

## Medial Patellofemoral Ligament (MPFL) Reconstruction Surgery in Iranian Patients with Recurrent Patellar Dislocation: Report of Three Years Experiences

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### ABSTRACT

Reconstruction of the medial patellofemoral ligament (MPFL) is reported as recent and challengeable treatment approach for recurrent patellar dislocation. There is no complete study with suitable follow-up time on Iranian patients with recurrent patellar dislocation and assessment outcome of MPFL reconstruction with patellar suture anchor (PSA) technique. Present clinical survey, summarized three years experiences of MPFL reconstruction with patellar suture anchor technique and clinical features in Iranian patients with recurrent patella dislocation and related topics in our university hospital. Present retrospective clinical survey had been performed on 23 patients with patellar recurrent dislocation that had MPFL reconstruction between March 2010 and May 2013. MPFL reconstruction was performed by one orthopedic surgeon in a university hospital. Patellar Apprehension test, Standard Kujala Score and knee range of motion measurement had been performed before and after MPFL reconstruction and its results were inserted into the checklist after at least 12 months follow-up. During follow-up with average of 17.4 months, there was no patellar dislocation or subluxation and patellar apprehension test was negative among all of patients. The patients reach to their full flexion (10.83 weeks in male and 9.77 weeks in female) and extension (3.33 weeks) in their knee joints postoperatively. Mean of Kujala score in the patients had been significantly improved after MPFL reconstruction (from 59.8 to 88.6). Patellar fracture was not seen. Findings of our study suggested that outcome of MPFL reconstruction surgery using two anchor suture in treatment of recurrent patellar dislocation is good and successful.

**Key words:** Patellar dislocation; MPFL operation; Recurrence.

### INTRODUCTION

Patellofemoral problems had been known as most common conditions in the general orthopedic field and recurrent patellar dislocation mainly affecting adolescents and young adults<sup>1, 2</sup>. Although recurrent patellar dislocation accounted only 2-3% of knee problems, it is known as second cause of traumatic hemarthrosis of the knee<sup>3, 4</sup>.

Patients with patellofemoral problems must receive proper treatment for avoiding or

minimizing its complications such as recurrent dislocation, painful subluxation and even osteoarthritis in developed cases<sup>5</sup>. The literature suggested some non-operative treatments such as a period of immobilization in a splint or cast, and then physiotherapy, principally of the quadriceps complex<sup>6, 7</sup>. Some investigators due more than 50% chance of recurring instability in the knee after non-operative treatment, are suggested surgical intervention<sup>8-11</sup>.

Different surgical techniques such as proximal or distal patella realignment procedures had been suggested for treatment of recurrent patella dislocation in the recent years<sup>12,14</sup>.

MPFL provides 60% of the medial stabilization<sup>15-17</sup> so Reconstruction of the medial patellofemoral ligament (MPFL) is reported as recent and challengeable treatment approach for patella dislocation<sup>11-13</sup>. According to our knowledge, there is no complete study on MPFL reconstruction with suitable follow-up time on Iranian patients with patella recurrent dislocation. Present clinical survey, summarized 3 years experiences on 15 patients with at least 12 months follow-up with MPFL reconstruction for treatment of recurrent patellar dislocation in our university hospital.

#### Patients and methods

Present retrospective clinical survey had been performed on 23 patients with recurrent patellar dislocation that had MPFL reconstruction with patella suture anchor (PSA) technique between March 2010 and May 2013. 8 patients had less than 12 months follow-up so 15 patients included in this study. The patients had recurrent patellar dislocation, Q-Angle <20 degree, TT-TG < 20mm and no severe trochlear dysplasia as inclusion criteria and patients with history of previous knee surgery or severe and massive defect in knee ligaments were excluded from the survey. Recurrence of patellar dislocation was assessed by history taking and physical examination. Study protocol had been approved in research ethical committee of Iran University of medical sciences and health services. Study investigators designed one checklist in Persian language for gathering clinical survey data. Noted checklist had been revised according comments of other expert orthopedic surgeon and expert staff in epidemiology and biostatistics. Finally, study checklist with 10 questions with five likert scale answers was finalized.

#### Operation technique

MPFL reconstruction was performed by one orthopedic surgeon and in a university hospital.

