

# **“Rehabilitation Following Arthroscopic Partial Meniscectomy –A Neglected Issue”**

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## **Abstract**

Meniscus injury is common in sports. Arthroscopic partial meniscectomy has been the gold standard treatment in symptomatic cases. This procedure is associated with minimal morbidity, though early return to sport and performance are questionable issues. The Department of Physical Medicine and Rehabilitation, Regional Institute of Medical Sciences had organised a rehabilitation protocol and instituted of the same starting from the early postoperative period with the aim to minimise early complications and help early return to sports. During early phase of rehabilitation, knee effusions were noted in two, lower lateral scar adhesion in one and restricted mobility of patello-femoral joint in another. Two cases of lateral compartment pain and another case of infrapatellar tendinitis were recorded as late complications. The need of a supervised rehabilitation programme is emphasised in this paper.

**Key Words:** meniscal injury, arthroscopic partial meniscectomy, rehabilitation

## **Introduction:**

Manipur is a leading sporting state in the country. Recent hosting and performance in the 5<sup>th</sup> National games and 58<sup>th</sup> Santosh trophy have proven the state's credibility. Sport related injuries are also very common. Proper and timely management of sport injury is critical. Many promising sportspersons are disabled due to improper management. One such problem is management of meniscus injury.

Meniscus injury represents one third of all athletic injury<sup>1</sup>. Treatment options for meniscal injuries include nonoperative management, meniscectomy, meniscal repair and meniscal replacement. For patient with frequently symptomatic and irreparable tear, partial meniscectomy removes unstable fragments that may cause symptoms of locking and catching.

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Arthroscopic partial meniscectomy is the gold standard procedure for the symptomatic cases. It gives less morbidity, lesser risk for major complications, rapid return to sports and a better long-term result when compared with the open meniscectomy procedure. However importance of a defined rehabilitation programme following such an important procedure is often underestimated. This common procedure is associated with problems that may hamper early return to sport. Common findings include a knee that is warm to touch, joint effusion, muscle atrophy, decrease in muscle tone and strength especially quadriceps, adhesion and scar tissue over the arthroscopic incisions, loss of range of mobility and tenderness of medial or lateral compartments of knee<sup>2</sup>. Such morbidity however minimal it may be will surely affect performance of the athletes. Institution of a proper rehabilitation programme shall help in early detection of such problems and help smooth return to sport. The

Department of Physical Medicine has developed a rehabilitation protocol and instituted the same starting from the early postoperative period with the aim to minimise early complications and help smooth and early return to sports. The results are analysed in this paper.

## Material and methods

Eighteen active sportspersons who underwent arthroscopic partial meniscectomy for isolated meniscus injury by different orthopaedic surgeons during the period of October 2001 to July 2003 were selected. Sportspersons with both meniscus injury or associated chondromalacia patellae or cruciate ligament injury detected during arthroscopy, instability of opposite knee joint or any other associated problem that will hamper the rehabilitation programme, more than six month of injury before operation were excluded from the study. A rehabilitation protocol developed in the Department of Physical Medicine and Rehabilitation, Regional Institute of Medical Sciences was instituted immediately following the arthroscopic procedure.

## Rehabilitation goals

1. To control pain and swelling, 2. To regain a pain free active range of motion, 3. Graduated weight bearing, 4. Progressive strengthening within the available range of motion, 5. Return to functional activities/sport

## Rehabilitation programme –

first week

- Compression bandage/knee sleeve immediate and early post operative period
- Partial weight bearing as tolerated starting from day of surgery
- Full weight bearing from the third day
- Active and active assistive range of

motion, patello-femoral joint mobilisation exercises started immediate post operative

- Strengthening of quadriceps (from 2<sup>nd</sup> post operative day) and hamstring muscles (from 5<sup>th</sup> post operative day)
- Strengthening of hip extensor and abductor, ankle dorsiflexors
- Ice, ultrasound therapy, electrical stimulation, interferential therapy
- Stationary bike from 4<sup>th</sup> postoperative day

Second week

- Isotonic and isokinetic (mild and faster speed) strengthening exercises for quadriceps and hamstrings
- Closed kinetic chain exercises
- Balance or proprioception training using a rocker board
- Jogging or swimming from 10<sup>th</sup> post operative days
- Strengthening of muscles around hip, ankle and other limb

Third week

- Continued strengthening exercises with increase speed
- High speed isokinetic strengthening exercises for quadriceps and hamstrings
- Sports specific drills – jump, hop, skip
- Jogging on soft surface with progressive increase in speed and distance

Fourth week

- Progressive agility drills( backward and lateral running, vertical jumping, cross over, figure 8 running, etc.) with increasing speed and complexity
- Progressive introduction of sprinting, acceleration and deceleration
- Return to sports

## Criteria for returning to sports

1. Absence of effusion, 2. Full range of motion of knee joint, 3. Normal quadriceps/hamstrings

strength, 4. Normal hip external rotator function, 5. Good proprioception, 6. Functional exercises performed without difficulties, 7. Simulated match situation (continuous cycling for 30 minutes) without subsequent knee pain

## Results

All eighteen sportspersons were in the age group of 17 to 28 years. Fifteen were males and three were females. Medial meniscus was involved in 14 and lateral in four cases. Highest numbers of sportspersons were from football (11), followed by basketball (2), fencing (2), athletics (1), taekwondo (1), and hockey (1).

