Meniscus Allograft Transplantation Delays Arthroplasty in Patients Over 50 Years of Age

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Introduction

A 10-year delay in total knee arthroplasty has been shown to significantly decrease the lifetime risk of arthroplasty revision.[1] This study evaluates the utility of meniscus allografts to delay knee arthroplasty for patients over 50 years old previously advised to have a joint arthroplasty.[3] **It was hypothesized that subjects older than 50 would benefit from an arthroscopic meniscus transplant in terms of improved knee symptoms, function, and importantly delay of arthroplasty.**

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Methods

89 meniscus allograft transplants (MATs) using the Stone arthroscopic three-tunnel technique in patients over 50 years of age were included in this study. Patient ages ranged from 50 to 69 years of age (mean 55.8). Exclusion criteria was defined as failure to comply with rehabilitation protocol or failure to complete baseline and follow-up research questionnaires. 74 of 86 (86%) patients had Grade III or IV arthritis at the time of surgery and 45 of 86 (52%) patients underwent concomitant cartilage repair with the articular cartilage paste graft technique.[2]

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Methods

International Knee Documentation Committee (IKDC) and Visual Analogue Pain Scale (VAS) scores were obtained longitudinally throughout the post-operative period. Failure was defined as excision of the allograft, progression to arthroplasty, revision of MAT, or increased pain.

Tables 1 and 2 demonstrate patient demographics and concomitant procedures.

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TABLE 1

Patient Demographics

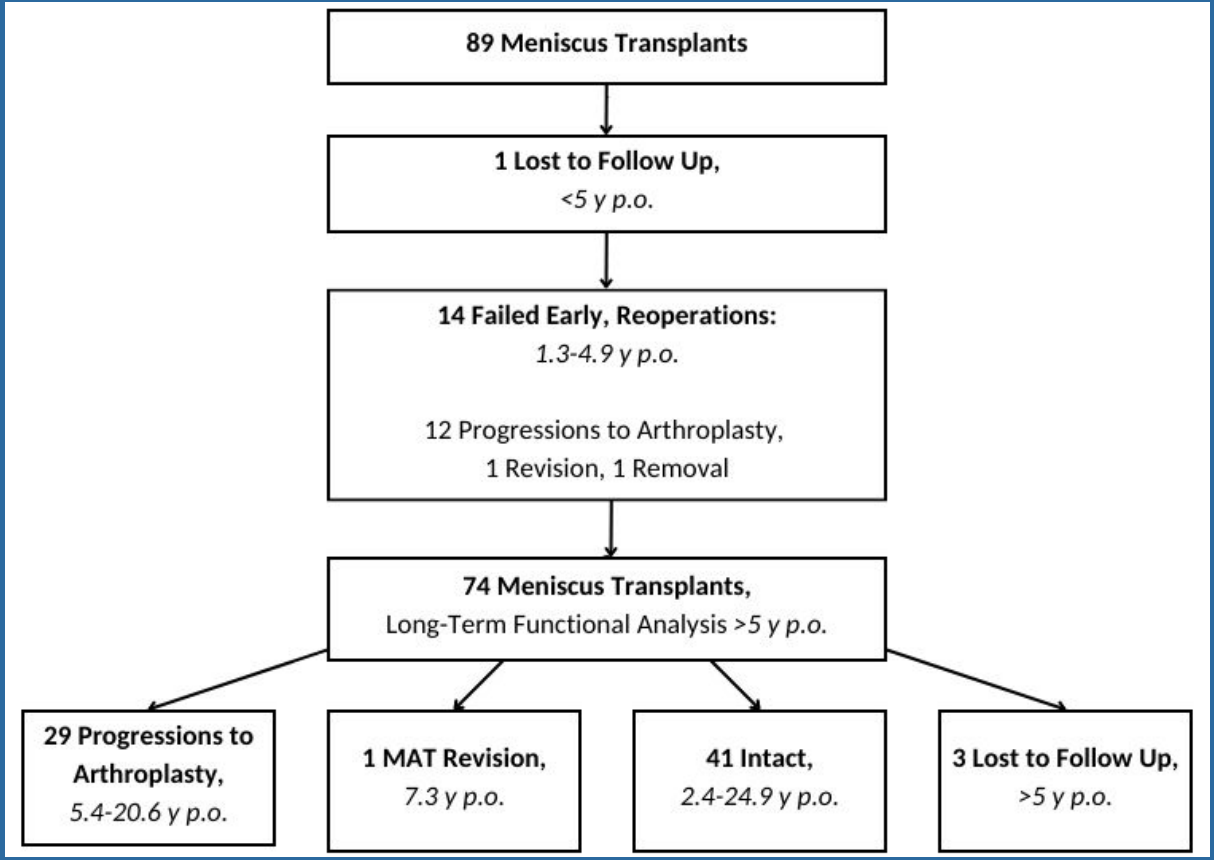
Meniscus transplants/patients, n	89/86
Mean age (range), y	55.8
Male/female, n	61/25
Left/right knee, n	40/49
Medial/lateral, n	63/26

