RADIOGRAPHIC EVALUATION AND FUNCTION OF THE TALOCALCANEONAVICULAR JOINT

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In the text *Anatomy of the Foot and Ankle* Sarrafian[1] describes the talocalcaneonavicular joint as two joints (posterior and anterior) that function as a unit. The posterior joint is the concavoconvex posterior facet of the talus and the calcaneus. The anterior joint is the acetabulum pedis formed by the head of the talus articulating with the middle and anterior calcaneal facets, the calcaneonavicular component of the bifurcate ligament, the superomedial calcaneonavicular ligament, and the plantar calcaneonavicular (spring) ligament.

The position of the talocalcaneonavicular joint will change the articular structures identified on a lateral radiograph. The ability to evaluate and appreciate the subtle radiographic changes will improve the decision making process.

ILLUSTRATED TECHNIQUE

Figure 1A. Normal talocalcaneal articulation. Note the lateral process of the talus articulating with the posterior facet of the calcaneus and the sustentaculum tali of the calcaneus articulating with the middle facet of the talus.

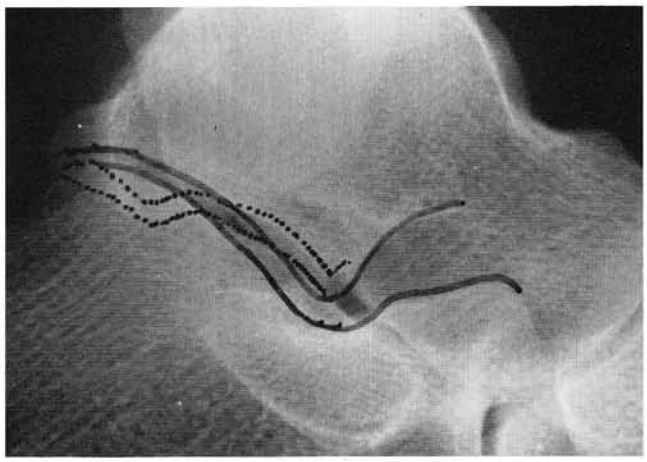

Figure 1B. The posterior facet of the subtalar joint. The solid line represents the lateral side of the joint: the lateral aspect of the articulating surfaces, the lateral process of the talus, the floor of the sinus tarsi and the anterior beak of the calcaneus. The dotted line represents the medial side of the joint: the medial articulating surface and the groove for flexor hallucis longus.

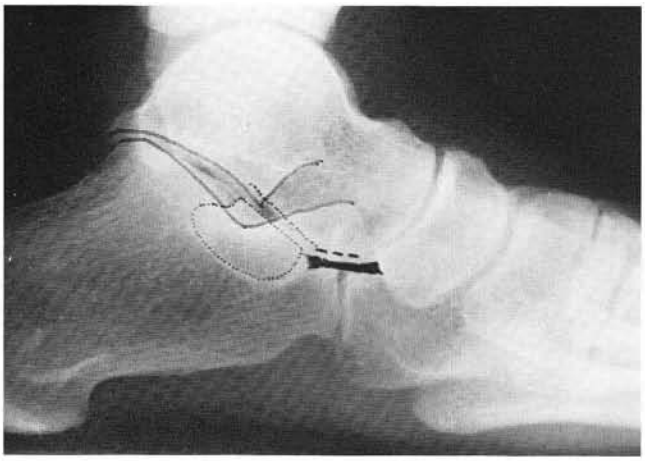

Figure 1C. The solid line identifies the posterior facet. The short dotted line identifies the sustentaculum tali supporting the middle facet. The plantar calcaneonavicular (spring) ligament is drawn and supports the anterior facet articulation on the talus.

