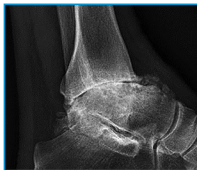


Zimmer® Trabecular Metal™ Total Ankle System Flat Top Deformities

Introduction

An ankle replacement that involves a flat top talus presents unique challenges, requiring the surgeon to carefully consider a number of preplanning issues and to be prepared to make important intraoperative decisions. In a typical case with a flat top talus, the medial malleolus may be slightly hypoplastic, the slope of the medial and lateral facets may be more horizontal, and the ankle may extrude anteriorly. These issues must be considered in preoperative planning, especially with regard to preparing the joint and releasing soft tissues before bone resection, determining the optimal bone resection, selecting the appropriate implant size, and setting up the Alignment Stand in a manner that will allow the necessary joint manipulation to achieve the desired alignment.



Up close lateral x-ray of an ankle joint with a flat top talus.

Addressing the Issue

The extent of the posterior release is important to help ensure sufficient access to the posterior aspect of the joint. But in the case of a flat top talus, the release should also facilitate any necessary posterior translation of the talus, whether it occurs naturally with the release, or through surgeon intervention.

Appropriate implant size selection must be considered in concert with determining the optimal level of bone resection. It is important to consider how the width of the ankle is affected when the slopes of the medial and lateral facets are more horizontal than commonly encountered. The resected surface of the talus will be slightly wider, so a decision must be made whether to base the sizing on the width of the talus at its most superior aspect before resection, or at the expected level of resection, which often may indicate a larger size. Most prefer to gauge the size at the level of resection. However, this may create a sizing mismatch between the talus and the tibia. As talar and tibial component sizes are not interchangeable, the size must be chosen to ensure maximum bone coverage in both the A/P and M/L dimensions while avoiding overhang with either component.

Also, when determining the optimal level of resection, it is important to minimize notching of the talar neck, although slight notching may be necessary to maintain the joint line. A slightly more superior talar resection will help minimize notching of the talar neck, but consider the impact of this position on the corresponding tibial resection, particularly how it may compromise the medial malleolus. When the joint line is moved superiorly, more bone must be removed from the area of the medial malleolus. If the medial malleolus is hypoplastic, the integrity of the structure could be further compromised. The goal is to optimize talar coverage without compromising the medial malleolus. Consider also, that the arced resection of the tibia will leave more bone anteriorly and posteriorly compared to a flat resection. In effect, this provides an additional buttress to help preserve the function of the medial malleolus.

When planning the appropriate talar bone resection for a flat top talus, the surgeon should place the available overlays over the radiographs to observe the cutting arc and the area where bone will be removed. This will help reveal potential notching of the talar neck. The central portion of the cutting arc will be above the bone surface. It is recommended that this uncut central area be no more than 50% of the arc, leaving at least 25% both anteriorly and posteriorly where bone will be removed. This will provide a sufficient base for the implant rails.

As it is likely that a patient with a flat top talus will present with some anterior extrusion, an alternate frame configuration using an anterior-to-posterior distal tibial pin should be considered. This frame configuration is explained in the first part of this series, "A/P Translation."

Case Review

This case involves an active 68-year-old man with a history of a severe sprain. Pre-operative radiographs reveal a relatively flat talus, minor hypoplasia of the medial malleolus, some anterior extrusion, and relatively horizontal lateral facets.



Weight bearing x-ray of an ankle joint with a collapsed talar dome.



Anterior x-ray of the ankle joint with a flat top talus, prior to surgery.

Postoperative radiographs show excellent alignment in both the sagittal and coronal planes. Although the resection level is more superior, there is still some notching. In retrospect, the surgeon believes that the resection could have been made slightly more superior. Sizing was maximized without compromising the medial malleolus. Had the resection level been higher, it may have been necessary to downsize the components to avoid compromising the medial malleolus.



Anterior (left image) and Lateral (right image) x-ray of the ankle joint replaced with the Zimmer Trabecular Metal Total ankle prosthesis.