TABLE 2

Concomitant Surgeries

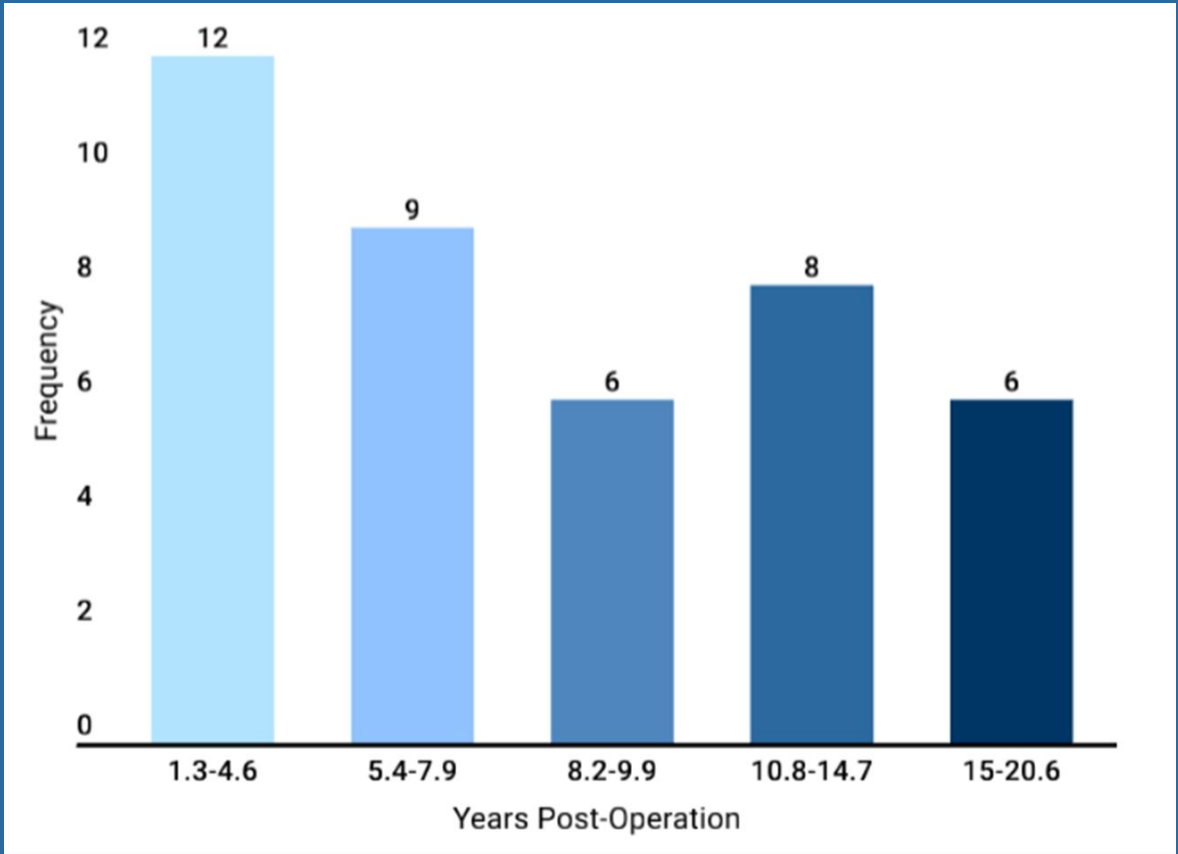
Debridement	81
Chondroplasty	64
Articular cartilage reconstruction	45
Microfracture	40
Notchplasty	21
Osteophyte removal	18
Other	17
Loose body removal	9
Osteotomy	9
ACL reconstruction	7
Meniscectomy	7
Posterolateral corner reconstruction	6
ACL revision	5
Hardware removal	3