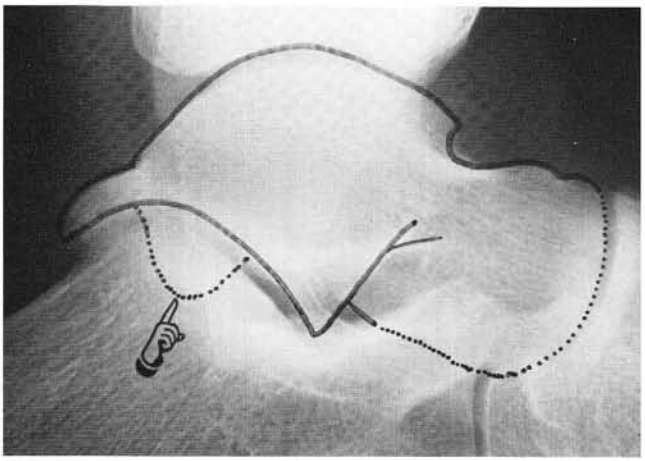

Figure 3A. The hand identifies the medial posterior process of the talus. Note the relationship to the lateral posterior process and the posterior facet on the lateral side of the joint.

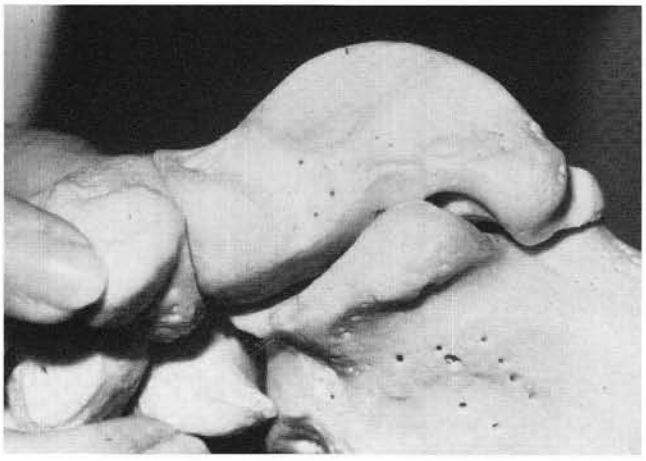

Figure 3B. The medial aspect of the right foot. Note the anterior facet of the talus supported by the plantar calcaneonavicular ligament, the sustentaculum tali supporting the middle facet dorsally and the groove for flexor hallucis longus plantarly. The prominent medial posterior process of the talus articulates with the dorsal medial aspect of the calcaneus and forms the posterior wall of the sinus tarsi.

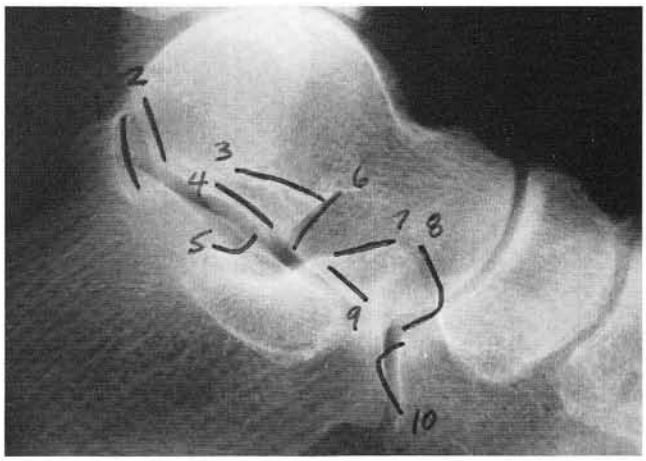

Figure 2. The following radiographic features are identified.

1. The groove for flexor hallucis longus between the medial and lateral posterior process of the talus.
2. The posterior aspect of the fibula.
3. The roof of the sinus tarsi in the talus.
4. The posterior facet of the talus.
5. The floor of the sinus tarsi in the calcaneus.
6. The anterior edge of the lateral process of the talus.
7. The anterior dorsal beak of the calcaneus, origin of extensor digitorum brevis.
8. The anterior beak of the calcaneus, lateral aspect.
9. The anterior facet of the talus.
10. The medial aspect of the cuboid at the calcaneocuboid joint.

