), located in the city of São Paulo.

RESULTS

Four hundred twenty-six microbiological examinations of 250 different patients who were admitted to the Burned Unit of the General Hospital "*José Pangella*" in *Vila Penteado* from January 2011 to the end of December 2018 were evaluated. From these tests, 495 microorganisms were isolated, 436 bacteria (88,080%) and 59 fungi (11,919%) (Table 1).

Of these 426 microbiology exams, they were evaluated 247 blood culture samples (57.891%), 31 urine cultures (7.276%), 51 catheter tip cultures (11.971%), 2 tracheal secretion samples (0.449%), 1 of vaginal secretion (0.234%), 12 samples of anal swab (2.816%), 2 samples of axillary swab (0.469%), 1 oral swab (0.234%), 2 nasal swab (0.469%) and 77 samples of secretion from burned injuries (18.075%).

From these exams, we can highlight blood cultures, catheter tip samples (associated with another positive blood culture) and urine cultures (total of 355 samples or 77.138% of the total) as representative of systemic infection with laboratory microbiological evidence, since they represented circulation of the microorganisms and were collected at moments compatible with the patient's infectious clinical condition. These samples were called, by the author, clinically relevant to the study.

Among the samples analyzed, the highest prevalence was *Staphylococcus sp*. (130 cases or 26.262%), followed by *Pseudomonas sp*. (102 cases or 20.606%) and *Klebsiella sp*. (61 cases or 12.323%), with *Candida sp*. (58 cases or 11.717%) and *Acinetobacter sp*. (57 cases or 11.515%) (Figure 1).

There was also an increase in the positivity of the samples in recent years, with *Staphylococcus sp*., *Pseudomonas sp*., *Acinetobacter sp*., and *Klebsiella sp*. (Figure 2).

Table 1. Distribution of microbiological tests.

	2011	2012	2013	2014	2015	2016	2017	2018	Total
Patients	6	30	43	14	17	36	65	39	250
Cultures	7	61	88	17	30	51	105	67	426
Microorganisms	7	67	97	17	30	62	130	85	495
Bacterias	5	58	73	17	28	60	122	73	436
Fungi	2	9	24	0	2	2	8	12	59

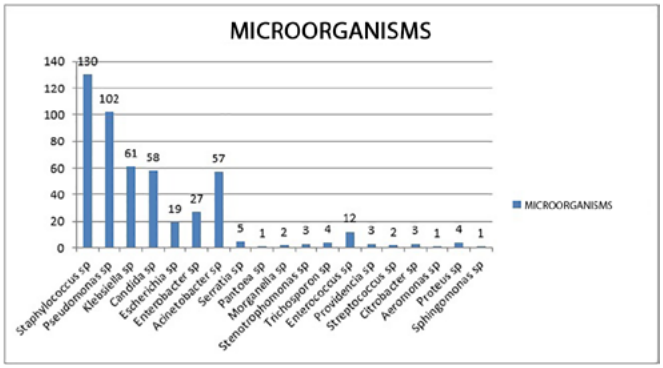


Figure 1. Prevalence of positive samples as a percentage in the period 2011 to 2018.

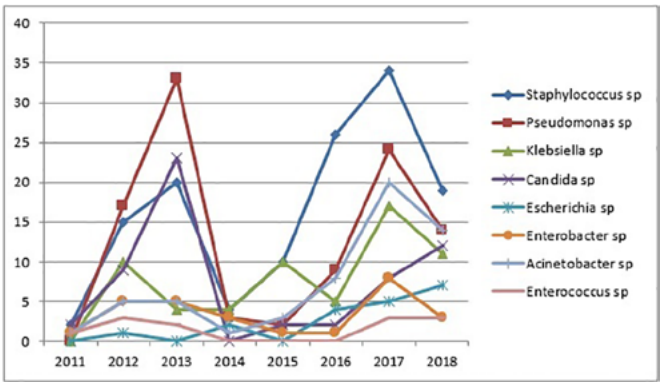


Figure 2. Positive samples of the main microorganisms from 2011 to 2018.

The antibiotic sensitivity profiles of the five most common microorganisms in the study (*Staphylococcus sp., Pseudomonas sp., Klebsiella sp., Acinetobacter sp.* and *Enterobacter sp.*) were also analyzed, disregarding *Candida sp.*, since antifungigram is not routinely performed, as the mutation profile for resistance to yeast antifungals is low (28). The strains of *Staphylococcus sp.* were sensitive to Vancomycin (128 out of 130 microbiological tests or 98.461%), Linezolid (124 out of 130 or 95.384%) and Teicoplanin (120 out of 130 or 92.307%), while being resistant to Penicillin (123 out of 130 or 94.615%), Erythromycin (88 out of 130 or 67.692%) and Clindamycin and Oxacillin (84 out of 130 or 64.615%). *Pseudomonas sp.* was sensitive to Polymyxin B (96 in 102 or 94,117%), Amikacin (40 in 102 or 39,215%) and Imipenem (37 in 102 or 36,274%), while being resistant to Ceftazidime (81 in 102 or 79,411%), Ciprofloxacin (79 in 102 or 77,450%), Meropenem (76 in 102 or 74,509%) and Piperazine-Tazobactam (73 in 102 or 71,568%). *Klebsiella sp.* was sensitive to Amikacin (44 in 61 or 72.131%), Imipenem (30 in 61 or 49.180%), Gentamicin (29 in 61 or 47.540%) and Meropenem (27 in 61 or 44.262%), while being resistant to Ampicillin (57 in 61 or 93.442%), Ciprofloxacin 46 in 61 or 75.409%), Cefepime (45 in 61 or 73.770%) and Ceftriaxone (44 in 61 or 72.131%). *Acinetobacter sp.* was sensitive to Polymyxin B (56 in 57 or 98.245%), Amikacin (43 in 57 or 75.438%) and Gentamicin (42 in 57 or 73.684%), while being resistant to Ceftriaxone (49 in 57 or 85.964%), Ceftazidime (41 out of 57 or 71.929%) and Cefepime, Imipenem and Meropenem (39 out of 57 or 68.421%). Finally, *Enterobacter sp.* was sensitive to Amikacin and Imipenem (25 in 27 or 92.592%), Ertapenem and Meropenem (24 in 27 or 88.888%) and Ciprofloxacin (20 in 27 or 74.074%), while being resistant to Ampicillin (25 in 27 or 92.592%) %), Ceftazidime (24 out of 27 or 88.888%) and Ceftriaxone (23 out of 27 or 85.185%) (Figures 3 and 4).

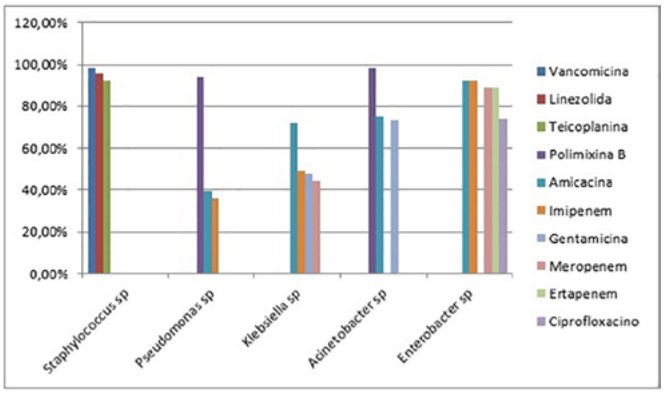


Figure 3. Bacteria sensitive to antibiotics.

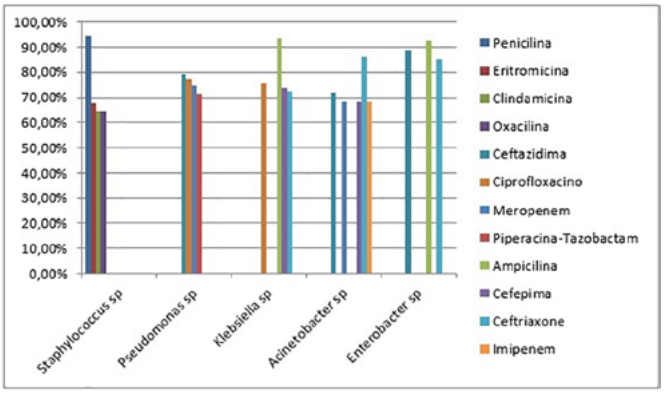


Figure 4. Bacteria resistant to antibiotics.

DISCUSSION

The infection of the burn patient remains a significant cause of morbidity and mortality in this group of patients despite having decreased in incidence in recent years due to improvements in diagnosis and treatment. It mostly affects the male population with 63% of cases[11] and, around 50% of patients with the burned body surface, 20% develop sepsis[12], while 75% of deaths in patients with 40% or more of burned body surface are due to secondary infections[9]. Other

literatures point out infections as responsible for about 75% of all deaths in this group[13-15], preferentially affecting the extremes of age groups, such as children (mainly 0-10 years old) and the elderly[13,16,17]. Some studies mention that burns in the child population represent up to 50% of all severe burns, in addition to the population up to 5 years old, representing 50-80% of all childhood burns[1].

According to Coutinho et al., 2015[18], the average body surface burned in 171 patients admitted to the ICU was 28%.

In Brazil, data from the Ministry of Health show that spending on burn victims can reach up to one million reais per month[19], with daily expenses of US $ 1,000 per day[20] for non-fatal cases and more than R $ 1,620.00 for those who die[21,22].

Despite being the fourth most common type of trauma, behind traffic accidents, falls, and interpersonal violence[3], burns have the third place in accidental deaths in the world[21], hence its great importance in public health worldwide. Its leading cause of hospitalization in adults is fire and flammable burns and scalds in pediatric patients[1,10]. According to the National Burn Information Exchange (1996), 60% of accidents happen in the home environment. Luiz Philipe Molina Vana, plastic surgeon and president of SBQ, says that this figure rises to 77%.

The risk of the burned patient contracting an infection varies according to the extent and depth of the injury[14,23]. These lesions, to a greater or lesser degree, are responsible for breaking the protective barrier of the skin, which facilitates the entry of microorganisms, in addition to the immunological depression caused in these patients, the formation of necrosis as a favorable environment for bacterial proliferation, of the various invasive procedures, the extended hospital stay of these patients, the gastrointestinal bacterial translocation, among others[13]. There is also vascular obstruction caused by thermal injury, which hinders the arrival of both antimicrobials and components of the immune system to the burned area[15].

Contaminated wounds usually present phlogistic characteristics, such as hyperemia, heat, and discharge of secretion, in addition to, in cases of bacteremia, dysthermias and leukocytosis. Necrosis is a crucial culture medium for the growth of opportunistic microorganisms and needs to be removed as soon as possible. In the first 48 hours, the wounds are already colonized by gram-positive bacteria, which can be reduced with the use of topical antimicrobials. After about 5 to 7 days, however, they are colonized by gram-negative bacteria, of hospital origin or origin of the gastrointestinal or respiratory tracts[24,25], which can have severe consequences for the patient, such as serious infections and increased morbidity and mortality.

According to Nasser et al., 2003[26], in the first week of hospitalization, gram-negative bacteria were predominant (55.7%) against gram-positive bacteria (40.3%), whereas, in the second week, this predominance of gram-negatives becomes even more evident (72.7% x 22.7%). Among bacterial pathogens, we must highlight the microorganisms that potentially cause serious infections, such as the gram-positive *methicillin-resistant Staphylococcus aureus* (MRSA) and the gram-negative *Pseudomonas aeruginosa*, requiring broad-spectrum antibiotic coverage. Its use on a large scale, however, favors the growth of fungal microorganisms, such as *Candida, Aspergillus, and Mucor*[9].

Staphylococcus aureus, the most prevalent pathogen in wounds and blood cultures after the advent of Penicillin, has a mortality rate of up to 30% and can reach 45% when it comes to MRSA. The group A Beta Hemolytic Streptococcus, group A, the primary pathogen present in burn wounds before the development of Penicillin, stands out as a gram-positive[27,28].

Of the gram-negatives, *P. aeruginosa* (most prevalent), *Acinetobacter baumanniie*, and *Enterococcus spp* stand out[9,15,29].

The importance of these pathogens lies, in addition to their higher virulence, in the great capacity to develop resistance to the antibiotic treatments currently used. The use of broad-spectrum drugs should be used carefully to try to avoid the spread of these pathogens, which corroborates the importance of research related to microbiological profiles. Studies show that, of the patients infected with *Acinetobacter baumanniie*, 46% develop bloodstream infection and, of these, 38% end up dying[30], showing the high virulence of the microorganism. Severe patients in the ICU or on mechanical ventilation for more than 24 hours are more likely to develop fungal infections, such as *C. tropicalis, C. parapsilosis, C. krusei*, and *C. glabrata*[31]. Thus, the knowledge of the profile of the most common microorganisms in each Burn Unit is essential to restrict the proliferation of these resistant pathogens.

The present study, as well as in the literature, demonstrates the prevalence of *Staphylococcus sp.* (26.262%), *Pseudomonas sp.* (20.606%) and *Acinetobacter sp.* (11.515%), in addition to highlighting the importance of others, such as *Klebsiella sp.* (12.323%) and *Candida sp.* (11.717%). It also shows a predominance of gram-negative (73.737%) over gram-positive (26.262%)[9].

CONCLUSION

The handling of burn victims remains a significant challenge for burn treatment centers. Identifying the pathogens responsible for infections, as well as the appropriate choice of antibiotic therapy, can lead to an optimization of treatment and, thus, reduce the morbidity and mortality of these patients.

The rationalization of antimicrobial therapy is a mainstay of antibiotic administration programs and is associated with fewer side effects and lesser appearance of resistant microorganisms, in addition to significantly reducing hospital stay and costs.

Besides, it is observed that the number of positive cultures and infections remain high in the population studied, corroborating the importance of studying microbiological profiles.

COLLABORATIONS

AFA Analysis and/or data interpretation, conception and design study, conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, realization of operations and/or trials, resources, writing - original draft preparation, writing - review & editing.

EMT Conception and design study, conceptualization, final manuscript approval, methodology, project administration, supervision, validation, visualization, writing - review & editing.

REFERENCES

1. Medeiros ACS, Albuquerque BCH, Mignoni ISP, Pereima MJL, Baungratz MM, Feijó RS. Análise das causas de morte em uma unidade de queimados do Hospital Infantil Joana de Gusmão (HIJG), de janeiro de 1991 a dezembro de 2012. Rev Bras Queimaduras. 2013;12(3):153-8.
2. World Health Organization (WHO). Burns. Geneva: WHO; 2018; [acesso em 2019 agosto 16]. Disponível em: https://www.who.int/en/news-room/fact-sheets/detail/burns
3. Agbenorku P, Agbenorku M, Fiifi-Yankson PK. Pediatric burns mortality risk factors in a developing country's tertiary burns intensive care unit. Int J Burns Trauma. 2013 Jul;3(3):151-8.
4. Souza AA, Mattar CA, Almeida PC, Faiwichow L, Fernandes FS, Enéas Neto CA, et al. Epidemiological profile of patients admitted at Burn Unit Servidor Público Estadual de São Paulo Hospital. Rev Bras Queimaduras. 2009;8(3):87-90.
5. Henrique DM, Silva LD, Costa ACR, Rezende APMB, Santos JAS, Menezes MM, et al. Controle de infecção no centro de tratamento de queimados: revisão de literatura. Rev Bras Queimaduras. 2013;12(4):230-4.
6. Arruda FCF. Comparação de escores de gravidade para previsão de mortalidade e tempo de internação em unidade de queimados. Rev Bras Queimaduras. 2017;16(3):142-9.
7. Ministério da Saúde (BR). Queimados. Brasília (DF): Ministério da Saúde; 2017; [acesso em 2019 agosto 16]. Disponível em: http://www.saude.gov.br/component/content/article/842-queimados/40990-queimados
8. Church D, Elsayed S, Reid O, Winston B, Lindsay R. Burn wound infections. Clin Microbiol Rev. 2006 Apr;19(2):403-34.
9. Oliveira FL, Serra MCVF. Infecções em queimaduras: revisão. Rev Bras Queimaduras. 2011;10(3):96-9.
10. Neligan PC. Cirurgia Plástica - Extremidade Inferior, Tronco e Queimaduras. Amsterdã: Elsevier Editora Ltda.; 2015. vol. 4.
11. Pereira NCS, Paixão GM. Características de pacientes internados no centro de tratamento de queimados no estado do Pará. Rev Bras Queimaduras. 2017;16(2):106-10.
12. Sala LGP, Lima NL, Simioni PU, Ugrinovich LA. Principais patógenos envolvidos em casos de sepse em pacientes queimados: uma revisão de literatura. Rev Bras Queimaduras. 2016;15(3):164-168.
13. Macedo JL, Rosa SC, Castro C. Sepsis in burned patients. Rev Soc Bras Med Trop. 2003;36(6):647-52.
14. Sodré CNS, Serra MCVF, Rios JAS, Cortorreal CG, Maciera L, Morais EN. Perfil de infecção em pacientes vítimas de queimadura no Hospital Federal do Andaraí. Rev Bras Queimaduras. 2015;14(2):109-12.
15. Henrique DM, Silva LD, Costa ACR, Rezende APMB, Santos JAS, Menezes MM, et al. Controle de infecção no centro de tratamento de queimados: revisão de literatura. Rev Bras Queimaduras. 2013;12(4):230-4.
16. National Safe Kids Campaign (NSKC). Burn fact sheet. Washington, DC: NSKC; 2002.
17. Pruitt Junior BA, Goodwin CW, Mason Junior AD. Epidemiological, demographic and outcome characteristics of burn injury. In: Herndon DN, ed. Total burn care. London: Saunders; 2002. p. 16-30.
18. Coutinho JGV, Anami V, Alves TDO, Rossatto PA, Martins JIS, Sanches LN, et al. Estudo de incidência de sepse e fatores prognósticos em pacientes queimados. Rev Bras Queimaduras. 2015;14(3):193-7.
19. Rossi LA, Ferreira E, Costa ECFB, Bergamasco EC, Camargo C. Prevenção de queimaduras: percepção de pacientes e de seus familiares. Rev Latino-Am Enferm. 2003;11(1):36-42.
20. Teodoro AL, Paiva VS. Perfil epidemiológico de pacientes queimados admitidos em um serviço terciário de Caxias do Sul - RS. Rev Bras Queimaduras. 2013;12(2):108-11.
21. Rempel LCT, Tizzot MRPA, Vasco JFM. Incidência de infecções bacterianas em pacientes queimados sob tratamento em hospital universitário de Curitiba. Rev Bras Queimaduras. 2011;10(1):3-9.
22. Martins CBG, Andrade SM. Queimaduras em crianças e adolescentes: análise da morbidade hospitalar e mortalidade. Acta Paul Enferm. 2007;20(4):464-9.
23. Raz-Pasteur A, Hussein K, Finkelstein R, Ullmann Y, Egozi D. Blood stream infections (BSI) in severe burn patients--early and late BSI: a 9-year study. Burns. 2013 Jun;39(4):636-42.
24. Zanetti G, Blanc DS, Federli I, Raffoul W, Petignat C, Maravic P, et al. Importation of Acinetobacter baumannii into a burn unit: a recurrent outbreak of infection associated with widespread environmental contamination. Infect Control Hosp Epidemiol. 2007;28(6):723-5.
25. Oliveira AC, Silva RS. Desafios do cuidar em saúde frente à resistência bacteriana: uma revisão. Rev Eletr Enferm [Internet]. 2008;10(1):189-97.
27. Pruitt Junior BA, McManus AT, Kim SH, Goodwin CW. Burn wound infections: current status. World J Surg. 1998 Feb;22(2):135-45.
26. Nasser S, Mabrouk A, Maher A. Colonization of burns wounds in Ain Shams University Burn Unit. Burns. 2003;29(3):229-33.
28. Macedo JL, Santos JB. Bacterial and fungal colonization of burn wounds. Mem Inst Oswaldo Cruz. 2005 Aug;100(5):535-9.
29. Hodle AE, Richter KP, Thompson RM. Infection control practices in U.S. burn units. J Burn Care Res. 2006 Mar/Apr;27(2):142-51.

30. Sengupta S, Kumar P, Ciraj AM, Shivananda PG. Acinetobacter baumannii: an emerging nosocomial pathogen in the burns unit Manipal, India. Burns. 2001 Mar;27(2):140-4.

31. Dean DA, Burchard KW. Fungal infection in surgical patients. Am J Surg. 1996 Mar;171(3):374-82.

***Corresponding author:** **Adriano Fernandes Araújo**
Rua Juquis, nº391 - Apto 154B - Indianópolis, SP, Brazil
Zip Code: 040811-10
E-mail: adrianowb@hotmail.com

Original Article

Plastic surgery in a medium complexity hospital: prospective cohort with cost and results analysis of the treatment of skin tumors within the scope of the Unified Health System (SUS)

Cirurgia plástica em hospital de média complexidade: coorte prospectiva com análise de custos e dos resultados do tratamento de tumores cutâneos no âmbito do Sistema Único de Saúde (SUS)

DANIELE WALTER DUARTE [1,2,3]*

■ **ABSTRACT**

Introduction: The Brazilian health system is organized into basic health units, medium complexity hospitals, and high complexity hospitals. The composition of medium complexity services is variable, with or without specialists such as the plastic surgeon. The objective of the present study is to analyze data on the treatment of patients with skin tumors by a plastic surgeon in a medium complexity hospital. **Methods:** prospective cohort with analysis of epidemiological, demographic data, costs, results, complications, and degree of satisfaction. **Results:** In nine months, 166 patients were treated, of whom 103 underwent surgery. The most common pathologies were: basal cell carcinomas, benign subcutaneous and cutaneous tumors, squamous cell carcinoma and melanoma, in decreasing order of appearance. Most of the injuries were treated with exeresis and suture surgery and in 29 patients, more complex reconstructions were required. The degree of resolution of cases was high, and only a patient was derived to a high complexity hospital. The degree of satisfaction with the treatment was also high. However, the estimated financial transfer of SUS, in the case of malignant tumors treatment, was approximately 25% less than it is in a high complexity hospital. **Conclusion:** The role of the plastic surgeon in medium complexity hospitals can prevent diseases such as skin cancer from reaching high complexity hospitals in advanced stages. However, there would have to be adaptations in the government transfer to enable the routine performance of this professional in these institutions.

Keywords: Skin neoplasms; Unique Health System; Costs and cost analysis; Therapeutic interventions results evaluation; Plastic surgery.

Institution: Fundação Hospitalar Getúlio Vargas de Sapucaia do Sul.

Article received: December 21, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0031

[1] Hospital Ernesto Dornelles, Porto Alegre, RS, Brazil.
[2] Hospital de Pronto Socorro de Porto Alegre, Porto Alegre, RS, Brazil.
[3] Hospital de Clínicas de Porto Alegre, Porto Alegre, RS, Brazil.

■ **RESUMO**

Introdução: O sistema único de saúde brasileiro organiza-se basicamente em unidades básicas de saúde, hospitais de média e hospitais de alta complexidade. A composição dos serviços de média complexidade é variável, podendo contar ou não com especialistas como o cirurgião plástico. O objetivo do presente trabalho é o de descrever dados do tratamento dos pacientes com tumores cutâneos atendidos por um cirurgião plástico, em um hospital de média complexidade. **Métodos:** Coorte prospectiva com análise de dados epidemiológicos demográficos, de custos, resultados, complicações e grau de satisfação. **Resultados:** No período de 9 meses foram atendidos 166 pacientes dos quais 103 foram operados. As patologias mais comuns foram: carcinomas basocelulares, tumores benignos de subcutâneo e pele, carcinoma epidermóide e melanoma, em ordem decrescente de ocorrência. A maioria das lesões foi tratada com cirurgia de exérese e sutura. Reconstruções mais complexas foram necessárias em 29 pacientes. O grau de resolução dos casos foi alto, com apenas um paciente sendo encaminhado a hospital de alta complexidade. O grau de satisfação com o tratamento também foi elevado. Contudo, o repasse financeiro estimado do SUS, no caso do tratamento dos tumores malignos, foi em torno de 25% menor do que seria na alta complexidade. **Conclusão:** A atuação do cirurgião plástico em hospitais de média complexidade pode impedir que doenças como o câncer de pele cheguem em estágios avançados em hospitais de alta complexidade, com alto grau de satisfação. Contudo, adaptações no repasse governamental precisariam ocorrer para viabilizar a atuação rotineira deste profissional nestas instituições.

Descritores: Neoplasias cutâneas; Sistema Único de Saúde; Custos e análise de custo; Avaliação de resultado de intervenções terapêuticas; Cirurgia plástica.

INTRODUCTION

The Unified Health System (SUS) is organized into basic health units and medium and high complexity establishments. The entrance door to the system is the basic health unit, which must solve the main problems with economic and straightforward measures and act in the prevention of the disease. Medium and high complexity hospitals, on the other hand, have specialized professionals and special technological resources[1].

The division between medium and high complexity represents a great difficulty for SUS[1] managers, and, unfortunately, their vision of this area is still fragmentary, with sets of procedures listed in the traditional "system procedure tables," for outpatients or hospitals. This system is often a limiting factor that mainly penalizes medium-sized institutions that carry out many of the procedures and that, according to these tables, would be exclusive of high complexity.

The specialist professionals who work in these medium complexity hospitals experience that reality every day, as these places have more and more resources and specialists from multiple areas, with great potential for resolution, avoiding most transfers to institutions of high complexity already overcrowded. This situation happens not only because midsize hospitals have the structure and qualification to handle many of the so-called highly complex procedures, but also because high complexity cannot absorb all of these cases due to the lack of vacancies.

In the context of skin tumors, cared for in medium complexity hospitals, the above is repeated mainly in the case of malignant tumors. These are hospitals that have the resources to operate most tumors, including the most extensive malignant tumors, as long as they have a professional who specializes in plastic surgery or similar areas. These institutions have a surgical center, anesthetist, and even an Intensive Care Unit (ICU), which allows for

numerous procedures. However, surgical codes in oncology are restricted to high complexity.

Non-melanoma skin tumors are the most frequent cancer in the population[2,3], and the inclusion of medium hospitals in the care of these lesions could contribute to reducing the waiting time for referral to highly complex institutions. Unfortunately, in addition to not receiving resources for treatment according to the codes in oncology, these institutions do not always have professionals capable of treating these tumors in more advanced cases. Therefore, it is necessary to evaluate the cost and benefits of treating these injuries, as well as to discuss possible solutions for a better functioning of the system.

OBJECTIVE

The objective of the present study is to describe the experience of a plastic surgeon for nine months in the treatment of patients with skin tumors in a medium institution, not only to describe the epidemiology and results of the treatment of these injuries, but also discussing how to optimize the care of these patients and estimate the costs under the SUS.

METHODS

This one is a prospective cohort study carried out from January 2017 to September 2017 at the Getúlio Vargas Hospital in Sapucaia do Sul, Rio Grande do Sul. Data collection was performed in an Excel™ database, with data demographics such as sex, age, surgery data, operated area, the technique performed, pathological result, number of surgeries, among others. The financial transfer, according to SUS tables, was estimated for major surgeries performed in the operating room and only for malignant skin tumors. The degree of satisfaction was measured according to the Glasgow Benefit Inventory (GBI) scale, which was applied to part of the sample in patients contacted approximately two years after surgery. This questionnaire consists of 18 questions whose answers are rated from 1 to 5, which measure a global score and global, social, and health subpoints ranging from -100 (maximum negative impact) to +100 (maximum positive impact)[4,5]. Costs were estimated according to the codes used for each patient and based on the SUS website with the tables available online[6]. These last data were compared with the exclusive codes of high complexity that would be more appropriate for the case of each patient.

Inclusion criteria in the general cohort were all patients with benign and malignant skin and subcutaneous tumors who consulted during the study period. Although this outpatient clinic focuses on soft tissue tumors, patients with other pathologies such as dermatochalasis of lid, ectropion, breast hypertrophy, exposed orthopedic plates, and complex wounds were also treated, but were excluded from the present study. Data were analyzed in SPSS, version 20, IBM™.

This work was presented to the Brazil Platform and approved by the Research Ethics Committee (CEP) number 5329, President Vargas Maternal and Child Hospital (HMIPV-RS), designated by the National Research Ethics Commission (CONEP), under the number Certificate of Presentation and Ethical Appreciation (CAAE) 16036719.2.0000.5329. The patients with photos published in this work approved their disclosure through a Free and Informed Consent Form (ICF). Patients whose data are reported here together, without the possibility of identification, were released from IC.

Four types of surgery regimens were used depending on the case to be treated: in an outpatient room with local anesthesia, in a surgical block with local anesthesia, in an operating room with sedation or an operating room with general anesthesia. The management of the patients was carried out following the "guidelines" for the removal of skin tumors[7,8], and the reconstructions were performed according to the case and based on the current literature[9-11], respecting the resources available in the Institution.

RESULTS

During the study period, 166 patients were treated, 63 of whom were excluded from the analysis because they were patients with pathologies other than skin and subcutaneous tumors, or patients who did not undergo surgery. One hundred three patients underwent surgery and who had complete data for analysis.

The average age of the operated patients was 60.1 years. The presence of associated comorbidities was found in 50.5% of the sample. The most frequent were: systemic arterial hypertension, diabetes, hypothyroidism, and depression, most of whom had more than one comorbidity at the same time. The average number of consultations was three per patient. Table 1 shows the demographic data for the cohort.

The main areas of the body affected by the tumors were the face, followed by multiple areas as extremities and trunk (Figure 1). Basal cell carcinoma was the most commonly found tumor (44.7%), followed by benign skin and subcutaneous tumors, including nevi, epidermal cysts, and lipomas. Epidermoid tumors were found in 8.7% of cases, and three patients with melanomas underwent surgery. All of the latter were in the initial stage (less than 0.75 mm thick and without ulcerations), and only needed an increased margin, without the need for other interventions[12,13]. Taking

Table 1. Demographic data of the 103 patients in the cohort of patients treated at a medium complexity hospital.

Variable	N (%) or Mean and standard deviation
Gender	
Masculine	45 (43.7)
Feminine	58 (56.3)
Age	60.12 (16.0)*
Presence of Comorbidities	52 (50.5)
Multiple	25 (24.3)
Hypertension	9 (8.7)
Others	18 (17.5)
Number of consultations per patient	
One	16 (15.5)
Two	32 (31.1)
Three	25 (24.3)
Four	15 (14.6)
Five or more	15 (14.6)
Surgery Location	
Ambulatory	53 (51.5)
Surgery Center	50 (48.5)
Operated Area	
Face	72 (69.9)
Multiples areas	18 (17.3)
Members	8 (7.8)
Trunk	5 (4.9)
Reconstruction technique	
Exeresis and suture	74 (71.8)
Exeresis and flap	21 (20.4)
Exeresis and graft	8 (7.4)
Reconstruction (graft/flaps)	29 (28.1)
Late reconstruction (post-AP)	9 (8.7)
Anatomopathological Diagnosis	
Basal cell carcinoma	46 (44.7)
Squamous cell carcinoma	9 (8.7)
Melanoma	3 (2.9)
Epidermal Cysts	13 (12.6)
Others	27 (26.2)
Margins (malignant tumors not melanoma)	55 (53.4)
Free	46 (83.6)
Comprometida	9 (16.4)
Number of surgery per patient	
One	87 (84.5)
Two	11 (10.7)
Three	3 (2.9)
Four	2 (1.9)
Complications	2 (1.9)

* Data with normal distribution by the Shapiro-Wilk test represented by the mean of standard deviation.

into account the risk classification for nonmelanoma skin tumors of the NCCN (National Comprehensive Cancer Network) whose criteria are set out in Table 2[14], 38.7% were low risk, 55.5% high risk, and 5.8% already locally advanced.

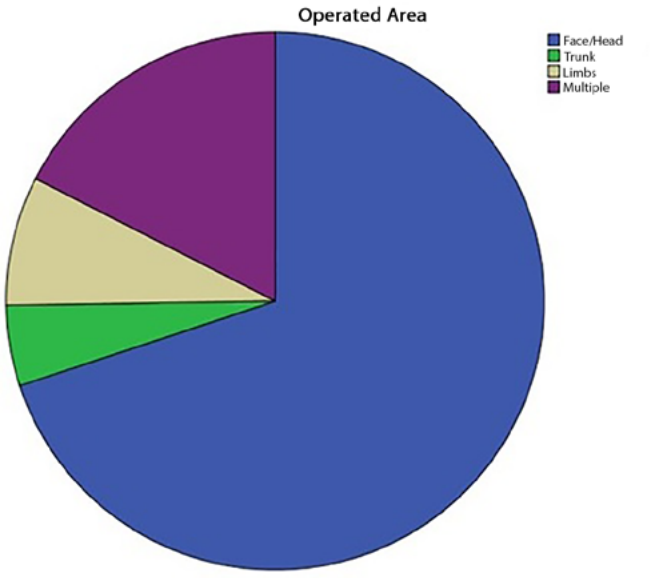


Figure 1. Distribution of tumors according to affected areas.

Nine patients with squamous cell and basal cell tumors had margins described as compromised or small. Of these, all were expanded, except one who refused to expand the margins and another who decided to observe and did not return for the expansion. Of the seven operated patients, two had residual carcinoma in the surgical sample, and only one remained with a compromised margin until reconstruction, losing the graft. The latter was the only patient who had to be referred to a high complexity center because he was a patient with squamous carcinoma little differentiated from the temporal region, already with an invasion of the parotid gland, locally advanced and with a poor prognosis. He was subsequently operated in conjunction with the head and neck surgeon, who performed a partial parotidectomy and a neck dissection. The patient was referred to radiotherapy after resection.

More complex reconstructions with grafts or flaps were necessary in only 28% of the total number of operated patients, with 31% of these patients opting for late reconstruction, leaving patients with a local bandage until pathological diagnosis (PA) definitive, followed by reconstruction around two weeks after the first surgery in the case of free margins.

Twenty-one flaps were made that included the Limberg technique, bilobed, axial flap, glabellar flap (Rieger), nasogenian, and triple rhomboid flap of scalp. Figures 2 to 4 show results for some of these more complex reconstruction cases.

Table 2. High-risk characteristics for malignant nonmelanoma skin tumors.

	Low Risk '	High Risk
Location/Size	< 20mm in area L < 10mm in area M < 0,6mm in area H	> 20mm in area L > 10mm in area M > 0,6mm in area H
Margins	Well defined	Badly defined
History	Primary	Recurrents
Immunosuppression	No	Yes
Prior radiation	No	Yes
Anatomopathological diagnosis	Nodular/superficial BCC	BCC: moreaform, basal squamous, sclerodermiform, micronodular SCC: acantholytic, adenosquamous, desmoplastic, metaplastic

Zone H: Central face, eyelids, eyebrow, nose, lips, chin, jaw, pre-auricular, post-auricular, ears, genitals, hands, feet; Zone L: Trunk, limbs (excluding nails, feet, hands and pre-tibial); Zone M: Cheeks, forehead, scalp, neck and pre-tibial; BCC: basal cell carcinoma; SCC: Squamous cell carcinoma.

Figure 2. Patient with basal cell carcinoma, reconstruction with nasogenian flap. Trapdoor deformity with spontaneous resolution.

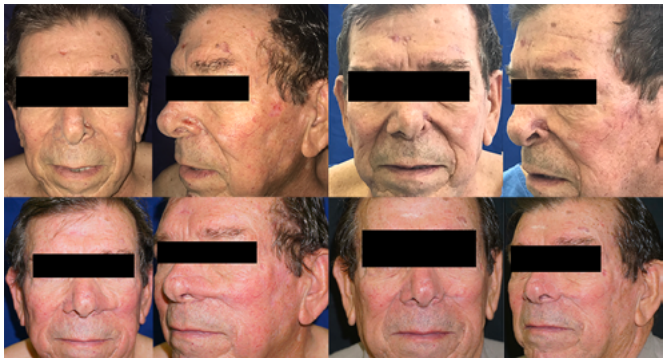


Figure 3. Patient with basal cell carcinoma of the nasal wing reconstructed with auricular cartilage graft and nasogenian flap. Late reconstruction after definitive pathology. Preoperative, postoperative photos without reconstruction with nasal wing retraction, after reconstruction and final photos after refining the flap pedicle with reconstruction of the nasogenian groove.

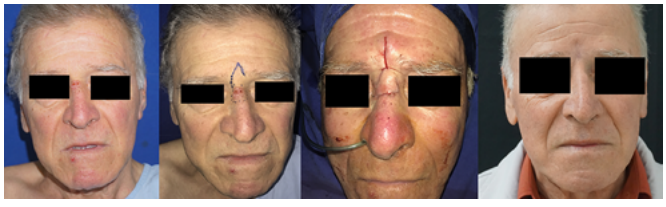


Figure 4. Tumor of the nasal dorsum reconstructed with a glabellar or Rieger flap.

Complications occurred in 16.5% of patients, which included 5 cases of wound infection, one hematoma, one patient with persistent pain that remitted after three months, one suture dehiscence with fat necrosis, two partial flap necrosis, two scar hypertrophies, one partial graft loss, three trapdoor deformities that improved in 6 months, one temporary paralysis of the temporal branch of the facial due to the local anesthetic and a definitive paralysis of the temporal and zygomatic branch of the facial compromised by the tumor (patient who performed the parotidectomy described above). Figure 5 shows a case of a patient with partial flap necrosis with proper final resolution with dressings, which shows a good result even in the case of complications.

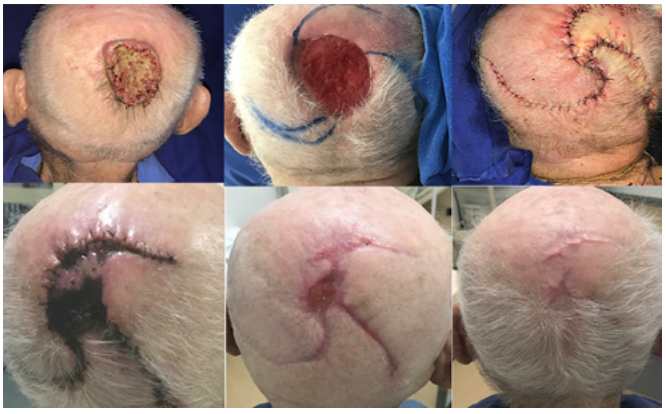


Figure 5. Patient with a basal cell tumor who underwent reconstruction with a rhomboid flap that evolved with partial necrosis of the flaps, but with good final result after care and dressings.

Twenty patients were contacted to answer a questionnaire to calculate the GBI scale, 3 of whom had died, and nine did not answer the phone or did not attend the day of the interview, leaving only 8 to answer the questionnaire. In these, the improvement was shown in the four subdomains of the scale, with an average of 53.8 points on the general scale, 75 points on the general subscale, 4.1 on the social subscale, and 18.75 on the health subscale.

Taking into account the transfers according to the SUS table for surgery and only the patients operated on in the operating room for malignant tumors, this resulted in 37 patients for the estimation.

