



## ANATOMICAL MCL RECONSTRUCTION A SHORT TERM STUDY

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### ABSTRACT

**Introduction:** In cases of multiple ligament injury or severe medial collateral ligament (MCL) lesion, nonoperative treatment of the MCL lesion may lead to chronic valgus instability or rotatory instability.

**Methods:** From May 2012 to December 2014, 16 patients with grade 3 or 4 medial instability were treated with MCL reconstruction. Median age was 36 years. Three patients underwent isolated MCL reconstructions, 14 had combined MCL and anterior cruciate ligament (ACL) reconstruction. All patients had reconstruction of the medial collateral using ipsilateral semitendinosus autografts. All patients were available for follow-up more than 12 months postoperatively and were examined by an independent observer using objective International Knee Documentation Committee (IKDC) measures.

**Results:** At follow-up, medial stability according to the IKDC score showed 98% normal or nearly normal (grade A or B), and for overall IKDC score, patients improved from 5% with grade A or B preoperatively to 79% with grade A or B at follow-up. There were 91% who were satisfied or very satisfied with the result.

**Conclusion:** Acceptable clinical results with the MCL reconstruction technique were achieved in patients suffering from chronic valgus instability.

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## INTRODUCTION

The medial collateral ligament (MCL) is one of the most commonly injured ligamentous structures of the knee joint. Symptomatic chronic MCL instability is rare and is typically seen in cases of multiligament injuries. Isolated chronic MCL instability is seen very rarely. The first choice of treatment for acute lesions is non operative, with a hinged brace for cases of grade 1 or 2 laxity<sup>1,2</sup>. Some authors advocate acute surgical repair for cases of grade 3 laxity<sup>3,4</sup>.

The majority of patients who sustain MCL injuries of varying severity can achieve pre-injury activity level with nonoperative treatment alone. The most severe injuries, especially those with multiple ligament involvement, may require operative repair or augmentation on an acute basis. In addition, surgical reconstruction is indicated for isolated symptomatic chronic MCL laxity. Our choice of surgical procedure for such cases is open anatomical MCL reconstruction. In this study we discuss the surgical description and outcome of this surgical procedure in patients with chronic MCL tear.

## MATERIALS AND METHODS

This is a prospective study done in Sri Ramachandra university from May 2012 to Dec 2014. 16 patients with history of pain and instability of their knee joint, investigated

and diagnosed to have isolated MCL tear, ACL with MCL tear and ACL with MCL and Medial meniscus tear were included in this study. Patients with posterior and lateral ligament instability, previous knee surgery and fractures around the knee joint, features of degeneration were excluded from the study.

Pre-op Lysholm score was documented in all patients.

All cases were done under general anesthesia, tourniquet control and patient in supine position.

Anatomical MCL reconstruction was performed in isolated cases, along with Arthroscopic ACL reconstruction with or without partial medial meniscectomy in indicated cases by a single senior experienced knee surgeon. Post-operative rehabilitation was done as per standard protocol and patient followed up at regular intervals, 2,4,8,12 weeks, 6 months and 1 year.

Post-op Lysholm score was documented at 6 months and 1 year.

Subjective IKDC score assessment was done at the end of 1 year.

### Surgical Technique

The anatomic MCL reconstruction technique<sup>11</sup> consisted of a reconstruction of the proximal and distal divisions of the superficial medial collateral and the posterior oblique ligament using semitendinosis graft. A longitudinal incision was made on the medial side of the knee joint approximately

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from the medial epicondyle of the femur longitudinally toward the tibia about 5 cms below the joint line and increased the incision as required. Semitendinosus graft was harvested. The femoral insertion site of the sMCL 3mm superiorly and 4mm posterior to the medial epicondyle was identified using an image intensifier. An eyelet pin is passed following which appropriate size reaming was done about 25 mm depth. The femoral site for the POL is identified by identified the gastrocnemius tubercle. It is about 2mm distal and 3mm anterior to the gastrocnemius tubercle similarly, eyelet is passed and appropriate size reaming was done about 25 mm depth.

