

EPIDEMIOLOGY OF VERTEBRAL FRACTURES EVALUATED AT IOT-FMUSP FROM 2019 TO 2022

EPIDEMIOLOGIA DAS FRATURAS VERTEBRAIS AVALIADAS NO IOT-FMUSP DE 2019 A 2022

EPIDEMIOLOGÍA DE FRACTURAS VERTEBRALES EVALUADAS EN IOT-FMUSP DEL 2019 AL 2022

EDELVAN GABANA¹ , MATHEUS TRINDADE BRUXELAS DE FREITAS¹ , RAPHAEL MARTUS MARCON¹ , ALEXANDRE FOGAÇA CRISTANTE¹ ,

TARCÍSIO ELOY PESSOA DE BARROS FILHO¹ 

1. Universidade de São Paulo, Faculty of Medicine, São Paulo, SP, Brazil.

ABSTRACT

Objective: To determine the epidemic profile of patients with spinal fractures referred for evaluation by Spine Group of IOT-HCFMUSP between 2019 and 2022. To enable the effect of the Covid-19 Pandemic on these epidemic profiles. **Methods:** We retrospectively analyzed the medical records of patients with spinal fractures referred by the São Paulo Center for the Regulation of Health Offers and Services (CROSS) to the Spine Group of IOT-HCFMUSP between 2019 and 2022. The epidemiological profile between the pre-pandemic Covid-19 period and the period of the Covid-19 pandemic until December 2022 in the city of São Paulo was compared. **Results:** The medical records of 427 patients were analyzed between March 2019 and December 2022. During the period, males accounted for 71.9% of cases, and the mean age was 46.7 years. Falls from heights were the most frequent trauma mechanism (63.7%), followed by motorcycle accidents (14.3%). The absence of neurological deficit occurred in 76.8% of the cases, and the most injured region was the lumbar region (39.3%). There were changes in the epidemiological profile during the Covid-19 pandemic compared to the pre-pandemic. **Conclusions:** A predominance of middle-aged males was observed, in addition to the trauma mechanism of falling from a height, as well as the absence of a neurological deficit in the initial evaluation. The lumbar and cervical regions were the most frequent sites of injury. The pandemic period interfered with the epidemiological profile presented and in the time interval between the injury and the evaluation at the IOT-HCFMUSP. **Level of Evidence IV; Case Series.**

Keywords: Spinal Injuries; Spinal Cord Trauma; Epidemiology; Spinal Fractures; COVID-19; COVID-19 Pandemic.

RESUMO

Objetivos: Determinar o perfil epidemiológico dos pacientes com fraturas na coluna vertebral encaminhados para avaliação pelo Grupo de Coluna do IOT-HCFMUSP entre 2019 e 2022. Avaliar o efeito da Pandemia de Covid-19 sobre esse perfil epidemiológico. **Métodos:** Foram analisados retrospectivamente os prontuários dos pacientes com fratura na coluna encaminhados pela Central de Regulação de Ofertas e Serviços de Saúde (CROSS) de São Paulo ao Grupo de Coluna do IOT-HCFMUSP entre os anos de 2019 e 2022. Foi comparado o perfil epidemiológico entre o período pré-pandemia Covid-19 e o período de pandemia Covid-19 até dezembro de 2022 na cidade de São Paulo. **Resultados:** Analisou-se o prontuário médico de 427 pacientes entre março de 2019 e dezembro de 2022. No período o sexo masculino correspondeu a 71,9% dos casos, a média da idade foi de 46,7 anos. Queda de altura foi o mecanismo de trauma mais frequente (63,7%), seguido de acidentes de motocicleta (14,3%). A ausência de déficit neurológico ocorreu em 76,8% dos casos, bem como a região mais lesada foi a lombar (39,3%). Houveram mudanças no perfil epidemiológico durante a pandemia de Covid 19 em relação à pré-pandemia. **Conclusões:** Observado predomínio do sexo masculino de meia idade, além do mecanismo de trauma de queda de altura, bem como ausência de déficit neurológico a avaliação inicial. A região lombar e cervical foram os locais mais frequentes de lesão. O período pandêmico interferiu no perfil epidemiológico apresentado e nos intervalos de tempo entre a lesão e a avaliação no IOT-HCFMUSP. **Nível de Evidência IV; Série de Casos.**

Descritores: Traumatismos da Coluna Vertebral; Traumas Medulares; Epidemiologia; Fraturas da Coluna Vertebral; COVID-19; Pandemia por COVID-19.