In these patients, the estimated cost for SUS was 349.25 reais per patient, 253.38 reais per surgery. If it were possible to use cancer codes that are only authorized for high complexity, but that would be more suitable for the surgeries performed, the transfer could be an average of 470.94 per patient and 341.66 per surgery, that is, about 25% bigger. Furthermore, the standard procedures performed in this cohort of patients, such as the removal of multiple malignant skin tumors, the removal of lip and pinna tumors, do not find equivalent codes in the table of average complexity, and the code used in these cases. It was much lower in terms of transfer rates compared to those available in high complexity. Fortunately, in the case of the graft and flap codes, the transfer is smaller, but less impactful, that is, 10% less than the graft and flap codes after the oncological excision of highly complex tables.

DISCUSSION

Nonmelanoma skin tumors are the most frequent neoplasty; in the USA, its diagnosis is higher than the diagnosis of all cancers combined[2]. In the cohort presented in this study, basal cell carcinoma was the most commonly reported lesion, even surpassing benign skin and subcutaneous tumors. The most affected place was the face, followed by the extremities. The authors who have studied facial tumors[15] and basal cell tumors (BCC) [5] have found similar results to those shown here[16,17]. In a recent review of keratinocytic skin cancers (nonmelanoma), it is noted that their incidence and, therefore, the costs of this disease have increased worldwide, with an estimated risk of 20-30% of development during life in white patients, according to US estimates[7,8,18].

These tumors can be divided into high and low risk, according to the criteria proposed by the NCCN[19] shown in Table 2, translated by Hughley et al., In 2018[14]. It should be noted that in this cohort, according to these specifications, the majority of patients (61.3%) already had high-risk or locally advanced squamous cell and basal cell carcinomas.

In these cases of facial tumors, flaps are preferred over grafts because they have better aesthetic results[16]. As in our case series, the most affected area was the face, in the case of reconstructions, flaps were preferred, with 21 flaps versus eight grafts performed, with only 2 of these graft cases used on the face. In 9 cases, in which flap reconstructions were proposed, late reconstruction was chosen only after pathology, demonstrating that disease-free margins decrease the risk of reconstruction loss, as recommended in the literature[7,8,14,19]. According to the guidelines for the treatment of skin tumors, the best indication for many cases in this cohort would be Mohs micrographic surgery since they are lesions with various high-risk criteria, according to NCCN[14]. However, this technique is not available in the institution, opting for standard resection and late reconstruction in the case of the need for a significant mobilization of tissues for reconstruction.

Regarding the analysis of costs, results, and degree of patient satisfaction, it is important to clarify from which perspective this analysis is carried out[20]. In the case of this cohort, from the hospital's perspective, there is a particular financial loss for the institution regarding the care of these patients; however, for SUS, there is a benefit in the treatment of these injuries at a medium level, since the transfer is less than that performed at high complexity and also because the access is fast. This study compares the transfer of SUS between medium and high complexity, but does not estimate whether this transfer covers the real hospital costs with the treatment of these injuries. In this context, Bócoli et al., In 2013[21], made this comparison, demonstrating that the internal expenditure on the treatment of these injuries is higher than that transferred by SUS. However, in this study, the author does not specify if the estimation was made in a medium or high complexity hospital, he only mentions that it was in a university hospital, probably a high complexity one. Therefore, considering the findings of Bócoli et al., In 2013[21], the loss of the institution of medium complexity is probably even more significant than that shown in this study in highly complex hospitals.

Regarding the results, there was a low rate of complications, especially considering that it is a cohort with several tumors with a high risk of recurrence and because it is a population with a high average age and the presence of comorbidities in 50.5% of the sample. Besides, according to the questionnaire on the degree of satisfaction that was applied to part of the patients, there is an improvement in all the domains of the questionnaire, mainly in the general scores and the general scores. Furthermore, regarding resolution capacity, we highlight that only one patient could not be treated with medium complexity, being referred to a highly complex hospital. Therefore, from a population perspective, the benefits are many.

CONCLUSION

Because of the preceding and considering that nonmelanoma skin cancer is a disease that is increasing worldwide and in Brazil, it is concluded that this disease has and will continue to have a critical impact on the Unified Health System that should seek alternatives for allowing access to these patients for effective treatment, in this context, the inclusion of medium-sized hospitals in the care of these patients seems to be a great strategy

to optimize the operation of the system; however, the feasibility of this routine action at this level of health care should undergo a review in the SUS procedure tables, which should be updated, since in practice several procedures of exclusivity of high complexity are already performed in medium complexity, through replacement codes that mostly do not contemplate the real complexity of the procedures performed, with values received 25% lower.

The presence of qualified professionals to adequately treat this problem, such as the plastic surgeon at the medium level of complexity, can significantly contribute to resolving this high-incidence disease without referral to high complexity. According to the cohort presented here, the degree of resolution of cases of medium complexity was excellent, and the routine inclusion of medium-sized institutions in the treatment of skin cancers would collaborate with better patient care and better SUS functioning.

COLLABORATION

DWD Analysis and/or data interpretation, Conception and design study, Data Curation, Final manuscript approval, Formal Analysis, Investigation, Methodology, Project Administration, Realization of operations and/or trials, Writing - Original Draft Preparation

REFERENCES

1. Ministério da Saúde (BR). Conselho Nacional de Secretários de Saúde (CONASS). Assistência de média e alta complexidade no SUS. Brasília (DF): CONASS; 2007.
2. Nehal KS, Bichakjian CK. Update on keratinocyte carcinomas. N Engl J Med. 2018 Jul;379(4):363-74.
3. Brandt MG, Moore CC. Nonmelanoma skin cancer. Facial Plast Surg Clin North Am. 2019 Feb;27(1):1-13.
4. Kotzampasakis D, Piniara A, Themelis S, Kotzampasakis S, Gabriel E, Maroudias N, et al. Quality of life of patients who underwent aesthetic rhinoplasty: 100 cases assessed with the Glascow Benefit Inventory. Laryngoscope. 2017 Sep;127(9):2017-25.
5. Hornos A. Correção de orelha de abano por técnica combinada: análise de resultados e alteração da qualidade de vida. Rev Bras Cir Plást. 2001 Jan;28(3):406-15.
6. Ministério da Saúde (BR). Sistema de Gerenciamento da Tabela de Procedimentos, Medicamentos e OPME do SUS (SIGTAP). Tabela unificada [Internet]. Brasília (DF): SIGTAP, 2019; Mai;1. Available from: http://sigtap.datasus.gov.br/Tabela-unificada/app/sec/inicio.jsp
7. Kim JYS, Kozlow JH, Mittal B, Moyer J, Olencki T, Rodgers P. Guidelines of care for the management of basal cell carcinoma. J Am Acad Dermatol. 2018 Mar;78(3):540-59.
8. Alam M, Armstrong A, Baum C, Bordeaux JS, Brown M, Busam KJ, et al. Guidelines of care for the management of cutaneous squamous cell carcinoma. J Am Acad Dermatol. 2018 Mar;78(3):560-78.
9. Mélega JM. Cirurgia Plástica - Fundamentos e Arte. Rio de Janeiro: MEDSI; 2002.
10. Jackson IT. Retalhos locais na reconstrução de cabeça e pescoço. Rio de Janeiro: DiLivros; 2002.
11. Baker SR. Baker: local flaps in facial reconstruction. 2nd ed. Philadelphia, PA: Elsevier Health Sciences; 2007.
12. Knackstedt T, Knackstedt RW, Couto R, Gastman B. Malignant melanoma: diagnostic and management update. Plast Reconstr Surg. 2018 Aug;142(2):202e-16e.
13. Schadendorf D, van Akkooi ACJ, Berking C, Griewank KG, Gutzmer R, Hauschild A, et al. Melanoma. Lancet. 2018 Sep;392(10151):971-84.
14. Hughley BB, Schmalbach CE. Cutaneous head and neck malignancies in the elderly. Clin Geriatr Med. 2018 May;34(2):245-58.
15. Laitano FF, Teixeira LF, Siqueira EJ, Alvarez GS, Martins PDE, Oliveira MP. Use of skin flaps for nasal reconstruction after neoplastic resection. Rev Bras Cir Plást. 2012 Jun;27(2):217-22.
16. Broetto J, Freitas JOG, Sperli AE, Soh SW, Richter CA, Toni RA. Surgical treatment of basal and squamous cell carcinomas: experience of the Plastic Surgery Services of Hospital Ipiranga. Rev Bras Cir Plást. 2012 Dec;27(4):527-30.
17. Souza CFD, Thomé EP, Menegotto PF, Schmitt JV, Shibue JRT, Tarlé RG. Topografia do carcinoma basocelular e suas correlações com o gênero, a idade e o padrão histológico: um estudo retrospectivo de 1.042 lesões. An Bras Dermatol. 2011 Apr;86(2):272-7.
18. Cameron MC, Lee E, Hibler BP, Barker CA, Mori S, Cordova M, et al. Basal cell carcinoma: Epidemiology; pathophysiology; clinical and histological subtypes; and disease associations. J Am Acad Dermatol. 2019;80(2):303-17.
19. Bariani RL, Nahas FX, Barbosa MVJ, Farah AB, Ferreira LM. Basal cell carcinoma: an updated epidemiological and therapeutically profile of an urban population. Acta Cir Bras. 2006 Mar/Apr;21(2):66-73.
20. Blank MM, Chen L, Papageorge M, Driscoll D, Graham R, Chatterjee A. The underreporting of cost perspective in cost-analysis research: A systematic review of the plastic surgery literature. J Plast Reconstr Aesthet Surg. 2018 Mar;71(3):366-76.
21. Bócoli KH, Veiga DF, Cabral IV, Carvalho MP, Novo NF, Veiga Filho J, et al. Tratamento cirúrgico de carcinomas cutâneos pelo Sistema Único de Saúde: análise de custos. Rev Col Bras Cir. 2013 Dec;40(6):449-52.

***Corresponding author:** **Daniele Walter Duarte**
Rua General Caldwell 969, Bairro Menino Deus, Porto Alegre, RS. Brazil.
Zip Code: 90130-051
E-mail: daniwalterduarte@gmail.com

Original Article

Perception of patients about professional performance and procedures performed in the pre, intra, and postoperative period of abdominoplasty

Percepção das pacientes sobre a atuação profissional e os procedimentos realizados no pré, no intra e no pós-operatório de abdominoplastia

NATÁLIA LIGEIRO DOS SANTOS [1]
IARA GAMA ESTEVES-DE-OLIVEIRA [2]
ROGÉRIO EDUARDO TACANI [2]
CRISTIANO SCHIAVINATO BALDAN [1]
IGOR FAGIOLI BORDELLO MASSON [1]
THIAGO SAIKALI FARCIC [1]
ALINE FERNANDA PEREZ MACHADO [1,2]*

Institution: Universidade Paulista, São Paulo, SP, Brazil.

Article received: December 11, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0032

■ **ABSTRACT**

Introduction: abdominoplasty is the third most performed cosmetic surgery in Brazil. Its surgical planning involves the pre, intra, and postoperative moments with the performance of several specialized professionals. Therefore, the objective of this study was to analyze the patients' perception of their professional performance and the procedures performed before, during, and after the abdominoplasty. **Methods:** This is a cross-sectional and observational study. Data collection was done through an online questionnaire made available digitally to women aged between 18 and 60 years, who underwent abdominoplasty in the last 12 months. **Results:** A total of 376 patients answered the questionnaire; however, 22 were excluded, totaling 354 questionnaires answered. It was observed that 63.5% reported having undergone abdominoplasty due to skin flaccidity, 53.3% had undergone abdominoplasty associated with liposuction, 61% reported that they had not undergone preoperative procedures, 59.9% reported not knowing whether there was a physiotherapist in the operating room during the intraoperative period. , 70.6% of the patients underwent postoperative procedures, 37.4% of whom were physiotherapists, the most common complication being edema representing 84.2%. **Conclusion:** The main indication for abdominoplasty was sagging skin, which is most often associated with liposuction. Most of the patients did not undergo preoperative procedures. They were performed after 1 to 3 days after the operation, with a physiotherapist, on the advice of an acquaintance, often three times a week, due to the complaint of edema. The most performed procedures were manual lymphatic drainage and therapeutic ultrasound.

Keywords: Postoperative complications; Physiotherapy modalities; Abdominoplasty; Lipectomy; Manual lymphatic drainage; Ultrasound therapy; Fibrosis; Edema.

[1] Universidade Paulista, Departamento de Fisioterapia, São Paulo, SP, Brazil.
[2] Universidade Cidade de São Paulo, São Paulo, SP, Brazil.

■ **RESUMO**

Introdução: A abdominoplastia é a terceira cirurgia estética mais realizada no Brasil, sendo que o planejamento cirúrgico envolve os momentos pré, intra e pós-operatórios com a atuação de diversos profissionais especializados. Portanto, o objetivo deste estudo foi analisar a percepção das pacientes sobre a atuação profissional e os procedimentos realizados no pré, no intra e no pós-operatório de abdominoplastia. **Métodos:** Trata-se de um estudo transversal e observacional. A coleta de dados foi feita através de um questionário online, disponibilizado por meios digitais para mulheres com idade entre 18 e 60 anos, que realizaram a abdominoplastia nos últimos 12 meses. **Resultados:** Um total de 376 pacientes respondeu ao questionário; porém, 22 foram excluídos, totalizando 354 questionários respondidos. Observou-se que 63.5% relataram que realizou a abdominoplastia por flacidez de pele, 53.3% realizaram a abdominoplastia associada à lipoaspiração, 61% relataram que não realizaram procedimentos pré-operatórios, 59.9% relataram não saber se havia fisioterapeuta no centro cirúrgico durante o intraoperatório, 70.6% das pacientes realizaram procedimentos pós-operatórios, sendo 37.4% com fisioterapeuta, a complicação mais comum foi edema representando 84.2%. **Conclusão:** A principal indicação para a abdominoplastia foi por flacidez de pele, sendo mais frequentemente associada à lipoaspiração. A maior parte das pacientes não realizou procedimentos pré-operatórios e realizou pós-operatório iniciado após 1 a 3 dias, com fisioterapeuta, por indicação de um conhecido, com frequência de três vezes na semana, pela queixa de edema, sendo que os procedimentos mais realizados foram a drenagem linfática manual e o ultrassom terapêutico.

Descritores: Complicações pós-operatórias; Modalidades de fisioterapia; Abdominoplastia; Lipectomia; Drenagem linfática manual; Terapia por ultrassom; Fibrose; Edema.

INTRODUCTION

Since the 19th century, the female body pattern responds to skinny women, who continuously seek a beautiful and healthy body, accepting to undergo modifications to achieve what is understood as the current beauty standard[1]. Thus, the field of plastic surgery in Brazil grows every year. The International Society for Aesthetic Plastic Surgery (ISAPS)[2] points out that Brazil occupies the second place in the world ranking of aesthetic surgical procedures. Abdominoplasty is a procedure that has shown a significant evolution in the last century due to the development of new techniques, in addition to a better understanding of the anatomy, physiology, and aesthetics of the abdominal wall. In 2018, the *Sociedade Brasileira de Cirurgia Plástica* [3] reported that abdominoplasty is the third most performed cosmetic surgery in Brazil, representing around 15.9% of surgical procedures.

The progressive increase in the demand for plastic surgery has generated concern for the pre, intra, and postoperative moments. Therefore, a new concept of patient care for plastic surgery has emerged, which proposes that obtaining a more satisfactory final result of plastic surgery does not depend exclusively on the surgical planning and experience of the plastic surgeon, but is also directly related with pre, intra and postoperative care offered by various professionals who work in this context[4-8]. In the preoperative period, professionals will be able to assess the possible physical, motor, and sensory changes that already existed in patients before surgery, offering the patient adequate guidance to prevent postoperative complications, especially in those with risk factors[9-11]. The intraoperative period involves the execution of surgical planning directed at the beginning of the treatment program for the patient's main complaint[4]. Furthermore, in the postoperative period, it is essential to subject the patient to the necessary care to improve

recovery after surgery, as well as to prevent, control, or minimize possible postoperative complications, to promote the well-being and quality of life of patients[12-20].

This research is relevant because it discusses the management of the moments that the abdominoplasty goes through, relates the different professionals who work in this context, understands how patients know these professionals, determines the guidelines given to patients, verifies the techniques that are used in the treatment of abdominoplasty and to know the satisfaction of the patient with the operation. Besides, it discuss the performance of the professionals following the legal competences according to the professional category in the pre, intra, and postoperative moments, presenting the resources and techniques used. This study will promote among professionals a reflection on their performance in monitoring and on the results to obtain a satisfactory aesthetic and functional result.

OBJECTIVE

The objective of this study was to analyze the perception of the patients about professional performance and the procedures performed in the pre, intra, and postoperative period of the abdominoplasty.

METHODS

Study type

This one is a cross-sectional and observational study.

Ethical considerations

The study began after the approval of the Research Committee of the Universidade Paulista (UNIP), in São Paulo/SP (protocol number: 13022019.8.0000.5512). To carry out the research, all the volunteers signed and accepted the elements specified in the Free and Informed Consent Form.

Sample

The sample consisted of women aged between 18 and 60 years who underwent abdominoplasty only or associated with another surgical procedure in the last 12 months.

Digital Questionnaire

A self-administered digital questionnaire was developed by the researchers in this study using the "Google Forms." The questionnaire was divided into six stages, which were:

- *Free and Informed Consent Term*: the objective of the research and the non-disclosure of the patient's personal data was explained. When answering "not accepted" in the Informed Consent Form, the questionnaire automatically ended, and when answering "accepted," the patient proceeded to the second stage of the questionnaire;

- *Gender:* the alternatives were "female," "male," and "I prefer not to say." The patient only proceeded to the third stage if she marked "female" as an answer, otherwise the questionnaire was closed;

- *Personal data:* information was collected such as name, age, race, email, cell phone number, marital status, region of Brazil in which she lives, body mass and height, educational level, if she had already become pregnant and how many pregnancies she had, the chief complaint for performing abdominoplasty, the age at which this procedure was performed and if there was another associated procedure;

- *Preoperative:* it was asked if preoperative procedures were performed, professional category of the person responsible for the procedure, if she had manual lymphatic drainage done (and how many sessions), respiratory physiotherapy and exercises with the physical therapist before surgery, if she received postoperative guidance and which professional made such guidelines;

- *Intraoperative:* it was asked if there was a physical therapist in the operating room during the surgery and if the procedures performed by the physical therapist during this period were important for the postoperative period;

- *Postoperative period:* currently postoperative time; whether postoperative procedures were performed and the professional category of the person responsible for the procedure; who recommended the professional; how long after surgery did treatment begin; how many times a week was this treatment performed. Each patient answered about the pain and edema they felt in the postoperative period and quantified these complaints according to the Visual Numerical Scale (VNS), which varies from zero to ten (0-10), with zero without complaint and ten higher levels of complaint. Furthermore, if there was a change in sensitivity, if there were complications, if the compression mesh was used in the immediate postoperative period and for how long, if it was difficult to change the dressings and if this change was done alone or with help; what was the team and/or manual techniques used by the professional who performed the postoperative treatment, if she was satisfied with the postoperative treatment, scoring her level of satisfaction with the treatment using the VNS.

The email address of the digital questionnaire was made available on the Internet platform and was sent to patients through social networks and

the WhatsApp® messaging application from June to December 2019.

Data analysis

The data were tabulated in an Excel® spreadsheet, and descriptive analyzes were performed with means and percentages of the responses obtained, which showed the most relevant values according to the questioned item.

RESULTS

A total of 376 patients showed interest in participating in the research. Of these, 354 patients answered the questionnaire thoroughly, and 22 patients were excluded for the following reasons: being male (n = 9) or preferred not to say gender (n = 4), and did not accept the Informed Free and Informed Consent Form (n = 9). Therefore, the final sample consisted of 354 patients who answered the digital questionnaire.

Demographic characteristics

The demographic characteristics of the patients are described in Table 1, whose analyzed variables are expressed in absolute and percentage values (%).

As for obstetric characteristics, it was observed that 89.5% (n = 317) have already become pregnant; of these, 37.6% (n = 133) had two pregnancies, 27.4% (n = 97) one, 18.4% (n = 65) three and 6.2% (n = 22) more than three. As for the motivation to perform abdominoplasty, 63.5% (n = 224) reported sagging skin, 53.7% (n = 190) due to abdominal diastasis, 45.5% (n = 161) due to localized adiposity, 20.6% (n = 73) due to hernias, 15.3% (n = 54) after bariatric surgery, 11.3% (n = 28) due to abdominal distension, 10.7% (n = 47) for different reasons and 7.9% (n = 28) due to multiple pregnancies. Only 24% of the patients underwent only abdominoplasty, the others associated with liposuction (53.3%, n = 188), mastopexy (20.4%, n = 72), augmentation mammoplasty (15.6%, n = 55), gluteus surgery (8.8%, n = 31), reduction mammoplasty (7.6%, n = 27), and other associations (5.3%, n = 18).

Preoperative

The vast majority of patients (61%, n = 216) reported that they did not perform preoperative procedures. However, of those who underwent preoperative procedures (39%, n = 138), 32.2% (n = 114) reported having done it with a doctor, 6.2% (n = 22) with an esthetician, and 5.4% (n = 19) with a physical therapist, with 18.9% (n = 67) of the patients who underwent the manual lymphatic drainage technique for

Table 1. Demographic characteristics of patients undergoing abdominoplasty.

Demographic characteristics	Sample (n=354)
Age	
18 a 25 years	24 (6.8%)
26 a 35 years	143 (40.5%)
36 a 45 years	144 (40.7%)
46 a 55 years	35 (9.9%)
56 a 60 years	5 (1.4%)
61 a 71 years	3 (0.8%)
More than 71 years	0 (0%)
Body mass (Kg)	
Less than 50 Kgs.	2 (0.6%)
Between 50 and 60 Kgs.	69 (19.5%)
Between 60 and 70 Kgs.	148 (41.8%)
Between 70 and 80 Kgs.	104 (29.5%)
More than 80 Kgs.	31 (8.8%)
Height (cm)	
Up to 150 cm	15 (4.2%)
Between 151 and 160 cm	136 (38.5%)
Between 161 and 170 cm	172 (48.6%)
Between 171 and 180 cm	30 (8.5%)
More than 180 cm	1 (0.3%)
Ethnicity	
White	221 (62.4%)
Black	34 (9.6%)
Mixed race	93 (26.3%)
Yellow	5 (1.4%)
Indigenous	1 (0.3%)
Marital status	
Single	78 (22.1%)
Married	246 (69.5%)
Divorced	18 (5.1%)
Separated	10 (2.8%)
Widow	2 (0.6%)
State of residence	
Acre	1 (0.3%)
Amazonas	1 (0.3%)
Bahia	3 (0.8%)
Distrito Federal	3 (0.8%)
Goiás	9 (2.5%)
Maranhão	1 (0.3%)
Mato Grosso	2 (0.6%)
Mato Grosso do Sul	5 (1.4%)
Minas Gerais	29 (8.2%)
Pará	4 (1.1%)
Paraná	28 (7.9%)
Pernambuco	3 (0.8%)
Rio de Janeiro	44 (12.4%)
Rio Grande do Sul	13 (3.7%)
Roraima	1 (0.3%)

Continue...

Continuation...

Table 1. Demographic characteristics of patients undergoing abdominoplasty.

Santa Catarina	13 (3.7%)
São Paulo	194 (54.8%)
Education	
Incomplete elementary school	7 (2%)
Complete elementary school	8 (2.3%)
Incomplete high school	13 (3.7%)
Complete high school	78 (22%)
Incomplete higher education	79 (22.3%)
Complete higher education	89 (25.1%)
Postgraduate studies	80 (22.6%)

Note: No responses were obtained from the following states: Alagoas, Amapá, Ceará, Espírito Santo, Paraíba, Piauí, Rio Grande do Norte, Rondônia, Sergipe and Tocantins.

more than 3 sessions (15.6%, n = 54). Regarding physical therapy, 92.7% (n = 328) and 93.8% (n = 332) reported not having performed respiratory physical therapy and exercises with the physical therapist, respectively.

Practically all the patients (97.7%, n = 346) reported that they received postoperative guidance, given by the doctor (90.1%, n = 317), by the nurse (21.6%, n = 76), by the physical therapist (19.3%, n = 68) and by the esthetician (8.5%, n = 30).

Intraoperative

Regarding the intraoperative, 59.9% (n = 212) reported not knowing if there was a physical therapist in the operating room, 32.8% (n = 116) answered "no" and 7.3% (n = 26) answered "yes " Regarding the importance of the physical therapist in the operating room, 18.3% (n = 35) answered that the procedures performed by the physical therapist were important for postoperative recovery.

Postoperative

The variables related to the postoperative period are described in Table 2, which are expressed in absolute and percentage values (%). Postoperative time when answering the questionnaire was between 6 months and 1 year after surgery for 33.9% (n = 120), between 2 and 3 months for 17.6% (n = 62), and between 1 and 2 months at 15.3% (n = 54). Most of the patients reported having undergone postoperative procedures (70.6%, n = 250). Regarding the professional who performed these procedures, it was observed that 37.4% (n = 132) reported having done it with a physical therapist and 37.1% (n = 131) with an esthetician. Regarding the recommendation of this professional, 31.8% (n = 112) reported being an indication of an acquaintance, 30.7% (n = 108) of the doctor and 22.2% (n = 78) found it on their own. Regarding the time to start postoperative treatment, it was observed that 36.4% (n = 119) started between 1 to 3 days and 27.8% (n = 91) between 4 to 7 days, with 35.7% (n = 115)) performing treatment 3 times a week, 32.6% (n = 105) 2 times a week and 19.6% (n = 63) 4 or more times a week (Table 2).

Table 2. Outcomes of the responses related to the postoperative period of abdominoplasty.

Outcomes	Postoperative (n=354)
Postoperative time at the moment of the questionnaire	
Up to 5 days	9 (2.5%)
Between 6 and 10 days	22 (6.2%)
Between 11 and 15 days	13 (3.7%)
Between 16 and 30 days	43 (12.1%)
Between 1 and 2 months	54 (15.3%)
2 to 3 months	62 (17.5%)
4 to 5 months	31 (8.8%)
6 months to 1 year	120 (33.9%)
Performed postoperative procedures	
Yes	250 (70.6%)
No	104 (29.5%)
Category of professional who performed the postoperative treatment	
I did not perform postoperative treatments	38 (10.7%)
Doctor	39 (11%)
Physiotherapist	132 (37.4%)
Beautician	131 (37.1%)
Biomedic	4 (1.1%)
Nurse	6 (1.7%)
I do not know the professional category	2 (0.6%)
Nutritionist	1 (0.3%)
Who recommended the professional who performed the postoperative treatment?	
I did not perform postoperative treatments	36 (10.3%)
Nobody. I found it on my own	78 (22.2%)
The surgeon told me	108 (30.7%)
Indication of an acquaintance	112 (31.8%)
I found him/her on the internet or other channels	18 (5.1%)
Postoperative time when treatment started.	
1 to 3 days	119 (36.4%)
4 to 7 days	91 (27.8%)
8 to 9 days	36 (11%)
10 to 15 days	44 (13.5%)
15 days or more	37 (11.3%)
Postoperative treatment frequency	
Once a week	39 (12.1%)
2 times a week	105 (32.6%)
3 times a week	115 (35.7%)
4 or more times a week	63 (19.6%)

Regarding postoperative pain, 56.2% (n = 199) reported having felt postoperative pain, of these 11.6% (n = 41) obtained 3, 11.3% (n = 40) 5 , 10.2% (n = 36) 8, 9% (n = 32) 10, 8.2% (n = 29) 1, 8.2% (n = 29) 2, 8.2% (n = 29) 4, 5.4% (n = 19) 7, 5.1% (n = 18) 6 and 4% (n = 14) 9 (Figure 1).

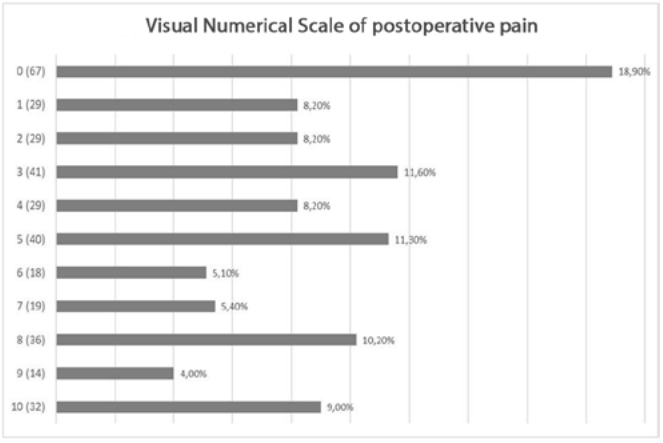


Figure 1. Visual Numerical Scale (VNS) of postoperative pain.

Most of the patients (96%, n = 340) reported having experienced postoperative edema; of these, 22.9% (n = 81) obtained 10, 20.6% (n = 57) 8, 12.4% (n = 44) 5, 10.5% (n = 37) 9, 10.2% (n = 36) 7, 6.8 % (n = 24) 6, 6.8% (n = 24) 4, 4.4% (n = 15) 2, 3.4% (n = 12) 3 and 0.3% (n = 1) 1 (Figure 2).

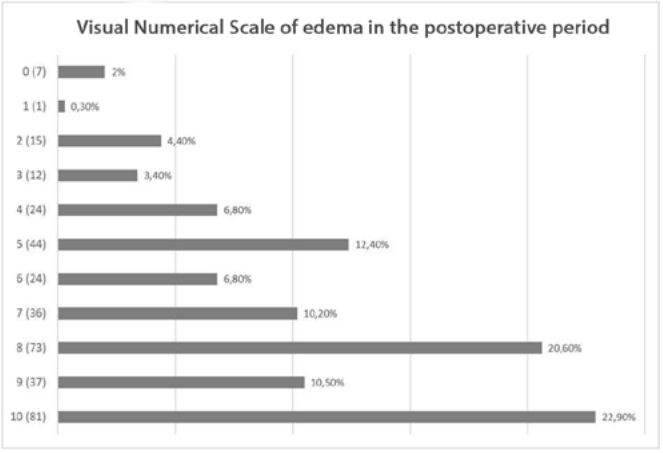


Figure 2. Visual Numerical Scale of edema in the postoperative period.

In relation to the change in sensitivity, 37% (n = 131) of the patients reported decreased sensitivity, 30.8% (n = 109), absent sensitivity, 17.5% (n = 62), normal sensitivity, and 14.7% (n = 52).) increased sensitivity.

Regarding postoperative complications, 84.2% (n = 298) reported that edema was a complication, 21.8% (n = 77) hematoma, 19.8% (n = 70) seroma, 15.8% (n = 56) scar dehiscence and 11.9% (n = 42) fibrosis (Figure 3).

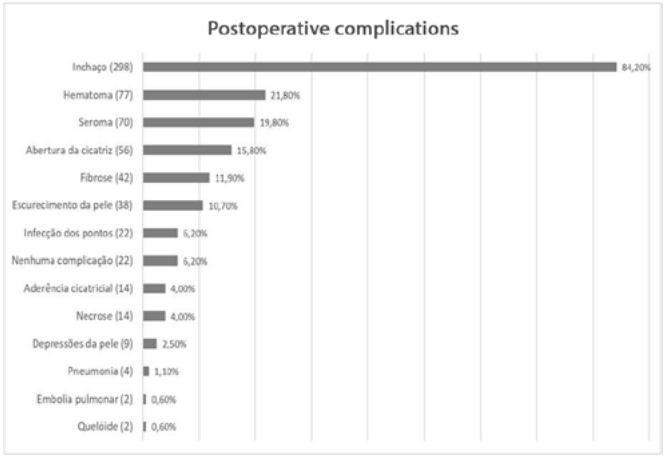


Figure 3. Number of patients who reported postoperative complications.

The majority of patients (95.5%, n = 338) reported the use of the compression mesh in the immediate postoperative period, with the recommended use for 3 months for 33.1% (n = 117), for 2 months for 26.3% (n = 93), for 4 months or more for 14.4% (n = 51) and only 12.7% of patients (n = 45) used it for 1 month.

About dressing changes, 83.9% (n = 297) reported having no difficulties. More than half of the patients (52.5%, n = 186) changed with the help of family members, 31.1% (n = 110) changed alone, and 16.4% (n = 58) changed with professional help.

Respect to the postoperative treatment, in relation to the use of equipment, only 16.5% (n = 54) reported not having undergone any equipment. Among the equipment used, it was observed that 51.7% (n = 183) reported the use of therapeutic ultrasound and 12.4% (n = 44) the use of radiofrequency. Most of the patients (83.1%, n = 294) reported the use of manual techniques, with manual lymphatic drainage used in 87% (n = 308) of the patients and 14.7% (n = 52) underwent a modeling massage, the other manual techniques did not obtain an expressive score. Regarding satisfaction with postoperative treatment, it was observed that 53.4% (n = 166) reported being satisfied and 33.8% (n = 105) reported that they were still under treatment. It was observed that 35.7% (n = 111) obtained 10, 16.1% (n = 50) 8, 14.5% (n = 45) 9, 10.6% (n = 33) 7, 9, 6% (n = 30) 5, 1.6% (n = 5) 3 and 1% (n = 3) 2.

DISCUSSION

The 2018 Census of the *Sociedade Brasileira de Cirurgia Plástica* [3] points that the southeast region is the one with the highest number of plastic surgeries performed in Brazil (51.1%). This fact justifies the main number of responses obtained from the states of São Paulo, Rio de Janeiro, and Minas Gerais (75.4%). The age range of patients who undergo plastic surgery was

71% between 19 and 50 years old, and in the present study, 88% between 18 and 45 years old. The primary motivation for performing plastic surgery is aesthetics (60.3%), which corroborates the responses of patients on the motivation to perform abdominoplasty, being skin flaccidity, abdominal diastasis, and localized adiposity. Abdominoplasty is the most commonly performed procedure for the correction of deformities of the abdominal wall, due to the significant loss of weight after treatment for obesity, bloating, sagging skin, localized fat, hernia, tumor resection, pregnancy, multiple, previous surgeries and abdominal diastasis. The complaint of localized adiposity for abdominoplasty may justify the fact that liposuction was the frequently associated procedure[7].

Most patients did not perform preoperative procedures, and those who did reported having done it with the doctor. The importance of performing non-preoperative respiratory physiotherapy is suggested, due to lipoabdominoplasty with negative repercussions on chest mobilization and recent non-postoperative lung function[9]. When carrying out a program of respiratory exercises, it could be reduced to intra-abdominal, non-intraoperative pressure[10,12]. The intraoperative physical therapy performance is still recent, since 92.7% of the patients did not know or said they did not have a physical therapist during the surgery. Physiotherapy performed from the preoperative period reduces edema, ecchymosis, and fibrosis in the postoperative period, in addition to decreasing the number of physical therapy sessions and accelerating the patient's recovery in the postoperative period of abdominal surgeries, using manual lymphatic drainage, resources of electrothermal phototherapy and/or application of taping in the operated area[4].

Virtually all patients reported receiving postoperative guidance given by the physician, reducing the risk of complications. The most-reported postoperative complication was edema (84.2%), which differs from the findings in the literature[12,16,21], presumably because it is an expected event due to the tissue injury caused, surveys do not include it as a complication[4, 5 7,8,14]. The most observed complication is seroma, around 15% [12,13,21], statistically more frequent in surgeries combined with other procedures[12,16,21]. The sum of the responses of the patients in the present study obtained an index of 19.8%, close to the mentioned values. Infection occurs in approximately 1 to 3.8% [12,21] of patients, while the questionnaire showed 6.2%. With an incidence close to 2%, the hematoma is the third most common complication in abdominoplasty[12,21]. However, the prevalence shown here was 21.8%; possibly, such discrepancy may be justified because patients did not know how to report the difference between hematoma and ecchymosis.

Most of the patients reported having undergone postoperative procedures (70.6%), with a physical therapist (37.4%) and an esthetician (37.1%). The Brazilian Society of Plastic Surgery3 recommends that physiotherapists perform the postoperative period of cosmetic and restorative plastic surgery. The professional who worked in the postoperative period was indicated by an acquaintance (31.8%), the doctor (30.7%), or found him alone (22.2%). The surgeon must recommend the professional who will work with the patient in the postoperative period. Tacani et al., In 2005[22], found that 84.8% of doctors indicated their patients to perform the postoperative period with the physiotherapist, and Flores et al., In 2011[5], found that 63% said that they refer specifically to a dermatofunctional physiotherapist. Physiotherapy has a specialty recognized by the Council[23], "Dermatofunctional Physiotherapy" (COFFITO Resolution No. 362/2009) [24], that acts in the prevention, promotion, and recovery of the integumentary system, this includes professional performance in the pre and postoperative period. of plastic and cosmetic surgeries

There is no consensus on the ideal start for postoperative procedures. Patients started postoperative treatment between 1 and 7 days, considering an early onset. It is considered positive, since the later the treatment for tissue fibrosis begins, the worse its prognosis, with collagen disorganization, which makes reorganization even more difficult[4,7,25]. The treatment was carried out with a frequency of 3 times per week (35.7%), corroborating the literature[4,14]. Regarding the procedures used by the professional, the indication for manual lymphatic drainage (87%) and therapeutic ultrasound (51.7%) were used. Both are believed to be recommended for tissue recovery, the prevention and reduction of edema, fibrosis and adhesions, the prevention of scar retraction, and the elimination of postoperative pain[4,5,14]. Manual lymphatic drainage is the technique most indicated by plastic surgeons[8,22].

It is important to note that the questions in the questionnaire were prepared after a bibliographic survey, considering the most common situations related to abdominoplasty. The sample was made up of patients from all regions of Brazil, but there was no evaluation of these by a professional in person, it is worth considering that the patient may not know precisely some data, such as the category of professional who attended the postoperative. Despite this, it is a pioneering study to characterize the management of patients undergoing abdominoplasty. It is suggested that more studies be developed to assess patients' perception of what professionals have been doing for the pre, intra and postoperative treatment of abdominoplasty. Based on these findings, a reflection of the professionals involved

in the care management of this patient is suggested, as well as it is recommended to carry out controlled and randomized clinical trials to verify the effectiveness of each of the items discussed here.

CONCLUSION

The primary indication for abdominoplasty was sagging skin, which is most often associated with liposuction. Most patients did not undergo preoperative procedures and performed postoperatively started after 1 to 3 days, with a physiotherapist, as indicated by an acquaintance, often three times a week, due to the complaint of edema. The most performed procedures were manual lymphatic drainage and therapeutic ultrasound.

COLLABORATIONS

NLS Analysis and/or data interpretation, conception and design study, data curation, final manuscript approval, methodology, project administration, realization of operations and/or trials, writing - original draft preparation.

IGEO Analysis and/or data interpretation, data curation, final manuscript approval.

