



# Assessment of the impact on the care of patients with detaching wounds during the COVID-19 pandemic in a specialized service

## *Avaliação do impacto no atendimento de pacientes com ferimentos descolantes durante a pandemia de COVID-19 em serviço especializado*

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### ■ ABSTRACT

**Introduction:** The COVID-19 pandemic was responsible for increasing social isolation rates, resulting in a reduction in traffic accidents. Trauma, in general, is among the most important public health problems worldwide. This study aims to evaluate the impact of social isolation in the city of São Paulo during the COVID-19 pandemic on the care of patients with detaching wounds. **Methods:** Observational, retrospective and descriptive study. All medical records of patients treated at the Emergency Room of the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo (HCFMUSP), by the Complex Wounds Group of the Plastic Surgery Service, admitted for detaching wounds and undergoing surgical procedures, were reviewed, from April to June of the years 2019 and 2020. **Results:** Twenty patients with detaching injuries on the lower limbs were included. In 2019, 14 patients were seen, with a mean age of 47 years, 7 of which were victims of traffic accidents, 5 of being run over, 1 of crushing and 1 of falling from standing height. In 2020, 6 patients were treated with detaching wounds during the pandemic, with a mean age of 36.16 years, 5 of which were victims of motorcycle accidents and 1 of being run over. No patient had COVID-19. **Conclusion:** During social isolation, there was a numerical reduction in care for detaching trauma during the quarantine period.

**Keywords:** Coronavirus infections; Lower limb; Autografts; Plastic surgery; Traffic-accidents.

### ■ RESUMO

**Introdução:** A pandemia da COVID-19 foi responsável pelo aumento dos índices de isolamento social, resultando na diminuição de acidentes de trânsito. Traumas em geral estão entre os problemas de saúde pública mais importantes em todo o mundo. O objetivo deste trabalho é avaliar o impacto do isolamento social na cidade de São Paulo durante a pandemia da COVID-19 nos atendimentos de pacientes com ferimentos descolantes. **Métodos:** Estudo observacional, retrospectivo e descritivo. Foram revisados todos os prontuários de pacientes atendidos no Pronto Socorro do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HCFMUSP), pelo Grupo de Feridas Complexas do Serviço de Cirurgia Plástica, admitidos por ferimentos descolantes e submetidos a procedimento cirúrgico, no período de abril a junho dos anos de 2019 e 2020. **Resultados:** Foram incluídos 20 pacientes com ferimentos descolantes em membros inferiores. Em 2019, foram atendidos 14 pacientes, com idade média de 47 anos, sendo 7 vítimas de acidente de trânsito, 5 de atropelamento, 1 de esmagamento e 1 de queda da própria altura. Em 2020, durante a pandemia, foram atendidos 6 pacientes com ferimento descolante, com idade média de 36,16 anos, sendo que 5 foram vítimas de acidentes com motocicletas e 1 de atropelamento. Nenhum paciente apresentou COVID-19. **Conclusão:** Durante o isolamento social houve redução numérica nos atendimentos de traumas descolantes no período de quarentena.

**Descritores:** Infecções por coronavírus; Extremidade inferior; Autoenxertos; Cirurgia plástica; Acidentes de trânsito.

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## INTRODUCTION

Coronavirus disease 2019 (COVID-19), has had a worldwide impact, mainly in the health area. First identified in China on December 31, 2019<sup>1</sup>, due to its high transmissibility rate associated with the characteristics of the globalized world, it showed an exponential increase in the number of people and countries affected. On March 11, 2020, with more than 118,000 cases reported in 114 countries and 4291 deaths, the World Health Organization (WHO) declared COVID-19 a pandemic<sup>2</sup>.

The first case of COVID-19 in Brazil was confirmed on February 26, 2020, in the city of São Paulo/SP<sup>3</sup>. Since then, due to the accelerated growth of rates in the state and throughout the country, after 27 days of the index case, the state of São Paulo government has decreed a quarantine period in all 645 municipalities. In this scenario, only essential services in public health, food, supply, security and cleaning remained working, safeguarding the due care and protection measures<sup>4</sup>.

