



**Full Article Reference:** Filbay SR, Roemer FW, Lohmander LS, et al. Evidence of ACL healing on MRI following ACL rupture treated with rehabilitation alone may be associated with better patient-reported outcomes: a secondary analysis from the KANON trial. *Br J Sports Med.* 2023;57(2):91-98. doi:[10.1136/bjsports-2022-105473](https://doi.org/10.1136/bjsports-2022-105473)

**Study Design:** Exploratory study and secondary analysis of a Randomized Controlled Trial (RCT) - Sackett Level 2C

**Abstract: Objectives:** Evaluate the natural course of anterior cruciate ligament (ACL) healing on MRI within 5 years of acute ACL rupture and compare 2-year and 5-year outcomes based on healing status and treatment group. **Methods:** Secondary analysis of 120 Knee Anterior Cruciate Ligament Nonsurgical vs Surgical Treatment (KANON) trial participants randomised to rehabilitation and optional delayed ACL reconstruction (ACLR) or early ACLR and rehabilitation. ACL continuity on MRI (Anterior Cruciate Ligament OsteoArthritis Score 0–2) was considered evidence of ACL healing. Outcomes included Knee Injury and Osteoarthritis Outcome Score (KOOS), KOOS patient acceptable symptomatic state (PASS) and treatment failure criteria. Linear mixed models were used to estimate adjusted mean differences (95% CIs) in patient-reported sport and recreational function (KOOS-Sport/Rec) and quality of life (KOOS-QOL) at 2 and 5 years, between participants with MRI evidence of ACL healing and those who had (1) no evidence of ACL healing, (2) delayed ACLR or (3) early ACLR. **Results:** MRI evidence of ACL healing at 2-year follow-up was observed in 16 of 54 (30%, 95% CI 19 to 43%) participants randomised to optional delayed ACLR. Excluding participants who had delayed ACLR, 16 of 30 (53%, 36–70%) participants managed with rehabilitation-alone displayed MRI evidence of ACL healing. Two-year outcomes were better in the healed ACL group (n=16) compared with the non-healed (n=14) (mean difference (95% CI) KOOS-Sport/Rec: 25.1 (8.6–41.5); KOOS-QOL: 27.5 (13.2–41.8)), delayed ACLR (n=24) (KOOS-Sport/Rec: 24.9 (10.2–39.6); KOOS-QOL: 18.1 (5.4–30.8)) and early ACLR (n=62) (KOOS-Sport/Rec: 17.4 (4.1–30.7); KOOS-QOL: 11.4 (0.0–22.9)) groups. Five-year KOOS-QOL was better in the healed versus non-healed group (25.3 (9.4–41.2)). Of participants with MRI evidence of ACL healing, 63–94% met the PASS criteria for each KOOS subscale, compared with 29–61% in the non-healed or reconstructed groups. **Conclusions:** MRI appearance of ACL healing after ACL rupture occurred in one in three adults randomised to initial rehabilitation and one in two who did not cross-over to delayed ACLR and was associated with favourable outcomes. The potential for spontaneous healing of the ACL to facilitate better clinical outcomes may be greater than previously considered.

**Key Findings:** For participants allocated to the rehabilitation alone group who did not decide to cross over to delayed ACLR, 53% had evidence of ACL healing on MRI at 2 years, while 58% had evidence of healing at 5 years. At the 2 year follow up, participants with evidence of ACL healing on MRI had better KOOS subscale scores (Sport/Rec and QOL) compared with the non-healed, delayed ACLR, and early ACLR groups. However, 5 year outcomes reveal no



meaningful difference in KOOS subscale scores between groups, but 95% CIs did not rule out clinically relevant differences in favor of the healed group. A higher proportion (63-94%) of participants with evidence of ACL healing on MRI reached the PASS for each KOOS subscale in comparison to the other groups. No participants in the rehabilitation group with evidence of ACL healing on MRI reached the criteria for treatment failure.

**Reviewer Summary:** This article performed a secondary long term outcome analysis on a RCT that investigated the outcomes for patients presenting with an acute complete ACL rupture who were randomized to either an exercise based rehabilitation with optional delayed ACLR or an early ACLR with rehabilitation. The authors specifically sought to determine the proportion of spontaneous healing of the ACL on MRI in the rehabilitation with optional delayed ACLR group, as well as investigate this groups 2 and 5 year outcomes and whether there was a relationship between these outcomes and ACL healing status/treatment status. The sample size included 120 young adults aged 18-35 who presented to a Swedish University and Hospital with an acute ACL rupture within the previous 4 weeks (sample of convenience). Participants were excluded if they had a less than moderate activity level (<5 on TAS), were professional athletes (10 on TAS), had total collateral ligament ruptures, a full thickness cartilage lesion or extensive meniscal fixation. ACL healing was evaluated using an MRI and the Anterior Cruciate Ligament Osteoarthritis Score (ACLOAS) with a grade of 3 (absent ligament or complete discontinuity) being considered a non-healed ACL. Limitations from this study include a smaller sample size following stratification based on healing status and treatment group, no between group statistical comparisons, lack of blinding for laxity assessors in the KANON trial, and lack of generalizability to professional athletes or lower level physical activity individuals due to the exclusion criteria. The key findings and results as listed above demonstrate that there is a potential for the ACL to heal spontaneously without surgical intervention, but with exercise-based rehabilitation instead. With the prevalence of research demonstrating poor long term outcomes for patients post-ACLR, this article definitely provides some interesting insight into the possibility that depending on the patient, surgery may not be the only solution. I think this article is an initial step, but there is still a good deal of high quality research that needs to be performed to determine the potential for ACL healing with rehabilitation alone while achieving good patient reported outcomes and return to sport. My biggest takeaway from this article is that it is ultimately up to us as good clinicians to make an appropriate clinical decision based on the patient in front of us while considering all their confounding factors, including demographics, history, concomitant injuries, and long term goals.