RESUMEN

Objetivos: Determinar la epidemiología de los pacientes con fracturas vertebrales evaluadas por el Grupo de Columna IOT-HCFMUSP entre 2019 y 2022. Evaluar el efecto de la Pandemia Covid-19 sobre esta epidemiología. **Métodos:** Análisis retrospectivo de historias clínicas de pacientes con fracturas de columna remitidos por el Central de Regulação de Ofertas e Serviços de Saúde (CROSS) de São Paulo al Grupo de Columna IOT-HCFMUSP entre 2019 y 2022. Se comparó el perfil epidemiológico entre el periodo de la pre-pandemia de Covid-19 y el período de pandemia de Covid-19 hasta diciembre de 2022. **Resultados:** Serie de casos de 427 pacientes entre marzo de 2019 y diciembre de 2022. En el período, el sexo masculino representó el 71,9% de los casos, la edad promedio fue de 46,7 años. La caída de altura fue el mecanismo traumático más común (63,7%), seguido de los accidentes de motocicleta (14,3%). La ausencia

Study conducted by the Universidade de São Paulo, Faculty of Medicine, São Paulo, SP, Brazil.

Correspondence: Edelman Gabana. 333, Dr. Ovídio Pires de Campos Street, Cerqueira César, São Paulo, SP, Brazil. 05403-010. edegabana@gmail.com



de déficit neurológico se presentó en el 76,8% de los casos, siendo la región lumbar (39,3%) la región más lesionada. Hubo cambios en el perfil epidemiológico durante la pandemia de Covid-19 con relación a la prepandemia. Conclusiones: Hubo predominio del sexo masculino, caídas de altura como mecanismo traumático y ausencia de déficit neurológico en la evaluación inicial. La región lumbar y cervical fueron los sitios de lesión más frecuentes. El período pandémico interfirió con el perfil epidemiológico presentado y los intervalos de tiempo entre la lesión y la evaluación en el IOT-HCFMUSP.

Descriptor: *Traumatismos Vertebrales; Traumatismos da Medula Espinal; Epidemiologia; Fracturas de la Columna Vertebral; COVID-19; Pandemia de COVID-19.*

INTRODUCTION

The COVID-19 pandemic has been associated with changes in the epidemiological pattern of trauma. In the initial phases, studies indicated a 32.5% decrease in the overall volume of trauma in emergency services,¹ but later, changes were perceived not only in volume but also in the causes of traumatic injuries, diagnoses, and subsequent procedures. In addition, resources were re-adapted due to the significant demand from patients with Severe Acute Respiratory Syndrome infected by Covid-19.

There was an increase in aggressions, bicycle accidents, and off-road vehicle injuries, and a decrease in injuries from motorized vehicles/pedestrians, workplace injuries, and recreational injuries, as people's movements were affected by public policies during the Covid-19 pandemic.²

Among traumatic injuries, spinal cord trauma (SCT) is an important injury to be evaluated. It is a broad term that encompasses different patterns of spinal cord injury resulting from trauma, with varying degrees of symptom severity and neurological dysfunction.

The importance of SCT in trauma is imperative due to the high annual incidence of spinal cord injury (SCI). Literature data from the United States show that the incidence is approximately 54 cases per million population, with approximately 17,000 new cases of SCI each year.³ This number is still underestimated; for example, it is estimated that 10% to 20% of patients with spinal cord injury die before reaching a health unit⁴ and are therefore excluded from any national hospital database. In our country, reliable data on the incidence of SCT and spinal cord injuries are still scarce.

Besides, understanding the epidemiology of spinal cord injuries is paramount since high-cost services and technologies are required for health systems.^{5,6} In addition, there is a significant impact on the quality of life of patients with spinal cord injuries.^{7,8}

The present study aims to determine the epidemiological profile of patients with spinal fractures referred by the Central Regulation of Health Offers and Services (CROSS) of São Paulo to the Spine Group of the IOT-HCFMUSP between 2019 and 2022. Furthermore, it also aims to evaluate the effect of the first two years of the Covid-19 pandemic on this epidemiological profile.

METHODS

Medical records of patients with vertebral fractures referred to the Spine Group of IOT-HCFMUSP between March 2019 and December 2022 were analyzed based on the Central Regulation of Health Services Supply (CROSS) of the Brazilian Unified Health System (SUS) in the city of São Paulo. Patients referred for evaluation who did not have vertebral trauma and those referred without prior scheduling (known as "zero vacancy") were excluded from the study. The epidemiological profile of the analyzed patients was defined from the following variables: age, gender, mechanism of trauma, presence or absence of neurological deficit, Frankel classification of neurological injury, level of anatomical injury, instituted treatment (surgical or conservative), the time interval from injury to patient reception in our service, and the time interval between hospitalization in our service and surgery (in surgical cases).

No specific Informed Consent Form was applied for this project, as it is a retrospective study of medical record analysis. However, the initial project was submitted and approved by the HCFMUSP Ethics Committee (protocol 66512923.5.0000.0068).