As of March 24, social isolation indices in the city and state of São Paulo remained high (ranging from 46-59%) compared to levels before the pandemic decree (25-28%)<sup>5</sup>. These indices proved a direct relationship with the decrease in the number of traffic accidents, according to a survey by the Respect for Life program of the São Paulo State Government<sup>6</sup>.

Traffic accidents are responsible for about one in four trauma victims. Trauma, in general, is among the most important public health problems worldwide, being the leading cause of death among children and young adults. In addition, they can cause non-fatal, disabling injuries and loss of work capacity<sup>7</sup>. In this context, traumatic wounds have significant relevance in emergency care. They can range from small abrasions to extensive wounds with tissue loss and may or may not be associated with injuries to underlying structures, such as bones or organs<sup>8</sup>.

At the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo (HC-FMUSP), the Complex Wounds Group, linked to the Plastic Surgery Service, is responsible for joint care with trauma surgery for traumatic wounds in the emergency room. They are mainly attended to by patients suffering from complex wounds, with loss of skin coverage, including detaching wounds. These are generally characterized as severe injuries resulting from a tangential force against the skin surface, leading to separating the skin and subcutaneous cellular tissue from deep tissues, such as fascia and muscle. Vascular circulation is usually compromised, as the skin and subcutaneous cellular tissue are tenuously connected<sup>9</sup>. These patients demand simple procedures, such as debridement and skin grafts, to more complex ones, such as local and microsurgical flaps<sup>10</sup>.

## OBJECTIVES

This study aims to evaluate the impact of social isolation in the city of São Paulo during the COVID-19 pandemic in the care of patients with detaching lower limb wounds surgically treated by the Complex Wounds Group of the Plastic Surgery Service of HC-FMUSP, in the initial period of quarantine in 2020, and compare with the attendances in the same period of the previous year.

## METHODS

An observational, retrospective and descriptive study was carried out. All medical records of patients treated in the emergency room of the HC-FMUSP, by the Group of Complex Wounds of the Plastic Surgery Service, who were admitted for detaching wounds and underwent a surgical procedure, in the period from April to June of the years 2019 and 2020.

The following variables were analyzed: epidemiological data, diagnosis, personal history, trauma etiology, injury, location, wound area, MESS (mangled extremity severity score), treatment, length of hospital stay and complications. Data were analyzed using descriptive statistics.

Wound areas were estimated based on scaled photographic records using ImageJ<sup>11</sup> software. The MESS index was used to stratify the severity of injuries to the extremities<sup>12</sup>.

The study was approved by the Research Ethics Committee of the Hospital das Clínicas, Faculty of Medicine, University of São Paulo, under protocol number 35085020.8.0000.0068.

## RESULTS

We included 14 patients victims of detaching wounds in the lower extremities, treated from April to June 2019, and 6 patients in the same period of 2020, represented in Figure 1. The results are summarized in Table 1.

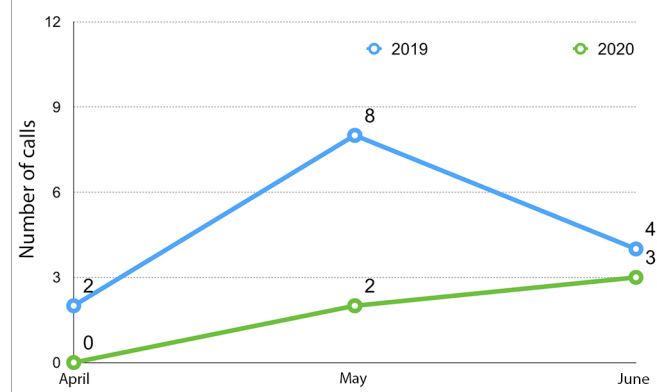


Figure 1. Number of visits to patients with detaching wounds from April to June, in 2019 and 2020.