Patient was located in the supine position, after tourniquet inflation, semitendinous

tendon Autograft harvested in standard fashion and then two other short incisions were made, one, in the proximal two-third of patella bone and the other on medial epicondyle of the femur (pic 1) and then a groove was made on the proximal medial part of the patella (pic 2). Two anchor suture were inserted in two ends of the groove and prepared graft was attached to sutures and passed over the knee joint capsule through a soft tissue tunnel between layer 2 and 3 to the medial condyle of the femur (pic 3) and fixed 1 cm distal and 5 mm posterior to the adductor tubercle slightly proximal to the medial epicondyle (confirm with imaging) in 30 degree knee flexion and proper tension with one Bio screw.

#### Postoperative care

After surgery knee was placed in hinge knee brace (1 week in extended position). Quadriceps isometric strength exercise and leg raising initiated. In 2 weeks Gradual range of motion of the knee was initiated. The patient walked with Crutch for 3 weeks with partial weight bearing and after that with full weight bearing. At 6 weeks patients returned to normal daily activity. Jogging is allowed after 3 months. After 6 months with good quadriceps strength the patient is allowed to return to the original sporting activity. All of the patients were visited at 2 weeks, 1 month, 2 months, 6 months and one year after surgery and then annually

Patellar Apprehension test had been performed before and 12 months after MPFL reconstruction and its results were inserted into the checklist. Standard Kujala Score had been used for assessment pain and function of the patients before operation and 12 months after that (18). Returning time for natural force of the extensor and flexor muscles had been measured by physical examination and history taking and inserted into the patient's checklist.

#### Statistical analysis

Study data were entered into the SPSS software and were presented with mean, standard deviation, frequency and percentages. Normality of distribution had been assessed with Kolmogorov-Smirnov test. Chi-square was used for comparing qualitative variables between two groups and independent sample t-test was used for comparing

quantitative variables between two groups. Mann Whitney U, Wilcoxon and Kruskal-Wallis test were used in non-parametric distribution. All P-values less than 0.05 had been known as significant results.

## RESULTS

In the present clinical survey, 15 (9 female, 6 male) patients that completed at least 12 months follow-up with MPFL reconstruction were participated. Mean of age in study patients was  $26.53 \pm 5.97$  (17-38) years old and mean of age among women ( $25.33 \pm 6.8$ ) and men ( $28.33 \pm 4.36$ ) had no significant difference ( $P=0.16$ ). None of them had patella dislocation. Patella fracture was not seen in any of patients.

Patellar Apprehension test among all of the patients was positive before operation and after that all of the patients had negative results for postoperative Patellar Apprehension test. The patients reach to full flexion level in their knee until 12 weeks after operation. Most of men in 12 weeks and most of women at nine weeks after operation reached to full flexion in their knee joints. There was non-significant association between reaching time of full flexion in the knee joints between male and female patients ( $10.83 \pm 1.83$  vs.  $9.77 \pm 1.71$ ;  $P=0.39$ ).

The patients reach to full extension level in their knee until 4 weeks after operation. Most of men in three weeks and most of women at four weeks after operation reached to full extension in their knee joints. There was non-significant

association between reaching time of full extension in the knee joints between male and female patients ( $P=0.98$ ).

There was positive and non-significant association between age of patients and time witch needed to reach full extension in their knee joints ( $r_{sp} = 0.24$ ;  $P=0.37$ ). There was similar positive and non-significant association between age of patients and time witch needed to reach full flexion in their knee joints ( $r_{sp} = 0.45$ ;  $P=0.08$ ). Mean of Kujala score in the patient had been significantly improved after MPFL reconstruction operation ( $88.6 \pm 3.29$  vs.  $59.8 \pm 6.41$ ;  $P<0.001$ ).

## DISCUSSION

The treatment of recurrent patella dislocation is divided in two groups: conservative therapy and surgical therapy. Different conservative and surgical therapy has been suggested<sup>12-14</sup>.