The numbers of Covid-19 cases in the city of São Paulo (available

electronically at https://www.prefeitura.sp.gov.br/cidade/secretarias/saude/vigilancia_em_saude/doencas_e_agrivos/coronavirus/index.php?p=310771) presented by the Municipal Health Secretariat of São Paulo were observed to determine the first two years of the Covid-19 pandemic (April 2020 to April 2022), subdivided into two periods: pandemic 1, April 2020 to March 2021; pandemic 2, April 2021 to December 2022. The epidemiological profile analyzed in this study was compared between the pre-Covid-19 pandemic period (March 2019 to March 2020) and the pandemic period (pandemic 1 and 2). Subsequently, the detailed epidemiological profile between pandemic 1 and pandemic 2 was also compared.

Absolute and relative frequencies (percentages) were calculated for qualitative variables. Mean, median, standard deviation, 25th percentile, 75th percentile, minimum, and maximum values were calculated for quantitative variables. Pearson's chi-square test evaluated the association between two qualitative variables or Fisher's exact test (if 25% or more of the expected values were less than 5). The Mann-Whitney test was used to compare two groups, and the Kruskal-Wallis test was used for three groups after evaluating if the data followed a normal distribution with the Kolmogorov-Smirnov test.

The descriptive level used was 5% to reject the null hypothesis. The analyses were performed using the statistical software SPSS for Windows v.25.

RESULTS

From March 2019 to December 2022, 427 patients with some type of trauma were evaluated at IOT-HCFMUSP. Most patients were male (71.9%), with a mean age of 46.7 years, ranging from 9 to 95. The main mechanism of trauma was fall from height (63.7%), followed by motorcycle accidents (14.3%) and car accidents (8.9%). Of the patients treated, 39.3% had injuries in the lumbar region and 37.2% in the cervical region. Some neurological deficit was found in 23.2% of patients. In the Frankel evaluation for neurological status, categories D and E were the most frequent (11% and 76.6%, respectively). Conservative treatment was indicated in 69.1% of cases. The complete description of these data and the analyzed follow-up times is shown in Table 1.

Table 2 summarizes the epidemiological profile found by comparing the pre-pandemic period and during the Covid-19 pandemic (April 2020 to December 2022).

The analysis of epidemiological data of evaluated patients considered different moments of the Covid-19 pandemic to subdivide the pandemic period into two periods: pandemic 1 (April 2020 to March 2021) and pandemic 2 (April 2021 to December 2022). The results found for these periods are described in Table 3 below.

The graphical analysis of the frequencies of trauma mechanisms and injury locations according to the period of care divided as pre-pandemic, pandemic 1, and pandemic 2 are represented in Figures 1 and 2 below. In the pandemic period (pandemic 1 + pandemic 2), 65% of trauma mechanisms were related to falls from height, and 11.8% were related to motorcycle accidents. In contrast, these mechanisms were responsible for 60.3% and 20.7% of cases in the pre-pandemic period.

The analysis of the time interval between the injury and admission was assessed in the pre-pandemic period, Pandemic 1 and Pandemic 2, and is visually depicted in Figure 3 below. The time interval between admission and surgery during these periods was also evaluated in Figure 4. There was no significant difference in the

Table 1. Characteristics of patients with trauma evaluated by the Spine Group of IOT-HCFMUSP, 2019-2022.

Characteristics	n = 427	n (%)	
Sex	Male	307 (71.9)	
	Female	120 (28.1)	
Age (Years)	Mean(SD)		46.7 (18.4)
	Median (P25-P75)		47 (32-60)
	Minimum and Maximum		9-95
Mechanism of trauma	Falls from heights	272 (63.7)	
	Motorcycle accidents	61 (14.3)	
	Car accidents	38 (8.9)	
	Bicycle accidents	9 (2.1)	
	Firearm injuries	9 (2.1)	
	Shallow water diving	9 (2.1)	
	Pedestrian accidents	14 (3.3)	
	Direct trauma	15 (3.5)	
Region injured	Lumbar	168 (39.3)	
	Cervical	159 (37.2)	
	Thoracic	70 (16.4)	
	Cervical and Thoracic	14 (3.3)	
	Thoracic and Lumbar	13 (3.0)	
	Sacral	2 (0.5)	
Neurological deficits	No	328 (76.8)	
	Present	99 (23.2)	
Frankel score	A	23 (5.4)	
	B	6 (1.4)	
	C	24 (5.6)	
	D	47 (11.0)	
	E	327 (76.6)	
Treatment instituted	Conservatively	295 (69.1)	
	Surgically	132 (30.9)	
Time interval between injury and admission to IOT-HCFMUSP (days)	Mean(SD)		29.8 (31.2)
	Median (P25-P75)		20 (10-40)
	Minimum and Maximum		0-300
Time interval between admission and surgery (days)	Mean(SD)		8.0 (6.6)
	Median (P25-P75)		6 (4-9)
	Minimum and Maximum		1-44

DP: Standard deviation; P25: 25 percentile; P75: 75 percentile.

admission or surgery time based on the confidence interval within these periods.