Knee effusion lasting more than 10 days was noted in 2 patients. Lower lateral scar adhesion and restricted mobility of patello-femoral joint was also noted in 1 patient each. Two patients reported continued tenderness of lateral compartment of knee even after the completion of rehabilitation programme. One patient with continued knee effusion during the rehabilitation programme was treated with additional intra-articular injection of methyl prednisolone. Another patient (fencer) developed infra-patellar tendinitis within one month of joining the main sport. All patients returned to sports within 34+ 3.2 days. Follow up period ranged from 8 months to 2 years. Maximum performance of two patients was inhibited, one due to continued lateral compartment pain and another due to infra-patellar tendinitis. MRI of the knee for the first patient showed osteonecrosis of the lateral femoral condyle. Ultrasonography of the second case showed features suggestive of infra-patellar tendinitis, which was later co-related with the training scheduled and found to be overuse injury not related with the surgery.

## Discussion

The menisci of knee play an important role in joint congruence, stability and

absorption. They thus contribute to cartilage preservation. Biomechanical testing has shown that the medial and lateral menisci transmit at least 50 to 70% of the weight bearing load when knee is extended and upto 85 to 90% when knee is flexed. This is why current treatment of meniscal lesions is based on the notion of maximum preservation of menisci: meniscectomy as partial as possible, but also whenever possible, meniscal repair, or abstention from surgery. In the case of meniscal lesion on an otherwise intact knee, the usual approach is very partial arthroscopic meniscectomy. Arthroscopy has shortened postsurgical effect, but long-term results still show a certain percentage of narrowing of joint's space, in particular on the lateral meniscus<sup>3</sup>.

Our common experience is that majority of the patients who underwent partial meniscectomy do not undergo a supervised rehabilitation programme. They are usually discharged following surgery with ROM and quadriceps strengthening exercises. Subsequently, we have come across patients developing reflex sympathetic dystrophy, severely restricted mobility of patello-femoral joint following arthroscopic surgery. Such morbidity though minimal, frequently questioned the future of the sportsperson. A supervised rehabilitation programme can prevent these complications during the early postoperative period.

In the present study, males are more frequently involved (15:3) than females. Medial meniscus was more commonly injured than the lateral meniscus (14:4). Footballers were most commonly involved. Marc R. Safran<sup>1</sup> reported male: female ratio of 2.5:1 and medial to lateral meniscus tear ratio of 3:1. He identified football and basketball as main sports associated with meniscal injury. Otherwise a meniscal tear is usually encountered in any sport which necessitate twisting force with knee semi-flexed

or flexed. Lateral meniscus injuries are not common as this meniscus is more mobile and therefore escapes injury.

Smillie<sup>4</sup> reported 17% delayed recovery in his own series and 34% from other series due to complications following open meniscectomy. Complications are associated with long pre-operative history, rupture anterior cruciate ligament, retained posterior segment, osteochondritis dissecans, neuroma of infrapatellar branch of saphenous nerve, congenital discoid meniscus, osteoarthritis, multiple meniscectomies, para-articular ossification, postoperative infection. Presently available literature mostly focus on late complications like osteoarthritis and joint instability changes not on early postoperative complications. Moreover, a definite projection on the need of a follow up rehabilitation programme is lacking.

In 1988 Small<sup>5</sup> presented the largest prospective arthroscopy complication review. In this study, estimated complications of arthroscopic meniscectomy ranged from 1.5% for lateral meniscus to 1.7% for medial meniscus with an overall complication rate of 1.68%. Thrombophlebitis, hemarthrosis, infection, persistent effusion, and synovitis dominates post operative complications.

Arthroscopic partial meniscectomy is usually a straightforward procedure followed by a fairly rapid return to sport after four weeks of rehabilitation. The rehabilitation process usually takes longer if there has been a more complicated tear of the meniscus, especially if the lateral meniscus is injured. The presence of articular cartilage damage or ligament (MCL, ACL) tears, will necessary slow down the rehabilitation process<sup>1</sup>. Probably this explains why one patient continues to have pain in the lateral compartment due to articular damage that was not detected during the arthroscopic procedure.

