Painful Osteophytes, Ectopic Bone, and Pain in the Malleolar Gutters Following Total Ankle Replacement

Management and Strategies

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KEYWORDS

• Ankle arthroscopy • Débridement • Heterotrophic bone • Malleolar impingement
• Total ankle arthroplasty

KEY POINTS

- Osseous overgrowths leading to osteophytes and ectopic bone formation are fairly common occurrences after primary total ankle replacement.
- The most common site for ectopic bone formation is the posterior ankle joint followed by the medial and/or lateral gutters.
- Most osteophytes and ectopic bone formation do not require surgical intervention.
- When ectopic bone formation in the malleolar gutters restricts motion or is a source of pain it may require surgical intervention.
- Open and arthroscopic procedures have been described to address these postoperative complications with good relief obtained in most instances; however, a high reoperation rate exists, especially if talar component subsidence is responsible for the ectopic bone formation within the medial and/or lateral gutters.

INTRODUCTION

The incidence of osseous overgrowth after primary total ankle replacement (TAR) has been reported to range from 3.8% to 82%, but has not been linked to one clear causative entity. Lee and colleagues[1] conducted a study on 88 ankles following primary TAR and reported that 25% of patients developed ectopic bone growth. Specifically, 35% of these patients displayed bone formation at the posterior-medial and posterior-lateral quadrants of the ankle; 25% displayed only posterior-medial bone

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formation; 25% displayed only posterior-lateral bone formation; 10% displayed anterior-medial and posterior-lateral bone formation; and 5% developed anterior-lateral and posterior-medial bone formation.[1] It is important to note that each of the patients with ectopic bone formation had some degree of posterior bone formation that is consistent with other reports following TAR.[2–5] Lee and colleagues[1] also reported that only 10% of patients who developed ectopic bone ossification were symptomatic with only 2.3% of their patients requiring surgical resection. This finding is consistent with what is reported in existing orthopedic literature relative to hip and knee replacements, with symptomatic ectopic bone ossifications resulting in severe functional loss only accounting for 1% to 2% of patients.[6]

There exists a divide in the current foot and ankle literature in this area, as many studies suggest that osteophytes and ectopic ossifications are linked to anterior and posterior impingement syndromes[4] with associated functional disabilities, such as pain with traversing uneven terrain, incline ambulation, or rising from a seated position. In contrast, other investigators do not associate a loss of function or postoperative pain with ectopic ossifications in TAR.[1,3,5,7,8]

Orthopedic data pertaining to ectopic ossification after knee and hip replacement have stirred similar critical evaluation following TAR. Early attempts to identify factors that lead to, or even predispose a patient to postoperative formation of osteophytes and/or ectopic bone ossifications are currently being conducted. It has been suggested that age, body weight (ie, increased body mass index), presence of preoperative osteophytes, and increased preoperative serum calcium and alkaline phosphatase will increase the likelihood of postoperative osteophytes and ectopic ossification in hip and knee replacements.[1,2,9] Choi and Lee[7] investigated the aforementioned predisposing factors in a series of 90 ankles following primary TAR and found that the only associated risk factor for postoperative osteophytes and ectopic bone formation was gender. Specifically, they found that men were twice as likely to develop osteophytes and ectopic ossifications as women.[7]

Other theories suggest that the formation of osteophytes and ectopic bone ossification could be a result of procedural factors as opposed to the previously discussed patient demographics. Potential factors that have been studied include the large amount of soft tissue dissection associated with the procedure, the amount of osseous trauma involved in the procedure, persistence of bone debris in the surgical field, postoperative hematoma, appropriate sizing of prosthetic components, and position of the prosthetic components leading to changes in the biomechanical axis of the ankle joint.[2] Removal of the posterior portion of the resected tibia is often difficult due to the attachment of the posterior capsular tissues and dissection occurring from the anterior aspect of the ankle for most TAR systems available in the United States. Multiple attempts at removing this portion of the tibia frequently result in morcelization of fragments. San Giovanni and colleagues[3] suggest that these morcelized portions of bone are not always completed resected and may lead to postoperative osteophytes or ectopic bone formation.

King and colleagues[2] noted that a high percentage of patients in their study with posterior osseous overgrowth had their prosthetic components inserted at an angle that was not perpendicular to the anatomic axis of the tibia, usually placed in varus or valgus with a positive slope (ie, apex posterior). They found a positive correlation between increased slope of the tibial component and uncovering of the posterior distal tibia. With decreased tibial coverage, there was found to be an increase in ectopic bone formation around the tibial tray, thus making size selection of prosthetic components and accurate insertion critical.[2] Surgeons choosing larger tibial component size to increase the amount of cortical coverage may do so at the cost of greater bone resection medially and laterally at the malleoli that can lead to malleolar fractures.