The graphical analysis of the treatment choices divided as pre-pandemic, pandemic 1, and pandemic 2 are represented in Figure 5 below. In the pre-pandemic period, 74.5% of the injuries were conservatively treated; on the other hand, there was an increase in the choice of surgical treatment in the first epidemic year, accounting for 40.5% of the injuries. During the Pandemic 2 period, the percentage of conservative treatment was at 30.2%.

DISCUSSION

The cases evaluated by the spine group of IOT-HCFMUSP come mostly from hospitals located in the West and South zones of the city of São Paulo, as well as extended metropolitan areas of these regions. The scheduling of cases is organized by the Central Regulation of Health Service Offer (CROSS) of the Unified Health System (SUS) of the city of São Paulo, which follows SUS guidelines. Due to the allocation of resources to attend to Covid-19 patients during the pandemic, surgeries and outpatient visits were suspended in various health services, especially during the first year of the pandemic. This fact may have influenced the differences found in the calculated time intervals in this study. The time interval between the lesion and admission to IOT-HCFMUSP before the pandemic was

Table 2. Profile of trauma patients treated during pre-pandemic and COVID-19 pandemic periods, Institute of Orthopedics and Traumatology, 2019-2022.

Characteristics	n = 427	Pre-pandemic n = 121, n (%)	Pandemic n = 306, n (%)	p Value
Sex	Male	87 (71.9)	220 (71.9)	0.999 ¹
	Female	34 (28.1)	86 (28.1)	
Age (Years)	Mean(SD)	45.0 (19.9)	47.4 (17.7)	0.158 ³
	Median (P25-P75)	45 (29-61)	48 (34-60)	
Mechanism of trauma	Falls from heights	73 (60.3)	199 (65.0)	0.009 ²
	Motorcycle accidents	25 (20.7)	36 (11.8)	
	Car accidents	6 (5.0)	32 (10.5)	
	Bicycle accidents	0	9 (2.9)	
	Firearm injuries	6 (5.0)	3 (1.0)	
	Shallow water diving	2 (1.7)	7 (2.3)	
	Pedestrian accidents	5 (4.1)	9 (2.9)	
	Direct trauma	4 (3.3)	11 (3.6)	
Region injured	Lumbar	48 (39.7)	120 (39.2)	0.261 ²
	Cervical	40 (33.1)	119 (38.9)	
	Thoracic	19 (15.7)	51 (16.7)	
	Cervical and Thoracic	7 (5.8)	7 (2.3)	
	Thoracic and Lumbar	6 (5.0)	7 (2.3)	
	Sacral	1 (0.8)	1 (0.3)	
	Cervical, Thoracic, and lumbar	0	1 (0.3)	
Neurological deficits	No	92 (76.0)	236 (77.1)	0.810 ¹
	Present	39 (24.0)	70 (22.9)	
Frankel score	A	10 (8.3)	13 (4.2)	0.149 ¹
	B	1 (0.8)	5 (1.6)	
	C	3 (2.5)	21 (6.9)	
	D	16 (13.2)	31 (10.1)	
	E	91 (75.2)	236 (77.1)	
Treatment instituted	Conservatively	90 (74.4)	205 (67.0)	0.137 ¹
	Surgically	31 (25.6)	101 (33.0)	
Time interval between injury and admission to IOT-HCFMUSP (days)	Mean(SD)	40.5 (37.3)	25.5 (27.4)	<0.001 ³
	Median (P25-P75)	35 (18-51)	17 (9-30)	
	Minimum and Maximum			
Time interval between admission and surgery (days)	Mean(SD)	8.3 (4.8)	7.9 (7.0)	0.182 ³
	Median (P25-P75)	7 (5-10)	6 (4-9)	

DP: Standard deviation; P25: 25 percentile; P75: 75 percentile. ¹ Pearson's chi-squared test; ² Fisher's exact test; ³ The Mann-Whitney test.

longer than during the pandemic period (40.5 days vs. 25.5 days, respectively), observing statistically significant differences between the distributions of these time intervals according to the period of attendance (p<0.001).

In addition, we know that the severity (in number of deaths) of Covid-19 cases changed the pandemic, so health policies and people's circulation were also affected differently over time. Thus, a detailed analysis of the epidemiology of spinal fracture cases is justified, dividing the Covid-19 pandemic period into two: the first year of the pandemic (pandemic 1) and subsequent periods (pandemic 2).