Where there is persistent effusion some causes should be sought and, where possible eliminated. Postoperative effusion is more easily prevented than cured. It is important that an efficient compression bandage be maintained in the early stages of weight bearing<sup>4</sup>. Ogilvie- Harris<sup>6</sup> and Metcalf<sup>7</sup> discussed persistent post operative effusion and synovitis. If effusion persist for more than 3 to 4 weeks, NSAID therapy may be initiated. If effusion is large, aspiration with installation of a corticosteroid may be carried out. If the effusion continue for several months postoperatively, additional or subsequent intraarticular pathology should be considered. If the athlete returns to play before the knee is properly rehabilitated, he or she may not experience difficulty during the first competition but may be prone to develop recurrent effusion and persistent pain. Persistent effusion in two cases in the present study may be due to overactivity with the aim to return to sport early during the early postoperative period or due to inadequate surgery or failure to detect other injuries during the procedure. Close monitoring is essential during post meniscectomy rehabilitation as the remaining meniscus and underlying articular cartilage slowly increase their tolerance to weight bearing. The development of increased pain and swelling should result in the programme being slowed down or revised accordingly.

Infection has become a more frequent complication as arthroscopy becomes more widely used. Scar adhesion may be seen when arthroscopic wounds are infected. This is associated with poor aseptic and antiseptic techniques. It may lead to restricted mobility of the patello-femoral joint and pain due to stretching of scar during knee movements. In both situations, return to sport may be delayed or patient return to sport with limitations.

Bonneus<sup>8</sup> evaluated thirty-one knees following arthroscopic partial meniscectomy of the lateral meniscus in athletes after an average follow up of 8 years. 48.4% had excellent/good IKDC scores and 64.5% excellent/good Lysholm score. The Tegner activity score dropped from 7.2 (competitive sports) to 5.7 (recreational sports). Fairbank changes were noted in 92.9% of the radiographs. Deterioration of results after arthroscopic partial meniscectomy is obvious. The extent of resection is a significant factor. Burks RT<sup>9</sup> followed up 146 patients who had undergone arthroscopic partial meniscectomy about 14.7 years before. There were 88% good and excellent results in the anterior cruciate stable knees. The radiographic grade side-to-side difference showed the operative knee to be only a 0.23 grade worse than the nonoperative knee. Age at the time of meniscectomy was not found to be a factor. Male patients had better radiographic results than female patients, but not better functional score. Medial and lateral meniscus results were not significantly different. Knees with a femoral-tibial anatomic alignment of more than 0 degree valgus compared with less than or equal to 0 degree and that had undergone medial meniscectomy had significantly better radiographic results. In patients with anterior cruciate ligament tears, outcome after meniscectomy was significantly poorer than stable knee in regards to radiographic grade change, Lysholm, Tegner and medial joint space narrowing. Schimmer RC<sup>10</sup> reported results of the two steps evaluation following arthroscopic partial meniscectomy with a 12 years follow up. He reported that 91.7% had an excellent or good result 4 years after surgery and 78.1% rated excellent or good 12 years after surgery. Early results therefore were mostly representative and did not change significantly during the long-term course for the isolated meniscal lesion. The factor with the

highest impact on long-term results was damage to the articular cartilage, which did not influence knee function for several years after surgery but become increasingly symptomatic over time after 5 years or more. Only 62% of patients with additional cartilage damage rated excellent and good 12 years after surgery, in contrast with 94.8% good and excellent results in patients with isolated meniscal tear.

Return to sports following arthroscopic partial meniscectomy is considered when the quadriceps and hamstring muscles have regained their strength, endurance and synchrony, usually at approximately 6 to 8 weeks<sup>11</sup>. In the present series, return to sport took around 34+ 3.2 days. Parry et al<sup>12</sup> in his series of 1723 cases from Royal Air Force rehabilitation units reported that average time for return to duty after open meniscectomy was 62 days and no difference in the time of recovery from medial as opposed to lateral meniscus injury. In their series, 74% cases were discharged to full duty; 21% discharged to modified duty and 3.9% returned to hospital. Although knee arthroscopy and more specifically, meniscectomy have relatively low morbidity, complications do certainly occur. Thorough patient evaluation, proper use of arthroscopic equipments, gentle and correct surgical technique, meticulous intra- and post-operative monitoring, and patient education will help in reducing the incidence of such complications. Above all, a supervised rehabilitation programme will certainly help in minimising morbidity due to such complications.

## Conclusion

Meniscus injury is a common sports related injury. Arthroscopic partial meniscectomy has been a standard treatment for the symptomatic cases. However this procedure is not the ultimate in their treatment,

rather it should be viewed as the beginning of a supervised rehabilitation programme for early and smooth return to sports without complications.

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