

SINGLE STAGE ACL RECONSTRUCTION, MEDIAL MENISCUS ROOT REPAIR AND MOSAICPLASTY IN YOUNG PATIENT WITH NONCONTACT ACL INJURY



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Introduction:

ACL tear is common in sport activities and accidents. High percentages of these injuries are associated with meniscal, ligament, or chondral injuries(1). Articular cartilage injury in the knee may be found alone, but it is mostly accompanied with injuries to the ligaments and menisci(2). Articular cartilage does not usually regenerate after injury or disease leading to loss of tissue and formation of a defect(3). Repair of meniscal root injuries is the

treatment of choice with the aim of restoring joint kinematics, contact pressures, and delaying the development of osteoarthritis

The volume of literature focused on treatment of chondral defects in conjunction with ACL reconstruction is significantly inferior. We did not find any case report of single stage treatment of medial meniscus root tear and chondral lesion in conjunction with ACL tear in literature.

Case presentation:

We present a case of 37-year male patient presented with pain and instability of left knee since last 3 month following twisting injury of knee while slipping off stairs . On examination patient had positive medial joint line tenderness, positive Lachman, anterior drawer test grade II, positive pivot shift & full range of motion of knee which was terminally painful.

His MRI left knee revealed a complete ACL tear from femoral site with medial meniscus root tear with infolding of meniscus lying in meniscotibial recess and grade 4 chondral defect at medial femoral condyle of size 1.5 x 1.5 cm(Fig 1).

Under spinal anesthesia standard anterolateral and anteromedial portals were made. Medial meniscus which was lying meniscotibial recess was liberated with labral elevator following which the torn root was repaired using transtibial suture pullout technique. ACL reconstruction was done with quadrupled Semitendinosus graft by transportal technique. Anterolateral portal incision extended by 1cm and from lateral femoral condyle two 6mm osteochondral plugs were harvested and

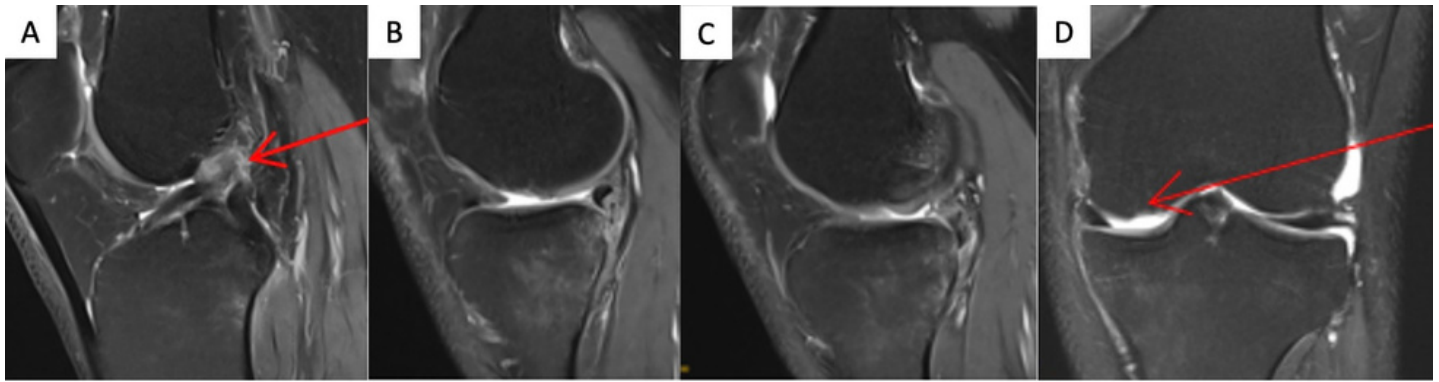


Fig 1: A: Femoral sided ACL tear, B&C: Meniscus root tear with torn meniscus in the meniscotibial recess, D: Grade IV ICRS cartilage lesion-medial femoral condyle

implanted at the recipient site over the medial femoral condyle through an extended AM portal incision. (Fig 2).

