# Traumatic versus Non-Traumatic Spinal Cord Injury: Complications and Functional Outcomes in an Acute Inpatient Rehabilitation Hospital

Lesão Medular Traumática versus Não Traumática: Complicações e Resultados Funcionais num Hospital de Reabilitação de Doentes Internados Agudos

Patrícia Pereira<sup>(1)</sup> | Sónia Tizón<sup>(1)</sup> | Sara Freixo<sup>(1)</sup> | Sofia Ribeiro<sup>(1)</sup> | Gabi Almeida<sup>(1)</sup> | João Sousa<sup>(1)</sup>

### Abstract

**Introduction:** This retrospective cohort study aimed to compare demographic differences, functional outcomes, duration of stay (DOS), and complication profiles between patients with traumatic (TSCI) and non-traumatic (NTSCI) spinal cord injuries in an acute inpatient rehabilitation service.

**Methods:** This study included 128 spinal cord injury patients, 68 with traumatic and 60 with nontraumatic lesions, admitted to the Physical Medicine and Rehabilitation service of Hospital de Braga between January 2017 and December 2022. Parameters included demographics, injury causes, neurological levels, ASIA impairment scales, functional scores (FIM and SCIM), DOS, complications, discharge destination, bladder management, and ambulation level.

**Results:** NTSCI patients were older (mean 64 vs 59 years, p=0.074) and predominantly female (45% vs 16.2%, p=0.000). TSCI was primarily caused by falls (66.2%), while NTSCI stemmed from degenerative diseases (50%). TSCI patients had significantly longer DOS (mean 65.07 vs 45.78 days, p=0.021) and were admitted later post-injury (mean 51.61 vs 26.77 days, p=0.001). NTSCI patients had more paraplegia (61.7%) and incomplete injuries, while TSCI showed higher rates of tetraplegia (72.1%) and complete injuries (AIS A, 27.7% vs 7.3%, p=0.010). TSCI patients experienced more complications (mean 2.0 vs 1.4 per patient), including higher rates of pressure ulcers and

depressive symptoms (p<0.05). Functional outcomes at discharge (FIM and SCIM scores) were lower in TSCI but demonstrated significant intra-group improvements, with no intergroup differences in functional gains. NTSCI patients were more likely to be discharged home, walk with assistive devices, and manage bladder function, while TSCI patients frequently required wheelchairs and indwelling catheters.

**Conclusion:** NTSCI patients were older, hospitalized earlier, had shorter rehabilitation DOS, fewer complications, and better functional status at admission than TSCI patients. Despite more severe impairments, TSCI patients achieved comparable functional gains during rehabilitation, emphasizing the need for tailored management strategies to address their higher complication rates and disability levels.

**Keywords:** Inpatients; Physical Therapy Department, Hospital; Recovery of Function; Rehabilitation Centers; Spinal Cord Injuries/rehabilitation.

## Resumo

**Introdução:** Este estudo tem como objetivo comparar as complicações e resultados funcionais entre pacientes com lesões traumáticas e pacientes com lesões medulares não traumáticas, num serviço de reabilitação hospitalar de agudas.

**Métodos:** Foi realizada uma análise retrospectiva que incluiu 128 pacientes com lesões medulares, 68 com lesões

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<sup>(1)</sup> Serviço de Medicina Física e de Reabilitação, Unidade Local de Saúde (ULS) de Braga, Braga, Portugal.

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Autor Correspondente/Corresponding Author: Patrícia Pereira. email: cpatriciadiaspereira@gmail.com. Unidade Local de Saúde (ULS) de Braga, R. das Sete Fontes, 4710-243 Braga.

traumáticas e 60 com lesões não traumáticas, internados no serviço de Medicina Física e de Reabilitação do Hospital de Braga, entre janeiro de 2017 e dezembro de 2022.

