ORTHOPEDIC FOOT & ANKLE CENTER

Posterior Ankle Scope Approach to Symptomatic Os Trigonum Removal

John M. Thompson DPM[1], Travis M. Langan DPM, AACFAS[2], Christopher F. Hyer DPM, MS, FACFAS[3]

1. Resident Physician, Grant Medical Center, Columbus, OH 2. Fellow, Orthopedic Foot and Ankle Center, Worthington, OH 3. Residency Program Director, Grant Medical Center, Columbus, OH Fellowship Director for Advanced Foot and Ankle Surgical Fellowship, Orthopedic Foot and Ankle Center, Worthington, OH

INTRODUCTION

Os trigona are reported in 3-24% of the general population and are found bilaterally in 50% of observed cases [1,2]. Symptomatic trigona are frequently triggered by acute or chronic/repetitive compression of the posterior ankle. If conservative treatment fails, surgical removal of the os trigonum can be performed. Classically, this involves open excision of the os via a posterior, posteromedial, or posterolateral approach [3]. More recently, arthroscopic and endoscopic removal has been described as a less invasive technique [5,6]. Standard anteromedial and anterolateral ankle portals are used in most ankle arthroscopic procedures and allow for adequate access to the front of the joint. However, posterior ankle joint visualization is limited with the anterior portals. In response, Marumoto and Ferkel developed the technique of an augmented posterolateral portal in combination with the standard anterior approach.[7] This enabled proper access to posterior ankle. Later, Van Dijk et al demonstrated a posterior, two portal endoscopic technique that enabled not only access of the posterior ankle joint and also allowed access to the flexor hallucis longus tendon (FHL), os trigonum, and posterior osteochondral lesions [8]. Since the advent of the posterior approach, several studies have been published describing several posterior ankle scope technique and results [9-12]. The purpose of this study is to retrospectively analyze the post-operative outcomes following a posterior approach endoscopic os trigonum removal with specific emphasis towards return to activity and complication rate.

Pre-op MRI & XR of Symptomatic Os Trigonum

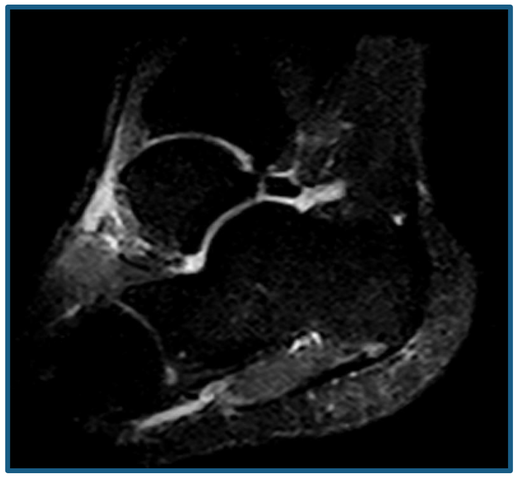

Figure 1: Pre-operative T2- weighted MRI confirming presence of os trigonum noted to the posterior ankle. Concomitant hyper-intense fluid signal surrounding the os and adjacent structures.

METHODS

From May 2009 to September 2018, all patients who underwent excision of a symptomatic os trigonum were reviewed. Outcomes of interest were major and minor complications and time to return to full weightbearing activities. Postoperative protocol included 5-7 days non weightbearing, 1-2 weeks of protected weightbearing, followed by full release to weightbearing activities.

Surgical Planning

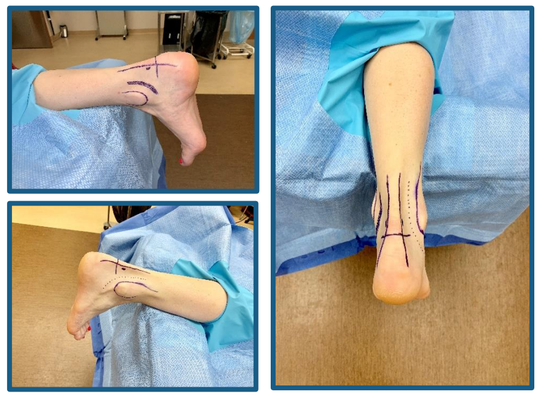

Figure 2: Pre-operative surgical planning/positioning with Anatomic outlining of distal tibia, fibula and Achilles tendon. Surgical scope portals depicted by oval marks adjacent to Achilles tendon.

Surgical Technique

Patient is placed in a prone position with the feet at or slightly distal to the end of the table. A thigh tourniquet is utilized and a small towel bump is positioned at the anterior ankle to slightly suspend the foot to allow for dorsiflexion and plantarflexion as needed (Figure 2). Posteromedial and posterolateral arthroscopy portals are created alongside the medial and lateral border of the Achilles tendon 0.5cm proximal to the tip of the fibula (Figure 2). The portals allow for convergence toward the os trigonum avoiding neurovascular bundle at all times. Incision is made and blunt dissection performed to the level of the posterior ankle. The camera (4.0 mm, 30°) is placed in the lateral portal. The arthroscopic shaver is positioned into the medial portal and directed laterally away from neurovascular bundle. The shaver is used to debride any posterior fat within Kaeger's triangle. Diligent identification of the posterior ankle joint, subtalar joint, and FHL tendon along with hypertrophic bone/os trigonum is obtained (Figure 3). Any FHL tendon adhesions and thickened synovium is debrided to eliminate any impingement. The os trigonum was removed using a quarter inch osteotome, power rasp, and/or shaver. A large grasper, hemostat, or rongeur can be used to grasp and remove the large ossicle once free (Figure 4). Direct visualization with the camera allows for complete removal and debridement of any remaining sharp edges or fragments.

