UNIVERSITY OF GOTHENBURG

ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8 -11

Injury Mechanism is Related to Short-Term Treatment Failure After Primary Isolated PCL Reconstruction: A Study From the Swedish and Norwegian Knee Ligament Registries

BÁLINT ZSIDAI, MD, PHILIPP W. WINKLER, MD, ERIC NAARUP, MD, MSC, EBBA OLSSON, MSC, ALEXANDRA HORVÁTH MD, PHD, MSC, GILBERT MOATSHE, MD, PHD, MARTIN LIND, MD, PHD, VOLKER MUSAHL, MD, ERIC HAMRIN SENORSKI, PT, PHD, KRISTIAN SAMUELSSON MD, PHD, MSC

DEPARTMENT OF ORTHOPAEDICS, THE INSTITUTE OF CLINICAL SCIENCES, UNIVERSITY OF GOTHENBURG

Disclosures

- VM reports educational grants, consulting fees, and speaking fees from Smith & Nephew plc, educational grants from Arthrex and DePuy/Synthes, is a board member of the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS), and deputy editor-in-chief of Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA).
- KS is a member on the board of directors for Getinge AB (publ).
- No funding was obtained for the current study.

Background

- Posterior cruciate ligament (PCL) reconstruction has relatively high rates of surgical and subjective failure
- Limited research on factors associated with inferior outcomes after isolated PCL-R
- Improved understanding of factors associate with failure needed to improve patient management

Aims

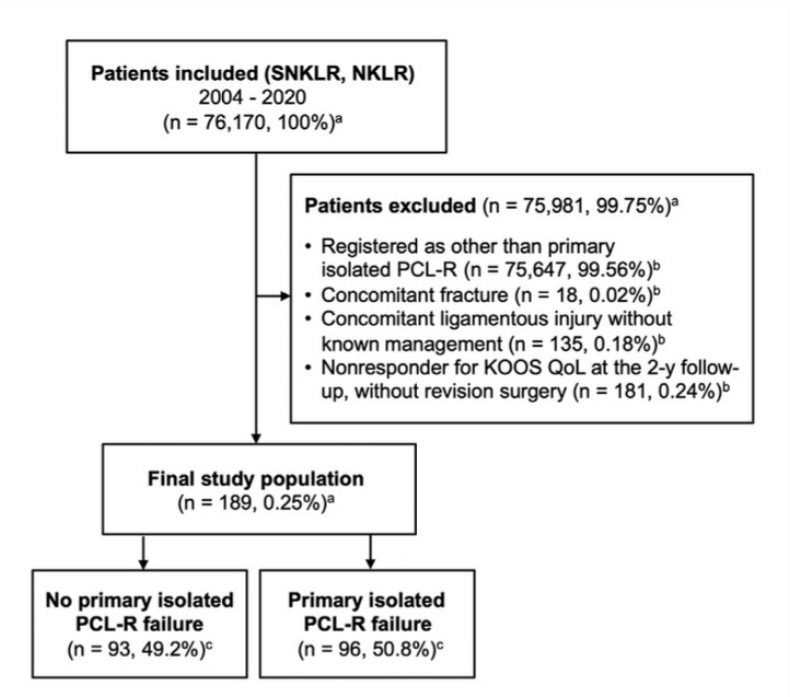
- To determine the association between patient and injury-related factors and total failure after PCL-R
- To assess both surgical failure and clinical failure at 2-year follow-up
- Data from the Swedish and Norwegian Knee Ligament Registries

Methods

- Cohort study of patients with primary isolated PCL-R (2004/2005-2020)
- **Primary outcome:** total failure at 2-year follow-up
  - Surgical failure: revision PCL-R within 2 years
  - Clinical failure: KOOS Quality of Life (QoL) < 44
- Risk factors assessed using univariable and multivariable logistic regression

Methods – Inclusion & exclusion

- Patients **with primary isolated PCL-R performed at the index surgery**
- Exclusion criteria: fractures, tendon injuries, vascular or nerve complications, prior surgery to the knee
- Patients with missing preoperative PROs excluded