Concerning 2019, 8 male and 6 female patients were seen, with a mean age of 47 years (minimum 21, maximum 88 years). Regarding the trauma mechanism, 7 were victims of traffic accidents, 5 of being run over; 1 of crushing, and 1 of falling from standing height, with 4 patients having trauma exclusively to the affected limb and 9 were with associated trauma (polytrauma). The location of the trauma was that of the lower limbs in the entire sample. The wounds had a mean area of 260.756 cm<sup>2</sup> (25.335-514.531 cm<sup>2</sup>). The average MESS index was 5.36. Regarding the care of these patients, negative pressure therapy was used in all cases, followed by grafting. Complementary flap coverage was required in 42.86%. The average number of surgeries to resolve the wound was 3, 4 per patient. At follow-up, 9 patients had no complications related to the wound, 1 had partial graft loss, 1 had total graft loss, 1 hematoma and 2 surgical wound dehiscence. There was no record of surgical wound infection. The average length of hospital stay was 30.86 days (minimum 5 and maximum 98 days). Four patients died due to clinical complications (2 due to ischemic stroke, 1 due to massive bronchoaspiration, and 1 due to septic bloodstream shock).

In 2020, during the pandemic, 6 patients were treated with detaching wounds. The mean age was 36.16 years (minimum of 23 and maximum of 60), with 4 males and 2 females. About the trauma mechanism, 5 were victims of motorcycle accidents and 1 of being run over. Polytrauma was present in 2 patients. Lower limbs were affected in all cases. The wounds had a mean area of 428.493cm<sup>2</sup> (54,070-1,005.174cm<sup>2</sup>). The average MESS index was 5.8. Regarding treatment, 5 used negative pressure therapy, 5 underwent skin grafting. Retail was needed in one case. At follow-up, none had complications related to the surgical wound. The average length of stay was 18.33 days (minimum 3 and maximum 33 days), and no patient died. No patient had a clinical manifestation of COVID-19, and 5 collected swabs (PCR) for coronavirus, all negative.

## DISCUSSION

Brazil is one of the countries most affected by the COVID-19 pandemic, and the city of São Paulo is the center with the highest number of cases in the country<sup>3</sup>. Given the new demand for treating patients with the acute respiratory syndrome, it is expected that oncological and urgent surgical procedures are prioritized.

During the first wave of COVID-19, the HC-FMUSP was adapted to meet the high demand of patients with the acute respiratory syndrome. Thus, outpatient activities and elective surgical procedures were reduced. The plastic surgery service started to act mainly in urgent and emergency cases, such as in the care of complex soft tissue trauma.

Detaching wounds have a high prevalence among complex traumatic wounds seen in the emergency room.

In a study previously published by our service, of a total of 178 patients seen between January 2010 and December 2011, 83 (46.6%) had detaching wounds. This type of injury represents a challenge for initial management and treatment. They are usually large, with extensive skin coverage defects, have exposure to deep structures, and are often associated with trauma to other organs<sup>13</sup>.

The care protocol for detaching wounds used in our service initially divides patients into two groups: unstable and stable. The first group includes patients with severe trauma, multiple trauma, requiring multiple transfusions, or presenting hypothermia and hemodynamic instability. In this group, treatment consists of resection of the detached tissue and an occlusive dressing on the extremity (including negative pressure therapy) so that the trauma team can perform the necessary procedures. At the same time, on an auxiliary table, the preparation of the resected piece is carried out for tissue thinning and storage in a tissue bank in the form of a skin graft. After clinical stability (24-72 hours), autogenous skin grafting is performed and preserved in the tissue bank for 14 days. In stable patients, the avulsed flap is initially evaluated. If feasible, after cleaning with pressure saline solution and debridement of the wound bed and flap edges, it is repositioned and sutured. If unfeasible, after cleaning, the tissue is resected and submitted to remove the graft, which will be positioned on the bed and applied to negative pressure therapy<sup>14</sup>.

The group of complex wounds in the plastic surgery service at HC-FMUSP has considerable experience with the care of detaching injuries. As mentioned above, more than 80 cases were treated in 2010 and 2011 in our service<sup>13</sup>. Car accidents and being run over are the main mechanisms of this type of injury. Due to the restriction on the movement of people imposed by the Government of the State of São Paulo during the quarantine, with a consequent reduction in vehicle traffic, a reduction in the incidence of complex soft tissue trauma is expected.

