

PHYSIOTHERAPEUTIC PERFORMANCE ON A MARTIAL ARTS FIGHTER VICTIM OF CRANIOBRAIN INJURY (TBI): EXPERIENCE REPORT

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Abstract: Objective: Report the experience of supervised physiotherapy internship in the neurological repercussions of TBI. **Methodology:** This is a descriptive experience report, developed from the practical experience of the mandatory supervised internship in Neurofunctional Physiotherapy in the 5th year of the Physiotherapy course at ``Universidade Estadual do Pará`` (UEPA) in the period from 09/11/2023 to 10/04/2023. **Results:** On the last day of contact with the patient, through comparison with the Mingazzini test, an improvement in the muscular strength of the lower limbs was observed, as well as a gain in balance based on the evolution of activities during care and the patient's report. **Conclusion:** Physiotherapy treatment has proven to be an essential part of the neurological repercussions of TBI and aspects that encompass its treatment and rehabilitation process. **Keywords:** Physiotherapy; Traumatic Brain Injury; Neurology.

INTRODUCTION

Traumatic brain injury (TBI) is defined as an alteration in brain function capacity caused by an external force to the head, mainly caused by traffic accidents, falls, explosion injuries, acts of violence and sports injuries (HASSETT, 2023) such as mixed martial arts (MMA). This is a modality that combines techniques from various fights, including punches, kicks, knees, elbows, falls and submissions. Therefore, there is a constant chance of various traumas occurring during exposure to this violent physical contact, including neurological trauma (BERNICK et al, 2013) (FARO, 2023).

The classification of TBI will be related to factors such as form, intensity and duration of the trauma, and victims may present cognitive deficiencies, language impairments, behavioral disorders and/or primary and secondary

physical disabilities (OLIVERTINO, 2018). Primary corresponds to high-impact injuries and also due to acceleration and deceleration mechanisms, while secondary injuries are consequences of primary trauma that form later and may vary according to the treatment received in the initial moments after the TBI, such as hypoxemia, hypercapnia, arterial hypotension and intracranial hypertension (OLIVERTINO, 2018).

Traditional rehabilitation services for these cases include physical therapy, occupational therapy (OT), and speech therapy. Among these, each with its own importance, the physical therapist plays a fundamental role in physical recovery and encourages patients to become as mobile and independent as possible (ANDELIC et al, 2020).

According to Carniel et al (2022), scientific advances in medicine have provided a different view of mobility restriction for patients with TBI, especially within the hospital environment, which was previously recommended because it was believed that rest associated with immobility was beneficial and is no longer so. This is due to research that indicated increased survival from early exercise, and it was identified that immobility would cause more harm to these patients admitted to the Intensive Care Unit (ICU), and could cause other serious dysfunctions of the musculoskeletal, gastrointestinal, urinary, cardiovascular, respiratory and cutaneous systems (CARNIEL et al, 2022).

Furthermore, it is understood that balance deficits and postural instability are very prevalent within the clinical picture of TBI, affecting 39–62% of individuals as they are closely related to factors such as longer periods of hospitalization and lack of adherence to therapeutic conduct (ALASHRAM et al, 2020). Given this, the need for appropriate conduct during the patient's recovery period is essential.

Furthermore, most patients who have suffered mild TBI return to work within 3 to 6 months. However, as the study by Torquato et al (2018) mentions, 5% to 20% may present changes that persist in the long term. Some evidence states that some factors can delay the patient's recovery and their return to work activities, which are: low educational level, injuries associated with TBI, high level of pain after the trauma, need for decision-making and limited independence in the functions performed at work, among others (CANCELLIERE et al, 2014).

In this scenario, physiotherapy can act on several neurological manifestations, including TBI, based on theoretical approaches that encompass the control of motor learning exercised by the Central Nervous System (CNS) and the problems faced in this command, presenting techniques that allow the reestablishment of functionality and physiological recovery, through the principles of recovery and reorganization of the CNS (OLIVERTINO, 2018).

METHOD

This is a descriptive experience report, developed from the practical experience of the mandatory supervised internship in a male TBI patient, adult, 33 years old, in Neurofunctional Physiotherapy in the 5th year of the Physiotherapy course at ``*Universidade Estadual do Pará*`` (UEPA), carried out at the Neurofunctional Outpatient Clinic of the Physiotherapy and Occupational Therapy Teaching and Assistance Unit (UEAFTO) located on campus II in Belém-PA, from September to October 2023.

The services were provided in the morning shift, from 8 to 9 am, on Tuesdays and Thursdays, with 16 sessions being held, with the services offered by a team made up of three students, two teachers and the physiotherapist responsible for the technical sector.

The procedures used in the treatment were mainly focused on free active kinesiotherapy and active resistance training with dumbbells and ankle weights of different kilograms, with gait and balance training being adjusted according to the patient's progression, in addition to breathing exercises to instruct on improving physical conditioning, such as increased inspiratory and expiratory times and diaphragmatic breathing training associated with kinesiotherapy. The objectives of the treatment were based on gaining strength, balance and conditioning, always prioritizing, in a general plan, greater independence of the patient and their recovery from functional limitations as a consequence of the TBI.

RESULTS

The patient K.S.N, male, 33 years old, attended the Neurofunctional Physiotherapy sector at UEAFTO on June 1, 2023 with a diagnosis of TBI and ICD-10 classification of S067 (Intracranial trauma with prolonged coma).

The History of Present Illness (HHI) begins with the patient's account of his former profession as an MMA fighter, in which during a fight on May 11, 2015, he was hit by a kick, fell and hit his head on a weight plate that was outside the mat. From the moment of the injury, he was in a coma for 7 days and woke up with sequelae in his lower limbs (LL), presenting reduced muscle strength, decreased motor coordination and difficulty walking.