**Resultados:** Este estudo demonstrou que a lesão medular traumática está significativamente mais associada à tetraplegia e lesões medulares completas (ASIA A). Além disso, os pacientes com lesão medular traumática apresentam significativamente duração de internação superior (p = 0,021), maior prevalência de sintomas depressivos (p = 0,043), úlceras de pressão (p = 0,003) e episódios de disreflexia autonômica (p = 0,044), em comparação com o grupo não traumático. A comparação intragrupo demonstrou ainda que ambos os grupos apresentam melhorias funcionais significativas na escala MIF e SCIM à dados de alta em relação à entrada no serviço, no entanto, os ganhos funcionais não foram significativamente diferentes entre os dois grupos de lesão.

**Conclusão:** Ambos os grupos de pacientes obtiveram ganhos e por isso se beneficiaram do programa de reabilitação em regime de internamento no Hospital de Agudos. Contudo, com uma duração média de internamento e uma taxa de complicações elevadas em ambos os grupos, deve ter-se em consideração a necessidade de cuidados hospitalares adequados.

*Palavras-chave*: Centros de Reabilitação; Doentes Internados; Lesões da Medula Espinhal/reabilitação; Recuperação da Função; Serviço de Medicina Física e de Reabilitação.

# Introduction

Spinal cord injury is a severe condition that has a significant impact on a patient's functionality and quality of life. These injuries can have a traumatic etiology, such as road accidents, falls, or occupational accidents, or non-traumatic causes, including degenerative diseases, acute spinal cord ischemia, primary or metastatic tumors, inflammatory, or infectious diseases.

Existing literature reveals that the percentage of complications in patients with spinal cord injury from any cause during inpatient rehabilitation is higher than that in other classes of patients.<sup>1</sup> The main complications described include urinary tract infections, respiratory complications such as pneumonia, pressure ulcers, sleep disorders, depressive symptoms, and pain.<sup>1</sup> Such complications can occur in both traumatic and non-traumatic spinal cord injury patients, adding morbidity, impairing functional outcomes, and increasing the length of hospital stay.

The effect of a rehabilitation program on traumatic spinal cord injuries has been well studied, with multiple studies on functional outcomes and complications during

hospitalization. On the other hand, the functional outcomes of non-traumatic spinal cord injuries have not been widely studied, with few studies comparing the two patient groups.

This study aimed to analyze the demographic results of the two patient groups and compare the functional outcomes and complications during hospitalization in acute inpatient Physical Medicine and Rehabilitation (PMR) service. Thus, we aimed to evaluate the demographic differences and similarities between the two groups and determine whether the etiology of spinal cord injury is a predictive factor for functional gains, length of hospital stay, or occurrence of complications.

# Methods

In this retrospective analysis, records from patients with traumatic and non-traumatic spinal cord injuries (SCI) who were hospitalized in the Hospital de Braga acute inpatient PMR unit for six years (January 2017 to December 2022) were examined. The study did not include patients who were readmitted for treating late complications, rather than a recent-onset SCI, or confined for less than seven days. During this period, 128 new spinal cord injury patients were admitted to our department, of which 68 were traumatic injuries (TSCI), and 60 were non-traumatic injuries (NTSCI). Their demographic profile, lesion cause, level of lesion (classified as tetraplegia when cervical C1-C7 neurological level or paraplegia in case of below cervical D1-S5 neurological injury level) and ASIA impairment scale scores at discharge were compared and analyzed. Complications such as depressive symptoms, pressure ulcers, sleep disorders, venous thromboembolism, pneumonia, urinary tract infection, autonomic dysreflexia, neuropathic pain, and nociceptive pain were also compared between the groups. Functional scales such as the SCIM (Spinal Cord Independence Measure) and FIM (Functional Independence Measure) at admission and discharge were compared. The duration of stay (DOS) in both groups, discharge destination, bladder management, and level of ambulation were also compared and analyzed. This study has the approval of the Hospital de Braga ethical committee.

