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A survival analysis of ACL graft and contralateral ACL ruptures in patients under 18 years

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Background

Younger age risk factor for multiple ACL injuries

- 2-5 times greater risk for either graft rupture or contralateral ACL injury

20 year follow up (n=39 ≤18yrs)

- 46% graft survival males
- 69% graft survival females

20-Year Outcomes of Anterior Cruciate Ligament Reconstruction With Hamstring Tendon Autograft

The Catastrophic Effect of Age and Posterior Tibial Slope

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AJSM, 2017

Few studies in adolescents with longer term follow-ups

Purpose

To report rates of graft and contralateral ACL rupture after ACL reconstruction in a large series of younger patients (<18 years) over a period up to 10 years following first time ACLR

Methods

- Single surgeon series of 400 consecutive patients
  - ACR between Dec 2004-Feb 2018
- Inclusion : under 18 years, primary ACLR

Excluded

- Prior CL ACL injury n=8
- Bilateral ruptures n=2
- Died within 6 months of surgery n=2

Methods

- Primary outcome: second ACL injuries (either graft rupture or contralateral ACL injury)
- Follow-up
  - Medical record review
  - Email/electronic survey/telephone interviews
- Last follow up date was day of last clinic review or day completed survey/telephone interview
- Kaplan-Meier survival analysis, log-ranks tests for sex comparisons

Results: Cohort demographics

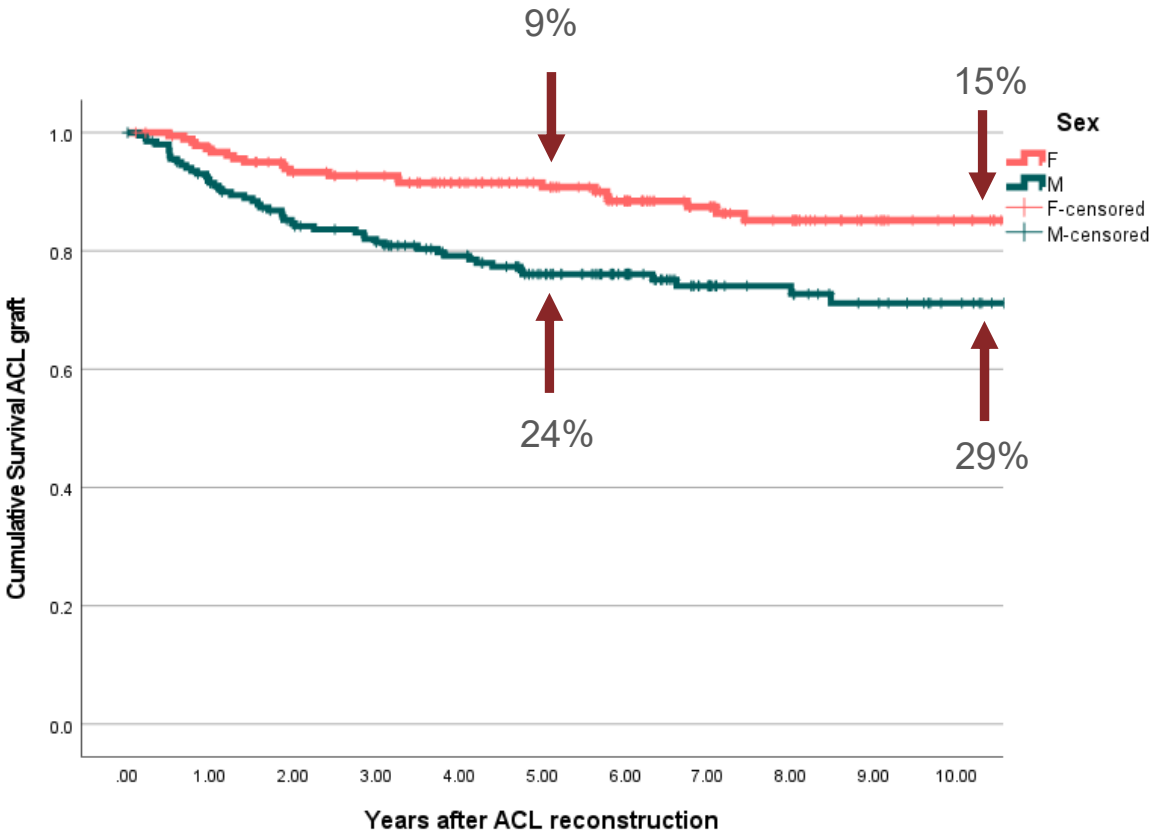
	Overall	Female	Male
Number	388	185	203
Age	16.1 (10-17)	15.9 (10-17)	16.3 (12 -17)
Graft Type(n)			
Hamstring	352	175	177
Patellar tendon	16	3	13
Quadriceps	20	7	13

