

Surgical Tactics in Breast Explants

Táticas cirúrgicas nos explantes mamários

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Abstract

Introduction Demand for breast implant and capsule removal has increased over the last 5 years. Plastic surgeons have the skills to perform capsulectomy, but some surgical tactics details depend on the degree of contracture and the plane of implant placement. Breast reconstruction following this procedure also has its particularities. Therefore, it would be ideal to identify the significant factors in choosing surgical tactics for intact total capsulectomy and to develop a decision-making flowchart to assist surgeons in each case.

Materials and Methods Description of surgical tactics and decision-making flowchart based on the author's experience with 712 patients undergoing total intact capsulectomy from June 2021 to 2023 in São Paulo, Brazil.

Results Most patients (78%) presented subglandular implants, followed by submuscular ones in 22%. Implants consisted of silicone alone in 89% and were polyurethane-coated in 11% of cases. In this series, 55% of patients underwent explantation with mastopexy, followed by explantation with mastopexy and fat grafting in 18%, explantation alone in 14%, and explantation with fat graft in 13%.

Conclusion Capsular contracture degree, implant position, and previous breast scarring are critical factors in surgical planning for intact total capsulectomy. The choice of breast repair tactic depends on aspects such as breast volume and sagging. Observation of the decision flowchart for these procedures can be an instrument for planning and standardizing surgical tactics.

Keywords

- ▶ breast
- ▶ breast implantation
- ▶ breast implants
- ▶ implant capsular contracture
- ▶ mammoplasty

Resumo

Palavras-chave

- ▶ contratura capsular em implantes
- ▶ implante mamário
- ▶ implantes de mama
- ▶ mama
- ▶ mamoplastia

Introdução A demanda pela remoção do implante de mama e da cápsula aumentou nos últimos 5 anos. Há detalhes de tática cirúrgica na capsulectomia que dependem do grau de contratura e do plano em que o implante está colocado. A reparação das mamas após esse procedimento também apresenta suas particularidades. Diante disso, seria ideal identificar os fatores importantes na escolha das táticas cirúrgicas na capsulectomia total intacta e desenvolver um fluxograma de tomada de decisão para auxiliar o cirurgião em cada caso.

Materiais e Métodos Descrição de tática cirúrgica e fluxograma de decisão baseado na experiência do autor em 712 pacientes submetidas à capsulectomia total intacta entre junho de 2021 e 2023 em São Paulo, Brasil.

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Resultados A maior parte dos pacientes (78%) tinham implantes subglandulares, seguidos por submusculares em 22%. Os implantes eram totalmente de silicone em 89% dos casos e revestidos de poliuretano em 11%. Nessa série, 55% dos casos foram submetidos à explante com mastopexia, seguido de explante com mastopexia e lipoenxertia em 18%, explante somente em 14% e explante com lipoenxertia mamária em 13%.

Conclusão O grau de contratura capsular, a posição do implante e a cicatriz prévia nas mamas são fatores importantes no planejamento cirúrgico da capsulectomia total intacta. A escolha da tática de reparação de mama depende de fatores como volume e queda das mamas. A observação do fluxograma de decisão para esses procedimentos pode ser um instrumento para planejamento e padronização das táticas cirúrgicas.

Introduction

Demand for breast implant and capsule removal has been increasing over the last 5 years. This demand results from patients' fear of local implant-related complications, including rupture and contracture, or the appearance of systemic symptoms from Asia syndrome or silicone disease.¹⁻³

Although it is not the most proper term, conventional and social media refer to implant and capsule removal as explantation or block explantation. Patients request the removal of intact breast implants and capsules in their entirety, with no damage. Therefore, as some authors discussed, the most correct term would be intact total capsulectomy. This article uses both terms.^{4,5}

Simple breast implant removal is less complex than capsulectomy. Plastic surgeons learn how to perform it during their training. However, each situation has specific features, such as capsular contracture and whether the implant is in a subglandular or submuscular position.^{6,7}

Many cases require breast repair in addition to capsulectomy. Some present with ptotic breasts requiring mastopexy, and others wish to enlarge their breasts with fat grafting. Submuscular implants may require the reattachment of pectoral muscles.^{8,9}

Given this new demand and the particularities of breast explantation and repair, it would be ideal to identify the factors for surgical tactic selection and develop a decision-making flowchart to assist surgeons in each case.

Objective

This study aimed to identify the significant factors for planning intact total capsulectomy and breast repair surgical tactics.