Figure 1: Flowchart of 89 MATs Included in Study



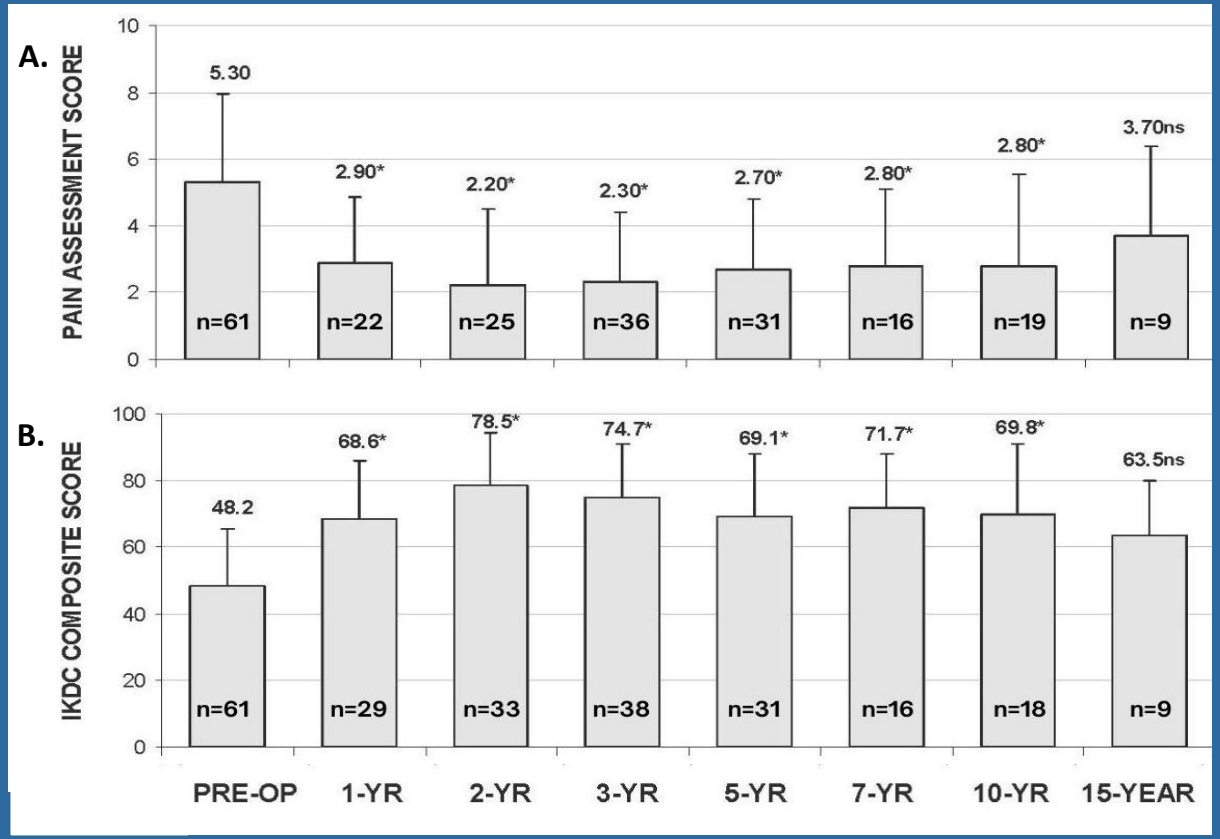
14 failures occurred within 5 years after the procedure: 12 progressions to arthroplasty, one allograft revision due to a sports injury tear at 4 years, and one allograft excision without arthroplasty at 3.2 years.

Figure 2: Progression to Arthroplasty Timeline



Over the follow-up range of 2 to 25 years, 41 of 86 (47.6%) patients progressed to revision by arthroplasty, at a mean time of 8.5 years. 21 progressions to arthroplasty occurred within 8 years. 68 of 89 (76%) meniscus transplants in patients over 50 delayed joint arthroplasty by a minimum of 8.2 years (8.2-20.6).

Figure 3: Patient Reported Knee Pain and Function Over Time



In the subjects with intact meniscus allografts, significant improvements ($p<0.05$) were observed in both pain and function as assessed by VAS and IKDC. These significant improvements were sustained through ten years post-operatively, correlated to a mean of 65.8 years of age.

Discussion

The findings of this study show that meniscus allografting when combined with other joint procedures delays joint arthroplasty. Favorable graft survivorship presents a mean time to revision by arthroplasty of 8.5 years, thereby decreasing the risk of revision while improving pain and function for an active population.[1] Limitations of this study include the lack of a control population and the difficulty separating the relative contribution of concomitant procedures from meniscus transplantation alone to the clinical benefit observed.

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Conclusion

Meniscus transplants when combined with other arthroscopic joint procedures improve knee symptoms of pain and function in a population over 50 years old even with arthritis and can serve as an effective intervention delaying knee arthroplasty.

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References

1. Bayliss LE, Culliford D, Monk AP, et al. The effect of patient age at intervention on risk of implant revision after total replacement of the hip or knee: a population-based cohort study. Lancet. 2017;389(10077):1424-1430.
2. Stone KR, Walgenbach AW, Freyer A, Turek TJ, Speer DP. Articular cartilage paste grafting to full-thickness articular cartilage knee joint lesions: a 2- to 12-year follow-up. Arthroscopy. 2006;22(3):291-299.
3. Verdonk PC, Verstraete KL, Almqvist KF, et al. Meniscal allograft transplantation: long-term clinical results with radiological and magnetic resonance imaging correlations. Knee Surg Sports Traumatol Arthrosc. 2006;14(8):694-706.

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