To expose the distal tibial attachment site of the superficial medial collateral ligament, the fascial expansion of the Sartorius muscle was incised and the gracilis and semitendinosus tendons were exposed. Deep within the pes anserine bursa, the distal tibial attachment of the superficial medial collateral ligament was identified. The attachment site is approximately 6 cm distal to the joint line. This reconstruction tunnel was placed at the posterior aspect of this attachment site, rather than the anterior aspect, because in one of the study, when the distal tibial reconstruction tunnel was placed slightly anterior, all of the reconstruction grafts failed during biomechanical testing. At this point, the tibial site was reamed after inserting a eyelet passing pin. A 7-mm reamer was reamed to a depth of 25 mm. To identify the posterior oblique ligament on the tibial site the attachment of the semimembranosus tendon was identified, slightly anterior to the direct arm attachment of the semimembranosus tendon. An eyelet passing pin was passed through the tibia, making sure that we don't injury the common peroneal nerve on the exiting site. A 7-mm reamer, drilled the tunnel to a depth of 25 mm. Then we fixed the semitendinosus graft of the femoral site of sMCL with an interference screw and with the knee is 30° flexion and with varus stress the tibial site is fixed with an inference screw. For the POL the femoral site is fixed and then the tibial site which is fixed in full extension of the knee. Following which a 5 mm suture anchor was fixed 1 cm below the tibial joint line with the knee in extension along the line of the MCL and the sutures were tied on the MCL graft. Concurrent arthroscopic partial meniscectomy or repair and ACL reconstruction was done using bone patella tendon bone graft. Semi-tendinous graft was harvested from the same side since all cases were chronic cases.

### RESULTS

16 patient were included in the study with mean age of 34 years. There were 4 female patient (25%) and 12 male patient (75%). 9 left (56%) knees and 7 right (44%) knee. Minimum follow up was 2 years.

There were

1. 3 isolated MCL tears
2. 2 O'donoghue lesions (ACL, MCL and Medial meniscus)
3. 11 ACL with MCL

18.75 % patients had fair Lysholm score and 81.25% had poor Lysholm score preoperatively. Post operatively at 6th months 25% progressed to good and the rest of the 75% progressed to excellent Lysholm scores. At 12<sup>th</sup> month follow up 93.75% had excellent Lysholm scores. At one year follow-up,

according to the IKDC subjective scoring system 98% were graded normal or nearly normal (grade A or B).

In one of our cases the tibial site graft was amputated while fixing it with interference screw, for which 5mm suture anchor was placed just above the tibial tunnel and the graft was fixed with the suture anchor. This patient was given a guarded weight bearing for a period of 8 weeks. The satisfaction rate in patients who underwent anatomic MCL reconstruction was excellent.

### DISCUSSION

In our study we found that an anatomic MCL reconstruction improved knee stability. Medial joint gapping was significantly reduced. All our case we started early knee ROM exercises with non-weight bearing walk with walker support for a period of 6 weeks. Initiating postoperative mobilization allows for return of knee function while minimizing the development of arthrofibrosis<sup>8,9</sup>. All patient were clinically evaluated with knee in 0° and 30°. Those with grade 2 and grade 3 tears were all treated surgically with semitendinosus graft. Post-surgery all our patients were evaluated clinical in 0° and 30° respectively and were found to have significant reduction in valgus stress test. This was also confirmed under c-arm on table before and after the procedure.

As part of the initial examination, inspection of the knee for any signs of abrasions, lacerations, contusions, or localized edema should be performed.<sup>10</sup> In addition, palpation of the entire lengths of MCL can also be very useful to identify the injury location.

Laprade *et al* found that anatomic Mcl reconstruction improved knee stability. He also added that medial joint gapping, valgus rotation and external rotation significantly reduced leading to improved outcomes. Our study also proved the same in terms of stability and all the other factors.

Numerous studies have shown that aggressive early motion does not significantly affect the anatomical reconstruction. Hence we followed early ROM exercise protocol in all our cases.

The term MCL is typically used to cover the medial ligament and capsular structures of the knee. However, the actual MCL is composed of 2 structures: a superficial MCL and deep MCL. Another important structure is the posteromedial corner, or posterior meniscocapsular complex consisting of the posterior oblique ligament (POL), the semimembranosus attachments, and the posteromedial horn of the medial meniscus. All these structures ensure static and dynamic function of the knee, and lesions to these structures can result in clinically significant valgus or rotational instability

Severe grade 3 injuries are often part of multiligament injuries, and 2 major schools exist for treatment in the case of multiligament injury.

- The first principle is subacute MCL repair and reconstruction of the anterior cruciate ligament (ACL) or posterior cruciate ligament.
- The second principle is no surgical treatment of the MCL and later reconstruction of the cruciate ligaments.<sup>5,6</sup>

It is unknown which principle gives the best results for MCL stability, but a study by Petersen and Laprell<sup>16</sup> indicates that

early ACL reconstruction gives increased incidence of range of motion complications.

A recent randomized controlled trial has demonstrated that MCL repair is unnecessary in cases with combined ACL and MCL injury when the ACL was reconstructed early.<sup>7</sup>

## CONCLUSION

Anatomical MCL reconstruction is a good surgical option for chronic MCL tears. Good knowledge of the anatomy of MCL is essential for better surgical outcomes. It's a simple surgery with excellent results.

### Limitations

Small sample size. Short term follow up. A long term follow up can throw light on progression towards degenerative arthritis.

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