Also, to assess if a decision-making flowchart for intact total capsulectomy and breast repair can assist this surgical planning.

Materials and Methods

This study described surgical tactics and a decision-making flowchart based on the author's experience with 712 patients undergoing intact total capsulectomy from June 2021 to 2023

in São Paulo, Brazil. Breast repair after intact total capsulectomy followed the flowchart presented in ►Fig. 8. The Research Ethics Committee from Plataforma Brasil approved this study under number 74568023.4.0000.5442.

Surgical tactics for intact total capsulectomy

Explantation alone, subglandular plane implantation

In these cases, the surgeon begins the incision at the previous scar, often in the inframammary fold, and continues the dissection up to the capsule. Next, the capsule is detached from the pectoralis major muscle posteriorly and from the breast tissue anteriorly.

The remaining detachment releases the breast tissue capsule from medial to lateral. This dissection can be complex in the superior or superolateral portion, so an option is to pull the implant and the capsule out of the incision to expose the attached segment for better dissection.

The implant curvature may require a mounted gauze to lower and pull the implant to access points further away from the detachment.

In the cases with previous periareolar scar, the explantation can be performed through an incision at the scar, with anterior detachment of the capsule, followed by a detachment from medial to lateral. This tactic provides better access for the posterior detachment of the capsule between the implant and the pectoralis major. Patients with small areolas or grade III or IV contractures (►Fig. 1) may require a lateral extension of the periareolar incision shaped like the Greek letter omega.

Explantation alone, submuscular plane implantation

The detachment sequence follows the same strategy as for subglandular plane implants. The surgeon performs the posterior detachment by dissecting the capsule from the rib periosteum and intercostal muscles. In the anterior portion, the capsule is detached from the pectoralis major muscle and, finally, it is dissected from medial to lateral (►Fig. 2).

Some cases present a capsule adhered firmly to the rib periosteum, making total intact capsulectomy unfeasible. Posterior capsule infiltration with saline solution in an attempt to create a plane does not work in the author's practice. In cases with a firm adherence of the capsule to the periosteum, it can be cauterized.

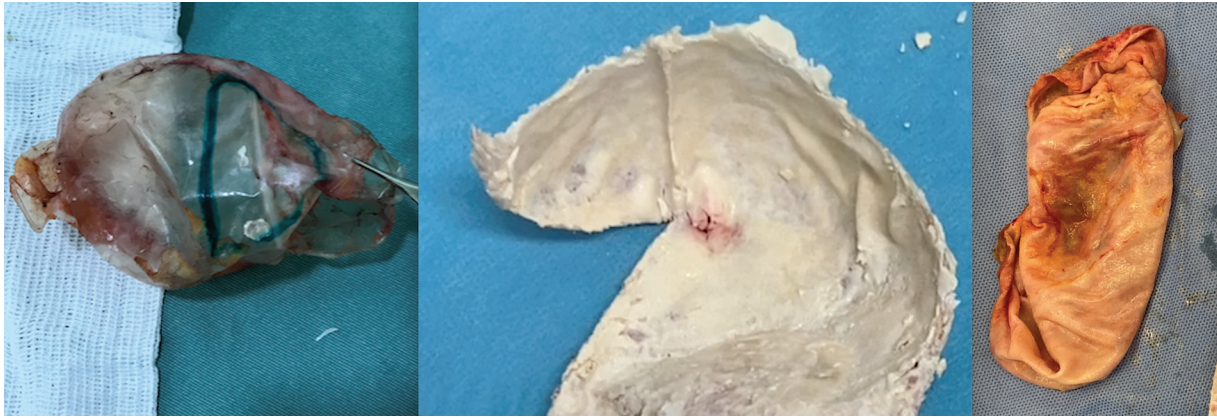


Fig. 1 From left to right: capsule with grade I contracture, capsule with calcified contracture IV, and thick capsule with contracture II of the polyurethane implant.



Fig. 2 Dissection of the anterior capsule of the pectoralis muscle in a submuscular implant (left) and dissection of the anterior capsule of a subglandular implant through the periareolar approach.

Explantation with mastopexy, subglandular plane implantation

An explantation with mastopexy results in greater exposure. The surgeon opens the entire T-shaped incision and reflects the upper pedicle flap (► **Fig. 3**).

The lateral and superolateral portions of the breast, towards the axilla, show more adherence between the capsule and the pectoralis major muscle. The lateral portion detachment is less complex from medial to lateral.

