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Outcomes after Osteochondral Allograft Transplantation Treatment Failures with Minimum Two-year Follow-up

James L. Cook, Kylee Rucinski, Cory Crecelius, Mauricio Kfuri, and James P. Stannard
Mizzou Joint Preservation Center
Thompson Laboratory for Regenerative Orthopaedics
Missouri Orthopaedic Institute, University of Missouri

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

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Purpose

This prospective cohort study assessed initial outcomes after treatment failures (revision or arthroplasty) for osteochondral allograft transplantation (OCAT) in the knee

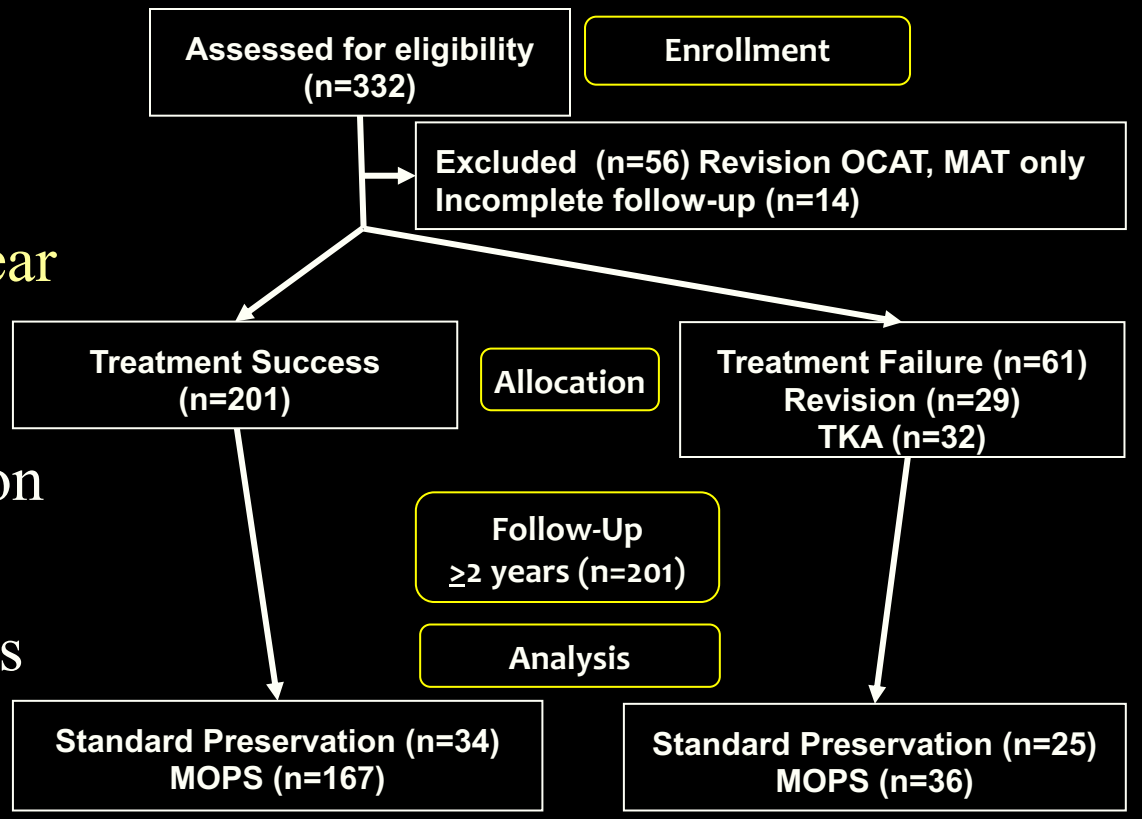
Background

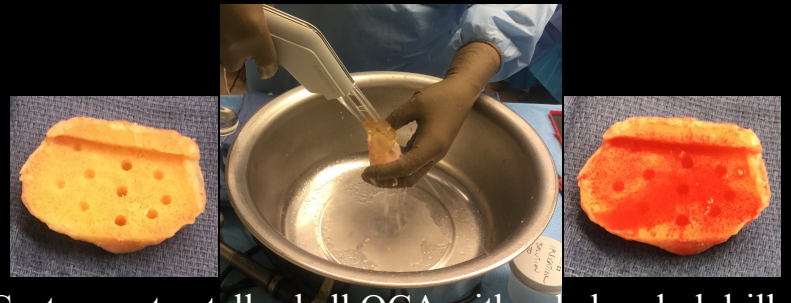
- OCAT has consistently been associated with good short- to mid-term outcomes, however, revision surgery or conversion to arthroplasty still occur more frequently than desired