RESULTS

Endoscopic View of Os Trigonum

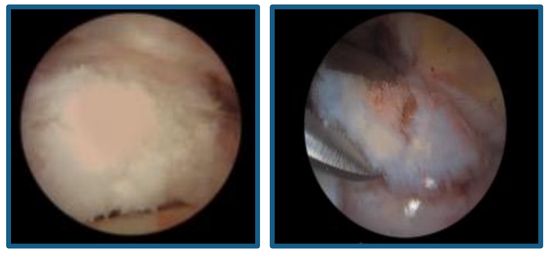

Figure 3: Endoscopic views of os trigonum prior to immobilization from soft tissue attachments (left image). Also, following detachment from soft tissues and initial capture with endoscopic grasper (right image).

Fourteen patients underwent posterior arthroscopic excision of a symptomatic os trigonum and 12 patients met inclusion criteria. There were 7 males and 5 females. Average age was 34.0 years and average follow up was 10.2 (±7.4) months. There were no major complications and 1 minor complication. The minor complication consisted of a small wound dehiscence of the lateral portal at the first post-operative visit related to excess moisture around the incision. The area healed within 1 week with local care. There were no incidences of post-operative infection or neurovascular damage. 10/12 patients reported minimal to no pain (0-2 out of 10 on VAS scale) at the first post-operative visit with the other two patients' pain resolving by the following visit. All patients were pain free at their second postoperative visit. Average advancement to protected weightbearing was 7.1 days. Average return to full weightbearing activities without restriction was 24.4 days.

Pre-op to Post-op XR of Left Foot

Figure 4: Pre-operative and Post-operative XR (first follow-up visit) of left foot demonstrating surgical removal of Os Trigonum.

Extricated Os Trigonum

Figure 5: Endoscopic removed os trigonum.

CONCLUSIONS

The current study describes the technique and results to minimally invasive os trigonum removal with favorable postoperative outcomes. Results demonstrated minimal complications and postoperative pain, also quick return to weightbearing and full activity.

BIBLIOGRAPHY

[1] Cilli F, Akcaoglu M. The incidence of accessory bones of the foot and their clinical significance. Acta Orthop Traumatol Turc 2005;39:243–6.
[2] Coskun N, Yuksel M, Cevener M, Arican RY, Ozdemir H, Bircan O, et al. Incidence of accessory ossicles and sesamoid bones in the feet: a radiographic study of the Turkish subjects. Surg Radiol Anat 2009;31:19.
[3] Kadel NJ. Excision of os trigonum. Oper Tech Orthop 2004;14:1–5.
[4] Ahn JH, Kim Y-C, Kim H-Y. Arthroscopic versus posterior endoscopic excision of a symptomatic os trigonum: a retrospective cohort study. Am J Sports Med 2013;41:1082–1089.
[5] Guo QW, Hu YL, Jiao C, Ao YF. Open versus endoscopic excision of a symptomatic os trigonum: a comparative study of 41 cases. Arthrosc J Arthrosc Relat Surg 2010;26:384–390.
[6] Horibe S, Kita K, Natsu-ume T, Hamada M, Mae T, Shino K. A novel technique of arthroscopic excision of a symptomatic os trigonum. Arthrosc J Arthrosc Relat Surg 2008;24:121–e1.
[7] van Dijk CN, de Leeuw PA, Scholten PE. Hindfoot endoscopy for posterior ankle impingement: surgical technique. JBJS 2009;91:287–298.
[8] Gasparetto F, Collo G, Pisanu G, Villella D, Drocco L, Cerlon R, et al. Posterior ankle and subtalar arthroscopy: indications, technique, and results. Curr Rev Musculoskelet Med 2012;5:164–70. doi:10.1007/s12178-012-9118-y.
[9] Ogut T, Ayhan E, Irgit K, Sarikaya AI. Endoscopic treatment of posterior ankle pain. Knee Surg Sports Traumatol Arthrosc Off J ESSKA 2011;19:1355–61. doi:10.1007/s00167-011-1428-x.
[10] Miyamoto W, Takao M, Matsushita T. Hindfoot endoscopy for posterior ankle impingement syndrome and flexor hallucis longus tendon disorders. Foot Ankle Clin 2015;20:139–47. doi:10.1016/j.fcl.2014.10.005.
[11] Smyth NA, Zwiers R, Wiegerinck JI, Hannon CP, Murawski CD, van Dijk CN, et al. Posterior hindfoot arthroscopy: a review. Am J Sports Med 2014;42:225–34. doi:10.1177/0363546513491213.
[12] Vilá J, Vega J, Mellado M, Ramazzini R, Golanó P. Hindfoot endoscopy for the treatment of posterior ankle impingement syndrome: a safe and reproducible technique. Foot Ankle Surg Off J Eur Soc Foot Ankle Surg 2014;20:174–9. doi:10.1016/j.fas.2014.03.002.