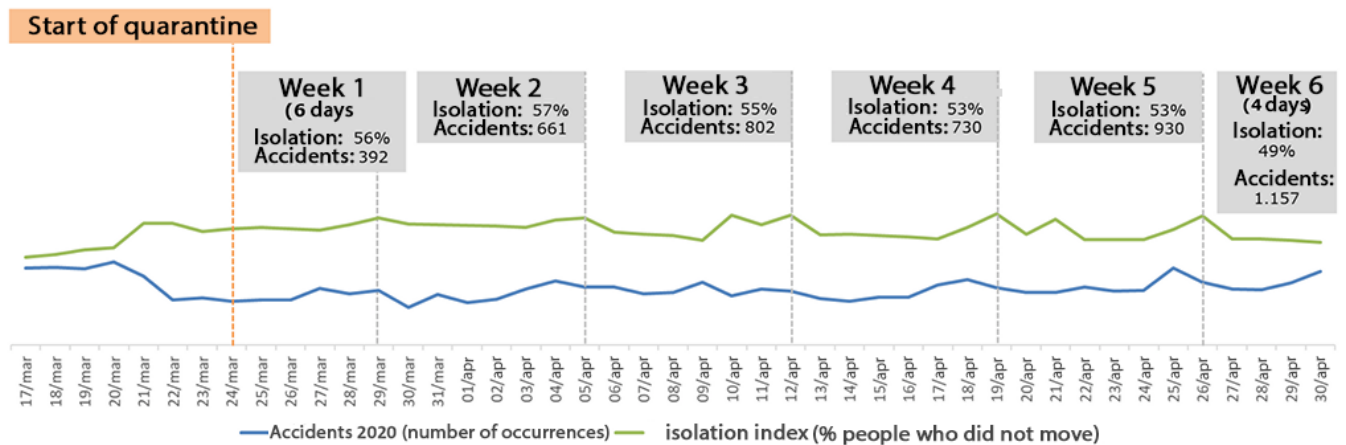
Comparing the analyzed periods, there was a numerical reduction in attendance during the pandemic. According to data from "Infosiga SP" a data system of the Government of the State of São Paulo managed by the "Respeito à Vida" program, the State showed a strong reduction in traffic accidents and fatalities rates. In May 2020, 387 deaths were registered, against 487 in 2019 - a decrease of 20.5%<sup>15</sup>. A survey by the program proved the direct relationship between rates of social isolation and the number of traffic accidents (Figure 2). Statistics from 104 cities between March 24, 2020, beginning of quarantine, and April 30, 2020, accompanied by the "Intelligent Monitoring System," showed a 41% reduction in urban roads and highways occurrences. This represented 6,800 fewer accidents with injured or fatal victims. This reduction helped increase COVID-19's health network

**Table 1.** Results.

Sex	2019		2020	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
Masculine	8	57.14	4	66.67
Feminine	6	42.86	2	33.33
Age				
<20 years old	0	-	0	-
20 - 30 years	4	28.56	3	50.00
30 - 40 years	2	14.29	1	16.67
40 - 50 years	2	14.29	1	16.67
40 - 50 years	2	14.29	1	16.67
>60 years old	4	28.56	0	-
	Average age	47.2 years	Average age	36.2 years
Personal background				
No comorbidities	7	50.00	5	83.33
1 comorbidity	1	7.14	1	16.67
2 comorbidities	2	14.28	-	-
3 or more comorbidities	2	14.28	-	-
Unknown	2	14.28	-	-
Etiology				
Car accident	12	85.72	6	100
Motorcycle x bulkhead	-	-	-	-
Motorcycle x car	3	21.43	1	16.67
Motorcycle x truck	2	14.29	3	50.00
Trampling	6	42.86	1	16.67
Motorcycle crash	-	-	1	16.67
Car x truck	1	7.14	-	-
Crush	1	7.14	-	-
Fall from own height	1	7.14	-	-
Polytrauma				
Yes	9	64.29	2	33.33
No	5	35.71	4	66.67
Location				
Lower limbs	14	100	6	100
Details of surgeries				
VAC	13	92.86	4	100.00
Graft	14	100	4	100.00
Retail	6	42.86	1	25.00
Complications				
Yes	5	35.71	1	16.67
Partial graft loss	1	7.14	0	0
Total graft loss	1	7.14	0	0
Dehiscence	1	7.14	0	0
Bruise	2	14.29	0	0
Others	0	0	1	16.67
No	9	64.29	3	83.34
Deaths	4	28.67	0	0
COVID				
Positive	-	-	0	0
Negative	-	-	6	100
Other information				
	Mínima / Máxima	Média	Mínima / Máxima	Média
Number of surgeries	2 / 6	3.14	2 / 2	2
Length of stay (days)	5 / 98	30.86	3 / 33	16.5
Area (in cm2)	25.335 / 514.531*	260,756*	54,070 / 1,005,174	428.493
MESS index	2 / 9	5.36	2 / 6	5.8

