



ISAKOS  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21

# FUNCTIONAL RESULTS IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH HYBRID GRAFTS

David Figueroa,

María Loreto Figueroa, Alexandra  
Feuereisen, Rafael Calvo, Alejandro  
Vaisman





ISAKOS  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21

None of the authors of this paper have a conflict of interest in this study.



# Introduction

- Success of an anterior cruciate ligament reconstruction (ACL-R) is multifactorial → Graft selection is a key factor
- The use of autologous graft is considered the "gold standard" in ACL-R surgery
  - Autografts with diameters less than 8mm have a higher rate of graft failure
- Use of hybrid grafts:
  - Customize the size of the graft
  - Increase inappropriate diameters
  - Achieve better results?
    - Objective
      - Evaluate functional results of patients operated with hybrid grafts in ACL reconstruction surgery



# Methods

- Retrospective cohort study
- Database of ACL – reconstruction surgeries from 2015 to 2021
- 20 patients operated with hybrid grafts
- Follow-up through file review and surveys by phone and e-mail

## Inclusion criteria

ACL – R with hybrid grafts

Same center

Same surgical team

## Exclusion criteria

Open growth plate

Incomplete follow up

= 20 patients  
included for analysis

# Methods

Evaluation before injury and at follow – up:

- Demographic data
- Sports activities
- Cincinnati score
- Lysholm score
- Tegner activity score
- Subjective IKDC score
- Time to return to sports
- Intraoperative:
  - Diameter of autograft harvested
  - Diameter of graft after augmentation with allograft

Statistical analysis:

- T-student
- Analysis of covariance
- Significance of 5% ( $p < 0.05$ )



**ISAKOS**  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18 – June 21

# Results

Demographic data		
Age ( $\bar{x}$ )	25.6 years	DS 8.59
Gender (female)	13 patients	65%

Complications		
ACL-R failure	1 patient	5%



Required ACL-R  
revision surgery



# Results

		Pre injury	Post ACL – R with hybrid graft	p value
Sports (+)		100%	100%	-
Type of sport	Soccer	50%	20%	-
	Gym/ Functional training	25%	50%	-
Cincinnati score		89	86	0.229
Lysholm score		100	94.2	<u>0.0002</u>
Tegner activity level score		6.3	5.6	<u>0.009</u>
Subjective IKDC score		100	99.32	0.168

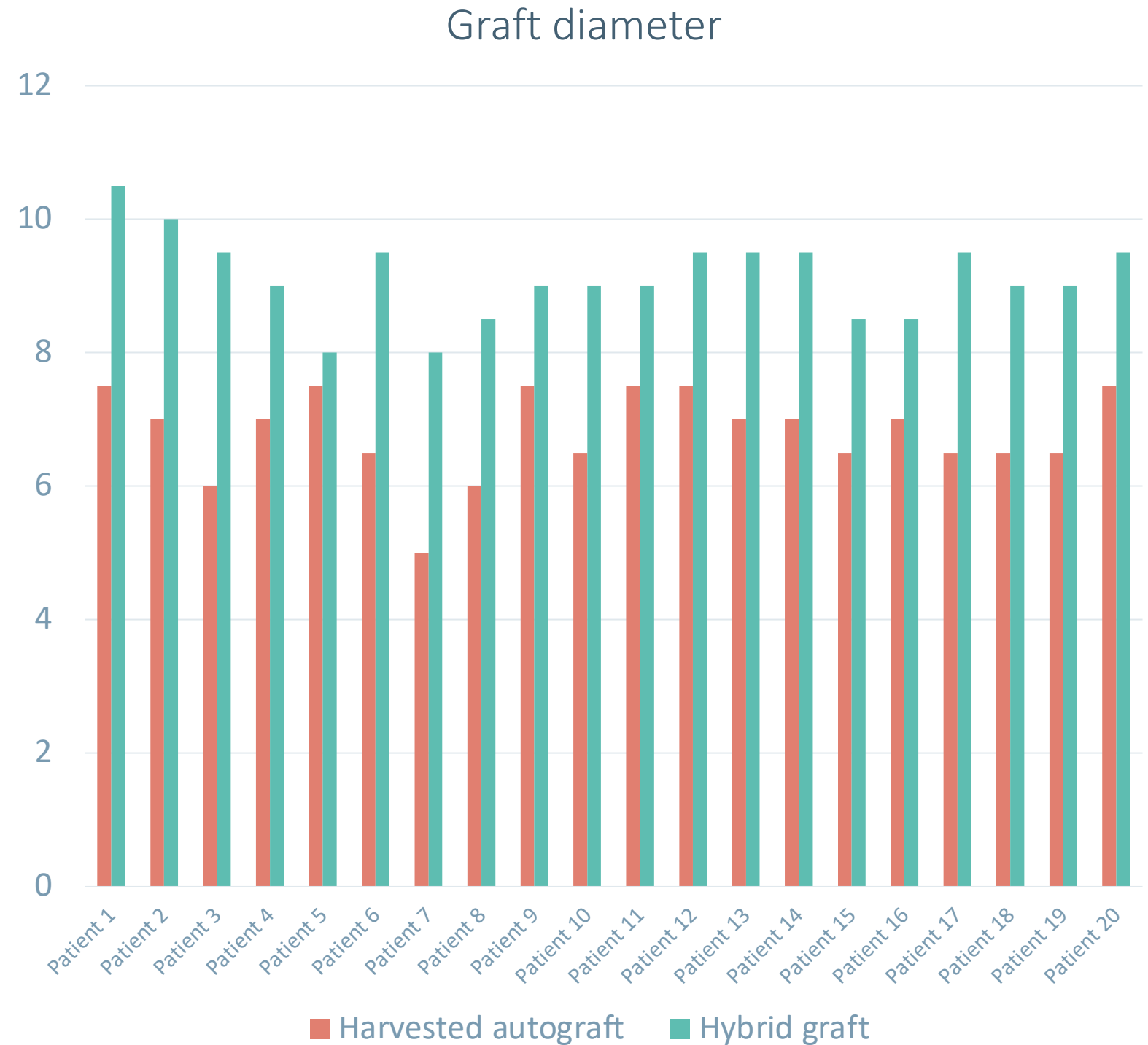
No correlation was found between sex and age with the change in the scores of the different scales.



