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MIDTARSAL JOINT SPRAIN – A QUICK REVIEW

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ABSTRACT

A midtarsal joint sprain (MJS) is a relatively common underdiagnosed injury that can be confused with an ankle sprain. Usually the only way to avoid misdiagnosis is to have imaging

performed by an experienced sonographer or radiologist, but in reality it is mainly due to a lack of knowledge of how to differentiate between these two injuries. This review focuses on a brief overview of MJS to help you better understand when to consider the possibility of this injury, how to investigate it, and how to treat it.

Keywords
Midtarsal Joint Sprain, Chopart's joint, ankle sprain, imaging diagnosis, differential diagnosis

INTRODUCTION

Ankle sprains are one of the most common injuries, especially in young patients who are active in sports [1, 2, 3, 4]. Approximately one third of ankle inversion sprains involve the midtarsal (talonavicular and/or calcaneocuboid) joints, with 25% being isolated midtarsal sprains without ankle ligament sprains [5, 6].Therefore, especially in the absence of appropriate diagnostic imaging, midfoot sprains may be diagnosed as ankle sprains, mainly lateral, or may coexist with ankle or other foot injuries [6, 7, 8, 9, 16].This means that lack of knowledge about this injury exposes the patient to poor diagnosis and treatment. Delayed diagnosis can lead to prolonged symptoms with the potential to develop instability and eventually osteoarthritis of the entire Chopart joint. [6, 7, 9, 16, 24].

In this case, we decided to examine the literature on midfoot sprains and present it in the form of a review in order to better understand this injury.

CHOPART JOINT CHARACTERISTIC

The transverse tarsal joint or midtarsal joint or Chopart's joint is formed by the articulation of the calcaneus with the cuboid (the calcaneocuboid joint), and the articulation of the talus with

the navicular (the talocalcaneonavicular joint, often called the talonavicular) [10, 11]
Ligaments stabilizing the Chopart joint include: the dorsal talonavicular ligament, bifurcate ligament, dorsal calcaneocuboid ligament, short and long plantar ligaments, and spring ligament. [12, 13].

The movement which takes place in this joint is more extensive than that in the other tarsal joints, and consists of a sort of rotation by means of which the foot may be slightly flexed or extended, the sole being at the same time carried medially (inverted) or laterally (everted) [10, 11]. The midtarsal joint complex, comprised of the talocal caneonavicular (often called the talonavicular) joint and calcaneo cuboid joint, provides both midfoot flexibility and stability, critical to normal gait and weight bearing [14, 15].

EPIDEMIOLOGY

Isolated midtarsal sprains have been reported to occur in only 5.5% of ankle sprains, suggesting that they are rare [5, 6, 17]. However, some reports suggest that midtarsal sprains are more common, occurring in up to 33% of inversion ankle injuries and in isolation in up to 24% of inversion injuries [5, 6, 18]. Lateral ankle sprains have been described as the most common musculoskeletal injury [19], with one study estimating an incidence of 2.15 per 1000 person-years in the United States, or 2 million sprains per year [20]. We can therefore estimate that mitral sprain occurs in as many as 500,000 to 690,000 Americans per year.
The main age group in which these injuries occurred was 20-40 years [6, 8], with different gender distributions depending on the methodology, but usually without a clear advantage of one gender over the other [6, 8, 21]. About 1/3 of the injuries were related to sports activities, with no single predominant activity, but mainly involved: football, rugby, basketball, tennis, surfing and ballet dancers; other more common situations include tripping, vehicle accidents or falls from height [6, 8, 16, 21, 22, 23].
The most common mechanism of trauma is foot inversion (about 75% of cases); others include plantar hyperflexion (about 20%). Less common are dorsal hyperflexion and foot eversion [6, 8].

SIGNS AND SYMPTOMS

Typical clinical manifestations include acute pain, point tenderness, swelling, and ecchymosis [8, 7, 16, 25, 26]. Clinical findings, particularly in isolated midtarsal sprains, are more distal than in ankle sprains, but only about half of cases showed concordance between the exact clinical location of pain (at the talonavicular or calcaneocuboid or both) and ultrasound findings [8, 16, 25, 26] Other findings include an audible crack on trauma, persistent total functional impotence and lateral calcaneocuboid joint laxity with varus stress of the foot [7, 8, 16, 25, 26]. The definitive clinical diagnosis of midtarsal sprains often requires a high index of suspicion due to the difficulty of clinical examination in acute oedema or the lack of experience of the examiner [7, 8, 28].

