The Effect of the Dorsal Opening Wedge (Cotton) Osteotomy as a Combined Procedure for the Treatment of Acquired Flat Foot Deformity

Foot & Ankle Category: Midfoot / Forefoot

Author(s):
Lew C. Schon, MD
Lawrence Wei, BS
Casey Jo Humbyrd, MD

Introduction
A dorsal opening wedge (Cotton) osteotomy is utilized as an ancillary procedure to correct medial column deformities while preserving midfoot articular surfaces. This study is a retrospective review of the radiographic findings after Cotton procedure as a combined surgery for acquired flat foot.

Methods
Radiographic Results were analyzed in 91 feet (88 patients). The average age of the patients was 50.85 years (standard deviation 14.49) and there was a predominance of women (61/88) in the population studied. All of the radiographic parameters were measured on the weightbearing AP and lateral x-ray films. Data was analyzed with paired t-tests using statistical software.

Results
At the beginning of the study, 24 feet demonstrated evidence of arthritis at the naviculocuneiform joint and/or the first metatarso-cuneiform joint. At final follow-up, 16 additional feet developed arthritis. Eight feet developed arthritis at the naviculocuneiform joint, 6 at the first metatarso-cuneiform joint, and 2 at both the naviculocuneiform and first metatarso-cuneiform joint. Thirteen feet were treated with metal grafts while the remaining seventy-eight patients were treated with standard bone grafts. Ten of the grafts failed to unite with the healed bone (3/13 metal and 7/78 standard bone graft). The majority of bone grafts demonstrated some degree of displacement (11/13 metal graft and 43/78 standard bone graft). Standing lateral films showed the mean lateral talus-first metatarsal angle improved from 20.0 degrees to 11.3 degrees (p < 0.0001), the calcaneal pitch improved from 14.0 degrees to 16.3 degrees (p < 0.0001), the medial column height improved from 11.4mm to 16.0mm (p < 0.0001) and the medial column length improved from 24.7mm to 29.3mm (p < 0.0001).

Conclusion
Dorsal opening wedge osteotomy of the medial cuneiform (Cotton procedure) is an effective procedure for the treatment of forefoot supination and medial arch collapse in flat foot surgery and resulted in statistically significant improvement of all radiographic parameters studied. Compared to standard bone graft, metal grafts demonstrated a lower union rate (76.9% for metal grafts versus 91.0% for bone graft) and a higher displacement rate (84.6% for metal grafts versus 55.1% for bone graft). Anticipation of a delayed collapse of the wedge may help with intra-operative planning.