

# OS TIBIALE EXTERNUM IN THE ADULT PATIENT

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## INTRODUCTION

Os tibiale externum (OTE) also termed accessory navicular, os naviculare, or os navicularis is a common accessory bone in the foot located medial and sometimes proximal to the navicular tuberosity. It is attached and continuous with the tibialis posterior tendon and is present in 10 to 15% of the population either unilateral or bilateral. At the age of 9 years, OTE normally ossifies to the navicular and becomes part of the navicular tuberosity. When the ossification center fails to ossify or only partially ossifies, it results in this common accessory bone.

## OS TIBIALE EXTERNUM

On examination, OTE can present as medial pain in the area of the navicular tuberosity with or without posterior tibialis dysfunction and tendon pathology. Often, there is an associated pes valgus foot type, but not always. A large OTE gives a visual prominence that is often larger than the typical navicular tuberosity eminence. In others, there is no visible prominence but direct pain over the tuberosity or just proximal to it. Commonly, an OTE is symptomatic in childhood if symptomatic at all. If seen in adults, the OTE is an incidental finding that is asymptomatic unless there is stress or trauma to the synchondrosis or bone itself.

Differential diagnosis of OTE includes insertional tibialis posterior tendonitis and navicular fractures or stress fractures and arthrosis of the medial column. It is important to differentiate a painful accessory bone due to tendonitis or a true fracture for treatment purposes.

Radiographic views that best display an OTE are a lateral oblique view, a valgus stress view, and the lateral view. If not easily visible on radiograph, computed tomography (CT) scans and bone scans can be useful. Magnetic resonance imaging can also be used to visualize edema within the bone and synchondrosis. The OTE will typically be obvious on radiograph, displayed as an extra bone with a visual synchondrosis between them. If the synchondrosis is ossified, the size of the navicular tuberosity usually indicates this type of accessory bone.

There are three types of OTE.<sup>1,2</sup> Type I occurs when an ossification center forms a sesamoid bone within the tibialis posterior tendon, near the navicular insertion. Type

I ossicles are generally well-defined round or oval bones, measuring approximately 2 to 3 mm in diameter, and are located up to 5 mm medial and posterior to the medial aspect of the navicular.

In type II OTE, the ossification center measures approximately 9 to 12 mm in size, and resides adjacent to the tubercle of the navicular bone. A residual cartilaginous synchondrosis joins the triangular type II ossicle approximately 1 to 2 mm medial and posterior to the navicular. The majority or entire tibialis posterior tendon inserts on the type II accessory ossicle.

Type III OTE is characterized by a prominent navicular tuberosity that is essentially a type II ossicle connected to the medial aspect of the parent navicular by an osseous bridge.

Conservative treatment for OTE includes padding around the prominence with a doughnut-shaped felt or moleskin, orthotics that shield the prominence, or cast immobilization. Often, surgical treatment is needed to treat a painful OTE. The Kidner procedure addresses the painful OTE by excision of the accessory bone and any hypertrophy of the navicular tuberosity followed by advancement of the tibialis posterior tendon in a plantar and lateral direction. Different techniques of reattachment of the tibialis posterior tendon have been described including suture techniques and uses of different bone anchors. Cast immobilization for a minimum of six weeks is typically utilized. Surgeons should keep in mind that the Kidner procedure does not restore a medial arch but only addresses a painful and prominent OTE.

## CASE REPORT

An 82-year-old man presented with diffuse foot pain. His family recalled an injury while fixing a fence and stepping into a hole. Radiographs were significant for an unusually shaped os tibiale externum with bone callus formation (Figures 1, 2). It had a “hook” or “C-shape” to it extending over the talonavicular and navicular cuneiform joint, which is not typical of an os tibiale externum accessory bone. To rule out other bone disorders or neoplasms, a CT scan was performed (Figure 3). Over-the-counter orthotics along with ice and anti-inflammatories were recommended. The pain progressed



Figure 1. Preoperative anteroposterior view. Note the abnormal “hook” or “C-shape” of the OTE.



