

## The role of physical therapists in the emergency room of a trauma hospital

### Atuação do fisioterapeuta no serviço de emergência de um hospital de pronto socorro referência em trauma

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#### ABSTRACT

Hospital emergencies are gateways to critically ill patients with potential risk of death. In a trauma referral hospital, the physical therapists role within the multiprofessional team must still be well established. **Objective:** To discuss the role of the physical therapist in the emergency department of a reference trauma hospital and to present the profile of the patients admitted to hospitalization. **Method:** This is a descriptive, observational, cross-sectional study that analyzes physiotherapy and records of hospitalized patients. **Results:** The most frequent causes of hospitalization of patients treated by the physiotherapy team were falls (51.7%), traffic accidents (14.9%), cardiovascular diseases (9.2%), assaults (9.1%), and respiratory (6.8%). Falls from standing height with associated femur fractures represented 26.4% of the records. With these patients, the procedures most used by physical therapists were orientations, breathing exercises, bedside exercises, and positioning adjustments. With lung-expanding breathing exercises, bedside exercises, and early walking, the physical therapist treated patients with pneumothorax, hemothorax, or hemopneumothorax who underwent thoracic drainage. Physical therapists also treated patients under invasive and non-invasive mechanical ventilation in the red ward. **Conclusion:** The physical therapist, as part of the multiprofessional team, has an essential role in the emergency rooms of a trauma hospital, such as care for patients undergoing invasive and non-invasive mechanical ventilation, use of respiratory physiotherapy techniques for lung expansion and removal of secretions, as well as the use of kinesiotherapy techniques to maintain and gain muscle strength and functionality.

**Keywords:** Emergency Medical Services, Trauma Centers, Accidental Falls, Accidents, Traffic, Physical Therapists

#### RESUMO

As emergências hospitalares são portas de entrada para pacientes graves com potencial risco de morte. Em um hospital referência em trauma, a função do fisioterapeuta dentro da equipe multiprofissional ainda tem necessidade de ser bem estabelecida. **Objetivo:** Discorrer sobre a atuação do fisioterapeuta no serviço de emergência de um hospital de pronto socorro referência em trauma e apresentar o perfil do paciente atendido. **Método:** Trata-se de uma pesquisa observacional descritiva, de caráter transversal retrospectiva a partir da análise dos atendimentos fisioterapêuticos registrados em prontuários de pacientes hospitalizados. **Resultados:** As causas mais frequentes de internação dos pacientes atendidos pela equipe de fisioterapia foram quedas (51,7%), acidentes de trânsito (14,9%), cardiovasculares (9,2%), agressões (9,1%), outros (8,3%) e respiratórias (6,8%). Quedas da própria altura com fratura de fêmur associadas representaram 26,4% da amostra. Nestes pacientes as condutas mais utilizadas pelos fisioterapeutas foram orientações, exercícios respiratórios, exercícios no leito e ajustes de posicionamento. O fisioterapeuta teve atuação com pacientes com pneumotórax, hemotórax ou hemopneumotórax submetidos à drenagem torácica, por meio de exercícios respiratórios expansivos, saída do leito e deambulação precoce. Observou-se também atuação com os pacientes em ventilação mecânica invasiva e não invasiva na sala vermelha. **Conclusão:** O fisioterapeuta, fazendo parte da equipe multiprofissional, apresenta importante atuação nas salas de emergência de um hospital de trauma, tal como o atendimento a pacientes submetidos a ventilação mecânica invasiva e não invasiva, uso de técnicas de fisioterapia respiratória para expansão pulmonar e remoção de secreções bem como a utilização de técnicas de cinesioterapia para manutenção e ganho de força muscular e funcionalidade.

**Palavras-chaves:** Serviços Médicos de Emergência, Centros de Traumatologia, Acidentes por Quedas, Acidentes de Trânsito, Fisioterapeutas

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Nothing to declare

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## INTRODUCTION

Emergency departments are gateways for critically ill patients with potential risk of death. In these facilities, the physical therapist is a care provider for cardiorespiratory disorders aiming to avoid the worsening of the clinical condition and the consequent need for ICU.<sup>1</sup>

The role of physical therapists in urgent and emergency units has been regulated in Brazil since 2002. Ordinance No. 2048 by the Brazilian Ministry of Health determines the presence of physical therapists in small to medium-sized hospitals' low and medium caring complexity.<sup>2</sup> Their role is focused on support, clinical follow-up, and rehabilitation of patients. In 2012, Ordinance No. 665 determined the inclusion of physical therapists in the multi-disciplinary teams of emergency departments, specifically for patients with Cerebral Vascular Accident (CVA or stroke).<sup>3</sup>

In December 2018, the Brazilian Federal Council of Physiotherapy and Occupational Therapy (*Conselho Federal de Fisioterapia e Terapia Ocupacional* - COFFITO) published Resolution No. 501, recognizing the physical therapist's role in Emergency facilities. However, this role is not considered a specialty of the profession yet. The same resolution also suggests that physical therapists in emergency teams should be trained in ACLS (Advanced Cardiovascular Life Support)<sup>4</sup>.

