Early Medial Reconstruction Combined with Severely Injured Medial Collateral Ligaments can Decrease Residual Medial Laxity in Anterior Cruciate Ligament Reconstruction

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INTRODUCTION:

While nonsurgical treatment is the general consensus for grade I-II MCL injuries when combined with ACL ruptures, the treatment of severe injured, grade III MCL lesion remains controversial. Grade III MCL injuries, including superficial MCL and posterior oblique ligament (POL) lesions, can lead to residual anteromedial instability and may increase the stress on the ACL graft compromising the remodeling process and increasing the incidence of ACL reconstruction failure rates. However, acute primary repairs of grade III MCL injuries during ACL reconstructions have been reported to increase the risks of more frequent complications such as stiffness, and residual medial laxity by creep and stress relaxation. Meanwhile, early graft reconstructions of both ACL and MCL secure a structural stability immediately after operation, then early rehabilitation can be proceeded to decrease the risk of stiffness. This study aimed to describe an anatomic medial knee reconstruction technique for combined anterior cruciate ligament (ACL) and grade III medial collateral ligament (MCL) injuries and to assess knee function and restoration of stability in patients who undergone primary MCL reconstruction compared with primary repair.

METHODS:

A total of 105 patients who had undergone anatomic ACL reconstructions from 2008 to 2017 were enrolled in this retrospective study and were divided into two groups according to concomitant MCL ruptures. Group A included patients with isolated ACL ruptures without MCL injuries, and Group B included patients with both ACL and MCL injuries. Group B was further subdivided into three groups according to the severity of the MCL injury and treatment modality—group B-1: grade I or II MCL injury treated conservatively; group B-2: grade III MCL injury treated by primary MCL repair; and group B-3: grade III MCL injury treated by primary reconstruction. At 6 months and 2 years postoperatively, knee stability was measured with telos valgus radiography. The Lysholm score, Tegner activity level, Likert scales (satisfaction), and return to previous sports were evaluated at the postoperative 2-year follow up.

RESULTS: At 6 months postoperatively, valgus laxity did not show a significant difference between B-2 and B-3 group. However, at the postoperative 2-year follow up, valgus laxity values were significantly higher both at 30° of flexion (5.2^{o} vs. 2.2^{o}, $p = 0.020$) and at full extension (3.4^{o} vs. 1.1^{o}, $p < 0.001$) with respect to patients who had undergone primary MCL repairs compared to primary MCL reconstruction. There were no statistically significant differences between the two groups with respect to Lysholm scores, Tegner activity levels, Likert scales (satisfaction), and returning to previous sports at the 2-year follow up.

DISCUSSION AND CONCLUSION:

Recommendations for the treatment of isolated MCL injuries have been well established. Grade I-II MCL injuries can be treated nonoperatively regardless of concomitant ligament injuries. Acute repair is indicated in isolated grade III MCL tears with severe valgus alignment, MCL entrapment over pes anserinus, or intra-articular or bony avulsions. However, the initial treatment of grade III MCL injuries with concomitant ACL injuries remains controversial. Although some authors advocate repair of the medial stabilizing structures, lesser ranges of motion and slower strength gains have been reported after primary MCL repairs. However, mutual influences between both ligaments during healing still **legitimize their initial stabilization.** The ACL acts as a secondary stabilizer to valgus stress in the knee, and as such, contributes to the innate healing potential of the MCL when intact. Similarly, an intact MCL improves healing of a reconstructed ACL. Some concerns have been raised regarding a residual laxity in valgus after ACL reconstructions and the effects this may have on the reconstructed knee. In our results, at 6 months postoperatively, medial laxity under varus-valgus stresses was not significantly different between primary repairs and primary reconstructions of grade III MCL injuries. However, medial laxity increased at the 2-year follow up, which was significantly greater in patients with primary repairs than those with MCL reconstructions. Even MCL residual laxity tends to be asymptomatic and outcomes for ACL reconstructions alone with this combined injury pattern were similar to those for ACL reconstructions for an isolated ACL tear.

Conclusion: Primary medial reconstruction when combined with severely injured MCL in ACL reconstruction may decrease residual medial laxity rather than primary repair.

Figure 1. Patients' Flowchart

Figure 2. (A) The distal extent of the ST and gracilis was identified with care taken to protect the distal insertion of the tendon; (B) a whipstitch was placed into the free end of the harvested tendons; (C) the femoral insertion for the sMCL was identified, and the proximal stitched end of the graft was looped around the screw and secured to the femur beneath the smooth washer; (D) after femoral fixation of the looped graft tensioned at 30^{o} of the flexed knee position, the remaining

portion of the graft looped around the screw was then routed distally beneath the POL; then (E) fixed in its tibial tunnel with a biointerference screw at the level of the tibial POL insertion.