Statistical analysis showed that in the Pandemic 2 period, there was an increase in cases due to falls from heights and a decrease in motorcycle accidents compared to other periods (pre-pandemic and pandemic 1). This relationship was statistically significant (p=0.007). The change in the trauma mechanism may arise from the policies adopted for the circulation of people during

Table 3. Profile of patients treated for trauma according to the pre-pandemic period and during the Covid-19 pandemic (two periods), Institute of Orthopedics and Traumatology, 2019-2022.

Characteristics	n = 429	Pre-pandemic n = 121, n (%)	Pandemic 1 n = 84, n (%)	Pandemic 2 n = 222, n (%)	p Value
Sex	Male	87 (71.9)	67 (79.8)	153 (68.9)	0.170 ¹
	Female	34 (28.1)	17 (20.2)	69 (31.1)	
Age (Years)	Mean(SD)	45.0 (19.9)	45.0 (17.9)	48.3 (17.5)	0.133 ³
	Median (P25-P75)	45 (29-61)	45 (28-59)	48 (35-60)	
Mechanism of trauma	Falls from heights	73 (60.3)	50 (58.8)	149 (67.1)	0.007 ²
	Motorcycle accidents	25 (20.7)	14 (16.7)	22 (9.9)	
	Car accidents	6 (5.0)	8 (9.5)	24 (10.8)	
	Bicycle accidents	0	1 (1.2)	8 (3.6)	
	Firearm injuries	6 (5.0)	1 (1.2)	2 (0.9)	
	Shallow water diving	2 (1.7)	5 (6.0)	2 (0.9)	
	Pedestrian accidents	5 (4.1)	2 (2.4)	7 (3.2)	
	Direct trauma	4 (3.3)	3 (3.6)	8 (3.6)	
	Cervical, thoracic, and lumbar	0	0	1 (0.5)	
Region injured	Lumbar	48 (39.7)	31 (36.9)	89 (40.1)	0.636 ²
	Cervical	40 (33.1)	36 (42.9)	83 (37.4)	
	Thoracic	19 (15.7)	13 (15.5)	38 (17.1)	
	Cervical and Thoracic	7 (5.8)	1 (1.2)	6 (2.7)	
	Thoracic and Lumbar	6 (5.0)	3 (3.6)	4 (1.8)	
	Sacral	1 (0.8)	0	1 (0.5)	
Neurological deficits	No	92 (76.0)	64 (76.2)	172 (77.5)	0.944 ¹
	Present	39 (24.0)	20 (23.8)	50 (22.5)	
Frankel score	A	10 (8.3)	4 (4.8)	9 (4.1)	0.067 ²
	B	1 (0.8)	4 (4.8)	1 (0.5)	
	C	3 (2.5)	6 (7.1)	15 (6.8)	
	D	16 (13.2)	6 (7.1)	25 (11.3)	
	E	91 (75.2)	64 (76.2)	172 (77.5)	
Treatment instituted	Conservatively	90 (74.4)	50 (59.5)	155 (69.8)	0.073 ¹
	Surgically	31 (25.6)	34 (40.5)	67 (30.2)	
Time interval between injury and admission to IOT-HCFMUSP (days)	Mean(SD)	40.5 (37.3)	19.0 (21.0)	28.0 (29.1)	<0.001 ³
	Median (P25-P75)	35 (18-51)	12 (6-23)	18 (11-32)	
Time interval between admission and surgery (days)	Mean(SD)	8.3 (4.8)	6.7 (6.3)	8.5 (7.4)	0.094 ³
	Median (P25-P75)	7 (5-10)	5 (4-7)	6 (4-9)	

DP: Standard deviation; P25: 25 percentile; P75: 75 percentile; ¹ Pearson's chi-squared test; ² Fisher's exact test; ³ The Kruskal-Wallis test