Therefore, it is meaningful to deepen the knowledge about the activities that the physical therapist performs in the emergency departments, describing the profile of the patients they treat.

## OBJECTIVE

This study aims to discuss the physical therapist's role in the emergency department of a specialized center.

## METHODS

This study is an observational and descriptive cross-sectional analysis of medical records. Records of patients hospitalized between January and December of 2018 were included in the analysis. The records considered patients with prescriptions for physiotherapy interventions admitted at the red and yellow wards of a trauma emergency and urgent department of a specialized hospital in Porto Alegre City, Rio Grande do Sul State, Brazil. Medical records with incomplete data were excluded.

In the red ward of the hospital, where the research was conducted, patients with emergencies (imminent risk of death) and urgencies (patients who need immediate care but have no risk of death) are treated. In the yellow ward, patients with emergencies who need quick care but can wait without posing a risk to their lives are treated. The risk classification at the institution is carried out through an adaptation of the Emergency Severity Index (ESI). This assessment estimates the necessary resources to treat a patient and determines a maximum waiting time.<sup>5</sup>

This research met the Regulatory Guidelines of the Brazilian National Health Council Resolution No. 466 of 2012 and was approved by the Research Ethics Board of Porto Alegre City, Rio Grande do Sul State, Brazil, receiving the registration number CAAE: 15990819.6.0000.5338.

The collected data included the number of medical records, age, date of birth, city of residence, gender, ethnicity, cause of hospitalization, outcome of hospitalization, and physiotherapeutic procedures addressed to the patients who had the most frequent causes of hospitalization.

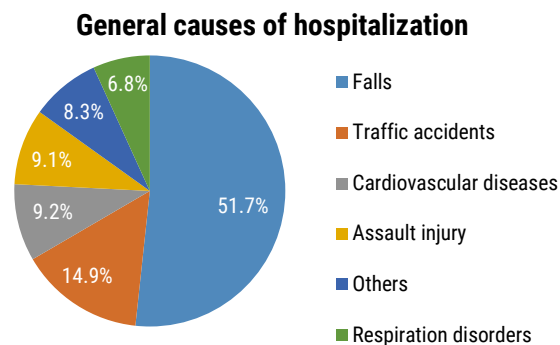
The search for patient information was conducted via the medical records system of the hospital, based on a list of patients prescribed physiotherapy in the period established by this research. In the statistical analysis, continuous variables were presented as median and minimum-maximum values and categorical variables were described as absolute and relative frequencies. All analyses were conducted using the SPSS® statistical package (v.22.0.0.1, Chicago, USA).

## RESULTS

The total sample consisted of 673 medical records reporting 532 patients admitted to the yellow room (79%) and 141 to the red room (21%). Figure 1 shows the most frequent causes of hospitalization for patients assisted by the physiotherapy team in the Emergency Department.

Falls accounted for 51.7% (n = 348) of the total reasons for hospitalization (Table 1). Falls from standing height with associated femur fractures stand out, representing 26.4% (n = 178) of the total.

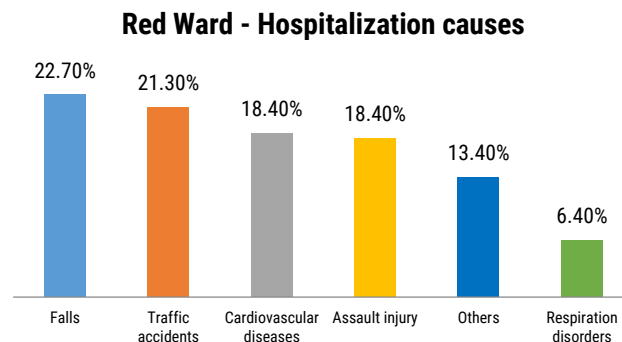
The profile of the hospitalized patients due to falls from standing height and associated femur fracture is predominantly female 82% (n=146), with a median age of 79 years (7-97), white 93% (n=166), and residents of Porto Alegre City 86% (n= 153). The most common outcome observed among these patients was the external transfer from the Emergency Department, 84% (n= 149).