(a)  (b) 

(a) Photograph of the feet approximately half an hour after injury. There is central swelling over the lateral malleolus and metatarsus (private archive).

(b) Photograph of the same foot approximately 10 hours later. The swelling is much more diffuse over the entire foot with no characteristic site (private archive).

IMAGING DIAGNOSIS

Typical imaging findings include avulsion fractures, ligament injuries, fluid and oedema. Midtarsal sprains are typically multiligamentous; therefore all Chopart ligaments are subject to injury and should be examined [5, 16, 24, 29, 31].

X-ray and CT

Acute ankle trauma is usually initially evaluated with plain radiographs due to ease of access and cost. While a midtarsal sprain may not be visible on radiographs, small avulsion fracture fragments in typical locations provide the first clue to the diagnosis [5, 16, 24, 29], less commonly impaction fractures [16, 24]. Soft tissue swelling may also be visible, but this is definitely a non-specific symptom [31].

Midtarsal fractures in the setting of the inversion mechanism can be subdivided into three major categories, often present simultaneously in the same patient:
- distraction-related avulsion fractures along the lateral column of the foot: most commonly involve the anterior process of the calcaneus. or less commonly the dorsolateral cuboid [16, 29, 31, 33]. - impaction fractures along the medial column, including navicular body fractures and talar head osteochondral fractures [16]. - plantar flexion–related avulsion fractures from the dorsal talar head and/or dorsal navicular, due to avulsion of the dorsal talonavicular ligament [16].
Eversion-related midtarsal fractures can be subdivided into :
- distraction injuries of the medial column - these include navicular tuberosity avulsion fractures [16] or - impaction fractures in the lateral column nutcracker-type impaction fractures at the calcaneocuboid joint [16].

Mentioned fracture fragments can be quite small, and while can be clearly visible at CT, are often overlooked at radiography [16]

Ultrasound

Ultrasound appears to be the best tool for confirming the diagnosis of midtarsal joint sprain in the emergency setting [8]. However, the injury can easily be missed by an inexperienced sonographer [8].

Individual analysis of each ligament allowed ultrasound classification of midtarsal joint sprains. Examination of the dorsal talonavicular ligament, bifurcate ligament and dorsal calcaneocuboid ligament should be performed [7, 8, 32]. In addition, ultrasound may show avulsion fractures, effusion or haematoma in the joint [7, 8].

MRI

Persistent pain after conservative management of a lateral ankle sprain is a common indication for MRI evaluation to exclude a more extensive injury than initially suspected. While small avulsion fractures may be better detected by plain radiography or CT, MRI is optimal for direct visualisation of midtarsal ligament tears and detection of bone marrow oedema associated with avulsion, impaction or contusion [16]. One study found that 48% of calcaneocuboid injuries and 50% of talonavicular injuries were seen on radiography compared to MRI [29], so MRI appears to be the most sensitive test for detecting midfoot joint sprains.

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TREATMENT

Treatment of midtarsal sprains varies widely and remains controversial [21, 27, 30. 34]. Often midtarsal sprains are treated conservatively, similar to lateral ankle sprains with ICE treatment; However, a recent report recommends more aggressive immobilisation with a rigid below-knee cast for 6-8 weeks followed by a return to weight bearing with a soft brace for 6 weeks or a modified controlled motion ankle walking boot designed to stabilise the lateral midfoot [34], 35] The outcomes of immobilisation as a treatment for midtarsal sprains have not been systematically studied, but it is recognised that a subset of patients will not improve with conservative management and may require surgical intervention such as ligament reconstruction and arthrodesis [17, 21].

PROGNOSIS AND COMPLICATIONS

Delayed diagnosis of midtarsal sprains can lead to dysfunction, prolonged pain and instability, and the need for surgical treatment. Inadequate treatment can lead to osteoarthritis of the entire Chopart joint. Therefore, it is important for clinicians and radiologists to assist in the timely diagnosis of this injury by being familiar with injury patterns and maintaining a high index of suspicion, especially in patients seen in the acute or subacute post-traumatic period after suspected lateral ankle sprains [6, 7, 9, 16, 17, 21].

CONCLUSION

Midtarsal sprain is a very common injury. When ordering and performing imaging, it is important to differentiate ankle injuries from other foot injuries, including midtarsal joint sprains. In the case of an ankle sprain that does not respond to treatment, it is worth considering whether there are other injuries to the foot, starting with a midtarsal joint injury.

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