Cook et al. Am J Sports Med 2023
Stannard et al. Am J Sports Med 2020
Familiari et al. Am J Sports Med 2018
Chahal et al. Arthroscopy 2013

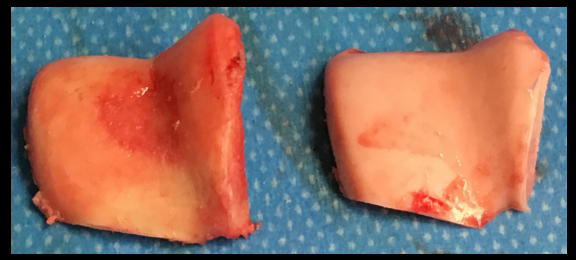
Methods

- Patients enrolled into an IRB-approved lifelong registry
- Included for analyses: Primary OCAT with ≥2-year follow-up
- **Failure** = reoperation to revise OCA or conversion to arthroplasty
- **Success** = patients returned to functional activities without revision or arthroplasty surgery
- Treatment Failure cohort compared to Treatment Success cohort for relevant risk factors

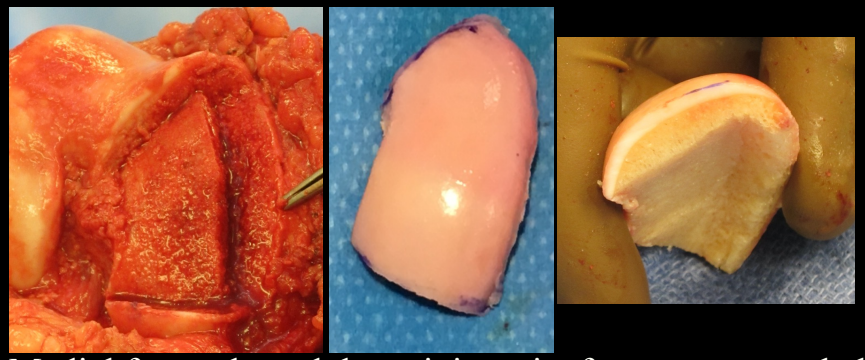




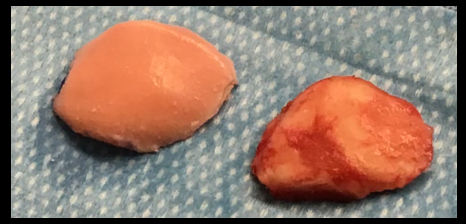
Custom-cut patella shell OCA with subchondral drill holes irrigated and saturated with autogenous BMC



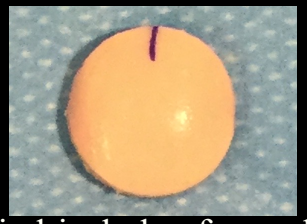
Resected trochlea with large full-thickness central defect and custom-cut trochlea shell OCA



