

## Poster #86

# Outcomes Following Concomitant Meniscal Allograft Transplantation and Anterior Cruciate Ligament Reconstruction

Andrew Gudeman, MD<sup>1</sup>; Dillen Wischmeier, BA<sup>2</sup>;  
Joshua Everhart, MD<sup>1</sup>; and Jack Farr, MD<sup>2</sup>

<sup>1</sup>Indiana University School of Medicine, Department of Orthopaedic Surgery

<sup>2</sup>OrthoIndy Hospitals



**SCHOOL OF MEDICINE**

# Disclosures

- AG, DW, JE: No disclosures
- JF reports paid consultant Aastrom Bioscience Inc., Aesculap/B.Braun, Arthrex Inc, Cartiheal, Ceterix Orthopaedics Inc, Cook Biotech Inc., Depuy Synthes, Exactech Inc, ISTO Technologies In. Medshape Inc, Moximed Inc, Organogenesis Inc, Osiris Therapeutics Inc, Regentis, RTI Surgical Inc, Samumed Inc, Vericel, Zimmer Biomet Inc, and ZKR Orthopaedics Inc; research support from Active Implants, Arthrex Inc, Episurf, Fidia Pharma, JRF Ortho, Moximed Inc, Novartis, Organogenesis Inc, Samumed Inc, Vericel, and Zimmer Biomet Inc.; other support (hospitality, honoraria, gift, etc.) from Aastrom Biosciences Inc., Aesculap/B.Braun, Arthrex Inc., Ceterix Orthopaedics Inc, Depuy Synthes, Exactech Inc, Osiris Therapeutics Inc, Vericel, and Zimmer Biomet Inc; paid presenter or speaker (CME/non-CME, accredited or otherwise) for Aastrom Biosciences Inc, Arthrex Inc, Moximed Inc, Organogenesis Inc, Vericel, and Zimmer Biomet Inc; IP royalties from Arthrex Inc., Biopoly LLC, DePuy Synthes, and Organogenesis Inc; publishing royalties from Springer and Thieme Medical Publishers Inc; stock or stock options in MedShape Inc. and Ortho Regeneratice Tech Inc; and editorial or governing board appointment to American Journal of Orthopaedics and Cartilage; outside the submitted work.



# Introduction

- 200,000 ACL injuries/year in U.S
- Meniscal deficiency can result in setting of ACL deficiency by:
  - Irreparable meniscal tear at initial injury
  - Chronic instability
  - Iatrogenic from repeated partial/total meniscectomy



# Introduction

- ACL and meniscal deficiency in young active patients leaves few good treatment options:
  - Activity modification → unacceptable sedentary lifestyle
  - Isolated ACLR → progression of OA and increased failure without restoring shock absorption and secondary stability of meniscus
  - UKA/TKA → high rates of complications and aseptic loosening in young patients
  - We propose: Concomitant ACL and MAT, but clinical outcomes largely unknown<sup>1</sup>



# Study Objectives

1. Do these patients have significant functional improvement?
2. Is there an acceptable failure rate?
3. Are there patient factors that predict failure or worse outcome?