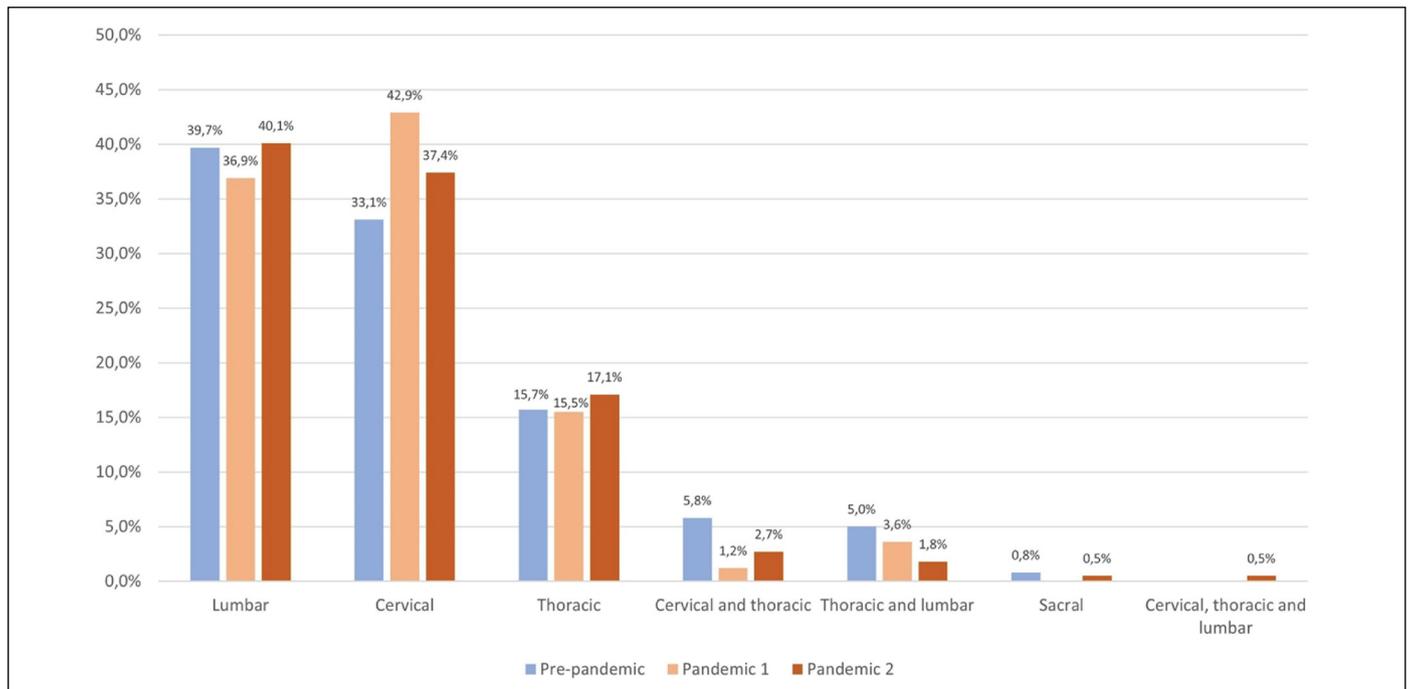


Figure 1. Location of the lesions according to the year of admission, IOT-HCFMUSP, 2019-2022.

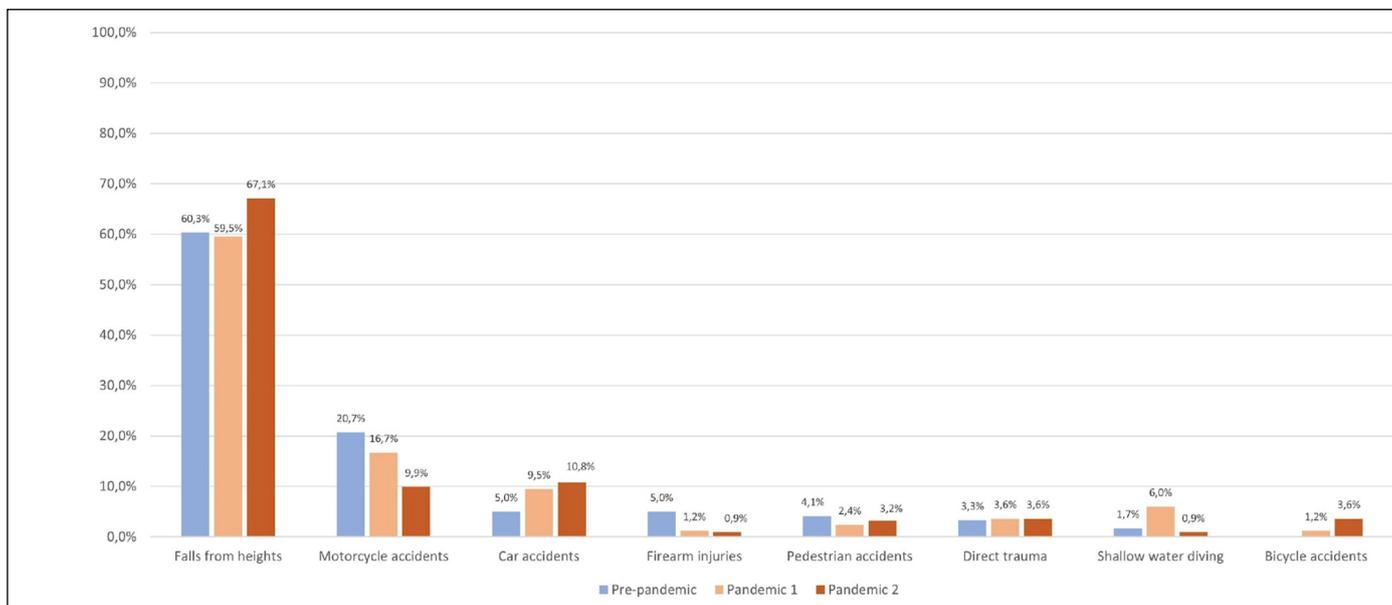


Figure 2. Trauma mechanisms by year of admission, IOT-HCFMUSP, 2019-2022.