After reaching the superolateral region, the detachment can be craniocaudal, following the fibers of the pectoralis major muscle to where they are attached to the ribs.

Explantation with mastopexy, submuscular plane implantation

These cases require an anterior detachment between the capsule and the pectoralis major muscle, in addition to a posterior detachment between the capsule, the intercostal



Fig. 3 Dissection of the anterior part of the capsule in a subglandular implant (left) and craniocaudal dissection from the pectoralis major attachment to the posterior portion of the capsule.

muscle, and the rib periosteum. Next, the surgeon detaches the capsule from the adjacent tissues from medial to lateral.

If the adherence between the posterior capsule and the periosteum is too strong, it is possible to cauterize it and remove the anterior capsule alone.

Postintact total capsulectomy repair

With no ptosis and little breast tissue

In this case, the option is an intact total capsulectomy through the original (inframammary or periareolar) incision and observation for breast retraction.

Fat grafting can be used, often in multiple planes, starting in the deep breast tissue and proceeding superficially into the subcutaneous tissue. Grafting must include all quadrants, with special attention to the lower and medial portions, which can present breast tissue atrophy resulting from the weight of the implant.

The grafting ratio is 1:1. As such, if the estimated volume of the residual breast is 200 mL, the graft must have then 200 mL of fat. The absorption rate is approximately 50% of the volume.^{10,11}

For subglandular implant cases, the area between the pectoralis major and minor muscles can receive 100 to 250 mL of fat graft (► Fig. 4). For grafting into the pectoral muscle, the amount of fat is the maximum amount possible depending on the muscle elasticity and size. Pectoral muscles with larger areas and greater elasticity can carry a greater graft volume. The region below the pectoralis major muscle is an additional plane for fat grafting, especially in patients with thin breast tissue.^{12,13}

Fat distribution occurs throughout the pectoral muscle, and its injection is in a bolus. Submuscular fat grafting increases the volume and projection in the upper part of the breast, but with inferior results in the lower part.

With no ptosis and proper breast tissue

These cases require total intact capsulectomy alone, with no need for repair. Breast fat grafting can be performed for cleavage increase, at discretion of the surgeon.

With ptosis and little breast tissue

Mastopexy can be periareolar, circumvertical, L-shaped, or T-shaped. The surgeon can perform fat grafting between the

pectoralis major and minor muscles in patients with subglandular implants.

For pseudoptosis, the surgeon can perform a horizontal wedge excision of up to 3 cm in the inframammary fold, with no significant change in the areolar height. Another option is an internal mastopexy technique with sutures for pillar approximation, but with limited outcomes.¹⁴

In grade-I ptosis, periareolar mastopexy is an option, but it reduces breast projection. The author prefers to perform a circumvertical or L-shaped mastopexy in these cases.

For grade-III ptosis requiring an areolar elevation higher than 4 cm, the author uses the superomedial pedicle with a T-shaped scar. For other cases, the superior pedicle is preferred (► Fig. 5) as it is easy to prepare during capsulectomy.¹⁵ For areolas firmly attached to the implant, the lower pedicle is an option to avoid a very thin upper pedicle.

The fat graft plan can be subcutaneous, in the breast tissue, or submuscular. The upper quadrant receives around 60% of the graft volume. For explantation with mastopexy, it is not recommended to perform a fat graft in a ratio greater than 1:1 of the removed implant's volume.^{16,17}

With ptosis and proper breast tissue

The same previous incision and pedicle selection options apply to this group of patients. These cases do not require breast fat grafting.

Pectoralis major refixation should be considered for all submuscular plane implants. Suture the pectoralis major muscle with separate X-shaped stitches at the upper edge of the sixth rib.^{18,19} This procedure prevents the muscle from healing in a nonanatomical position, resulting in the breast sinking or moving during contraction.

Tactics to reduce “dog ears” incidence

The decreased breast volume tends to increase skin sagging. This can potentially lead to the formation of “dog ears” on the medial and lateral corners of the inframammary fold incision (► Fig. 6).