Statistical Package for the Social Sciences (SPSS), version 26 was used to conduct the analysis. Age, DOS, number of complications, SCIM, and FIM are continuous variables tested using the Mann-Whitney U test. Other demographic features, including gender, complications, lesion level, ASIA scale, discharge destination, bladder management, and ambulation level, were compared between the two groups using the chi-square test. Within-group parametric variables, including the FIM and SCIM scales, were compared using the Wilcoxon test. The following independent variables were considered for the regression models (dependent variable

DOS): pressure ulcer, ASIA impairment scale at discharge, and FIM and SCIM at admission. At a 95% confidence level, a p-value of  $\leq$ 0.05 was deemed significant.

# Results

The medical records of 128 patients were reviewed: 68 (53%) patients with traumatic SCI and 60 (47%) patients with non-traumatic SCI. Nonetheless, it should be considered that some data on the ASIA scale were missing in 21 patients, of which 18 in the non-traumatic group.

Demographic characteristics of traumatic and non-traumatic spinal cord injury patients are shown in Table 1. In the traumatic spinal cord injury group, 57 (83.8%) patients were male, and 11 (16.2%) were female.

In the non-traumatic group, 33 (55%) patients were male, and 27 (45%) were female. There was a significant gender difference (p = 0.000) between groups, with significantly more males in the traumatic SCI group. The mean and median ages of traumatic and non-traumatic SCI patients were 59 ± 14.83 (median 61) and 64 ± 14.22 (median 68) years, respectively. No statistically significant difference was observed between the two groups based on age (p = 0.074).

Causes of injury in patients with traumatic SCI included 45 falls (66.2%), 20 motor vehicle accidents (29.4%), and 3 occupational accidents (4.4%). In patients with non-traumatic spinal cord injury, the cause of injury was degenerative diseases in 30 patients (50%), 15 (25%) inflammatory diseases, 6 (10%) tumors (1 metastatic lesion and five primary tumors), 3 (5%) infectious diseases, 3 (5%)

of vascular origin, and 3 (5%) of iatrogenic injury (in context of post-surgery medullar hematoma).

The traumatic and non-traumatic SCI groups' lengths of stay in the rehabilitation unit were contrasted (Table 1). In the traumatic group, the mean DOS was 65.07 (12-275) days, while in the non-traumatic group, it was 45.78 (6-123) days. This difference was found to be statistically significant (p=0.021). The patients were admitted at our PMR service 51.61 days after injury in the traumatic group and 26.77 days after non-traumatic injury (p=0.001).

The non-traumatic group had significantly more paraplegic patients 37 (61.7%), and the traumatic group had significantly more tetraplegic patients (49,72.1%) based on neurological levels (p=0.000). In the traumatic group, the percentage of patients with a complete injury (AIS A) was 27.7%, whereas in the non-traumatic group, it was 7.3%. This difference between the two groups was statistically significant (p=0.010).

Of the patients, 118 (92.2%) experienced at least one complication during rehabilitation (Table 2), 65 patients (95.6%) were in the traumatic group versus 53 (88.3%) in the non-traumatic. The traumatic group has, on average 2 complications per patient and the non-traumatic group demonstrated 1.4 complications per patient. Urinary tract infection was the most common complication in both the traumatic and non-traumatic groups (95.6 and 88.3%, respectively). Neuropathic pain (33.8% and 23.3%, respectively) and nociceptive pain (33.8% and 31.7%, respectively) were the second and third most common complications, though there was no statistically significant difference between the groups. The traumatic group

