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Initial Outcomes after Unicompartmental Tibiofemoral Bipolar Osteochondral and Meniscus Allograft Transplantation in the Knee using Fresh High-viability Tissues

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I (and/or my co-authors) have something to disclose.

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Full study data subsequently published in *Am J Sports Med* 2023

Purpose

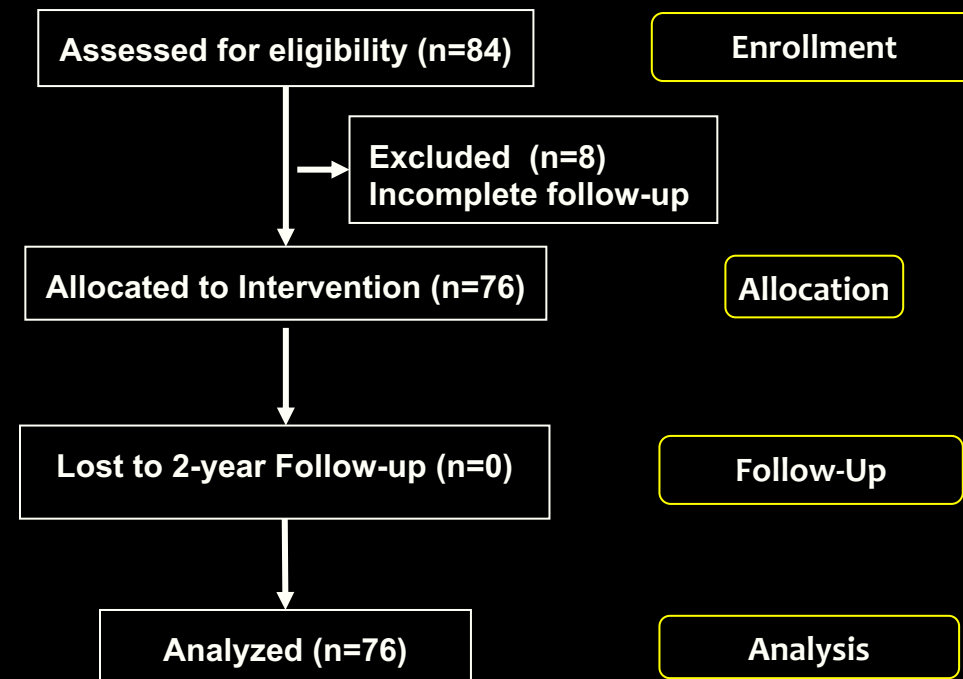
This prospective cohort study assessed short-term (2 to 6 years) outcomes after primary unicompartamental tibiofemoral bipolar osteochondral allograft transplantation (OCAT) with meniscus allograft transplantation (MAT) using fresh, high-viability (MOPS®-preserved) tissues

Background

- Unicompartmental tibiofemoral bipolar OCAT with MAT has not historically been associated with consistently successful outcomes for treatment of knee articular cartilage defects with meniscus deficiency
- Historical treatment failure rates of 48-85% reported