To avoid this, when starting to suture the breast, place the patient in a sitting position with their arms along the body for skin sagging assessment. An alternative maneuver is bringing both breasts medially and downwards to assess

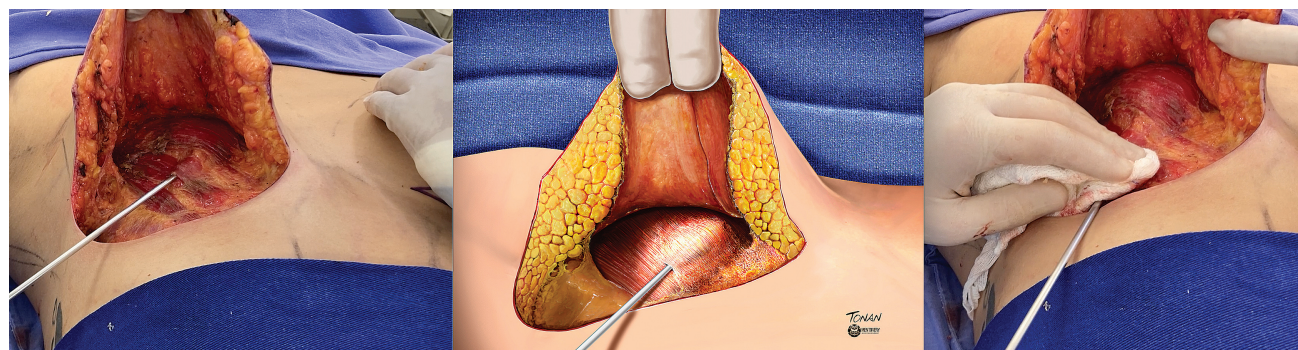


Fig. 4 Fat grafting between the pectoralis major and minor muscles. Start of graft preparation (left), illustration of the procedure (middle), and outcome after 100 mL of fat grafting (right).

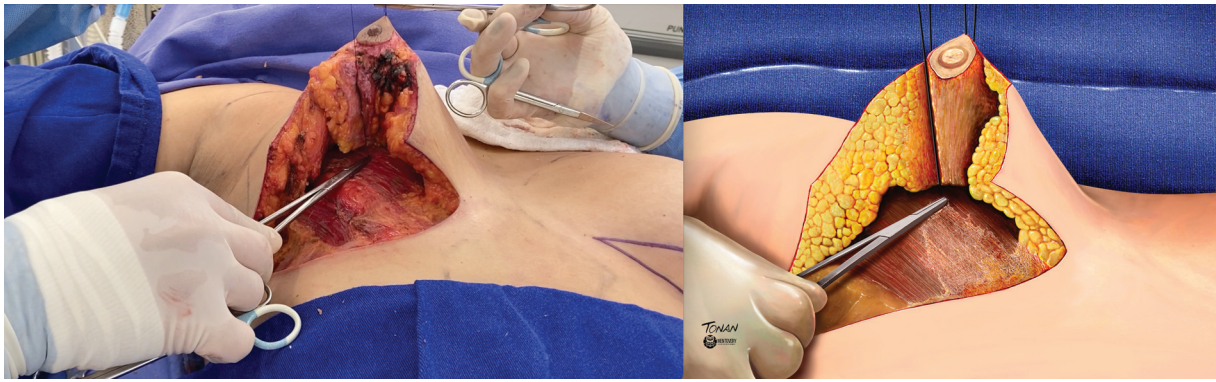


Fig. 5 Superior pedicle suture at point A of the breast in mastopexy.



Fig. 6 Excessive skin ("dog ears") in the medial (left) and lateral (right) corners in a patient 3 months after explantation with mastopexy.

medial sagging and placing them downwards and laterally for lateral sagging.

In addition to extending the incision to correct sagging, it is necessary to remove the corner volume by tissue resection. The first incision in the inframammary fold is beveled and directed to the lower portion, removing volume.

Results

The average age of the patients was 41.3 years, and most patients had silicone implants in the subglandular plane (► **Table 1**).

The most frequent complication was surgical wound dehiscence (► **Table 2**).

Table 1 Mean age inclusion plan, and implant type

	N = 712
Mean age	41.3 years
Inclusion plan and implant type: n (%)	
Subglandular implant	555 (78%)
Submuscular implant	157 (22%)
Silicone-based implant	633 (89%)
Polyurethane-coated implant	79 (11%)

The most performed surgery was explantation with mastopexy, with or without breast fat grafting (► **Fig. 7**).

► **Fig. 8** shows a decision-making flowchart for breast repair after implant removal and intact total capsulectomy. ► **Figs. 9** and **10** demonstrate the outcomes following these surgical tactics and the decision-making flowchart.