	TSCI (n=68)	NTSCI (n=60)	
Sex (male)	57 (83.8%)	33 (55%)	X <sup>2</sup> = 12.686 <sup>a</sup> ; <i>p</i> =0.000 <sup>*</sup> ; OR 4.240
Sex (female)	11 (16.2%)	27 (45%)	X <sup>2</sup> = 12.686 <sup>a</sup> ; <i>p</i> =0.000 <sup>*</sup> ; OR 0.236
Age (mean)	59±14.83	64±14.22	U=1666.5 <sup>b</sup> ; <i>p</i> =0.074
Duration of stay (days)	65,07 (12-275)	45,78 (6-123)	U= 2524.5 <sup>b</sup> ; <i>p</i> =0.021 <sup>*</sup>
Time after injury at admission in PMR service (days)	51,61 (4 -370)	26,77 (3-145)	U= 2672.5 <sup>b</sup> ; <i>p</i> =0.001*
Level of SCI			
Tetraplegia (C1-C7)	49 (72.1%)	23 (38.3%)	X <sup>2</sup> = 14.732 °; <i>p</i> =0.000 <sup>*</sup> ; OR 4.149
Paraplegia (D1-S5)	19 (27.9%)	37 (61.7%)	X <sup>2</sup> = 14.732 °; <i>p</i> =0.000 <sup>°</sup> ; OR 0.241
Complete lesion (AIS A)	18/65 (27.7%)	3/41 (7.3%)	X <sup>2</sup> = 10.714 <sup>a</sup> ; <i>p</i> =0.010 <sup>*</sup> ; OR 6.840

 Table 1 - Demographic characteristics.

\*p<0.05; a Chi- square test; b Mann–Whitney U test

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	2		
	TSCI (n=68)	NTSCI (n=60)	
Number of patients with ≥1 complication	65 (95.6%)	53 (88.3%)	X <sup>2</sup> = 2.329 <sup>a</sup> ; <i>p</i> =0.127
Number of complications (mean per patient)	2,06 (0-8)	1,48 (0-5)	U= 2580 <sup>b</sup> ; p=0.007 <sup>*</sup>
Urinary tract infection	53 (77.9%)	42 (70%)	X <sup>2</sup> = 1.051 <sup>a</sup> ; <i>p</i> =0.305
Pressure ulcers	14 (20.6%)	2 (3.3%)	X <sup>2</sup> = 8.677 °; <i>p</i> =0.003 <sup>*</sup> ; OR 7.510
Depressive symptoms	18/65 (27.7%)	3/41 (7.3%)	X <sup>2</sup> = 10.714 <sup>a</sup> ; <i>p</i> =0.010 <sup>*</sup> ; OR 6.840
Autonomic dysreflexia	7 (10.3%)	1 (1.7%)	X <sup>2</sup> = 4.049 <sup>a</sup> ; <i>p</i> =0.044 <sup>+</sup> ; OR 6.770
Deep venous thrombosis	2 (2.9%)	3 (5%)	X <sup>2</sup> = 0.360 <sup>a</sup> ; <i>p</i> =0.549
Neuropathic pain	23 (33.8%)	14 (23.3%)	X <sup>2</sup> = 1.707 °; <i>p</i> =0.191
Nociceptive pain	23 (33.8%)	19 (31.7%)	X <sup>2</sup> = 0.067 <sup>a</sup> ; <i>p</i> =0.795
Pneumonia	7 (10.3%)	2 (3.3%)	X <sup>2</sup> = 2.363 <sup>a</sup> ; <i>p</i> =0.124

Table 2 - Medical complications in traumatic and non-traumatic SCI.