**Figure 1.** Hospitalization at the Emergency Department

## Red Ward

The median age of patients admitted to the red room was 55 years, ranging from 14 to 94. Most patients were male 70% years, ranging from 14 to 94. Most patients were male 70% (n= 75), white 88% (n= 94), and residents of Porto Alegre City 70% (n= 75).



**Figure 2.** Hospitalization causes of patients admitted to physiotherapy intervention at the red ward

**Table 1.** Patients characteristics and distribution of hospitalization causes

	Falls (n= 348)	Traffic accidents (n= 100)	Cardiovascular diseases (n= 62)	Assault Injury (n= 61)	Others (n=56)	Respiratory disorders (n= 46)
<b>Age, Years</b>	74 (4-98)	40 (8-81)	69 (20-92)	29 (11-82)	53 (12-91)	62 (16-92)
<b>Males, n (%)</b>	135 (40)	73 (73)	30 (48)	53 (87)	29 (52)	20 (44)
<b>Ethnicity, n (%)</b>						
White	314 (91)	87 (87)	52 (84)	44 (72)	45 (80)	42 (91)
Brown	21 (6)	9 (9)	8 (13)	8 (13)	4 (7)	0 (0)
Black	9 (3)	3 (3)	2 (3)	9 (15)	7 (13)	4 (9)
Asian	4 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)
<b>Hometown, n (%)</b>						
Porto Alegre City	290 (83)	75 (75)	45 (73)	42 (69)	43 (77)	39 (85)
Other cities	58 (17)	25 (25)	17 (27)	19 (31)	13 (23)	7 (15)
<b>Hospitalization outcome, n (%)</b>						
External transfer	189 (54)	32 (32)	9 (14)	10 (16)	15 (27)	4 (9)
Internal transfer						
Infirmery	78 (22)	33 (33)	18 (29)	22 (36)	15 (27)	17 (37)
Intensive Care Unit	12 (3)	4 (4)	8 (13)	4 (7)	5 (9)	3 (6)
Discharge	63 (18)	31 (31)	25 (40)	24 (39)	20 (36)	22 (48)
Nonadherence	1 (1)	0 (0)	1 (2)	1 (2)	0 (0)	0 (0)
Death	5 (2)	0 (0)	1 (2)	0 (0)	1 (1)	0 (0)

Among the 22.7% (n= 32) causes of hospitalization due to falls, falling from standing height was the most frequent 15.6% (n= 22), followed by falls from height, such as a roof. The most observed complication among patients hospitalized for falls from standing height in the red ward was traumatic brain injury (TBI), with 8.5% (n= 12) of all cases.

Most patients hospitalized with moderate to severe TBI required invasive mechanical ventilation, and the physical therapist played an essential role in managing the artificial airway. The most common conducts during orotracheal intubation were thoracic release maneuvers, aspiration of the orotracheal tube and upper airways, adjustments of mechanical ventilator parameters, and patient positioning in bed.

Concerning the 30 reports of traffic accidents (21.3%), most of them were characterized by collisions or rollover accidents, motorcycles and bicycle accidents 14.9% (n= 21), followed by pedestrian accidents 4.9% (n= 9).

Patients hospitalized for assaults 17.8% (n= 25) were divided into gunfire injury (or gunfire wound) with 18 events (12.8%), stabbing with six events (4.3%), and beating with a single case (0.7%).

A frequent occurrence of pneumothorax, hemothorax, and hemopneumothorax with consequent thoracic drainage (use of chest drains) was observed in patients hospitalized due to traffic accidents, gunfire injury, and stabbing with 21 events (37.5%). Among these patients, the most observed physiotherapeutic procedures are described in Table 2.

**Table 2.** Physiotherapeutic intervention for patients under thoracic drainage

Intervention	n= 21
Gait, n (%)	11 (52)
Bedside sitting, n (%)	12 (57)
Releasing ventilatory maneuvers, n (%)	21 (100)
Positive expiratory pressure (PEP) therapy, n (%)*	8 (38)

Values are presented as absolute and relative frequencies

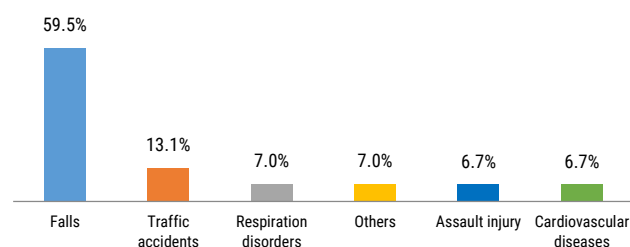
Although the setting where this study was conducted is a reference trauma hospital, there were other clinical demands in the yellow and red wards. Among these patients, respiratory cardiovascular illnesses were highly prevalent during hospitalization (Figure 1), requiring non-invasive mechanical ventilation.