Discussion

The average age of the patients operated on was 41 years, reflecting the author's reality of operating mostly on women who have had children. Some degree of breast ptosis is expected in these patients, which is consistent with the data of 55% requiring mastopexy after intact total capsulectomy in the present study.^{8,13}

The implant was in the subglandular plane in 78% of cases, which makes total intact capsulectomy technically easier.

Table 2 Complication incidence

Complications: n (%)	N = 712
Dehiscence	8 (1.12%)
Hematoma	6 (0.84%)
Surgical wound infection	5 (0.7%)
Partial areola necrosis	1 (0.14%)

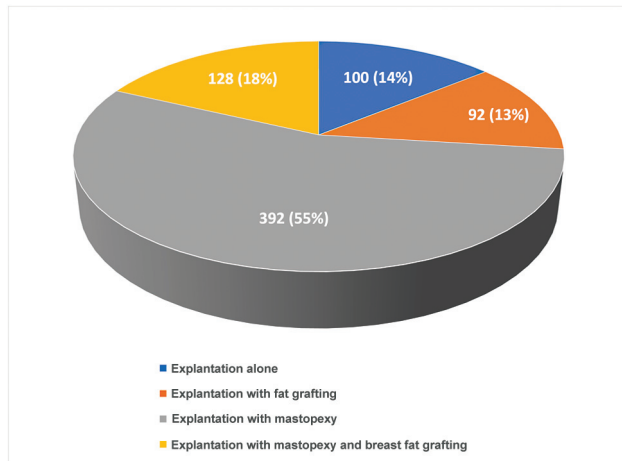


Fig. 7 Explantation and repair type percentages.

Polyurethane-coated prostheses were present in 11% of patients, which are associated with a thicker capsule and, therefore, a lower risk of capsule rupture during dissection.²⁰

The incidence of complications was consistent with the literature, and the most common complications included small dehiscences at the mammary column and hematomas requiring surgical drainage. The only case of areola necrosis was partial, involving approximately 40% of the area.⁷

The literature and the author's experience served as the basis for developing a decision-making flowchart for planning and discussing surgical options with patients, both in intact total capsulectomy and breast repair.^{8,21,22}

One of the most common indications for total intact capsulectomy is capsular contracture, ranging from grades I to IV and occurring in 2.8 to 18.9% of patients.²² Grade III or IV contractures require total removal to avoid seroma or palpability.²³

For grade-I and -II contractures, it is more difficult to find the detachment plane between the capsule and the breast tissue. There is a higher risk of rupture but removal is less complex through a smaller incision, as in cases of explantation alone, due to its higher elasticity.

For grade-III and -IV contractures (► Fig. 1), it is easier to find the dissection plane, and the chance of rupture is

