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# Factors Associated with Tunnel Widening After ACL Reconstruction

Garrett J. Kearney, BS, Maxwell J. McKay, BS, Peter D. Asnis, MD, Lars C. Richardson, MD, Mark D. Price, MD, Miho J. Tanaka, MD, PhD

Massachusetts General Hospital  
Division of Sports Medicine  
Department of Orthopaedic Surgery  
Harvard Medical School, Boston, USA

# Disclosures



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## Relevant Financial Relationships:

- Miho Tanaka, MD, PhD:
  - Consultant for DePuy/Mitek, VeryWell Health, Healthy Sleep
  - CMO, Core2U
  - Research Funding from AANA & FujiFilm
  - NIH R21EB031185, NIH 1R01AR079442, NIH 1R01AR081344
- Garrett Kearney, BS, Maxwell McKay, BS, Peter D. Asnsis, MD, Lars C. Richardson, MD, Mark D. Price, MD:
- No financial conflicts of interest

## Relevant Nonfinancial Relationships:

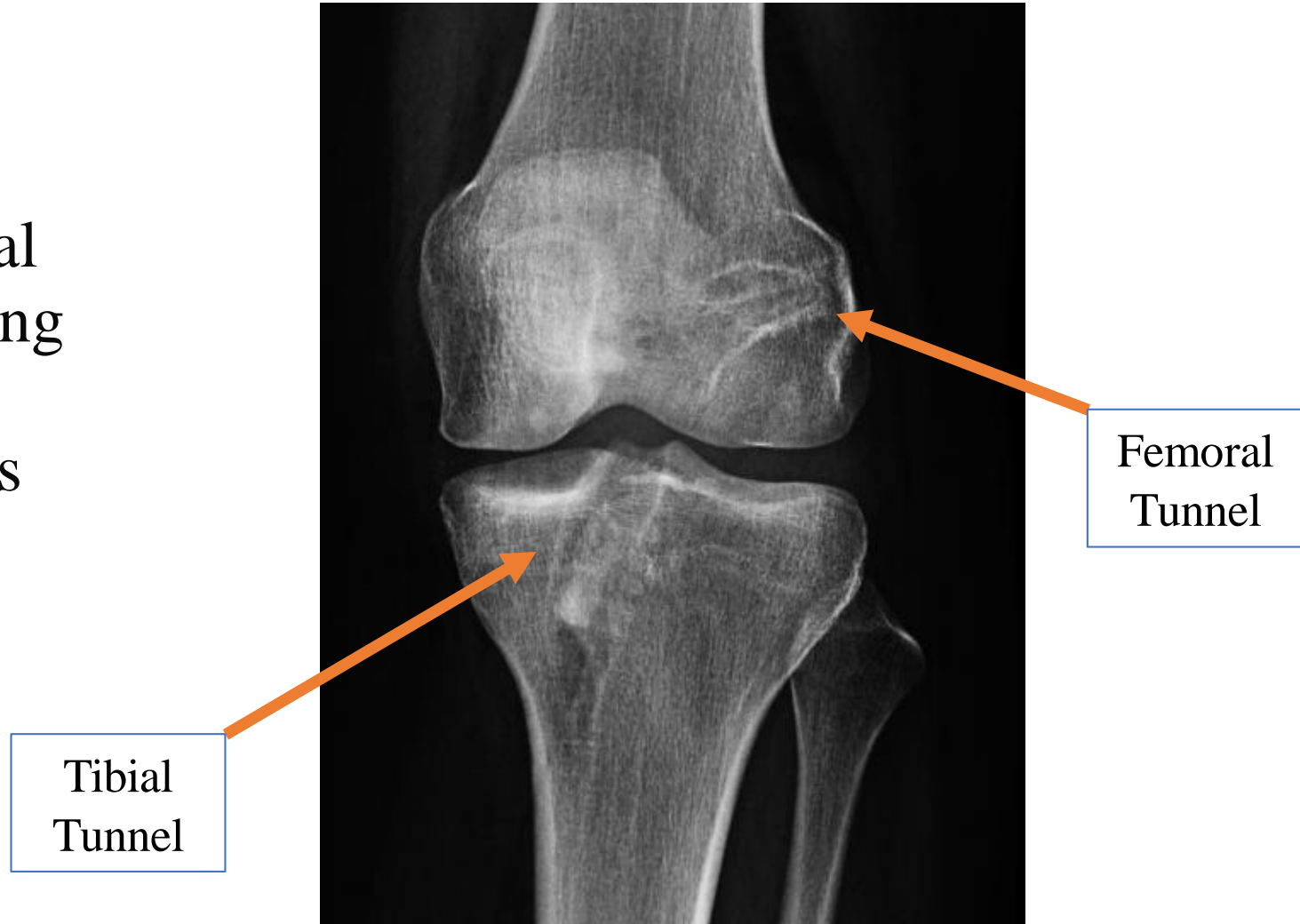
- Peter D. Asnis, MD:
  - On the scientific advisory board for Clearing (a pain management company)
- Garrett Kearney, BS, Maxwell McKay, BS, Lars C. Richardson, MD, Mark D. Price, MD, Miho Tanaka, MD, PhD:
  - No nonfinancial conflicts of interest