### Yellow Ward

The median age of patients admitted to the yellow room was 66.5 years, ranging from 4 to 98 years (Figure 3). Most patients were female 55% (n= 292), white 87% (n= 460), and residents of Porto Alegre City 82% (n= 435).

Among the patients assisted by the physiotherapy team in the yellow ward, falls were the most prevalent cause of hospitalization, with 316 cases (60%). About half of the patients (n= 173) hospitalized for falls in the yellow ward had a femur fracture.

### Yellow Ward - Hospitalization causes

**Figure 3.** Patients assisted by the physiotherapy team in the yellow ward

Such patients were confined to bed during the preoperative period before being transferred to another hospital where surgical procedures were conducted to heal the fracture or place a prosthesis. The setting where this research took place did not have the resources to perform orthopedic surgeries at the time of data registration in the medical records. The procedures performed with these patients, as described in the medical records, are listed in Table 3.

**Table 3.** Physiotherapy interventions to patients with femur fracture

Intervention	n= 173
Recommendations and advice, n (%)	141 (81)
Release maneuvers, n (%)	153 (88)
Active/resisted and passive mobilization exercise, n (%)	158 (91)
Position adjustments, n (%)	8 (38)

Values are presented as absolute and relative frequencies

## DISCUSSION

The results of the present study agreed with those of other authors,<sup>6,7</sup> concerning the causes of hospitalization of patients assisted by physiotherapy teams. In a study carried out at the *Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo* with 198 patients, the authors reported a higher prevalence of traffic accidents (63.1%), falls (25.2%), and general violence (11.6%). At the emergency unit of the *Hospital Metropolitano de Urgência e Emergência (HMUE)* in Ananindeua City, Pará State, Brazil, researchers analyzed 179 medical records of patients treated by physical therapists.<sup>7</sup> They found that traffic accidents were also prevalent, with motorcycle accidents representing 32.57% of the sample, gunshot wounds 16%, and falls 14%.

An emergency hospital that is a reference in trauma generally treats victims of traffic accidents, pedestrians being run over, assaults, falls, and burns, among other external causes.<sup>8</sup>

The physical therapist role in the red ward of this study with patients under invasive mechanical ventilation was similar to that in the intensive care units. In both settings, physical therapists adjust mechanical ventilator parameters and perform respiratory physiotherapy procedures to allow lung release and mobilization of pulmonary secretions, aspiration of the orotracheal tube and upper airways, and mobilization and positioning of the patient in bed.

According to the Brazilian Recommendations of Mechanical Ventilation,<sup>9</sup> formulated by the Brazilian Association of Intensive Care Medicine (*Associação de Medicina Intensiva Brasileira - AMIB*) and the Brazilian Thoracic Society (*Sociedade Brasileira de Pneumologia e Tisiologia - SBPT*), patients under invasive mechanical ventilation must be assisted by a physiotherapy team on a 24-hour basis.

These guidelines recommend procedures for bronchial hygiene therapy in patients with increased airway resistance generated by pulmonary secretions. Lung expansion techniques are also suggested for patients with signs of lung collapse, reduced compliance, and artificial oxygenation.<sup>9</sup>

Most of the patients submitted to mechanical ventilation had Traumatic Brain Injury (TBI) due to a fall from standing height, the most prevalent reason for hospitalization in the red ward. About this patient profile, Brazilian Recommendations of Mechanical Ventilation also recommend avoiding hypoxemia since it leads to increased morbidity and mortality rates and avoiding prophylactic or prolonged hyperventilation, interventions attributed to the physical therapist when treating this type of patient.<sup>9</sup>

Even though there is lower demand for the use of non-invasive mechanical ventilation (NIV) compared to a general hospital, this study observed the use of NIV with patients diagnosed with acute respiratory failure due to the severity of Chronic obstructive pulmonary disease (COPD), cardiogenic pulmonary edema, and

chest trauma. The last guideline of the 2017 European Respiratory Journal on non-invasive ventilation in acute respiratory failure provides conditional recommendations for using NIV in patients with chest trauma, with moderate evidence. The indications for using this therapy in acute respiratory failure due to severe COPD and cardiogenic edema are well established, with moderate to high evidence.<sup>10</sup>

In the emergency department presented in this study, the physical therapist had a relevant role with patients undergoing chest drainage for pulmonary re-expansion. The most commonly used procedures for these patients were to sit at the bedside, get out of bed and walk, ventilatory exercises, and positive pressure therapies. These interventions agree with the study by Costa et al.<sup>11</sup>, as they evaluated the impact of physiotherapy interventions in the rehabilitation of patients undergoing thoracic drainage.