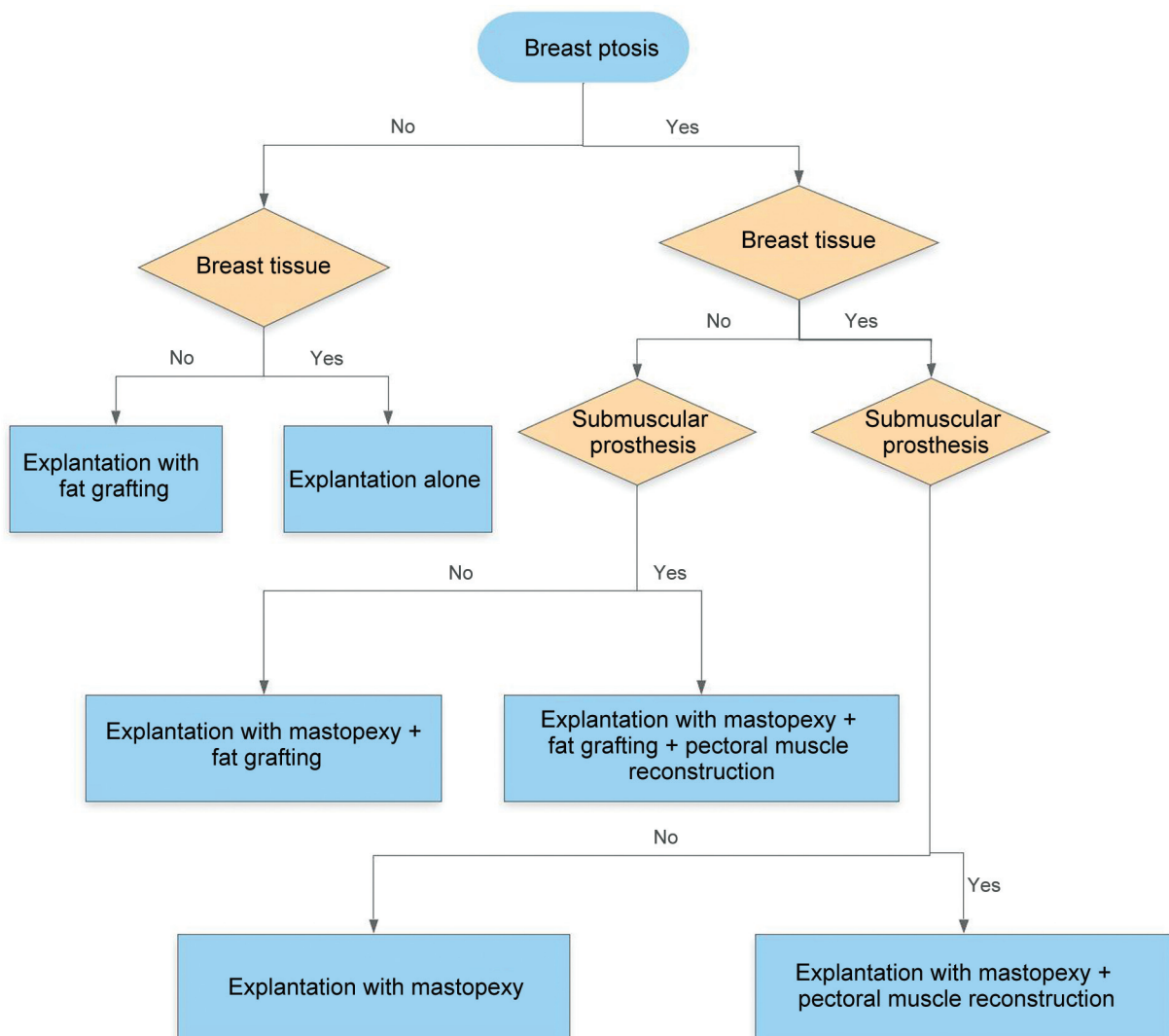


Fig. 8 Decision-making flowchart for intact total capsulectomy and repair.

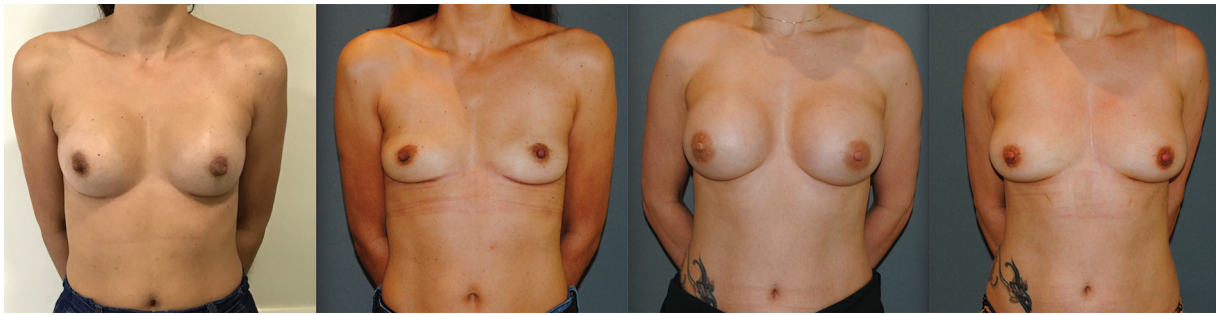


Fig. 9 Pre- and postoperative photographs at 3 months after explantation without fat grafting (first two images on the left) and with breast fat grafting (last two images on the right).



Fig. 10 Pre- and postoperative photographs of explantation with mastopexy explant without fat grafting (first two images on the left) and with fat grafting (last two images on the right).

smaller. However, implant removal through a small incision is more complex due to the low elasticity of the capsule.

Capsulectomy can be partial, sparing part of the capsule. Total, in which the entire capsule is removed, with risk of tears, but removal occurs without tears in the total intact technique. In this study, all patients underwent intact total capsulectomy for standardization purposes.