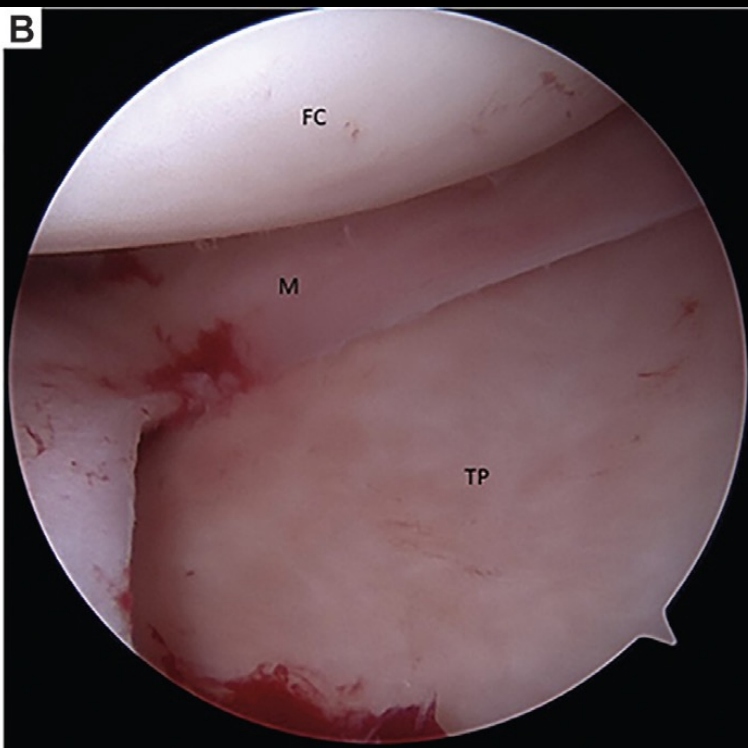
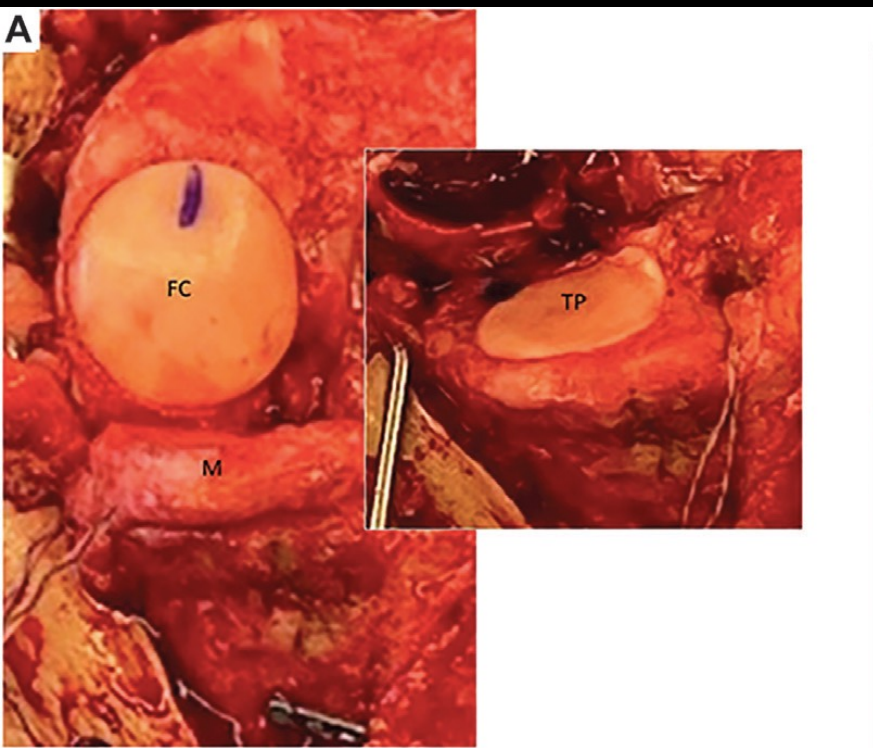
Methods

- Patients enrolled into an IRB-approved lifelong joint preservation registry
- Included for analyses: Primary tibiofemoral OCAT and MAT involving one femoral condyle, tibial plateau, and meniscus (Uni) and Uni with additional OCAT(s) in same knee (Uni-Plus) using MOPS-preserved allografts with ≥ 2 -year follow-up
- Assessed for treatment failure (revision or arthroplasty), reoperations, PROMs, and patient satisfaction



Failure = reoperation to revise OCA or conversion to arthroplasty

Success = patients returned to functional activities without revision or arthroplasty surgery

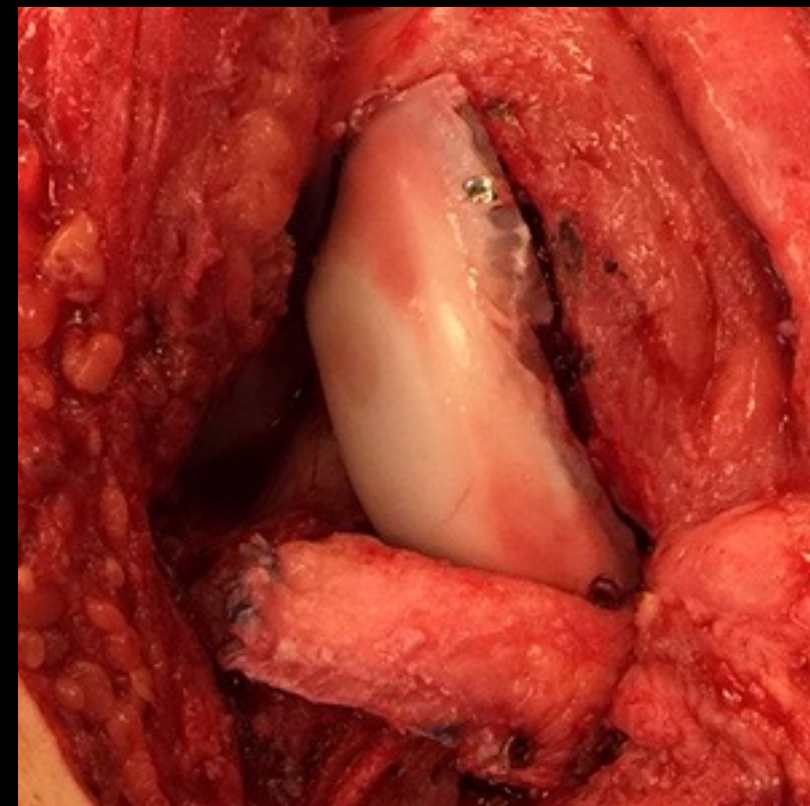


Bipolar medial OCAT and MAT using cylindrical “plug” osteochondral allografts and separate medial meniscus allograft

