

The Effect of Containment Type on Clinical Outcome in Osteochondral Lesions of the Talus Treated with Autologous Osteochondral Transplantation

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Introduction/Purpose: Operative management for osteochondral lesions of the talus (OLT) can be broadly divided into reparative techniques, including bone marrow stimulation (BMS), and replacement techniques, including autologous osteochondral transplantation (AOT). Predictors of outcome of BMS have been established as lesion size, containment of the lesion, and previous surgery. Predictors of outcome of AOT or allograft transplantation have been established as body mass index and the requirement for greater than 2 grafts. However, containment of the lesions has not been assessed as a predictor of outcome in patients undergoing AOT to date. Therefore, the purpose of the current study is to clarify the effect of the containment of OLT on clinical and radiological outcomes in patients who underwent AOT procedure for the treatment of OLT.

Methods: A retrospective cohort study comparing patients with contained type and uncontained type OLT was undertaken, to include all patients who underwent AOT procedure for the treatment of OLT between 2006 and 2014. Analyses were performed by grouping the patients according to the containment type, location, and both the type of containment and location. Clinical outcomes were evaluated using the Foot and Ankle Outcome Scores (FAOS) and Short-Form 12 (SF-12) preoperatively and at the final follow-up. Magnetic resonance imaging (MRI) at 2 years follow-up was evaluated with modified magnetic resonance observation of cartilage repair tissue (MOCART) score. Comparisons between groups were made with the Man-Whitney U test for continuous variables and the χ^2 or Fisher exact test for categorical variables. Multivariate regression models were used to evaluate factors affecting postoperative FAOS, SF-12 and MOCART scores. A value of $p < 0.05$ was considered statistically significant.

Results: Ninety-four patients were included, with 31 with a contained type OLT and 63 with an uncontained type OLT. The median follow-up time were 45 months in contained type and 52 months in uncontained type. The mean FAOS and SF-12 improved significantly after surgery in both contained and uncontained lesions ($p < 0.001$). The mean postoperative FAOS in contained type was higher than uncontained type (89.5 vs 80.2, $p = 0.009$), but no significant differences were found between uncontained and contained type in postoperative SF-12 and MOCART score. The multivariate regression models showed that patients with contained type OLT had approximately 10 points better scores in FAOS compared to uncontained type ($p = 0.006$) (Table 1). Patients who had previous microfracture performed worse postoperative FAOS than those who did not ($p = 0.004$).

Conclusion: Patients with contained type OLT experienced better clinical outcomes than those with uncontained type OLT following AOT procedure for the treatment of OLT. However, the AOT procedure still provided good clinical and MRI outcomes in both contained type and uncontained type OLT at the mid-term follow-up.

Table 1. Multivariate Regression Models for Post-Op FAOS, SF-12, and MOCART Scores

Outcome	Clinical Characteristics	Unstandardized Coefficients		Standardized Coefficients	p-value
		B	Std. Error	Beta	
Post-op FAOS ^a	Contained (vs. Uncontained)	9.8	3.5	0.3	0.006*
	Lateral Side (vs. Medial)	-3.7	3.9	-0.1	0.347
	Male gender	5.3	3.5	0.2	0.137
	Pre-op FAOS	0.1	0.1	0.1	0.316
	Age	-0.1	0.1	-0.1	0.377
	Defect size (mm ²)	0.0	0.0	-0.1	0.346
	Cystic	1.2	3.2	0.0	0.711
	Trauma	-2.1	3.7	-0.1	0.563
	Prior microfracture	-10.0	3.4	-0.3	0.004*
	Number of grafts	5.1	4.9	0.1	0.305
	Concomitant procedure	1.9	3.7	0.1	0.601
Post-op SF-12 ^b	Contained (vs. Uncontained)	0.8	4.8	0.0	0.865
	Lateral Side (vs. Medial)	6.5	5.0	0.2	0.205
	Male gender	6.7	4.9	0.2	0.184
	Pre-op SF-12	0.6	0.2	0.5	0.002*
	Age	-0.1	0.2	0.0	0.777
	Defect size (mm ²)	0.0	0.1	-0.1	0.616
	Cystic	-6.4	4.1	-0.2	0.121
	Trauma	-4.9	4.9	-0.2	0.316
	Prior microfracture	-3.2	4.5	-0.1	0.466
	Number of grafts	-4.1	6.1	-0.1	0.503
	Concomitant procedure	5.1	5.3	0.1	0.342
Post-op MOCART ^c	Contained (vs. Uncontained)	0.5	2.0	0.0	0.792
	Lateral Side (vs. Medial)	-0.8	2.2	-0.1	0.708
	Male gender	-0.9	2.0	-0.1	0.649
	Pre-op FAOS	-0.1	0.1	-0.3	0.057
	Pre-op SF-12	0.0	0.1	0.1	0.638
	Age	0.0	0.1	-0.1	0.650
	Defect size (mm ²)	0.0	0.0	-0.3	0.112
	Cystic	-0.2	1.7	0.0	0.923
	Trauma	2.4	2.1	0.2	0.250
	Prior microfracture	-3.2	1.8	-0.2	0.088
	Number of grafts	3.8	2.5	0.2	0.141
	Concomitant procedure	-3.0	2.2	-0.2	0.184

^a R-Square for Model: 0.254^b R-Square for Model: 0.428^c R-Square for Model: 0.422