

Editorial Commentary: Meniscal Allograft Transplantation Is a Powerful Tool for Treating Pain for Properly Indicated Patients, but Ability to Prevent Osteoarthritis Progression Remains Undetermined

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Abstract: In well-indicated patients, meniscal allograft transplantation (MAT) survivorship can approach 80% to 90% at 10 years and 50% to 60% at 15 years, although these studies have included mostly younger patients (mean ages 25-30 years). Evidence-based indications for MAT are symptomatic meniscal deficiency in the absence of uncorrected osteoarthritis and malalignment in the young, active patient. The definition of young and active continues to evolve as demands of an aging population grow, and MAT has been performed with favorable outcomes in those over 40 and even 50 years old. However, MAT is not a solution to prevent arthritic progression, and the results in those with osteoarthritis have been less predictable in nature. No studies to date have demonstrated a definable delay to arthroplasty with the use of MAT as compared to the natural history of osteoarthritis. We recommend a focusing on alleviating symptoms in properly indicated patients and considering concomitant procedures that are performed to provide an optimal environment for MAT, such as realignment in the setting of $>5^\circ$ of varus (or valgus) or cartilage repair procedures that have been reproducibly performed by a number of authors to date in combination with MAT.

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Meniscal allograft transplantation (MAT) has increased in the number of procedures, research publications, and indications in recent years.¹⁻³ In well-indicated patients, MAT survivorship can approach 80% to 90% at 10 years and 50% to 60% at 15 years, although these studies have included mostly younger patients (mean ages 25-30 years).^{4,5} Indications for MAT have continued to expand to include older patients given the overall increasing health and demands of an aging population, with several studies reporting excellent patient-reported outcomes (PROs) and survivorship in patients in their 40s and 50s, but caution is warranted as results remain less predictable compared to patients under 30.^{6,7}

Stone, Walgenbach, Slatter, Turek, Ferguson-Dryden, Dicker, Miltenberger, Cowles, Liu, Wu, and Vessal should be commended on their article titled “Meniscal

Allograft Transplantation in Conjunction With Arthroscopic Biologic Knee Restoration Delays Arthroplasty in Patients Over 50 Years of Age” for continuing this research, with a large cohort of 86 patients over 50 years undergoing MAT, with an impressive mean follow-up of 8.55 years and upper range of 25.2 years.⁸ Their study provides valuable information on MAT in what we consider the “in-between” patients: older patients with mild to severe osteoarthritis (mean Kellgren-Lawrence grade 3.1 ± 1.2) and possible coronal malalignment (the authors reported high tibial osteotomy in 9 patients for an indication of varus between 7° and 14° , with varus $<7^\circ$ considered acceptable). We do have some concerns about the number of patients with $<7^\circ$ varus who did not undergo high-tibial osteotomy, as they did not report mean hip-knee angles or mechanical axis deviation for their patients and attributed this amount of varus to “primarily the result of loss of cartilage, and therefore treated by cartilage replacement [only].” In addition, there are no data reported on body mass index or medical comorbidities, although one can likely assume these patients are relatively healthy and nonobese. They

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demonstrated statistically and clinically significant improvements in International Knee Documentation Committee composite scores and reduction in pain scores, with arthroplasty-free survival rates of 33% at 10 years and 11% at 15 years and median time of conversion to arthroplasty of 8.05 years.

Our main concern with their findings is the conjectures that Stone et al.⁸ make from their data, stating in their conclusion that “meniscus allografts in combination with other arthroscopic interventions delay knee arthroplasty . . . in a population of knee arthroplasty candidates over 50 years of age.” The risks associated with this conclusion are that surgeons may extrapolate to routinely elevating unrealistic patient expectations with a discussion that includes “I can give you 5-15 more good years before a knee replacement.” Herein lies the danger of these claims from data that may not support them. To conclude that a specific procedure delays arthroplasty requires a comparison group, which in this scenario would be a matched group of patients who underwent arthroscopic debridement without MAT. While a relatively large cohort, the study by Stone et al.⁸ is a retrospective case series without a comparison group where outcomes in a single cohort are dramatically impacted by expectation bias on behalf of patients trying to avoid knee replacement in addition to a legitimate placebo effect associated with surgical care in general.

A second component required to demonstrate procedural delays in arthroplasty, often measured by the outcome of conversion to arthroplasty, is adequate follow-up, often thought of as at least 5 to 10 years.^{9,10} We would expect minimum follow-up time for inclusion to be at least 2 years, yet this study included patients with a follow-up as low as 0.68 years. In regard to PROs, at all time interval follow-ups, the overall percentage of responders was 51.7%. With these follow-up numbers and reported MAT survivorship of 69% at 5 years, 33% at 10 years, and 11% at 15 years, we are unsure if it can be claimed that in this study, MAT delays the need for arthroplasty when compared to survivorship rates of 80% at 10 years in a subgroup of patients over 50 years reported by Zaffagnini et al.⁷

Our last comment is regarding chondral procedures in relation to the MAT. The second half of the article title and claim by Stone et al.⁸ is that “MAT in conjunction with *arthroscopic biologic knee restoration* delays arthroplasty.” They reported 74 of 86 (86.0%) patients had grade III or IV arthritis at the time of surgery and 64 of 86 (74.4%) underwent chondroplasty, 40 of 86 (46.5%) underwent microfracture for small defects (<25 mm²), and 45 of 86 (52.3%) underwent cartilage repair via an articular cartilage paste technique for accessible defects ≥25 mm². This “paste technique” has been described by the corresponding author previously as a smashing of an 8- to 15-mm osteochondral plug

from the intercondylar notch into a paste for grafting chondral defects, with reported success in the literature.^{11,12} This technique has not been validated by other surgeons, however, and we believe a more reliable method of treating large, focal chondral and osteochondral defects in the setting of meniscal deficiency to be osteochondral allografts, which have been demonstrated to have no significant differences in PROs or reoperation rates compared to isolated MAT.^{13,14} Cases of more diffuse grade III or IV arthritic changes would be a contraindication to MAT and osteochondral allografts in our hands as this has been demonstrated to be a risk factor for failure with a lack of clinical responsiveness.¹⁵

While Stone et al.⁸ have published an impressive series of MATs in a cohort of patients over 50 years of age, we would caution against using this study to advertise the power of MAT to prevent arthroplasty. There have been no studies to our knowledge that definitively demonstrate causality between the use of MAT and prolonged conversion to arthroplasty, and despite our proclivity for the use of MATs in properly indicated patients and our hope to be able to promise them preservation of their knee, we will continue to have conversations with patients, avoiding phrases such as, “I can give you X more good years before a knee replacement.” Instead, we recommend a focusing on alleviating symptoms in properly indicated patients, as well as considering concomitant procedures that provide an optimal environment for MAT, such as realignment in the setting of >5° of varus (or valgus) or cartilage repair procedures that have been reproducibly performed by a number of authors to date in combination with MAT.

Disclosures

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