# Introduction

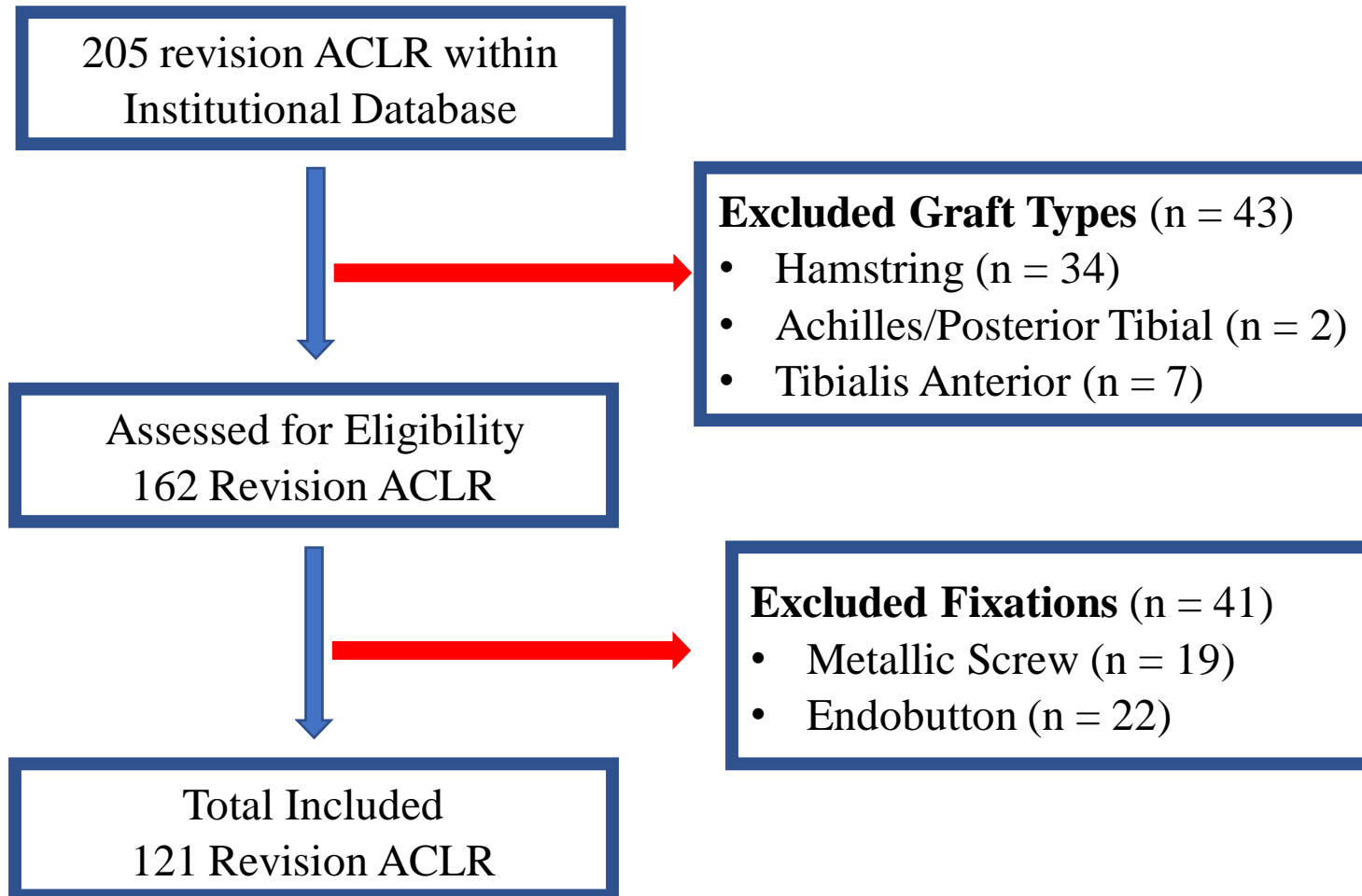
- Tunnel widening after ACL reconstruction has been described to have both biological and mechanical causes
- Widening of femoral and tibial tunnels can lead to difficulty during revision ACL reconstruction due to poor graft fixation
- The mechanism and factors associated with tunnel widening is not clear

