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Case Report

Impact of Tibial Press-Fit Technique in Anterior Cruciate Ligament Reconstruction on Concomitant Meniscal Healing: A Report of Two Cases

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ABSTRACT

Objective: The primary aim of this study is to evaluate the duration and quality of meniscal healing in patients undergoing anterior cruciate ligament (ACL) reconstruction using the Tibial Press-Fit technique. Functional outcomes will be assessed through standardized clinical scoring systems to provide a systematic observation of postoperative recovery. In this study, we aim to elucidate the potential advantages of this technique on meniscal healing.

Methods: In our institution, two patients who underwent ACL reconstruction using this technique along with concomitant meniscal repair will be evaluated. Early postoperative knee range of motion, KOOS, Lysholm, and IKDC scores, as well as quadriceps thickness measurements, will be assessed.

Results: Two male patients, aged 26 and 32, were evaluated with respect to postoperative Lysholm and IKDC scores, as well as quadriceps thickness measurements. Preoperative assessments were included in the analysis. Postoperative evaluations were performed on Day 1 and at the 2-month follow-up. The mean KOOS total score was measured as 48.3 ± 6.1, the mean Lysholm score as 42.7 ± 4.8, and the mean IKDC subjective score as 25.5% ± 5.2. At the 2-month follow-up, Clinically meaningful improvement was observed in functional outcomes in both patients. The mean KOOS total score increased to 73.8 ± 5.4, the Lysholm knee score improved to 78.5 ± 4.3, and the IKDC subjective knee evaluation score reached a mean of 58.7% ± 6.0.

Conclusion: In these two cases, ACL reconstruction using the tibial press-fit technique was associated with favorable early-term clinical and functional outcomes following concomitant meniscal repair

Objective

Anterior cruciate ligament (ACL) injuries rank among the most prevalent intra-articular pathologies of the knee, particularly within the young and active population. (Bram et Al., 2021) These injuries significantly compromise the rotational and translational stability of the knee, leading to functional deficits across a broad spectrum of activities, from daily living to sports. Due to post-traumatic instability, recurrent episodes of rotational giving-way, and concomitant meniscal and cartilage lesions, a substantial proportion of patients are ultimately indicated for surgical intervention. Particularly in young and active individuals, it compromises knee stability, leading to both functional deficits and additional damage to intra-articular structures. A significant proportion of these cases also present with concomitant meniscal tears. (Pruneski et al., 2024) The healing potential of the meniscal tissue is closely related to the impact of the reconstruction technique on knee biomechanics. The primary objective of this study is to evaluate the duration and quality of meniscal healing in patients who underwent Anterior Cruciate Ligament (ACL) reconstruction using the Tibial Press-Fit technique. (Kocabey et al., 2023) It aims to understand the impact of implant-free tibial fixation, in comparison to conventional implant-based methods, on the postoperative regenerative process of the meniscal tissue. The secondary objectives within the scope of the study include: examining early postoperative meniscal healing findings via Magnetic Resonance Imaging (MRI), assessing functional outcomes using validated clinical scoring systems. Through this investigation, the study seeks to elucidate the potential advantages of this technique in facilitating meniscal healing.

Methods

Ethical approval was obtained from the Ethics Committee of XxX. (Approval No: xXx) Two patients who underwent ACL reconstruction using the tibial press-fit technique with concomitant meniscal repair at our center will be evaluated. Early-stage findings, including knee range of motion, KOOS, Lysholm, and IKDC scores, as well as quadriceps thickness measurements, will be assessed for these two patients. Both patients underwent anterior cruciate ligament reconstruction using the tibial press-fit fixation technique. Intraoperatively, concomitant medial meniscal tears were identified in both cases and were treated with single all-inside meniscal suture during the same surgical session. Patients followed the same, standardized postoperative rehabilitation protocol. Partial weight-bearing with crutches was allowed immediately after surgery and progressed to full weight-bearing as tolerated by the end of the sixth postoperative week. Knee range of motion exercises were initiated on the first postoperative day, with flexion limited to 90° during the first four weeks due to the concomitant medial meniscal repair.

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Closed-chain quadriceps strengthening exercises were introduced gradually, while open-chain resisted knee extension was avoided during the early rehabilitation phase. Isometric quadriceps activation and straight leg raise exercises were started immediately postoperatively. Progressive strengthening and proprioceptive training were introduced after the fourth postoperative week. Return to running and high-impact activities was restricted during the early postoperative period and was not permitted before three months following surgery.

Results

Postoperative Lysholm and IKDC scores, as well as quadriceps thickness measurements, were evaluated in two male patients aged 26 and 32. Preoperative assessments were included in the study for comparison. Evaluations were conducted for these patients on postoperative day 1 and at postoperative month 2.

On the first postoperative day, the mean KOOS total score was 48.3 ± 6.1, the mean Lysholm score was 42.7 ± 4.8, and the mean IKDC subjective score was 25.5% ± 5.2.

At the two-month follow-up, a marked improvement was recorded in the patients' functional status compared to both their preoperative state and postoperative day 1. The mean KOOS total score increased to 73.8 ± 5.4. The mean Lysholm knee score was calculated as 78.5 ± 4.3, and the mean IKDC subjective knee evaluation score was 58.7% ± 6.0.(Table 1).