Closed chest drainage is a procedure applied to patients with lung mechanics and physiology disturbances due to chest trauma and infectious diseases, among other causes. Its objective is to remove the liquid (hemothorax) or air (pneumothorax) from the pleural cavity, allowing the balance of intrathoracic pressures with consequent lung re-expansion.<sup>12</sup>

Pneumothorax, hemothorax, and hemopneumothorax were commonly associated with stab wounds, gunshot wounds, and traffic accidents, found in 37.5% of those admitted into the red ward.

The importance of physiotherapeutic interventions for patients with chest drains is already known. In a study by Abreu et al.<sup>13</sup>, the authors evaluated the implementation of a standardized care protocol with 191 patients with thoracic drain in a public reference hospital for trauma, and one of the protocol items was the performance of respiratory physiotherapy conducted twice a day.

The daily respiratory physiotherapy intervention proved to be an independent factor in significantly reducing the incidence of 7 out of the eight outcomes studied, namely retained hemothorax, empyema, pneumonia, surgical wound infections, health complications at follow-up, hospitalization for less than six days, and drain residence time of less than five days.

The physical therapist's role is to identify and diagnose reductions in lung volumes in patients at risk and apply lung expansion therapy.<sup>9</sup> Resources to increase alveolar pressure, such as EPAP (Expiratory Positive Airway Pressure) and NIV, can be used in patients with spontaneous ventilation. NIV and resources that reduce pleural pressure, such as breathing exercises. In patients under Invasive Mechanical Ventilation, however, Positive end-expiratory pressure (PEEP) and lung hyperinflation can be used as first-choice therapies.<sup>9</sup>

The use of a handmade system to generate resistance to the expiratory flow through a water seal and the use of breathing exercises as a strategy to increase alveolar pressure was observed in the present study. A significant number of patients are hospitalized due to falls, especially falls from standing height with associated femur fractures. This complication was more frequent among white women, with a median age of 79 years, and residents of the downtown region of Porto Alegre city.

According to data from VIVA Survey - Surveillance of Violence and Accidents in Urgency and Emergency Sentinel Services (*VIVA Inquérito: Vigilância de Violências e Acidentes em Serviços Sentinelas de Urgência e Emergência*), the profile of elderly victims of falls assisted in urgent and emergency services in the main Brazilian capitals are mostly non-white (56.3%) females (62.6%), with

a mean age of 73 years (median of 72) whose accident happened within the urban area (91.7% of the cases).<sup>14</sup>

In an integrative review of the literature on the epidemiology of falls among older adults in Brazil,<sup>15</sup> it was observed that females above 80 years of age are risk factors for a higher incidence of falls.

Patients hospitalized with femur fracture due to a fall from standing height may have to endure immobility and restriction to the bed while waiting for the definitive surgical procedure, especially in the hospital where the present study was conducted, as it does not perform osteosynthesis and hip prostheses surgeries.

It is known that hospitalizations are risk factors for functional reduction, which is also considered a process that leads to functional decline due to immobility in bed and other issues.<sup>16</sup>

Although resting may benefit the injured site in some cases, its extension affects other systems, such as the circulatory and respiratory systems, reducing the patient's functional capacity. In this specific setting, kinesiotherapy is the most indicated therapy for treating bedridden individuals.<sup>17</sup> In awake patients with extremity fractures, it is recommended to mobilize the free segments with active and resisted exercises and perform isometric exercises for the immobilized segments.<sup>18</sup>

Therefore, the physiotherapeutic conducts observed in bedridden patients hospitalized in the emergency rooms due to femur fractures agree with the specialized literature recommendations. In such situations, the exercises should be performed to reduce the deleterious effects caused by immobility.

The large number of medical records with incomplete information regarding physiotherapy interventions and the fact that all the medical records are conditioned to the physiotherapy prescriptions made by the medical team may be considered limitations of this work. Many patients admitted to hospitalization with no physiotherapy prescription may have been excluded from the data collection and analysis.

## CONCLUSION

The physical therapist, part of the multidisciplinary team, has extensive work in the emergency rooms of a trauma hospital, such as caring for patients undergoing invasive and non-invasive mechanical ventilation, using respiratory physiotherapy techniques for lung expansion and removal of secretions as well as the use of kinesiotherapy techniques to maintain and gain muscle strength and functionality.

Further studies on the topic are suggested to generate indicators showing the importance of the physical therapist's role. These indicators guarantee the presence of this professional as a consistent part of the emergency department teams, especially those addressed to trauma, just as they are present at Intensive Care Units today.

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