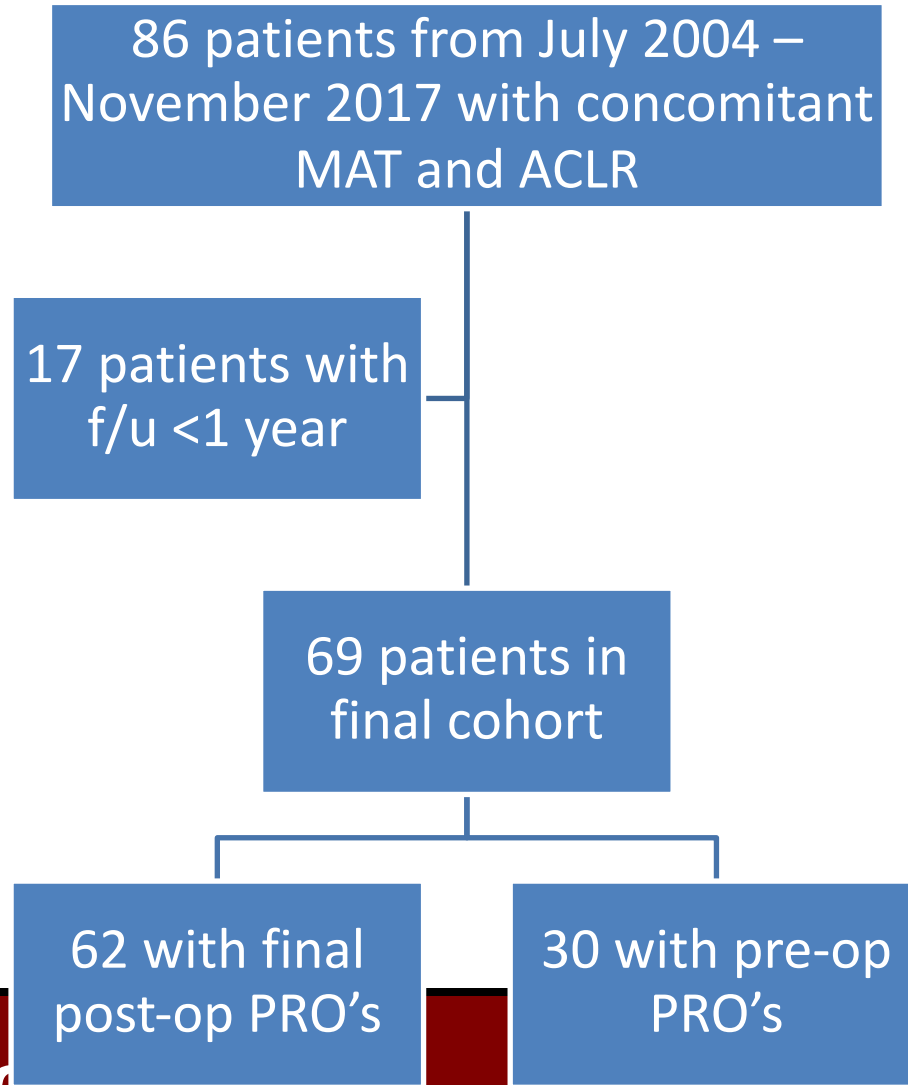


# Methods

1. Patient reported outcomes (with PASS and MCID analysis)
2. Number and % of patients identified as failures
3. Logistical regression analysis of failures by patient factors



# Methods



# Methods

- Demographic and Historical Data
- Surgical Data
- PROs obtained in clinic or over phone
- Reoperations
- Failure Rate
  - MRI or arthroscopically confirmed incompetence of ACL or MAT
  - Revision ACLR or MAT
  - Conversion to arthroplasty



# Methods

- Regression and survivorship analysis was performed to determine predictors of both failure and decreased functional outcome (IKDC)
- Possible predictors:
  - age, BMI, smoking status, duration of symptoms, number of previous surgeries, medial vs. lateral MAT, revision ACL, MAT technique, ACL graft, concomitant cartilage restoration





# Results

Demographic	Value (presented as mean [standard deviation] or percentage)
Age	28.0 years [8.6]
At Least Recreational Athlete	77.9%
Length of f/u	5.1 years [3.1]
Symptom Duration	4.0 years [13.2]
# of Previous Surgeries	2.9 [1.6]
BMI	27.6 kg/m <sup>2</sup> [5.1]
Smoker	14.5%



# Results

Surgical Demographic	N (percentage)
MAT Laterality	Medial: 46 (66.7) Lateral: 17 (24.6) Both: 6 (8.7)
MAT Technique	Bone bridge: 57 (77.0) Bone plugs: 17 (23.0)
Revision MAT	2 (2.9)
Revision ACL	50 (72.4)
ACL Graft	BTB allograft: 51 (73.9) Hamstring allograft: 15 (21.7) BTB autograft: 2 (2.9) Quad autograft: 1 (1.4)
Concomitant Cartilage Restoration	21 (30.4)
Concomitant or Staged DFO or HTO	12 (17.4)

