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Influence of the Tibial Slope and Lateral Femoral Condyle Ratio on Intraarticular Injuries During Primary ACL-Reconstruction

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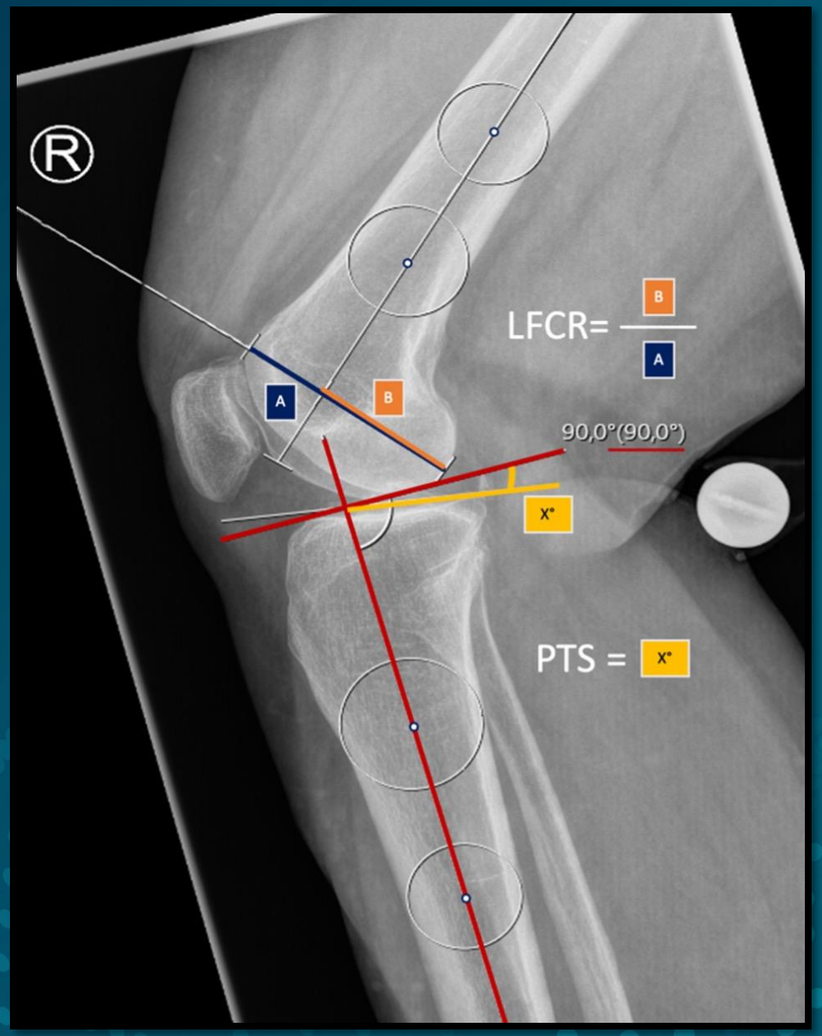
Faculty Disclosure Information

- There is no conflict of interest.

Background



- High prevalence of concomitant cartilage and meniscus injuries in ACL-insufficiency

  Sri-Ram, Bone Joint J; 2013

- More concomitant injuries in patients with ACL insufficiency in the period interval from injury to surgery

  Mehl, AOTS; 2019

- Comparable results for acute and delayed ACL reconstructions

  Vermeijden, AJSM; 2023

- Increased PTS → Risk factor for the occurrence of cartilage and meniscus injuries

  Kodama, KSSTA; 2023

- Lateral Femoral Condyle Ratio (LFCR):
  - Deep development of the posterior femoral condyle → Risk of ACL injury with increased with LFCR > 63%

  Pfeiffer, JBJS; 2018

1. Sri-Ram, Bone Joint J; 2013
2. Mehl, AOTS; 2019

Purpose

To assess the impact of the PTS and LFCR on the intra-articular concomitant injuries in patients with delayed versus acute ACL reconstruction?

Hypothesis

Increased PTS and LFCR are associated with an increased risk of associated intra-articular injuries in patients with delayed compared with acute ACL reconstruction.

Methods

Acute surgery — 12 Weeks — Delayed surgery

Intra-articular concomitant injuries

Influencing factors?

