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Paper #33

Meniscus Allograft Transplantation Allows Return To Sporting Activities

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Summary:

This study shows promising long-term clinical results and estimated survival of meniscus allograft transplantation in an athletic population; the procedure allows these patients to return to sporting activities.

Abstract:

INTRODUCTION: Loss of a significant portion of the meniscus can lead to osteoarthritis (OA) due to the increased contact pressure between the femur and tibia. OA is devastating for the athletic patient due to intense pain and discomfort when participating in sporting activities. Meniscus allograft transplantation has been reported to reduce pain and improve function; however, current recommendations state that the procedure is contraindicated in patients with OA and discourage return to high level sports. The purpose of this study was to evaluate the effect of meniscus allograft transplantation on clinical outcome and return to sports independent of the degree of arthritis. We hypothesized that the procedure would allow previously high-level athletes to again participate in sporting activities, and improve subjective measures of pain and function without adversely affecting the survival of the meniscus allograft. METHODS: Athletes with a pre-injury Tegner level of 8 or higher (competitive sports with moderate to high levels of running, jumping, and cutting) with the following indications were included: knee joint line pain with irreparable damage or loss of a minimum of 50% of the meniscus. Prior to surgery, patients underwent an informed consent process by an independent Institutional Review Board. Subjective clinical outcomes were determined from the analysis of International Knee Documentation Committee Subjective Knee Evaluation Form (IKDC) and Western Ontario and McMasters Osteoarthritis Index (WOMAC) scores. Patients' activity levels were determined using the Tegner activity index. Patients with Outerbridge (OB) scores of I-IV were included. Exclusion criteria were less than one year of postoperative follow-up or health issues not related to the knee joint that would inhibit return to sporting activities. Using these criteria, 68 patients were included in the final study population, 53 (77.9%) were male and 15 (22.1%) were female. Eight (11.8%) patients were lost to follow-up. The mean time from surgery to the most recent follow-up was 6.1 ± 4.2 years (range: 0.9 to 14.5 years). The mean estimated survival of the meniscus allograft was calculated using Kaplan-Meier (KM) product analysis. For the survival analysis, procedure failure was defined as removal of the meniscus allograft without replacement or progression to unicondylar or total knee replacement. Cox proportional hazards model was calculated to evaluate the combined effects of clinically relevant factors (age, sex, operative compartment arthritis, highest postoperative Tegner score) on allograft survival. Preoperative and most recent follow-up subjective outcome scores were compared using the Mann-Whitney U test for non-parametric data. Continuous variables are presented as mean ± standard deviation; categorical variables as number and percentage; and non-normally distributed variables as median and inter-quartile range [IQR]. Significance level was set at p = 0.05 for all tests. RESULTS: Medial meniscus transplantation was performed on 46 (67.6%) of the 68 patients and lateral meniscus transplantation on the other 22 (32.4%) patients. Three (4.4%) patients had OB grade I; 5 (7.4%) patients had grade II; 11 (16.2%) patients had grade III; and 49 (72.0%) patients had grade IV at the time of initial meniscus allograft transplantation. Concomitant procedures most commonly included a combination of debridement, chondroplasty, microfracture, and articular cartilage paste grafting. Patients underwent an average of 3.0 concomitant procedures (range, 0 – 7 procedures). Seventeen (25.0%) patients required



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at least one subsequent, non-failure related, surgery. Median IKDC scores improved from 50.7 [34.1, 61.3] pre-operatively to 70.1 [57.5, 81.0] at most recent follow-up (p < 0.001); WOMAC scores improved from 24.0 [13.0, 38.0] to 8.0 [1.0, 17.0] (p < 0.001); and Tegner Scores improved from 3.0 [2.0, 5.0] pre-operatively to 5.0 [3.0, 6.0] (p = 0.003). Median pre-injury Tegner score was 9.0 [8.0, 9.0] and the median highest Tegner score that these patients returned to was 6.0 [4.0, 7.0]. Patients' highest postoperative Tegner score did not have a significant effect on either graft survival (p = 0.117) or the number of surgeries subsequent to the original meniscus allograft surgery (p = 0.291). Nine (13.2%) patients experienced graft failure over the follow-up period: 8 medial and 1 lateral. KM estimated mean survival time was $12.9 \pm .6$ years (95% CI: 11.7 – 14.2 years). Cox proportional hazard model revealed no significant effect by the clinical factors tested on the survival of the meniscus allograft. DISCUSSION: This study shows that meniscus allograft transplantation can relieve pain and allow increased function and activity in patients who participated in high-level sporting activities prior to injury. Median subjective outcome scores showed significant improvement at most recent follow-up from pre-surgery in all three measures analyzed. Additionally, patients were able to return to sporting activities after the procedure without significantly affecting procedure survival time or the number of surgeries subsequent to the original meniscus allograft surgery. This suggests that patients with high preinjury activity levels can return to sporting activities following meniscus transplantation surgery. This study shows promising long-term clinical results and estimated survival of meniscus allograft transplantation in an athletic population.