Immobilization in cast or splint, and then physiotherapy, principally quadriceps complex is some kind of conservative therapy<sup>6,7</sup>. but because of more than 50% chance of recurring instability, several authors suggest surgical treatment for recurrent dislocation of patella<sup>8-11</sup>. Surgical approaches of patellar instability management had changed during last decade due to increase experience exchanges within the orthopedic surgeon around the world<sup>19</sup>. Proximal realignment procedures has been used for treatment of patella recurrent dislocation, but some authors stated that it has several potential disadvantages such as redislocation up to one-third

**Table 1: Comparing time to reach full flexion and extension after MPFL reconstruction surgery between male and female patients**

Variable		Male	Female	P-value
Time to reach full flexion	8 weeks	1 (16.7%)	2 (22.2%)	
	9 weeks	1 (16.7%)	4 (44.4%)	
	12 weeks	4 (66.6%)	3 (33.4%)	
Time to reach full extension	3 weeks	4 (66.7)	6 (66.7)	
	4 weeks	2 (33.3)	3 (33.3)	
Mean of time to reach full flexion		$10.83 \pm 1.83$	$9.77 \pm 1.71$	0.39
Mean of time to reach full extension		$3.33 \pm 0.51$	$3.33 \pm 0.52$	0.96

of patients, long term physiotherapy, and extensor mechanism injury<sup>5,6,7,14,17,20</sup>. After recognizing the role of MPFL in stability of patella, that it provided 60% medial stabilization<sup>9-10</sup>. During the past decade, reconstruction of the medial patellofemoral ligament (MPFL) has become the primary surgical treatment for recurrent patella dislocation and instability. Systematic reviews agree that MPFL reconstruction provides good outcomes, improves functional outcomes, and it has very low complication. So proximal realignment has been recently replaced by MPFL reconstruction for treatment of recurrent patella dislocation<sup>21,22,23,24</sup>. There are several techniques for MPFL reconstruction such as the patellar bone tunnel (PBT) and the patellar suture anchor (PSA).

The most important finding of the present study is that the clinical outcome of MPFL reconstruction in treatment of recurrent patellar dislocation is satisfactory at least 1 year follow-up.



**Fig. 1 : Incisions Were Made During Operation**



**Fig. 2 : The groove that was made on the medial part of patella**

after MPFL reconstruction using patellar suture anchor (PSA) technique.

Recent clinical studies on patellar bone tunnel (PBT) technique have described significant improvement in function and dislocation rates. Ronga *et al.*<sup>25</sup> reported on 28 patients with an average 3.1 years of follow-up. They achieved improvement in mean Kujala score (from 45 to 83). Panni *et al.*<sup>26</sup> included 45 patients. Patients were followed for an average of 33 months. Kujala score improved (from 56.7 to 86.8). No patient had patellar dislocation but 1 had patellar fracture. Christiansen *et al.*<sup>27</sup> prospectively investigated 44 patients with 12-32 months of follow-up. Kujala score improved (from 42 to 84). One patellar redislocation and 3 subluxations were observed. Si Young Song *et al.*<sup>28</sup> reported on 20 patients with an average of 34.5 months follow-up. All patients had MPFL reconstruction with PSA technique. Kujala score increased from 52.6 to 90.9. Redislocation or fracture were not seen. In present study Kujala score improved from 59.8 to 88.6. Redislocation or patellar dislocation was not seen in any patients. Our results are similar or superior to these recent studies and indicate that PSA technique is a good alternative for the patellar bone tunnel (PBT) technique.

Several authors have stated that PSA technique has several advantages over the PBT technique<sup>29,30</sup>. First it reduces the potential chance of patellar fracture by creating a sulcus instead of bony tunnels. Second it is more acceptable cosmetically because the lateral parapatellar



**Fig. 3 : Passing The Graft Over The Knee Medial Joint Capsule Through A Soft Tunnel Between Layer 2 And 3 To The Medial Epicondyle**

insicion is not needed and third is using short tendon in comparison with PBT technique.

In our opinion ,the PSA technique is relatively simple,and with using this technique we regain a structure that is closely like the normal MPFL,so would act as normal MPFL.

Our study had some limitations, firstly, although, we included all of patients with patellar dislocation into the study, we can find only 15 patients with MPFL surgery during study period in our hospital. It seems that next metacentric studies with more number of patients must be performed

for accurate assessment outcome of MPFL reconstruction operation. Secondary, we did not assess anxiety and stress level among patients. It seems that psychological characters including stress and anxiety might impact on outcome of MPFL reconstruction operation .

### CONCLUSION

Findings of our study suggested that outcome of MPFL reconstruction surgery using two anchor suture in treatment of recurrent patellar dislocation is good and successful.

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