\*Area calculated based on the availability of scaled photographic records (9/14 patients).

## Isolation Index x Traffic Accidents (104 cities of the state)



**Figure 2.** Social isolation index and number of traffic accidents in the State of São Paulo in March and April 2020. (Source: “Programa Respeito à Vida”, Government of the State of São Paulo, May 26, 2020).

service capacity, as traffic accidents demand emergency care and hospital beds, so necessary at the pandemic.<sup>16</sup>

There was a reduction in the mean age of patients treated during the quarantine period compared to pre-pandemic data (47 years versus 36.1 years). In April 2020, data from “Infosiga SP” drew attention to reducing traffic fatalities aged over 60 and children and adolescents aged up to 17 years. There was a 46.5% drop in fatality among the elderly (49 cases this year, against 97 in 2019) and 90% among young people (10 versus 19 victims)<sup>6</sup>. This change is likely related to greater social seclusion among elderly individuals, as this population is more susceptible to complications from the disease. There was also a slight reduction in the incidence of complex limb injuries in women compared to men (4 men: 3 women pre-pandemic; 4 men: 2 women post-pandemic).

There was no change in the location of the lesions. All traumas occurred in the lower limbs, with high severity, when analyzing the mean area of the wounds (>250 cm<sup>2</sup>) and the MESS index (5.36 in 2019 vs. 5.8 in 2020). In 2019, 14.28% of traumas were not associated with car accidents (1 crush injury; 1 fall from standing height). In 2020, on the other hand, all cases were the result of traffic accidents. Still on the etiology, in 2019, 42.85% of traumas involved motorcyclists. Comparatively, in 2020, this number was 83.33%. According to the program analysis above, in May 2020, there was a decrease in fatalities in all categories of means of transport compared to the same period of the previous year (Figure 3), except for motorcyclists. There were 179 fatal accidents in 2020 compared to 167 in 2019 (an increase of 7.2%)<sup>15</sup>. Due to the closing of physical establishments and interruption of face-to-face service, there was a significant increase in the demand for delivery services. Another associated factor

was the greater circulation of inexperienced motorcyclists, newly hired for delivery services.

The treatments for detaching wounds were similar in both periods, according to institutional protocol. In 100% of patients seen in 2020 and 92.86% in 2019, negative pressure therapy was used. All patients also underwent skin grafting to treat the wound (isolated or associated with other techniques). Retail was needed in 6 cases (42.86%) in 2019 and 1 (25.0%) in 2020.