\*p<0.05; a. Chi- square test; b. Mann-Whitney U test

	TSCI (n=68)	NTSCI (n=60)		
Bladder management				
Indwelling urinary catheters	39 (57.4%)	14 (23.3%)	X <sup>2</sup> = 15.205 <sup>a</sup> ; <i>p</i> =0.000 <sup>•</sup> ; OR 4.419	
Intermittent catheterization	5 (7.4%)	13 (21.7%)	X <sup>2</sup> = 5.404 <sup>a</sup> ; <i>p</i> =0.020 <sup>•</sup> ; OR 0.287	
Diaper/Urinary dispositive	1 (1.5%)	1 (1.7%)	X <sup>2</sup> = 0.008 <sup>a</sup> ; <i>p</i> =0.929	
Voiding with control	23 (33.8%)	32 (53.3%)	X <sup>2</sup> = 4.951 <sup>a</sup> ; p=0.026 <sup>c</sup> ; OR 0.447	
Ambulation level				
Wheelchair	40 (58.8%)	20 (33.3%)	X <sup>2</sup> = 8.317 <sup>a</sup> ; <i>p</i> =0.04 <sup>°</sup> ; OR 2.857	
Walk with assistive devices	14 (20.6%)	25 (41.7%)	X <sup>2</sup> = 6.685 <sup>a</sup> ; <i>p</i> =0.010 <sup>•</sup> ; OR 0.363	
Walk with assistance	3 (4.4%)	6 (10%)	X <sup>2</sup> = 1.523 <sup>a</sup> ; <i>p</i> =0.217	
Autonomous	11 (16.2%)	9 (15.0%)	X <sup>2</sup> = 0.033 <sup>a</sup> ; <i>p</i> =0.855	
Discharge destination				
Home	16 (23.5%)	33 (55%)	X <sup>2</sup> = 13.362 <sup>a</sup> ; <i>p</i> =0.000 <sup>+</sup> ; OR 0.252	
Rehabilitation Centre	43 (63.2%)	16 (26.7%)	X <sup>2</sup> = 17.155 <sup>a</sup> ; <i>p</i> =0.000 <sup>•</sup> ; OR 4.730	
Continuous Home Care	9 (13.2%)	11 (19.3%)	X <sup>2</sup> = 0.848 <sup>a</sup> ; <i>p</i> =0.357; OR 0.638	

\*p<0.05; a Chi- square test

experienced a statistically significant higher rate of pressure ulcers, and depressive symptoms (p<0.05).

Patients with traumatic lesions were primarily discharged to a rehabilitation center (43 - 63.2%), while the majority of patients with nontraumatic spinal cord injuries went back home (33 - 55%). There were statistically significant differences between the groups (p=0.000). The groups' bladder management at discharge was also compared (Table 3). In the traumatic SCI group, 39 (57.4%) patients significantly needed indwelling urinary catheters, and in the nontraumatic group, 32 (53.3%) patients significantly voided with control. The level of ambulation at the time of discharge was also examined: 40 patients (58.8%) in the traumatic group required a wheelchair, while 25 patients (41.7%) in the nontraumatic group were able to walk with the aid of a walker, crutches, or cane.

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		TSCI (n=68)		NTSCI (n=60)	
FIM admission (mean)	60.88	(54.35-67.40)	84.59	(77.51-91.66)	Z= 5.704 <sup>a</sup> ; <i>p</i> =0.000 <sup>*</sup>
FIM discharge (mean)	78.97	(71.13-86.81)	100.59	(92.21-108.97)	Z= 5.094 <sup>a</sup> ; p=0.000 <sup>*</sup>
FIM gain (mean)	18.09	(11.28-24.90)	16	(10.37-21.63)	Z= -0.211ª; <i>p</i> =0.833
SCIM admission (mean)	24.63	(18.39-30.86)	46.71	(39.51-53.90)	Z= 4.602 <sup>a</sup> ; <i>p</i> =0.000 <sup>*</sup>
SCIM discharge (mean)	43.16	(34.19-51.12)	61.65	(53.31-69.98)	Z= 2.734 <sup>a</sup> ; <i>p</i> =0.006 <sup>*</sup>
SCIM gain (mean)	18.53	(11.98-25.08)	14.94	(8.52-21.36)	Z= -0.151a; <i>p</i> =0.880

 Table 4 - Functional outcome comparisons between traumatic and nontraumatic SCI.

p=0.880\*p<0.05; a Mann-Whitney U test

The FIM and SCIM scales were used to assess the functional outcome of rehabilitation at the time of admission and discharge. A rise in the patients' scores at the discharge point indicated improved functional abilities. The traumatic SCI group had significantly lower scores than the non-traumatic SCI group (p=0.000) when the admission and discharge FIM and SCIM scores were compared between the two groups. Nevertheless, Table 4 shows no statistically significant difference between the two groups' FIM and SCIM gain scores (p=0.833 and p=0.880, respectively).

