Effect of Early Residual Laxity After Anterior Cruciate Ligament Reconstruction on Long-term Laxity, Graft Failure, Return to Sports, and Subjective Outcome at 25 Years: Letter to the Editor

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Dear Editor:

We read the article entitled "Effect of Early Residual Laxity After Anterior Cruciate Ligament Reconstruction on Long-term Laxity, Graft Failure, Return to Sports, and Subjective Outcome at 25 Years" with great interest.[2] Lindanger et al[2] included 151 patients with anterior cruciate ligament (ACL) rupture in their study. The authors performed ACL reconstruction (ACLR) for 78.2% of patients with a mini-open method and for 21.8% with a transtibial method. Meniscus lesions were detected in 66% of these patients and meniscus repair was performed in just 6.6% of patients. There was no detailed information about the location and the type of meniscus tears, and there was no information about whether an intraoperative evaluation was performed for a possible meniscus ramp lesion or a lateral meniscus posterior root tear (LMPRT). The authors evaluated patients' side-to-side difference (STSD) of anterior tibial displacement (3-5 mm) as a "slightly loose graft" with postoperative KT-1000 assessment and reported that patients in this group had a higher risk of graft failure and revision ACLR surgery. Authors also mentioned that preoperative STSD of the anterior tibial translation of this group was higher than that in the tight graft group.

Magosch et al,[3] as a result of their studies that included 358 patients who underwent primary and revision ACLR surgery, reported that 52% of these patients had meniscus ramp lesions and/or LMPRTs. Naendrup et al[4] reported that when meniscus ramp lesions were repaired, there was a statistically significant decrease in the anterior translation of the tibia compared with the group that was not repaired. Tang et al,[5] as a result of their biomechanical studies on cadaveric knees that underwent ACLR, reported that an unrepaired LMPRT increased postoperative tibial anterior translation by 1 mm. In light of these objective results and because of their preoperative high STSD of anterior tibial displacement, we think that patients included in the slightly loose graft group and reported to have a high risk of graft failure and revision ACLR, may have had intraoperatively missed meniscus ramp lesions and/or LMPRTs. There was no information on evaluation of the LMPRT and the meniscus ramp lesion in the limitation section of the study. This issue could be confusing for orthopaedic surgeons who evaluate their postoperative results with objective arthrometers, as did the authors of this study. Nowadays LMPRTs and meniscus ramp lesions are routinely repaired during ACLR surgery. Therefore, we think that in patients who have postoperative STSD in anterior tibial translation of 3 to 5 mm, graft failure is the first clinical condition that should be considered.

Iriuchishima and Goto,[1] as a result of the systematic review studies published in 2020, reported that the transtibial method is one of the least preferred ACLR methods and that the midpoint of the ACL footprint is mostly preferred for femoral tunnel placement during ACLR surgery. Vignos et al[6] reported that tunnel placement during ACLR surgery has an effect on postoperative knee laxity and clinical outcomes. Lindanger et al,[2] while they reported that most of the patients included in their study were treated with the mini-open method and other patients with the transtibial method, did not provide information about the landmarks used for tunnel placements during the ACLR. We believe that these limitations, which were not reported by the authors, should be taken into account when evaluating this magnificent study, which is one of the longest follow-up ACL studies in the literature.

Emre Anıl Özbek, MD
Mehmet Serdar Binnet, MD, MBA
Ankara, Turkey

Address correspondence to Emre Anıl Özbek, MD (email: anl_ozbek@hotmail.com).

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REFERENCES

1. Iriuchishima T, Goto B. Systematic review of surgical technique and tunnel target points and placement in anatomical single-bundle ACL reconstruction [published online June 1, 2020]. *J Knee Surg*. 2020;10.1055/s-0040-1710521. doi:10.1055/s-0040-1710521
2. Lindanger L, Strand T, Mølster AO, Solheim E, Inderhaug E. Effect of early residual laxity after anterior cruciate ligament reconstruction on long-term laxity, graft failure, return to sports, and subjective outcome at 25 years. *Am J Sports Med*. 2021;49(5):1227-1235. doi:10.1177/0363546521990801
3. Magosch A, Mouton C, Nührenbörger C, Seil R. Medial meniscus ramp and lateral meniscus posterior root lesions are present in more than a third of primary and revision ACL reconstructions. *Knee Surg Sports Traumatol Arthrosc*. 2021;29(9):3059-3067. doi:10.1007/s00167-020-06352-3