Knee ROM was started after 3 weeks postop and full weight-bearing walking was allowed after 2 months. No squatting and crossed leg sitting was allowed for 6 months. At 6 months his VAS score was 0 and IKDC score 86.2 (Fig 3). At 1 year follow up we did MRI of knee and found good incorporation of ACL graft with meniscus root healing and cartilage restoration with MOCART score 90/100 (Fig 4).

Discussion:

The diversity of meniscal tear patterns encountered in the ACL-deficient knee adds complexity to the treatment decision-making process, and questions still exist regarding the optimal strategies for maximizing outcomes. Approximately 50% of primary anterior cruciate ligament (ACL) ruptures and over 90% of failed reconstructions will have coexisting cartilage and/or meniscal pathology (4). In terms of location, 95% and 77% of medial and lateral menisci, respectively, involve the posterior horn. Association of posterolateral meniscus root in conjunction with ACL tears is approximately 8% to 14%. Conversely, posteromedial meniscal root avulsions are uncommonly observed with isolated ACL injury, although they have increased association with Multiligament injuries (5,6).

The effects of peripheral longitudinal posterior horn medial meniscal tears (mean 28 mm length tear) in the setting of ACL deficiency were evaluated by Ahn et al (7) and findings included significant increases in anterior translation with simulated Lachman maneuvers at flexion angles up to 60 (P , 0.05) but no differences with pivot shift. Furthermore, peripheral tears resulted in the same degree of instability as a total medial meniscectomy. After meniscal repair, however, stability was restored to the isolated ACL-deficient state. High-level clinical evidence on the effect of meniscal integrity on postoperative stability is also lacking. One level III review of 482 patients at mean 7.6 years postoperatively found significantly higher KT-1000 side-to-side differences in patients with any medial meniscal resection compared with intact medial menisci (2.6 6 1.7 versus 2.0 6 1.5 mm; P = 0.0065), but no differences in graft failures were reported (8).

In a recent level III study with median follow-up 26 months, 118 patients were evaluated after anatomic single bundle hamstring tendon autograft ACL reconstruction. The investigators found that medial and lateral meniscal deficiency were the highest risk factors for graft failure (medial: hazard ratio, 15.1; CI, 4.7 to 48.5; P , 0.001, lateral: hazard ratio, 9.9, CI, 3 to 33; P , 0.001) (9). A large level II cohort of 4,691

patients with 2-year follow-up found that only medial meniscal repairs had significantly worse Knee injury and Osteoarthritis Outcome Score (KOOS) subscales compared with isolated ACL reconstructions (Symptoms: $b = 22.5$; CI, 24.6 to 20.5; $P = 0.023$, Quality of Life: $b = 23.8$; CI, 26.8 to 21; $P = 0.009$) (10). However, all other treatments had no effect, including any lateral meniscal intervention. Røtterud et al (11) in nationwide cohort study from Norway and Sweden of 8476 patients with 2-year follow-up found no statistically significant difference in outcome with patient with medial meniscus tear. Two level I prospective investigations (12,13), both reporting on data from the same pool of patients with 6-year follow-up

found, compared with uninjured menisci, worse patient-reported outcomes with medial meniscal repairs and improved outcomes with nontreatment of lateral meniscal tears.

Articular cartilage injury associated with ACL reconstruction possibly has the greatest single effect on long term subjective outcomes. In a large, level-III review of 2,770 patients, 4.5% were found to have an isolated high-grade chondral defect (treated with benign neglect, mean size 1.7 cm²) in the absence of meniscal pathology. Compared with a cohort without meniscal or chondral pathology, at mean follow-up 8.7 years, IKDC scores were statistically lower but differences were