In nonptotic breasts, the incision for intact total capsulectomy follows the previous one for breast implant insertion. In most cases, the previous incision was in the inframammary fold and, to a lesser extent, in the periareolar region. Although the literature describes intact total capsulectomy via the axillary approach, the author prefers to use an inframammary fold incision for implant insertion via the axillary approach.²⁴

The removal sequence described in the methodology facilitates dissection and improves exposure of the capsule. Using the periareolar approach, dissection of the capsule's posterior portion is harder, and the risk of breast sinking in the periareolar scar region is higher.

Capsule dissection in submuscular implants can be challenging and result in complications, such as bleeding and pneumothorax.^{9,20} The posterior portion of the capsule adheres firmly to the region of the rib periosteum and less to the intercostal spaces containing muscle. Dissecting thin capsules from the pectoralis major muscle is a complex procedure.

Capsulectomy in subglandular implants is technically easier. When the implant or pocket is large, it may be difficult to approach the capsule for dissection in its uppermost and

superolateral portions, closer to the origin of the pectoralis major muscle. The difficulty is higher in explantation alone, as the exposure is smaller than in mastopexy.

The increased demand for implant removal resulted in a higher need for breast repair. Young patients with no ptosis do not require repair, as explantation alone can be sufficient. The retraction risk is higher when there is little breast tissue, where atrophy due to implant compression is more intense.

In small breasts and subglandular implants, explantation alone can be performed with fat grafting between the pectoralis major and minor muscles, reducing the risk of retraction. Fat grafting is unfeasible below the muscle in submuscular implants. Potential complications of fat grafting include the formation of oily cysts, steatonecrosis, and infection. The volume of fat grafted influences the development of oily cysts and steatonecrosis, with incidences of 4.5 and 6.2%, respectively.¹⁸

In patients with breast ptosis and sufficient tissue, the option is explantation with mastopexy. In these cases, fat grafting is an alternative to provide a little more volume and cleavage. The author prefers the upper pedicle, which has a lower chance of pseudoptosis. It is also versatile and can be fixed in a somersault at the level of the areola or inferiorly as if it were an inferior pedicle.

For submuscular implants, breast repair follows the same principles as subglandular ones (►Fig. 8). The difference is the pectoral muscle reattachment with interrupted sutures on the upper edge of the sixth rib in submuscular cases.²⁵

Some studies recommend explantation alone followed by mastopexy in patients with breast ptosis, smokers, with

breast tissue thickness < 4 cm, or requiring areola elevation higher than 4 cm.^{8,21} This has not been the author's conduct, who always performs mastopexy at the same surgical time as the explantation in ptosis cases.

Some authors recommend using an inferior pedicle to raise the areola by more than 6 to 8 cm. The inferior pedicle is an option, but it makes the explantation a little more complex and it has a higher risk of pseudoptosis. In these cases, the author has preferred a superomedial pedicle.²¹

The breast implant may rupture the ligaments of the inframammary fold and migrate below the fold, resulting in a double-bubble defect. These cases require an internal bra, returning the fold to its original site with sutures between the scar and the fascia of the pectoral muscle.²⁶

One of the main complications of explantation is hematoma. To reduce it, the author prefers ligating arterial vessels instead of cauterizing them. All patients undergoing explantation, regardless of the type of repair, received number 15 Blake drains.

Additionally, the author has routinely used 1 g of tranexamic acid during induction and, after reviewing hemostasis, washes the site with a solution of 2 vials of 500 mg tranexamic acid in 10 mL of saline solution.^{27,28}

One criticism of this study is that all patients underwent intact total capsulectomy, even in the lack of surgical indication, such as rupture, grade-III or -IV contracture, large recurrent seromas, or anaplastic large cell lymphoma. No scientific evidence supports that this surgical technique to improve the symptoms of silicone disease or Asia syndrome. Some studies demonstrated the improvement of systemic symptoms associated with breast implants regardless of the capsulectomy type, that is, total intact, total, or partial.^{2,5,29}

Intact total capsulectomy with no surgical indication depends on the surgeon's experience and judgment in each case. This surgery should not increase the risk of postoperative complications. Surgeons with more experience with intact total capsulectomy will naturally decrease surgical time and postoperative complications.

Conclusion

The capsular contracture degree, implant position, and previous breast scarring are significant factors in surgical planning for intact total capsulectomy. The choice of breast repair tactic after this technique depends on aspects such as breast volume and sagging.

The decision-making flowchart for intact total capsulectomy and breast repair can act as a tool for planning and standardizing surgical tactics.

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Clinical Trials

None.

Conflict of Interests

The author has no conflict of interests to declare.

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