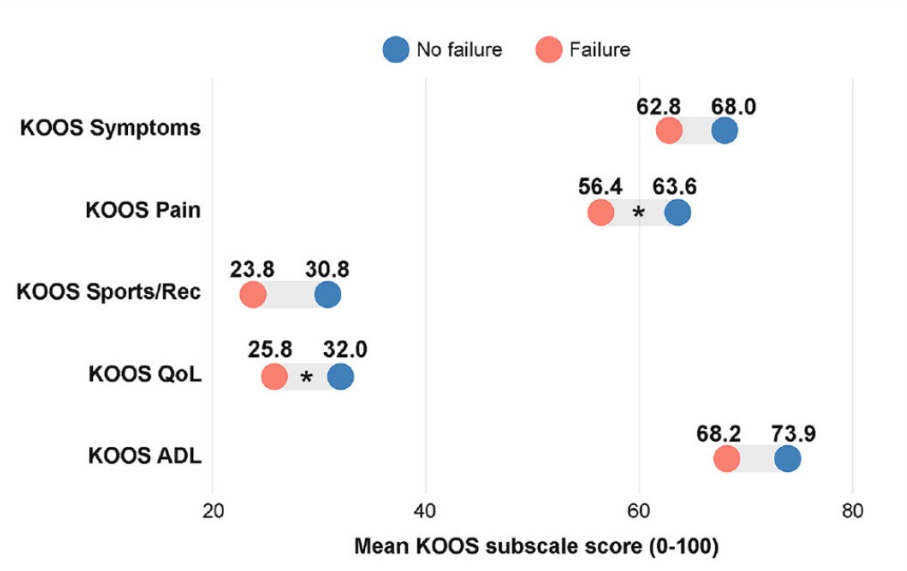


Methods

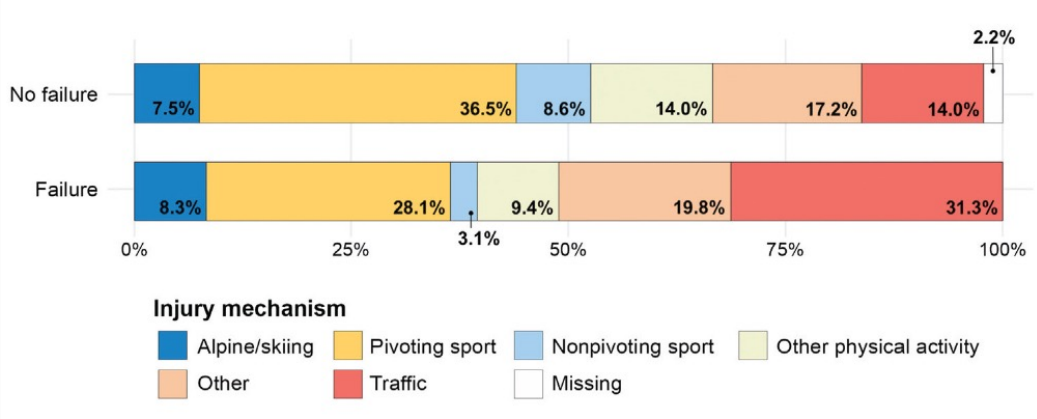
- Approval has been granted by the Swedish and Norwegian ethical review authorities
- Descriptive statistics (mean, standard deviation, etc.)
- Multivariable logistic regression models to assess association between variables and outcomes
- R-studio and packages for figures
- $\alpha = 0.05$
- Analysis and interpretation with the help of consultant statistician

Results

- 189 patients
- 5.8% surgical failure rate
- **45.0% clinical failure rate**
- Traffic-related injury associated with >6-fold increased failure risk (odds ratio: 6.11; 95% confidence interval: 2.01-18.55; p = 0.0014)
- Baseline KOOS QoL associated with failure risk



Results



- AUC = 0.70 (95% CI, 0.60-0.80) for the final multivariable model
- At best acceptable ability of the model to estimate PCL-R failure risk based on the variables considered.

TABLE 4
Results of Multivariable Logistic Regression Model for Traffic-Related Injury and Baseline KOOS QoL[a]

Risk Factor	OR (95% CI)	*P*
Traffic	6.11 (2.01-18.55)	.0014
KOOS QoL	0.74 (0.57-0.97)	.027

[a]AUC for multivariable model = 0.70 (95% CI, 0.60-0.80). KOOS, Knee injury and Osteoarthritis Outcome Score; QoL, Quality of Life.

Discussion

Key findings

- Concerning **45% short-term clinical failure** rate for isolated PCL-R
- **Traffic-related** PCL injuries may have an over **6-fold increased risk** of suboptimal short-term knee-related quality of life after isolated PCL-R.
- No modifiable demographic or injury-related risk factors associated with short-term PCL-R failure were identified

Discussion – Limitations

- Relatively large (but still limited) sample size from two national registries
- Strict inclusion/exclusion criteria reduce heterogeneity
- Loss to follow-up is prominent at 2 years (49%)
- No information about the treatment of concomitant ligament injuries other than ACL
- No imaging data - information about anatomic parameters, characteristics of other injuries

Conclusion

- Patients with isolated PCL-R have high rate (45%) of short-term clinical failure
- Traffic-related injury mechanism is associated with >6-fold increased odds of failure
- No modifiable risk factors identified
- Clinical implication: Counsel patients with traffic-related PCL injuries according to realistic short-term expectations

References

- Lind M, Nielsen TG, Behrndtz K. Both isolated and multi-ligament posterior cruciate ligament reconstruction results in improved subjective outcome: results from the Danish Knee Ligament Reconstruction Registry. Knee Surg Sports Traumatol Arthrosc. 2018;26(4):1190-1196.
- Moatshe G, LaPrade CM, Fenstad AM, et al. Rates of subjective failure after both isolated and combined posterior cruciate ligament reconstruction: a study from the Norwegian Knee Ligament Registry 2004-2021. Am J Sports Med. 2024;52(6):1491-1497.
- Owesen C, Sandven-Thrane S, Lind M, Forssblad M, Granan LP, Arøen A. Epidemiology of surgically treated posterior cruciate ligament injuries in Scandinavia. Knee Surg Sports Traumatol Arthrosc. 2017;25(8):2384-2391.
- Owesen C, Sivertsen EA, Engebretsen L, Granan LP, Aroen A. Patients with isolated PCL injuries improve from surgery as much as patients with ACL injuries after 2 years. Orthop J Sports Med. 2015;3(8):2325967115599539.
- Winkler PW, Zsidai B, Wagala NN, et al. Evolving evidence in the treatment of primary and recurrent posterior cruciate ligament injuries, part 2: surgical techniques, outcomes and rehabilitation. Knee Surg Sports Traumatol Arthrosc. 2021;29(3):682-693.
- Roos EM, Lohmander LS. The Knee injury and Osteoarthritis Outcome Score (KOOS): from joint injury to osteoarthritis. Health Qual Life Outcomes. 2003;1:64.
- Zsidai B, Horvath A, Winkler PW, et al. Different injury patterns exist among patients undergoing operative treatment of isolated PCL, combined PCL/ACL, and isolated ACL injuries: a study from the Swedish National Knee Ligament Registry. Knee Surg Sports Traumatol Arthrosc. 2022;30(10):3451-3460.