The individual underwent physiotherapy after the incident for a period of three months, interrupting for personal reasons and, despite reporting improvement, there was regression of gains due not only to the lack of continuity of treatment (ALASHRAM et al, 2020) but also due to the various medications used. During the initial evaluation, the patient presented normal superficial and deep sensitivity,

normotrophism, with changes in strength according to the Oxford Scale for knee flexion movement (score 3 for the right side and 4 for the left side), in addition to presenting the inability to walk alone without support as the main complaint.

DISCUSSION

According to Alashram et al (2020), balance is defined as the ability to sustain the line of gravity within the base of support (BOS) with the least possible oscillation, being a complete process that depends on the combination of several information (visual, vestibular and somatosensory) originating from the central nervous system (CNS).

The objectives adopted for the treatment were to increase muscle strength in the lower limbs, restore balance, optimize gait, improve proprioception and improve functionality. During the internship, the first contact with this patient took place in early September 2023, in which the continuity of the objective and physiotherapy plan was established.

On the 19th of the same month, following instructions from the teacher in charge, the Mingazzini test was performed to demonstrate slight paresis of the lower limbs, so that it could be tested again at the end of the internship in order to observe the results of the therapeutic conduct applied. After asking the patient to lie down on the platform, it was noted that he was able to remain flexed at the knee and hip for 30 seconds, but felt fatigued (3 on the Modified Borg Scale) at the end and maintained a facial expression of discomfort due to the effort during the test.

The procedure involved breathing exercises, active and resisted kinesiotherapy using 1kg and 2kg ankle weights, balance training using a green proprioceptive disc and/or on the parallel bar stimulating sustained unilateral support with contralateral hip flexion for 4 seconds, resisted knee flexion with ankle

weights in a seated position, sitting and standing training in front of a mirror with bilateral support, walking training in front of a mirror with bilateral and unilateral support on the parallel bar, lateral walking training on the parallel bar, climbing up and down steps stimulating sustained knee extension for 5 seconds and cardiorespiratory conditioning. In addition to the communication present during the consultation, the patient was encouraged to follow an exercise routine at home that was as similar as possible to that performed during the assisted care at UEAFTO, performing these exercises safely (with support and without additional repetitions or weights) in his/her free time.

On the last day of contact with the patient, the Mingazzini test was performed again, following the same verbal commands. After 30 seconds, the patient reported no fatigue, with no evidence of discomfort in the face when maintaining the position. Soon, there was an improvement in the muscular strength of the lower limbs, claiming a gradual return of functionality such as achieving firmness and balance in maintaining the orthostatic position for more than 15 minutes again, for

example. Regarding the gait assessment, the patient still presents instability of movement and continues to be unable to walk without the option of using support.



Figure 1: Mingazzini maneuver.

Source: Google Images (2024)).

CONCLUSION

According to the findings of this case report, physiotherapy treatment has proven to be effective as an essential part of the neurological repercussions of TBI and aspects that encompass its treatment and rehabilitation process and, consequently, reestablishing functional aspects of daily life. Furthermore, this study contributes to the scientific body of work on the subject, highlighting the importance of physiotherapy treatment in the various implications of TBI.

REFERENCES

- ALASHRAM, A.R. *et al.* 'Efeitos das intervenções fisioterapêuticas na capacidade de equilíbrio em pessoas com lesão cerebral traumática: uma revisão sistemática'. 1º de janeiro de 2020: 455 – 466.
- ANDELIC, N. *et al.* Long-term follow-up of use of therapy services for patients with moderate-to-severe traumatic brain injury. *Journal of Rehabilitation Medicine*, 52(3), 1–10. 2020.
- BERNICK *et al.* Professional Fighters Brain Health Study: Rationale and Methods. *American Journal of Epidemiology*. 2013.
- CANCELLIERE, C. *et al.* Systematic review of return to work after mild traumatic brain injury: results of the International Collaboration on Mild Traumatic Brain Injury Prognosis. *Archives of physical medicine and rehabilitation*, v. 95, n. 3, p. S201-S209, 2014.
- CARNIEL, C.F. *et al.* Early mobilization in victims of traumatic brain injury / Mobilização precoce em vítimas de traumatismo cranioencefálico. *ABCS health sci* ; 47: e022207, 06 abr. 2022.
- FARO, H. Efeitos cerebrais do trauma repetido na cabeça: os casos do Boxe e MMA. *Portal Brain Support*. 01 de Dezembro de 2023.

HASSETT, L. **Physiotherapy management of moderate-to-severe traumatic brain injury**. Journal of Physiotherapy. v. 69, p. 141-147, 2023.

OLIVERTINO, P.M. **CONDUTA FISIOTERAPÊUTICA EM CRIANÇAS COM TRAUMATISMO CRANIOENCEFÁLICO SUBMETIDAS A MAUS TRATOS**. 2018.

TORQUATO, K.D.S. *et al.* **PROGNÓSTICO E REABILITAÇÃO DOS PACIENTES COM TRAUMATISMO CRANIOCEREBRAL: UMA REVISÃO INTEGRATIVA DA LITERATURA**. Revista Interdisciplinar em Saúde, Cajazeiras, 5 (6): 1543-1554, out./dez. 2018, ISSN: 2358-7490.

CANCELLIERE, C. *et. al.* **Systematic review of return to work after mild traumatic brain injury: results of the International Collaboration on Mild Traumatic Brain Injury Prognosis**. Archives of physical medicine and rehabilitation, v. 95, n. 3, p. S201-S209, 2014.