Methods

Study design	– Retrospective case-control study
Material	– **Primary ACL reconstruction** – Operation period: 01/2011-12/2021 – Minimum follow-up: 2 years – Patient age: 16-60

Methods	– Patient and surgery related information
	– **Occurrence of intra-articular concomitant injuries**
	– Radiological evaluation
	  – **Medial Posterior Tibial Slope**
	  – **Lateral Femoral Condyle Ratio**

Results

Study population

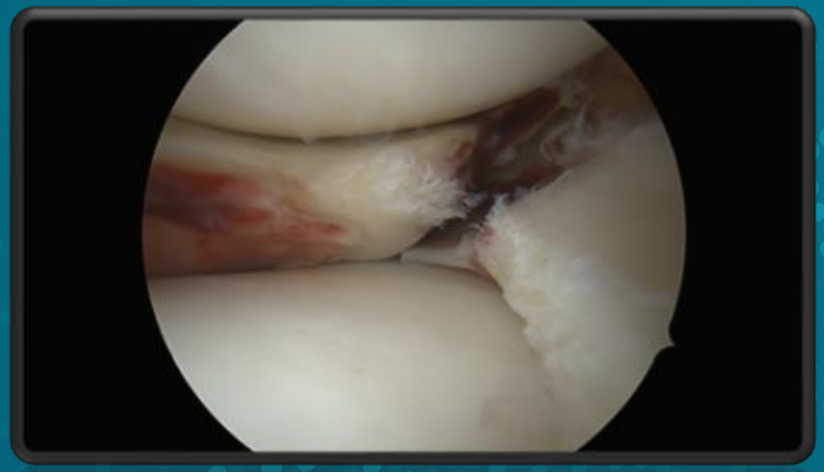
Patients	378
Age	30.6 ± 10.6 Jahre
Acute ACL reconstruction (< 12 weeks)	290 (77%)
Delayed ACL reconstruction (>12 weeks)	88 (23%)
Meniscus injuries	269 (71%)
Cartilage injuries	109 (29%)

Results

Concomitant meniscal injuries in acute ACL reconstruction

Factor	Acute ACL reconstruction (< 12 weeks)
n	212
PTS	9.3° ± 2.8°
LFCR	62.6% ± 3.6%
Alter	29.7 ± 10.6 Jahre

Factor	Odds Ratio	p-value
Age	1.00 (0.97 – 1.03)	.9
Gender	0.56 (0.29 – 1.10)	.092
PTS	0.99 (0.85 – 1.15)	.9
LFCR	0.95 (0.87 – 1.04)	.3

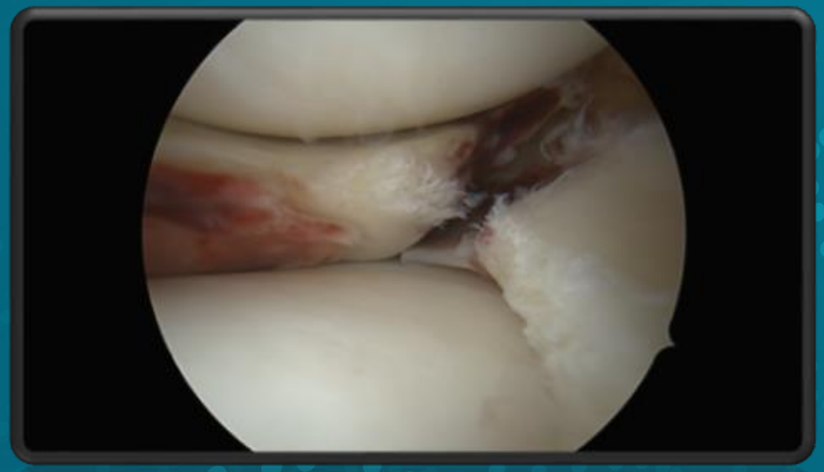


Results

Concomitant meniscal injuries in delayed ACL reconstruction

Factor	Delayed ACL reconstruction (> 12 weeks)
n	57
PTS	8.9° ± 2.7°
LFCR	63.2% ± 3.9%
Alter	35.4 ± 10.6 Jahre

Factor	Odds Ratio	p-value
Age	**1.09 (1.03 – 1.17)**	**.006**
Gender	**0.18 (0.05 – 0.58)**	**.006**
PTS	1.05 (0.86 – 1.29)	.6
LFCR	**1.20 (1.03 – 1.43)**	**.028**