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2021;49(14):NP72–NP74

4. Naendrup JH, Pfeiffer TR, Chan C, et al. Effect of meniscal ramp lesion repair on knee kinematics, bony contact forces, and in situ forces in the anterior cruciate ligament. *Am J Sports Med*. 2019;47(13):3195-3202. doi:10.1177/0363546519872964
5. Tang X, Marshall B, Wang JH, et al. Lateral meniscal posterior root repair with anterior cruciate ligament reconstruction better restores knee stability. *Am J Sports Med*. 2019;47(1):59-65. doi:10.1177/0363546518808004
6. Vignos MF, Smith CR, Roth JD, et al. Anterior cruciate ligament graft tunnel placement and graft angle are primary determinants of internal knee mechanics after reconstructive surgery. *Am J Sports Med*. 2020;48(14):3503-3514. doi:10.1177/0363546520966721

Effect of Early Residual Laxity After Anterior Cruciate Ligament Reconstruction on Long-term Laxity, Graft Failure, Return to Sports, and Subjective Outcome at 25 Years: Response

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Authors' Response:

We appreciate the interest in our recent paper "Effect of Early Residual Laxity After Anterior Cruciate Ligament Reconstruction on Long-term Laxity, Graft Failure, Return to Sports, and Subjective Outcome at 25 Years"[10] and the chance we are given to respond to questions raised by Özbek and Binnet.

Özbek and Binnet point to the importance of repairing ramp lesions and tears to the posterior root of the lateral meniscus at the time of the primary anterior cruciate ligament reconstruction (ACLR) to restore knee stability. They also call for a more thorough description of the tunnel placement techniques used in the current study.

Meniscus repair is indisputably important in restoring knee stability, together with ACLR.[11,14] Further, the recent renewed interest in the anterolateral structures of the knee[5] and their importance in controlling the rotatory knee laxity (pivot shift)[8] clearly states that restoring knee stability after an ACL injury is a complex procedure that needs a thorough and individualized approach. Tunnel placement techniques and their implication in residual knee laxity have been in the scope for the last decade; and the current tunnel placement technique is considered to be better suited in controlling the pivot shift phenomenon and in being more "anatomic" than at the time when our study participants underwent ACL surgery.[1,9]

In the current study, ACLR was initially performed as a mini-open technique[4] and the tunnel placement was guided by the remnants of the torn ACL and bony landmarks. The tibial tunnel was positioned anteriorly and medially, whereas the femoral tunnel was in a posterior and proximal position on the femur condyle.[2] The transtibial tunnel placement technique resulted in a more proximal and posterior tunnel position in the femoral notch, as the offset aimer used the back wall of the epicondyle as a reference, and the femoral tunnel position was predefined by the tibial tunnel placement.[6,7,12] Because the tibial tunnel was more anterior, there was an increased risk of graft impingement, and a moderate notch plasty was therefore performed in all cases.

Independent of the surgical approach, an initial arthroscopic examination was performed to verify the ACL injury and to treat any concomitant intra-articular pathology in the current study. Most ruptures of both the medial and the lateral meniscus were treated with a partial resection. Bucket-handle tears and unstable posteromedial meniscocapsular tears in the vascularized zone were treated with meniscus repair, if possible, and the latter was normally performed as an open procedure.[3,15] The term "ramp lesion" was, to our knowledge, not in regular use during the 1980s and 1990s; however, the description fits well with the few sutured posteromedial meniscocapsular ruptures seen in our study. At that time, posterolateral root tears were rarely observed and repaired—in the current cohort, none were reported. However, an arthroscopic evaluation with probing of the posteromedial recess[13] was not routinely performed, and therefore we cannot rule out the possibility of overseen ramp lesions. Finally, there was no difference in the number of repaired meniscus ruptures between the group with "slightly loose grafts" and the group with "tight grafts," although numbers are small.

The aim of our study was to investigate how early residual laxity after an ACLR affects the incidence of graft failure, the rate of return to pivoting sports, and the long-term outcome—and not to explain why patients ended up with a residual knee laxity after surgery, as suggested in the current critique. Our data would be insufficient to evaluate the range of multifactorial predictors of postoperative knee laxity suggested by Özbek and Binnet. Nevertheless, it is an inevitable fact that meniscus repair was performed more infrequently than in today's practice. The current data from the Norwegian Knee Ligament Registry (2004) show that concomitant partial meniscus resection has decreased from 80% to 30% over 15 years, while concomitant repair has increased from 5% to 55% in the same period.[16] Therefore, as indicated in our recent paper; this probably yields for improved knee laxity and long-term results when today's reconstructions are included for their 25-year follow-up evaluation.

Line Lindanger, MD
Torbjørn Strand, MD
Anders Odd Mølster, MD, PhD
Eirik Solheim, MD, PhD
Eivind Inderhaug, MD, PhD
Bergen, Norway