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# Two factors that may underpin outstanding outcomes after ACL rehabilitation

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Because ACL reconstruction does not automatically lead to successful outcomes and return to play,[1 2] active rehabilitation is a realistic option that is being adopted by an increasing number of patients.[3] In the Delaware-Oslo ACL Cohort Study, we found no differences in 2-year knee function, sports participation or new knee injuries between patients treated with ACL reconstruction followed by progressive preoperative and postoperative active rehabilitation, and patients treated with active rehabilitation alone.[4] In our 2015 paper, we found that 86–94% of our ACL reconstruction and active rehabilitation group reported 2-year Knee injury and Osteoarthritis Outcome Score (KOOS) within normative ranges—far superior to the outcomes after standard practice in Norway.[5]

In an accompanying editorial, Dr Hägglund *et al*[6] asked for the secret to these outstanding outcomes.[5] We offer two points for consideration.

## INTENSE REHABILITATION

First, the superior outcome in our cohort compared to the Swedish KANON[3] trial could be explained by differences in the rehabilitation programmes. The KANON trial started in 2002 with a rehabilitation protocol based on evidence available at that time. Two months after injury, the patients performed closed-chain quadriceps exercises only (unknown intensity, volume and progression) and one-legged standing on demanding surfaces.[3] The Delaware-Oslo ACL Cohort Study started in 2007. Our patients followed the Norwegian Research Center for Active Rehabilitation (NAR) programme.[7] Two months after injury, this programme includes three sets of 6RM full range of motion leg extensions and single-legged hopping. To the best of our knowledge, it is the most progressive preoperative ACL rehabilitation programme published to date—resulting in 73% of our patients passing the preoperative criteria (more than 90% symmetry index for quadriceps strength, hamstrings strength and four single-legged hop tests).[5] We agree that passing these criteria is not achievable for all patients; however, the preoperative/non-operative potential should not be underestimated as more patients pass the criteria preoperatively than 2 years after surgery.[4]

## PATIENT MOTIVATION—CLINICIANS CAN CONTRIBUTE

Second, we argue that patient motivation in the NAR study group is not due to selection bias. ACL rehabilitation is time-consuming as well as mentally and emotionally demanding.[8] In our experience, the patients do not show up to the clinic already fully motivated—motivation is created and maintained in at least three ways: (1) quality patient education, (2) goal-setting and (3) repeated functional testing (to provide feedback). Thus, a substantial part of our first few consultations is spent counselling the patient. In our opinion, patients must understand why they have problems with muscle strength and neuromuscular function, and why these features should be restored before ACL reconstruction, if they are to realise the importance of rehabilitation.

As with most research, our results introduce new questions to be answered. For now, we believe better rehabilitation results can be achieved by using a structured and highly progressive preoperative and postoperative rehabilitation programme, combined with clear goal-setting, repeated testing and thorough patient education. Clinicians, and not just those in specialised clinics, should be able to improve outcomes by incorporating these principles in practice.

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## Notes