

CLINICAL DECISION MAKING: The Injured Tibial Sesamoid with Overlying Hallux Valgus

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The sesamoids of the first metatarsophalangeal joint play an important role in the dynamic function of the joint. However, when the tibial sesamoid is diseased or injured, with concomitant hallux valgus, careful surgical planning and execution are necessary to treat the degenerative sesamoid, rebalance the joint, and correct the deformity. The correction is complicated by the loss of the stabilizing influence of the tibial sesamoid. The tibial sesamoid normally functions to adduct and plantarflex the hallux. When the tibial sesamoid is removed during hallux valgus surgery, the chance of recurrence of hallux valgus is increased. This specific clinical scenario and several surgical options will be presented.

CLINICAL PATHOLOGY

The plantar position of the hallucial sesamoids in relation to the first metatarsophalangeal joint make them vulnerable to injury. The function of a normal sesamoid is to absorb three times the weight of the body, protect the flexor hallucis longus, and help to increase the mechanical advantage of the intrinsic musculature on the first ray. The term sesamoiditis has been routinely used to describe symptoms and dysfunction associated with arthritis, trauma, osteochondritis, infection, chondromalacia, inflammation, or avascular necrosis.

The tibial or fibular sesamoid can be excised with relatively few complications in a foot without hallux valgus or hallux varus deformities. A significant deformity will rarely occur as a result of an isolated sesamoidectomy in a rectus foot. Conversely, excision of both sesamoids is contraindicated because of the potential of developing hallux malleus. Therefore, resection of both sesamoids should be avoided unless absolutely necessary.

A patient with advanced hallux valgus and an injured or compromised sesamoid presents a difficult dilemma. As the severity of a hallux valgus

deformity increases, both abduction and valgus rotation of the hallux occur. As the hallux pronates, the first metatarsal deviates medially. The sesamoid apparatus maintains its relationship with the second metatarsal because of its connection with the transverse intermetatarsal ligament and the conjoined adductor tendon. As the hallux valgus deformity progresses, the tibial sesamoid appears to migrate laterally. This is actually due to the relative position of the tibial sesamoid compared to the medially-displaced first metatarsal. Increased weight-bearing forces are then transmitted through the tibial sesamoid. Conversely, the fibular sesamoid becomes displaced laterally, where its weight-bearing role is diminished. This position also serves to propagate the deformity. The progression of the deformity displaces the tibial sesamoid laterally across the crista. Eventually, the intersesamoidal ridge erodes, causing additional arthritic symptoms. Excision of the tibial sesamoid without addressing the medial tendinous structures along with the hallux valgus correction will cause a recurrence of the deformity.

SURGICAL PLANNING

Corrective surgery should be considered when the patient is still experiencing pain after extensive conservative treatment has been tried. A small percentage of patients will have a painful hallux valgus deformity along with a symptomatic, injured tibial sesamoid which does not respond to conservative measures.

Surgical excision of a chronically painful sesamoid should be considered when conservative treatment has failed. Surgical excision of a tibial sesamoid with hallux valgus correction is more difficult to perform, and the long-term results can be unpredictable.

Based on the knowledge of anatomy and function, surgical reconstruction should attempt to maintain the integrity of the remaining intrinsic

muscles and capsule in order to realign the musculo-tendinous balance of the first metatarsophalangeal joint.

Surgical excision of the tibial sesamoid uniquely predisposes the first metatarsophalangeal joint to recurrence of the hallux valgus deformity. Postoperatively, the hallux has a tendency to drift laterally. In some cases, the abutment against the second toe will serve to stop this lateral migration. Several rebalancing techniques including adductor tendon transfer, medial capsulorrhaphy, or a more extensive lateral release including the lateral capsule, can be used to prevent this complication. Release of the flexor hallucis brevis must be weighed against the potential for hallux malleus. The extensor hallucis brevis is rarely a major deforming force, and should only be released when a significant contracture is present.