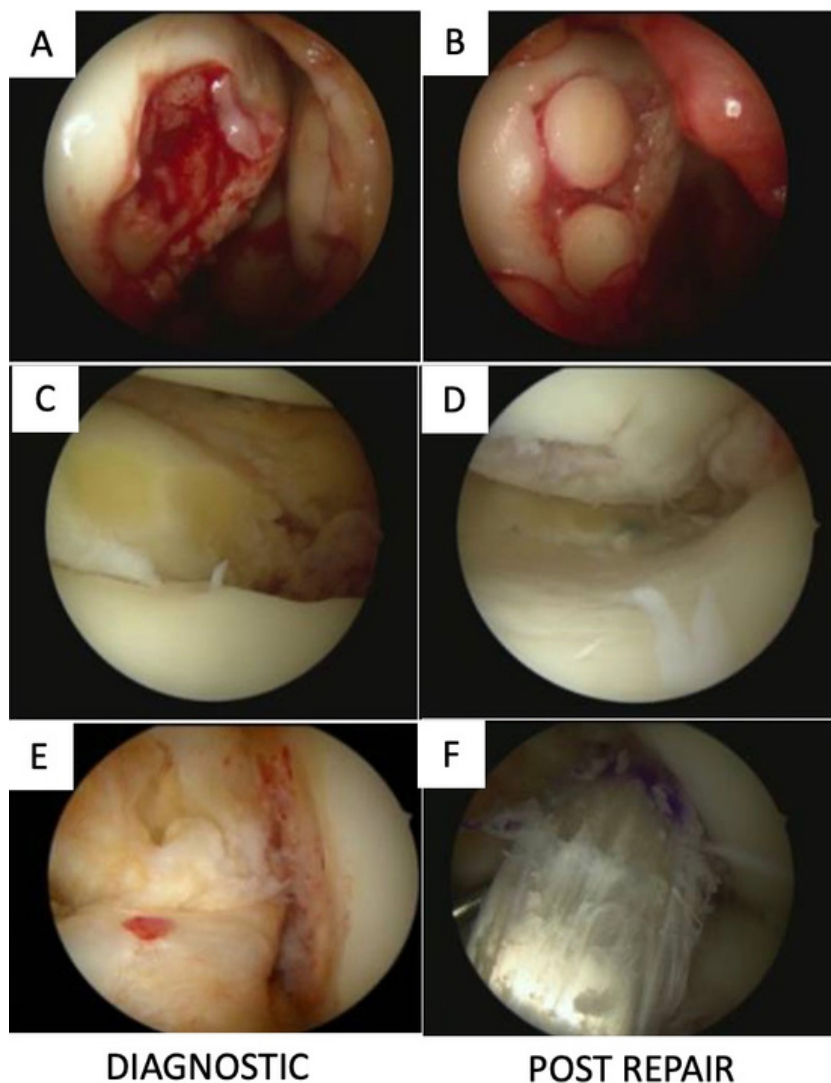


Fig 2: Intraoperative images: A: ICRS grade IV lesion medial femoral condyle(1.5cmx1.5cm) B: Post mosaicplasty, C: Medial meniscus root tear with the meniscus in the meniscotibial recess, D: Medial meniscus root repair, E: Femoral sided ACL tear, F: Completed ACL reconstruction

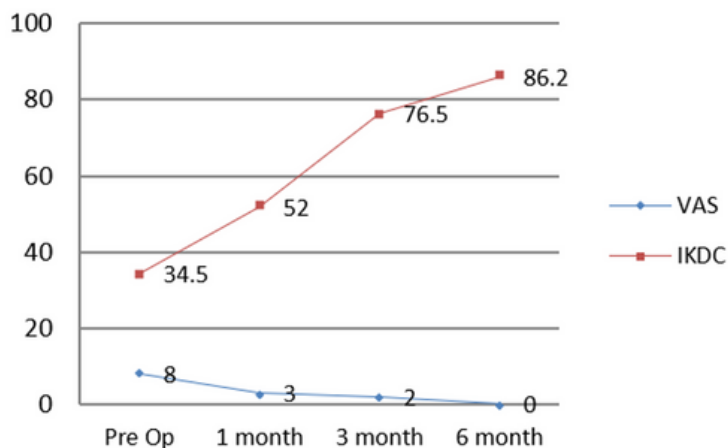


Fig 3: VAS score and IKDC score at follow-up

likely not clinically significant (medial: 1.2; $P = 0.0451$, lateral: 3.1; $P = 0.0047$) (14).

