Double-Plug Autologous-Osteochondral Transplantation Shows Equal Outcomes Compared to Single-Plug Procedures in Lesions of the Talar Dome: a Minimum Five-Year Follow Up

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Summary:
Autologous osteochondral transplantation (AOT) is a surgical treatment for large or cystic osteochondral lesions (OCL) of the talar dome. While patients with larger OCLs treated with microfracture have been shown to exhibit poor clinical outcomes, there is little evidence regarding lesion size, number of grafts required, and clinical outcomes following AOT. This study shows that patients with larger OCLs treated using double plug-AOT procedure did not show inferior clinical outcomes compared to single plug-AOT at a minimum of five-year follow up.

Introduction:
Cartilage damage of the talus may occur in up to 50% of ankle sprains, potentially leading to an osteochondral lesion (OCL). Autologous osteochondral transplantation (AOT) is a surgical treatment modality in which an OCL is replaced with a viable cylindrical osteochondral graft, and is used for large (>8-20 mm diameter) or cystic lesions of the talar dome. Large lesions, however, may require the use of more than one graft in order to fill the defect site. While patients with larger OCLs treated with bone marrow stimulation procedures (eg., microfracture) have been shown to exhibit poor clinical outcomes, there is little evidence regarding lesion size, number of grafts required, and clinical outcomes following AOT. The aim of this study is to test the hypothesis that large OCLs of the talar dome treated by double-plug AOT (dp-AOT) do not have inferior clinical outcomes compared to smaller OCLs requiring single-plug AOT (sp-AOT).

Methods:
A retrospective cohort of 14 consecutive patients (7 males and 7 females, mean age 42.79 + 11.9 years) with a larger OCL (mean 208+54 mm2) managed by dp-AOT procedure from 2003-2007 with a minimum of 5-year follow up were age and sex-matched to a control cohort of 28 patients (17 males and 11 females, mean age 44.14 + 11 years) who underwent a sp-AOT procedure for a smaller OCL (mean 74+26 mm2) over the same time period by the senior author. Functional outcomes were assessed both pre- and post-operatively using the Foot and Ankle Outcome Score (FAOS) and Short-Form 12 (SF-12), with a latest mean follow up time point of 85.28 months (range, 65-118 months).

Results:
All patients in both groups showed a statistically significant increase in their post-operative scores compared to their pre-operative scores. In the sp-AOT group, mean pre and post-operative FAOS scores were 51.55+10.19 and 87.06+5.14, respectively (p<0.05), and mean SF-12 scores were 57.78+9.64 and 87.89+5.69, respectively (p<0.05). Similarly, patients in the dp-AOT group had a statistically significant increase in functional outcomes. Mean FAOS score was 49.46+12.06 and 86.19+6.48, respectively (p<0.05) and mean SF-12 score was 56.60+13.29 and 85.61+5.69, respectively (p<0.05). When comparing pre-operative scores for both groups; there was no statistical significance between sp-AOT and dp-AOT for pre-operative scores (FAOS, p=0.719; SF-12, p=0.947). Notably, there was no significant difference in functional scores between the two groups post-operatively for both FAOS (p=0.883) and SF-12 scores (p=0.246).

Conclusion:
Patients with large OCLs treated using a dp-AOT procedure did not show inferior clinical outcomes compared to sp-AOT at a minimum of five-year follow up. The results of this study show that dp-AOT is as effective as single-plug OATS in treating larger OCLs of the talar dome in the intermediate term. Long-term follow-up of a larger cohort is further required to test the efficacy of the dp-AOT procedure in achieving similar high post-operative clinical outcomes as sp-AOT. References 1. Mitchell ME et al. J Am Acad Orthop Surg. 2009 17(7): 407-414. 2. Choi, WJ. et al. Am J Sports Med. 2009. 37(10): 1974-80.