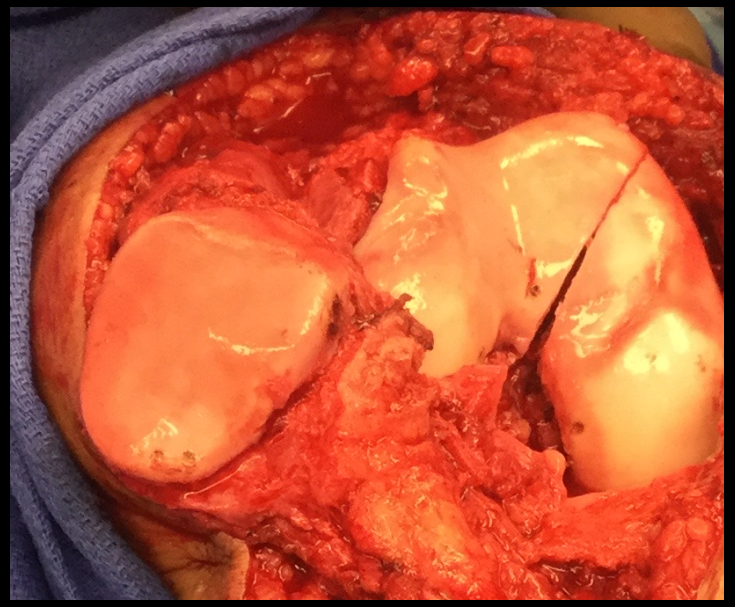
Medial femoral condyle recipient site for custom-cut shell OCA



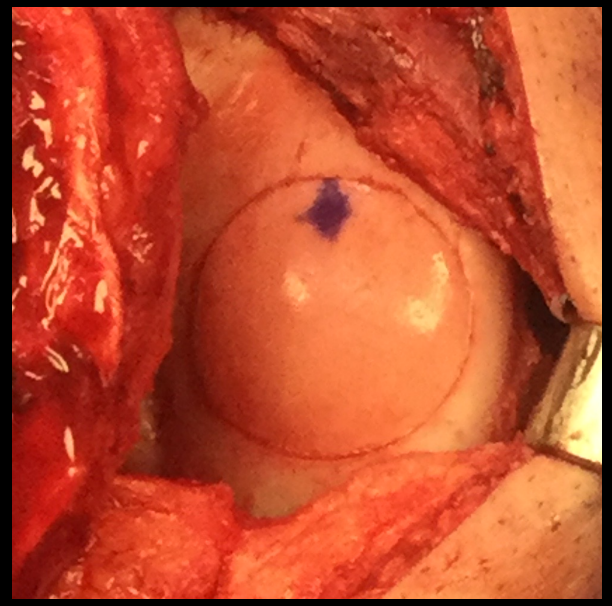
Custom-cut tibial plateau OCA



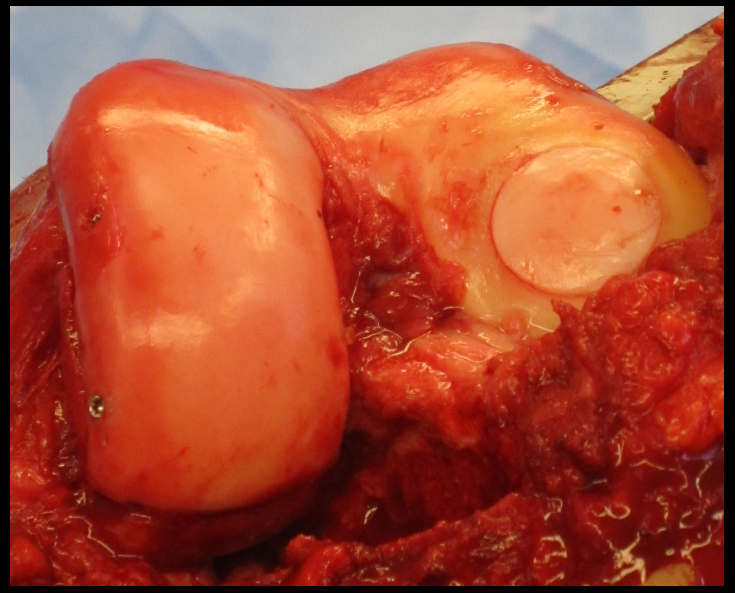
Cylindrical plug femoral condyle OCA for press-fit fixation