RET Analysis and/or data interpretation, data curation, final manuscript approval, methodology.

CSB Conception and design study, final manuscript approval, writing - original draft preparation.

IFBM Analysis and/or data interpretation, final manuscript approval, project administration, writing - original draft preparation.

TSF Analysis and/or data interpretation, data curation, final manuscript approval, writing - original draft preparation.

AFPM Analysis and/or data interpretation, conception and design study, data curation, final manuscript approval, methodology, project administration, writing - original draft preparation.

REFERENCES

1. Dourado CS, Fustinoni SM, Schirmer J, Brandão-Souza C. Body, culture and meaning. J Hum Growth Dev. 2018;28(2):206-12.
2. International Society of Aesthetic Plastic Surgery (ISAPS). Home [Internet]. Hanover, NH: ISAPS; 2019; [acesso em 2019 nov 5]. Disponível em: https://www.isaps.org/pt/
3. Sociedade Brasileira de Cirurgia Plástica (SBCP). Censo 2018 [Internet]. São Paulo (SP): SBCP; 2018; [acesso em 2019 nov 5]. Disponível em: http://www2.cirurgiaplastica.org.br/wp-content/uploads/2019/08/Apresentac%CC%A7a%CC%83o-Censo-2018_V3.pdf
4. Chi A, Lange A, Guimarães MV, Santos CB. Prevenção e tratamento de equimose, edema e fibrose no pré, trans e pós-operatório de cirurgias plásticas. Rev Bras Cir Plást. 2018;33(3):343-54.
5. Flores A, Brum KO, Carvalho RM. Análise descritiva do encaminhamento médico a tratamentos fisioterapêuticos dermato-funcionais nos períodos pré e pós-operatório de cirurgias plásticas cosméticas. Mundo Saúde. 2011;35(4):408-14.
6. Peniche MCD, Leija LB. Abdominoplastia y sus complicaciones. Rev Fac Med (Méx). 2016;59(6):33-8.
7. Tacani PM, Tacani RE, Machado AFP, Peroni AE, Silva MA, Freitas JOG. Perfil clínico de pacientes atendidos em fisioterapia assistencial à cirurgia plástica: análise retrospectiva. Conscientiae Saúde. 2013 Jun;12(2):290-7.
8. Tacani PM, Machado AF, Tacani RE. Perfil clínico dos pacientes atendidos em fisioterapia dermatofuncional na clínica da Universidade Municipal de São Caetano do Sul – USCS. Rev Bras Ciênc Saúde. 2009;6(21):36-43.
9. Fluhr S, Andrade AD, Oliveira B, Rocha T, Medeiros A, Couto A, et al. Lipoabdominoplasty: repercussions for diaphragmatic mobility and lung function in healthy women. J Bras Pneumol. 2019;45(3):e20170395.
10. Rodrigues MA, Ferreira LM, Calvi ENC, Nahas FX. Preoperative respiratory physiotherapy in abdominoplasty patients. Aesthet Surg J. 2018 Feb;38(3):291-9.
11. Pontelli EP, Scialom JM, Santos-Pontelli TEG. Profilaxia tromboembólica farmacológica e por compressão pneumática intermitente em 563 casos consecutivos de abdominoplastia. Rev Bras Cir Plást. 2012;27(1):77-86.
12. Gemperli R, Mendes RRS. Complicações em abdominoplastia. Rev Bras Cir Plást. 2019;34(2):53-6.
13. Ardehali B. A meta-analysis of the effects of abdominoplasty modifications on the incidence of postoperative seroma. Aesthet Surg J. 2017 Oct;37(10):1144-45.
14. Masson IFB, Oliveira BDA, Machado AFP, Farcic TS, Esteves Júnior I, Baldan CS. Manual lymphatic drainage and therapeutic ultrasound in liposuction and lipoabdominoplasty post-operative period. Indian J Plast Surg. 2014 Jan/Apr;47(1):70-6.
15. Mercedes-Acosta S, Fragoso-Báez A, Sabala R, Matos D, Medina T. Estudio de los transtornos postabdominoplastia de la sensibilidad cutánea superficial. Cir Plást Iberolatinoam. 2013 Sep;39(3):219-24.
16. Porchat CA, Santos EG, Bravo Neto GP. Complicações pós-operatórias em pacientes submetidos à abdominoplastia isolada e combinada à outras cirurgias do abdome. Rev Col Bras Cir. 2004;31(6):368-72.
17. Helene Junior A, Saad Junior R, Stirbulov R. Avaliação da função respiratória em indivíduos submetidos à abdominoplastia. Rev Col Bras Cir. 2006;33(1):45-50.
18. Silva RMV, Cordeiro LF, Figueirêdo LSM, Almeida RAL, Meyer PF. O uso da cinesioterapia no pós-operatório de cirurgias plásticas. Ter Man. 2013;11(51):129-34.
19. Araco A, Gravante G, Sorge R, Araco F, Delogu D, Cervelli V. Wound infections in aesthetic abdominoplasties: the role of smoking. Plast Reconstr Surg. 2008;121:305- 10e.
20. Farah AB, Nahas FX, Garcia EB, Ferreira LM. Experimental model for evaluation of the cutaneous sensitivity of the abdomen. Acta Cir Bras. 2004;19(Suppl 1):110-7.
21. Neaman KC, Armstrong SD, Baca ME, Albert ME, Vander Woude DL, Renucci JD. Outcomes of traditional cosmetic abdominoplasty in a community setting: a retrospective analysis of 1,008 patients. Plast Reconstr Surg. 2013 Mar;131(3):403e-10e.

22. Tacani RE, Gimenes RO, Alegrance FC, Assumpção JD. Investigação do encaminhamento médico e tratamentos fisioterapêuticos de pacientes submetidos a lipoaspiração. Mundo Saúde. 2005;29(2):192-8.
23. Conselho Federal de Fisioterapia (COFFITO). Resolução no 362, de 20 de maio de 2009. Reconhece a Fisioterapia Dermato-Funcional como especialidade do profissional Fisioterapeuta e dá outras providências. Diário Oficial da União, Brasília (DF), 16 jun 2009: Seção 1: 41-2; [acesso em 2019 nov 16]. Disponível em: https://www.coffito.gov.br/nsite/?p=3125
24. Associação Brasileira de Fisioterapia Dermatofuncional (ABRAFIDEF). Sociedade Brasileira de Cirurgia Plástica (SBCP). Nota à comunidade médica sobre pós-operatório de cirurgias plásticas [Internet]. São Paulo (SP): ABRAFIDEF/SBCP; 2015-2016; [acesso em 2019 nov 16]. Disponível em: https://coffito.gov.br/nsite/wp-content/uploads/2016/10/PL-959-03-Manifesto-ABRAFIDEF-AMB_MENOR.pdf
25. Meyer PF, Régis AJM, Araújo HG, Aby-Zayan R, Afonso YA. Protocolo fisioterapêutico para o pós-operatório de lipoaspiração. Ter Man. 2011;9(45):564-8.

***Corresponding author:** **Aline Fernanda Perez Machado**
Rua Antônio de Macedo, nº505 - São Paulo, SP, Brazil
Zip Code: 03087-040
E-mail: machado.lifpm@gmail.com

Original Article

Evaluation of three classification systems for fractures of the distal end of the radius: Frykman, Universal and A.O.

Avaliação de três sistemas de classificação das fraturas da extremidade distal do rádio: Frykman, Universal and A.O.

HENRIQUE MANSUR [1,2]*
LEONIDAS DURVAL GRIPP [3]

Institution: Universidade de Brasília, Brasília, DF, Brazil.

Article received: September 20, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0033

■ **ABSTRACT**

Introduction: Fractures at the distal end of the radius are among the most frequent fractures. Fracture classifications are widely used to define treatment and prognosis. **Methods:** radiographs were selected from 14 patients with fractures of the distal end of the radius in anteroposterior and profile views, and one case was repeated on purpose. Twelve participants at different stages of professional training (four residents and eight orthopedists) evaluated all the images at two different times, with an interval of 1 week. The inter and intraobserver concordance was analyzed using the weighted Kappa coefficient. The Student's t-test for paired samples was applied to verify if there was a significant difference in the degree of inter-observer concordance between the instruments. **Results:** Universal classification showed great intra-observer reproducibility (k = 0.72) and moderate interobserver reproducibility (k = 0.48). Frykman had moderate and mild intra and interobserver reproducibility, respectively (k = 0.51 and 0.36). The classification of the group A.O. demonstrated mild intraobserver and interobserver reproducibility (k = 0.38 and 0.25, respectively). **Conclusion:** The highest intra and interobserver concordance was observed in the Universal classification, followed by Frykman and, finally, that of the group A.O. The reproducibility of the classification did not vary significantly with the degree of experience of the evaluator.

Keywords: Colles Fracture; Radius Fractures; Classification; Reproducibility of tests; Diagnosis.

[1] Hospital Sírio-Libanês, Brasília, DF, Brazil.
[2] Universidade de Brasília, Brasília, DF, Brazil.
[3] Hospital Regional do Paranoá, Brasília, DF, Brazil.

■ **RESUMO**

Introdução: As fraturas da extremidade distal do rádio estão entre as mais incidentes de todas as fraturas do corpo. As classificações das fraturas são amplamente utilizadas para definição de tratamento e prognóstico. **Métodos:** Foram selecionadas radiografias de 14 pacientes com fratura da extremidade distal do rádio nas incidências anteroposterior e perfil, e um caso foi propositalmente repetido. Todas as imagens foram avaliadas por 12 participantes em diferentes estágios de formação profissional (4 residentes e 8 ortopedistas), em dois momentos distintos, com intervalo de 1 semana. Analisou-se a concordância inter e intraobservadores por meio do coeficiente Kappa ponderado. O teste *t* de Student para amostras pareadas foi aplicado para verificar se havia diferença significativa no grau de concordância interobservador entre os instrumentos. **Resultados:** A classificação Universal apresentou grande reprodutibilidade intraobservadores (k = 0.72) e moderada interobservador (k = 0.48). Frykman teve reprodutibilidade moderada e leve intra e interobservador, respectivamente (k = 0.51 e 0.36). A classificação do grupo A.O. demonstrou reprodutibilidade leve intraobservadores e interobservador (k = 0.38 e 0.25, respectivamente). **Conclusão:** A maior concordância intra e interobservador foi observada na classificação Universal, seguida pela de Frykman e, por último, a do grupo A.O. A reprodutibilidade da classificação não variou significativamente com o grau de experiência do avaliador.

Descritores: Fratura de Colles; Fraturas do rádio; Classificação; Reprodutibilidade dos testes; Diagnóstico.

INTRODUCTION

Fractures of the distal end of the radius are defined as those that occur up to three centimeters from the radiocarpal articulation[1]. It has an incidence of approximately 1: 10,000 people, representing 16% of all fractures of the human body[2]. The most affected age group is between 60 and 69 years, mainly women, but there is an increase in the incidence among young people due to traffic accidents and high-energy sports injuries[1-3]. The high incidence in the elderly is correlated with osteoporosis, female sex, white race, and early menopause[1-3].

The diagnosis of radio fractures is based on medical history, physical examination and image evaluation, generally obtained with plain radiographs of the wrist in the anteroposterior (AP) and lateral view[1-3]. Fractures at the distal end of the radius are divided according to the pattern of the injury Therefore, classifications are important insofar as they help to make decisions about treatment to institute and guide the prognosis of fractures[4].

The Frykman classification was, for many years, the most widely used system, and is based on the participation of the articular surfaces of the radius, which can be classified from 1 to 8[5]. The Universal or Rayhack classification was created in 1990 and modified by Cooney in 1993[6]. It differences between intra and extra-articular fractures, with or without deviations, their reducibility, and stability[6]. The A.O./OTA Group classification was created in 1986 and revised in 1990. It is divided into extraarticular (type A), partial articular (type B) and complete articular (type C). The three groups are organized in increasing order of severity concerning morphological complexity, difficulty of treatment, and prognosis[7].

The studies currently found in the literature present very different methodologies and show low intra- and interobserver reproducibility in the different classifications of fractures of the distal end of the radius, without consensus on which system should be used in daily practice and the conduction of scientific studies[4,8-10].

OBJECTIVE

The objective of this work is to evaluate the reproducibility of the three main classifications and to define which one has the highest intra and interobserver agreement, and whether the training stage of the participants influences the evaluation.

METHODS

This is an observational study, which includes imaging examinations of 14 patients seen in the emergency department of a public health hospital, diagnosed with a fracture of the distal end of the radius, from June to September 2017. All included patients had radiographs in two views, anteroposterior and profile. Patients with immature skeleton, those without satisfactory radiography, and those with previous wrist fractures or deformities were excluded. For the assessment, 15 cases were presented to the evaluators, with one patient being repeated on purpose, in order to improve intraobserver precision.

Twelve orthopedists in different stages of training were selected as participants, eight members of the Brazilian Society of Orthopedics and Traumatology, two specialists in hand surgery and six non-specialists; and four resident physicians, one in the first year of training (R1), two in the second year (R2) and one in the third year (R3). The evaluators classified the fractures presented after a brief explanation of the classification systems and their consultation was allowed at any time during the evaluation. After seven days, the participants classified the same fractures again.

The study met all requirements concerning the rights of human beings and was approved by the institution's Research Ethics Committee (substantiated opinion No. 2,294,348).

Statistical analysis

The weighted Kappa coefficient composed the inferential analysis for intra and interobserver concordance of Frykman, Universal, and AO classifications. The Student's t-test for paired samples was applied to verify if there was a significant difference in the degree of inter-observer concordance between the instruments. The interpretation of the Kappa values was made following what was proposed by Landis and Koch, in 1977[11], according to which the Kappa values below zero represent deficient reproducibility, from zero to 0.20 insignificant, from 0.21 to 0.40 slight reproducibility, 0.41 to 0.60 moderate reproducibility, 0.61 to 0.80 large reproducibility, and greater than 0.80 is considered a near-perfect match. The values obtained from the Kappa statistic were tested at a significance level of 5%.

RESULTS

Among the classifications, a better reproducibility was observed in the Universal classification, with a Kappa index of 0.72 considered as a great intraobserver reproducibility. In the inter-observer evaluation, this index showed a slight decrease, ceasing to have high reproducibility, changing to moderate with a value of 0.48. The Frykman classification had a Kappa index of 0.51, and reproducibility is considered moderate for intraobserver evaluations. In the inter-observer evaluation, the index was 0.36, classified as mild. The A.O. had a slight intraobserver and interobserver reproducibility (κ = 0.38 and 0.25, respectively) (Tables 1 and 2).

When analyzing the classification of the repeated fracture, it was observed that only one evaluator questioned that the same radiograph had been previously evaluated. However, all the evaluators classified the lesion in the same way in at least one of the three systems. The Frykman classification showed reproducibility equal to the Universal classification, with seven correct answers, while that of group A.O. presented five correct answers (Figure 1).

When analyzing the degree of education and experience of the evaluator, there was no statistically significant variation about the values of the Kappa index ($p < 0.05$).

DISCUSSION

The ideal classification of any fracture should provide enough information to help make appropriate treatment decisions, determine the prognosis, in addition to having satisfactory reproducibility and being accessible to memorize[12]. The reproducibility of the system is based on inter- and intra-observer concordance, and a useful classification must be reproducible so that it can be widely accepted and allow different series to be compared[4,8]. In the present study, we analyzed the reproducibility of fractures of the distal end of the radius, and a more significant

Table 1. General interobserver concordance of Frykman, A.O., and Universal for fracture of the distal end of the radius using the Kappa index.

	Moment 1		Moment 3	
Systema	Kappa	Concordance	Kappa	Concordance
Frykman	0.36	Mild	0.41	Moderate
Universal	0.48	Moderate	0.47	Moderate
A.O.	0.25	Mild	0.29	Mild

Table 2. General Intraobserver Concordance of Frykman, A.O., and Universal for fracture of the distal end of the radius using the Kappa index.

System	Kappa	Concordance
Frykman	0.51	Moderate
Universal	0.72	Great
A.O.	0.38	Mild

inter and intraobserver concordance was observed in the Universal classification, followed by Frykman and, finally, that of A.O. In the various studies found in the literature, as well as in this one, most used the inter-and intra-observer Kappa index to assess the concordance of the different types of fracture classifications[4,8,10].

Andersen et al., In 1996[13], studied four classifications for distal radius fractures: Frykman, Melone, Mayo, and A.O. They found that none of them showed high interobserver concordance (Kappa between 0.61 and 0.80). In Frykman's classification, the intraobserver concordance ranged from 0.40 to 0.60, and the interobserver had an average Kappa index of 0.36. Regarding the A.O. complete, the mean intraobserver concordance ranged from 0.22 to 0.37, and, when reduced to three categories, a concordance level of 0.58 to 0.70 was obtained. However, by reducing to three categories, the A.O. system has questionable value compared to other classifications.

Assessing the reproducibility of the A.O. in 30 radiographs of distal radius fractures, classified by 36 observers with different levels of experience, Kreder et al., in 1996[14], showed that the interobserver concordance was better for the simplified classification ($\kappa = 0.68$) and progressively decreased when including the groups ($\kappa = 0.48$) and subgroups ($\kappa = 0.33$) of this system. The Kappa index ranged from 0.25 to 0.42 for intraobserver concordance with the A.O. system and from 0.40 to 0.86 in the simplified classification. There was no difference regarding the degree of experience of observers in classifying "groups" and "subgroups."

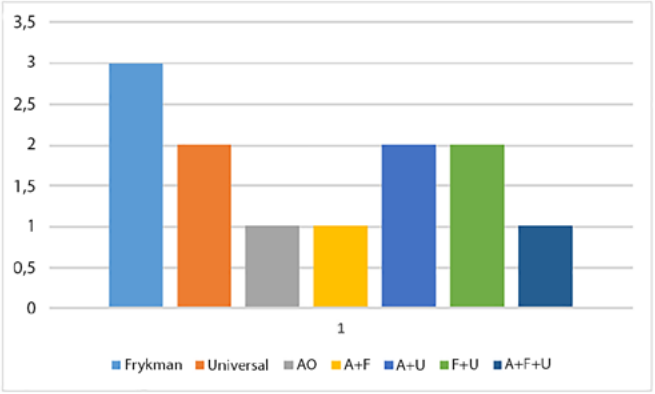


Figure 1. General intraobserver concordance of Frykman's classifications, A.O. and Universal for fracture of the distal end of the radius.
A + F: AO and Frykman classifications; A + U: AO and Universal classifications; F + U: Frykman and Universal classifications; A + F + U: AO, Frykman and Universal classifications.

Illarramendi et al., In 1998[15], used 200 radiographs classified by six observers with different levels of experience. For the Frykman classification, moderate interobserver reproducibility ($\kappa = 0.43$) and good intraobserver reproduction ($\kappa = 0.61$) were obtained. For the A.O.classification, they found slight interobserver reproducibility ($\kappa = 0.37$) and moderate intraobserver reproducibility ($\kappa = 0.57$). However, to obtain such results, the authors simplified the Frykman and A.O. classifications, improving the reproducibility of both, which perhaps would not occur if they were complete. There was greater intraobserver than interobserver reproducibility, and concordance did not improve with increasing observer experience.

There is still no consensus on the ideal methodology in the reproducibility studies of the classifications, since the number of image examinations analyzed and the number of evaluators influence the concordance of the answers [13-15]. In the study by Kreder et al., In 1996[14], there were 30 images and 36 evaluators, while in the one presented by Illarramendi et al., In 1998[15], six participants judged 200 images.

In the present study, we chose to reduce the number of fractures, totaling 15 with two incidences each, so as not to make the process tiring, which could harm the results of the evaluations. However, in concordance with the previous studies, from reproducibility, we found that the classifications evaluated were not satisfactory, with a result considered good only for intraobserver concordance at Universal. In the rest, the concordance was mild to moderate[13-15]. Another point of concordance with the studies cited is the little influence of the level of experience of the participants when classifying distal radius fractures, since there was no significant difference between residents and specialists[13,15].

Besides, unlike previous research, we purposely repeated a case for better assessment of intraobserver concordance. It was observed that many evaluators were unable to identify that they were classifying repeated radiographs, confirming the difficulty in creating a highly reproducible classification system.

CONCLUSION

The highest intra and interobserver concordance was observed in the Universal classification, followed by Frykman and, finally, that of the group A.O.; however, we found that the reproducibility of the classifications

was not satisfactory, with a result considered good only for the intraobserver concordance in Universal. Furthermore, it was observed that the reproducibility of the classification does not depend on the degree of experience of the evaluator.

COLLABORATIONS

HM Analysis and/or data interpretation, conception and design study, final manuscript approval, project administration, supervision, writing - original draft preparation, writing - review & editing.

LDG Analysis and/or data interpretation, data curation, formal analysis, methodology, realization of operations and/or trials, writing - original draft preparation.

REFERENCES

1. Mallmin H, Ljunghall S. Incidente of Colles' fracture in Uppsala. A prospective study of a quarter-million population. Acta Orthop Scand. 1992 Apr;63(2):213-5.
2. Pires PR. Fraturas do rádio distal. In: Traumatologia Ortopédica. Rio de Janeiro: Revinter; 2004.
3. Bucholz RW, Heckman JD, Court-Brown CM, Tornetta P. Rockwood and Green's Fractures in Adults. 7th ed. Philadelphia: Lippincott Williams & Wilkins; 2009.
4. Belloti JC, Tamaoki MJS, Santos JBG, Balbachevsky D, Chap EC, Albertoni WM, et al. As classificações das fraturas do rádio distal são reprodutíveis? Concordância intra e interobservadores. São Paulo Med J. 2008;126(3):180-5.
5. Frykman G. Fracture of the distal radius, including sequilla of shoulder-hand síndrome: disturbance of the distal radio-ulnar joint and impairment of nerve function. A clinical and experimental study. Acta Orthop Scand Suppl. 1973;108:1.
6. Cooney WP. Fractures of the distal radius: a modern treatment-based classification. Orthop Clin North Am. 1993 Apr;24(2):211-6.
7. Hahn DM, Colton CL. Distal radius fractures. In: Rüedi TP, Murphy WM, eds. AO Principles of fracture management. New York: Medical Publishers; 2001. p. 357-77.
8. Oskam J, Kingma J, Klasen HJ. Interrater reliability for the basic categories of the AO/ASIF system as a frame of referece for classifying distal radial fractures. Percept Mot Skills. 2001 Apr;92(2):589-94.
9. Reis FB, Faloppa F, Saone RP, Boni JR, Corvelo MC. Fraturas do terço distal do rádio: classificação e tratamento. Rev Bras Ortop. 1994;29(5):326-30.
10. Oliveira Filho OM, Belangero WD, Teles JBM. Fraturas do rádio distal: avaliação das classificações. Rev Assoc Med Bras. 2004;50(1):55-61.
11. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977 Mar;33(1):159-74.
12. Belloti JC, Santos JBG, Erazo JP Iani LJ, Tamaoki MJS, Moraes VY, et al. Um novo método de classificação para as fraturas da extremidade distal do rádio – a classificação IDEAL. Rev Bras Ortop. 2013;48(1):36-40.
13. Andersen DJ, Blair WF, Steyers Junior CM, Adams BD, El-Khouri GY, Brandser EA. Classification of distal radius fractures: an analysis of interobserver reliability and intraobserver reproducibility. J Hand Surg Am. 1996 Jul;21(4):574-82.
14. Kreder HJ, Hanel DP, McKee M, Jupiter J, McGillivary G, Swiontkowski MF. Consistency of AO fracture classification for the distal radius. J Bone Joint Surg Br. 1996 Sep;78(5):726-31.
15. Illarramendi A, Della Valle AG, Segal E, Carli P, Maignon G, Gallucci G. Evaluation of simplified Frykman and AO classifications of fractures of the distal radius Assessment of interobserver and intraobserver agreement. Int Orthop. 1998;22(2):111-5.

***Corresponding author:** **Henrique Mansur**
Área Militar do Aeroporto Internacional de Brasília, Lago Sul, Brasília, DF, Brazil.
Zip Code: 71607-900
E-mail: henrimansur@globo.com

Use of trichloroacetic acid for closure of lesion by extensors in lobules of ears

Uso de ácido tricloroacético para fechamento de lesão por alargadores em lóbulos de orelhas

JULIANA GULELMO STAUT [1]*
DIEGO OVALLE TORRES [1]
JULIANO PEREIRA [1]
ANDRÉ COEWLHO NEPOMUCENO [1]
CARINA PADUA [1]
FERNANDO GIOVANETTI MORANO [1]
RODRIGO PINTO GIMENEZ [1]

■ **ABSTRACT**

Introduction: The use of ear lobe extenders causes a circular defect whose closure becomes a challenge for the plastic surgeon. There are multiple techniques with mobilization of local flaps in an attempt to close and return to the natural shape of the lobe. We propose to present trichloroacetic acid (TCA) as an alternative for the correction of these lesions. **Methods:** A total of five patients with lesions by ear skin eyelets were selected, and 90% TCA was used to close the defects. **Results:** After applying the product, in the first days, there was a hyperemia around the area where the acid was applied. The frosting area was replaced by a crust, which loosened over the days, concomitantly reducing the diameter of the lesion with progressive closure of the defect. **Conclusion:** Although more studies are needed, the use of 90% TCA proved to be a simple and practical option for the closure of enlarged ear lobes.

Keywords: Acquired ear deformities; Trichloroacetic acid; Chemical abrasion; External ear; Ear.

■ **RESUMO**

Introdução: O uso de alargadores de lóbulos de orelhas provoca um defeito circular cujo fechamento se torna um desafio para o cirurgião plástico. Existem múltiplas técnicas com mobilização de retalhos locais na tentativa de promover o fechamento e devolver o formato natural do lóbulo. Nossa proposta é apresentar o ácido tricloroacético (ATA) como alternativa para a correção dessas lesões. **Métodos:** Foram selecionados um total de 5 pacientes com lesões por alargadores nos lóbulos das orelhas e utilizado ATA 90% para o fechamento dos defeitos. **Resultados:** Após a aplicação do produto, observou-se uma hiperemia ao redor da área onde foi aplicado o ácido nos primeiros dias, a área de frosting foi substituída por uma crosta, que foi se soltando com o passar dos dias, concomitante a redução do diâmetro da lesão com fechamento progressivo do defeito. **Conclusão:** Apesar de mais estudos serem necessários, a utilização de ATA 90% se mostrou uma opção simples e eficaz para o fechamento de lóbulos de orelhas alargados.

Descritores: Deformidades adquiridas da orelha; Ácido tricloroacético; Abrasão química; Orelha externa; Orelha.

Institution: Hospital Irmãos Penteado, Serviço de Cirurgia Plástica Professor Dr. Ricardo Baroudi, Campinas, SP, Brazil.

Article received: November 8, 2019.
Article accepted: February 22, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0034

[1] Hospital Irmãos Penteado, Serviço de Cirurgia Plástica Professor Dr. Ricardo Baroudi, Campinas, SP, Brazil.

INTRODUCTION

The use of ear lobe extenders is a widespread habit, especially among adolescents. Such devices cause a deformity in the ear lobe, with enlargement and circular holes. Several techniques have already been described and are currently used to close such defects. Mostly, different local flap techniques are used as a tool for lobe repair[1,2,3].

We propose to present a new correction option, simpler, faster, and cheaper, using trichloroacetic acid to close these lesions.

Trichloroacetic acid (TCA) in high concentrations induces necrosis of all layers of the epidermis, reaching the papillary dermis, followed by the reconstitution of the epidermis and the matrix of the papillary dermis, through wound healing processes[4,5].

TCA has cytotoxic effects, such as suppressing the proliferation of keratinocytes and fibroblasts and the synthesis of proteins by fibroblasts, but its biological mechanism is not yet fully understood[6].

TCA-treated skin stimulates platelets, monocytes and keratinocytes to produce different growth factors, including PDGF-B transiently. The platelet-derived growth factor stimulates tissue fibroblasts around the wound to proliferate, express the appropriate integrin receptors and migrate into the wound space and thus, presumably, increase wound closure by stimulating reepithelization[7].

Keratinocytes treated with TCA expressed IL-1 (pro-inflammatory) and IL-10 (anti-inflammatory) depending on TCA concentrations, which were regulated after treatment, which suggests that the inflammatory reaction after treatment with TCA is well balanced, resulting in a better cosmetic result[4].

METHODS

After using TCA 90% frequently for closing partial fissures in ear lobes, we decided to evaluate its action in patients with sequelae due to the use of skin eyelets.

We selected four patients with previous use of ear skin eyelets bilaterally, and 1 with unilateral injury and intent to close (Table 1), to assess the feasibility of the technique. First, the patients were instructed regarding the procedure and signed a free and informed consent term. Asepsis was performed with alcoholic chlorhexidine, followed by the application of a single uniform layer of 90% TCA, with the aid of a cotton swab or wooden toothpick. After application, the frosting was observed, noting a solid white layer, covering the entire internal surface of the hole. A dressing with micropore was performed, approaching the edges of the lesion (Figure 1). Patients were instructed on local care and scheduled weekly follow-up visits.

Table 1. Relationship between age, affected side, sex, usage time and skin eyelet diameter.

	Age	Side	Gender	Usage time	Diameter
Pacient 1	14	Bilateral	Feminine	2 years	30 mm
Pacient 2	29	Bilateral	Masculine	10 years	18 mm
Pacient 3	29	Bilateral	Feminine	8 years	18 mm
Pacient 4	22	Bilateral	Feminine	7 years	16 mm
Pacient 5	16	Left	Masculine	2 years	26 mm

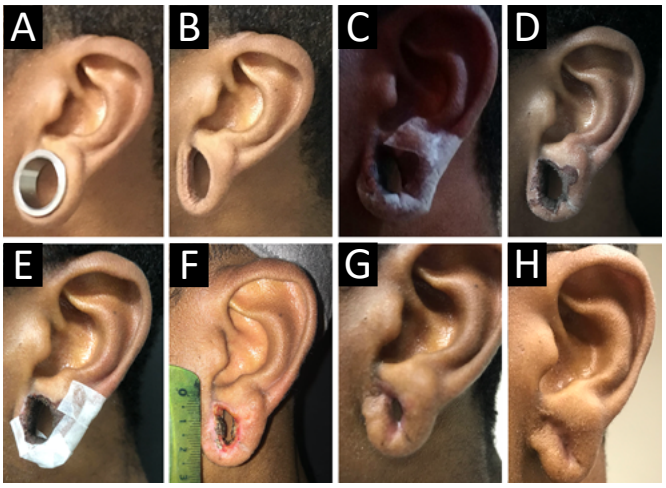


Figure 1. A. Patient with skin eyelets; **B.** Patient without skin eyelets; **C.** After immediate application of TCA; **D.** 2 weeks after application; **E.** 1 month after application; **F.** 2 months after application; **G.** 4 months after application; **H.** 1 year after application.

RESULTS

After applying the product, hyperemia was observed around the area where the acid was applied, followed by frosting. The frosting area was replaced by a crust in a few days and loosened over time, concomitantly reducing the diameter of the lesion. Patients were evaluated weekly with a photographic record to document their progress. Complete closure of the lesions was observed in moments, as described in Table 2. In just one patient, it was necessary to reapply the product, which was done at 4-week intervals. The lobes regained an aesthetically pleasing shape. There was a coaptation of the edges concentrically, returning a rounded shape to the lobes with a central scar (Figure 2).

Table 2. Relationship between closing time and number of applications.

	Closing time	No. of applications
Pacient 1	3 weeks	1
Pacient 2	2 weeks	1
Pacient 3	2 weeks	1
Pacient 4	2 weeks	1
Pacient 5	12 weeks	3

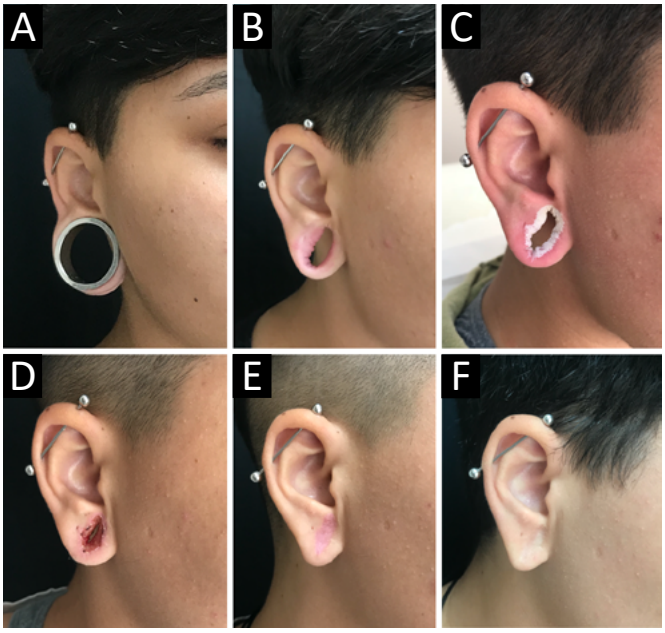


Figure 2. A. Patient with skin eyelets; **B.** Patient without skin eyelets, with a defect in the lobe of the right ear; **C.** After immediate application of TCA; **D.** 2 weeks after application; **E.** 2 months after application; **F.** 1 year after application.

DISCUSSION

The use of 90% TCA proved to be a simple and effective option for closing enlarged ear lobes. It can be an excellent alternative to surgeries for correction, which requires operative time, surgical material, and has a higher cost.

The procedure can be performed in the office, in a few minutes, without the need for surgical or auxiliary material. The cost of the procedure is low, and there is no need for anesthesia or any other additional material. Patients do not need to be away from work activities. We, therefore, understand that this is an up-and-coming technique for resolving a frequent complaint in our offices.

CONCLUSION

Although our sample is not significant enough to create a clinical approach, the use of TCA to correct ear lobe elongation has proved to be a low-risk, economical procedure that does not require a surgical environment for its execution. Further studies are needed to evaluate its effectiveness in different scenarios of lobuloplasty caused by using skin eyelets.

COLLABORATIONS

JGS	Conception and design study, Methodology, Project Administration, Realization of operations and/or trials, Supervision, Writing - Original Draft Preparation
DOT	Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Writing - Review & Editing
JP	Analysis and/or data interpretation, Supervision
ACN	Data Curation, Methodology
CP	Analysis and/or data interpretation, Data Curation
FGM	Analysis and/or data interpretation, Methodology, Project Administration
RPG	Analysis and/or data interpretation, Final manuscript approval, Project Administration

REFERENCES

1. Pek WS, Goh LHT, Pek CH. The rolling earlobe flap for dilated ear holes following ear gauging: a novel approach to aesthetically preserving earlobe soft tissue. Arch Plast Surg. 2017 Sep;44(5):453-6.
2. Collins J, Harvey J, Hilinski JM. Reconstructing the gauge earlobe defect. JAMA Facial Plast Surg. 2015 Mar/Apr;17(2):144-8.
3. Snell BJ, Caplash Y. A novel way to repair the earlobe after ear-gauging. J Plast Reconstr Aesthet Surg. 2013 Jan;66(1):140-1.
4. Kimura A, Kanazawa N, Li JH, Yonei N, Yamamoto Y, Furukawa F. Influence of chemical peeling on the skin stress response system, Exp Dermatol. 2012 Jul;(21 Suppl 1):8-10.
5. Nguyen TH, Rooney JA. Trichloroacetic acid peels. Dermatol Ther. 2000;13(2):173-82.
6. Rakic L, Lapière CM, Nusgens BV. Skin. Pharmacol Appl Skin Physiol. 2000;13:52-9.
7. Yonei N, Kanazawa N, Ohtani T, Furukawa F, Yamamoto Y. Induction of PDGF-B in TCA-treated epidermal keratinocytes. Arch Dermatol Res. 2007 Nov;299(9):433-40.

***Corresponding author:** **Juliana Gulelmo Staut**
Carlos Eduardo Correia de Negreiros, 50, Campinas, SP, Brazil.
Zip Code: 13049-352
E-mail: jgstaut@gmail.com

Review Article

Fat embolism syndrome secondary to the use of polymethylmethacrylate in bioplasty: a systematic review

Síndrome da embolia gordurosa secundária ao uso de polimetilmetacrilato na bioplastia: uma revisão sistemática

CARINA GABRIELA ANDRADE OLIVEIRA [1]*
FRANCISCO RODRIGUES DE SALES [1]
FLÁVIO ALMEIDA FARIA [2]
RICARDO ZENÓBIO DARWICH FILHO[1]

■ **ABSTRACT**

Fat embolism syndrome (FES) is defined as the presence of fatty emboli, not only in the pulmonary system, but also in the systemic circulation, with inflammatory, neurological and cutaneous manifestations. Currently, in cosmetic surgery, the polymethylmethacrylate (PMMA) material is indicated for skin filling techniques used in injectable form in small non-incisional aesthetic procedures, known as bioplasty. The objective of this study was to carry out a systematic review of the literature to show clinical studies that addressed the appearance of fat embolism syndrome in patients who underwent PMMA (polymethylmethacrylate) infiltration in bioplasty. Even with the exhaustion of sources and the expansion of systematic research that followed the precepts of the PRISMA protocol, the answer was only one article that was added to the present study. Unfortunately, no reviews or experimental studies are looking at FES in PMMA infiltration. Most of the available reports are about liposuction and correlate with bone trauma when PMMA use is mentioned. This review serves as a wake-up call for nonscientific studies and reports on the risks of using PMMA in bioplasty, but no reports or articles were obtained related to life-threatening fat embolism.

Keywords: Polymethylmethacrylate; Fat embolism; Dermal fillers; Plastic surgery; Long-term adverse effects.

Institution: Pontifícia Universidade Católica de Minas Gerais, Betim, MG, Brazil.

Article received: June 29, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0035

[1] Pontifícia Universidade Católica de Minas Gerais,Betim, MG,Brazil.
[2] Hospital Eduardo de Menezes, Departamento de Infectologia, Belo Horizonte, MG, Brazil.

■ **RESUMO**

A síndrome da embolia gordurosa (SEG) é definida como a presença de êmbolos gordurosos, não apenas no sistema pulmonar, como também na circulação sistêmica, com manifestações inflamatórias, neurológicas e cutâneas. Na cirurgia estética, atualmente, o material polimetilmetacrilato (PMMA) apresenta indicação para técnicas de preenchimento cutâneo, utilizado na forma injetável em pequenos procedimentos estéticos não incisionais, conhecidos como bioplastia. O presente estudo teve como objetivo fazer uma revisão sistemática de literatura para mostrar estudos clínicos que abordassem a ocorrência de síndrome da embolia gordurosa em pacientes que se submeteram a infiltração de PMMA (polimetilmetacrilato) na bioplastia. Mesmo com esgotamento de fontes e ampliação da pesquisa sistemática que seguiu os preceitos do protocolo PRISMA, a resposta foi de apenas um artigo que foi adicionado ao presente estudo. Infelizmente não há revisões ou estudos experimentais que contemplem a SEG na infiltração com PMMA. A maioria dos relatos disponibilizados é proveniente de lipoaspiração e correlacionados ao trauma ósseo quando citado o uso de PMMA. Esta revisão serve de alerta para os estudos e relatos não científicos sobre os riscos da utilização de PMMA na bioplastia, mas não se obteve relatos ou relacionados com a embolia gordurosa, potencialmente fatal.

