

Arthroscopic Anatomy of the Ankle Joint



Ronald G. Ray, DPM, WCC, PT

KEYWORDS

- Ankle anatomy • Intra-articular ankle anatomy • Anatomy of tibial plafond
- Anatomy lateral malleolus • Talar anatomy

KEY POINTS

- The anteromedial corner of the tibial plafond has a notch of variable size that is void of cartilage and is considered a normal variant of the articular surface.
- The anterior inferior tibiofibular ligament can have a low-lying band that can normally impinge on the anterolateral border of the talus.
- The deep transverse ligament of the posterior inferior tibiofibular ligament is considered a true labrum of the ankle joint and has been implicated in posterior ankle impingement.
- The anterior talofibular ligament and components of the deltoid ligament are intracapsular, but extrasynovial and not easily visualized arthroscopically.

Arthroscopy of the ankle joint provides a highly accurate means of locating and treating intra-articular abnormality. It is imperative to have a sound appreciation of the intra-articular environment of the normal ankle joint. This discussion focuses on the anatomic structures of the ankle joint that can be visualized through the arthroscope.

OSSEOUS STRUCTURES OF THE ANKLE JOINT

The ankle joint is composed of the tibia and fibula superiorly and the talus inferiorly. The distal aspect of the tibia is composed (from medial to lateral) of the medial malleolus, the tibial plafond, and the nonarticular lateral surface. The medial malleolus has an anterior, inferior, medial, posterior, and lateral surface. It is possible to visualize a large portion of the medial malleolus arthroscopically. The anterior aspect of the medial malleolus has a flat to slightly domed surface from medial to lateral. The anterior surface is flat to slightly convex from superior to inferior. The inferior aspect of the medial malleolus has 2 protuberances or colliculi, anterior and posterior. The former extends more inferiorly (by 0.5 cm) than the latter, with an intervening intercollicular groove.¹ The deep anterior and posterior tibiotalar ligaments of the deltoid arise from the

Foot and Ankle Clinic of Montana, Affiliate, Great Falls Clinic, 1301 11th Avenue South, Suite 6, Great Falls, MT 59405, USA

E-mail address: drnray@q.com

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anterior and posterior colliculi, respectively.¹ It is possible to visualize the medial surface of the medial malleolus above the inferior margins of the colliculi. The posterior surface of the medial malleolus cannot be visualized arthroscopically from within the ankle joint. In its upper one-half, this surface is slightly convex, whereas in the lower one-half, this surface becomes concave or grooved to accommodate the passage of the posterior tibial tendon. The lateral surface of the medial malleolus is comma-shaped and covered with cartilage to articulate with the medial articular facet of the talus (**Fig. 1**).¹ The cartilage on this surface can be seen to extend onto the margin or border of the anterior and inferior surfaces of the medial malleolus (**Fig. 2**).

The inferior surface of the tibia or tibial plafond is covered with hyaline cartilage to articulate with the talar dome. The surface is concave from anterior to posterior. The anterior and lateral borders are wider than the posterior and medial borders. Looking from below, the surface is somewhat rhomboid shaped with the base lateral and the upper narrower surface facing medially (**Fig. 3**). The posterior margin of the tibial plafond extends more inferiorly than the anterior margin. The more inferior position of the posterior tibial margin places the posterior capsular structures in a more inferior position, making them more difficult to visualize through standard anterolateral and anteromedial portals. Visualization of structures in the posterior aspect of the ankle joint is further complicated by the amount of coverage the tibial plafond provides over the talar articular surface. Regardless of the position of the talus (dorsiflexion or plantarflexion), two-thirds of the talar surface is always covered by the tibial plafond, leaving only one-third uncovered at all times.^{1,2}

A variation in the osseous and/or cartilaginous surface of the anterior medial tibial plafond requires further comment. The junction between the anterior medial margin of the tibia and the superior lateral margin of the medial malleolus marks the location of a posteriorly directed void or notch. The apparent defect represents either an isolated loss of cartilage or an absence of both cartilage and underlying bone (**Figs. 4 and 5**). Ray and colleagues³ found this area of deficit to represent a normal variation in the articular surface of the anterior medial tibial plafond. This region was not associated with degenerative changes in 77 specimens. The investigators noted that in 12 of 62 (19%) specimens, the capsule or synovial lining of the ankle joint attached to and followed the articular margins of the notch. In 32 others (52%), a capsular



Fig. 1. Lateral aspect medial malleolus, right ankle. A view looking from lateral to medial at the comma-shaped lateral articular surface of the medial malleolus. Notice the anterior colliculus extends more inferiorly than the posterior colliculus.

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