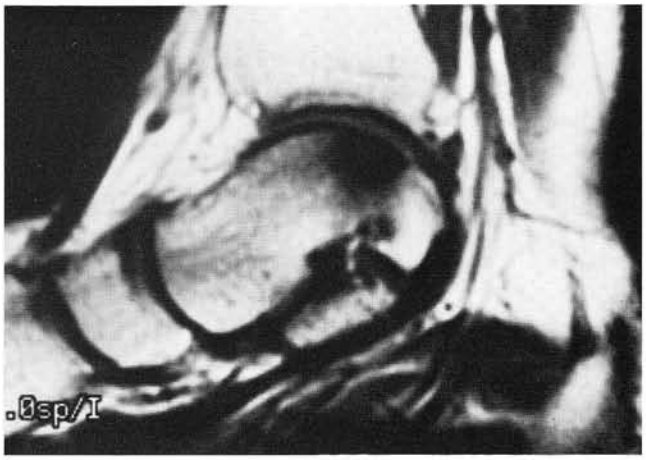

Figure 3C. A magnetic resonance image identifies the relationship of the flexor hallucis longus, posterior medial process of the talus, the sinus tarsi and the sustentaculum tali.

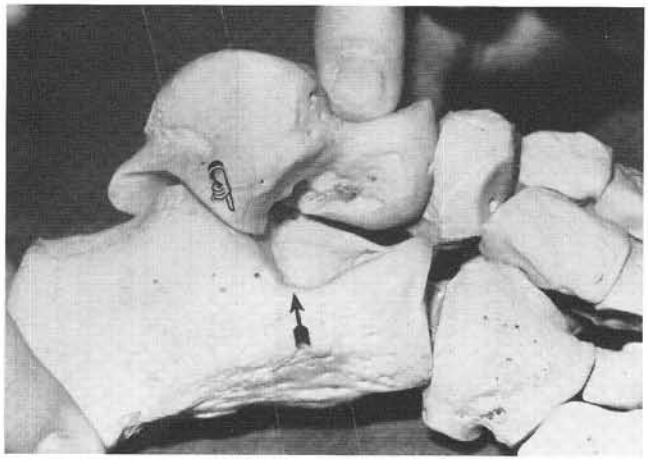

Figure 4A. The hand identifies the lateral process of the talus. The arrow identifies the floor of the sinus tarsi on the calcaneus. The distance between these two structures is the true, articular relationship of the subtalar joint. Supination of the subtalar joint moves the talus posterior in relation to the calcaneus. The talus dorsiflexes and abducts in relation to the calcaneus.

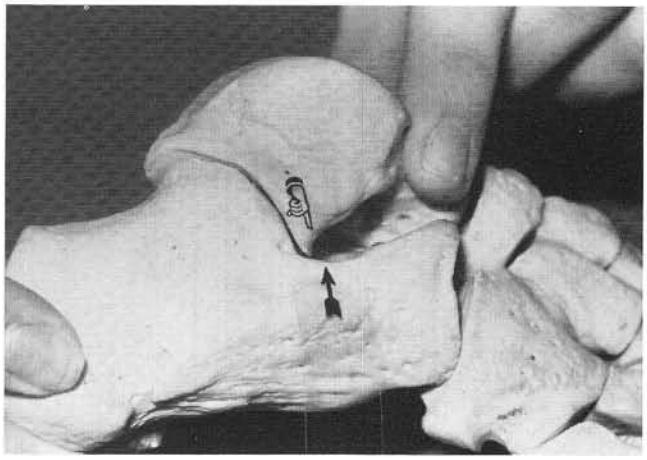

Figure 4B. Pronation of the subtalar joint moves the talus anterior in relation to the calcaneus. The talus plantar flexes and adducts in relation to the calcaneus. The maximum pronated position of the subtalar joint is the bone to bone contact of the lateral process of the talus against the floor of the sinus tarsi.