Descritores: Polimetilmetacrilato; Embolia gordurosa; Preenchedores dérmicos; Cirurgia plástica; Efeitos adversos de longa duração.

INTRODUCTION

Throughout the world, health practices are moving towards a more preventive approach, showing attitudes that value healthier lifestyles and behaviors based on disease prevention. In this context, it is also recognized that men and women seek strategies to reduce the visible signs of aging[1].

Following the example of North America, which currently ranks first, considering the total number of surgical and non-surgical cosmetic and aesthetic procedures performed[2]. Brazil ranks second, being the first only when considering surgical procedures[1,2].

However, in recent years, emphasis has been placed on minimally invasive aesthetic procedures[3]. This trend culminated in the use of a variety of non-incisional methods to combat the effects of aging, with the increased use of soft tissues in infiltrative facial implants being the most popular[4].

Currently, there are a large number of fillers available for this purpose, each with its chemical composition, specific indications, and effectiveness[5]. This wide range of available materials requires aesthetic specialists and plastic surgeons to choose the appropriate filler for each aesthetic complaint of their patients[5,6].

The ideal filler applied to treat signs of aging or to increase soft tissue should provide good cosmetic results and have a long-term effect. It must also be safe, biocompatible, and stable at the implantation site, with low-risk, non-migratory complications[6].

According to Lemperle et al., In 2006[7], all injectable dermal fillers can cause complications. Late side effects can be divided into those caused by insufficient training or technical errors during the injection, and those caused by immune reactions (allergic and non-allergic) to the injected substance. Granuloma formations are rare events that result from type IV hypersensitivity reaction to a foreign body. They usually occur over months to years after the injection[3].

Acute complications include those associated with the technique used during application and are mostly local. However, due to a chronic inflammatory reaction, they may appear years after infiltration, with the possibility of remission-reactivation episodes[2,4].

The histological reaction is always similar, and the trigger for this sudden stimulation of macrophages may be a systemic infection of the patient. Dermal fillers such as silicone, bovine collagen, Artecoll™ (Hafod B.V, Rotterdam, The Netherlands), and

Restylane™[8] (Q-Med AB, Stockholm, Sweden) have been used worldwide.

Bovine collagen (Zyderm™, Zyplasta™, McGhan Medical Corporation 3M, USA) was introduced between 1981 and 1983, becoming the standard for injectables[9]. Artecoll™ (Canderm Pharma Inc., Canada) was distributed between 1994 and 2006, and Restylane™ (Q-Med AB, Stockholm, Sweden) began its triumphal advance in 1997[8]. Since then, a variety of materials have been introduced, such as Radiesse™ (Merz, Brazil), which is approved for facial bone augmentation and has been used off-label since 2003 for the treatment of wrinkles[10]; and Sculptra™ (Aventis, USA), which is approved for facial lipodystrophy of the human immunodeficiency virus, but has been used to treat wrinkles since 2005. The Food and Drug Administration (FDA - USA) approved Restylane™ in 2003, Hylaform™ (Genzy me Biosurgery, USA) in 2004, Captique™ in 2005 and Juvedermem™ 2006 (both from Allergan, USA) for the treatment of facial wrinkles[9].

The polymethylmethacrylate (PMMA) molecule does not have any animal component in its structure, which makes this molecule a biocompatible material and also provides stability even decades after the initial implantation. Its commercial applications are PMMA microspheres suspended in bovine collagen[2].

In the context of the indications of the PMMA compound, the filling of grooves, deep wrinkles, scars, dermal defects, soft and bone tissues stands out[6]. It is also used in restorative procedures for volumetric facial and body correction of lipodystrophy syndrome, a result of the use of antiretrovirals in patients with the human immunodeficiency virus[11].

Fat embolism syndrome (FES) is a poorly defined clinical entity that arises from systemic manifestations of fat embolism within the microcirculation. Embolized fat in the capillary beds causes direct tissue damage, in addition to inducing a systemic inflammatory response, which produces pulmonary, cutaneous, neurological, and retinal symptoms. It occurs more frequently after orthopedic trauma, as well as in patients with many clinical conditions, including liposuction, bone marrow transplantation, pancreatitis, however, as observed in the present study, rarely in bioplasty procedures using PMMA[12].

OBJECTIVE

The present study aimed to carry out a systematic review of the literature in order to highlight the clinical studies that included FES in patients undergoing PMMA infiltration in bioplasty.

METHODS

Search strategies and eligibility criteria

A search of the PubMed/MEDLINE and LILACS / BVS databases was performed, including articles that addressed the topic "fat embolism syndrome secondary to the use of PMMA in bioplasty."

We included studies in humans, older than 18 years (adults), whose publication in English was between January 1, 2000, and January 8, 2019, and the text published with full access reported on FES after bioplasty with use. PMMA intervention.

Review articles (meta-analyzes an/or systematics), letters to the editor, case reports, and experimental studies in which the complication after using PMMA did not include FES were not added.

After the response of the electronic databases, a manual search of relevant articles was carried out, since the sample was not adequate. In this way, the search date was extended from January 1970 to January 2019.

The following search terms were included in English: "fat embolism syndrome," "polymethylmethacrylate," and "fat embolism syndrome." In Portuguese: "PMMA," *"polimetilmetacrilato," "síndrome embolia gordurosa," "embolia lipídica."* In Spanish: "PMMA," *"polimetilmetacrilato," "embolia grasa," "embolia lipídica."* As protocols, the recommendations of the *Preferred reporting elements for systematic reviews and meta-analyzes* were followed.

Data extraction

Research data, after extraction, was included, and the authors of this article reviewed controversies. Information such as: authors, year of publication, and country of origin was reviewed to identify and exclude duplicate publications from the same cohort. The extracted data included the total number of patients and injuries, age, sex, and occurrence.

RESULTS

In the PubMed/MEDLINE electronic search, 20 research article references were found. After reading the titles, 18 references were excluded, leaving two references. When read in full, two studies were excluded as they did not include bioplasty and the use of PMMA. The exclusion of these articles was based on the inclusion and exclusion criteria described above.

In the LILACS / VHL database, 59 references to research articles were found (subject index). After

reading the titles, 50 references were excluded, leaving nine references. When reading in their entirety, three studies that did not contemplate bioplasty and the use of PMMA were excluded, and the remaining six were also excluded because they are liposuction related studies that do not consider the use of PMMA. The exclusion of these articles was based on the inclusion and exclusion criteria described above.

In this way, a manual search was performed in the three languages (English, Portuguese, and Spanish), and the search date was extended from January 1970 to January 8, 2019. As a result, only one article was available for a complete reading. (Spanish language). The selection criteria are described in Figure 1.

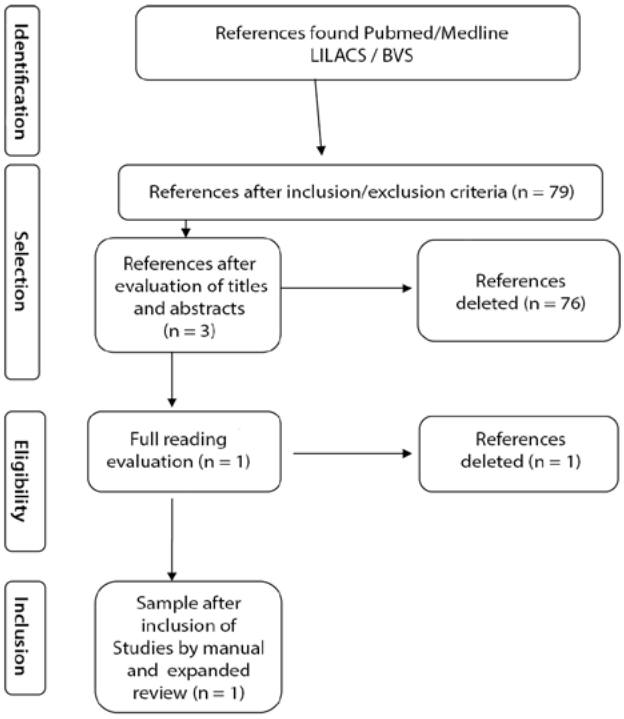


Figure 1. Flowchart of the process of searching for articles and including inclusion, prepared according to PRISMA.

Chart 1 describes the only study selected, by manual search, for this article, in which it presents the authors, the country of origin of the research, the main objectives and the main characteristics of the study.

DISCUSSION

The bibliographic search resulted in a single article, according to the descriptors, and the inclusion and exclusion requirements. Unfortunately, there is no significant number of articles that address FES in PMMA infiltration. Most of the available reports come from liposuction and correlate with bone trauma when PMMA use is mentioned.

The subject of the only report was a 26-year-old woman who started the condition 24 hours after PMMA injection into the bilateral gluteal region at a cosmetic clinic. The patient presented fever, anxiety, diaphoresis, headache, dizziness, drowsiness, and dysarthria[13].

On physical examination at admission, blood pressure of 110/70mmHg was presented, heart rate of 113 beats per minute, respiratory rate of 21 respiratory incursions per minute, with supplemental support of oxygen by mask and nebulizer; body temperature of 38.4° C, with Glasgow of 12. She was aware[13].

Pelvic tomography revealed abundant, diffuse, non-encapsulated material between the skin and the gluteus maximus. Her management was in the Intensive Care Unit, with general support, mechanical ventilation in the volume control in assisted mode. Broad-spectrum antibiotics and anticoagulation with low molecular weight heparin were also prescribed[13].

The patient developed pneumonia, systemic inflammatory response syndrome, and cerebral edema. Due to prolonged intubation and inadequate management of secretions, it was necessary to perform a tracheostomy. She had a prolonged clinical evolution; however, satisfactory, allowing her to remain without mechanical ventilation support. The infectious respiratory focus was controlled, and the patient evolved with hemodynamic stability. The patient was discharged after three weeks of hospitalization. In this case report, massive PMMA infiltration destroyed adipose tissue, which, together with the microspheres of this product, provoked fat embolism in the patient[13].

The case presented by Salgado and Olvera in 2008[13] was of non-medical professionals who performed the procedure. This type of practice has generated a public health problem, since most of the time, the subjects do not have medical training, and there are no reliable statistics on the incidence or prevalence of patient complications concerning the substances used. FES

Chart 1. Included studies: country of origin, methods and objectives and characteristics of the study.

Author/year	Country of Origin	Methods and Objectives	Study characteristics
Salgado and Olvera, in 2008[13].	México	Presentation of clinical case and outcomes.	Clinical case report with outcomes after FES in a post-procedure patient with PMMA infiltration

Source: Elaborated by the author.

was first described in 1862, by Zenker, who visualized fat cells in the pulmonary circulation of a polytraumatized individual after performing a biopsy[14]. The term FES is a severe consequence of fatty emboli that causes a distinct pattern of symptoms and clinical signs[15].

The typical clinical manifestation is the triad of acute respiratory failure, thrombocytopenia, and neurological dysfunction[15]. No definitive diagnostic criteria or tests have been developed, which makes the diagnosis of FES more difficult. It usually occurs within 48 hours after the trauma or during surgical procedures in most patients[12].

There are two main theories for the genesis of fat embolism; they are the mechanical theory and the biochemical theory. The first suggests that the obstruction of the systemic vasculature by fat embolism results from the direct release of the bone marrow into the venous system after the trauma. High intramedullary pressure after trauma causes the release of fat through open venous sinusoid. This embolized fat favors the obstruction of the capillary beds[12].

The second theory proposes that the inflammatory response to trauma causes the release of free fatty acids from the bone marrow into the venous system. Elevations in free fatty acids and inflammatory mediators damage the capillary beds. Elevated levels of free fatty acids have been correlated with hypoxemia and the induction of pulmonary inflammation[12].

Regarding the therapeutic approach, there is no specific treatment for FES. The procedures are based on clinical support measures, hemodynamic stabilization, volume replacement, nutrition and oxygen therapy or mechanical ventilation with alveolar recruitment in more severe cases[14]. There is insufficient data to support the initiation of steroid therapy, once FES is established. The proposed mechanism of action is generally an anti-inflammatory agent that reduces perivascular hemorrhage and edema. An experimental study did not show a beneficial effect and there were no prospective, randomized, and controlled clinical studies that demonstrated a significant benefit with its use[15].

CONCLUSION

In the current aesthetic situation, there is a significant increase in minimally invasive techniques that favor non-incisional methods, such as the implantation of PMMA, to minimize the effects of aging and correct body defects. It is known that in order to prevent or treat disorders, such as FES with dermal implants, it is essential to know their composition, the physiological reactions of the tissue, the time of absorption, and persistence. There is an urgent need for more studies targeting PMMA in cosmetic procedures, their risks, and clinical cases that identify FES and other potentially fatal postoperative problems for the patient.

COLLABORATIONS

CGAO Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Supervision, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing

FRS Analysis and/or data interpretation, Conceptualization, Final manuscript approval, Investigation, Resources, Supervision, Validation, Visualization

FAAF Conceptualization, Data Curation, Final manuscript approval, Supervision, Visualization, Writing - Original Draft Preparation

RZDF Final manuscript approval, Data Curation, Conceptualization, Writing - Original Draft Preparation, Supervision, Visualization.

REFERENCES

1 Chacur R, Menezes HS, Chacur NMBS, Alves DD, Mafaldo RC, Gomes LD, et al. Replacement of gluteal implants by polymethylmethacrylate filler: case report. Case Reports Plast Surg Hand Surg. 2019 Jan;6(1):20-4.

2. Souza TAB, Colomé LM, Bender EA, Lemperle G. Brazilian consensus recommendation on the use of polymethylmethacrylate filler in facial and corporal aesthetics. Aesthetic Plast Surg. 2018 Oct;42(5):1244-51.

3. Vedamurthy M. Beware what you inject: complications of injectables - dermal fillers. J Cutan Aesthet Surg. 2018 Apr/Jun;11(2):60-6.

4. Buck II DW, Alam M, Kim JYS. Injectable fillers for facial rejuvenation: a review. J Plast Reconstr Aesthet Surg. 2009 Jan;62(1):11-8.

5. Parada MB, Cazerta C, Afonso JPJM, Nascimento DIS. Overview and management of fillers complications. Surg Cosmet Dermatol. 2016;8(4):342-51.

6. Vargas AF, Amorim NG, Pitanguy I. Late complications of permanent fillers. Rev Bras Cir Plást. 2009;24(1):71-81.

7. Lemperle G, Rullan PP, Gauthier-Hazan N. Avoiding and treating dermal filler complications. Plast Reconstr Surg. 2006 Oct;118(3 Suppl 1):92S-107S.

8. Pollack SV. Some new injectable dermal filler materials: Hylaform, Restylane, and Artecoll. J Cutan Med Surg. 1999 Dec;(3 Suppl 4):S27-35.

9. Johl SS, Burgett RA. Dermal filler agents: a practical review. Curr Opin Ophthalmol. 2006 Oct;17(5):471-9.

10. Viscusi KS, Hanke CW. Soft tissue augmentation. In: Baran R, Maibach HI, eds. Textbook of cosmetic dermatology. 5th ed. Boca Raton: CRC Press; 2017. p. 473-80.

11. Antonio CR, Antonio JR, Oliveira GB, Alves FT. Polymethylmethacrylate (PMMA) filling in the lower limbs of a patient with lipodystrophy caused by antiretroviral drugs. Surg Cosmet Dermatol. 2014;6(4):373-5.

12. Kwiatt ME, Seamon MJ. Fat embolism syndrome. Int J Crit Illn Inj Sci. 2013 Jan;3(1):64-8.
13. Salgado EG, Olvera RM. Síndrome de embolia grasa secundario a infiltración de polimetilmetacrilato em región glútea. Cir Plast. 2008;18(2):78-80.
14. Jorens PG, Van Marck E, Snoeckx A, Parizel PM. Nonthrombotic pulmonary embolism. Eur Respir J. 2009 Aug;34(2):452-74.
15. Gupta A, Reilly CS. Fat embolism. Contin Educan Aesthetic Crit Care Pain. 2007 Oct;7(5):148-51.

***Corresponding author:** **Carina Gabriela Andrade Oliveira**
Rua Pintarroxo, 157, Bairro Goiânia, Belo Horizonte, Minas Gerais, MG, Brazil.
Zip Code: 31950-110
E-mail: carina.andradde@gmail.com

Review Article

Patient safety in plastic surgery: a systematic review

Segurança do paciente em cirurgia plástica: revisão sistemática

OTTO HUASCKAR MUCHINSKI SAUCEDO [1]
ELAINE ROSSI RIBEIRO [1]*
JULIANE CENTENO MULLER [1]
IZABEL CRISTINA MEISTER MARTINS COELHO [1]

■ **ABSTRACT**

Introduction: patient safety has become an increasingly present topic in health research. Plastic surgery is a specialty in evidence, and it is necessary to adapt patient safety to its particularities. **Methods:** Systematic review to investigate actions related to patient safety in plastic surgery. MEDLINE and SCIELO were chosen to locate the studies. The descriptors: "patient safety" and "plastic surgery" were used in the MEDLINE database. In SCIELO, the descriptors: "*segurança do paciente*" e "*cirurgia plástica*" were used. In both cases, the publication period was between 2012-2018, totaling 15 articles. **Results:** The countries that published the most on the subject were the United States and Brazil. The most frequent concern was safety related to the training of plastic surgery residents. Tools like the checklist have also been used to improve security. Another concern that requires more study will be if the weekends have higher complications with surgeries performed during the week. However, well-formulated medical records, as well as the Informed Consent Form (ICT), appear to have a more solid basis in patient safety. Pre-anesthetic consultation also seems to favor patient safety. Furthermore, finally, the use of WhatsApp seems to be a safe tool, and that improves the care provided by the medical team. **Conclusion:** The need for more in-depth studies on this topic is emphasized, considering that a systematized protocol was not found.

Keywords: Patient safety; Plastic surgery; Systematic review; Research on health services; Health policy.

Institution: Faculdades Pequeno Príncipe, Curitiba, PR, Brazil.

Article received: July 15, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0036

[1] Faculdades Pequeno Príncipe, Curitiba, PR, Brazil.

■ **RESUMO**

Introdução: A segurança do paciente tem se tornado um tema cada vez mais presente nas pesquisas na área da saúde. A cirurgia plástica é uma especialidade em evidência e torna-se necessário adequar a segurança do paciente as suas particularidades. **Métodos:** Revisão sistemática com a finalidade de investigar as ações relacionadas à segurança do paciente em cirurgia plástica. Para localizar os estudos foram escolhidas a MEDLINE e SCIELO. Na Base de dados MEDLINE foram usados os descritores: "patient safety" and "plastic surgery". Na SCIELO foram usados os descritores: "segurança do paciente" e "cirurgia plástica". Em ambos os casos o período das publicações foi entre 2012-2018, somando um total de 15 artigos. **Resultados:** Os países que mais publicaram sobre o assunto foram os Estados Unidos e o Brazil. A preocupação mais frequentemente encontrada foi a segurança relacionada à formação do residente de cirurgia plástica. Também ferramentas como o checklist têm sido usadas para a melhoria da segurança. Outra preocupação que exige mais estudos seria se os finais de semana apresentam maiores complicações em relação às cirurgias realizadas durante a semana. Porém, parece ter fundamentos mais sólidos na segurança do paciente o prontuário médico bem formulado, assim como o termo de consentimento informado (TCI). A consulta pré-anestésica também parece favorecer a segurança do paciente. E, por fim, o uso do WhatsApp que parece ser uma ferramenta segura e que incrementa o atendimento da equipe médica. **Conclusão:** Ressalta-se a necessidade de estudos mais aprofundados sobre esta temática, considerando-se que nenhum protocolo sistematizado foi encontrado.

Descritores: Segurança do paciente; Cirurgia plástica; Revisão sistemática; Pesquisa sobre serviços de saúde; Política de saúde.

INTRODUÇÃO

Patient safety has become an increasingly present topic in health research, which worries researchers around the world[1].

Concomitantly, the demand for plastic surgery has become more and more frequent due to the advent of new technologies and social acceptance. Culturally, plastic surgery is considered a safe procedure for the patient, however it is emphasized that there are associated risks as in any other surgical procedure[2].

We need to use History to discuss this topic, from Hippocrates, with the famous phrase *"Primun non nocere,"* to Florence Nightingale, an English nurse, who in the 19th century, when working in the Crimean War, advocated quality care for wounded soldiers.

A global landmark on the subject was the report "To err is human: building a safer health system," which brought up the debate on deaths due to health errors in the United States.

In Brazil, the bedside book was written by Souza and Mendes, in 2014[3], authors who studied the subject and that demonstrate the specific conceptual aspects of the subject area and also a historical and legal contextualization on safety and quality in health services.

The World Health Organization (WHO) launched, in 2004[4], the World Alliance for Patient Safety, with the purpose of awakening the commitment among health professionals to improve the safety of patient care, being the surgical environment a first place to implement security practices[5].

In 2011, the International Joint Commission (IJC) launched the six International Goals for Patient Safety (IGPS), which are: 1 - correct patient identification; 2 - good hand hygiene practices; 3 - effective communication; 4 - safe surgery; 5 - safety in the prescription, dispensing, administration/use of medications, diets and blood components; 6 - prevention of falls and pressure injuries.

Sequentially, the National Patient Safety Program (PNSP), instituted by the Ministry of Health (MS), was launched in 2013[6], which aims to incorporate assistance, educational and programmatic actions in the context of medical care, to reduce the number of adverse events that can lead to any type of harm to the patient. These actions include the implementation of Patient Safety Centers in health facilities, which include risk management and monitoring of patient safety[7].

In this sense, in relation to the surgical patient, concern has increased due to the high incidence of errors and adverse events, which in approximately 50% of cases could have been avoided[8].

Regarding patient safety, it is recurrent in the literature that there are several benefits in the implementation of preventive measures against adverse events in the operating room, among which the application of safety checklists in surgery stands out, due to their effectiveness in the reduction of preventable surgical complications, infections and, consequently, mortality[9].

The surgical safety checklist (SSC) is part of the actions proposed by the Ministry of Health, in the Safe Surgery Program saves lives, and should be applied before anesthetic induction and surgical incision and at the end of the procedure, before the patient leaving the operating room[10].

Carrying out studies on the safety of the surgical patient and the implementation of preventive measures are extremely positive actions, with a relevant impact factor, since according to the WHO recommendations there are three ways to achieve patient safety: prevention of adverse events, the discussion of adverse events that occurred, making them visible and minimizing their effects through assertive interventions[4].

Given this scenario, there are attempts made to identify in the literature protocols, activities, and programs related to patient safety in plastic surgery, to investigate actions related to patient safety in plastic surgery.

METHODS

It is a systematic review of the literature, a research designed to be methodical, explicit and reproducible, which requires the elaboration of a clear research question, definition of the search strategy and inclusion and exclusion criteria, and a thorough data analysis[11].

In this sense, the terms "patient safety" and "plastic surgery" were investigated in the Cochrane Library using the fields: Title, Abstract, Keywords, and All fields. Three systematic reviews were found, namely: 1 - "Perioperative corticosteroids for preventing complications following facial plastic surgery," whose objective is to determine the effects of perioperative administration of corticosteroids; 2 - "Wound drainage after plastic and reconstructive surgery of the breast" the objective of which is to compare the safety and efficacy of the use of wound drains after elective plastic procedures and reconstructive breast surgery; 3 - "Surgical orbital decompression for thyroid eye disease," to review the current published evidence on the efficacy of surgical orbital decompression for disfiguring proptosis in adult thyroid eye disease and summary information on possible complications and quality of identified studies. Therefore, the reviews sent to Cochrane have, in fact, objectives that are diametrically opposed to the purpose of this review.

Next, the researchers analyzed the 27 elements of PRISMA (Preferred Reporting Elements for Systematic Review and Meta-analysis Statement) to verify the essential parts of a systematic review.

To answer the research question, the researchers searched the databases for descriptors: *"segurança do paciente", "cirurgia plástica" e "protocolos"*. Although it was investigated in different bases, the result was null, that is, in no base were articles found on this topic. Finally, after reflections, the PVO was established as follows:

P: patient safety;

V: patient safety in plastic surgery;

O: actions related to patient safety in plastic surgery.

To locate the studies, the databases chosen were MEDLINE and SCIELO.

The following keywords were used in the MEDLINE database: "patient safety" and "plastic surgery," found in the title and abstract, and the following filters were applied: language: Portuguese, English and Spanish, text full and publication period between 2012-2018, using the primary Mesh.

In SCIELO, the descriptors: "patient safety" and "plastic surgery" were used in all the indices, and the following filters were applied: language - Portuguese, English and Spanish, thematic area of health sciences, full text available and Publication period between 2012-2018.

Regarding the search results, in MEDLINE, there were a total of 55 articles initially, of these, 33 were excluded because they did not meet the research objectives, two were excluded for not meeting the language filter, 1 in Swedish and 1 in German, and 2 for being repeated. After this first analysis, for the critical evaluation of the studies, four articles were excluded, since during the in-depth reading it was observed

that there was no adherence to the question and the research objectives, three were eliminated because they presented low evidence (level of evidence 3 and 4) indicated by the author of the articles and the magazine, a total of 11 articles from this database to compose the sample.

In SCIELO, there were a total of 11 articles in the initial search, of which one was excluded because it was a case study, and six were excluded after reading titles and abstracts, without meeting the research question and objectives, totaling four articles from this database to compose the sample.

There were 15 articles left to compose the final sample after adding the search results from the two databases, as shown in Figures 1 and 2.

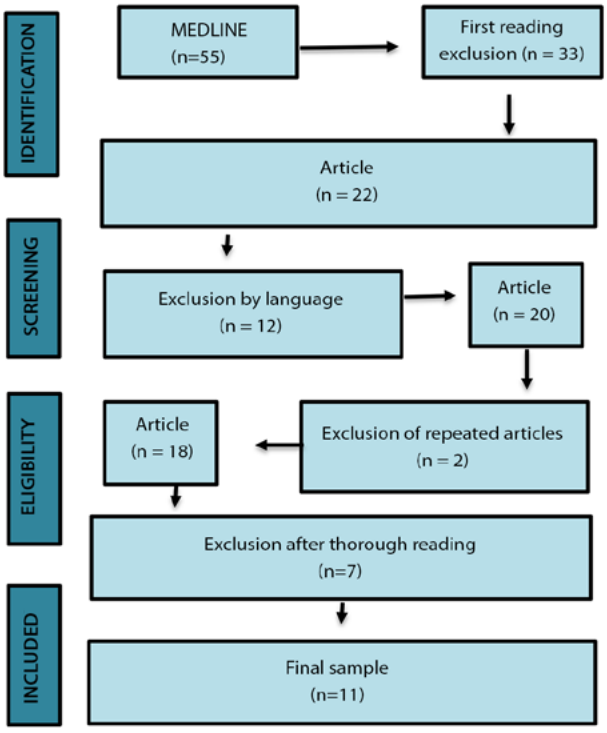


Figure 1. Flowchart for the selection of MEDLINE articles.

RESULTS

For analysis of the sample of this study, the following tables were constructed (Tables 1 to 4).

DISCUSSION

The studies that integrated the sample of this systematic review show that in 2016 there were four publications, with the largest number, followed by the years 2015 and 2012, with three publications on the subject studied, the rest published one article per year. The most prevalent countries found in the production of works on patient safety in plastic surgery were the United States and Brazil, with about 46% of the works being American and 33% of Brazilian works, 13% are from German authors, and 6.6 % are English.

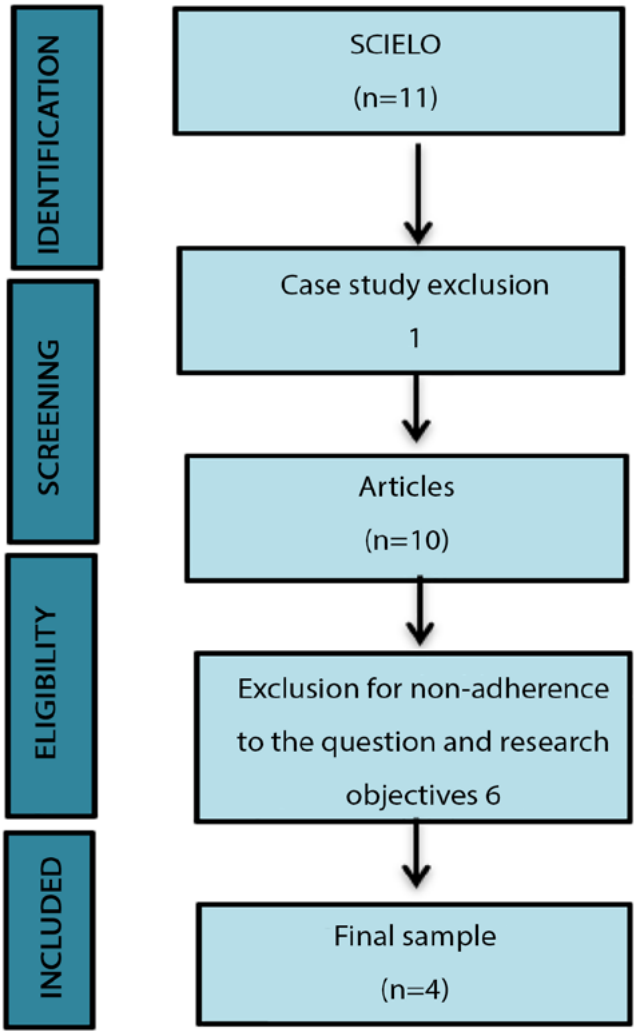


Figure 2. Flowchart for the selection of SCIELO articles.

As for the types of studies carried out, 26.5% of them were intervention research, 20.1% cohort, 20.1% retrospective, 13.3% analytical study, 13.3% retrospective correlational, and 6.7% transversal series.

The study participants were mostly patients with 41%; health professionals accounted for 18% of the participants; 12% were residents, and 6% a more specific population, pediatric patients.

After presenting the overview of the selected articles, for the best didactic effect, the content of the articles in the sample was divided into three categories, namely:

1. Preoperative period;
2. Transoperative period;
3. Perioperative period.

Chart 1. Title, authors and year of selected articles.

N. and Database	Title	Authors	Year
1. MEDLINE (24)	Impact of an event reporting system on resident complication reporting in plastic surgery training: addressing an ACGME and Plastic Surgery Milestone Project Core Competency.	Parikh PR, Snyder-Warwick A, Naidoo S, Skolnick GB, Patel KB[24]	2017
2. MEDLINE (16)	Aesthetic plastic surgery checklist: a safety tool.	Sucupira E, Matta R, Zuker P, Matta J, Arbeláez JP, Uebel CO[16]	2016
3. MEDLINE (19)	WhatsApp: improvement tool for surgical team communication.	Sidhoum N, Dast S, Abdulshakoor A, Assaf N, Herlin C, Sinna R[19]	2016
4. MEDLINE (22)	The impact procedures. of resident participation in outpatient plastic surgical procedures.	Massenburg BB, Sanati-Mehrizy P, Jablonka EM, Taub PJ[22]	2015
5. MEDLINE (23)	Resident Cosmetic Clinic: Practice Patterns, Safety, and Outcomes at an Academic Plastic Surgery Institution.	Qureshi AA, Parikh RP, Myckatyn TM, Tenenbaum MM[23]	2016
6. MEDLINE (25)	Surgical Precision in Clinical Documentation Connects Patient Safety, Quality of Care, and Reimbursement.	Kittinger BJ, Matejicka II A, Mahabir RC[25]	2016
7. MEDLINE (20)	The weekend effect in plastic surgery: analyzing weekday versus weekend admissions in body contouring procedures from 2000 to 2010.	Tadisina KK, Chopra K, Singh DP[20]	2015
8. MEDLINE (18)	Patient safety in plastic surgery: identifying areas for quality improvement efforts.	Hernandez-Boussard T, McDonald KM, Rhoads KF, Curtin CM[18]	2015
9. MEDLINE (21)	Aesthetic surgery performed by plastic surgery residents: an analysis of safety and patient satisfaction.	Koulaxouzidis G, Momeni A, Simunovic F, Lampert F, Bannasch H, Stark GB[21]	2014
10. MEDLINE (14)	Training in aesthetic surgery at a university clinic - the Munich model.	Rezaeian F, Schantz JT, Sukhova I, Schenck TL, Giunta RE, Harder Y, Machens HG, Müller D[14]	2013
11. MEDLINE (26)	Our own worst enemy.	Swanson E[26]	2016
12. SCIELO (15)	Comparison of surgical infection rates after implantation of the safety checklist.	Prates CG, Stadñik CM, Bagatini A, Caregnato RC, Moura GM[15]	2018
13. SCIELO (12)	Use of the informed consent term in cosmetic plastic surgery.	Doncatto LF[12]	2012
14. SCIELO (17)	Lipoabdominoplasty in the aesthetic treatment of the abdomen: 5-year experience.	Amorim Filho HC, Amorim CCB[17]	2012
15. SCIELO (13)	Anesthetic complications in plastic surgery and the importance of pre-anesthetic consultation as a safety tool.	Schwartzman UP, Batista KT, Duarte LTD, Teixeira D, Saraiva RA, Fernandes MC, et al.[13]	2011

Source: Author, 2019.

Chart 2. Objectives and country of the selected articles.

N. and Database	Objetives	Country
1. MEDLINE	The Accreditation Council for Graduate Medical Education and Plastic Surgery Milestone Project has identified practice-based learning and improvement, which involves systematically analyzing current practices and implementing changes, as a core competency in residency education. In surgical care, complication reporting is an essential component of practice-based learning and improvement as complications are analyzed in morbidity and mortality conference for quality improvement. Unfortunately, current methods for capturing a comprehensive profile of complications may significantly underestimate the true occurrence of complications. Therefore, the objectives of this study are to evaluate an intervention for complication reporting and compare this to current practice, in a plastic surgery training program.	USA
2. MEDLINE	About one in ten patients experiences iatrogenic events, and more than half of these occur in the perioperative environment. The objective of this study was to develop a complete and functional checklist for aesthetic plastic surgery and test it in patients who would undergo elective plastic surgeries.	Brazil
3. MEDLINE	Concerns about the security of WhatsApp and the possibility of spreading patients data and image	England

Continue...

Continuation...

4. MEDLINE	Ensuring patient safety, along with a complete surgical experience for residents, is of utmost importance in plastic surgical training. The effect of resident participation on the outcomes of outpatient plastic surgery procedures remains largely unknown. We assess the impact of resident participation on surgical outcomes using a prospective, validated, national database.	USA
5. MEDLINE	Comprehensive aesthetic surgery education is an integral part of plastic surgery residency training. Recently, the ACGME increased the minimum requirements for aesthetic procedures in residency. To expand aesthetic education and prepare residents for independent practice, our institution has supported a resident cosmetic clinic for over 25 years. To evaluate the safety of procedures performed through a resident clinic by comparing outcomes to benchmarked national aesthetic surgery outcomes and to provide a model for resident clinics in academic plastic surgery institutions.	USA
6. MEDLINE	Emphasis on quality of care has become a major focus for healthcare providers and institutions. The Centers for Medicare and Medicaid Services has multiple quality-of-care performance programs and initiatives aimed at providing transparency to the public, which provides the ability to compare services provided by hospitals and individual physicians directly. These quality-of-care programs highlight the transition to pay for performance, rewarding physicians and hospitals for high quality of care. To improve the use of pay for performance and analyze quality-of-care outcome measures, the Division of Plastic Surgery at Scott & White Memorial Hospital participated in an inpatient clinical documentation accuracy project (CDAP).	USA
7. MEDLINE	Body contouring operations are a quickly becoming the most commonly performed operations by American plastic surgeons, mirroring the increase in bariatric surgery in the US over the last decade. Despite previous studies showing worse patient outcomes on weekend admissions for non-emergent cases (spine, breast, and hernia), there is no comparative data reported regarding body contouring procedures. The authors aimed to determine whether body contouring surgery results in worse outcomes when performed on weekends versus weekdays.	USA
8. MEDLINE	Improving the quality of healthcare is a global priority. Before quality benchmarks are established, we first must understand rates of adverse events. This project assessed risk-adjusted rates of inpatient adverse events for soft tissue reconstructive procedures.	USA
9. MEDLINE	Aesthetic surgery is an integral component of plastic surgery. Despite its importance, adequate training in aesthetic surgery is met with challenges. Although the educational benefit of resident clinics has been demonstrated, such clinics are rarely found outside the United States. The objective of the present study was to assess safety and patient satisfaction associated with aesthetic surgery procedures performed by plastic surgery residents at a German academic medical center.	Germany
10. MEDLINE	Objective of the present study was the development, implementation and evaluation of a new training concept in aesthetic surgery.	Germany
11. MEDLINE	To identify risk factors by analyzing a national or regional database. The trend started with risk stratification for venous thromboembolism. Today, the plastic surgeon may be confronted by a number of challenges to his or her care of a patient who suffers a venous thromboembolism (VTE). If the plastic surgeon does not successfully clear each hurdle, the surgeon may be deemed responsible for a bad outcome. The pathophysiology of venous thromboembolism remains poorly understood in plastic surgery. Consequently, there is little scientific justification for holding a plastic surgeon negligent for not conforming with these numerous presumed safety criteria	USA
12. SCIELO	Objective To compare surgical site infection rates in clean surgery before and after the implementation of the checklist adopted by the World Health Organization.	Brazil
13. SCIELO	The informed consent form represents security for the plastic surgeon and the patient, and its use is recommended by the Consumer Protection Code. The most frequent causes of the actions and the main evidential elements that led to the condemnation or acquittal of the cases were evaluated.	Brazil
14. SCIELO	This study aimed to demonstrate the surgical technique of lipoabdominoplasty adopted by the senior author over five years and to evaluate results and complications in patients with indication for classic abdominoplasty.	Brazil
15. SCIELO	The authors describe the anesthetic complications in Plastic Surgery observed, over a year, at Hospital Sarah Brasília and contextualize the importance of pre-anesthetic consultation.	Brazil

Source: Author, 2019.

Chart 3. Research method and participants of the selected articles.

