The Lateral Distal Tibial Articular Angle and Relationship to Talar Subluxation in TAR

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Summary: 154 consecutive patients presenting between the years of 2000-2010 are to be evaluated in regards to their preoperative lateral talar station on the lateral alignment view. Based on the preliminary data, the majority of pre-operative ankles, approximately 80%, were classified as either anterior or neutral. A smaller subset, approximately 20%, was found to have posterior subluxation of the talus. It is our impression that posterior subluxation can be corrected by adjusting the lateral tibial articular angle.

Introduction: Alignment is integral for longevity of total ankle replacement. Most interest has focused on coronal alignment in the region of the tibiotalar joint and hindfoot alignment (1-6). The lateral alignment view provides distal tibial articular alignment and visualization of the talus relative to the tibia, and allows classification of the talus as anterior, neutral, or posterior (7). We postulate that lateral ankle alignment is critical for operative decision-making, specifically as it relates to adjustment of the distal tibial articular angle when making the distal tibial cut. At this point, lateral view alignment has only been assessed postoperatively post total ankle replacement (8). The majority of ankle arthritis patients present with anterior or neutral talar posture (9,10,11). Chronic ankle instability with anterior subluxation of the talus has been recognized as a common form of post traumatic ankle OA (12). Nonetheless, there is a smaller subset of ankles with posterior subluxation of the talus that is important to recognize. Our hypothesis is that in the setting of posterior subluxation of the talus, correcting the distal tibial articular angle by opening the tibiotalar cut anatomically restores the tibiotalar axis and enables joint reduction. This diminishes the possibility of postoperative posterior subluxation of the total ankle prosthesis, which can lead to early wear, and catastrophic failure of the polyethylene spacer and the prosthesis due to edge loading (1,3-6,13). This retrospective review of a cohort of patients presenting to the University of Iowa Hospitals and Clinics for total ankle arthroplasty classifies their lateral alignment, and assesses their treatment in regards to their distal tibial cut and effect on the articular alignment.

Methods: 154 consecutive patients presenting to the University of Iowa Hospitals and Clinics between the years of 2000-2010 are to be evaluated in regards to their preoperative lateral talar station on the lateral alignment view. They were classified as anterior, neutral and posterior using the measurement technique established by Tochigi et al. and the lateral talar axis (7). This cohort was further evaluated for their postoperative lateral talar alignment as it related to the distal tibial articular alignment.

Preliminary Results: The majority of pre-operative ankles, approximately 80%, were classified as either anterior or neutral. The distal tibial articular angle in this group was measured in the normal range 8 +/- 5 degrees. A smaller subset, approximately 20% of ankles, was found to have posterior subluxation of the talus. The distal tibial articular angle in this group measured 0 +/- 5 deg. Of this subset, in those that did not receive an opening distal tibial cut with correction of the articular angle, posterior subluxation remained.

Conclusion: Lateral station of the talus in relation to the tibia in total ankle replacement candidates is important to assess preoperatively. It is our impression that posterior subluxation can be corrected by adjusting the lateral tibial articular angle. It plays a critical role in planning the appropriate distal tibial cut specifically as it pertains to posterior subluxation.