

Subtalar Dislocations



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KEYWORDS

- Subtalar joint • Dislocation • Talar process fracture • Avascular necrosis
- Open dislocation

KEY POINTS

- Treatment of subtalar dislocations consists of early reduction under adequate sedation or open reduction if necessary.
- Purely ligamentous subtalar dislocations have an excellent prognosis with early reduction.
- Complications such as avascular necrosis and posttraumatic arthritis are seen predominantly after open dislocations, total talar dislocations, and associated fractures.

Subtalar dislocation (syn.: luxatio pedis sub talo) is defined as a simultaneous dislocation of the subtalar (talocalcaneal) and talonavicular joints. The first case report was probably provided by DuFaurest in 1811.¹ Broca, in 1853, termed them “luxations sous-astragaliennes” and he discriminated between medial, lateral, and posterior dislocations, in descending order of frequency.² Malgaigne³ and Henke⁴ later added an anterior type. With this modification, Broca’s classification of subtalar dislocations is still in use today. Leitner, in an analysis of 4521 dislocations at Böhler’s clinic in 1952, found 42 cases of subtalar dislocations (36 medial, 6 lateral) and brought attention to the fact that interposed ligaments and tendons may warrant open reduction.⁵

Subtalar dislocations have to be distinguished from tibiotalar (ankle) dislocations (luxatio pedis cum talo), midtarsal (Chopart) dislocations that involve the talonavicular and calcaneocuboid joint, and total talar dislocations (luxatio tali totalis) from the ankle and subtalar joints.⁶ Subtalar dislocations represent between 1% and 2% of all dislocations and 15% of all peritalar injuries.⁷ They occur more frequently in men than in women and predominately affect people in their mid-30s.^{8,9} Although pure ligamentous dislocations have an excellent prognosis after proper reduction, care has to be taken not to overlook the frequent associated bony injuries like fractures of the lateral talar process and the sustentaculum tali that may rapidly lead to the development of painful posttraumatic arthritis of the subtalar joint.^{10–12}

The authors have nothing to disclose.

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RELEVANT ANATOMY

The subtalar joint is divided by the strong talocalcaneal ligaments in the sinus tarsi and the tarsal canal into an anterior and posterior portion. The latter is formed by the posterior joint facets of the talus and calcaneus and is saddle shaped. The anterior portion forms a functional unit with the talonavicular joint (talocalcaneonavicular joint). It is a ball-and-socket joint that has also been called “coxa pedis” because of the developmental and functional similarities with the hip.

The subtalar joint is stabilized by its inherent bony structure and reinforced by numerous ligaments at the sinus tarsi, the tarsal canal, the posterior subtalar joint, and the talonavicular joint. An important stabilizer for the subtalar joint is the ligament complex in the sinus and canalis tarsi, the components of which display a substantial variability and are termed inconsistently in the literature. Schmidt, who gave one of the most detailed descriptions of the complex anatomy of the ligaments in the sinus tarsi and tarsal canal in 1978, discriminates 5 separate ligaments that form the complex of the interosseous ligament (IOL): the lateral, intermediate and medial roots of the inferior extensor retinacle (IER), the oblique talocalcaneal ligament (also referred to as cervical ligament because it connects the talar neck with the calcaneal neck), and the talocalcaneal interosseous ligament (TCIL) which he also termed the ligament of the tarsal canal.¹³ He stated that 4 of the 5 parts limit excessive supination and inversion because they lie laterally to the pivot of the subtalar joint, whereas only the medial root of the IER limits pronation and eversion. Several authors have described a V-shaped appearance of the TCIL, and 2 recent studies on 40¹⁴ and 32 cadaver feet¹⁵ noted that the fibers of the TCIL blend with those of the medial root of the IER, forming a V-shaped ligament. Li and colleagues¹⁵ in addition identified a smaller, separate tarsal canal ligament anterior to this complex and behind the medial subtalar joint facets in 20 of 32 specimens; Jotoku and colleagues¹⁴ termed it the “anterior capsular ligament.”

The important calcaneofibular ligament, running from the tip of the fibula to the posterior part of the calcaneal tuberosity, provides lateral stability to both the ankle and subtalar joints.¹⁶ Smaller, inconstant ligaments (lateral and posterior talocalcaneal ligaments) are merely capsular reinforcements. Recently, Li and colleagues¹⁵ identified a posterior capsular ligament in 25 of 32 specimens directly in front of the posterior facet of the subtalar joint. On the medial side, the ligamentous support for the subtalar joint is provided by the tibio-calcaneal ligament as a part of the deltoid ligament complex.^{6,17}

The bifurcate ligament stabilizes both the anterior portion of the subtalar joint (the talocalcaneonavicular joint) and the midtarsal (Chopart's) joint. The common origin of both the calcaneonavicular and calcaneocuboidal parts of the bifurcate ligament lies on the dorsal aspect of the anterior process of the calcaneus. According to Schmidt and Grünwald¹⁸ the calcaneonavicular part is stronger with an average diameter of 3 mm and longer with an average length of 15 mm than the calcaneocuboidal part (2 and 9 mm, respectively). The anterior subtalar (talocalcaneonavicular) joint is further stabilized by the dorsal talonavicular ligaments (mainly capsule reinforcements), the strong plantar calcaneonavicular (“Spring”) ligament and medial calcaneonavicular (Volkmann's “neglected”) ligament.¹⁹

MECHANISM OF INJURY

Because of the strong ligamentous support, subtalar dislocations are caused by high-energy injuries like motor vehicle accidents and falls from a height in 50% to 80% of cases.^{20–22} However, a substantial number of subtalar dislocations result from rather trivial injuries or during sports (“basketball foot”).²³ In a recent literature review of 359

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