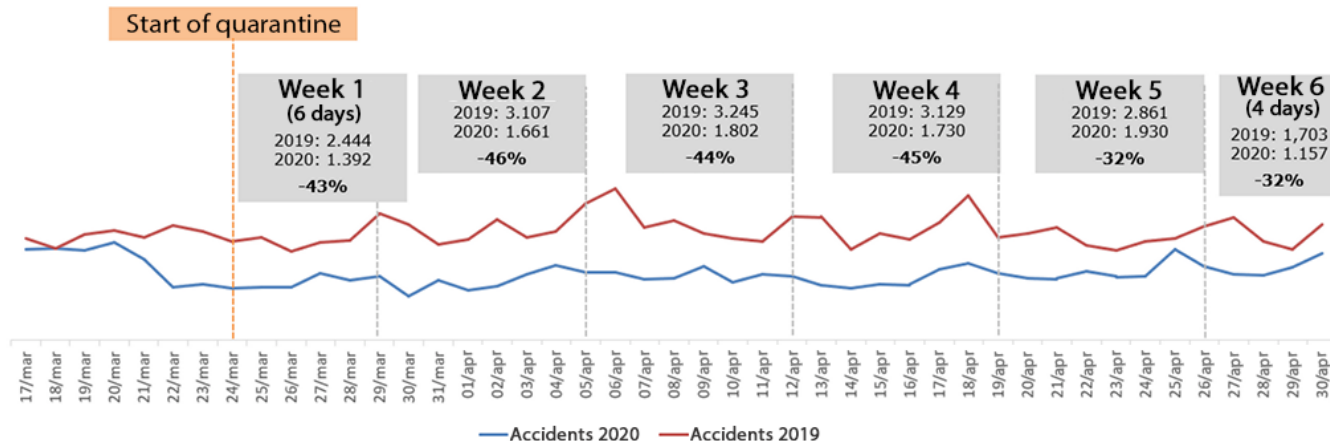
Because of the pandemic scenario, recommendations for the care of surgical patients were instituted. Elective procedures were suspended during the period to prioritize the care of patients with COVID-19. However, emergency approaches cannot be delayed. For proper care, security protocols must be adopted. Upon admission, full face masks are recommended for all patients. Personal protective equipment for respiratory and contact transmission (cap, goggles, N95 mask or similar, face shield, waterproof apron and disposable gloves) must be used by all professionals<sup>17</sup>.

Similar precautions must be maintained in the operating room, considering every patient as potentially infected with the coronavirus. The team should be reduced, keeping only essential collaborators in the room and the necessary materials for the procedure. The approach should be as brief as possible, minimizing the professionals' exposure time to possible contact<sup>17</sup>. The anesthetic act must also adopt new safety measures<sup>18</sup>. In our sample, the care of all patients followed the institutional protocol, although no case of COVID-19 was confirmed during the hospital stay.

An overall rate of surgical-related complications of 35.71% in 2019 and 25% in 2020 was observed. In the



## Accidents during quarantine (104 cities in the state)



**Figure 3.** Traffic accidents in the State of São Paulo in March and April 2019 and 2020 (Source: “Programa Respeito à Vida”, Government of the State of São Paulo, May 26, 2020).

previous year, there was partial graft loss in 1 patient, total graft loss in 1, surgical wound dehiscence in 1 and hematoma in 2. In 2020, there was 1 vascular graft obstruction, resulting in the infeasibility and amputation of the affected limb. In none of the analyzed periods, there was a record of surgical wound infection. The outcomes of the 2019 consultations were 4 (28.57%) deaths and 10 (71.43%) hospital discharges, with an average length of stay of 30.84 days. In 2020, 4 patients were discharged after an average of 16.5 days of hospitalization. Despite the mobilization of HC-FMUSP for the preferential treatment of COVID-19 during the pandemic, severe trauma continued to be referred to the service for specialized assistance, without prejudice to the care of detaching wounds.

### CONCLUSION

During the social isolation enacted due to the COVID-19 pandemic, there was a decrease in car accidents and a numerical reduction in the incidence of detaching injuries. Even so, urgent and emergency care by a group specialized in treating complex wounds remains relevant, always with the adoption of the safety measures recommended in the current scenario.

### COLLABORATIONS

**GMC** Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Methodology, Project Administration, Writing - Original Draft Preparation, Writing - Review & Editing.

**DAM** Conception and design study, Conceptualization, Final manuscript approval, Project Administration, Supervision.

**DNB** Analysis and/or data interpretation, Conceptualization, Data Curation, Writing - Original Draft Preparation.

**RDAR** Analysis and/or data interpretation, Writing - Original Draft Preparation.

**LA** Conception and design study, Project Administration.

**GGRM** Conception and design study, Project Administration.

**RG** Final manuscript approval, Project Administration.

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