N. and Database	Method	Participants
1. MEDLINE	This is a preintervention and postintervention study evaluating resident reporting of complications on a plastic surgery service. The intervention was an online event reporting system developed by department leadership and patient safety experts. The cohorts consisted of all patients undergoing surgery during two separate 3- month blocks bridged by an implementation period. A trained reviewer recorded complications, and this served as the reference standard. Fisher's exact test was used for binary comparisons.	The pre-intervention and post-intervention cohorts consisted of all patients having surgery on the pediatric plastic surgery service during two separate 3- month blocks bridged by a transition period for intervention implementation. The pre-intervention evaluation occurred from June 2015 to August 2015 and the post-intervention evaluation occurred from October 2015 to December 2015.
2. MEDLINE	Patient data were collected from a general hospital and the particular clinic between October 2013 and October 2015, through history, physical examination, diagnosis, laboratory tests, pre-, during, and postoperatively, and complications. An expanded safety checklist was developed and optimized for aesthetic plastic surgery based on the model presented by the WHO in 2009 with reference to the information related to the prevention of more frequent complications in this specialty.	Patient data were collected from a general hospital and the particular clinic between October 2013 and October 2015, through history, physical examination, diagnosis, laboratory tests, pre-, during, and postoperatively, and complications
3. MEDLINE	A retrospective was conducted, reviewing the number of messages performed using WhatsApp Messenger, and also evaluating its content from 1 April 2013 to 31 December 2013. Number of messages were differentiated regarding age, and the app use was evaluated comparing users over and under 45-years-old. Any interference with medical devices in the operating room was registered.	All health professionals involved in the surgical treatment of the patients
4. MEDLINE	We identified all outpatient procedures performed by plastic surgeons between 2007 and 2012 in the American College of Surgeons National Surgical Quality Improvement Program database. Multivariate regression models assessed the impact of resident participation when compared to attending alone on 30-day wound complications, overall complications, and return to the operating room (OR).	All outpatient procedures performed by plastic surgeons between 2007 and 2012 in the American College of Surgeons National Surgical Quality Improvement Program database
5. MEDLINE	We identified a consecutive cohort of patients who underwent procedures through our resident cosmetic clinic between 2010 and 2015. Major complications, as defined by CosmetAssure database, were recorded and compared to published aesthetic surgery complication rates from the CosmetAssure database for outcomes benchmarking. Fisher's exact test was used to compare sample proportions.	Patients who underwent procedures through our resident cosmetic clinic between 2010 and 2015.
6. MEDLINE	The Division of Plastic Surgery had been identified within our institution as having an opportunity for improvement in documentation. After institutional review board approval, the division engaged in a top-down educational effort aimed specifically at improving the institutional culture related to clinical documentation. Clinical providers at all levels of training, including senior staff and resident physicians, were educated on DRGs and documentation. Preprinted forms were added to every patient's chart to facilitate capturing CCs and events of the hospitalization. These forms were reviewed daily and were also used as part of the discharge summary.	Clinical providers at all levels of training, including senior staff and resident physicians
7. MEDLINE	A serial cross-sectional study of body contouring patients was performed using the Nationwide Inpatient Sample database from 2000 to 2010. Data were gathered using international classification of diseases, ninth revision codes for liposuction and reduction of adipose tissue (86.83) for weekday and weekend admissions, including demographics, hospital charges, and patient outcomes.	A serial cross-sectional study of body contouring patients was performed using the Nationwide Inpatient Sample database from 2000 to 2010.
8. MEDLINE	Patients receiving soft tissue reconstructive procedures from 2005–2010 were extracted from the Nationwide Inpatient Sample. Inpatient adverse events were identified using patient safety indicators (PSI), established measures developed by Agency for Healthcare Research and Quality.	Patients receiving soft tissue reconstructive procedures from 2005–2010 were extracted from the Nationwide Inpatient Sample

Continue...

Continuation...

9. MEDLINE	The study had 2 components, namely, a retrospective chart review and an administration of a patient satisfaction survey. Only patients who underwent a surgical intervention by a plastic surgery resident between 2003 and 2011 were included in the study. Parameters of interest included age, sex, procedure performed, number of procedures, revenue (in &OV0556;), length of follow-up, revision rate, and postoperative complication rate. Patient satisfaction was assessed by the client satisfaction questionnaire-8.	Only patients who underwent a surgical intervention by a plastic surgery resident between 2003 and 2011 were included in the study
10. MEDLINE	Over a period of 2 years, 304 aesthetic operations were performed in the fields of body contouring, breast surgery and facial surgery as an educational surgery . Educational surgeries were performed by resident surgeons under the guidance of experienced specialists and under favourable financial conditions. As indicator for safety of the interventions, the incidence of complications was recorded and assessed.	Resident surgeons under the guidance of experienced specialists.
11. MEDLINE	138 clinical trials about venous thromboembolism like a predictable event, with potentially dire consequences to the "noncompliant" surgeon, compounding the tragedy	Plastic surgery patient suffers VTE
12. SCIELO	Observational, descriptive, retrospective correlational study carried out in a general hospital.	Sample consisting of 15,319 records of clean surgeries for trauma-orthopedics, cardiovascular, plastic, general and urology specialties monitored by the Hospital Infection Control Service.
13. SCIELO	Analysis of 100 judgments of the Courts of Justice of 5 Brazilian states, in cases involving aesthetic plastic surgery. The retrospective study was carried out from July 2010 to August 2012, in a universe of 3,427 plastic surgeons. The most frequent causes of the actions and the main evidential elements that led to the condemnation or acquittal of the cases were evaluated.	3,427 plastic surgeons.
14. SCIELO	A retrospective study was carried out, by reviewing medical records, of a group of 162 patients who underwent lipoabdominoplasty associated or not with other procedures, from May 2006 to May 2011, at the Hermínio Amorim Nucleus - Plastic Surgery and Aesthetic Treatments (Lavras, SP, Brazil). The age of the patients varied between 33 years and 62 years.	A group of 162 lipoabdominoplasty. Patients undergoing lipoabdominoplasty.
15. SCIELO	A retrospective and analytical cohort study of hospital patients was carried out, focused on causality, addressing the anesthetic complications of surgical procedures performed by the Plastic Surgery team and other specialties at Hospital Sarah Brasília. The anesthetic consultation performed routinely in the preoperative period was described.	Retrospective and analytical cohort study of hospital patients addressing anesthetic complications.

Source: Author, 2019.

Preoperative period category

Surgery always begins with the patient in the office when the benefits and risks of the procedure to be performed are explained. In this sense, it is necessary to use the term of informed consent (ICT). Doncatto, in 2012[12], performed a retrospective analysis on 100 judgments of the Courts of Justice of 5 Brazilian states, from July 2010 to August 2012, in cases related to cosmetic plastic surgery, excluding cases of restorative plastic surgery. The last 20 trials of each state were considered, covering a total of approximately 3,427 active plastic surgeons, where the most frequent causes of the actions and the main evidentiary elements that led to the conviction or acquittal of the cases were evaluated. The author noted that in cases of medical process, in addition to a favorable expert opinion, the appropriate use of the consent form was the most relevant aspect in cases in which there was absolution.

Therefore, the Informed Consent Form represents safety for the plastic surgeon and the patient, since it equals and consolidates the relationship of trust and transparency between the two, fulfilling the obligation of the doctor to inform the patient and in turn that

Chart 4. Results and Conclusions of the selected articles.

N. and Database	Results and Conclusions
1. MEDLINE	There were 32 complications detected in 219 patients from June to August of 2015 and 35 complications in 202 patients from October to December of 2015. The proportion of complications reported in the preintervention group was nine of 32 (28.1 percent). After the intervention, this significantly increased to 32 of 35 (91.4 percent) ($p<0.001$). An intervention utilizing an event reporting system, supported by departmental leadership, led to significant improvements in complication reporting by plastic surgery residents.
2. MEDLINE	The tool was applied to 486 patients, of whom 430 (88%) were women and 56 (12%) were men. The most frequently performed procedure was liposuction with 30% of cases, and the most widely used type of anesthesia (39%) was local anesthesia + sedation. The greater adherence of professionals to the checklist was the group of residents (98%). The observed complications were seromas (7%), other complications unrelated to the wound (3%), and hematoma (0.2%) in only one patient who underwent facelift. The use of the checklist in addition to allowing data collection and the identification of potential risks promoted favorable changes in the attitudes of some professionals and generated interest in patient safety and teamwork.
3. MEDLINE	Instant messaging can be used as a valuable tool in order to coordinate surgical teams. We consider this as a valuable approach in order to streamline the communication between members. We consider that future development of specific apps to improve communication between health professionals is granted.
4. MEDLINE	A total of 18,641 patients were identified: 12,414 patients with an attending alone and 6227 with residents participating. The incidence of overall complications, wound complications, and return to OR was increased with resident participation. When confounding variables were controlled for in multivariate analysis, resident participation was no longer associated with increased risk of wound complications. When stratified by year, incidence of overall complications, wound complications, and return to OR in the resident participation group are trending down and fail to be significantly different in 2011 and 2012. Multivariate analysis shows a similar trend. Resident participation is no longer independently associated with increased complications in outpatient plastic surgery in recent years, suggesting that plastic surgical training is successfully continuing to improve in both outcomes and safety. Additional prospective studies that characterize patient outcomes with resident seniority and the degree of resident participation are warranted.
5. MEDLINE	Two hundred and seventy-one new patients were evaluated and 112 patients (41.3%) booked surgery for 175 different aesthetic procedures. There were 55 breast, 19 head and neck, and 101 trunk or extremity aesthetic procedures performed. The median number of preoperative and postoperative visits was 2 and 4 respectively with a mean follow-up time of 35 weeks. There were 3 major complications (2 hematomas and 1 infection requiring IV antibiotics) with an overall complication rate of 1.7% compared to 2.0% for patients in the CosmetAssure database ($p=.45$). Surgical outcomes for procedures performed through a resident cosmetic clinic are comparable to national outcomes for aesthetic surgery procedures, suggesting this experience can enhance comprehensive aesthetic surgery education without compromising patient safety or quality of care.
6. MEDLINE	Performance and improvement on metrics such as case mix index, severity of illness, risk of mortality, and geometric mean length of stay were assessed after implementation. After implementation of the CDAP, the division of plastic surgery showed increases in case mix index, calculated severity of illness, and calculated risk of mortality and a decrease in length of stay. For academic plastic surgeons, quality of care demands precise documentation of each patient. The CDAP provides one avenue to hone clinical documentation and performance on quality measures. Implementation of a CDAP resulted in increases in CMI, calculated SOI, and calculated ROM and a decrease in length of stay. The Division of Plastic Surgery was able to improve its documentation and, in doing so, improved the recognition of the complexity of the patients it was treating. As transparency in outcomes becomes a reality, it is critical for institutions to be compared with those treating similar patients. In this study, an endeavor to improve documentation proved fruitful in terms of both quality of care and financial reimbursement for the hospital.
7. MEDLINE	A total of 50,346 hospital admission cases of inpatient body contouring were examined over the 11-year period, 98% of which were on a weekday. When compared to weekday admissions, weekend admissions were associated with a statistically significant increase in hospitalization costs ($35,481, $p<0.000$) and in hospital length of stay (5.68 days, $p<0.000$). Mortality rates were found to be higher on weekend admissions (3.7%) versus weekdays (0.5%) as well. Although outcomes are multifactorial, in body contouring patients, weekday admission is associated with favorable outcomes in terms of length of stay and hospital charges.

Continue...

Continuation...

8. MEDLINE	We identified 409,991 patient with soft tissue reconstruction and 16,635 (4.06%) had a PSI during their hospital stay. PSIs were associated with increased risk-adjusted mortality, longer length of stay, and decreased routine disposition (p<.01). Patient characteristics associated with a higher risk-adjusted rate per 1,000 patients at risk (RAR) included older age, men, non-white, and public payer (p<.05). Overall, plastic surgery patients had significantly lower RAR compared to other surgical inpatients for all events evaluated except for failure to rescue and postoperative hemorrhage or hematoma, which were not statistically different. RAR of hematoma hemorrhage were significantly higher in patients receiving size-reduction surgery, and these rates were further accentuated when broken down by gender and payer. In general, plastic surgery patients had lower rates of in-hospital adverse events than other surgical disciplines, but PSIs were not uncommon. With the establishment of national basal PSI rates in plastic surgery patients, benchmarks can be devised and target areas for quality improvement efforts identified. Further prospective studies should be designed to elucidate the drivers of adverse events identified in this population.
9. MEDLINE	A total of 273 aesthetic procedures were performed in 206 patients with an increase in recent years. The median follow-up period was 49.5 months. The most frequently performed procedures were liposuction (n=59), breast augmentation (n=53), and upper eyelid blepharoplasty (n=31). One hundred ninety-two (90.3%) patients had an uneventful postoperative course. The client satisfaction questionnaire-8 questionnaire was completed by 110 patients (response rate, 50.2%). The median value of 28 indicates a high degree of patient satisfaction. An association between occurrence of major complications and patient satisfaction was seen. Aesthetic surgery performed by plastic surgery residents under supervision by attending physicians is safe and provides for high levels of patient satisfaction postoperatively. Offering these services may be able to bridge the gap between providing high-quality aesthetic surgery training while yet recruiting an increasing number of patients who may appreciate the lower fees associated with these services.
10. MEDLINE	The presented training concept aims at ensuring high quality in patient care by structure and quality of surgical training. Our data give evidence that a structured training of residents in the field of aesthetic surgery is possible without loss in quality. We expect that sufficient surgical education and the associated quality will consequently contribute to keep aesthetic surgeries a domain of plastic surgery and to prevent these procedures from being taken over by other surgical disciplines.
11. MEDLINE	It concludes that operating more than 3 hours is an independent predictor of complications. However, correlation does not imply causation; longer operations are usually longer because there are problems, not the other way around. The same is true for inpatient surgery, also identified as a risk factor. Factor V Leiden and a history of venous thromboembolism are well-known risk factors, but are dwarfed by the increased risk associated with advancing age. Routine preoperative screening for coagulopathies is unhelpful, simply because affected patients are still at a low risk even if the risk is doubled or tripled. Importantly, individual risk stratification does not consider the specific diagnosis and type of procedure. As a practical matter (and as any surgeon exposed to these forms in surgical facilities can attest), risk stratification is not consistently implemented.
12. SCIELO	There was a significant reduction in the surgical site infection rate in clean surgeries when comparing the pre and post-implantation periods of the checklist proposed by the World Health Organization.
13. SCIELO	This study allowed us to observe that in cases of aesthetic plastic surgery in which there was absolution, the appropriate use of ICT and the medical expertise of the expert of the court were predominantly favorable to the physician.
14. SCIELO	The lipoabdominoplasty technique is a safe procedure, with a low rate of complications, as long as the safety criteria are respected, which allows obtaining a well-vascularized flap, with preservation of perforating arteries. The association of liposuction technique performed on the abdomen and body contour is considered safe and essential in the search for better body harmony, for better aesthetic results and, consequently, for greater patient satisfaction.
15. SCIELO	In the present study, the incidence of anesthetic complications was 8%, mainly cardiovascular, and all had a favorable outcome.

Source: Author, 2019.

this patient declares that understood and that he/she agrees to submit to the proposed treatment, allowing the doctor legal certainty, unless the term has been obtained irregularly.

Many lawyers have considered plastic surgery to be a result-binding specialty. Therefore, there is a condemnation without any malpractice, imprudence or negligence, disregarding the biological, technical and specific aspects of the patient. Doncatto, in 201212, (p. 353) still notes that:

> "Brazilian judges are increasingly adopting a new jurisprudence, in line with a contemporary trend and following in the footsteps of the French and Canadian trends,

> which consider cosmetic plastic surgery as best-endeavors contract, therefore, require testing the guilt of the doctor to condemn him. "

The required result obligation of cosmetic plastic surgery has generated uneasiness in the medical profession, as many judges have not yet understood that it is impossible to guarantee results in all types of surgery, as organic tissues react differently to the will of both the physician and the patient. In this perspective, the author considers that the consent form leaves the doctor-patient relationship in addition to being transparent, respectful in the sense of the patient's autonomy for his body, aware of the advantages and disadvantages, risks, and possible results. He says: "in turn, the plastic surgeon, when using the ICT properly, demonstrates suitability, good intentions, good principles and honesty, a fact that becomes an attenuator[12].

The consent form must provide adequate and sufficient information, containing the nature and purpose of the treatment, the probable risks and benefits, the alternative treatments, in addition to the risks of failing to perform the proposed treatment or the alternatives. Doncatto, in 2012[12], observed that in cases of medical process, in addition to a favorable expert opinion, the proper use of the consent form was the most relevant aspect in cases in which there was an acquittal.

The article called "Anesthetic complications in plastic surgery and the importance of pre-anesthetic consultation as a safety instrument" already points to the aspect of patient safety according to the pillars of the Federal Council of Medicine, which says it has been mandatory since 2006, the pre-anesthetic consultation (CFM, in 2016X). Schwartzman et al., In 2011[13], in a retrospective and analytical cohort study of hospital patients, discussed the anesthetic complications of surgical procedures in a given hospital in Brazilia. In the preoperative periods, pre-anesthetic consultations were carried out with clinical evaluation and description of the anesthetic plan.

The authors, in agreement with Doncatto, in 2012[12], previously presented, also state that the informed consent form was signed, which is kept confidential, attached to the medical record. The focus of this study was the main information obtained in the pre-anesthetic consultation and the classification of the patient's physical state.

As a result of this study, it was found that 6365 anesthetic procedures were performed between April 2006 and December 2007, and of these, 2.74% had an anesthesia-related complication rate. Several specialties have been researched, and concerning plastic surgery, even with complex procedures for reconstruction of the upper limb (neurotendinous lesions and tumors), lower limb, injuries to the trunk (pressure ulcers, myelomeningocele and ostemilielitis), there was a complication in 8%, compared to orthopedics, with 46.25% and neurosurgery with 24.6%. Regardless of surgical specialty, the authors identified hypotension with 22.8% of cases as an anesthesia-related complication, followed by vomiting and arrhythmias with 13.7% and perforation of the dura mater and laryngospasm with 6.3%.

Schwartzman et al., In 2011[13], point out that the team of health professionals, composed of anesthetists and nurses, is of paramount importance for the realization of pre-anesthetic consultation in the context of patient safety in plastic surgery, "as it can reduce complications intra and postoperative periods and avoid unfavorable outcomes "(p. 226).

Also, in this category, we can point out the study by Rezaeian et al. in 2013[14], a German publication, which sought to develop, implement and evaluate a new concept of teaching and training in aesthetic plastic surgeries. Although this research was carried out with residents, a fact that will be discussed in another category of analysis, the central point is the training program carried out in 304 aesthetic surgeries of body, breast and facial contour. The responsible physicians used these surgeries to teach residents the best techniques and recorded cases where complications occurred as an indicator of patient safety. It emerged from the study that training was effective, considering that the incidence of complications from educational surgeries and those that did not compose the research sample, that is, that were not for teaching the residents, had practically the same percentage of complications, being 4.4% for elective surgeries and 4.9% for educational ones.

Transoperative period category

For this category, some articles dealt with issues related to the transoperative period, such as a checklist, surgical evolution, iatrogeny, adverse events, and communication.

Prates et al., in 2018[15], demonstrate that the checklist can also be used to reduce rates of surgical infection. According to the authors, surgical infections are recognized worldwide as a serious public health problem because they are associated with high morbidity and mortality, increased length of stay, and hospital costs. They are one of the main targets of epidemiological surveillance in health institutions. In underdeveloped and developing countries, the authors claim that it can affect up to a third of patients undergoing surgical procedures. Monitoring and

implementing effective strategies to prevent them in health facilities have been stimulated and driven by worldwide movements for patient safety. Surgical site infections are, for the authors, preventable adverse events and markers of low quality of care, requiring efforts by health professionals and institutions to reduce them.

Also related to the checklist, the study by Sucupira et al., In 2016[16], describes authors who recall in their work "Aesthetic Plastic Surgery Checklist: A Safety Tool" that about 10% of patients have iatrogenic events and that more than half of them occur in the perioperative environment. The research aimed to develop a complete and functional checklist for cosmetic plastic surgery and to test it in patients undergoing elective plastic surgery. It was developed a complete checklist to improve patient safety in cosmetic plastic surgery.

Although the authors marked the level of evidence in this study as IV, the results point to the use of data from 486 patients, 430 of whom were female, and 56 of whom were male, with the most commonly performed liposuction in 305 cases and anesthesia plus sedation. As for complications, the authors identified seromas with 7%, other complications not related to the wound with 3%, and the group that most adhered to the use of the checklist was the group of residents.

In the paper, it was demonstrated that the use of the checklist allows the collection of data and the identification of potential risks, promoted favorable changes in the attitudes of some professionals, and generated interest in patient safety and the team labor.

Another article that is classified in the category related to the transoperatory period is the one that discusses the safety of the technique itself. Amorim et al., in 2012[17], in their work on lipoabdominoplasty, demonstrates that surgical techniques undergo evolution over time, resulting in greater safety for the patient. The author demonstrates that the evolution of the technique has made lipoabdominoplasty a more elaborate surgery, enabling the achievement of good results by knowing the safety limits of the surgery.

A retrospective study was carried out using 162 medical records of patients who underwent lipoabdominoplasty over five years, and the results show a significant reduction in cutaneous-adipose tissue, with a significant decrease in abdominal flaccidity and an improvement in body contour.

The author reports that the safety of this procedure is modernly based on decreased detachment of the abdominal flap. On the other hand, it is undeniable the greater viability and safety of a less detached flap, which preserves its vascular and sensitive source. This safety for flap irrigation is described in studies with Doppler, as shown by the authors. That is, the lipoabdominoplasty technique is a safe procedure, with a low rate of complications, as long as the safety criteria described by the authors are respected. This proceeding allows obtaining a well-vascularized flap, with preservation of perforating arteries. Amorim et al., In 2012[17], stated that the postoperative complications found in the medical record review are low and meet the incidences reported in the literature.

Hernandes-Boussard et al., In 2015[18], remember that adverse events are not rare, 3.7% of all hospital admissions experience an adverse event, and most of these events are considered preventable. In addition to the impact on the patient and his family, adverse events increase the use of hospital resources and the costs of hospitalization.

Given the wide-ranging impact of these events, there has been global prioritization in patient safety and associated hospital performance. The authors say that plastic surgery is a surgical discipline with its particularities, that there are essentially two groups of patients who need reconstructive plastic surgery: elective patients, who are generally young and healthy adults; and, complex patients, who need reconstructive surgery due to other conditions, such as the closure of exposed wounds, reconstruction after tumor removal or injury repair such as burns. It was observed in their work that patients undergoing reconstructive plastic surgery, in general, had lower rates of complications than other surgical specialties, but adverse effects were not uncommon. Over five years, a total of 16,635 patients experienced at least one potentially preventable adverse event during hospitalization. These events led to more than twice the patient's hospital stay time and increased hospital expenses.

Sidhoum et al., In 2016[19], discuss, in their work, the relatively modern concern in patient safety that has been the use of social media such as Whatsapp. The author recalls that concerns such as the dissemination of data and images of patients that would be protected by medical confidentiality are considered, but the safety of this data in new media and mobile devices is questioned. Instant messaging can be used as a valuable tool to coordinate surgical teams or for simpler patient guidance. It is a valuable approach to simplify communication.

The authors present the experience and results of the plastic surgery team at Centro Hospitalar Universitário Amiens, using instant messaging as part of medical communication for almost three years. In terms of daily time spent writing messages, the statistics are quite favorable and show no detrimental time wasted with using WhatsApp. The use of this tool seems to keep the medical team in a continuous call

throughout the day, favoring the treatment of patients. Regarding the technical characteristics involving security in 2014, the Electronic Frontier Foundation, an independent American institution that defends civil liberties in the world, assessed the vulnerability of WhatsApp messages to measure their security by a complex analysis of their encryption. This institution concluded that WhatsApp has a good level of security and confidentiality, guaranteeing the security of the data and communications exchanged. A disadvantage would be the medical record. Undeniably, medical information shared through WhatsApp during the patient's hospitalization does not appear in his medical record. However, even so, instant messaging is an effective, inexpensive, and safe tool for professional communication. It does not seem to harm oral communication and brings better communication from the surgical team.

Tadisina et al., In 2015[20], raised another interesting question regarding patient safety in plastic surgery in the transoperative category. The authors question whether the procedures performed during the week would have any difference in terms of safety concerning those performed at the weekend. The authors point out that several studies demonstrate greater complications on weekends. This situation would be attributed to the lack of availability of personnel, services, and worse access to diagnostic tests. It can also be seen that the surgeon is without his usual team at the weekend. However, the authors remember that these studies do not take into account the particularities of plastic surgery patients, who are generally healthier. Even so, there are the factors mentioned that are independent of the health of the surgical patient, such as the decrease in hospital resources on weekends, including the team and access to diagnostic tests.

Besides, Tadisina et al., in 2015[20], reported that plastic surgeons often end up operating on weekends due to the lack of an operating room during the week, as these are used for emergency cases, which can result in more operative cases being performed on weekends. The authors were the first to investigate whether there is a relationship between patient safety and plastic surgery on weekends. They consider that although it seems to be negative, this subject needs further investigation.

Perioperative period category

This category was the one with the highest number of selected articles. It is believed that since many subjects are related to various times that involve surgery in its different aspects, this category covers most of the studies in this review.

It will begin with different investigations that inform the participation of residents in the surgical act, such as Koulaxouzidis et al. in 2014[21], in their work, they performed 273 aesthetic procedures in 206 patients. They demonstrated that cosmetic surgery performed by plastic surgery residents, under the supervision of medical assistants is safe and provides high levels of postoperative patient satisfaction. Furthermore, offering these services can bridge the gap between providing training in high-quality cosmetic plastic surgery and, at the same time, allowing an increasing number of patients who can perform procedures less cheaply.

Similarly, in the article "The Impact of Resident Participation in Outpatient Plastic Surgical Procedures," Massenburg et al., in 2015[22], observed all outpatient procedures performed by plastic surgeons between 2007 and 2012 in the database of the National Health Improvement Program American College of Surgeons Surgical Quality. The authors assessed the impact of residents' participation in the surgery of 6,227 patients and the results demonstrate that initially, the resident's presence may appear to increase the levels of complication, however, in conclusion, a more careful analysis shows that the levels of safety and complications are the same as those of more experienced surgeons. It is reiterated that this study has a level of evidence II.

Qureshi et al., in 2016[23], remember that plastic surgery procedures tend to be costly for patients. The authors, considering the American health care system, remember that services that have medical residency in general, imply less expensive procedures. They exemplify through patients that after bariatric surgery, they lose much weight. Health insurance only covers expenses for abdominal surgery, but these patients generally require other procedures such as brachioplasty or cruroplasty.

The authors report that surgery services where there is teaching, health institutions that are references in teaching, could enable these procedures to be performed with the same levels of complication and safety as clinics with trained surgeons at a lower cost to patients. In this study, the authors assessed the safety of procedures performed at a school clinic and statistically compared it with the results of national cosmetic surgery, concluding that in 175 cosmetic procedures, there was a general complication rate of 1.7%, compared with 2,0% for patients in the Cosmet Assure database.

When talking about event notification by residents, Parikh et al., 2017[24], demonstrated that an intervention using an online event notification system, developed by the head of the plastic surgery

department, in conjunction with Patient safety experts have led to significant improvements in the reporting of complications by plastic surgery residents at an academic hospital.

The proportion of complications reported in the pre-intervention group of the notification system was 28.1%; after the intervention, this increased significantly to 91.4% ($p < 0.001$). Therefore, the authors demonstrated that the implementation of this system could improve learning and safety in plastic surgery by improving reports of complications. Also, the authors point out that the involvement of residents in quality improvement initiatives is essential to train physicians for clinical practice in a complex health system.

Also, in this category, there is the issue of documentation that involves all surgical procedures. Within this context of medical documentation, Kittinger et al., 2016[25], proposed a project to improve the quality and safety of care performed at the Plastic Surgery Division of Scott & White Memorial Hospital. The main focus of the project involved improving the clinical documentation of inpatients. This interaction between doctors and specialists, in documentation in the health area, allowed the doctors to write down in the medical record all the diagnoses relevant to the treatments that were provided during hospitalizations. The plastic surgery service was able to improve its documentation and, in doing so, improved the recognition of the complexity of the patients it was treating. It has been shown that an effort to improve documentation has proved fruitful in terms of quality of care and cost management for the hospital.

To finalize this category, we can mention Swanson, in 2016[26], who cites thromboembolism as a feared complication in plastic surgery. The author reports that the procedures are associated several times, increasing the surgical time and the risk of thrombosis. The author also recalls that many doubts arise in the transposition of protocols idealized for surgeries of other specialties, without taking into account the particularities of plastic surgery. The author exemplifies with breast prosthesis surgery. The patients are at low risk because it is a quick surgery, usually performed on young and thin patients. This fact makes it seems that the opposite, overweight male patients in long surgeries, would have a higher risk, but the correlation, according to the author, is not necessarily true.

In 2016, Swanson[26] recalled that the pneumatic boot for intermittent compression of the lower limbs presents conflicting studies. Although it appears that it reduces the appearance of deep vein thrombosis (DVT) by up to 60%, it would increase cases of pulmonary embolism by 12% with its use. Another question that the author raises would be related to the combined procedures. It seems that the combination of surgical times would increase the risk of thrombosis, however, if we consider the sum of the two surgical procedures performed individually, the author says that the patient would have a higher risk of thromboembolic events. Caprini's own score, widely used in risk stratification of surgical patients for thrombotic events, according to the author, is questionable, as it is an uncontrolled and randomized study with a 2C degree of recommendation. The author also points out that the clotting tests, Prothrombin Activation Time (PAT) and Thromboplastin Partial Activation Time (PTT), which are routinely ordered and do not diagnose various genetic disorders that interfere with coagulation.

CONCLUSION

In this systematic review, the countries that most published on the subject were the United States and Brazil. The most frequently encountered concern was safety related to the training of plastic surgery residents. Tools such as the checklist have also been used to improve security. Another concern that requires further studies would be whether the weekends present more significant complications in relation to surgeries performed during the week, precisely because there is a lack of evidence considering the particularities of plastic surgery patients. These particularities are also remembered in the prevention of thromboembolism, and further studies are recommended taking into account the particularities of patients in this specialty for the prevention of thromboembolism. However, it seems to have more solid foundations in patient safety, the well-formulated medical record, as well as the informed consent form. Pre-anesthetic consultation also seems to favor patient safety.

Moreover, finally, just as surgical procedures evolve towards better safety, so do new technologies, such as the use of WhatsApp. The use of this tool seems to be safe and seems to increase the attendance of the medical team by improving the team's communication.

It appears that, when studying these 15 articles, there is no way to identify a unique way to answer the research question: "What are the actions related to patient safety in plastic surgery?", Because the authors found in searches in databases, data pointed to varied needs and discussed different focuses of attention.

Evident is the importance of new and other more in-depth studies to achieve the subject of patient

safety in plastic surgery, in order to favor health care. It is essential to reinforce the patient's safe practice in any healthcare environment, to minimize risks and damage to the patient. It is considered that the few articles found explicitly on safety in plastic surgery may reveal that there is a lack of reflections in this regard. The various specificities of these patients must be considered, such as the fact that they are generally female, healthy, and young. Also, the specific considerations of the specialty, such as intolerance to any adverse effect precisely because of the profile of patients it treats. Therefore, it is essential to do more research on the subject to avoid disorders and promote better treatment of patients.

From a future perspective, it can be considered that the field of operation of plastic surgery and the assumptions of patient safety are certainly fertile fields, not only in health care but also in teaching. Professional training must be carried out in such a way as to enable the future doctor to develop unequivocal skills on the subject.

The subject of patient safety should be transversal to the undergraduate medical curriculum, allowing that, in specialization, the fundamental principles about safety are rooted in the professional, becoming a culture of safety.

The teaching of the theme would bring effectiveness to health actions, and this reflection could be brought up in educational institutions. For this researcher, it is reiterated that knowing the theme, identifying the low intellectual production, led to reconsider the attitude towards the daily performance in the act of teaching patient safety, not only in plastic surgery, but as an interdisciplinary theme.

COLLABORATIONS

OHMS	Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Investigation, Writing - Review & Editing
ERR	Final manuscript approval, Methodology, Supervision, Writing - Original Draft Preparation
JCM	Final manuscript approval, Writing - Original Draft Preparation, Writing - Review & Editing
ICMMC	Analysis and/or data interpretation, Conceptualization, Final manuscript approval, Methodology, Supervision, Writing - Review & Editing

REFERENCES

1. Reis CT, Martins M, Laguardia J. A segurança do paciente como dimensão da qualidade do cuidado de saúde: um olhar sobre a literatura TT. Ciênc Saúde Coletiva. 2013;18(7):2029-36.
2. Saldanha OR, Salles AG, Ilaverias F, Saldanha Filho OR, Saldanha CB. Fatores preditivos de complicações em procedimentos da cirurgia plástica sugestão de escore de segurança. Rev Bras Cir Plást. 2014;29(1):105-13.
3. Souza P, Mendes W. Segurança do paciente. Rio de Janeiro: Fiocruz; 2014.
4. World Health Organization (WHO). Summary of the evidence on patient safety: implications for research. Geneva: WHO; 2008.
5. World Health Organization (WHO). World alliance for patient safety. Implementation manual surgical safety checklist. Safe Surgery saves lives. Geneva: WHO; 2008.
6. Monteiro F, Silva LR. "Checklist" lista de verificação de segurança cirúrgica: avaliação e intervenção. Rev Ciênc Méd Biol. 2013;12(4):482-5.
7. Ministério da Saúde (BR). Agência Nacional de Vigilância Sanitária. Segurança do paciente e qualidade em serviços de saúde: uma reflexão teórica aplicada à prática. Brasília (DF): Ministério da Saúde; 2013.
8. Ferraz EM. A cirurgia segura: uma exigência do século XXI. Rev Col Bras Cir. 2009;39(4):281-2.
9. Alpendre FT, Cruz E, Dyniewicz AM, Mantovani MF, Silva AE, Santos GS. Safe surgery: validation of pre and postoperative checklists. Rev Latino- Am Enfermagem. 2017;25:e2907.
10. World Health Organization (WHO). WHO guidelines for safe surgery: safe surgery saves lives. Geneva: WHO; 2009.
11. Sampaio RF, Mancini MC. Estudos de revisão sistemática: um guia para síntese criteriosa da evidência científica. Rev Bras Fisioter. 2007;11(1):83-9.
12. Doncatto LF. Uso do termo de consentimento informado em cirurgia plástica estética. Rev Bras Cir Plást. 2012;27(3):353-8.
13. Schwartzman UP, Batista KT, Duarte LTD, Teixeira D, Saraiva RA, Fernandes MC, et al. Complicações anestésicas em Cirurgia Plástica e a importância da consulta pré-anestésica como instrumento de segurança. Rev Bras Cir Plást. 2011;26(2):221-7.
14. Rezaeian F, Schantz JT, Sukhova I, Schenck TL, GIunta RE, Harder Y, et al. Training in aesthetic surgery at a university clinic - the Munich model. Handchir Mikrochir Plast Chir. 2013 Oct;45(6):370-5.
15. Prates CG, Stadñik CMB, BagatinI A, Caregnato RC, Moura GMSS. Comparação das taxas de infecção cirúrgica após implantação do checklist de segurança. Acta Paulista Enfermagem. 2018;31(2):116-22.
16. Sucupira E, Matta R, Zuker P, Matta J, Arbeláez JP, UebeL CO. Aesthetic plastic surgery checklist: a safety tool. Aesthetic Plast Surg. 2016 Oct;40(5):785-91.
17. Amorim Filho HC, Amorim CCB. Lipoabdominoplastia no tratamento estético do abdome: experiência de 5 anos. Rev Bras Cir Plást. 2012;27(2):301-8.
18. Hernandez-Boussard T, McDonald KM, Rhoads KF, Curtin CM. Patient safety in plastic surgery: identifying areas for quality improvement efforts. Ann Plast Surg. 2015 May;74(5):597-602.
19. Sidhoum N, Dast S, Abdulshakoor A, Assaf N, Herlin C, Sinna R. WhatsApp: improvement tool for surgical team communication. J Plast Reconstr Aesthet Surg. 2016 Nov;69(11):1562-3.
20. Tadisina KK, Chopra K, Singh DP. The "weekend effect" in plastic surgery: analyzing weekday versus weekend admissions in body contouring procedures from 2000 to 2010. Aesthet Surg J. 2015;35(8):995-8.

21. Koulaxouzidis G, Momeni A, Simunovic F, Lampert F, Bannasch H, Stark . GB. Aesthetic surgery performed by plastic surgery residents: an analysis of safety and patient satisfaction. Ann Plast Surg. 2014;73(6):696-700.
22. Massenburg BB, Sanati-Mehrizy P, Jablonka EM, Taub PJ. The impact of resident participation in outpatient plastic surgical procedures. Aesthetic Plast Surg. 2015;40(4):584-91.
23. Qureshi AA, Parikh RP, Myckatyn TM, Tenenbaum MM. Resident cosmetic clinic: practice patterns, safety, and outcomes at an academic plastic surgery institution. Aesthet Surg J. 2016 Oct;36(9):NP273-80.
24. Parikh PR, Snyder-Warwick A, Naidoo S, Skolnick GB, Patel KB. Impact of an event reporting system on resident complication reporting in plastic surgery training: addressing an ACGME and Plastic Surgery Milestone Project Core Competency. Plast Reconstr Surg. 2017 Nov;140(5):736e-45e.
25. Kittinger BJ, Matejicka II A, Mahabir RC. Surgical precision in clinical documentation connects patient safety, quality of care, and reimbursement. Perspect Health Inf Manag. 2016 Jan;13:1.
26. Swanson E. Our own worst enemy. Plast Reconstr Surg. 2016 May;137(5):911e-4e.

***Corresponding author:** **Elaine Rossi Ribeiro**
Rua Carneiro Lobo, Nº 333, Bairro Água Verde, Curitiba, PR, Brazil.
Zip Code 80240-240
E-mail: elaine.rossi@hotmail.com

Review Article

Microneedling: a review

Microagulhamento: uma revisão

ADRIANA DA SILVA FERREIRA [1]*
DANIELLA LEIROS AITA [1]
MEIRE APARECIDA MUNERATTO [1]

■ **ABSTRACT**

Introduction: Microneedling, also called percutaneous collagen induction therapy (PCIT), is a technique applied with an equipment called roller. It is suitable for rejuvenation, alopecia, all types of scars, acne, photo rejuvenation, stretch marks, skin flaccidity, melasma, expression wrinkles, and improvement of the general aspect of the skin. **Objective:** Perform a literature review to identify the major clinical applications of microneedling. **Methods:** The research was done from 2009 to 2018, in electronic databases PubMed and Scielo. The studies recovered were described and analyzed. **Results:** We selected 12 articles and two books for their relevant content. **Conclusion:** Microneedling is a simple technique, an innovative treatment that has been used for different dermatological pathologies. This method acts by naturally stimulating collagen by responding to the inflammatory process and also by activating the transdermal ingredient access system (TIAS), known as Drug Delivery.

Keywords: Collagen; Wound healing; Rejuvenation; Striae distensae; Wounds and injuries.

