Intermediate-Term Results of First Metatarsal Head Osteochondral Defect Treatment with Particulated Juvenile Cartilage Allograft Transplantation

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INTRODUCTION:
Focal damage to articular cartilage and the supporting subchondral plate, commonly referred to as an osteochondral defect (OCD), can be a cause of joint pain and subsequent decreased range of motion. There are few studies specifically describing these lesions in the first metatarsophalangeal (MTP) joint, where they are traditionally grouped into hallux rigidus. There exists an opportunity for early detection and intervention with the intent to prevent deterioration and improve patient outcomes. One contemporary treatment concept is to implant particulated juvenile cartilage allograft to restore articular cartilage. The aim of our study was to review the clinical results of patients that had undergone this procedure for first metatarsal head OCDs.

METHODS:
After IRB approval, a retrospective review of a consecutive case series was studied utilizing the records of three foot and ankle surgeons. Inclusion criteria included all adult patients who were a minimum of one year post surgery and consented to participate. Patient demographics and preoperative visual analog scale (VAS) pain level were recorded from a standardized intake sheet. From the operative note, the OCD size and location was recorded, as well as any concomitant procedures. At a minimum follow up of one year, we obtained objective measurements of arthritis grade and subjective considerations of pain and function, including VAS pain level, Foot Function Index (FFI), questionnaire, the American Orthopaedic Foot and Ankle Society (AOFAS) Hallux Metatarsophalangeal-Interphalangeal scale, and an overall patient satisfaction score.

RESULTS:
We found 9 patients that met the inclusion criteria, 4 males and 5 females. The average age was 41 years old (±11.77, range 21-60). The mean average preoperative VAS pain score was 7.50 (±18.32, range 30-80). Four of the nine OCDs were located centrally on the first metatarsal head. The average OCD size intraoperatively was 30 mm² (range 16-49). The average time since surgery was 3.26 years (±1.21, range 1.41-6.52). The postoperative patient results were exceptionally positive. Average first MTP dorsiflexion was 41.78 degrees (±20.70, range 6-70). The average postoperative hallux rigidus classification was grade 2 (range 1-3). The mean VAS pain score improved to 5.22 (±6.84, range 4-20). The average AOFAS score was 88 (±15.91, range 52-100). The average FFI score was 8.04 (±15.60, range 0-30.6). All but one patient were satisfied or very satisfied with their results.

DISCUSSION:
At an average of 3.26 years postoperatively, patients had improved pain, did not show significant progression of their first MTP joint degeneration, and were satisfied with their results. Patients reported very little, if any, limitations in their activity level. Potential areas for improvement in this study would be a larger sample size and increased follow-up time. We believe particulated juvenile cartilage allograft is a valuable tool for surgeons to use in treating articular defects. Encouraged by these results, increased suspicion for these lesions may allow for successful early identification and intervention.