# Results

Intraoperative data			p value
Harvested autograft diameter ( $\bar{x}$ )	6.8mm	5 – 7.5mm	<u>0.0001</u>
Hybrid graft diameter after augmentation ( $\bar{x}$ )	9.1mm	8 – 10.5 mm	

The average size increased by 2mm after allograft augmentation, which was statistically significant.





# Discussion

- Autograft diameter:  $6.4 \pm 0.2$  mm -  $8.8 \pm 0.5$  mm
  - Hybrid graft diameter:  $8.9 \pm 1.0$  mm -  $9.9 \pm 0.8$  mm
  - Autograft failure rate reported: 0 – 28%
  - Hybrid graft failure rate reported: 0 – 30%
  - Remains unclear whether a larger hybrid graft provides any clinical advantages over a smaller autograft
- 
- Insufficient autograft size was the main reason for extra allograft augmentation
  - No differences in failure rate between the two groups
  - Better Lysholm score, KT-1000 test and KOOS-QOL in the autograft group
  - No differences in IKDC, Tegner score, KOOS-ADL, KOOS-Sports, KOOS-Symptoms and VAS pain score between groups

## Systematic Review

### Risk of Retear Following Anterior Cruciate Ligament Reconstruction Using a Hybrid Graft of Autograft Augmented With Allograft Tissue: A Systematic Review and Meta-analysis

Moneer M. Abouljoud, B.S., Joshua S. Everhart, M.D., M.P.H., Benjamin O. Sigman, B.S., David C. Flanigan, M.D., and Robert A. Magnussen, M.D., M.P.H.

[Ther Clin Risk Manag.](#) 2019; 15: 487–495.

PMCID: PMC6422411

Published online 2019 Mar 14. doi: [10.2147/TCRM.S187979](https://doi.org/10.2147/TCRM.S187979)

PMID: [30936710](https://pubmed.ncbi.nlm.nih.gov/30936710/)

### Hybrid graft vs autograft in anterior cruciate ligament reconstruction: a meta-analysis

[Lei Wang](#),<sup>1</sup> [Jian-gang Cao](#),<sup>2</sup> and [Jun Liu](#)<sup>1</sup>

# Conclusions

- ACL reconstruction surgery with hybrid grafts:
  - Allows to significantly increase the diameter of the graft
    - Could be a useful tool in patients with autograft diameters <7mm
  - Achieves good clinical and functional results reported by patients
    - Allowing an adequate return to sports in most of them



# References

- *Wang, L., Cao, J., & Liu, J. (2019). Hybrid graft vs autograft in anterior cruciate ligament reconstruction: a meta-analysis. Therapeutics and Clinical Risk Management.*
- *Alvarez-Pinzon, A. M., Barksdale, L., Krill, M. K., & Leo, B. M. (2015). Hybrid Graft Anterior Cruciate Ligament Reconstruction: A Predictable Graft for Knee Stabilization. Orthopedics.*
- *Abouljoud, M. M., Everhart, J. S., Sigman, B. O., Flanigan, D. C., & Magnussen, R. A. (2018). Risk of Retear Following Anterior Cruciate Ligament Reconstruction Using a Hybrid Graft of Autograft Augmented With Allograft Tissue: A Systematic Review and Meta-analysis. Arthroscopy: The Journal of Arthroscopic & Related Surgery.*
- *Mirzayan, R., Prentice, H. A., Essilfie, A., Burfeind, W. E., Ding, D. Y., & Maletis, G. B. (2020). Revision Risk of Soft Tissue Allograft Versus Hybrid Graft After Anterior Cruciate Ligament Reconstruction. The American Journal of Sports Medicine.*
- *Matthew J. Kraeutler, Darby A. Houck, Trevor J. Carver, Jonathan T. Bravman, Armando F. Vidal, Eric C. McCarty. (2018). Demographics and Clinical Outcomes of Patients Undergoing Anterior Cruciate Ligament Reconstruction with a Planned or Unplanned Hybrid Graft. The Journal of Knee Surgery.*

