Successful treatment of Charcot foot and arthritic arch collapse with anatomically designed 3D medial column plating alleviates pain and restores function

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INTRODUCTION: Collapse of the Medial Column Joint Complex due to arthritis or Charcot can cause significant pain and dysfunction[1]. Surgical repair with internal fixation is one treatment option to restore functionality and alleviate pain. Therefore, the purpose of this study was to assess the effectiveness of Titanium Medial Column plates in the treatment of flatfoot deformity associated with degenerative conditions.

METHODS: An Ethics Committee approved retrospective study from a single site evaluated clinical and radiographic outcomes of 27 patients treated with Titanium Medial Column plates to treat Charcot (5 patients) and arthritic collapsed arches (22 patients). Patients underwent a single Dorsal incision approach with the use of an Anatomically Contoured 3-dimensional 70° rotational geometrical plate. Charcot patients were non-weightbearing for 6 weeks then placed in a Weight Bearing Total Contact Cast for 6 weeks. Arthritic patients were non-weightbearing for 6 weeks then managed in a weightbearing cast for 6 weeks. The American Orthopaedic Foot and Ankle Society Midfoot (AOFAS) Scale assessed pain, function and alignment. Statistical significance was calculated between pre-operative and post-operative outcomes using a paired T-test with significance set at $p<0.05$.

RESULTS: Twenty-six patients had successful fusion (96.3%). One patient had a partial, asymptomatic nonunion of the 2nd Naviculocuneiform joint following treatment. Two Charcot patients had wound infections that resolved with PO antibiotic treatment. Twenty-five patients had pre-operative (56.5±10.8) and 6-month post-operative (91.4±2.4) AOFAS scores demonstrating a significant ($p<0.0001$) improvement in pain, function and alignment (see **Table 1**).

	Pre-operative	**6- Month Post-operative**	**P-value**
AOFAS Score	56.44 ± 10.76	91.36 ± 2.43	P<0.0001

Table 1: Patients demonstrated significantly improved AOFAS scores following treatment

DISCUSSION: This study demonstrated the ability of anatomically designed medial column plates to restore joint stability following collapse of the Medial Column Joint Complex. Patients obtained high fusion rates and improved patient reported outcomes as demonstrated by the AOFAS assessment. While additional research is required to fully evaluate long-term outcomes, this study demonstrates the effectiveness of anatomically designed plates to treat patients with arthritic and Charcot induced arch collapse.

SIGNIFICANCE/CLINICAL RELEVANCE**:** Anatomically designed medial column plates can successfully correct Medial Column anatomy in patients with Charcot foot and/or collapsed arthritic arches to alleviate pain and restore function.

REFERENCES:

1. Kurup, H. and Vasukutty, N. Midfoot arthritis – current concepts review. *Journal of Clinical Orthopaedics and Trauma* 11: 399-405 (2020)