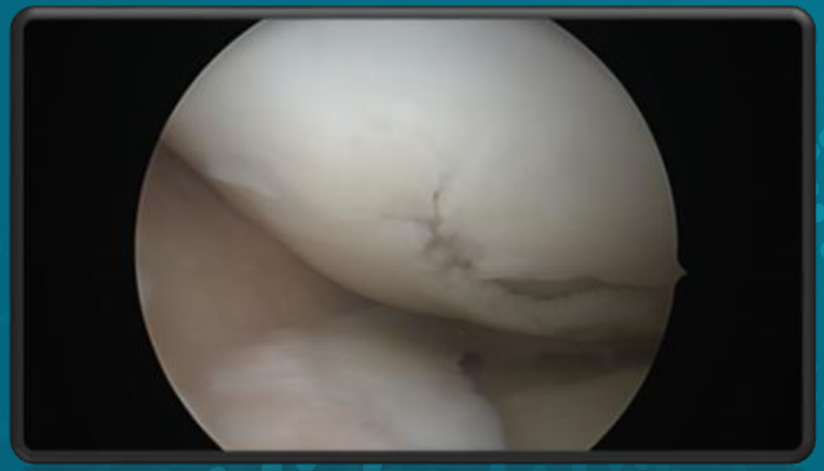


Results

Concomitant cartilage injuryies in acute ACL reconstruction

Factor	Acute ACL reconstruction (< 12 weeks)
n	78
PTS	9.5° ± 3.0°
LFCR	62.5% ± 4.1%
Alter	34.7 ± 11.3 Jahre

Factor	Odds Ratio	p-value
Age	**1.07 (1.04 – 1.10)**	**.1**
Gender	0.80 (0.42 – 1.47)	.5
PTS	1.03 (0.93 – 1.13)	.6
LFCR	0.96 (0.98 – 1.04)	.4

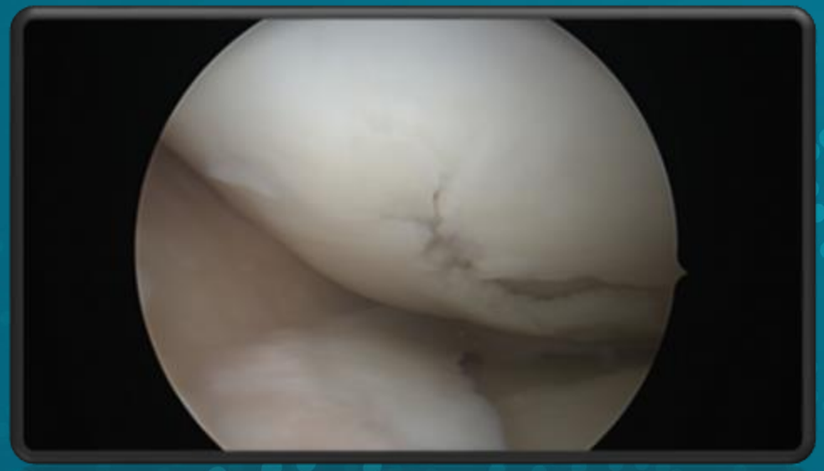


Results

Concomitant cartilage injuryies in delayed ACL reconstruction

Factor	Delayed ACL reconstruction (> 12 weeks)
n	31
PTS	9.2° ± 2.9°
LFCR	62.8% ± 3.2%
Alter	38.4 ± 10.6 Jahre

Factor	Odds Ratio	p-value
Age	**1.08 (1.03 – 1.14)**	**.002**
Gender	1.26 (0.44 – 3.53)	.7
PTS	1.11 (0.93 – 1.35)	.2
LFCR	0.92 (0.80 – 1.06)	.2



Limitations

1. Retrospective study design

   Difficulty: Distinguishing when the concomitant injuries occurred:

   → index injury or in the time between injury and ACL reconstruction

2. Any pre-existing degenerative cartilage and meniscus injuries cannot be clearly identified in older patients

3. Patients with concomitant injuries were advised to undergo early acute ACL reconstruction

Conclusions

1. Acute ACL reconstruction (<12 weeks) is recommended in male patients with higher LFCR and older age.

2. Increased PTS does not represent a risk factor for associated intra-articular injuries in patients undergoing acute or delayed ACL reconstruction.

3. These findings may help individualize the timing of ACL reconstruction based on demographic characteristics and bony morphology.

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1. Sri-Ram, Bone Joint J; 2013
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