

Meniscal Allograft Transplantation: Indications, Techniques, Outcomes



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Abstract: Meniscal allograft transplantation (MAT) has become an acceptable surgical treatment for select symptomatic and relatively young (<50 years of age) patients with a meniscal deficiency. MAT may also be considered in meniscal-deficient patients undergoing anterior cruciate ligament reconstruction and/or articular cartilage repair procedure in the ipsilateral compartment. Contraindications to MAT include asymptomatic patients, severe osteoarthritis, uncorrectable malalignment or instability, irreparable chondral damage, active infection, or inflammatory arthropathy. Most institutions prefer the use of fresh-frozen allografts, whereas the use of fresh-viable grafts is limited by their availability, and the use of cryopreserved and lyophilized grafts has gone out of favor. Donor allografts are size-matched to the recipient using x-rays or magnetic resonance imaging measurements. To date, no particular surgical technique has demonstrated superiority. Therefore, there are several used approaches (mini-open or arthroscopic), horns-fixation techniques (soft-tissue, bone-plugs, or bone-bridge), and peripheral suture techniques (inside-out or all-inside). Ipsilateral malalignment, instability, and/or chondral defects should be corrected or repaired if MAT is being performed. MAT survival rates are estimated at 73.5% at 10 years and 60.3% at 15 years. Mean time-to-failure is ~8.2 and ~7.6 years for a medial and lateral meniscus transplant, respectively. Significant improvement in patient-reported outcomes is expected following MAT, and 90% of patients will attest they will undergo the procedure again. Reoperation rates are estimated at 32%, with the most common complication being a tear of the meniscal allograft. Many studies reporting on outcomes of MAT are flawed because of low-quality, the use of non-fresh-frozen preservation techniques, and heterogeneity of patients and concomitant procedures. As our knowledge regarding patient selection, graft preparation, and techniques continue to develop, we expect MAT outcomes to improve much further.

Bibliography

- Getgood A, LaPrade RF, Verdonk P, et al. International Meniscus Reconstruction Experts Forum (IMREF) 2015 consensus statement on the practice of meniscal allograft transplantation. *Am J Sports Med* 2017;45:1195-1205.
- Mascarenhas R, Yanke AB, Frank RM, Butty DC, Cole BJ. Meniscal allograft transplantation: preoperative assessment, surgical considerations, and clinical outcomes. *J Knee Surg* 2014;27:443-458.
- McCormick F, Harris JD, Abrams GD, et al. Survival and reoperation rates after meniscal allograft transplantation: analysis of failures for 172 consecutive transplants at a minimum 2-year follow-up. *Am J Sports Med* 2014;42:892-897.
- Novaretti JV, Patel NK, Lian J, Vaswani R, Getgood A, Musahl V. Long-term survival analysis and outcomes of meniscal allograft transplantation with minimum 10-year follow-up: A systematic review. *Arthroscopy* 2019;35:659-667.
- Noyes FR, Barber-Westin SD. Meniscal transplantation in symptomatic patients under fifty years of age: survivorship analysis. *J Bone Joint Surg Am* 2015;97:1209-1219.
- Pollard ME, Kang Q, Berg EE. Radiographic sizing for meniscal transplantation. *Arthroscopy* 1995;11:684-687.
- Vundelinckx B, Vanlauwe J, Bellemans J. Long-term subjective, clinical, and radiographic outcome evaluation of meniscal allograft transplantation in the knee. *Am J Sports Med* 2014;42:1592-1599.
- Zaffagnini S, Grassi A, Macchiarella L, et al. Meniscal allograft transplantation is an effective treatment in patients older than 50 years but yields inferior results compared with younger patients: a case-control study. *Arthroscopy* 2019;35:2448-2458.

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Meniscal Allograft Transplantation (MAT)

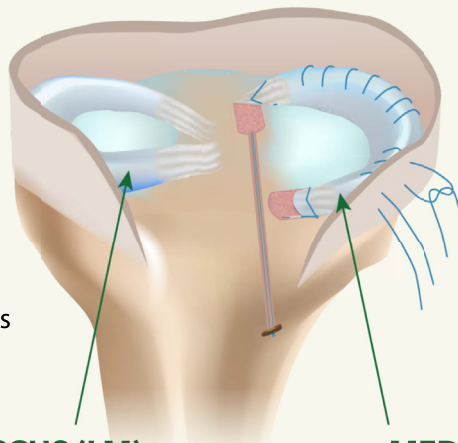
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INDICATIONS

- **Meniscal deficiency**
- Ipsilateral pain with or without swelling
- <50 years of age
- Correction of comorbidities
- ✓ Ligament tears
- ✓ Focal cartilage loss
- ✓ Malalignment



LATERAL MENISCUS (LM)

MEDIAL MENISCUS (MM)

CONTRAINDICATIONS

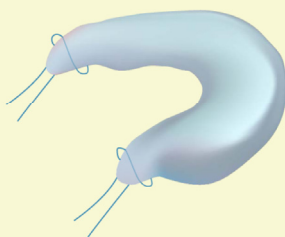
- Asymptomatic
- Kellgren-Lawrence grade 3–4 arthritis
- Uncorrected instability or malalignment
- Irreparable chondral lesion
- Inflammatory disease

PATIENT SELECTION IS KEY!

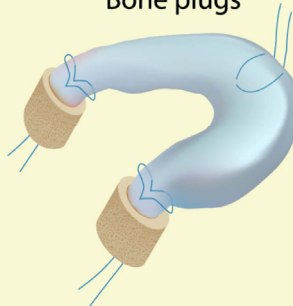


SURGICAL TECHNIQUES

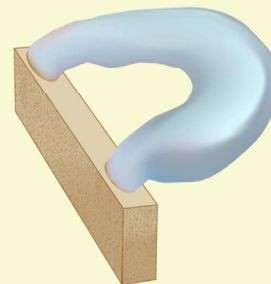
Soft tissue



Bone plugs

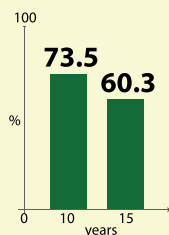


Bone bridge

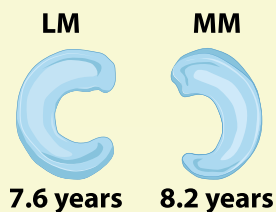


OUTCOMES

Transplant survival rates



Mean time to failure



Significant improvement in patient-reported outcomes



32% reoperation rate



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