■ **RESUMO**

Introdução: O microagulhamento também denominado como terapia de indução percutânea de colágeno (TIPC), consiste numa técnica aplicada através de um equipamento chamado *roller*. A técnica é indicada para rejuvenescimento, alopecia, todos os tipos de cicatrizes, acne, foto rejuvenescimento, estrias, flacidez de pele, melasma, rugas de expressão e melhora do aspecto geral da pele. **Objetivo:** Realizar revisão da literatura para identificar as principais aplicabilidades clinicas no uso do microagulhamento. **Métodos:** A pesquisa foi realizada no período de 2009 a 2018, em bases de dados eletrônicas PubMed e Scielo. Os estudos assim recuperados foram descritos e analisados. **Resultados:** Foram selecionados 12 artigos e 2 livros por apresentar conteúdo relevante. **Conclusão:** O microagulhamento é uma técnica simples, tratamento inovador e vem sendo utilizado para diferentes patologias dermatológicas. A técnica age pela estimulação natural de colágeno através da resposta ao processo inflamatório e outra facilitando o sistema de acesso transdermal de ingredientes (SATI), conhecido como *Drug Delivery*.

Descritores: Colágeno; Cicatrização; Rejuvenescimento; Estrias de distensão; Ferimentos e lesões.

Institution: Universidade de Ribeirão Preto, Pós-Graduação Fisioterapia Dermatofuncional, Ribeirão Preto, SP, Brazil.

Article received: September 30, 2018.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0037

[1] Universidade de Ribeirão Preto, Pós-Graduação Fisioterapia Dermatofuncional, Ribeirão Preto, SP, Brazil.

INTRODUCTION

Microneedling, also called percutaneous collagen induction therapy (PCIT), is a technique applied with a device called roller[1]. The first roller was developed in 1993, in France, by a South African surgeon named Dr. Desmond Fernandes[1], who is considered the father of microneedling.

This equipment consists of a polyethylene roll that has embedded sterile stainless steel or titanium needles, whose number varies between 190 and 450 needles, according to the manufacturer[2,3]. In the literature, we find some nomenclatures used, being the most appropriate: microneedling, percutaneous collagen induction, CIT (collagen induction therapy or collagen therapy), roller technique, or just roller.

The technique is indicated for rejuvenation, alopecia[4], all types of scars, acne, photo rejuvenation, stretch marks, sagging skin, melasma, wrinkles, expression lines, and to improve the overall appearance of the skin[1,2,3,5,6].

Therefore, the objective of this study is to support the clinical applicability of microneedling in the literature.

METHODS

To carry out this study, we have searched the PubMed and Scielo electronic databases, using as keywords: "microagulhamento", "drug delivery" and "microneedlings."

The inclusion criteria were: clinical studies on the use of microneedling to treat aesthetic disorders, in Portuguese, English and also textbooks with relevant content, in the period from 2009 to 2018. The exclusion criteria were: experimental work, study of bibliographic review and those that were not related to the topic.

After selecting the studies, the data were organized in a table that considers the following items: identification of the author, year and title of the work, material, treatment location, treatment technique, number of sessions, use of assets after microneedling, anesthetic use, associated resources and complications, evaluation methods, results and conclusions.

RESULTS

The research consisted of 12 articles; five of them were selected and placed in a table for a better understanding of the studies, the other seven were not included in the table because they were experimental, review, master's thesis and course completion papers, however, because present relevant content, were used for the study, in the same way as two more books (Table 1)

DISCUSSION

Microneedling is a technique that uses a device called a roller, it consists of a polyethylene roller embedded in sterile stainless steel or titanium needles, its number varies from 190 to 450 needles whose length ranges from 0.5mm to 2.5mm[2,7].

The 0.25mm and 0.5mm needles are used to deliver drugs in fine wrinkles and to improve the shine and texture of the skin; those of 1.0mm and 1.5mm are used for sagging skin, medium wrinkles and global rejuvenation; those of 2.0mm and 2.5mm are used for distensible depressed scars, stretch marks, wavy and retractable scars[3].

Regarding the use of anesthetics, sizes from 0.2mm to 0.3mm do not require the use of anesthesia, while sizes from 0.5 to 2.0mm need topical anesthetic and needles from 2.0mm to 2.5mm need general anesthesia[3,8].

The technique works in two ways: the first one by stimulating the natural production of collagen (NPC) by responding to the inflammatory process and the second by facilitating the Transdermal Ingredient Access System (TIAS), known as "drug delivery," that is, increased permeation of actives[2].

The stimulus to collagen production begins with the loss of the integrity of the skin barrier, targeting the dissociation of keratinocytes, which results in the release of cytokines such as interleukin, resulting in dermal vasodilation and migration of keratinocytes to restore damage epidermal[1].

The healing process occurs in three phases: In the first, injury, there is the release of platelets and neutrophils responsible for growth factors with action on keratinocytes and fibroblasts. In the second, neutrophils are replaced by monocytes, and angiogenesis, epithelialization, and proliferation of fibroblasts occur, followed by the production of type III collagen, elastin, glycosaminoglycans and proteoglycans. In the third, maturation, type III collagen, which is predominant in the initial phase of the healing process and which is slowly being replaced by type I collagen, which is more durable, persisting for a period ranging from five to seven years.[7]

The mechanism of action of drug delivery is as follows: when rolling the equipment over the skin, microchannels are created, and in this way, the applied cosmetics or formulations permeate the skin much more effectively and quickly. In the literature, there are a range of studies that report the effectiveness of the technique in increasing the permeation of the actives, this can vary from 80% to 500%. Thus, the active ingredients present in the treatment products can reach the deeper parts of the skin with more efficiency than if they were applied only topically[2].

Table 1. Summary of Included Studies.

Author / Year	Paper Title	Material / Nº Sessions	Place and treatment technique	Use of actives and anesthetics	Associated resources / complications	Evaluation methods	Results	Conclusion
1. Kalil *et al.* (2015)[12]	Treatment of acne scars with the microneedling technique and drug delivery	Sterile Dr. Roller® device; 192 2mm needles; Three sessions interval of one to two months between sessions.	Atrophic scars of moderate to severe acne on the face. The rollers directed in a horizontal and oblique position, imitating the shape of the wind rose, with ten repetitions in each direction	Applying a mask; EGF - Epidermal growth factor 1%, IGF - Insulin growth factor 1%, TGF3 - Transforming growth factor 1%, Hyaluronic acid 0.5%, Acid 0.5% tranexamic, Vitamin E 2%, Portulaca extract 1%, Gel mask containing growth factor. Dermomax® topical anesthetic for 60 min.	Did not associate; Edema and Erythema.	Pre- and post-procedure photos. Skin biopsy before and after 30 days of treatment.	Eight patients completed the study. Overall improvement in the appearance of the skin and slight improvement of distensible atrophic scars. Atrophic scars like ice picks did not improve with the procedure.	Modest improvement of atrophic scars; ice picks atrophic scars showed no improvement with the procedure.
2. Kalil et al. (2015)[13]	Randomized, double-blind comparative study of microneedling associated with drug delivery to rejuvenate the skin of the anterior chest	Dr.Roller®; 192 needles 0.07mm surgical steel thickness and 1.5mm in length. 3, with monthly interval.	Anterior region of the chest. With minimal 45 ° angle pressure, ten spreading movements in four directions: horizontal, vertical, diagonal right, and left.	Juvenile® 2%; Phytocelltec Malus Domestic® 0.5%; Cell to Cell® 2%; Homeostatine ®; Hyaluronic Acid 2.5%; Fluid Anhydrous Serum q.s.p 30. Anesthetic cream topic.	Home application of the same product, or the placebo, with gentle massages with the fingers until complete absorption 1x a day, at night Phenol Peeling 88%, before microneedling; No adverse effects were observed in the treated patients.	Pre and post 30-day evaluation of the procedure through photography, performed by a dermatologist unrelated to the study, and by applying self-assessment questionnaires by patients.	Twenty-two patients, three months of treatment, 100% improvement of patients; 28% improvement in overall rejuvenation with the use of the test product compared to placebo. Improvement 30% in patients treated with the use of microneedling and test product on skin texture, smoothness and firmness	To obtain results for advanced global rejuvenation, it is necessary to add specific actives for drug delivery. Significant improvement in overall appearance, demonstrating a well-tolerated procedure, with minimal adverse effects and a high patient satisfaction index
3. Lima (2015)[7]	Association between microneedling and phenol peeling: a new therapeutic proposal for sagging, wrinkles, and acne scars on the face. Periorbital wrinkle treatments by collagen induction therapy	Instrument with 192 2.5mm needles, arranged in 8 rows, DR Roller® one session.	Face Back and forth movements until obtaining uniform bloody dew. Periorbital wrinkles. Rolling the device back and forth, with the same pressure; horizontally, vertically and diagonally to the right and left.	Skin regenerator 3x a day; industrialized depigmenting agent (0.05% retinoic acid, Hydroquinone 4%, fluocinolone acetonide 0.01%), alternating with the skin regenerator for 15 days; sunscreen with protection factor 50. Anesthetic block of infraorbital and mentonian nerves, followed by infiltrative anesthesia with 2% lidocaine solution.	Patient B also had as adjunctive treatment lymphatic drainage and regular physical activities. Patients A and D had only physical activity, C and E did not undergo physical activity during the follow-up; Erythema, edema, post-inflammatory hyperpigmentation, and infections	A clinical and photographic evaluation was performed by the investigator three months after the procedure, using a scale with the items very good, good, reasonable, and bad. Patient satisfaction questionnaires were also applied.	Twenty-eight patients were treated; 12 of them had wrinkles and sagging, five only acne scars, and ten patients with wrinkles, sagging, and acne scars. Result from good to very good; 100% of patients reported satisfaction with the results.	It can produce improvement in the quality of the skin, attenuating wrinkles and correcting depressed acne scars. The procedure of the evaluated group presented an excellent safety profile; The addition of 88% phenol before microneedling enhances the results for acne, sagging, and ritid scarring treatments.

Continue...

Continuation...

4. Fabbrocini et al. (2009)[11]	Periorbital wrinkle treatments by collagen induction therapy	Rolling cylinder 20mm wide, with 192 needles in eight rows, 1.5mm long and 0.25mm in diameter, according to the applied penetration, they were introduced into the skin from 0.1 to 1.3mm. 2 sessions with an interval of 8 weeks between them	Periorbital wrinkles. Rolling the device back and forth, with the same pressure; horizontally, vertically and diagonally to the right and left.	Did not use; Topical anesthesia (EMLA applied and left for 60 min).	Did not describe; Redness and swelling.	The evaluation was based on photographs taken on a digital camera and images computerized. Silicone rubber molds were used to assess the depth of the wrinkles and print their micro-relief.	Eight weeks after the first CIT session, all patients had smoother skin, a slight reduction in the severity of injuries and minimal aesthetic improvement; thirty-two weeks after the second session of CIT, the improvement of periorbital wrinkles was evident.	It shows that CIT is a simple technique and that with a specialized tool you can have an "immediate effect" on improving periorbital wrinkles. The degree of severity of periorbital wrinkles after just two sessions were highly reduced, and overall aesthetic improvement was also remarkable.
5. Contin (2016)[4]	Male androgenetic alopecia was treated with microneedling isolated and associated injectable minoxidil using the skin micro-infusion technique.	Cylinders with needles, which produce punctures 1.5 mm deep; Tattoo machine with 17 microneedles in a row(MMP). Case 1: 4 monthly sessions; Case 2: 3 sessions.	Scalp. Moves back and forth until a bleeding dew is produced.	Case 1: Minoxidil 0.5%; neutral shampoo; simple painkillers; Case 2: Microneedling without drug infusion. Lidocaine 4% cream.	Gentle washing with neutral shampoo six hours after the procedure and use of simple painkillers if there is local pain. Ache	Photographic record before the procedure and one month after the last session.	Partial and satisfactory response in both cases, one of them had the infiltration of minoxidil and the other only to the microneedling process.	Partial and satisfactory response in both cases.

The created microchannels show a retraction after 5 minutes, but their complete closure occurs after 24 hours[9]. And the absence of retraction after 15 minutes has also been reported[10].

Its use is individual and comes sterilized at the factory and registered in ANVISA (Agência Nacional de Vigilância Sanitária). The treatment can be done by several professionals such as physiotherapists, doctors, biomedical, and other professionals in the aesthetic and health area.

The microneedling technique has been used in several aesthetic procedures. The present study consists of 5 articles, namely, an article on the treatment of alopecia4, one on periorbital wrinkles[11], one on acne scars[12], one on skin rejuvenation of the anterior chest[13] and one on flaccidity treatment, wrinkles and acne scars on the face[7].

The microneedling interspersed with 5% retinoic acid peeling at 21-day intervals between sessions was also useful in the treatment of melasma and aging associated with growth factors. It was possible to observe a significant improvement in the two dysfunctions.[8]

It also presents promising results for gynoid lipodystrophy; changes in patients' lifestyle and behavioral habits contribute significantly to the success of therapy, as well as the appropriate drug and a correct technique[14].

The method proved to be effective in the treatment of stretch marks with a reduction in size (millimeters) when they were associated with growth factors. By assisting in the process of collagen formation, it reconstructs the broken fibers, promoting skin filling. The technique does not provide a significant improvement in cases of phototype VI, although the depigmentation process is reversible, it is slow.[15]

Comparing the results for the treatment of atrophic acne scars between the non-ablative fractional Erbium laser and microneedling, the degree of post-treatment improvement evaluated by the participants on a scale of 0 to 10, had an average of 7.65 in the microneedling and 7.95 in the laser group. The difference between the groups was not significant, showing that the technique is as effective as fractional technology[5].

Concerning the correct form of application and prior care with the area to be treated, we analyzed an article that used back and forth movement[4]; one with horizontal, vertical, diagonal movements, 15 to 20 times each[7]; one with horizontal, diagonal, vertical movements to the right and left[11]; one with movements in multiple directions until slight bleeding and four times in all directions until the petechiae appear[8,14]; one with movements in four directions: horizontal, diagonal, vertical to the right and left, ten times each[13]; and an article with repetitions of 10 times in each direction, following the shape of the wind rose[12].

Another proposal recommends that the movements be performed in the same directions, being applied first horizontally in the direction of the lymphatic path, then vertically and finally in one of the diagonals (except for the center of the frontal region and nose, for which it is suggested to use the two diagonal lines)[17].

The application of the roller should be per quadrant, working in small regions, around twice the width of the roller for facial and capillary areas, and four times for the body. When applying it in four directions (vertical, horizontal, diagonal right, and left), you must pass ten times over each direction, with five reciprocating movements in each one[2].

Studies have shown the use of various active substances or drugs such as hyaluronic acid and vitamin E[14], growth factor[8,13], skin regenerator, hydroquinone[7], retinoic acid, vitamin C[8] and minoxidil.[4]

The results vary according to the therapeutic proposal and the definition of needle sizes ranging from 0.25mm to 2.5mm[3]. In the treatment for alopecia[4], there was a partial and satisfactory response, applying one treatment only with microneedling and the other together with minoxidil. In the stretch mark study[13,] it was shown that the technique is effective in reducing its size in millimeters, the growth factors used helped in the process of collagen formation.

The application in the treatment of wrinkles and acne scars[11] can produce improvement in the quality of the skin, attenuating wrinkles and correcting depressed acne scars. The addition of 88% phenol applied with gauze until substantial bleaching is achieved, followed immediately by microneedling enhances the results for acne scar treatments.[7]

Although considered a simple technique with a specialized tool, it can have an "immediate effect" on the improvement of wrinkles, showing after two sessions that they were highly reduced and that the overall aesthetic improvement was also important[11].

In another article, it shows a slight improvement in atrophic acne scars, in which the increase in hemoglobin is related to the initial tissue injury, providing neocolagenesis. Ice-pick scars did not improve with the procedure[12].

Concerning the rejuvenation treatment[14], the author says that the technique is safe and established. Still, to obtain results for advanced global rejuvenation, the action of specific actives for skin rejuvenation in drug delivery is necessary, promoting significant

improvement in the overall appearance, with minimal adverse effects and high patient satisfaction index.

Regarding the study of rejuvenation and melasma, it is stated that it is essential to carry out more in-depth scientific studies to corroborate the data presented in this work and to be able to evaluate the effectiveness of the therapy[8].

For the article on gynoid lipodystrophy, it is worth mentioning that it is a promising treatment, significantly contributing to the success of therapy[14], the choice of an appropriate drug, a correct technique, and changes in patients' lifestyle and behavioral habits.

It can be said that the association of the technique with several actives provided the optimization of results, as well as the low cost and easy application if compared to other treatments on the market. But it is emphasized that there is a need for more research on the topic.

Some care must be taken about the application of the technique: the first has to do with the choice of equipment that must be sterile and registered with ANVISA; on the other hand, the skin can be previously cleaned with, for example, alcohol 70%[13]. One article mentions that the skin was disinfected, but does not describe what was used[11]; in another case, it is said that the procedure was performed after cleaning the face[12], asepsis with chlorhexidine degermante solution[14] and also the degreasing of the skin with liquid soap and asepsis with chlorhexidine[7].

Regarding the evaluation criteria used in the studies, photographic records were pointed[4,7,11,12,13], volunteer satisfaction questionnaires[7,13], histological analysis[12], and silicone molds from digitalized photographs to measure the depth of wrinkles[11]. In this way, we can observe that the standardized photographic record before and after the treatment, as well as a satisfaction questionnaire concerning the results found, can be performed because it is easy to apply and low cost

CONCLUSION

Based on the results found in this review, we can say that microneedling is a simple, promising, and easy to apply technique. This innovative treatment has been used for different dermatological pathologies. The method works in two ways: the first by stimulating natural collagen production (NCP), by responding to the inflammatory process, and the second facilitating the Transdermal Ingredient Access System (TIAS), known as "drug delivery," that is, increasing the permeation of actives.

The technique can be painful, and this is related to the size of the needles. The use of local anesthetics may be indicated in some cases.

However, it is necessary to generate more knowledge with other studies to reach more reliable conclusions regarding the maintenance of long-term results, as well as about the repaired tissue.

COLLABORATIONS

ASF	Project Administration, Writing - Review & Editing
DLA	Supervision
MAM	Data Curation, Writing - Original Draft Preparation

REFERENCES

1. Fernandes D. Minimally invasive percutaneous collagen induction. Oral Maxillofac Surg Clin North Am. 2005 Feb;17(1):51-63.
2. Negrão MMC. Microagulhamento, bases fisiológicas e práticas. São Paulo: CR8; 2016.
3. Lima EVA, Lima MA,Takano D. Microagulhamento: estudo experimental e classificação da injúria provocada. Surg Cosmet Dermatol. 2013;5(2):110-4.
4. Contin LA. Alopecia androgenética masculina tratada com microagulhamento isolado e associado a minoxidil injetável pela técnica de microinfusão de medicamentos pela pele. Surg Cosmet Dermatol. 2016;8(2):158-61.
5. Cachafeiro TH. Comparação entre laser Erbium fracionado não ablativo 1340nm e microagulhamento para tratamento de cicatrizes atróficas de acne: ensaio clínico randomizado [dissertação]. Porto Alegre (RS): Universidade Federal do Rio Grande do Sul; 2015.
6. Mateus A, Palermo E. Cosmiatria e laser: prática no consultório médico. São Paulo: Guanabara Koogan; 2012.
7. Lima EA. Associação do microagulhamento ao peeling de fenol: uma nova proposta terapêutica em flacidez, rugas e cicatrizes de acne da face. Surg Cosmet Dermatol. 2015;7(4):328-31.
8. Bergmann CLMS, Bergmann J, Silva CLM. Melasma e rejuvenescimento facial com o uso de peeling de ácido retinóico a 5% e microagulhamento: caso clínico. 2014; [acesso em 2016 jan 18]. Disponível em: http://clinicabergmann.com.br/wp-content/uploads/2015/01/ARTIGO-PEELING.pdf
9. Kalluri H, Kolli CS, Banga AK. Characterization of microchannels created by metal microneedles: formation and closure. AAPS J. 2011 Sep;13(3):473-81.
10. Setterfield L. The concise guide to dermal needling (Expanded medical edition). Victoria, CA: Acacia Dermacare Inc.; 2010.
11. Fabbrocini G, Padova MP, Vita V, Fardella N, Pastore F, Tosti A. Tratamento de rugas periorbitais por terapia de indução de colágeno. Surg Cosmet Dermatol. 2009;1(3):106-11.
12. Kalil CLPV, Frainer RH, Dexheimer LS, Tonoli RE, Boff AL. Tratamento das cicatrizes de acne com a técnica drug delivery. Surg Cosmet Dermatol. 2015;7(2):144-8.
13. Kalil CLP, Campos VB, Chaves CRP, Pitassi LHU, Cignachi S. Estudo comparativo, randomizado e duplo-cego do microagulhamento associado ao drug delivery para rejuvenescimento da pele da região anterior do tórax. Surg Cosmet Dermatol. 2015;7(3):211-6.
14. Garcia ME. Microagulhamento com drug delivery: um tratamento para LDG [dissertação]. Santo André (SP): Faculdade de Medicina do ABC; 2013; [acesso em 2016 jan 18]. Disponível em: http://www.marcelaengracia.com.br/artigos_e_noticias/trabalho%20celulites.pdf
15. Cosme LV. Micropuntura com fatores de crescimento no tratamento de estrias abdominais: um estudo experimental acerca da biomedicina estética [monografia]. Brasília (DF): Centro Universitário de Brasília (UNICEUB) – Faculdade de Ciências da Educação e Saúde; 2015.

16. Cunha MG, Paravic FD, Machado CA. Alterações histológicas dos tipos de colágeno após diferentes modalidades de tratamento para remodelamento dérmico: uma revisão bibliográfica. 2015 Out/Dez;7(4):285-92.

17. Setterfield L. The concise guide to dermal needling (Expanded medical edition). Victoria, CA: Acacia Dermacare Inc.; 2013.

***Corresponding author:** **Adriana da Silva Ferreira**
Rua do Professor, 838, Ap. 64, Jardim Irajá, Ribeirão Preto, SP, Brazil.
Zip Code: 14020-280
E-mail: adriana1fisio@yahoo.com.br

Case Report

Reverse frontal lifting: alternative for the treatment of pachydermoperiostosis

Lifting frontal reverso: alternativa para o tratamento da paquidermoperiostose

RONALDO PONTES [1]*
AMANDA FIGUEIRA BUSSADE [1]
MÁRCIA DE QUEIROZ ARAÚJO GOMES [1]
LUIS ALEJANDRO VARGAS GUERRERO [1]
GISELA HOBSON PONTES [1]

■ **ABSTRACT**

Introduction: Patient diagnosed with pachydermoperiostosis, presenting a strong cutaneous manifestation, making it impossible to correct the defect by the usual facial lifting techniques. The reverse frontal facelift was the idealized technique for this case. It is an innovative technique, there being no previous publication in the literature. **Case report:** Italian male patient, 56 years old, with cutaneous manifestation syndrome, especially in the frontal region of the face, with leathery inelastic skin, which generated aesthetic discomfort, predisposing for a syndromic stigma. **Methods:** The technique developed for this case involves an incision, which starts at the root of the helix (point A), bypasses the eyebrow in a sinuous line distant half a centimeter from the implantation of the eyebrow hair, going to the glabella, curving towards the nasal root and going to meet identical dimensions on the other side. From point A, a curved line also leans towards the medial direction, at a distance of 2 cm. The intention is to reduce the distance between the area to be pulled and the incision area, in order to obtain more traction, thus enabling the correction of the aspect of the face in focus. **Results:** Caudal traction of the flap by a supraciliary incision made it possible to correct the defect in the frontal region without altering the capillary implantation line or causing excessive eyebrow rise. **Conclusion:** The reverse frontal lifting technique was created for a specific case of pachydermoperiostosis syndrome. When correctly indicated, this technique can be used to achieve good results.

Keywords: Face; Rhytidoplasty; Osteoarthropathy, Primary hypertrophic; Forehead; Surgery, Plastic.

Institution: Serviço de Cirurgia Plástica Professor Ronaldo Pontes, Cirurgia Plástica, Niterói, RJ, Brazil.

Article received: February 19, 2019.
Article accepted: February 29, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0038

[1] Serviço de Cirurgia Plástica Professor Ronaldo Pontes, Cirurgia Plástica, Niterói, RJ, Brazil.

■ **RESUMO**

Introdução: Paciente com diagnóstico de paquidermoperiostose, apresentando forte manifestação cutânea, impossibilitando a correção do defeito pelas técnicas usuais de lifting facial. O lifting frontal reverso foi a técnica idealizada para o caso. É uma técnica inovadora, não havendo publicação prévia na literatura. **Relato de caso:** Paciente italiano, sexo masculino, 56 anos, apresentando síndrome de manifestação cutânea, em especial na região frontal da face, com pele inelástica de aspecto coriáceo, que gerava desconforto estético, ensejando um estigma sindrômico. **Métodos:** A técnica elaborada para este caso envolve incisão, que se inicia na raiz da hélice (ponto A), contorna o supercílio em linha sinuosa distando meio centímetro da implantação dos pelos da sobrancelha, indo até a região da glabela, curvando para a raiz do nariz e indo se encontrar com dimensões idênticas do outro lado. Do ponto A, também ascende uma linha curva inclinando-se para o sentido medial, com uma distância de 2cm. A intenção é diminuir a distância entre a área a ser tracionada e a área de incisão, a fim de obter maior tração, possibilitando assim a correção do aspecto da face em foco. **Resultados:** A tração caudal do retalho por incisão supraciliar possibilitou a correção do defeito em região frontal sem que houvesse alteração da linha de implantação capilar ou ascensão excessiva das sobrancelhas. Conclusão: A técnica de lifting frontal reverso foi criada para um caso específico de síndrome de paquidermoperiostose. Quando bem indicada esta técnica pode ser utilizada atingindo bons resultados.

Descritores: Face; Ritidoplastia; Osteoartropatia hipertrófica primária; Testa; Cirurgia plástica.

INTRODUCTION

Pachydermoperiostosis or Touraine-Solente-Golé syndrome is a rare inherited disease, predominant in males characterized by thickening of the skin (pachydermia), acropachy, periostosis of long bones, which may be associated with hyperhidrosis and seborrheic dermatitis[1]. Facial deformity is one of the main complaints of these patients, and surgical treatment is the best strategy for its correction. There are several surgical options, among which are conventional facelift techniques and local skin resections[2].

Facelift techniques emerged in the early 20th century[3]. The first steps in the treatment of facial wrinkles were attributed to Charles Conrad Miller, due to his publication on the eradication of wrinkles, in which he proposed the subcutaneous section of the facial muscles[4]. Dissatisfied with the results of small skin extractions in front of the ear and on the edge of the scalp, Eugene Von Hollander, in 1901[5], was the first surgeon to perform a facelift using a long vertical incision in front of the ear and sideways to the neck[3,4].

Later, Lexer at in 1931[6] suggested that the skin flaps be dissected in a subcutaneous plane. He was the first surgeon to perform an elevation of the frontal region[7].

At the end of World War I, the high demand for repair surgeries was the basis for facelift. For instance, in 1926, Hunt[8] described the coronal incision with resection of the scalp. Five years later, in 1931, Joseph[9] reported using a capillary incision for the same purpose[10]. In 1960, Pagman et al.[11] described frontal facelifts by a coronal incision in the hairline or the capillary insertion[10].

From the 70' onwards, greater emphasis is placed on technical refinements such as reduced scars, muscle manipulation, and musculoaponeurotic systems[4]. Skoog reported, in 1974[12], the elevation of the platysma of the neck and the lower third of the face without skin detachment[4,7]. This more profound dissection method, together with the description of the superficial aponeurotic muscular system (SAMS) by Mitz and Peyronie, in 1976[13], paved the way for modern facelift techniques[3,10].

Pierce et al. em 1947[14] recognized the relationship between the corrugator muscles and vertical expression lines in the glabella area and advocated addressing these muscles through a supraciliary incision[4]. Castanhares, in 1964[15], proposed the resection of a cutaneous spindle by incision on the eyebrow to elevate the lateral portion[10].

Many early frontal lifts involved resection of the skin on the forehead or scalp without weakening

the strength of the frontal muscle. Regnault, in 1972[16], marked the frontal muscle; Skoog, in 1974[12] and Vinas et al., in 1976[17], defended the resection of the frontal strips to weaken the muscle[10].

As in all scientific activities, the evolutionary process is continuous. Techniques and tactics continue to emerge, showing the importance of rhytidoplasties for the scene of plastic surgery[4].

The case report, the object of this paper, has its peculiarity in the fact that it is a patient with syndromic facies, which presents a strong cutaneous manifestation, especially in the distal third in the frontal region, making it impossible to correct the defect using the usual facial lifting techniques, where the frontal flap is performed cranially. Therefore, it was necessary to make an atypical incision to help this European patient, who had emigrated to Brazil exclusively in an attempt to find treatment for his problem. Reverse frontal cosmetic surgery was the idealized surgical technique for the case. It is an innovative technique without prior publication in the literature.

CASE REPORT

56-year-old Italian patient diagnosed with pachydermoperiostosis with thickening of the dermis and epidermis (pachydermia), acropachy, and periostosis (Figure 1). The cutaneous manifestation was more pronounced in the frontal region of the face with the presence of inelastic and redundant skin and with the formation of deep grooves, which generated aesthetic discomfort for the patient (Figure 2). Due to the characteristics of the skin and the distance from the coronal incision to the site to be treated, traction in the cranial direction would be ineffective. Therefore, an atypical facelift incision, called reverse frontal, was conceived, where the front flap is pulled in the caudal direction.

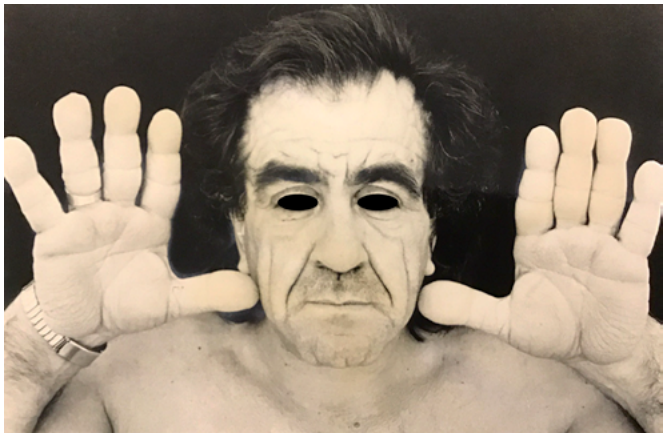


Figure 1. Patient with pachydermia, acropathy and swelling of fingers.

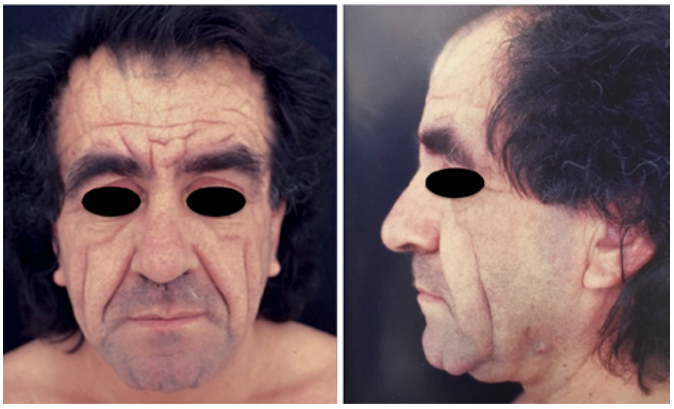


Figure 2. Left: Preoperative frontal view; Right: Preoperative view from profile.

METHODS

The incision begins at the root of the helix at point A, outlines the eyebrow in a sinuous line half a centimeter from the implantation of the eyebrow hairs, rises to the glabella region, curves towards the root of the nose, and it is found with identical dimensions on the other side (Figure 3). From point A, a curved line rises leaning towards the medial direction, at a distance of 2 cm, to allow a secure nutritional basis for the entire flap. The intention is to reduce the distance between the area to be pulled and the area of the incision, to obtain greater traction, thus allowing correction of the appearance of the face. After the incision, a cranial subgaleal detachment of the forehead was performed, and the frontal and interciliary muscles were treated. Flap traction is performed in the caudal (reverse) direction with subsequent marking and resection of the cutaneous excess in the frontal region, symmetrically, resulting in a supraciliary scar (Figures 4 and 5).

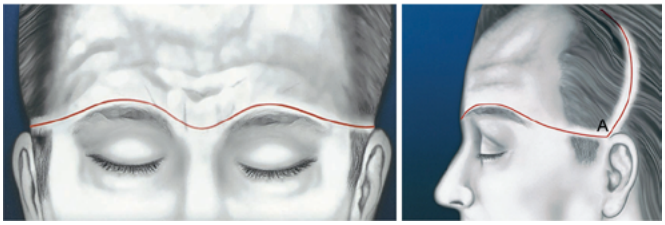


Figure 3. Trace from the root of the helix (point A) around the eyebrows, curving towards the root of the nose, finding identical dimensions on the other side. From point A, a curved line leans towards the medial direction, at a distance from each other, which allows a secure nutrition base for the entire flap.

The middle and lower thirds of the face were treated through a pre-intracapillary, retroauricular, pre-auricular and pre-tragal MACE incision, reaching point A, with subsequent broad flap detachment, SAMS plication and medial platysma approach. Skin spindle resection was performed in the nasogenian grooves,

Figure 4. Photo of the technique being performed intraoperatively. Resection of excess tissue in the frontotemporal region.

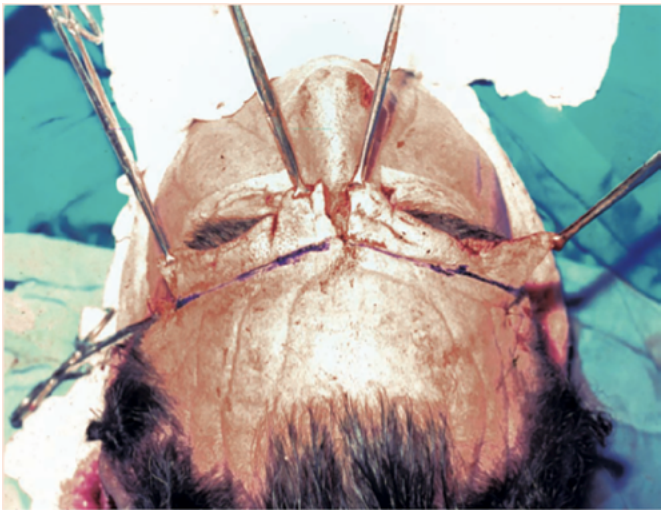


Figure 5. Photo of the technique being performed intraoperatively. Caudal flap traction.

which, being pronounced, required local traction following the same concept used in the upper third. A skin excision was performed on the submentum to treat excess skin in the mentonian region.

RESULTS

The caudal traction of the flap, made using a supraciliary incision, made it possible to correct the defect in the frontal region without altering the capillary implantation line or producing excessive eyebrow rise. The treatment of the middle and lower thirds of the face, added to the resection of the skin spindle in the nasogenian groove and submentum, also allowed the rejuvenation of the face in a broad aspect and the smoothing of the grooves (Figures 6 and 7).

However, preoperative counseling is essential so that the patient becomes aware that the scars will become more apparent, but are necessary to obtain a more effective result.

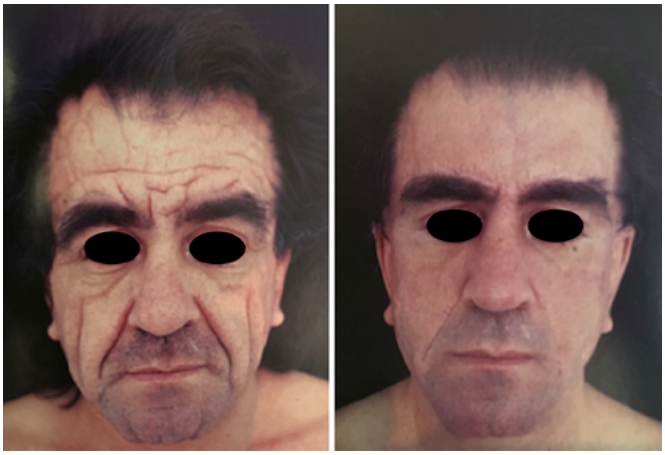


Figure 6. Front view of the pre and postoperative period.

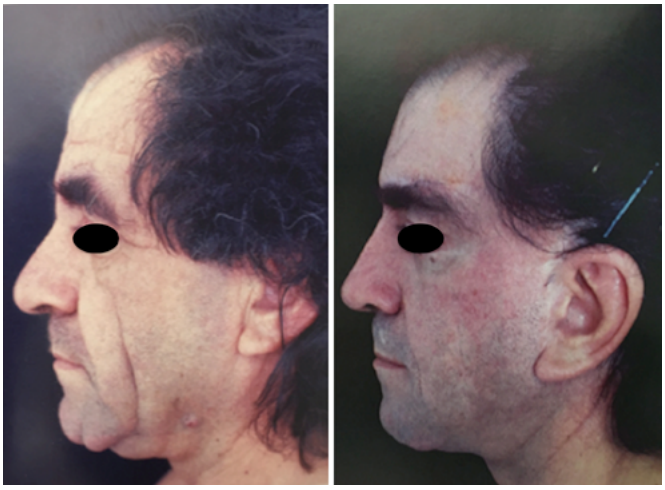


Figure 7. Pre and postoperative profile view.

DISCUSSION

There is still no consensus for the treatment of frontal and nasoglabelar wrinkles, and the best surgical option for patients diagnosed with pachydermoperiostosis has not been established. Endoscopic lifting is one of the most used techniques because it has reduced surgical time and less apparent scarring. However, it presents as a disadvantage the difficulty in positioning the eyebrow and the persistence of redundant skin, since, with this technique, only the soft tissues are elevated, without performing skin resections[4,18].

Transpalpebral approaches are another alternative for the treatment of the frontal region, but they are indicated only for small degrees of ptosis of the eyebrow and have frequent recurrence. More recently, the use of botulinum toxin, hyaluronic acid, support threads, and surgical techniques, such as gliding brow lifting, have been described as less invasive options for the treatment of the frontal region[19,20,21,22]. These techniques are also indicated

for cases with less skin excess since the tissues are not resected.

In the case presented, the redundancy of the skin was more pronounced in the frontal region, mainly in the caudal third, near the eyebrow. Therefore, correction would not be possible using the existing coronal rhytidoplasty techniques, since the skin tissue had an inelastic characteristic. Traction of the flap in the cranial direction would be ineffective in this case due to the distance between the incision and the area to be corrected.

In the literature, there are descriptions of the treatment of the frontal region with the traditional coronal incision. However, this method has the disadvantage of the need to subject the patient to multiple surgical procedures to correct excess skin in the supraciliary region[2,23].

Therefore, the author of this article developed the reverse frontal lift technique, which allows treating excess skin in the caudal third of the forehead, while attenuating frontal and nasoglabellar wrinkles. The same concept of local traction applies to the nasogenial sulcus region, which will not be corrected only with SAMS traction and overlying skin. The burden of local resections is the most apparent scarring, however, accepted by this patient without resistance.

