

ARTHROSCOPIC TREATMENT OF OSTEOCHONDRAL LESIONS OF THE TALUS UTILIZING JUVENILE PARTICULATED CARTILAGE ALLOGRAFT: A CASE SERIES



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Introduction

Osteochondral lesions occur many for several reasons, often associated with sports-related and post-traumatic injuries. If left untreated, the patient will likely suffer chronic joint pain, persistent swelling, joint effusion, and mechanical sensations of popping or locking which all ultimately lead to joint degeneration.

There are a myriad of different treatment options for osteochondral defects and most techniques focus on the regeneration of fibrocartilage, consisting of primarily type I collagen. Although this is ultimately better than non-existent cartilage, fibrocartilage lacks the viscoelastic properties of true hyaline cartilage and is overall less durable. The primary concept of juvenile particulated cartilage transplantation is to try and restore the hyaline cartilage as opposed to substituting with the inferior fibrocartilage.

Treatment of osteochondral lesions (OCL) of the talar dome prove to be challenging and newer techniques with longer term effectiveness include the use of juvenile particulated cartilage allograft. Our aim was to subjectively review patients with OCL of the talar dome who were treated with an arthroscopic implantation of juvenile particulated cartilage allograft. Our hypothesis was that these patients would have good to excellent results from a relatively minimal risk surgery.

Materials and Methods

In our retrospective study, we included patients with documented OCL visible on MRI who underwent arthroscopic particulated cartilage implantation. Each patient was followed up for a minimum of 1 year and Foot Ankle Orthopedic Surveys (FAOS) were mailed out to each patient's home address. We were able to perform this procedure on a total of 81 patients from 2009 to 2016 and we received a total of 32 responses back.

At surgery, patients had a mean age of 40.68 (range 13 – 63). There were a total of 9 males and 23 females that did return their surveys. The surgical technique included debridement and remodeling of osteochondral defect through standard arthroscopic portals. The subchondral plate is then penetrated through standard microfracture. Next, the joint is dried with an abdominal insufflator to create a dry scope environment. Finally, fibrin glue is layered over the prepared OCL to act as an adhesive for the DeNovo hyaline cartilage. To complete the implantation the DeNovo is left to set for 3 minutes.

The post-operative protocol includes soft dressing with a non-weight bearing posterior splint for 3 weeks. ROM exercises and strengthening would begin at this point and transition to weight bear as tolerated by 6 weeks post-op.

The FAOS scoring system is a validated system based off the Knee Osteoarthritis Outcome Score. It is a patient-administered, user friendly survey that takes 10 minutes to complete. As for interpreting the FAOS scale, 100 points indicates no symptoms whereas 0 indicates extreme symptoms.

Results

The mean follow up for time of submission of their FAOS survey in relation to date of surgery was an average of 24 months (range 9 – 86 months). There were a total of 9 questions for the pain subscale and the mean subjective Pain score was 85.6 (range from 58.3 – 100). There were a total of 7 questions for the symptoms subscale and the mean subjective Symptom score was 80.0 (range from 46.43 – 97.22). There were a total of 17 questions for the activities of daily living subscale and the mean ADL score was 92.0 (range from 76.47 – 100). There were a total of 5 questions for Sports and Recreation subscale and the mean Sports&Rec score was 74.6 (range from 30 – 100). There were a total of 4 questions for the Quality of life subscale and the mean QOL score was 64.1 (range from 31.25 – 100).

The FAOS survey consists of 4 pages where patients can mark their selection for each question. We believe that if you were to quantify the results of each subscale, 90-100 would be considered an excellent outcome. 80-89 would be a good outcome. 60-79 would be considered a fair outcome. 40-59 would be considered less than 50% or poor outcome, and less than 40 would be considered failure. Based of those categories, one can see that through this arthroscopic juvenile particulated cartilage implantation that all but four of the 32 patients scored a good or excellent result in activities of daily living. 26/32 (82%) patients had at least good result in both pain and symptoms, and 25/32 (78%) had at least a fair result for functional sports and quality of life.

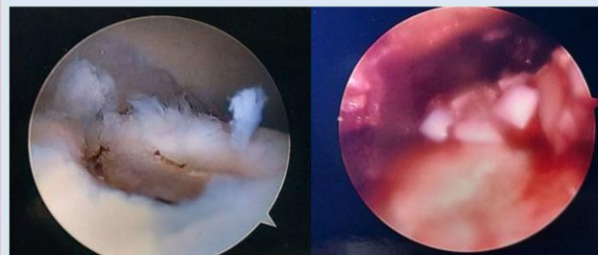
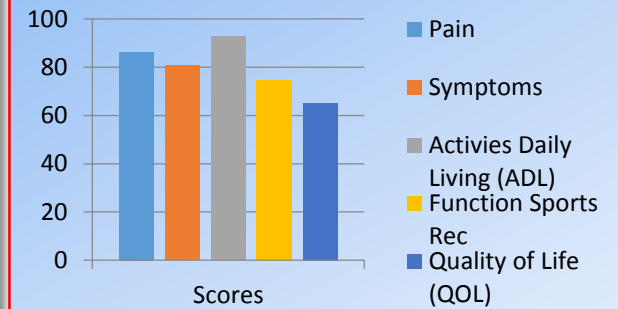


Figure 1 – Pre-implantation intra-operative image of an osteochondral defect after debridement. Right hand picture displays the dry scope portion in which the juvenile particulated cartilage is being implanted

Figure 2 – Foot and Ankle Survey Sample

FAOS Score Profile



Discussion

Treatment of OCD lesions, especially with advanced staged lesions often necessitate surgical intervention. Surgical repair of OCD lesions include a large gamut of different interventions such as bone marrow stimulation (debridement, microfracture, drilling), osteochondral autograft transfer, fresh osteochondral allograft transplantation, and autologous chondrocyte implantation.

The novel use of arthroscopic debridement and implantation of juvenile particulated allograft that we present in this study has shown to provide good to excellent results for patients suffering from an OCD lesion as evidenced by the validated FAOS survey. There were some limitation of this study since we had no pre-operative FAOS scores. In order to augment this study in the future, we would request patients to fill out the FAOS both before and after the procedure to more accurately assess subjective improvement.

Although the use juvenile particulated cartilage implantation for repair of osteochondral defects exists as a fairly new line of treatment, we believe that our study results provide strong evidence of the potential effectiveness of this procedure. Our results show that the mean subjective post-op scores > 70 in all but 1 category of the FAOS scoring system. Nevertheless, a larger randomized controlled prospective data will help further assess if this modality can become the new gold standard for treatment of osteochondral lesions.