Prehabilitation Prior to Anterior Cruciate Ligament Reconstruction is a Safe and Effective Intervention for Short- to Long-Term Benefits: A Systematic Review

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Introduction

- Preoperative rehabilitation (prehabilitation) expedites regaining full range of motion (ROM), improving knee flexor/extensor strength and neuromuscular and proprioceptive control following anterior cruciate ligament reconstruction (ACLR), contributing to reduced rates of postoperative complications.[1,2]
- Prehabilitation also yields educational benefits in helping patients set realistic expectations regarding the rehabilitation process, the timeline for recovery, and the timeline for return to sports (RTS).[2]

Objectives

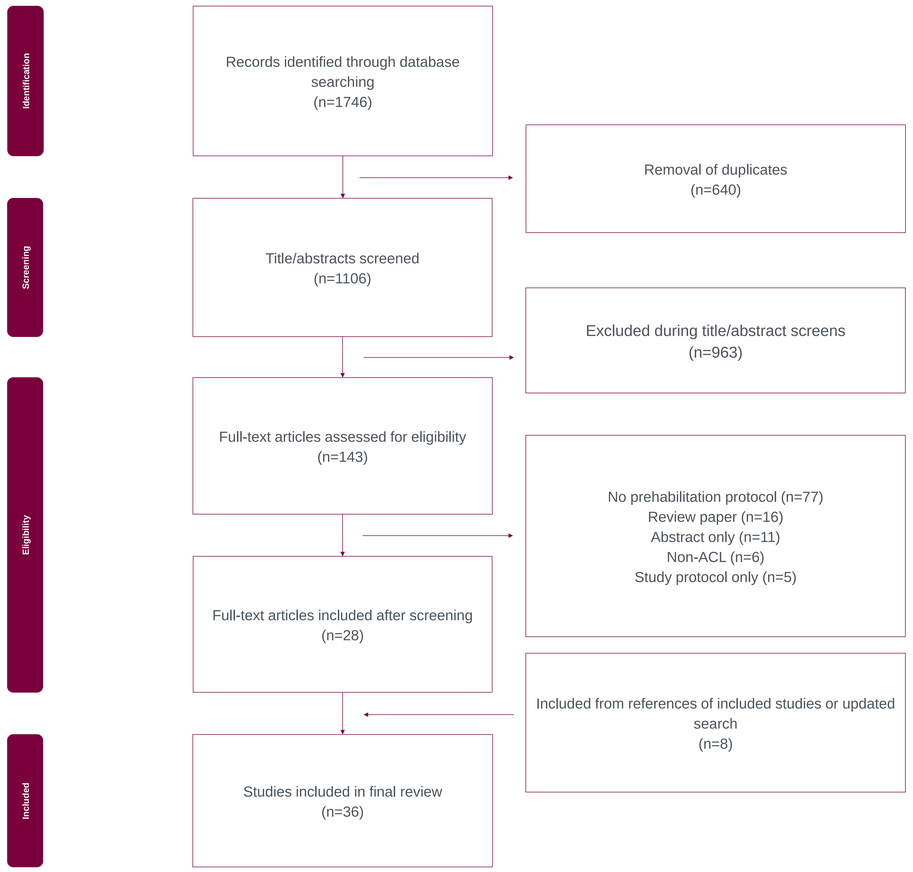
- To provide an updated comprehensive assessment of the existing range of prehabilitation protocols for ACLR, while assessing the reported postoperative outcomes, and associated complication rates and profiles.

Methods

- Systematic search of EMBASE, MEDLINE, Cochrane, and PubMed was conducted from inception to November 1, 2024.
- All studies reporting outcomes and/or complications following prehabilitation and ACLR were included.

Results

- 36 studies with 7,341 patients (2,326 undergoing prehabilitation) were included. 48.1% of all patients were reported female. Mean patient age ranged from 16.5–53.9 years of age. Final follow-up duration ranged from 2.8–126.1 months postoperation.
- Predominant elements of prehabilitation protocols included ROM exercises, progressive strengthening, impairment resolution, isometric quadriceps exercises, neuromuscular exercises, perturbation training, and closed- and open-chain exercises.



Results Continued

- Weighted averages of all clinical outcomes met or surpassed patient acceptable symptoms state (PASS) thresholds and RTS criteria.
- There were no preoperative complications reported following prehabilitation. 116 of 1,427 reported patients (8.1%) experienced major postoperative complications.

Discussion & Conclusion

- In addition to helping patients meet postoperative PASS thresholds and RTS criteria, studies directly comparing the outcomes of patients undergoing prehabilitation+ACLR to those undergoing ACLR only suggest that prehabilitation may confer short- to long-term postoperative functional benefits.
- Patients undergoing prehabilitation+ACLR had notably faster recovery of knee function, strength, and ROM in the short-term, significantly improved KOOS subscale scores in the moderate- and long-term, and significantly greater subjective knee function in the long-term than those undergoing ACLR only.
- There is a lower prevalence of persistent postoperative arthrofibrosis-related stiffness reported in this review than previous large studies and reviews.[3,4] Given that preoperative knee ROM is a well-established predictor of immediate postoperative knee ROM, this difference may be due to the preservation of knee mobility conferred with prehabilitation.
- Most studies reporting use of prehabilitation do not comment in detail on the progression criteria of exercises or the rationale for exercise choices, limiting the synthesis of a broadly applicable, specific ACLR prehabilitation protocol.

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Disclosures

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