FC = femoral condyle

M = meniscus

TP = tibial plateau



Bipolar tibiofemoral lateral OCAT and MAT using custom-cut patient-specific shell osteochondral allografts with attached lateral meniscus allograft

Results

- 76 patients: 28 Uni, 48 Uni-Plus
- Mean follow-up of 52 months
- Mean age = 41.1 years
- Mean BMI = 28.9 kg/m²
- Standard Preservation (SP) = 59 cases
- MOPS = 203 cases
- Initial **Success** Rate = 77.6%
 - with Revisions = 88%
- Statistically significant and clinically meaningful improvements in all PROMs
- Patient satisfaction = 78%
- Risk factors for **Failure** :
 - Ipsilateral osteotomy =
 - 3.3X (p = .046)
 - Ipsilateral concurrent procedure
 - 5.5X (p = .0057)
 - Non-adherence
 - 7.2X (p = .0009)

Mean \pm SD Patient-Reported Outcomes after Tibiofemoral Bipolar OCAT and MAT in the Knee using MOPS-Preserved Fresh Tissue

	Preop (n = 76)	1 y (n = 76)	2 y (n = 76)	3 y (n = 58)	4 y (n = 43)	5 y (n = 34)
VAS pain	5.3 \pm 2.1	1.6 \pm 1.8	1.5 \pm 1.6	1.7 \pm 1.3	1.9 \pm 2.0	1.3 \pm 1.3
PROMIS: PF	40.9 \pm 7.6	45.5 \pm 6.2	49.0 \pm 7.8	49.2 \pm 7.5	52.4 \pm 11.0	48.9 \pm 8.2
IKDC	40.8 \pm 14.4	58.5 \pm 15.5	68.4 \pm 16.1	69.1 \pm 17.5	67.5 \pm 13.1	73.6 \pm 15.5
SANE	40.9 \pm 11.9	73.8 \pm 13.4	74.1 \pm 17.2	78.3 \pm 16.2	77.7 \pm 16.8	81.8 \pm 13.5
PROMIS: mobility	39.6 \pm 5.6	45.3 \pm 6.2	48.5 \pm 7.0	48.3 \pm 7.2	47.2 \pm 8.7	47.6 \pm 9.5

IKDC, International Knee Documentation Committee; MAT, meniscal allograft transplantation; MOPS, Missouri Osteochondral Preservation System; OCAT, osteochondral allograft transplantation; PF, physical function; PROMIS, Patient-Reported Outcomes Measurement Information System; SANE, Single Assessment Numeric Evaluation; VAS, visual analog scale.

P values for differences at each annual follow-up when compared with preoperative values for patient-reported outcome measures based on 1-way analysis of variance were all <0.001

Study Summary

- MOPS-preserved OCAT with MAT for the treatment of femoral condyle and tibial plateau articular cartilage defects with concurrent meniscal deficiency was associated with a **78% success rate** and significant and clinically meaningful improvements in patient-reported outcome measures of pain and function (mean, 52 months; median, 56 months).
- Variables associated with need for **treatment failure**, which occurred at a mean 17 months after transplantation, included ipsilateral staged or concurrent realignment osteotomy, ipsilateral surgical procedure, and nonadherence. Of these, documented nonadherence with the prescribed postoperative rehabilitation protocol during the first year after surgery was associated with the highest risk (7.2 times) for revision or arthroplasty.
- At final follow-up (2-6 years), **78% of patients were satisfied or very satisfied** with their outcomes.
- When successful revisions were included for data analysis, the functional graft survival rate for patients in the present study was **88%**.

Conclusions

- Unicompartmental tibiofemoral bipolar osteochondral and meniscus allograft transplantation can result in successful short-term (2 to 6 years) outcomes and satisfaction in the majority (78%) of patients.
- Primary MOPS-preserved OCAT and MAT for treatment of femoral condyle and tibial plateau articular cartilage defects with concurrent meniscus deficiency was associated with statistically significant and clinically meaningful improvements in patient-reported measures of pain and function.



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