Only occasionally will a deviated proximal articular set angle (PASA) need to be addressed with a first metatarsal osteotomy. A deviated asymmetrical proximal phalanx is treated with an ancillary Akin procedure.

SURGICAL TECHNIQUE

A standard dorsomedial incision gives adequate surgical exposure to both sesamoids when hallux valgus correction with sesamoid excision is performed. The goal is to realign the existing sesamoid apparatus with the plantar first metatarsal facets. A plantar lateral release of the adductor tendon and fibular sesamoidal ligament allows the sesamoid complex to be relocated medially. It also allows exposure to the dorsal medial aspect of the tibial sesamoid.

In a case of mild tibial sesamoiditis with a radiographically near-normal sesamoid, the tibial sesamoid can be reseeded into its natural groove. This can be augmented with the use of an adductor tendon transfer. The chance of iatrogenic hallux varus is minimized with excision of the tibial sesamoid. The prognosis for this procedure is improved when the plantar crista is intact and devoid of arthritic changes. In a cases where a small distal fragment is found, a partial sesamoidectomy can be performed from this approach.

In cases where the decision has been made to remove the tibial sesamoid, the same dorsomedial incision is used so the sesamoid can be "shelled out" of the medial flexor hallucis brevis. Care is taken to avoid sectioning the flexor hallucis longus tendon. Round-tipped surgical blades are effective. The defect should then be reapproximated to maintain the pull of the flexor hallucis brevis. This is accomplished through an end-to-end anastomosis technique using absorbable suture or a side-to-side anastomosis with tendon redundancy.

A sesamoid planning is only indicated in the case of a plantar hypertrophic sesamoid, or an irregular sesamoid due to a congenital anomaly. If plantar tibial sesamoid planing is performed, an additional plantar medial incision will give good exposure to the plantar aspect of the sesamoid. However, care should be taken to avoid the proper plantar digital nerve to the hallux.

In the event that both sesamoids require excision, arthrodesis of the hallux interphalangeal joint will prevent a cocked-up hallux deformity. It is hard to predict whether this complication will occur, and staging of the interphalangeal joint arthrodesis may be preferred over a prophylactic fusion. These patients usually demonstrate weakness in the ability to plantarflex the hallux.

Following the soft tissue and sesamoid rebalancing procedures, an osteotomy of choice is performed at the first metatarsal. After final positioning and fixation of the osteotomy, the soft tissue structures are rebalanced. Attention is directed at transverse plane alignment of the joint, as well as sagittal plane motion.

The specific postoperative course is determined by the number of procedures performed. If the sesamoid apparatus was significantly altered with excision of the tibial sesamoid, a semi-rigid dressing in the immediate postoperative period is used. This semi-rigid dressing is followed by a splint for the first 1 to 2 months postoperative, until the plantar mechanism is healed and stabilized (Figs. 1A, 1B).



Figure 1A. The fractured tibial sesamoid with an overlying hallux valgus deformity is shown.

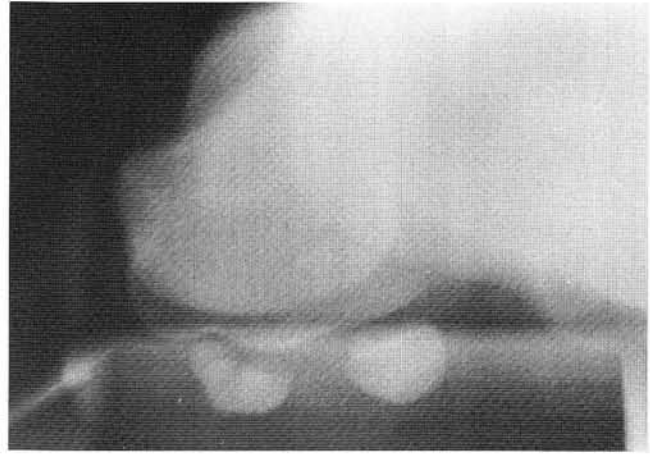


Figure 1B. Sesamoid axial view showing the fragmented tibial sesamoid in a displaced plantar-lateral position.