CONCLUSION

Despite the wide range of facelift techniques, surgeons are not free to face challenging cases that must be addressed through atypical incisions. The reverse frontal elevation technique was created for a specific case of pachydermoperiostosis. When well indicated for application in rare cases, this technique can be used to achieve good results. Despite the increased exposure to the scar, with a layered suture and carefully coaptized skin, it is possible to achieve a satisfactory result.

COLLABORATIONS

RP	Final manuscript approval, Project Administration, Realization of operations and/or trials, Writing - Original Draft Preparation
GHP	Analysis and/or data interpretation, Final manuscript approval, Supervision
AFB	Data Curation, Writing - Original Draft Preparation, Writing - Review & Editing
MAGQ	Writing - Review & Editing
LAVG	Software

REFERENCES

1. Supradeeptha C, Shandilya SM, Reddy KV, Satyaprasad J. Pachydermoperiostosis - a case report of complete form and literature review. J Clin Orthop Trauma. 2014 Mar;5(1):27-32.
2. Taichao D, Fuling L, Hengguang Z. Comprehensive surgical strategies for the management of pachydermoperiostosis. Facial Plast Surg. 2018 Jun;34(3):330-4.
3. Barrett DM, Casanueva FJ, Wang TD. Evolution of the rhytidectomy. World J Otorhinolaryngol Head Neck Surg. 2016;2(1):38-44.
4. Pontes R. O universo da ritidoplastia. Rio de Janeiro: Revinter; 2011.
5. Hollander E. In: Plastische(Kosmetische) Operation: KritischeDarstellungihresgegenwartigen, Stands. Berlin: Urban and Schwarzenberg; 1932:1e17.
6. Lexer E. Leipzig: JA Barth; 1931.
7. Kaplan JL. Skin only facelift. Medscape Drugs Dis. 2014.
8. Hunt HL. Plastic surgery of the head, face, and neck. Philadelphia: Lea & Febiger; 1926.
9. Joseph J. NasenplastiK und sonstige gesichtsplastik: nebst einem Anhang über mammaplastik. Ant Labitzsch Leipzig 1931:507-509
10. Liang MD. Temporal approach to corrugator laser ablation. In: Ramirez OM, Rollin DK, eds. Endoscopic plastic surgery. New York: Springer-Verlag; 1996. p. 28-35.
11. Pangman WJ 2nd, Wallace RM. Cosmetic surgery of the face and neck. Plast Reconstr Surg. 1961;27:544-50.
12. Skoog T. Plastic Surgery: New Methods and Refinements. Philadelphia: W.B. Saunders; 1974.
13. Mitz V, Peyronie M. The superficial musculo-aponeurotic system (SMAS) in the parotid and cheek area. Plast Reconstr Surg. 1976;58:80e88.
14. Pierce GW, Klabunde EH, Bergeron VL. Useful procedures in plastic surgery. Plast Reconstr Surg (1946). 1947;2(4):358-361.
15. Castañares S. Forehead wrinkles, glabellar frown and ptosis of the eyebrows. Plast Reconstr Surg.1964;34:406-13.
16. Regnault P. Complete face and forehead lifting, with double traction on "crow's-feet". Plast Reconstr Surg. 1972;49(2):123-129.
17. Vinas JC, Caviglia C, Cortinas JL. Forehead rhytidoplasty and brow lifting. Plast Reconstr Surg. 1976;57(4):445-454.
18. Chi JJ. Periorbital surgery forehead, brow, and midface. Facial Plast Surg Clin North Am. 2016 May;24(1):107-17.
19. Fattahi T. Open brow lift surgery for facial rejuvenation. Atlas Oral Maxillofacial Surg Clin North Am. 2016 Sep;24(2):161-4.
20. Moradi A, Watson J. Current concepts in filler injection. Facial Plast Surg Clin North Am. 2015 Nov;23(4):489-94.
21. Pedroza F, Anjos GF, Bedoya, Rivera M. Update on brow and forehead lifting. Curr Opin Otolaryngol Head Neck Surg. 2006 Aug;14(4):283-8.
22. Viterbo F, Auersvald A. Glinding brow lifting. Plast Reconstr Surg Glob Open. 2017 Sep;5(9 Suppl):186-7.
23. Lima JSF, Costa SM, Chiari Júnior A, Bezerra MM, Polizzi LQR, Polizzi RJ. Surgical treatment of primary pachydermoperiostosis: report of two cases. Rev Bras Cir Plást. 2014;29(1):165-8.

***Corresponding author:** **Ronaldo Pontes**
Av. Sete de Setembro, 301, Santa Rosa, Niterói, RJ, Brazil.
Zipe Code: 24230-251
E-mail: servicopgronaldopontes@gmail.com

Case Report

Lyell syndrome in 72% of the body surface

Síndrome de Lyell em 72% de superfície corporal

JOSÉ AUGUSTO PUPIO REIS JÚNIOR [1]*
RITA DE CÁSSIA NEVES NORONHA [2]
CARLOS CUNHA OLIVEIRA [2]
ROGÉRIO DE OLIVEIRA RIBEIRO [2]

■ **ABSTRACT**

Introduction: Lyell's syndrome is characterized by phlyctenas on more than 30% of the body surface and by involvement of the mucous membranes. It is related to the allergic reaction resulting from medications and has a high mortality. **Case report:** A 28-year-old woman presented phlyctenas on 72% of the body surface after using various drugs. Despite a great extent, the patient progressed satisfactorily and was discharged without sequelae. **Conclusion:** Early diagnosis, stratification, and management are essential to reduce mortality from the disease.

Keywords: Plastic surgery; Stevens-Johnson syndrome; Rash; Erythema multiforme; Skin diseases.

■ **RESUMO**

Introdução: A síndrome de Lyell é caracterizada por flictenas em mais de 30% de superfície corporal e acomete mucosas. Está relacionada à reação alérgica decorrente de medicamentos e apresenta alta mortalidade. **Relato de caso:** Mulher de 28 anos apresentou flictenas em 72% de superfície corporal após uso de diversos fármacos. Apesar da grande extensão, a paciente evoluiu de maneira satisfatória e recebeu alta sem sequelas. Conclusão: É fundamental o diagnóstico precoce, a estratificação e a conduta para reduzir a mortalidade da doença.

Descritores: Cirurgia plástica; Síndrome de Stevens-Johnson; Exantema; Eritema multiforme; Dermatopatias.

Institution: Hospital de Emergência Osvaldo Cruz, Macapá, AP, Brazil.

Article received: February 22, 2019.
Article accepted: October 20, 2019.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0039

[1] Universidade Federal do Amapá, Macapá, AP, Brazil.
[2] Hospital de Emergência Osvaldo Cruz, Macapá, AP, Brazil.

INTRODUCTION

Toxic epidermal necrolysis (TEN), also known as Lyell's syndrome (LS), is an allergic reaction mediated by CD8 lymphocytes that evolves with epidermal necrosis due to keratinocyte apoptosis. The etiology is unknown, but the use of drugs triggers it. Due to the high mortality, knowledge of the condition, early diagnosis, stratification, and an adequate approach is essential for optimized patient management.

CASE REPORT

Patient MD, woman, 28 years old, mixed race, from the municipality of Laranjal do Jari in the state of Amapá. On January 26, 2019, the patient presented phlyctenas in the oral mucosa after using the medication allopurinol 200 mg per day for 17 consecutive days, 50 mg of diclofenac sodium, 30 mg of caffeine, 125 mg of carisoprodol, 300 mg of paracetamol every 12 hours. In the following 48 hours, the patient developed phlyctenas on 72% of the body surface. Involvement was also observed in the mucosa of the oral, vaginal, anal, and genitourinary tracts.

In the first 48 hours, her body temperature was 38ºC, and she was admitted to the Hospital Estadual de Laranjal do Jari on January 28, 2019. On February 1, 2019, she was referred to the Hospital de Emergência Osvaldo Cruz, where an evaluation was requested from the plastic surgery team (Figure 1). Upon entering the plastic surgery service, she was treated clinically, showing a satisfactory evolution, being discharged without the need for surgical treatment on February 10, 2019 (Figure 2). The SCORTEN scale was not calculated as it was not applied at the time of disease progression.

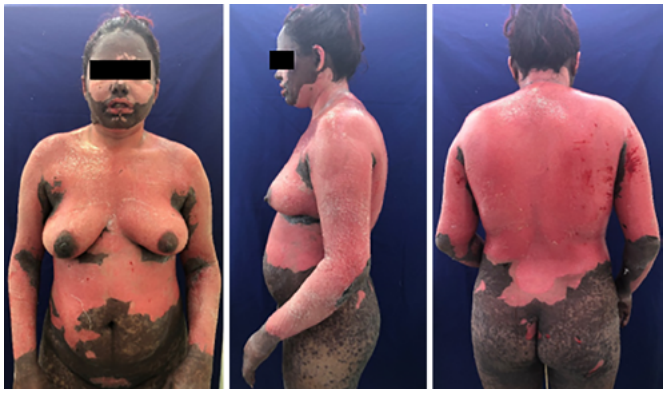


Figure 1. Patient no 17º of evolution no day of admission no burn center.

DISCUSSION

In 1922, Indian surgeon Albert Stevens and American pediatrician Frank Johnson described two cases of fever, conjunctivitis, and inflammation of the mucous membranes in children, with one case with total loss of vision. Despite the lack of knowledge of the cause at the time, it was the first description of what was later called Stevens-Johnson Syndrome (SJS). Back in 1956, Scottish dermatologist Alan Lyell described a condition in which disseminated epidermal necrosis occurred, which evolved with the formation of phlyctenas associated with a toxic febrile reaction. The pathology study was of apoptosis of keratinocytes, which the dermatologist named TEN[1].

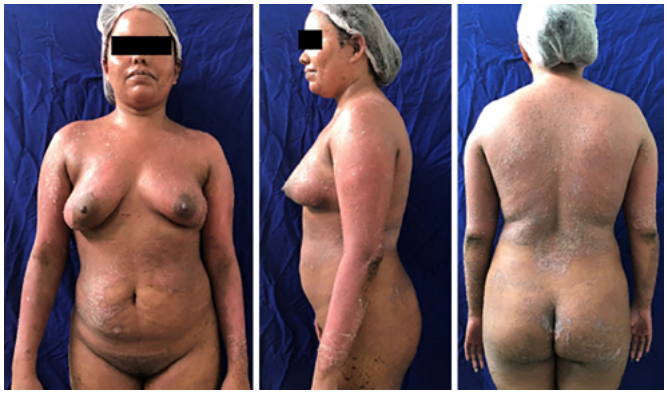


Figure 2. Patient on the day of hospital discharge.

Despite the low incidence: 2 cases per million per year, mortality from the disease is high: 30%. It is a hypersensitivity reaction that affects the skin and mucous membranes and does not yet have a clear etiology. The leading cause of TEN is medication, and the primary triggers are allopurinol, aromatic anticonvulsants, sulfonamides, and non-steroidal anti-inflammatory drugs. It is also seen more frequently in patients with HIV, systemic lupus erythematosus, and patients undergoing bone marrow transplantation. On average, the exposure time to the trigger factor is two weeks, but there are reports of up to 48 hours[2].

Didactically TEN can be divided according to the affected body surface. In this way, it is called SJS in cases where the participation is up to 10%; overlap syndrome when involvement varies between 10 and 30%; and TEN, also known as Lyell Syndrome (LS), when the participation exceeds 30%[3]. Due to the high mortality, the SCORTEN scale - Disease severity score was developed for the toxic epidermal necrolysis scale. On the scale, seven variables weigh one point each and are: age over 40 years; heart rate higher than 120 beats per minute; associated malignancy; epidermal detachment of more than 10% of the body surface on the first day; urea greater than 28 mg/dl; glucose higher than 252 mg/dl and bicarbonate less than 20 mEq /l. According to the score, mortality increases dramatically (Table 1). The scale should be applied on the first and third days of hospitalization to increase the predictive value[4].

Table 1. SCORTEN scale – *Severity of Illness Score for Toxic Epidermal Necrolysis*.

Risk factors	
Age> 40 years	
Neoplasm	
Heart rate> 120bpm	
Epidermis detachment> 10%	
Urea> 28md / dl	
Glucose> 252mg / dl	
Serum bicarbonate <20mg / dl	
Mortality	
Scorten 0 or 1	3,2%
Scorten 2	12,1%
Scorten 3	35,3%
Scorten 4	58,3%
Scorten > 4	90%

The initial manifestation can be confused with a flu-like syndrome for three days before the mucocutaneous manifestations. On physical examination, the Nikolsky and Asboe-Hansen sign can be seen: shear of the skin with light friction and lateral shedding of the skin after light pressure on the blister, respectively. The involvement of the urethral, genital, oral, and ocular mucosa is frequent and can precede skin lesions[3].

Treatment consists of removing the causative agent and offering the necessary support to the patient, preferably in a burn treatment unit. There is no consensus on the best way to manage wounds, as some ointments can trigger a similar condition so that injuries can be treated with soap and water. Surgical debridement is also not a consensus. Systemic antibiotics should be reserved only for cases of infection, as they can also be causative agents of TEN. The use of intravenous corticosteroids has not shown benefits and may even delay the healing process and favor secondary infection. Plasmapheresis, although indicated by some authors, did not show a significant impact on mortality and length of stay. The use of cyclosporine has been indicated successfully, although the mechanism of action is not yet well defined. The use of immunoglobulins has shown good results and depends on the dose and early administration[5].

COLLABORATIONS

JAPRJ Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Realization of operations and/or trials, Resources, Software, Supervision, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing

RCNN Final manuscript approval

CCO Visualization

ROR Visualization

REFERENCES

1. Lyell A. Toxic epidermal necrolysis: an eruption resembling scalding of the skin. Br J Dermatol. 1956 Nov;68(11):355-61. DOI: http://dx.doi.org/10.1111/j.1365-2133.1956.tb12766.x
2. Santos Neto FC, Piccinini PS, Andary JC, Sartori LDP, Cancian LT, Uebel CO, et al. Abordagem cutânea na necrólise epidérmica tóxica. Rev Bras Cir Plást. 2017;32(1):128-34.
3. Criado PR, Criado RFJ, Vasconcellos C, Ramos RO, Gonçalves AC. Reações cutâneas graves adversas a drogas - aspectos relevantes ao diagnóstico e ao tratamento - Parte I - Anafilaxia e reações anafilactóides, eritrodermias e o espectro clínico da síndrome de Stevens-Johnson & necrólise epidérmica tóxica (Doença de Lyell). An Bras Dermatol [Internet]. 2004 Aug; [cited 2019 feb 18]; 79(4):471-88. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0365- 05962004000400009&lng=en DOI: http://dx.doi.org/10.1590/S0365-05962004000400009
4. Trent JT, Kirsner RS, Romanelli P, Kerdel FA. Use of SCORTEN to accurately predict mortality in patients with toxic epidermal necrolysis in the United States. Arch Dermatol. 2004 Jul;140(7):890-2. DOI: http://dx.doi.org/10.1001/archderm.140.7.890
5. Wong A, Malvestiti AA, Hafner MFS. Stevens-Johnson syndrome and toxic epidermal necrolysis: a review. Rev Assoc Med Bras [Internet]. 2016 Aug; [cited 2019 feb 18]; 62(5):468-73. Available from: https://www.scielo.br/scielo.php?pid=S0104-42302016000500468&script=sci_abstract DOI: http://dx.doi.org/10.1590/1806-9282.62.05.468

***Corresponding author:** **José Augusto Pupio Reis Júnior**
Rodovia JK, KM 6, n 4440, Bairro Universidade, Macapá, AP, Brazil.
Zip Code: 68903-419
E-mail: alieksei@gmail.com

Case Report

Treatment of deep second-degree burns on the abdomen, thighs, and genitalia: use of tilapia skin as a xenograft

Tratamento de queimaduras de segundo grau profundo em abdômen, coxas e genitália: uso da pele de tilápia como um xenoenxerto

EDMAR MACIEL LIMA JÚNIOR [1*]
MANOEL ODORICO MORAES FILHO [2]
BRUNO ALMEIDA COSTA [2]
ALEX MARQUES DO NASCIMENTO UCHÔA [2]
CAMILA BARROSO MARTINS [2]
MARIA ELISABETE AMARAL DE MORAES [2]
MARINA BECKER SALES ROCHA [2]
FRANCISCO VAGNALDO FECHINE [2]

■ **ABSTRACT**

Tilapia skin has a non-infectious microbiota and a morphological structure similar to human skin. Phase II clinical studies, not yet published, have shown promising results in their use for the treatment of burns. In the protocols of these studies, patients with lesions in areas of skin folds, such as genitals and inguinal regions, were excluded, as it was thought that the biomaterial would not adhere properly, resulting in a lower degree of healing. Case report of a female patient, 18 years old, without comorbidities, with deep second-degree burns in the abdomen, inguinal region, part of the genitalia and upper half of both thighs, involving 13.5% of the total body surface area. Tilapia skin was applied to the lesions leading to a complete re-epithelialization with 16 days of treatment. No side effects were observed. Tilapia skin, therefore, brings the promise of an innovative product, easy to apply, and highly available, which can become the first animal skin nationally studied and registered by the Agência Nacional de Vigilância Sanitária, for use in the treatment of burns. This case report contributes to reduce the limitations concerning the anatomical areas appropriate for the application of tilapia skin, since, even with the need for skin replacement, good results were obtained with application to the genitalia and inguinal region.

Keywords: Burns; Tilapia; Biological dressings; Biocompatible materials; Cichlids.

Institution: Universidade Federal do Ceará, Núcleo de Pesquisa e Desenvolvimento de Medicamentos, Unidade de Farmacologia Clínica, Fortaleza, CE, Brazil.

Article received: March 12, 2019.
Article accepted: April 21, 2019.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0040

[1] Instituto Dr. José Frota, Centro de Tratamento de Queimados, Fortaleza, CE, Brazil.
[2] Universidade Federal do Ceará, Núcleo de Pesquisa e Desenvolvimento de Medicamentos, Unidade de Farmacologia Clínica, Fortaleza, CE, Brazil.

■ **RESUMO**

A pele de tilápia possui microbiota não infecciosa e estrutura morfológica semelhante à pele humana. Estudos clínicos fase II, ainda não publicados, mostraram resultados promissores na sua utilização para tratamento de queimaduras. Nos protocolos destes estudos, pacientes com lesões em áreas de dobras de pele, como genitais e região inguinal, foram excluídos, pois achava-se que o biomaterial não aderiria apropriadamente, resultando em um grau de cicatrização inferior. Relato de caso de paciente do sexo feminino, 18 anos, sem comorbidades, com queimaduras de segundo grau profundo em abdômen, região inguinal, parte da genitália e metade superior de ambas as coxas, envolvendo 13,5% da área total da superfície corporal. A pele de tilápia foi aplicada nas lesões levando a uma reepitelização completa com 16 dias de tratamento. Não foram observados efeitos colaterais. A pele de tilápia traz, portanto, a promessa de um produto inovador, de fácil aplicação e alta disponibilidade, que pode se tornar a primeira pele animal nacionalmente estudada e registrada pela Agência Nacional de Vigilância Sanitária, para uso no tratamento de queimaduras. Este relato de caso contribui para reduzir as limitações em relação às áreas anatômicas apropriadas para a aplicação da pele de tilápia, uma vez que, mesmo com a necessidade de reposição de pele, foram obtidos bons resultados com aplicação na genitália e região inguinal.

Descritores: Queimaduras; Tilápia; Curativos biológicos; Materiais biocompatíveis; Ciclídeos.

INTRODUCTION

Burns are responsible for 180,000 deaths annually, which are mainly concentrated in low and middle-income countries, a group in which Brazil is included. Besides, non-fatal burns result in prolonged hospitalization, disfigurement, and disability, with subsequent stigma and rejection[1].

Nile tilapia (Oreochromis niloticus) is the most cultivated fish in Brazil and the fourth most cultivated in the world[2]. In addition to the full availability and constituting a product that used to be discarded, tilapia skin demonstrated, in previous studies, a non-infectious microbiota[3], a morphological structure similar to human skin, even with higher amounts of collagen type1 [4,5], and excellent results when it was used as a xenograft to treat experimental burns in rats[6].

Phase II clinical studies, not yet published, comparing tilapia skin with 1% silver sulfadiazine cream have shown promising results. In the protocols of these studies, patients with burns in areas such as the face, genitals, neck, armpits, antecubital fossa, and inguinal region were excluded. The presence of skin folds in these regions generated the hypothesis that the biomaterial would not adhere properly, resulting in a lower degree of healing.

OBJECTIVE

Report the case of a patient with deep second-degree burns involving genitalia and inguinal region, among other areas, in which treatment was performed using tilapia skin as a xenograft.

CASE REPORT

Female patient, 18 years old, without comorbidities, admitted to a burn unit after thermal injury by direct contact with flames. Using the Lund and Browder table, an involvement of 13.5% of the total body surface area (TBSA) was calculated, mostly by deep second-degree burns and, less significantly, by superficial second-degree burns (Figure 1). After hospitalization, the patient was resuscitated with intravenous fluids according to Parkland's formula and remained hemodynamically stable. Approval from the Research Ethics Committee and written permission from the patient were obtained.

The method of processing, decontamination, and sterilization of tilapia skin for use in burns was registered at the Instituto Nacional da Propriedade Industrial (INPI) under number BR1020150214359 and is described in Lima Júnior et al., In 2017[6]. Before use in the patient, the skin was washed in sterile 0.9%

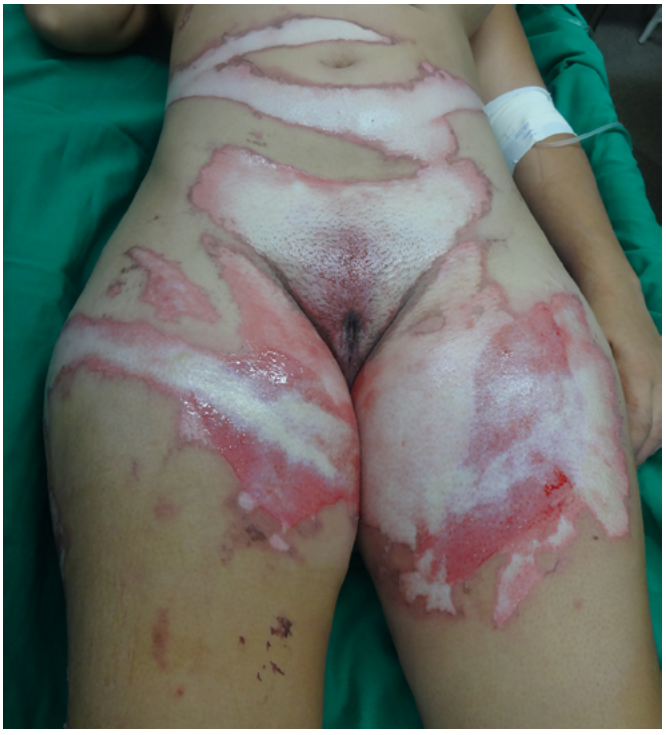


Figure 1. Aspect of the burn before application of the tilapia skin.

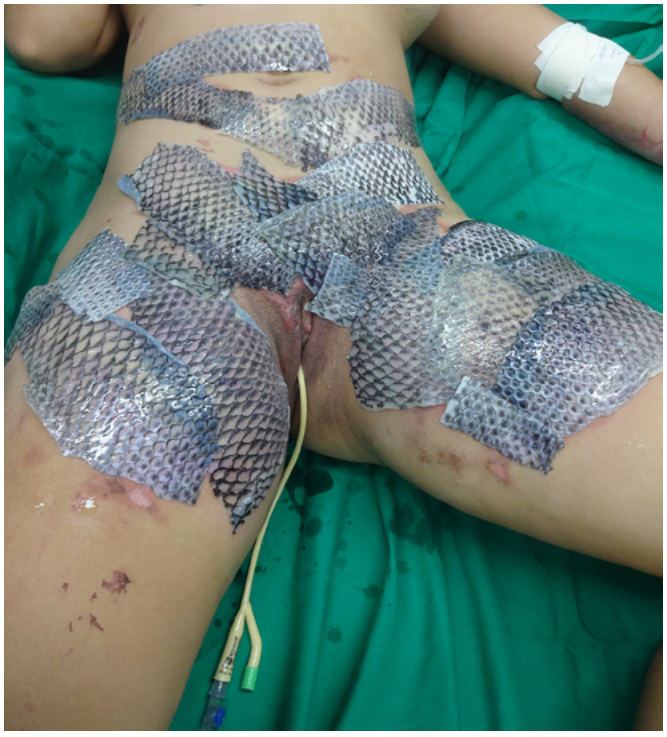


Figure 2. Aspect of the burn after application of tilapia skin.

sodium chloride solution for 5 minutes, a process that is repeated three times in a row. The coverage of at least 1cm of healthy skin at the edges of the burned area and the overlapping of at least 1cm between the pieces of skin are necessary procedures to ensure that an eventual movement of patients in the first days of treatment does not lead to the exposure of any segment of the lesion.

The patient underwent balneotherapy under anesthesia and analgesia with 100mg of ketamine, 2mg of midazolam, and 2000mg of dipyrone. After removing any necrotic tissue and cleaning the lesion with drinking water and 2% chlorhexidine gluconate, the tilapia skin was applied. In total, 11 tilapia skins were used, sometimes cut to fit the contour of the burned area (Figure 2). Finally, the region was firmly covered with gauze and bandage.

On the fourth day of treatment, the patient was submitted to a new anesthetic bath, in which the dressing was opened for the first time. It was observed good adhesion of the tilapia skin in part of the burned surface; however, in some regions, the skin did not adhere, having been removed together with the gauze or remaining in the burn bed, but with softened consistency and excess of underlying secretion (Figure 3). In these regions, the tilapia skin was removed (Figure 4), and, after cleaning, the biomaterial was replaced (Figure 5), covering tightly with gauze and bandage. The same sequence of procedures was performed on the seventh day of treatment, but with

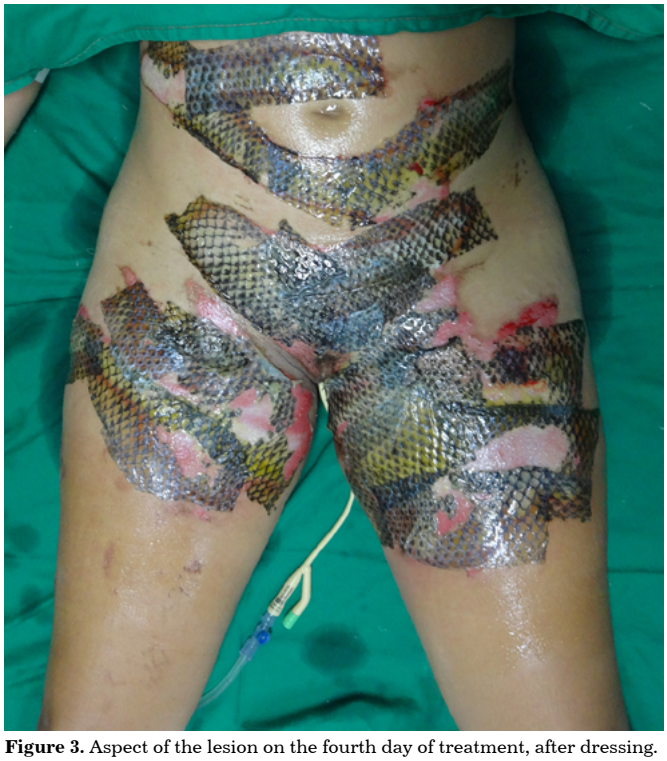


Figure 3. Aspect of the lesion on the fourth day of treatment, after dressing.

better adherence to the tilapia skin and less presence of secretion (Figure 6).

On the 14th day of treatment, after opening the dressing, it was observed that several of the pieces of tilapia skin previously adhered, now had a dry, hardened

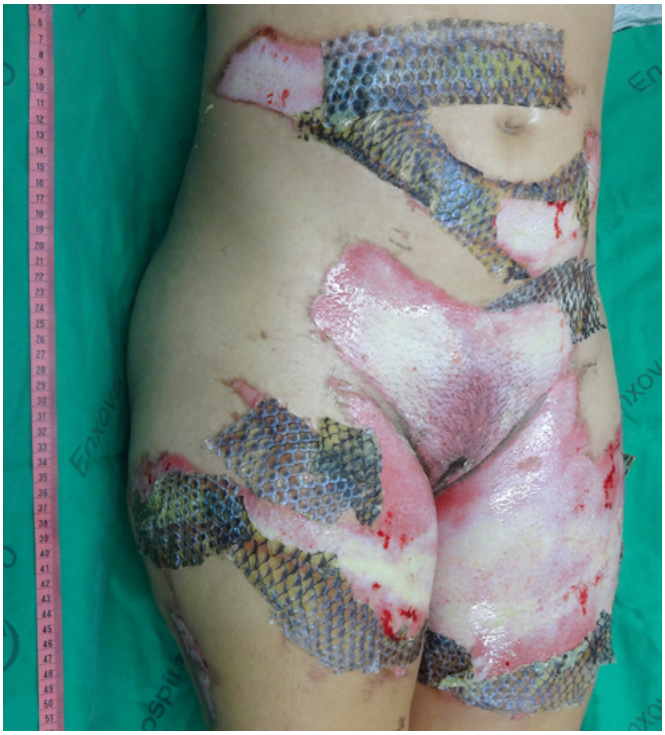


Figure 4. Aspect of the lesion on the fourth day of treatment, after removal of skins that did not adhere.

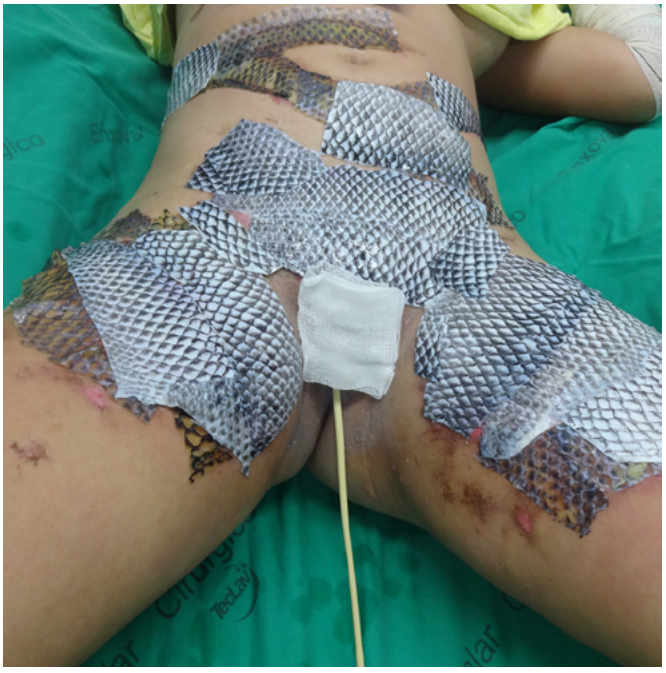


Figure 5. Aspect of the lesion on the fourth day of treatment, after tilapia skin replacement.

appearance and had started to come off. These pieces were removed by digitally separating the burn bed with the aid of petroleum jelly, exposing the underlying scarred skin (Figure 7). The rest of the tilapia skin was removed in the following 48 hours, and the patient was discharged, totaling 16 days of treatment.

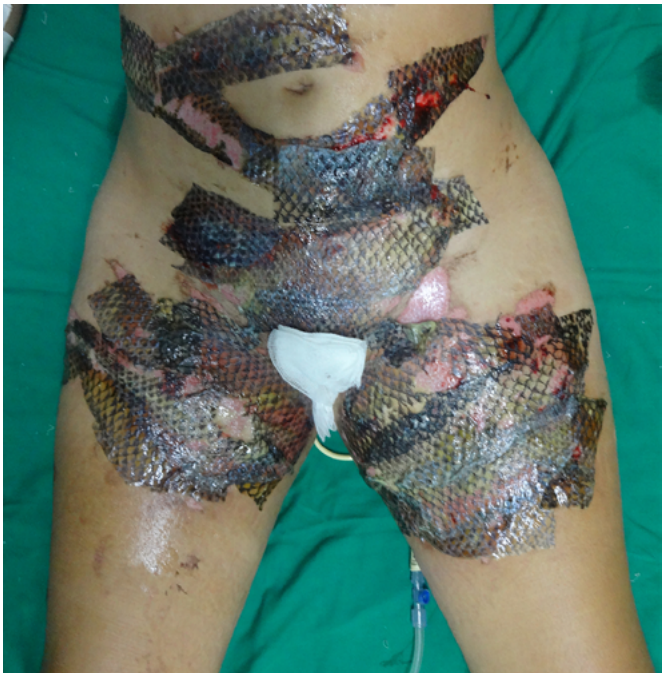


Figure 6. Aspect of the lesion on the seventh day of treatment, after dressing.

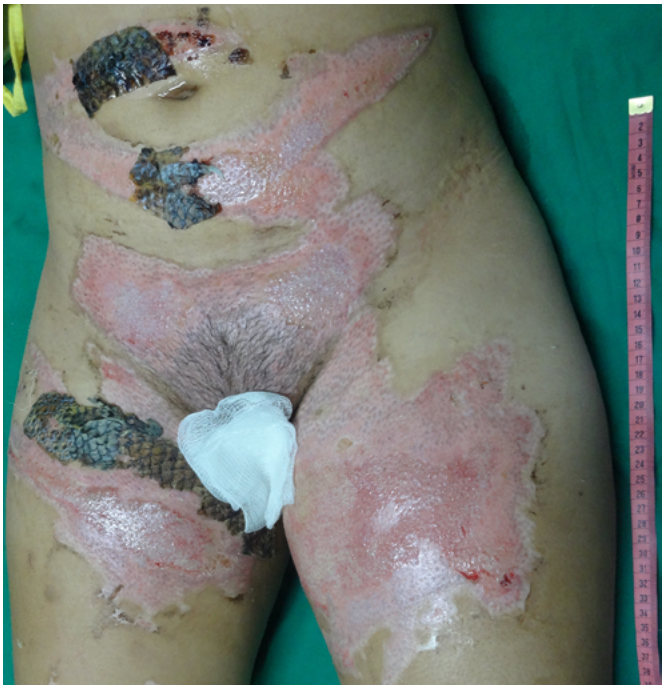


Figure 7. Healing status after removing the tilapia skin on the fourteenth day of treatment.

DISCUSSION

In the search for new therapeutic alternatives for the treatment of burns, biocompatible or biological dressings have been highlighted. Since allografts are challenging to obtain and have low availability, xenografts can be a viable alternative due to their greater safety and reduced price[7]. Although frog skin

has been used as a treatment for burns in Brazil[8], it has never been registered by the Agência Nacional de Vigilância Sanitária (ANVISA) and is no longer in use. Therefore, the tilapia skin promises to be an innovative product, easy to apply, and highly available, which can become the first animal skin nationally studied and registered by ANVISA for use in the treatment of burns, in addition to be the first aquatic animal skin in the world used for this purpose.

With the use of standard treatments, it is expected about three weeks for complete healing of deep second degree burns[9]. Therefore, the 16-day period required for reepithelialization of this patient's burn and the absence of side effects suggested the effectiveness of tilapia skin as a flexible and adherent xenograft, with no antigenicity and toxicity, and the ability to conserve moisture and avoid the entry of microorganisms, characteristics of an ideal dressing for burns[10]. Besides, this case report contributes to reducing the limitations concerning the anatomical areas appropriate for the application of tilapia skin, since, even with the need for skin replacement, good results were obtained, including in the inguinal and genital regions. The decrease in the number of dressing changes is an essential factor in reducing pain in these patients, decreasing teamwork and hospital costs.

COLLABORATIONS

EMLJ Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Investigation, Methodology, Project Administration, Realization of operations and/or trials, Resources, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.

MOMF Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Investigation, Methodology, Project Administration, Realization of operations and/or trials, Resources, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.

BAC Analysis and/or data interpretation, Conceptualization, Data Curation, Final manuscript approval, Investigation, Realization of operations and/or trials, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.

AMNU Analysis and/or data interpretation, Data Curation, Final manuscript approval, Investigation, Realization of operations and/or trials, Writing - Original Draft Preparation, Writing - Review & Editing.

CBM Analysis and/or data interpretation, Data Curation, Final manuscript approval, Investigation, Realization of operations and/or trials, Writing - Original Draft Preparation, Writing - Review & Editing.

MEAM Conception and design study, Conceptualization, Final manuscript approval, Methodology, Project Administration, Resources, Supervision, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.

MBSR Conception and design study, Conceptualization, Final manuscript approval, Methodology, Project Administration, Resources, Supervision, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.

FVF Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Methodology, Project Administration, Supervision, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.

REFERENCES

1. World Health Organization (WHO). Burns. Genebra: WHO; 2018 Mar; [acesso em 2019 mar 10]. Disponível em: http://www.who.int/news-room/fact-sheets/detail/burns
2. Oliveira M. Tilapia's turn. Pesquisa FAPESP. 2016 Nov; [citado 2019 mar 10]; 249:66-71. Disponível em: http://revistapesquisa.fapesp.br/en/2017/05/17/tilapias-turn
3. Lima Júnior EM, Bandeira TJPG, Miranda MJB, Ferreira GE, Parente EA, Piccolo NS, et al. Characterization of the microbiota of the skin and oral cavity of Oreochromis niloticus. J Heal Biol Sci. 2016;4(3):193-7.
4. Alves APNN, Verde MEQL, Ferreira Júnior AEC, Silva PGB, Feitosa VP, Lima Júnior EM, et al. Avaliação microscópica, estudo histoquímico e análise de propriedades tensiométricas da pele de tilápia do Nilo. Rev Bras Queimaduras. 2015;14(3):203-10.
5. Alves APNN, Lima Júnior EM, Piccolo NS, Miranda MJB, Verde MEQL, Ferreira Júnior AEC, et al. Study of tensiometric properties, microbiological and collagen content in nile tilapia skin submitted to different sterilization methods. Cell Tissue Bank. 2018 Sep;19(3):373-82.
6. Lima Junior EM, Picollo NS, Miranda MJB, Ribeiro WLC, Alves APNN, Ferreira GE, et al. Uso da pele de tilápia (Oreochromis niloticus), como curativo biológ ico oclusivo, no tratamento de queimaduras. Rev Bras Queimaduras. 2017;16(1):10-7.

7. Hermans MHE. Porcine xenografts vs. (cryopreserved) allografts in the management of partial thickness burns: is there a clinical difference?. Burns. 2014 May;40(3):408-15.
8. Piccolo N, Piccolo MS, Piccolo MTS. Uso de pele de rã como curativo biológico como substituto temporário da pele em queimaduras. Rev Bras Queimaduras. 2002;2:18-24.
9. Pan SC. Burn blister fluids in the neovascularization stage of burn wound healing: a comparison between superficial and deep partial-thickness burn wounds. Burns Trauma. 2013 Jun;1(1):27-31.
10. Chiu T, Burd A. "Xenograft" dressing in the treatment of burns. Clin Dermatol. 2005;23:419-23.