# Purpose

- To describe differences in patterns of tibial and femoral tunnel widening by comparing radiographs of intact and failed ACL grafts, and assess the factors associated with these changes



# Methods

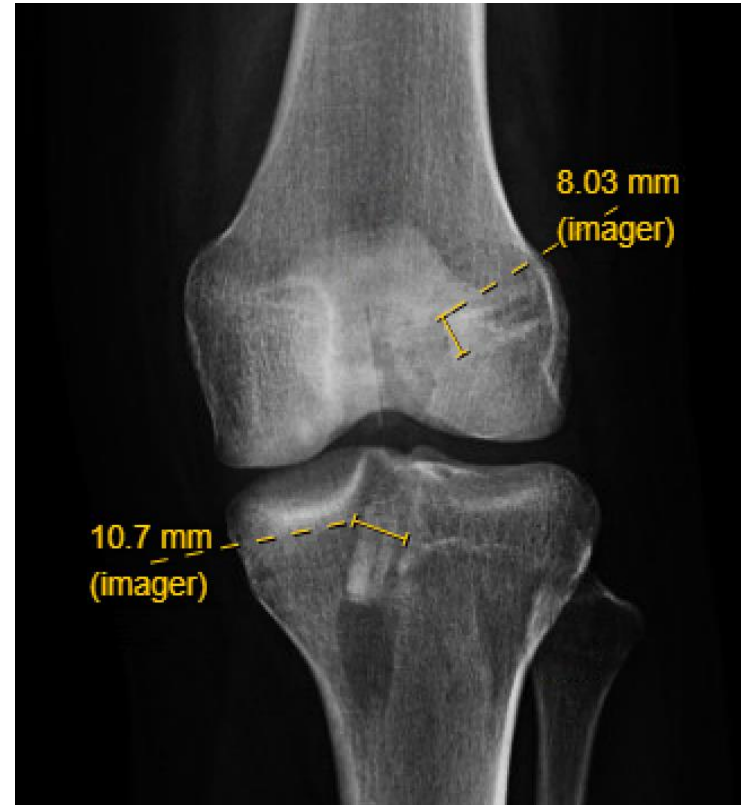


- Patients with primary ACL reconstruction with BTB autograft or allograft using biocomposite screw fixation who were subsequently evaluated for graft failure or contralateral knee injury were included in this study
- Operative notes were reviewed to determine femoral and tibial tunnel sizes created at the time of index surgery