In both patients' groups, the presence of pressure ulcers, AIS A lesions and lower FIM and SCIM score at admission increased significantly the days of hospital stay. Furthermore, according to the intragroup comparison, both TSCI and NTSCI groups significantly improved in terms of functional scales (Table 5).

## Discussion

This retrospective study assessed and compared the neurological and functional outcomes, etiological factors, complications, and demographic characteristics of patients with traumatic and nontraumatic SCI who were admitted to an acute inpatient rehabilitation hospital in Portugal.

According to earlier data,<sup>2-4</sup> degenerative diseases like lumbar spinal stenosis and cervical spondylotic myelopathy were the most commonly reported causes of non-traumatic SCI, while falls and motor vehicle accidents were the most common etiological factors of traumatic SCI.

Previous epidemiological studies have indicated that highenergy auto accidents and falls were common among younger patients, whereas low-energy injuries, such as

TSCI	
FIM gain	Z=5.191 <sup>a</sup> ; p=0.000*
SCIM gain	Z=4.938 <sup>a</sup> ; p=0.000*
DOS*Pressure Ulcers	R <sup>2</sup> = 0.114 <sup>b</sup> ; B=39.484; β=0.337; t=2.908; <i>p</i> =0.005*
DOS*AIS A	$R^2$ = 0.187 <sup>b</sup> ; B=46.442; $\beta$ =0.433; t=3.898; $p$ =0.000*
DOS* FIM admission	R <sup>2</sup> = 0.146 <sup>b</sup> ; B=-1.183; β=-0.382; t=-2.713; <i>p</i> =0.010*
DOS* SCIM admission	R <sup>2</sup> = 0.268 <sup>b</sup> ; B=-1.486; β=-0.518; t=-3.783; <i>p</i> =0.001*
NTSCI	
FIM gain	Z=5.647°; p=0.000*
SCIM gain	Z=3.724 <sup>a</sup> ; p=0.000*
DOS*Pressure Ulcers	R <sup>2</sup> = 0.0153 <sup>b</sup> ; B=16.328; β=0.121; t=0.926; <i>p</i> =0.358
DOS*AIS A	R <sup>2</sup> = 0.103 <sup>b</sup> ; B=35.667; β=0.320; t=2.575; <i>p</i> =0.013*
DOS* FIM admission	$R^2$ = 0.478 <sup>b</sup> ; B=-0.951; $\beta$ =-0.691; t=-6.124; $\rho$ =0.000*
DOS* SCIM admission	R <sup>2</sup> = 0.451 <sup>b</sup> ; B=-1.191; β=-0.672; t=-4.349; <i>p</i> =0.000*

Table 5 - Intragroup functional outcomes.

\*p<0.05; a Wilcoxon signed-rank test; b Linear Regression

those caused by low falls, were most prevalent in the elderly.<sup>5</sup> Unlike in many developed countries where traffic accidents are the leading cause of spinal cord injuries, our study found that falls were the primary cause of traumatic SCI, followed by auto accidents. It's worth noting that the causes of SCI can vary by country and region, and in our studied population, falls from trees and low-energy elderly falls may contribute to the high percentage of fall-related injuries.

In our study, the male-to-female patient ratio was nearly equal in the non-traumatic group, while the number of male patients was twice as high in the traumatic group. This aligns with findings from prior epidemiological studies that also showed traumatic SCI to be more common in men.<sup>2</sup> Some studies also have reported an even higher ratio of males to females in non-traumatic groups.<sup>2,3</sup>

According to reports in the literature, patients with nontraumatic SCI are noticeably older than those with traumatic SCI.<sup>2,4,5</sup> In line with previous research, although not statistically significant, the average age of the traumatic group in our study was lower than that of the non-traumatic group, although there is a tendency to increase the average age due to the increase in falls in older adults.

