



Original Article

Intraobserver and interobserver reproducibility of the old and new classifications of thoracolumbar fractures[☆]



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ABSTRACT

Objective: To evaluate the inter and intraobserver agreement of the Magerl AO and AOSpine thoracolumbar fracture classification systems.

Methods: The participants were divided into two groups, the first composed of six spinal surgeons and the other composed of 18 medical orthopedic residents. On two different occasions, separated by an interval of one month, the participants analyzed and classified 25 radiographs with thoracolumbar fractures using both thoracolumbar fracture classification systems, Magerl AO and AOSpine. The results were analyzed for classification reliability using the Kappa coefficient (k).

Results: The Magerl AO classification system showed a fair interobserver agreement ($k = 0.32$), considering the fractures type and subtype, whereas the AOSpine classification system showed a moderate interobserver agreement ($k = 0.59$). The Magerl AO classification showed a fair intraobserver agreement for both residents and specialists ($k = 0.21$ and 0.38 , respectively), while the AOSpine showed a substantial agreement between residents ($k = 0.62$) and moderate between specialists ($k = 0.53$).

Conclusions: When evaluating fracture morphology, the AOSpine thoracolumbar fracture classification system presented a better reliability and reproducibility compared to the Magerl AO classification system.

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[☆] Study conducted at Instituto de Ortopedia e Traumatologia de Joinville, Joinville, SC, Brazil.

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Análise da reprodutibilidade intra e interobservadores das classificações antiga e atual da AO para fraturas toracolombares

R E S U M O

Palavras-chave:

Fraturas da coluna vertebral
Classificação Magerl AO
Classificação AOSpine
Concordância interobservadores
e intraobservadores

Objetivo: Avaliar a concordância inter e intraobservadores dos sistemas de classificação Magerl AO e AOSpine para fraturas toracolombares.

Métodos: Os participantes foram divididos em dois grupos, um com seis médicos ortopedistas especialistas em coluna e o outro com 18 médicos residentes em ortopedia. Os participantes analisaram 25 radiografias com fraturas toracolombares em duas oportunidades, com um mês de intervalo entre elas, e classificaram com o uso dos dois sistemas de classificação de fratura toracolombar, Magerl AO e AOSpine. Os dados de concordância foram analisados pelo método do coeficiente kappa.

Resultados: A classificação de Magerl AO apresentou uma concordância interobservadores leve ($k=0,32$), considerando o tipo e o subtipo das fraturas, enquanto a classificação AOSpine obteve uma concordância interobservadores moderada ($k=0,59$). A classificação de Magerl AO apresentou uma concordância intraobservadores leve entre médicos residentes e médicos especialistas ($k=0,21$ e $0,38$, respectivamente), enquanto a classificação AOSpine apresentou uma boa concordância intraobservadores entre médicos residentes ($k=0,62$) e moderada entre médicos especialistas ($k=0,53$).

Conclusão: O sistema de classificação da AOSpine para fraturas toracolombares apresentou uma melhor confiabilidade e reprodutibilidade comparado com o sistema de classificação Magerl AO, em relação à morfologia da fratura.

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Introduction

Approximately 90% of spinal fractures affect the thoracic and lumbar regions.¹ The thoracolumbar junction is very susceptible to fractures since in this region there is a difference in the rigidity from a more rigid thoracic spine to a more flexible lumbar spine.¹ Over 50% of the injuries occur between T11 and L2, usually due to high-energy traumas, with other associated lesions,² such as intra-abdominal lesions (splenic and hepatic lesions), limb fractures, and brain trauma.¹

Several classification systems for thoracolumbar fractures had been described before Magerl et al.³ introduced the AO classification system for these fractures in 1994. A classification system that used vector forces as a classification criterion, included fractures that occur by compression, distraction, and torsional forces.^{1,3,4} This classification was established aiming at creating a standard classification system; however, it is not practical, which reduces its reliability.¹ The AO spine classification group proposed a new classification system, using the Magerl AO classification system as the main reference, in order to create a similar classification, but with a better and more immediate clinical application in medical practice. The AOSpine classification was then created, which has appeared to be fairly reliable and accurate. However, it needs further assessment.⁵

A bone fracture classification system should be reliable, valid, and accurate, as it will aid in the prognosis and indication of treatment. A classification system is considered to be reliable when a single evaluator obtains consistent results by classifying the same fracture at different times, or when

several evaluators produce the same result with the same classification. When this reliability is observed in medical practice, the classification is considered to be accurate.^{6,7} According to Vaccaro et al.,⁸ the current classification, AOSpine, allows a better understanding of the lesion, since not only it modified and simplified the old morphological classification, but also six neurological lesion topics and two patient modifiers were added, which help to guide treatment. However, there is still no global consensual classification for thoracolumbar fractures.⁹

This study was aimed at evaluating the reproducibility of the two AO classifications regarding the morphology of thoracolumbar fractures by assessing the intra- and inter-observer agreement.

Material and methods

Ethical considerations

The study was submitted to the Research Ethics Committee of the Hospital Municipal São José (HMSJ; Joinville, SC), and approved through the Brazil Platform, under No. 1.769.539.

Participants

The study included six spine specialists working in the same orthopedics department and 18 training physicians in their first, second, and third year of the orthopedic and traumatology medical residency at the Institute of Traumatology and Orthopedics (ITO) of Joinville (Santa Catarina State, Brazil).

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