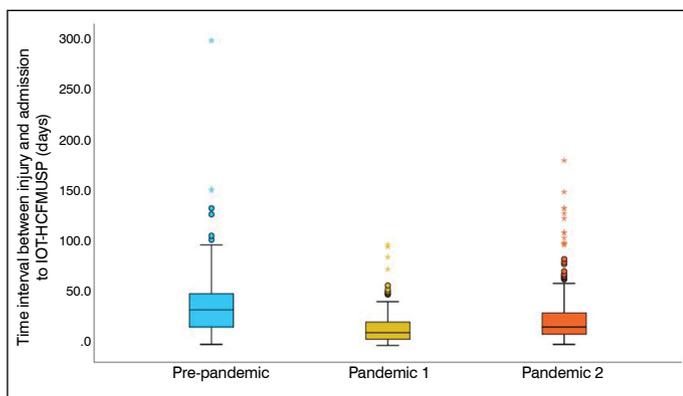


Figure 3. Distribution of the time interval between the lesion and admission to IOT-HCFMUSP, 2019-2022.

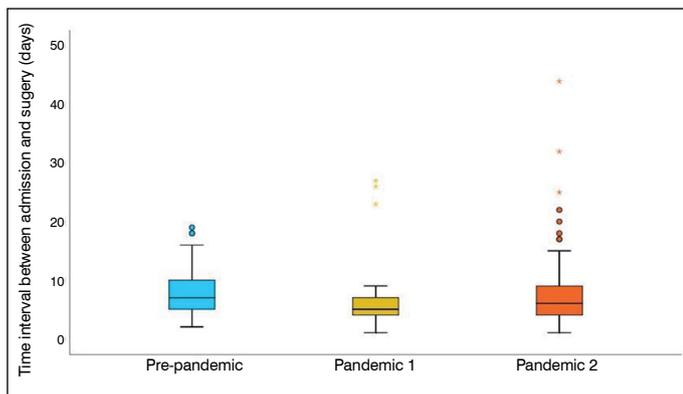


Figure 4. Distribution of the time interval between admission to IOT-HCFMUSP and surgery, 2019-2022.

the Covid-19 pandemic. The importance of falling from heights concerning others should also be considered, especially in motorcycle accidents, which was initially expected to be the most relevant among the mechanisms.

Regarding the trauma mechanism of falling from heights, it should be noted that different levels of height were considered, ranging from a few cases of falls from their height to falls from great heights (such as in cases of attempted suicide). For this mechanism,

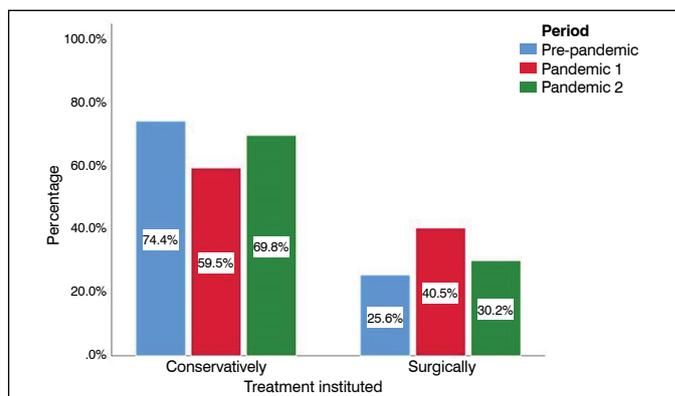


Figure 5. Treatment option for patients treated in the service according to the period, Institute of Orthopedics and Traumatology, 2019-2022.

the most frequent among the evaluated patients was the fall from medium height (roofs, high places between 3 and 5 meters).

In addition to the trauma mechanism, we can observe that the time interval between the lesion and evaluation at IOT-HCFMUSP changed throughout the analyzed periods. In the pandemic 1 period (the first year), there was a shorter interval than the other periods. This association was also statistically significant ($p < 0.001$). Other factors may have directly interfered with the time intervals calculated in this work:

a. The time interval from injury to patient admission to our service:

It should be noted that by institutional rule, one case is scheduled daily from Monday to Thursday, so there is generally a formation of a waiting list. Some patients with severe and acute cases were referred without prior scheduling (known as “zero vacancy”) and are not part of this study.