***Corresponding author:** **Edmar Maciel Lima Júnior**
Instituto Dr. José Frota (IJF), Rua Barão do Rio Branco, 1816, Centro, Fortaleza, CE, Brazil.
Zip Code: 60025-061
E-mail: edmarmaciel@gmail.com

Case Report

Trochanteric dermolipectomy in a patient after bariatric surgery: case report

Dermolipectomia trocantérica em paciente pós-cirurgia bariátrica: relato de caso

MARIANA FERNANDES [1]*
OSVALDO SALDANHA [1]
OSVALDO SALDANHA FILHO [1]
RENATO GIANNINI NETO [1]
CARLOS GOYENECHE MONTOYA [1]
BEATRIZ YAEDU [1]
RODRIGO INÁCIO FERNANDES [1]
VANESSA LUDMILLA MORETTO [1]

■ **ABSTRACT**

Introduction: Currently, with the increase in reducing gastroplasty (bariatric surgery) and the great weight loss, there is also an increase in the demand of these patients for plastic surgery. One of the characteristics of these patients is the excess of dermal adipose tissue that causes deformities, especially in the lower limbs, affecting the trochanteric region. **Objective:** To report a case of trochanteric dermolipectomy in a patient after bariatric surgery, where liposuction alone would not solve the correction of the deformity. **Case report:** IPMS, female, 55 years old, history of reducing gastroplasty (bariatric surgery) with great weight loss. She reports significant discomfort with lipodystrophy and extensive flacidity in the bilateral trochanteric region. After the team's evaluation, it was decided to perform bilateral trochanteric dermolipectomy, in January 2019, at the Plastic Surgery Service Osvaldo Saldanha **Discussion:** In cases of trochanteric lipodystrophy with severe deformities, the scar of dermolipectomy in relation to the deformity is favorable in terms of the choice of this technique, since liposuction may further aggravate the deformity, and it is mandatory to use the trochanteric dermolipectomy technique to correct it. **Conclusion:** Therefore, liposuction is beneficial in cases of localized adiposity, limiting the indications for the dermolipectomy technique, especially in the trochanteric region, without invalidating it for selected cases, as described in this case report.

Keywords: Bariatric surgery; Lipodystrophy; Lower extremity; Surgery, Plastic; Cicatrix.

Institution: Hospital São Lucas, Serviço de Cirurgia Plástica Osvaldo Saldanha, Santos, SP, Brazil.

Article received: March 18, 2019.
Article accepted: July 8, 2019.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0041

[1] Serviço de Cirurgia Plástica Osvaldo Saldanha, Santos, SP, Brazil.

■ **RESUMO**

Introdução: Atualmente com o aumento das gastroplastias redutoras (cirurgia bariátrica) e grande perda ponderal, há também um aumento na procura destes pacientes pela cirurgia plástica. Uma das características destes pacientes é o excesso de tecido dermogorduroso que causa deformidades, principalmente nos membros inferiores, acometendo a região trocantérica. **Objetivo:** Relatar um caso de dermolipectomia trocantérica em paciente pós-cirurgia bariátrica, onde a lipoaspiração por si só não resolveria a correção da deformidade. **Relato de caso:** IPMS, sexo feminino, 55 anos, histórico de gastroplastia redutora (cirurgia bariátrica) com grande perda ponderal. Relata desconforto importante com a lipodistrofia e extensa flacidez em região trocantérica bilateral. Após avaliação pela equipe, foi optado por realizar dermolipectomia trocantérica bilateral, em janeiro de 2019, no Serviço de Cirurgia Plástica Osvaldo Saldanha. **Discussão:** Nos casos de lipodistrofia trocantérica com deformidades graves, a cicatriz da dermolipectomia em relação à deformidade é favorável quanto a escolha desta técnica, pois a lipoaspiração poderá agravar ainda mais a deformidade, sendo mandatório utilizar a técnica de dermolipectomia trocantérica para corrigi-la. Quanto à lipodistrofia com deformidade moderada há dúvida entre a relação do benefício e a deformidade resultante, sendo aplicada a técnica de acordo com a necessidade do paciente e, por fim, nos casos de lipodistrofia com deformidade leve, opta-se pela lipoaspiração devido à correção ser realizada sem grandes cicatrizes aparentes. **Conclusão:** Portanto, a lipoaspiração tem benefício nos casos de adiposidade localizada, limitando as indicações da técnica de dermolipectomia, em especial na região trocantérica, sem invalidá-la para casos selecionados, como o descrito neste relato de caso.

Descritores: Cirurgia bariátrica; Lipodistrofia; Extremidade inferior; Cirurgia plástica; Cicatriz.

INTRODUCTION

Currently, with the increase in reducing gastroplasty or bariatric surgery, there has also been an increase in the number of patients with large weight losses who are looking for plastic surgery. One of the characteristics of these patients is the excess of dermal adipose tissue, which represents a real challenge for the plastic surgeon. Among the most common deformities, those that affect the lower limbs, especially the trochanteric region, represent an important psychological disorder for the patient and have a high degree of technical difficulty[1,2,3].

Therefore, the correct indication of the different procedures, based on an assessment, considering both the organic and the psychological aspects, is essential in the treatment of these deformities[3].

In 1964, Pitanguy described a technique with scars camouflaged in natural grooves, which when understood and correctly indicated, offers very satisfactory results. With the advent of liposuction, there was a reformulation of the possibilities of treatment for trochanteric lipodystrophy, establishing new concepts, but not invalidating the procedures previously used[4,5].

Therefore, the objective was to report a case of trochanteric dermolipectomy in a patient after bariatric surgery, where liposuction alone would not solve the correction of the deformity.

CASE REPORT

Female patient, 55 years old, with a history of reducing gastroplasty (bariatric surgery) in December 2013, her pre-bariatric BMI was 52.3 kg/m^2 and had great weight loss (approximately 52 kg in 5 years). He reported significant discomfort with lipodystrophy and

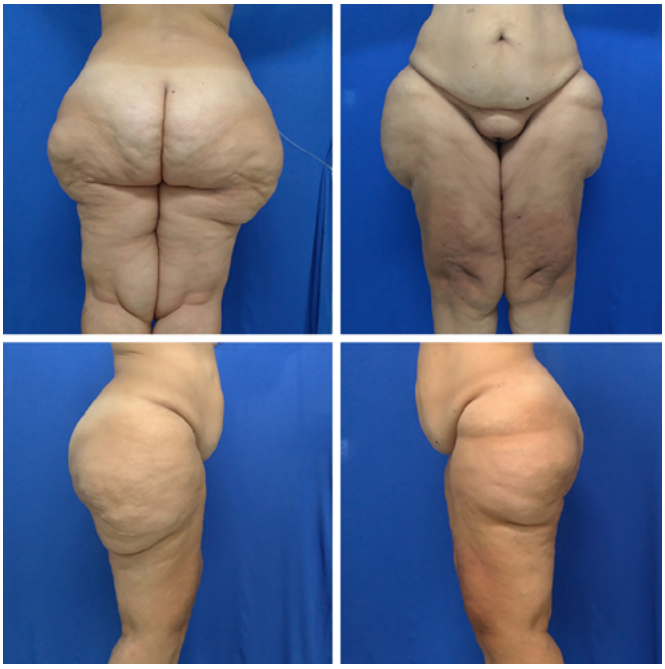


Figure 1. Preoperative.

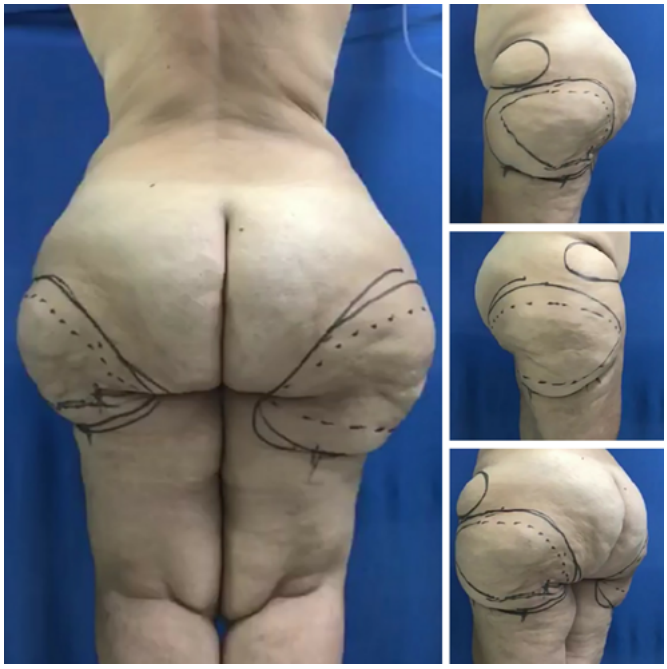


Figure 2. Marking

extensive flaccidity in the bilateral trochanteric region (Figure 1). After evaluation by the team, it was decided to perform bilateral trochanteric dermolipectomy. The patient underwent the procedure indicated in January 2019 at the Plastic Surgery Service Osvaldo Saldanha, in Santos/SP.

The criteria for surgery indication were: great weight loss after bariatric surgery (approximately 52 kg in 5 years, BMI pre-trochanteric dermolipectomic surgery equal to 31.8 kg/m^2), excess skin and subcutaneous cell tissue (SSCT) in the bilateral trochanteric region and the patient's desire to perform the correction of lipodystrophy in the aforementioned region.

Surgical technique

The excision areas are marked with the patient in an orthostatic position, prior to anesthesia (Figure 2). Patient under general anesthesia, is placed in prone position on the operating table. Asepsis, antisepsis and placement of sterile fields are performed. Incision in previous mark. The incision corresponds approximately to the grooves formed by the deformity due to lipodystrophy in the trochanteric region, starting at the junction of these two grooves, proceeding towards the anterosuperior iliac crest, but not reaching it. Once the skin incision is made, it is deepened until the muscular plane is reached, making a bevel in the caudal direction. The flaps are dried up to the limit of the defined area, with their total weight equal to 3kg and 200g. A continuous suction drain is used on each resected side and closed by planes (Figure 3).

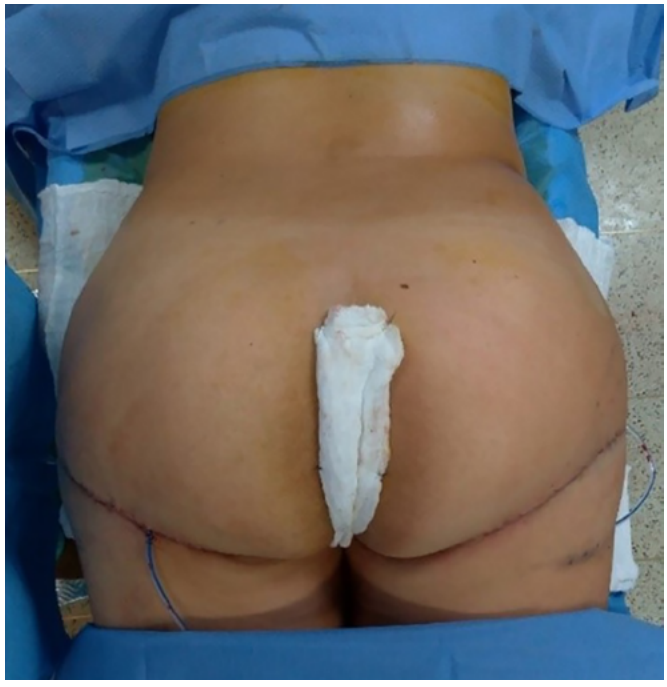


Figure 3. Immediate postoperative

The patient had a good postoperative evolution, without complications such as seroma, hematoma or suture dehiscence in the postoperative period (Figures 4 e 5).

DISCUSSION

Trochanteric lipodystrophy is attributed to several factors, hormonal and, mainly, hereditary.

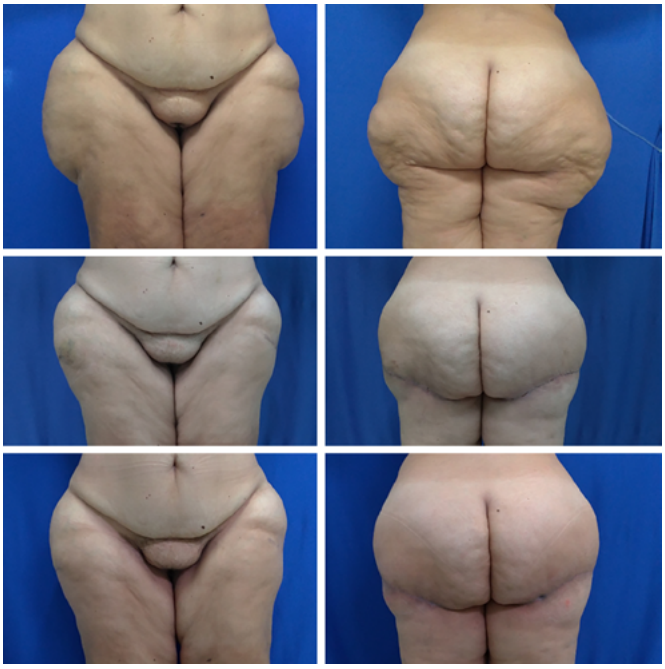


Figure 4. Preoperative, 20 days postoperatively, 1 month and 20 days postoperatively: anterior and posterior views.

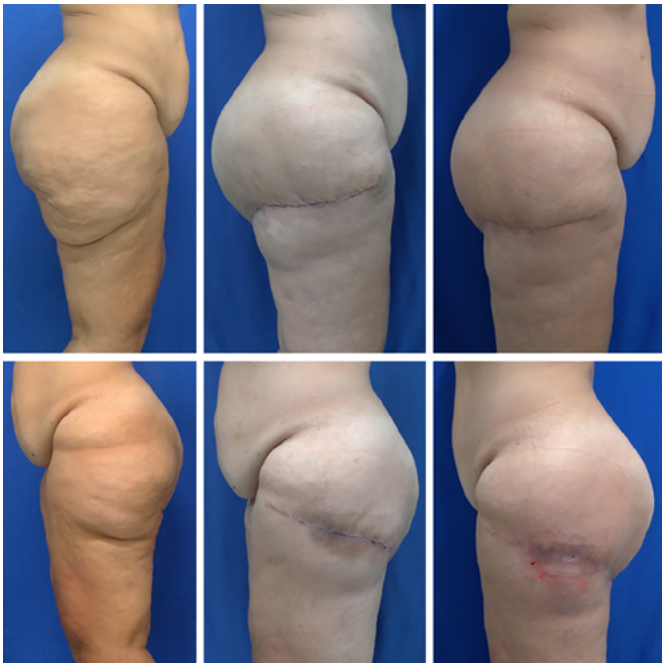


Figure 5. Preoperative, 20 days postoperatively, 1 month and 20 days postoperatively: bilateral side view.

There is also the adipocyte theory, which states that there is a fixed number of adipocytes in the body containing two types of receptors sensitive to the same chemical mediators of the adrenergic system. It has been shown that adipocytes with alpha 2 receptors, in women, are located mainly in the trochanteric region, for this reason there is no improvement in the deformity of this region, despite great weight loss, being one of the most common complaints of patients, the fat deposit in this region. These patients have a characteristic gynecoid body: the pelvis is larger than the trunk, the breasts are small and the arms are thin. When these patients go on a diet, exercise and try in other ways to reduce body measures, they can only lose weight, but this disproportion remains and can even be accentuated[3,4,5].

Therefore, due to these deformities, these patients look for plastic surgery, so that they can minimize them. In trochanteric lipodystrophy, in cases of mild and moderate deformities, the scar resulting from a dermolipectomy is undoubtedly one of the most controversial points of the classic technique, in which the relationship between the benefit and the resulting deformity would be unfavorable. Regarding less severe deformities, there is currently the option of treatment by liposuction, which allows the correction without visible scars, consequently limiting the indications for classic dermolipectomy, with relatively apparent scars. On the other hand, liposuction used in a patient with major deformities, may aggravate them even further, resulting in sequelae whose correction needs to be performed using the trochanteric dermolipectomy technique[3,4,6].

The analysis of the different procedures performed in the 90's showed that liposuction brought an indisputable benefit in cases of localized adiposity, limiting the indications for the dermolipectomy technique, especially in the trochanteric region, without, however, invalidating it for selected cases[5,7,8].

In conclusion, as described in this case report, due to the presence of great adiposity and flaccidity in the patient's trochanteric region, the trochanteric dermolipectomy technique was indicated, since liposuction alone would not be enough to correct the patient's complaints, which may further aggravate the deformity of the region in question.

COLLABORATIONS

MF	Analysis and/or data interpretation, Data Curation, Methodology, Project Administration, Realization of operations and/or trials, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.
OS	Final manuscript approval, Supervision, Validation, Visualization.
OSF	Realization of operations and/or trials.
RGN	Analysis and/or data interpretation, Writing - Original Draft Preparation.
CGM	Writing - Original Draft Preparation.

BY Writing - Original Draft Preparation.
RIF Writing - Original Draft Preparation.
VLM Writing - Original Draft Preparation.

REFERENCES

1. Regnault P, Baroudi R, Carvalho CGS. Correction of lower limb lipodystrophy. Aesthetic Plast Surg. 1979 Dec;3:233-49.
2. Franco T. Aesthetic surgery of the upper and lower limbs. Aesthetic Plast Surg. 1980 Dec;4(1):245-56.
3. Mazzarone F, Pitanguy I, Gabriele J, Nunes D, Vargas A. Dermolipectomia crural com prolongamento médio-anterior no paciente pós-obesidade. Rev Bras Cir Plást. 2005;20(3):142-7.
4. Pitanguy I, Correa WEM, Salgado F, Kauak L, Solinas R. Aspectos atuais da lipodistrofia trocantérica e interfomoral. Rev Bras Cir. 1987;77(3):181-94.
5. Farina R, Baroudi R, Golcman B, Castro O. Riding-trousers-like type of pelvicrural lipodystrophy (trochanteric lipomatosis). Br J Plast Surg. 1960;13:174-8.
6. Shaer WD. Gluteal and thigh reduction: reclassification, critical review, and improved technique for primary correction. Aesthetic Plast Surg. 1984;8(3):165-72.
7. Pitanguy, I. Trochanteric lipodystrophy. Plast Reconstr Surg. 1964 Sep;34:280-6.
8. Pitanguy, I. Upper extremity: dermolipectomy. In: Pitanguy I, ed. Aesthetic surgery of head and body. Berlin: Springer-Verlag; 1984. p. 153-8.

***Corresponding author:** **Mariana Fernandes**
Avenida Osvaldo Reis, 3281, 13º andar, Salas 1310/1311, Praia Brava, Itajaí, SC, Brazil.
Zip Code: 88007-001
E-mail: dramarianacp@gmail.com

Case Report

Surgical treatment of infantile nasal and labial hemangioma in the involuted phase: a case report

Tratamento cirúrgico de hemangioma infantil nasal e labial na fase involuída: relato de caso

MONIQUE MENDES [1]*
RODOLFO COSTA LOBATO [1]
LUIZ CARLOS ISHIDA [1]
ROLF GEMPERLI [1]

■ **ABSTRACT**

Infantile hemangioma (IH) is the most common vascular tumor and the most frequent benign neoplasm in childhood, with the highest incidence in females and the white population. Almost 60% of cases occur in the head and neck, and active treatment during the proliferative phase is the most frequently indicated, due to possible functional problems and disfiguring potential. We report a case of a patient with involute infantile hemangioma of the nasal tip and upper lip, treated expectantly during childhood, submitted to residual deformity correction with rhinoplasty techniques, associated with zetaplasty and upper lip grafting with good results and patient satisfaction.

Keywords: Hemangioma; Rhinoplasty; Lip; Nasal diseases; Nose.

■ **RESUMO**

Hemangioma infantil (HI) é o tumor vascular mais comum e a neoplasia benigna mais frequente da infância, com maior incidência no sexo feminino e na população branca. Quase 60% dos casos ocorrem em cabeça e pescoço, sendo o tratamento ativo durante a fase proliferativa mais frequentemente indicado, em decorrência dos possíveis problemas funcionais e do potencial desfigurante. Relatamos um caso de paciente com hemangioma infantil involuído de ponta nasal e lábio superior, tratado de forma expectante durante a infância, submetida à correção da deformidade residual com técnicas de rinoplastia, associado à zetaplastia e lipoenxertia do lábio superior com bom resultado e satisfação do paciente.

Descritores: Hemangioma; Rinoplastia; Lábio; Doenças nasais; Nariz.

Institution: Hospital das Clínicas da Faculdade de Medicina da USP, Disciplina de Cirurgia Plástica e Queimaduras, São Paulo, SP, Brazil.

Article received: April 4, 2019.
Article accepted: June 22, 2019.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0042

[1] Hospital das Clínicas da Faculdade de Medicina da USP, Disciplina de Cirurgia Plástica e Queimaduras, São Paulo, SP, Brazil.

INTRODUCTION

Infantile hemangioma (IMH) is the most common benign vascular tumor in childhood, with a higher incidence in females and the white population. Almost 60% of cases occur in the head and neck, and those located on the face are more associated with psychosocial, aesthetic and functional disorders[1-2].

The lesion varies clinically according to its evolution throughout the child's growth, which has a natural history divided into 3 phases: the initial growth phase, called proliferative; the spontaneous or involuting regression phase and the final or involuted equilibrium phase[1].

When considering central hemangiomas of the face, and especially nasal hemangiomas, active treatment during the proliferative phase becomes more frequently indicated, due to the possible functional problems and the disfiguring potential that such lesions can present[2,3].

Some studies also indicate that the rate of spontaneous resolution of nasal hemangiomas is lower, even after the end of the proliferative phase. The presence of fibrous fat deposits and excess skin can cause contour deformation and contribute to the unsatisfactory outcome often seen in untreated lesions. Thus, cases not treated with propranolol or not operated in childhood often require correction in the adult phase, due to aesthetic and/or functional discomfort[3-6].

OBJECTIVE

Report a case of infantile hemangioma with nasal tip, columella and upper lip, treated surgically in the involuted phase.

CASE REPORT

A 28-year-old female patient reported the presence of a reddish lesion on the nasal tip, columella, upper lip filter, and part of the vermilion, which appeared in the first days of life. The lesion was treated expectantly, without the use of medications, evolving with spontaneous size reduction, from 3 years of age. Despite this, the patient maintained increased volume in the nasal tip and retraction of the upper lip, with whistling deformity (Figures 1 and 2).

Surgical procedures

Rhinoplasty

Open rhinoplasty, with transcolumellar and marginal access, is performed to resect the excess soft tissue and improve the definition of the nasal tip.

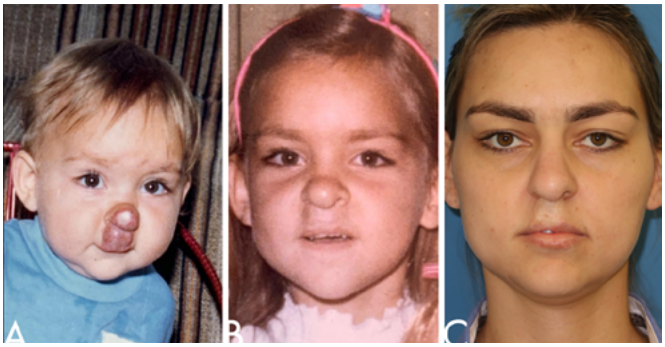


Figure 1. A. A 1-year-old patient with nasal hemangioma, columella, and upper lip; **B.** Patient 7 years old, with lesion already involuted; **C.** Patient at 28 years old, with residual lesion and lip retraction.

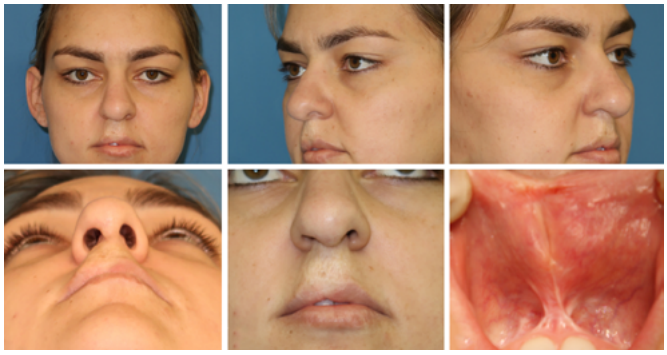


Figure 2. A, B, C, and **D.** Patient with nasal hemangioma and upper lip involuted with a deep predominant component; **D** and **E.** Retraction of the upper lip with whistling deformity.

The following changes were identified concerning the normal anatomy of the nose: the presence of anomalous fibrofatty tissue in the columella and nasal tip, compatible with the involuted hemangioma (measuring 1.8 cm) and a discontinuity of the alar cartilage in the domus region on the right, with narrow and fragile medial crosses. After resection of the excess fibrofatty tissue, we opted for amputation and reinsertion of the lateral crosses with the construction of a neodomus, equalizing the forces between the sides and avoiding possible asymmetries (Figure 3). In order to

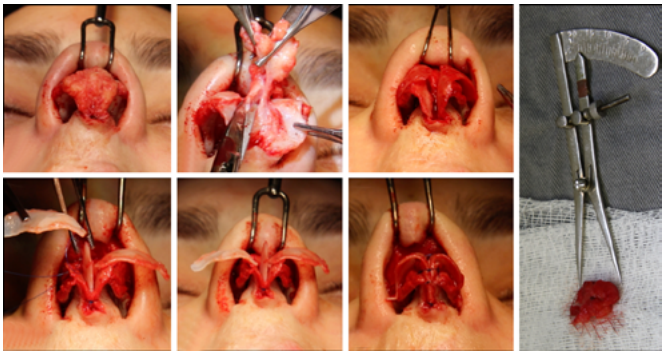


Figure 3. A. Open access with an excess of soft parts in the columella; **B.** Excision of soft tissues; **C.** Domus fractured on the right; **D.** Amputation and reinsertion of lateral crosses in the domes; **E.** Fixation of the columellar strut at medial and lateral crosses with symmetrical position and strength; **F.** Interdomal points and on medial crosses next to the columellar strut; **G.** Lesion of 1.8 cm.

acquire a good projection and definition of the nasal tip, a columellar strut was used, fixed to the medial crosses and transdomal points were performed (Figure 3).

It is essential to highlight that there were no technical difficulties related to bleeding or dissection of the planes, besides the usual ones found in a rhinoplasty.

Labiaplasty

In the upper lip, mucosal zetaplasty was chosen, allowing the wet vermilion to progress and the retraction to improve. Due to the persistence of lack of volume and projection in the region, 2ml fat grafting was associated with the resolution of the whistling deformity (Figure 4).

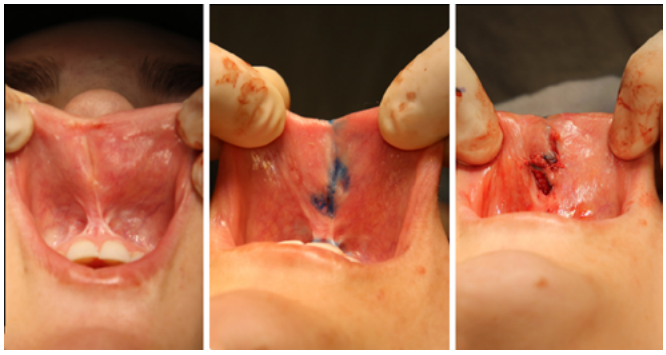


Figure 4. A and **B.** Marking of zetaplasty in the retraction area of the upper lip mucosa; **C.** Transposition of zetaplasty flaps.

The patient was followed up in the postoperative period with satisfactory evolution, accommodation of skin on the nose, and improvement of lip deformity (Figure 5).

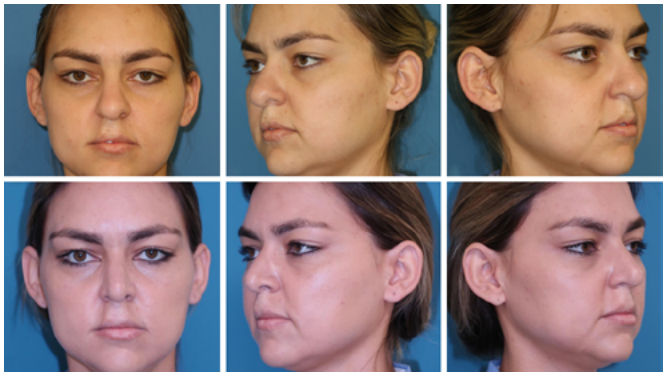


Figure 5. A, **B** and **C.** Preoperative; **D**, **E** and **F.** Postoperative period of 3 months.

DISCUSSION

Due to their central location on the face and great aesthetic importance, nasal hemangiomas are uncomfortable injuries for patients and family members. They can course with local complications, functional impairment, deformities and impact on psychosocial development[1-2].

Besides the expectant behavior, pharmacological and surgical interventions and laser use are the current treatment options. Propranolol represents the first line for IH due to its high efficacy, and safety[7]. Surgery maintains its role in refractory cases, in those with local complications, with functional impairment and for sequelae after hemangioma regression.

The ideal moment for surgical indication is still controversial in the literature. The benefits of early intervention, even for limited lesions, are to reduce the damage caused by the proliferation of hemangiomas, avoiding damage to the growth of nasal cartilages[8]. However, nasal reconstruction in young children is challenging, and the potential risk of iatrogenic deformity, nasal skeletal growth disorders, or excessive scarring should be considered[5,8].

Authors like Giugliano et al., in 2018[9], prefer to perform the surgery in the involuted phase, considering that the anatomical structures are better defined and the size of the lesion may have reduced, making the reconstruction technically easier and with a consequent better result. In their series, there was no change in growth, but the separation of different structural elements of nasal cartilages, requiring adequate repositioning of the alar complex. These findings are similar to the experience reported by Waner et al. in 2008[6] and Hochman et al. in 2005[10], noting that the destruction of the cartilage is unusual.

In the present case, we also observed bleeding similar to that of other rhinoplasties, consistent with the literature. In cases of isolated involvement of the nasal tip, due to deep and involuted hemangioma (without skin involvement), there is an indication for open rhinoplasty (McCarthy et al., In 2002[5]) and excess skin may be resected. In the case above, we chose not to resect the excess skin, as we believe that, with the improvement of the definition and projection of the tip, the skin presents suitable accommodation and satisfactory aesthetic results.

On the other hand, an open rhinoplasty will not always be the surgical solution for involuted cases. In cases of skin involvement in the subunit of the nasal tip or contiguity with other subunits, a frontal flap or another regional flap is indicated to provide adequate reconstruction. When other subunits are affected, a direct excision can also be performed[5].

COLLABORATIONS

MM Analysis and/or data interpretation, Data Curation, Realization of operations and/or trials, Writing - Original Draft Preparation, Writing - Review & Editing.

RCL Analysis and/or data interpretation, Conception and design study, Conceptualization, Final manuscript approval, Realization of operations and/or trials, Writing - Original Draft Preparation.

LCI Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.

RG Supervision, Validation, Writing - Review & Editing.

REFERENCES

1. Hiraki PY, Goldenberg DC. Diagnóstico e tratamento do hemangioma infantil. Rev Bras Cir Plast. 2010;25(2):388-97.
2. Boye E, Jinnin M, Olsen BR. Infantile hemangioma: challenges, new insights, and therapeutic promise. J Craniofac Surg. 2009 Mar;20(Suppl 1):678-84.
3. Bruckner AL, Frieden IJ. Hemangiomas of infancy. J Am Acad Dermatol. 2003;48:477-93.
4. Frieden IJ, Eichenfield LF, Esterly NB, Geronemous R, Mallory SB. Guidelines of care for hemangiomas of infancy. J Am Acad Dermatol. 1997 Oct;37(4):631-7.
5. McCarthy JG, Borud LJ, Schreiber JS. Hemangiomas of the nasal tip. Plast Reconstr Surg. 2002 Jan;109(1):31-40.
6. Waner M, Kastenbaum J, Scherer K. Hemangiomas of the nose. Arch Facial Plast Surg. 2008;10(5):329-34.
7. Leaute-Labreze C. Infantile hemangiomas: the revolution of betablockers. Rev Prat. 2014 Dec;64(10):1421-8.
8. Cho S, Lee SY, Choi JH, Sung KJ, Moon KC, Koh JK. Treatment of Cyrano angioma with pulsed dye laser. Dermatol Surg. 2001;27:670-2.
9. Giugliano C, Reculé F, Guler K, Gantz JT, Hasbún T. Persistent nasal infantile hemangioma: a surgical treatment algorithm. J Craniofac Surg. 2018 Sep;29(6):1509-13.
10. Hochman M, Mascareno A. Management of nasal hemangiomas. Arch Facial Plast Surg. 2005;7:295-300.

***Corresponding author:** **Rodolfo Costa Lobato**
Rua da Consolação, 3741, 11º andar, Cerqueira Cesar, São Paulo, SP, Brazil.
Zip Code: 01416-907
E-mail: rodolfolobato49@yahoo.com.br

Increased projection of the nasal tip with "pseudo-flaps" obtained from lateral cephalic excesses of the alar cartilages

Aumento da projeção da ponta nasal com "pseudo-retalhos" obtidos dos excessos cefálicos laterais das cartilagens alares

FABIANO CALIXTO FORTES ARRUDA[1,2,3]*
PAULO RENATO SIMMONS DE PAULA [2]
MARCELO PRADO [2]

Mr. Editor,

We read with great interest the article with the title: "Increase in the projection of the nasal tip with 'pseudo-flaps' obtained from excess cephalic alar cartilages" by Bozola et al. in 2019[1], published in the Brazilian Journal of Plastic Surgery. The authors describe a different technical approach to the projection of the nasal tip, using the resected cephalic portion to reduce alar cartilage in rhinoplasty. The concept of using the alar cartilage itself for reuse in the nose area, as reinforcement of alar cartilage[2], in use as an expander graft[3], in the back filling[4] or the filling of the soft triangle region[5] has been described in the current literature and we believe that its reuse, in rhinoplasty techniques, is the ideal way.

According to the description of the results, we would like the authors to comment on the following questions regarding this article:

- **First:** An increase in the projection of the nasal tip was observed. What was the instrument used to compare and evaluate the projection objectively?
- **Second:** In increasing the nasal projection, we have several techniques used with sutures and use of grafts, in addition to the technique described, which other techniques were used together in the patients studied?
- **Third:** In the description, patients reported a satisfactory result. Which instrument was used to measure the pre and postoperative evaluation of these patients?

Finally, we congratulate the authors for their work and innovation regarding the rhinoplasty technique.

Institution: Hospital de Clinicas UFG, Cirurgia Plástica, Goiânia, GO, Brazil.

Article received: February 18, 2020.
Article accepted: May 2, 2020.

Conflicts of interest: none.

DOI:10.5935/2177-1235.2020RBCP0043

[1] Centro de Reabilitação Henrique Santillo, Plastic Surgery, Rhinoplasty, Goiânia, GO, Brazil.
[2] Hospital de Clinicas UFG, Cirurgia Plástica, Goiânia, GO, Brazil.
[3] Hospital Estadual de Urgências Governador Otávio Lage de Siqueira, Cirurgia Plástica, Goiânia, GO, Brazil.

REFERENCES

1. Bozola AB, Bozola AC, Sommer CG. Aumento da projeção da ponta nasal com “pseudo-retalhos” obtidos dos excessos cefálicos das cartilagens alares. Rev Bras Cir Plást. 2019; 34(4):445-51.
2. Racy E, Fanous A, Pressat-Laffouilhere T, Benmoussa N. The modified sliding alar cartilage flap: a novel way to preserve the internal nasal valve as illustrated by three-dimensional modeling. Plast Reconstr Surg. 2019 Sep;144(3):593-9.
3. Uebel CO, Matta R. Alar cartilage-an alternative for spreader graft in primary rhinoplasty. Eur J Plast Surg. 2017;40(5):417-26.
4. Kreutzer C, Hoehne J, Gubisch W, Rezaeian F, Haack S. Free diced cartilage: a new application of diced cartilage grafts in primary and secondary rhinoplasty. Plast Reconstr Surg. 2017 Sep;140(3):461-70.
5. Campbell CF, Pezeshk RA, Basci DS, Scheuer JF, Sieber DA, Rohrich RJ. Preventing soft-tissue triangle collapse in modern rhinoplasty. Plast Reconstr Surg. 2017 Jul;140(1):33e-42e.

***Corresponding author:** **Fabiano Calixto Fortes Arruda**
R. T-50, 723 - 07, St. Bueno, Goiânia, GO, Brazil.
Zip Code: 74150-170
E-mail: arrudafabiano@hotmail.com

Answer

ANTÔNIO ROBERTO BOZOLA [1]

Dear Reader,

In clarifications to the questions requested regarding the article “Increase of nasal tip projection with pseudo flaps obtained from cephalic excesses of the alar cartilages”:

- **First:** The instrument used for comparison were the photos of Pre and Postoperative profile.
- **Second:** The patients studied were initially submitted to the tactic described without using other procedures.
- **Third:** The instruments used for the analysis of the results were the clinical examination and photos as reported and also the evaluation of the patients themselves. Metric measurements were not used in any of the cases.

[1] Faculdade de Medicina de São José do Rio Preto, São José do Rio Preto, SP, Brazil.

NOVA EMBALAGEM DE **IMPLANTES MAMÁRIOS**

- Embalagem instagramável
- Nas cores da Silimed
- Design minimalista

Saiba mais: WWW.SILIMED.COM.BR

SILIMEDBRASIL **SILIMED.OFFICIAL**

SILIMED
conectando ciência e bem-estar

CIRURGIA® SEGURA

Um dos momentos mais delicados na relação médico-paciente está no enfrentamento de **complicações cirúrgicas**. A intercorrência é imprevisível e pode ocorrer em até 10% dos procedimentos cirúrgicos.

O **Cirurgia Segura** garante proteção financeira de até R$ 150 mil para reembolso de despesas médico-hospitalares. **Proteja suas cirurgias e seus pacientes.**

Cirurgia Segura: tranquilidade para você, **segurança para seus pacientes**

Consulte condições ou peça a visita de um de nossos representantes:
(61) 99559-7763

www.cirurgiasegura.com

Prazer, somos a POL-LUX: importadora oficial da POLYTECH no Brasil.

A POL-LUX é a parceira estratégica de marca, negócios e comunicação da POLYTECH no Brasil: uma das maiores fabricantes de implantes de silicone no mundo, a única marca alemã do segmento.

Nossas áreas de atuação:

- **Pesquisa de mercado**
- **Regulatório**
- **Importação**
- **Branding**
- **Comercial e Logística**

Estamos aqui para construir relacionamentos de longo prazo entre global medical brands, médicos e pacientes brasileiros.

Vamos juntos?

POL-LUX | POLYTECH

www.pollux-brasil.com.br