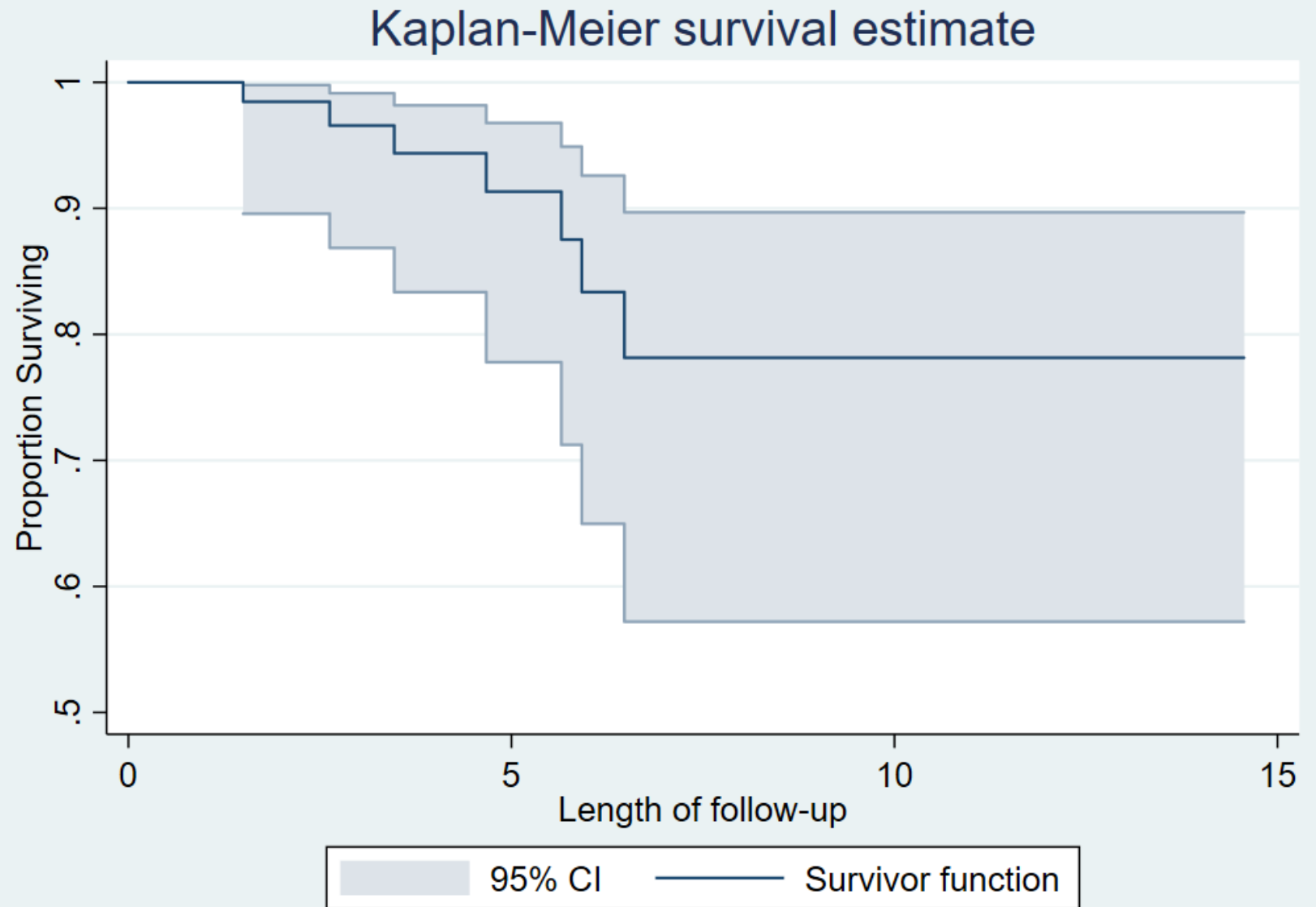


# Results

Outcome	Avg Pre-op	Avg Post-op	P-value	Meet PASS?	Meet MCID?
Lysholm	54.8	66.4	6.1e-4	YES	YES
IKDC	44.0	59.7	8.8e-5	YES	YES
KOOS Pain	55.7	74.9	1.2e-5	N/A	YES
KOOS Symptoms	55.7	66.1	1.5e-2	NO	NO
KOOS ADL	72.9	84.1	8.4e-3	N/A	YES
KOOS Sport	36.9	49.2	9.8e-3	N/A	YES
KOOS QOL	28.6	44.2	9.1e-3	YES	YES