Table 1. Postoperative Lysholm and IKDC scores

Outcome Parameter	Postoperative Day 1 (Mean ± SD)	Postoperative Month 2 (Mean ± SD)	Change (Δ)
KOOS	48.3 ± 6.1	73.8 ± 5.4	+25.5
Lysholm	42.7 ± 4.8	78.5 ± 4.3	+35.8
IKDC	25.5 ± 5.2	58.7 ± 6.0	+33.2

Discussion

The findings from this two-case series suggest that ACL reconstruction performed using the tibial press-fit technique in combination with concomitant meniscal repair may be associated with favorable early clinical, radiological, and functional findings.

The early clinical observations in the present cases appear to be in line with trends reported in the existing literature regarding concomitant meniscal repair during ACL reconstruction. (Feroe et al., 2024) In the two cases presented, the rapid improvement in functional scores during the early postoperative period, the preservation of quadriceps muscle thickness, and the clear integrity of the meniscal repair line observed on magnetic resonance imaging suggest that this technique may provide a stable biomechanical environment that could support early functional recovery.

These findings present a compelling comparison with the existing literature. The work by Redler et al. (2021), for instance, reported a transient decrease in hamstring strength in young athletes undergoing ACL reconstruction with concomitant meniscal injury, while noting no significant deficit in functional jump and dynamic control tests (Redler et al., 2021). This supports the concept that although a meniscal injury may temporarily affect local force dynamics, functional recovery can proceed with adequate knee stability. The preservation of quadriceps thickness observed in these cases may support the hypothesis that early joint stabilization can be achieved following this technique, potentially mitigating muscular impairment.

The large cohort study by Liau et al. (2023) reported that two-year outcomes following ACL reconstruction with added meniscal surgery were generally good; however, in the group that underwent meniscal intervention, KOOS and Lysholm scores followed a slightly lower trajectory compared to the isolated ACL group (Liau et al., 2023). In contrast, the favorable early scores observed in our cases may reflect the combined effect of early stabilization and meniscal preservation, rather than indicating a definitive advantage of one fixation technique over another.

The study by Kaarre et al. (2023) demonstrated that in ACL reconstructions with concomitant lateral meniscus injury, KOOS scores were lower, yet this did not constitute a clinically significant difference (Kaarre et al., 2023). This indicates that a meniscal injury alone does not dramatically impair long-term outcomes. In our cases, however, the marked early healing of the meniscus suggests that a stable joint environment may have the potential to further improve this clinical picture.

The report by Bayerl et al. (2024) of higher osteoarthritis rates at a 10-year follow-up in ACL injuries with concomitant medial meniscus involvement underscores the importance of meniscus preservation for long-term joint health. While previous studies have emphasized the importance of meniscal preservation for long-term joint health, the present case series does not allow any conclusions regarding long-term outcomes such as osteoarthritis risk, given the limited follow-up duration.

In another study within an ACL cohort, general outcomes at a 10-year follow-up were found to be similar between early surgery and rehabilitation alone; however, delayed reconstruction resulted in functionally inferior outcomes (Urhausen et al., 2025). This finding highlights the importance of timely restoration of knee stability. In our study, the fact that the repair was performed without delay and that a stable environment was achieved early may have positively influenced meniscal healing. Furthermore, as this cited study did not contain analysis regarding the meniscal repair or the tibial fixation technique used, these early observations may contribute preliminary insights to an area where clinical data remain limited.

Given the very limited sample size and short-term follow-up, the findings of this study should be interpreted as hypothesis-generating rather than confirmatory. A synthesis of the current literature reveals two critical findings. Primarily, meniscal repair performed concomitantly with ACL reconstruction is associated with superior outcomes when compared to isolated meniscal repair. Subsequently, surgical techniques that promote biological healing, such as the tibial press-fit method, may have the potential to further support this process. However, the most significant limitations of the present study are its very small sample size and exclusive focus on early-term results. The short follow-up duration precludes any conclusions regarding long-term outcomes, such as the development of osteoarthritis or sustained functional performance. In addition, the absence of randomization and a direct control group limits causal interpretation. Therefore, the findings should be considered hypothesis-generating, and future large-scale, multicenter, prospective studies are required to further evaluate the potential role of the tibial press-fit technique in meniscal healing.

Conclusion

In these two cases, ACL reconstruction using the tibial press-fit technique was associated with favorable early-term clinical and functional outcomes following concomitant meniscal repair.

Declaration of conflicting interests

No conflict of interest was declared by the authors.

Abbreviations

ACL: Anterior Cruciate Ligament
IKDC: International Knee Documentation Committee
KOOS: Knee Injury and Osteoarthritis Outcome Score
MRI: Magnetic Resonance Imaging

Data Availability

The data used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Funding

No financial support was received for the study.

Ethical approval

Ethical approval was not required for this single case report. Written informed consent for publication was obtained from the patient.

Institutional Review Board

Information about the study was given to the personnel and informed consent for this study was obtainee

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