

# Comparative Study on Immediate Versus Delayed Meniscus Allograft Transplantation: Letter to the Editor

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## Dear Editor:

We read with interest the article by Jiang and colleagues<sup>4</sup> titled “Comparative Study on Immediate Versus Delayed Meniscus Allograft Transplantation: 4- to 6-Year Follow-up,” and we would like to express our comments to the authors. In this paper, the authors describe their clinical outcomes after immediate and delayed meniscus allograft transplantation (MAT). Patients in the immediate study group (IM) underwent MAT immediately after total meniscectomy, while those in the delayed study group (DE) underwent MAT after the report of knee symptoms mean time, 35 months after total meniscectomy (range, 9-92 months); both groups were compared to a control group of patients undergoing meniscectomy (ME). The authors reported significantly improved outcomes in the IM group compared to the DE group with respect to International Knee Documentation Committee (IKDC) scores (mean, 93; range, 85-99 vs mean, 74; range, 38-95;  $P < .05$ ) and with respect to cartilage degeneration via radiographic/MRI analysis. Of note, there were no significant differences between any of the groups with regard to Lysholm score, Tegner score, joint narrowing, or meniscus extrusion.

While the findings of this study are of interest, the clinical ramifications of these results should be clearly delineated. Specifically, the main limitations are secondary to the small sample size and lack of clearly defined comparison group. Regarding the small sample size (8 patients in the IM group, 10 patients in the DE group), though significant findings were described, a power analysis should be included, as many of the other outcome variables were not adequately powered to find a difference. Further, it is difficult to explain the difference in IKDC between the IM and DE groups, but not between the IM versus ME groups, or between the DE versus ME groups. Thus, we are uncertain as to the clinical appropriateness of stating that immediate MAT is superior to delayed MAT as determined by IKDC when the authors report that both immediate and delayed MAT were no different compared to patients undergoing meniscectomy. Importantly, there were no differences between the IM and DE groups with respect to Tegner and Lysholm scores, which are clinically relevant in the MAT patient population.

Second, the comparison group is flawed as they are “randomly selected”<sup>4</sup> and unmatched with regard to age,

sex, transplanted compartment, and concomitant procedures, including ACL reconstruction, which adds further variability to the clinical interpretation of the statistical findings. The clinical details of the control group are not well described, as no information is given with regard to the length of symptoms before meniscectomy. Ideally, the comparison group for the IM group would be patients undergoing immediate meniscectomy, and the comparison group for the ME group would be patients who have developed symptoms after prior meniscectomy. Essentially, this would result in matched control groups for each treatment group that utilized the same inclusion criteria for each group. In addition, the difference in follow-up duration between the IM (mean, 51 months) and DE (mean, 72 months) groups is certainly worth mentioning, as a difference of 21 months is likely clinically relevant, even if not statistically different. Similarly, the difference in age between the IM (mean, 23 years) and DE (mean, 28 years) groups is likely also significant and underpowered, with  $P$  values of .058 (IM vs DE) and .055 (IM vs ME). We appreciate the difficulty in creating matched cohorts based on demographic variables and certainly understand that often with MAT, concomitant procedures are performed. However, the small sample size, inadequate matching, and lack of proper control groups in this study make the statistical outcomes difficult to interpret.

From a practical standpoint, multiple authors have reported on the short-, medium-, and long-term clinical outcomes following MAT.<sup>5-7</sup> For the vast majority of patients, outcomes are satisfactory, regardless of the duration of time between the initial meniscal injury and/or index meniscectomy and MAT. Two recently published systematic reviews<sup>2,3</sup> describe the outcomes of MAT in thousands of patients, noting overall good outcomes with improvements in pain and function for the majority of patients. In the review conducted by Verdonk’s group<sup>2</sup> consisting of 1136 grafts in 1068 patients, the duration of “delay” from injury to MAT was an average 10.7 years, with clinical improvement reported in the majority of patients. At this stage, it is clear that there is an “at risk” patient group that cannot compensate for the meniscectomized state; however, it is not clear as to what factors place patients into this category. Currently, when taking into account the cost of MAT, rehabilitation, and potential complications, it is difficult to recommend this surgery in asymptomatic patients. Interestingly, in 2003, Aagaard and colleagues<sup>1</sup> examined the effects of immediate versus delayed (3 months) MAT in a sheep model and found that at 6 months after surgery, immediate MAT reduced but did not prevent degeneration of the articular cartilage.

Pragmatically, meniscus allografts remain a scarce resource with many appropriately indicated patients waiting for a properly sized matched implant. In the United States there are between 500,000 and 700,000 meniscectomies performed each year. Radiographic progression may occur in up to 50% by 10 years, but clinical symptom onset lags behind this by at least another 5 to 10 years. Meniscal allografts may predictably only last 5 to 7 years before they deteriorate anatomically. The addition of a meniscal implant to an asymptomatic patient can not only be associated with

a serious complication that they would otherwise be able to avoid but present a scenario of obligatory activity modification if the patient wishes to avoid compromising their implant. Alternatively, given the lack of evidence between disease progression and activity profiles, the meniscectomized patient can return to activities rather predictably and most commonly for an indefinite period of time.

Certainly, the authors are to be commended for their comprehensive evaluation of what remains an extremely challenging patient population for even the most experienced of orthopaedic surgeons. In addition, the authors should be applauded for their ability to obtain postoperative MRI scans on all included patients. A controlled, adequately powered, prospective study with matched patient cohorts would be helpful to better understand the results presented here; however, such a study would be difficult, as the literature does not currently advocate for performing immediate MAT on asymptomatic patients. Clearly, more research is needed to better understand this patient population and the long-term effects of MAT.

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