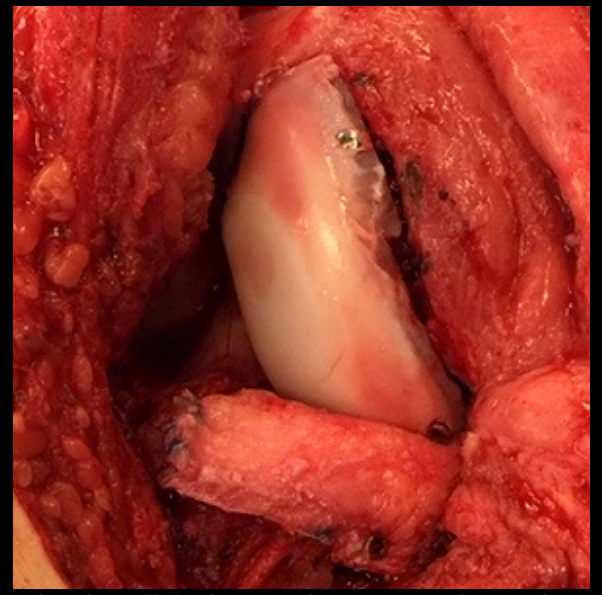
Bipolar patellofemoral OCA transplants for patella and trochlea



Single-surface unipolar OCA transplant for medial femoral condyle



Multisurface unipolar OCA transplants for lateral and medial femoral condyles



Bipolar tibiofemoral OCA and meniscus allograft transplants for medial compartment

Results

- 262 patients
- Mean follow-up of 56 months
- Mean age = 36.1 years
- Mean BMI = 28.9 kg/m^2
- Standard Preservation (SP) = 59 cases
- MOPS = 203 cases
- Treatment Failure = 23.3%
  (29 revisions, 32 TKAs)

- Risk factors for **Failure** :
  - Standard Preservation = 3.4X (p=0.0015)
  - Tibiofemoral Bipolar OCAT + meniscus allograft transplant (MAT) = 2.7X (p=0.0012)
  - Non-adherence = 2.4X (p=0.0052)
  - Older Age (p=0.001)
  - Higher BMI (p=0.016)

Variables Assessed for Significantly Different 2-year Treatment Failure Rates after Osteochondral and Meniscus Allograft Transplantation in the Knee

Variable	Comparison	p-value
Age (years)		
Successful	34.7 ± 12.3	.001
Revision/Arthroplasty	40.6 ± 10.9	
BMI (kg/m²)		
Successful	28.3 ± 4.9	.016
Revision/Arthroplasty	30.6 ± 4.7	

Variable	Success Rate (%)	p-value
Sex		
M	74.3	.38
F	79.4	
Tobacco Use		
Yes	62.5	.12
No	92.5	
OCA Preservation Method		
Standard Preservation	57.6	.0015
MOPS	82.3	
Concurrent Ligament Surgery		
Yes	73.2	.69
No	77.4	
Osteotomy		
Yes	70.8	.19
No	78.9	
Concurrent MAT		
Yes	66.7	.38
No	77.5	
Surgery Type		
Single-surface Unipolar	89.9	.0012
Multisurface Unipolar	77.4	
Tibiofemoral Bipolar	67.7	
Patellofemoral Bipolar	82.9	
Adherent		
Yes	81.3	.0052
No	64.2	

Results

- 19 revision surgeries were associated with successful outcomes making the total success rate = 84%

- No TKAs required revision during the study period

Study Summary

- Knee OCAT can consistently result in **successful** short- to mid-term outcomes in the majority (70-88%) of cases
- OCAT revision surgeries can functionally survive for at least 1 year in up to 66% of cases
- Factors associated with treatment **failure** included older patient age, higher BMI, standard allograft preservation method, tibiofemoral bipolar transplants, and non-adherence with the prescribed postoperative rehabilitation protocol

Conclusions

- It is imperative to counsel patients regarding relative risks prior to joint restoration surgeries using osteochondral allograft transplants for patient education and shared decision-making regarding treatment choice and evidence-based expectations

- Successful outcomes for these complex cases were significantly more likely to be realized when OCAs with high viable chondrocyte density at time of transplantation were used

Missouri
Orthopaedic Institute

University of Missouri Health Care

Thompson Laboratory for
Regenerative Orthopaedics

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