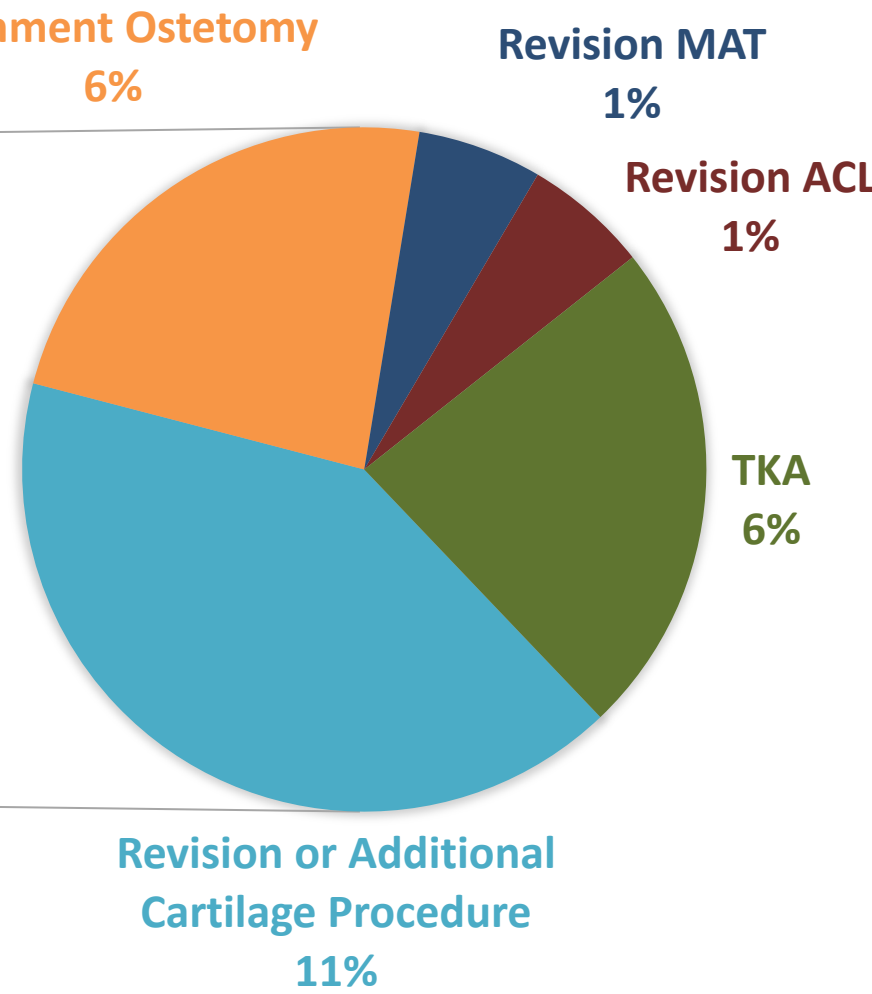