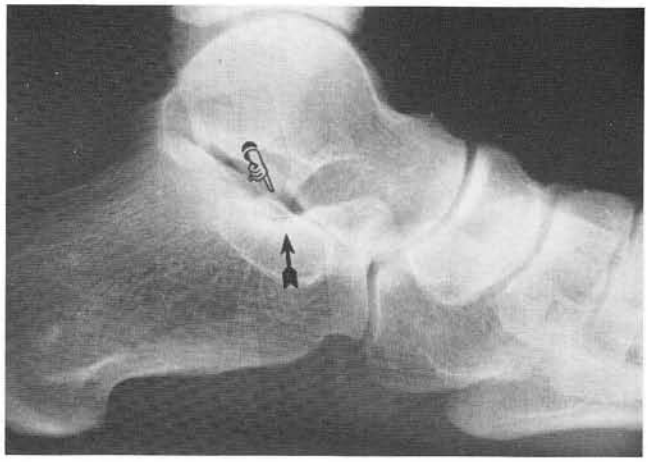

Figure 4C. The true, articular relationship of the subtalar joint can be easily identified on the lateral radiograph: The distance between these anatomic structures is absolute. Talar declination angle or calcaneal inclination angle are relative and often unreliable indicators of subtalar joint position and function.

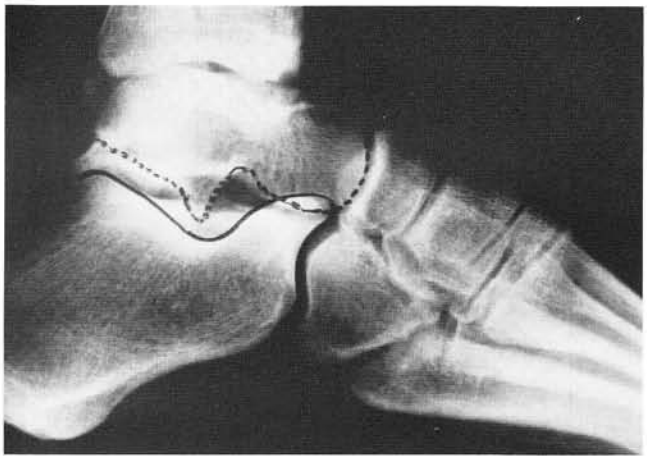

Figure 5A. The lateral process of the talus and floor of the sinus tarsi are outlined. This is a cavus foot with a very high calcaneal inclination angle and very low talar declination angle, though the subtalar joint is almost fully pronated.

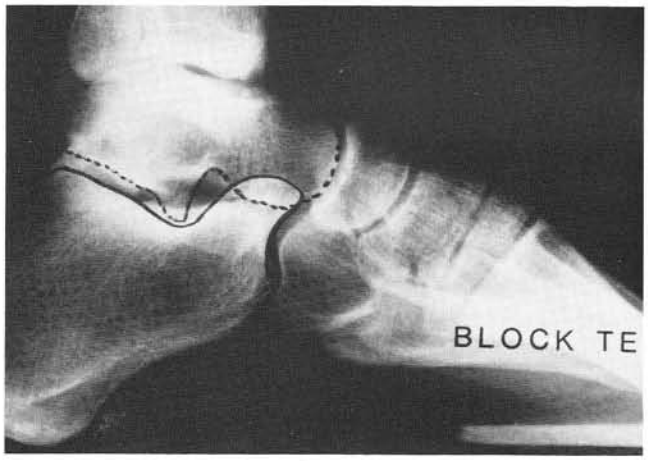

Figure 5B. The Coleman block test is performed. The lateral column of the foot is elevated until the maximum pronated position of the subtalar joint is identified. The radiograph shows the lateral process of the talus abutting the floor of the sinus tarsi.

REFERENCE

1. Sarrafian SK: *Anatomy of the Foot and Ankle* Lippincott, Philadelphia, 1983 p. 387.