Non-traumatic spinal cord injuries are often associated with more incomplete injuries, as indicated by published research.<sup>2</sup> Similarly, non-traumatic spinal cord injuries in our study typically lead to paraplegia and incomplete lesions. Furthermore, the AIS A score at discharge was significantly higher in the traumatic group, consistent with previous research,<sup>6</sup> suggesting that patients with traumatic spinal cord injuries experience more severe neurological impairment and disability. Additionally, complete lesions led to a significantly longer hospital stay, regardless of the type of lesion.

In our investigation, we found that patients with traumatic spinal cord injuries (SCI) had longer hospital stays and were admitted later in our service compared to non-traumatic SCI patients. Other studies<sup>1,6,7</sup> have also reported longer hospital stays for traumatic SCI patients, which supports our findings. They suggested that additional medical and trauma-related issues were responsible for this. Patients with traumatic SCI had lower functional scores and were more likely to have tetraplegia, complete lesions, and more severe disabilities. Furthermore, we observed that this patient cohort had a higher incidence of pressure ulcers, despite being transferred from previous facilities, which may have prolonged their hospitalization in our service. It is important to note that the traumatic injury group had a notably higher number of patients experiencing autonomic dysreflexia episodes. This observation is influenced by the fact that the traumatic injury group includes more patients with high-level spinal cord injuries or tetraplegia, which

inherently carries a higher risk of autonomic dysreflexia.

In our rehabilitation unit, 92.2% of the patients experienced one or more complications, with the traumatic population having twice the number of complications compared to those with non-traumatic spinal cord injuries (NTSCI). Urinary tract infection was the most common complication in both groups, consistent with earlier research.<sup>1,2</sup> Pressure ulcers were more frequent in patients with traumatic SCI than in those with non-traumatic SCI, and the development of these ulcers prolonged the hospital stay in the traumatic group. It is important to note that patients with traumatic injuries typically had more severe and dependent status, putting them at a higher risk of developing pressure ulcers. All healthcare professionals should be particularly aware of pressure ulcers and actively work to prevent them, as they can significantly affect patients' quality of life and their ability to participate in daily activities and the rehabilitation program.

The majority of patients with traumatic lesions were sent to a rehabilitation center due to their severe neurological and functional status. These patients required an indwelling urinary catheter for bladder management and a wheelchair for mobility. By comparison, nontraumatic patients were more likely to go home, be able to control their bladder and walk with assistive devices.

Traumatic SCI functional scores are lower than nontraumatic lesions on the FIM and SCIM scales at admission and discharge. However, compared to at-admission scores, both groups (within each group) demonstrated a significant improvement in their FIM and SCIM scores at discharge; however, the intergroup difference in gains was not statistically significant.

#### Limitations:

The study was limited by its retrospective design and the fact that it only included patients from a single center. It also had limitations due to missing data and the small sample size. A larger sample size and a prospective design could have achieved a more thorough comparison between the traumatic and non-traumatic SCI groups.

## Conclusion

According to this study patients with nontraumatic SCI were typically older, less likely to be male, had a shorter rehabilitation DOS, were admitted earlier to PMR service and had less disability at admission compared to patients with traumatic SCI. The majority of patients in both groups had one or more complications to manage in our PMR service making his rehabilitation program a more complicated challenge.

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Conflitos de Interesse: Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho. Fontes de Financiamento: Não existiram fontes externas de financiamento para a realização deste artigo. Confidencialidade dos Dados: Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes. Proteção de Pessoas e Animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pela Comissão de Ética responsável e de acordo com a Declaração de Helsínquia revista em 2024 e da Associação Médica Mundial. Proveniência e Revisão por Pares: Não comissionado; revisão externa por pares.

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