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Update Article

Turco's injury: diagnosis and treatment^{☆,☆☆}

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ARTICLE INFO

Article history:

Received 2 May 2013

Accepted 16 July 2013

Available online 14 May 2014

Keywords:

Tarsal joints/injuries

Metatarsal bones

Bone fractures

Dislocations

ABSTRACT

The aim of this study was to alert doctors to the existence of Turco's injury and discuss the existing treatments that have been described in the worldwide literature. A bibliographic survey of Lisfranc's injury and Turco's injury covering from 1985 to 2013 was conducted in the SciELO and PubMed databases. Among the 193 articles, those relating to bone-ligament injuries of the Lisfranc joint and high-energy trauma were excluded, as were the case reports. The patients selected were professional or amateur athletes who solely presented a ligament injury to the Lisfranc joint (Turco's injury), which was diagnosed from the history, physical examination, radiographs and magnetic resonance images. Non-athletic patients and those with associated bone injuries were excluded (10). According to the injury classification, the patients were treated by means of either an open or a closed procedure and then a standard rehabilitation protocol. Out of the 10 patients, five underwent conservative treatment and five underwent surgical treatment using different techniques and synthesis materials. We obtained two poor results, one satisfactory, five good and two excellent. We conclude that the correct diagnosis has a direct influence on the treatment and on the final result obtained, and that lack of knowledge of this injury is the main factor responsible for underdiagnosing Turco's injury. There is a need for randomized prospective studies comparing the types of synthesis and evolution of treated cases, in order to define the best treatment for this injury.

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Lesão de Turco: diagnóstico e tratamento

RESUMO

Este trabalho tem por objetivos alertar os médicos sobre a existência da lesão de Turco e discutir sobre os tratamentos existentes descritos na literatura mundial. Foi feito levantamento bibliográfico da lesão de Lisfranc e da lesão de Turco de 1985 a 2013 nas bases de dados Scielo e Pubmed. Dos 193 artigos, foram excluídos os com lesão osteoligamentar da articulação de Lisfranc, os por traumas de alta energia, os relatos de caso. Foram

Palavras-chave:

Articulações tarsianas/lesões

Ossos do metatarso

Fraturas ósseas

Luxações

[☆] Please cite this article as: da Silva APS, Shimba LG, Ribas LHBV, de Almeida AS, Naves V, Duarte Júnior A. Turco's injury: diagnosis and treatment. Rev Bras Ortop. 2014;49:321-327.

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selecionados pacientes atletas profissionais ou amadores, com lesão ligamentar exclusiva da articulação de Lisfranc (lesão de Turco), a qual foi diagnosticada pela história, pelo exame físico, pelas radiografias e pela ressonância magnética. Como fatores de exclusão, pacientes não atletas e com lesões ósseas associadas (10). De acordo com a classificação da lesão, os pacientes foram tratados cruenta ou incruentamente e submetidos a um protocolo-padrão de reabilitação. Dos 10 pacientes, cinco foram submetidos a tratamento conservador e cinco a tratamento cirúrgico, por diferentes técnicas e materiais de síntese. Obtiveram-se dois resultados ruins, um satisfatório, cinco bons e dois excelentes. Concluímos que o diagnóstico correto influencia diretamente no tratamento e no resultado final obtido e que o desconhecimento da lesão é o principal responsável pelo subdiagnóstico da lesão de Turco. Há necessidade de estudos prospectivos randomizados que comparem os tipos de síntese e a evolução dos casos tratados para uma definição do melhor tratamento para tal lesão.

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Introduction

The Lisfranc or tarsometatarsal joint is thus named in homage to the French physician Jacques Lisfranc, who was the first to describe an amputation through this joint.¹⁻⁴ This complex is formed by bone elements (base of the metatarsals, cuneiforms and cuboid) and ligaments that give structure and support to the transverse arch of the midfoot. Between the medial cuneiform and the second metatarsal, there is a strong oblique ligament called the Lisfranc ligament. This, in association with the effect of the most proximal fitting of the second metatarsal, forms the main stabilizer of this joint.^{1,3,5-8} The complex anatomy of bones and ligaments in this region, in association with the multiple injury patterns and mechanisms, makes radiographic interpretation and diagnosis a challenge, particularly in attending emergency cases.⁹

Dislocated fractures of the Lisfranc joint are unusual injuries of the foot and occur at a rate of 1:55,000 to 60,000 per year, which corresponds to 0.1% to 0.9% of all fractures. Approximately one third of these injuries go undiagnosed, which may lead to chronic pain in the foot affected, osteoarthritis and deformities.^{1,3,10-13} Among the various injury mechanisms that have been described, the commonest is plantar flexion over the metatarsals, in association with rotational stress.⁹ In this manner, it is important for physicians to become familiar with the types of presentation of Lisfranc dislocated fractures, and specifically the one discussed in this study, which bears the name of Turco's injury, given that early diagnosis and intervention are essential for better prognosis.^{14,15} Turco's injury is one in which there is a low-energy trauma mechanism that only causes ligament tears, with or without dislocation of this joint, and it occurs especially among athletes.⁹

This injury is therefore characterized by an opening of up to 5 mm in the intermetatarsal space of the first and second metatarsals, and it may range in severity, according to the classification of Nunley and Vertullo, from stage I to IV.¹⁶

Anatomy and biomechanics

Understanding the anatomy of the tarsometatarsal complex is essential for it to be possible to evaluate, diagnose and treat injuries to this joint. The stability of this complex is

achieved through bone architecture and ligament support. The first, second and third metatarsals articulate with the medial, intermediate and lateral cuneiforms, in this order, and the fourth and fifth metatarsals articulate with the cuboid. The second metatarsal not only lies between the first and third metatarsals, but also has a greater contact surface with the bones that surround it, given that the intermediate cuneiform is located more proximally than the medial and lateral cuneiforms. Thus, it has a lock-and-bolt fit that increases the stability.^{17,18}

In addition to the structured bone framework, there is a ligament support. The bones of the metatarsus are joined together by means of the dorsal and plantar intermetatarsal ligaments, as are also the cuneiforms and the cuboid, but there is no ligament that joins the base of the first metatarsal to the second metatarsal. There is also a variable network of longitudinal and oblique ligaments that secures the last four metatarsals to the cuneiforms and cuboid on the plantar and dorsal sides, along with two longitudinal ligaments that anchor the first metatarsal in the medial cuneiform.^{17,18}

The largest and strongest ligament of the tarsometatarsal complex is the so-called Lisfranc ligament. Its origin is in the lateral surface of the medial cuneiform and it is inserted into the medial face of the base of the second metatarsal^{17,18} (Fig. 1).

Physiopathology

Lisfranc injuries can be caused by direct or indirect mechanisms. Direct trauma to the dorsum of the foot is rare and may be complicated through contamination, vascular impairment and compartmental syndrome. Injuries through indirect mechanisms are responsible for most cases and result both from rotational forces applied to the forefoot with the hindfoot fixed and from axial loads on a fixed foot in plantar flexion.¹⁴

The commonest cause of indirect trauma that has been described in the literature is car accidents, which account for approximately 40% to 45% of the injuries.¹⁷ Other causes that have been described include acts of falling from a height, accidents with horses, motorcycle accidents and injuries in athletes.^{14,17}

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