Patients referred for evaluation should be hemodynamically stable and clinically able to be transferred. Thus, some patients with multiple traumatic injuries were referred for evaluation with a longer injury time.

During the Covid-19 pandemic, initially, the institution required that the patient at admission present a recent negative Covid-19 test since the State Health Department designated the IOT-HCFMUSP during the pandemic as a hospital for patients who did not have this pathology within the hospital complex of HCFMUSP.

b. The time interval between admission to our service and surgery (in surgical cases):

The cases included in this study, upon admission to IOT-HCF-MUSP, entered the surgical waiting list along with other cases that were admitted through other means (such as cases that arrive directly at the HC-FMUSP emergency department and internal referrals between institutes at HCFMUSP).

During the Covid-19 pandemic, especially in the early months, there was a significant reduction in the availability of surgical rooms to allocate technical and human resources necessary for the full care of patients with Covid-19.

Some patients admitted for surgical treatment were not clinically ready for surgery, requiring prior correction or stabilization before subsequent surgery.

It should be noted that this work has some limitations, including in the selection of patients, there was a loss of follow-up due to incomplete data from some patients; the analysis of medical records is based on the information described therein, and there may be small differences in notation; the assessment of neurological deficits consisted of the first physical examination performed in our institution, and was not carried out by the same evaluator throughout the entire study period.

CONCLUSION

The epidemiological evaluation of spinal trauma cases is of utmost importance for the adoption of public health policies, from prevention to patient rehabilitation. This study presented in detail the spinal trauma cases evaluated by the Spine Group of IOT-HCFMUSP during the pre-Covid-19 period and the first years of this pandemic. There was a predominance of middle-aged males, with the mechanism of trauma related to falls from heights, as well as the absence of neurological deficits in the initial assessment. The lumbar and cervical regions were the most frequent sites of injury. It was also observed that the pandemic period interfered with the epidemiological profile presented and the time interval between injury and evaluation at our institution. Thus, we conclude that the Covid-19 pandemic influenced part of the epidemiological profile of fractures evaluated in this study. Further studies are necessary to determine the influence of Covid-19 on spinal trauma with clarity.

All authors declare no potential conflict of interest related to this article.

CONTRIBUTIONS OF THE AUTHORS: Each author made significant individual contributions to this manuscript. Description of individual contributions: EG: data collection, analysis, and interpretation; article writing. MTBF: data collection, analysis, and interpretation; article writing. RMM: article revision and intellectual conception. AFC: article revision and intellectual conception. TEPBF: article revision and intellectual conception.

REFERENCES

1. Berg GM, Wyse RJ, Morse JL, Chipko J, Garland J, Slivinski A, et al. Decreased adult trauma admission volumes and changing injury patterns during the COVID-19 pandemic at 85 trauma centers in a multistate healthcare system. 2021;6(1):e000642. doi:10.1136/tsaco-2020-000642.
2. Salottolo K, Caiafa R, Mueller J, Tanner A, Carrick MM, Lieser M, et al. Multicenter study of US trauma centers examining the effect of the COVID-19 pandemic on injury causes, diagnoses, and procedures. *Trauma Surg Acute Care Open*. 2021;6(1):e000655. doi:10.1136/tsaco-2020-000655.
3. Spinal Cord Injury (SCI) 2016 Facts and Figures at a Glance. *J Spinal Cord Med*. 2016;39(4):493-4. doi:10.1080/10790268.2016.1210925.
4. Thurman DJ, Burnett CL, Jeppson L, Beaudoin DE, Sniezek JE. Surveillance of spinal cord injuries in Utah, USA. *Paraplegia*. 1994;32(10):665-9. doi:10.1038/sc.1994.107.
5. Sikka S, Callender L, Driver S, Bennett M, Reynolds M, Hamilton R, et al. Healthcare utilization following spinal cord injury: Objective findings from a regional hospital registry. *J Spinal Cord Med*. 2019;42(2):194-200. doi:10.1080/10790268.2018.1505330.
6. Post MWM, van Leeuwen CMC. Psychosocial issues in spinal cord injury: a review. *Spinal Cord*. 2012;50(5):382-9. doi:10.1038/sc.2011.182.
7. Alexander CJ, Sipski ML, Findley TW. Sexual activities, desire, and satisfaction in males pre- and post-spinal cord injury. *Arch Sex Behav*. 1993;22(3):217-28.
8. Bombardier CH, Rimmele CT. Alcohol use and readiness to change after spinal cord injury. *Arch Phys Med Rehabil*. 1998;79(9):1110-5.