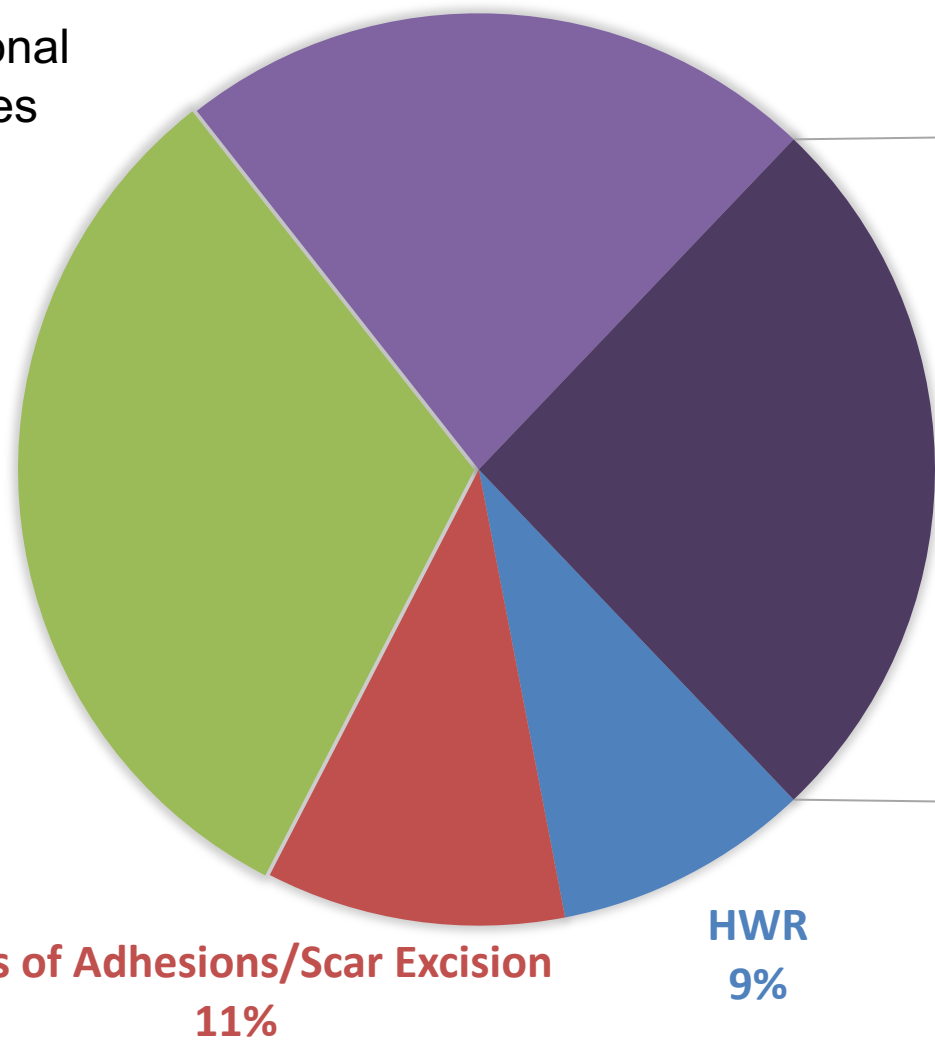