Results: follow-up

- Average of 8 years (range 0-18 years)
- 50% between 6-10 years
- 91% minimum 3 year follow-up
- 83% minimum 5 year follow-up

Results: Graft rupture

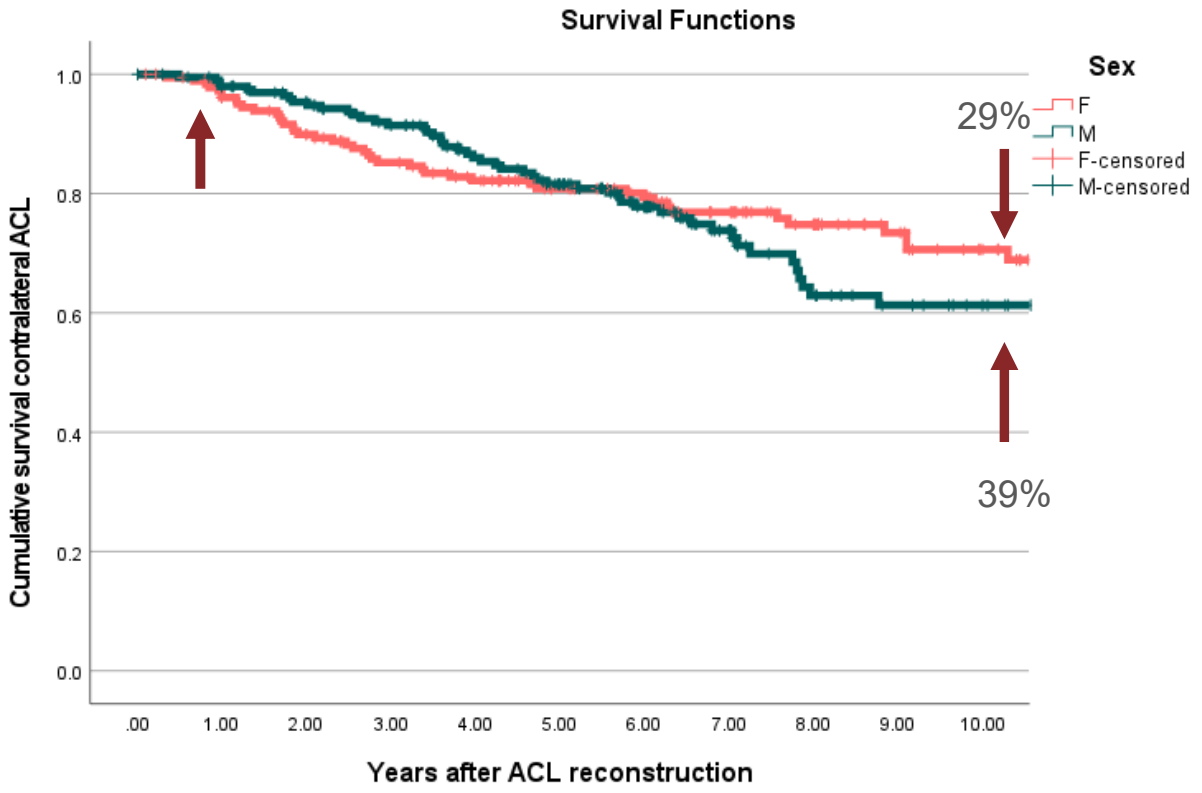
Years after ACLR	Graft rupture (%)		
	Overall	Female	Male
2	11	7	16
5	17	9	24
10	22	15	29



Overall rates of graft rupture higher for males (p=0.001)

Results: Contralateral ACL injury

Years after ACLR	Graft rupture (%)		
	Overall	Female	Male
2	7	10	5
5	19	19	18
10	33	29	39



Summary

- Highlights high risk for second ACL injury in younger patients
  - 5 year results (17% graft rupture) are consistent with DeFrancesco et al. (2020) n=504 <16 years

    21.6% cumulative graft rupture rate by 4 years

An In-Depth Analysis of Graft Rupture and Contralateral Anterior Cruciate Ligament Rupture Rates After Pediatric Anterior Cruciate Ligament Reconstruction

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AJSM, 2020

Summary

- Over time cumulative risk for contralateral ACL injury greater than graft rupture
- Rate of contralateral ACL in males consistent over time, rate reduces in females after 5 years
  - New finding (large cohort followed for longer time)
  - Important to document postop time course for second ACL injuries – better understand contributing factors and prevent such injuries in these young athletes

Thank you

Melbourne, Australia