Contradictory to it a level-III review with longer mean follow-up of 8.6 years found that both meniscal resections and chondral defects were associated with worse subjective outcomes (8). High-level studies evaluating ACL reconstruction with concurrent cartilage repair are lacking. Techniques described include chondroplasty, microfracture, autologous chondrocyte implantation, and osteochondral autograft/allograft transplantation.

A prospective, randomized level II (nonblinded) study comparing osteochondral autograft transplantation, microfracture, and debridement of high-grade defects (mean, 2.6 cm²) in conjunction with ACL reconstruction found at mean 36-month follow-up superior results with osteochondral autograft transplantation compared with microfracture (15).

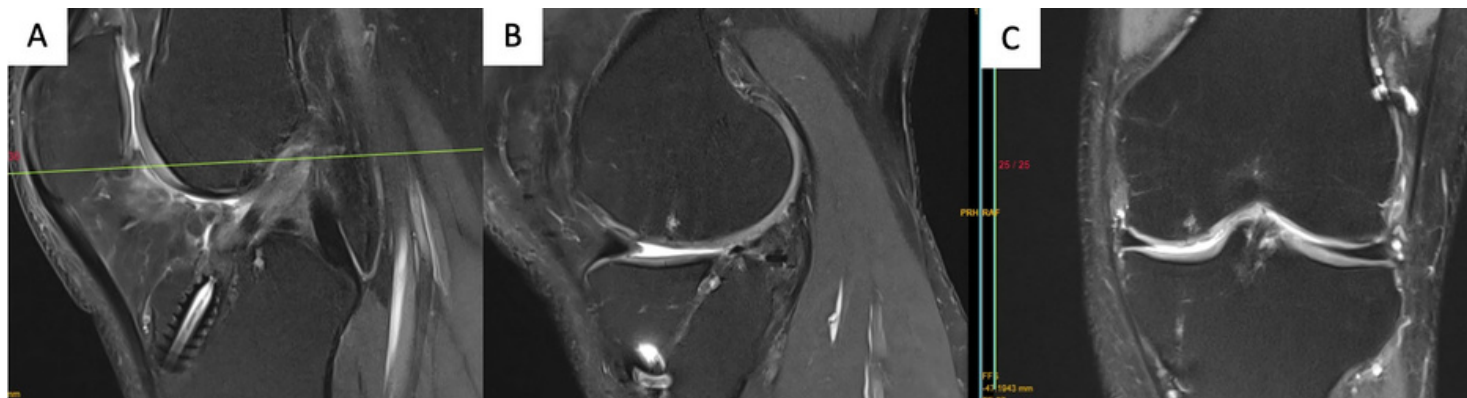


Fig 4: Post operative MRI. A: Well healed ACL, B&C: Well incorporated cartilage plugs & healed medial meniscus root

Conclusion:

- Optimizing long-term outcomes in treating ACL tears with associated chondral and meniscal pathology requires an understanding of both the natural history of specific pathology and the results of various treatment modalities.
- Meniscal tears and previous partial meniscectomies have higher associations with corresponding compartmental chondral defects in both primary and revision ACL reconstructions.

- Benign neglect of stable meniscal tears in association with ACL reconstruction leads to generally acceptable outcomes; however, medial meniscal tears left in situ are associated with higher revision surgery rates than lateral tears.
- The presence of chondral defects consistently results in lower intermediate-to-long-term patient-reported outcomes.
- Despite these observations, further study is needed to elucidate the complex factors involved in optimizing patient outcomes in the setting of ACL insufficiency with concomitant meniscal or chondral injury.

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