Shrinkage and Extrusion of Graft After Meniscus Allograft Transplantation: Do They Progress and Affect Clinical Outcome?

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Summary:
Graft extrusion or shrinkage after meniscus allograft transplantation is not a progressive, but a static phenomenon and has no correlation with early clinical outcomes.

Abstract:
Introduction: Shrinkage or radial extrusion of graft has been reported as a complication after meniscus allograft transplantation (MAT). However, there are controversies about whether shrinkage or extrusion progress with time after surgery and whether they are associated with clinical outcome of MAT. In this study, we measured shrinkage and graft extrusion; in both coronal and sagittal plane; on serial postoperative magnetic resonance imaging (MRI), and evaluated if graft shrinkage or extrusion is correlated to clinical outcome of MAT.

Methods: Consecutive 30 patients (21 men and 9 women) who underwent MAT (6 medial and 24 lateral MAT) were prospectively checked for serial MRI at 3 months and 12 months after surgery. Two independent musculoskeletal radiologists measured graft shrinkage and extrusion from each MRI. The graft shrinkage was measured by the width and thickness of the graft (Fig 1). To determine the graft extrusion, distances between the proximal tibia cartilage margin and the extruded graft margin were measured in both coronal (either lateral or medial) and sagittal (both anterior and posterior) plane and relative percentage of extrusion (RPE) was calculated (Fig 2). Subjective International Knee Documentation Committee (IKDC) scores at each time period were evaluated as a clinical outcome measurement and correlation between graft shrinkage or extrusion and IKDC score were analyzed.

Results: The inter-rater agreements were the lowest in measuring the anterior extrusion (r = 0.59, regarded as moderate) and the highest in measuring the width (r = 0.89, regarded as very strong). The widths of the graft were similar between postoperative 3 months (average 9.2 mm) and 12 months (average 9.8 mm) (P = 0.262). Also, no statistical difference was found between the thickness of the graft measured at postoperative 3 months (average 6.9 mm) and 12 months (average 7.2 mm) (P = 0.196). On coronal plane, radial graft extrusion was average 43.6% at postoperative 3 months, but there was no significant progression of extrusion at 12 months (average RPE = 42.0%) (P = 0.728). Neither anterior nor posterior extrusion showed significant progress of RPE (P = 0.487 and P = 0.166, respectively) between postoperative 3 and 12 months. The change of graft volume from postoperative 3 to 12 months did not correlate with IKDC score at postoperative 12 months (R = 0.176, P = 0.435). Also, the graft extrusions in radial (R = 0.147, P = 0.525), anterior (R = 0.249, P = 0.264), and posterior (R = 0.230, P = 0.315) directions were not correlated to IKDC score. Possible confounding factors that can influence the clinical outcome including age, sex, body mass index, laterality of MAT (medial or lateral), time from previous meniscectomy, limb alignment, or degree of cartilage degeneration did not show any correlation with clinical outcome.

Discussion: Shrinkage and extrusion of the graft were found at 3 months after MAT, but did not progress until 12 months. This finding suggests that graft extrusion or shrinkage is not a progressive, but a static phenomenon. In addition, shrinkage and extrusion of the graft had no correlation with early clinical outcomes.