- 10.1% failure rate
  - 4 converted to TKA
  - 1 required revision of ACL and MMAT
  - 2 had biomechanical failure of MAT without revision



- 30 patients (43.5%)
- 50 additional surgeries
- 66 additional procedures

# RE-OPERATIONS



# Predictors of Failure

- Only data point found to predict failure was use of a bone bridge technique for medial MAT ( $p < 0.01$ )
- HOWEVER, when performing survivorship analysis, this correlation was no longer significant ( $p = 0.49$ )
- No other factors correlated with failure

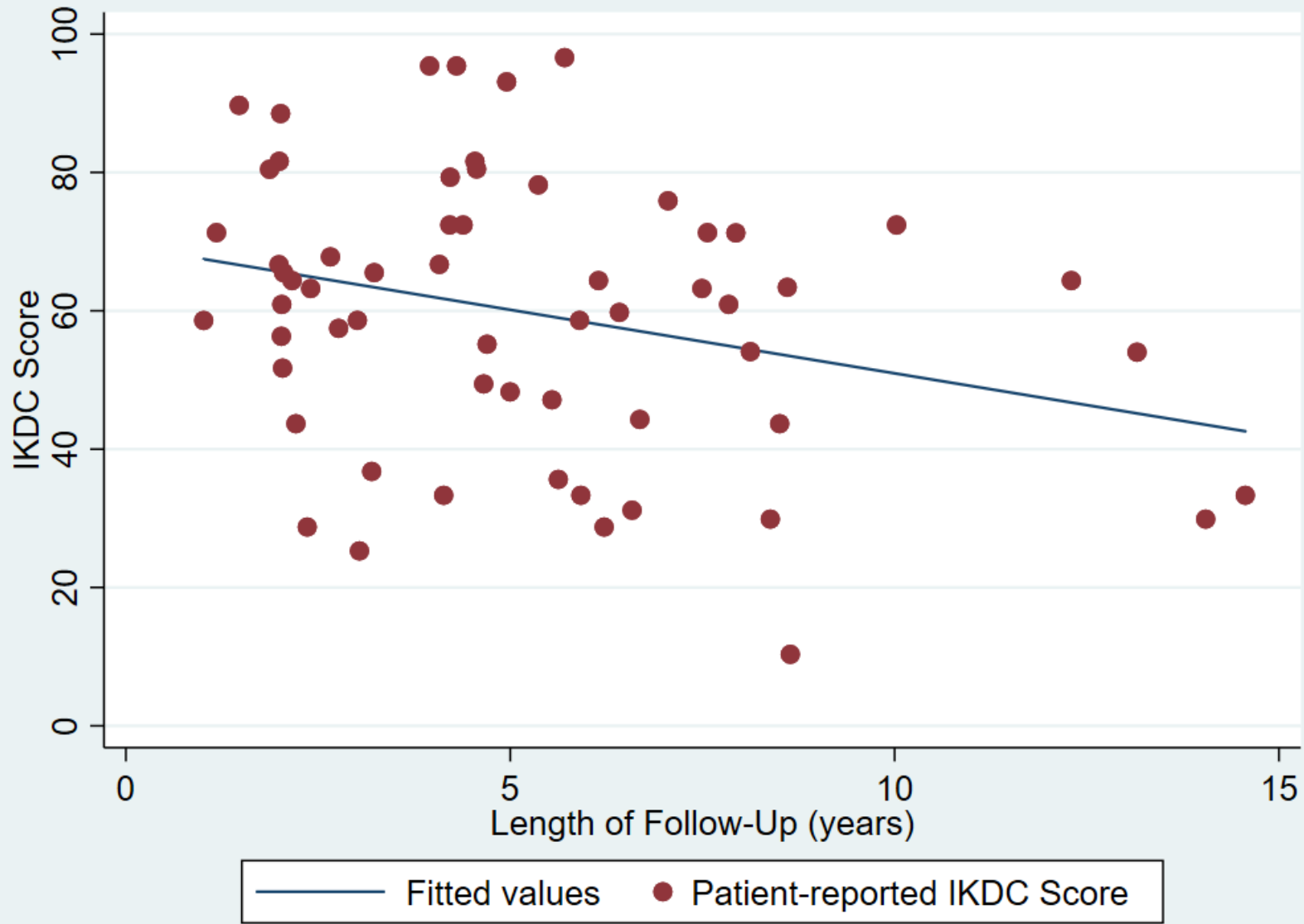


# Predictors of Worse Functional Outcome (IKDC)

Factor	Coefficient	P-value
Length of f/u (years)	-1.94	0.009
Age (years)	-0.78	0.004
Revision ACLR	-12.94	0.013




No other investigated factors correlated with worse outcomes.







# Discussion

1. Do these patients have significant functional improvement?  1. Statistically and clinically significant improvements in PRO's
2. Is there an acceptable failure rate?  2. Yes, 10.1%
3. Are there patient factors that predict failure or worse outcome?  3. No predictors of failure. But longer f/u, older age, and revision ACL led to worse outcomes



# Limitations

1. Single high-volume surgeon
2. Retrospective design
3. Lack of comparison group
4. Need continued f/u for definitive survival



# Conclusions

- Largest cohort of MAT/ACLR to date in literature
- Concomitant ACLR and MAT results in clinically significant improvements for complex patients
- There is a low failure rate at avg 5 years f/u, but a high re-operation rate
- Temper expectations in older patients, revision ACLR, and as patients get further out from surgery