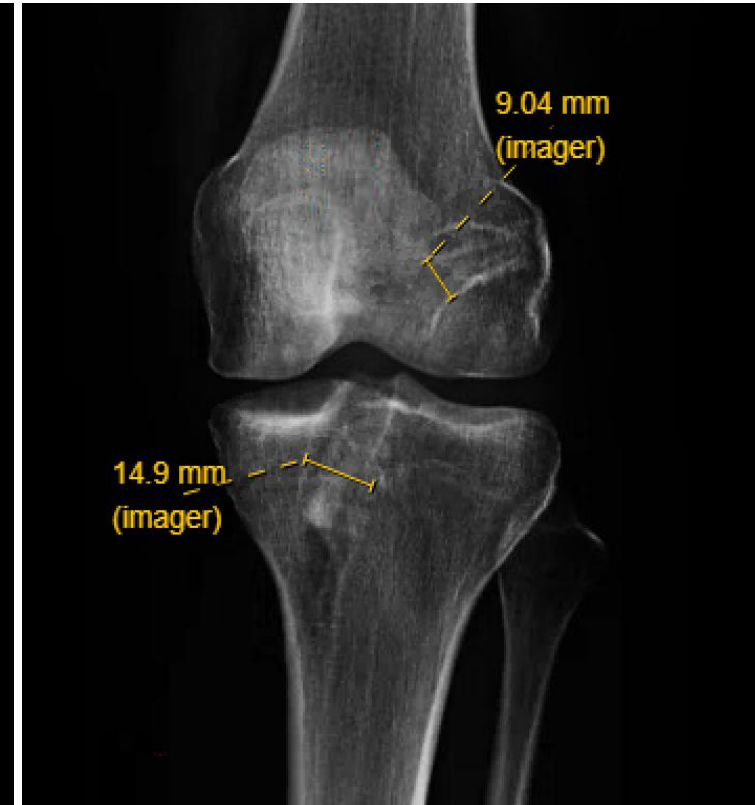


# Methods

- Radiographs at the time of follow up were reviewed
  - Tunnel sizes were measured at the largest diameter on the AP views
  - Tunnel widening was calculated based on the changes in tunnel size and compared between cases with failed vs intact ACL grafts



Intact ACL  
Reconstruction



Failed ACL  
Reconstruction

# Methods

- Subgroup analyses by sex and graft type were performed
- Linear regression analyses were performed to assess relationship to tunnel widening
  - Age at time of first surgery
  - Time to follow-up

# Results

- **Patient Pool:** 121 knees (59F, 62M)
  - 68.6% reconstruction with BTB autograft
  - 31.4% w BTB allograft
- Femoral tunnel widening was greater in knees with failed ACL grafts than intact knees by 1.3+/-1.5mm ( $p<0.001$ ) whereas tibial tunnel widening was comparable

	Intact (N=34)	Failed (N=87)	Significance
Age at Primary ACL Surgery (years)	27.8±13.2	29.1±11.7	0.6
Time to Followup (years)	3.5±2.3	3.6±2.8	0.9
Femoral tunnel widening (mm)	0.3+/-1.9	1.4+/-1.5	0.001
Femoral tunnel widening (%)	3.2+/-19.9	15.6+/-16.7	0.001
Tibial tunnel widening (mm)	0.9+/-1.8	1.1+/-2.1	0.589
Tibial tunnel widening (%)	9.0+/-18.7	10.8+/-21.2	0.657



# Results

- **Regression Analyses:**
- Age of Surgery: No significant association between tunnel widening and age
- Time Between Initial & Revision ACL Reconstruction: No significant association between tunnel widening or time to follow-up

# Sex-Specific Findings

Females	Intact Autograft (N=12)	Failed Autograft (N=26)	Significance	Intact Allograft (N=4)	Failed Allograft (N=17)	Significance
Femoral tunnel widening (mm)	0.2+/-1.8	1.6+/-1.3	0.015	-1.3+/-2.0	1.6+/-1.7	0.006
Femoral tunnel widening (%)	2.6+/-19.2	17.0+/-14.7	0.015	-13.0+/-20.2	18.1+/-18.4	0.008
Tibial tunnel widening (mm)	1.2+/-1.6	0.7+/-2.3	0.466	-1.1+/-0.9	1.0+/-1.4	0.012
Tibial tunnel widening (%)	12.9+/-15.9	6.0+/-22.7	0.409	-10.5+/-0.09	9.8+/-13.6	0.011
Males	Intact Autograft (N=15)	Failed Autograft (N=30)	Significance	Intact Allograft (N=3)	Failed Allograft (N=14)	Significance
Femoral tunnel widening (mm)	1.1+/-1.6	1.1+/-1.4	0.973	-2.0+/-0.4	1.6+/-2.1	3.596
Femoral tunnel widening (%)	12.4+/-16.7	12.2+/-15.0	0.977	-19.5+/-2.2	16.9+/-21.6	0.365
Tibial tunnel widening (mm)	1.0+/-1.8	1.2+/-2.6	0.867	1.1+/-3.1	1.8+/-1.1	0.620
Tibial tunnel widening (%)	10.5+/-17.8	11.9+/-26.7	0.852	11.3+/-30.9	16.9+/-10.3	0.055

# Conclusion

- On radiographs at the time of followup, knees with failed ACL grafts had greater tunnel widening than knees with intact ACL grafts
  - The patterns and location of tunnel widening differed by sex and graft type
- Further studies are needed to better understand the surgical and patient-related factors that can contribute to these differences following ACL reconstruction

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