Figure 2. Preoperative lateral oblique view.

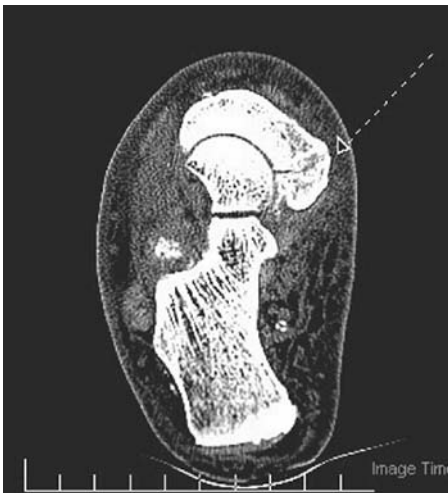


Figure 3. Preoperative CT image displaying an obvious synchondrosis of the OTE.

to direct pain over the navicular tuberosity. It became severe and immobilization was needed for relief. Even with a cam-walker boot, the pain progressed and surgical intervention was discussed.

A Kidner procedure was performed excising the OTE and reattaching the tibialis posterior tendon with an Opus Magnum anchor (Arthrocare, Sunnvale, CA) (Figures 4, 5).

Dissection and exposure of the accessory bone was performed with care taken to preserve the tibialis posterior tendon. The tendon was inspected and no damage was visualized. The synchondrosis was found easily with a Freer elevator and the OTE was mobile. The synchondrosis also had a significant amount of gouty tophi between the navicular and accessory bone. The OTE was removed, navicular tuberosity flattened, and the tibialis posterior tendon reattached with distal advancement. Intra-operative and postoperative imaging was useful in extra-articular placement of the anchor (Figure 6). Cast immobilization was utilized postoperatively for 6 weeks.

## DISCUSSION

In adults, the os tibiale externum is typically asymptomatic and seen as an incidental finding on radiograph. Trauma to the area can disrupt the synchondrosis and cause progressive symptoms. This unusually-shaped OTE with a sudden increase in pain prompted a full workup for other bone disorders or neoplasms. Surgical intervention included the Kidner procedure with excisional biopsy. Final diagnosis included an OTE with trauma to the synchondrosis complicated with an acute gouty attack.



Figure 4. A Freer elevator was placed into the synchondrosis separating the OTE and navicular. Note the large amount of gouty tophi within the synchondrosis.

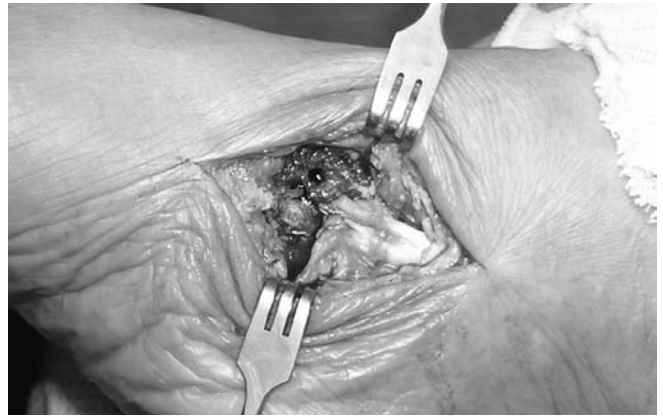


Figure 5. Reattachment of the tibialis posterior tendon was performed using the Opus Magnum anchor (Arthrocare, Sunnyvale, CA).



Figure 6. Postoperative lateral oblique view displaying the navicular post excision of the OTE and extra-articular placement of the bone anchor.

## REFERENCES

1. Lawson JP, Ogden JA, Sella E, Barwick KW. The painful accessory navicular. *Skel Radiol* 1984;12:250-62.
2. Sella EJ, Lawson JP, Ogden JA. The accessory navicular synchondrosis. *Clin Orthop Rel Res* 1986;209:280-5.