Radiographic Assessment of Lower Extremity Alignment in Ankle Arthritis Using Preoperative Long-Leg Alignment Views

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Introduction/Purpose:
Post-traumatic ankle arthritis is commonly associated with proximal lower extremity deformities. Malalignment of more proximal structures can impact decision-making and prognosis for ankle arthritis treatment such as total ankle replacement or arthrodesis. The purpose of this study is to determine the prevalence, specific location and characteristics of lower extremity deformity in patients who present with ankle arthritis, and determine if there is a correlation between lower extremity radiographic parameters and degree of ankle arthritis.

Methods:
Fifty-three patients (59 ankles) with ankle arthritis were included in the study. Mean age was 59 years (range 28 to 85). Inclusion criteria were radiographic findings of ankle arthritis and presence of LLA view. On LLA view, mean axis of deviation (MAD) at the knee, joint line congruence angle (JLCA) at the knee, anatomic medial proximal tibial angle (aMPTA) and anatomic lateral distal tibial angle (aLDTA) were measured on both the affected and unaffected sides. Kellgren-Lawrence arthritis grade at the knee was obtained. Takakura, van Dijk and COFAS arthritis grade at the ankle were obtained.

Results:
There were 15 female patients and 38 male patients (24 left, 35 right ankles). Prevalence of deformity was defined as a measurement at least one standard deviation outside of normal historical controls. For our population, 61.0% of extremities had MAD measurements outside this definition (9.7 +/- 6.8 mm); 20.3% had abnormal JLCA measurements (outside 0-2 degrees); 27.1% had aMPTA measurements outside one standard deviation (87.2 +/- 1.5 degrees), as did 47.5% of patients concerning aLDTA measurements (88.6 +/- 3.8 degrees). Higher aLDTA was a significant predictor for allocation to a grade 3 Van Dijk ankle arthritis grade (p < 0.1). Using multinomial logistic regression, Kellgren Lawrence knee arthritis grade was significantly predictive of van Dijk ankle arthritis grade 2 and 3 compared to grade 1 (p< .001). When compared to historical controls, patients with a van Dijk grade 3 had a statistically significant difference in MAD (p < 0.05). Comparing patients with Takakura grade 4 to historical controls, the MAD, knee JLCA, and MPTA were all significantly different.

Conclusion:
In patients with ankle arthritis, there is a high prevalence of lower extremity malalignment using radiographic parameters measured with a LLA view when compared to the unaffected extremity. While proximal malalignment was not found to be predictive of degree of ankle arthritis, it is important to recognize the presence of these deformities when surgical planning is performed. We recommend obtaining LLA view in all patients with ankle arthritis, in particular those who will undergo a total ankle arthroplasty.