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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 recostruction 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 9.77weeks in female) and extension(3.33weeks) 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[1, 2]. Although recurrent patellar dislocation accounted only 2-3% of knee problems, it is known as second cause of traumatic hemarthrosis of the knee[3,4].

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[5]. 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[6,7]. Some investigators due more than 50% chance of recurring instability in the knee after non-operative treatment, are suggested surgical intervention[8-11].

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

MPFL provides 60%of the medial stabilization[15-17] so Reconstruction of the medial patellofemoral ligament (MPFL) is reported as recent and challengeable treatment approach for patella dislocation[11-13]. According to our knowledge, there is no complete study on MPFL recostruction 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-Angel <20 degree, TT-TG< 20mm and no severe trochlear dyplasia 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 keen medial joint capsule through a soft tissue tunnel between layer 2 and 3 to the medial condyle of the femur(pic 3) and fixed 1cm distal and 5 mm posterior to the adductor tubercle slightly proximal to the medial epicondyle(confirm with imaing) 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).Quariceps 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 weightbearing 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 annualy

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±5.97 (17-38) years old and mean of age among women (25.33±6.8) and men (28.33±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±1.83 vs. 9.77±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±3.29 vs. 59.8±6.41; *P*<0.001).

DISCUSSION

The treatment of recurrent patella dislocation is devided in two groups:conservative therapy and surgical therapy.Different conservative and surgical therapy has been suggested[12-14].

Immobilization in cast or splint,and then physiotherapy ,principally quadriceps complex is some kind of conservative therapy[6,7]. but becauase of more than 50% chance of recurring instability,several authors suggest surgical treatment for recurrent dislocation of patella[8-11]. Surgical approaches of patellar instability management had changed during last decade due to increase experience exchanges within the orthopedic surgeon around the world[19].Proximal realignment procedures has been used for treatment of patella recrrent 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 ± 1.83	9.77 ± 1.71	0.39
Mean of time to reach full extension		3.33 ± 0.51	3.33 ± 0.52	0.96

of patients,long term physiotherapy,and extensor mechanism injury[5,6,7,14,17,20]. After recognizing the role of MPFL in stability of patella ,that it provided 60% medial stabilization[8-10]. 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 provide good outcomes,improve functional outcomes and it has very low complication.so proximal realignment has been recently been replaced by MPFL reconstruction for treatment of recurrent patella dislocation[21,22,23,24]. There is several technique 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 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[25] 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 .[26] 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[27] prospectively investigated 44 patients with 12-32 months of follow-up.Kujala score improved(from 42 to 84).ONE patellar redislocation and 3 subluxation were observed.Si Young Song et al[28] reported on 20 patients with an averge 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 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 indicates that PSA technique is a good altenative for the patellar bone tunnel(PBT) technique.

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

Fig. 1 : Incisions Were Made During Operation

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

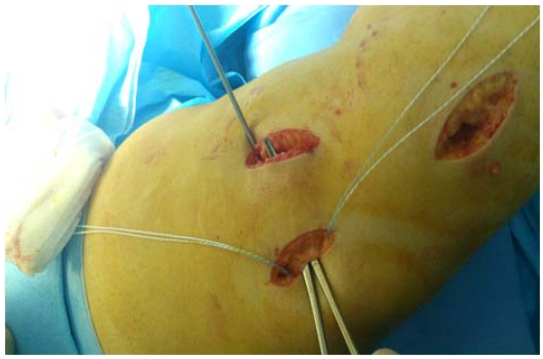

Fig. 3 : Passing The Graft Over The Knee Medial Joint Capsule Through A Soft Tunnel Between Layer 2 And 3 To The Medial Epicondyle

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.

REFERENCES

1. Hughston JC. Subluxation of the patella. The Journal of bone and joint surgery American volume. **50**(5):1003-26 (1968).
2. Camanho GL, Viegas Ade C, Bitar AC, Demange MK, Hernandez AJ. Conservative versus surgical treatment for repair of the medial patellofemoral ligament in acute dislocations of the patella. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. **25**(6):620-5 (2009).
3. Stefancin JJ, Parker RD. First-time traumatic patellar dislocation: a systematic review. *Clinical orthopaedics and related research.* ; **455**:93-101 (2007).
4. Arendt EA, Fithian DC, Cohen E. Current concepts of lateral patella dislocation. *Clinics in sports medicine.* **21**(3):499-519 (2002).
5. Sillanpaa PJ, Mattila VM, Maenpaa H, Kiuru M, Visuri T, Pihlajamaki H. Treatment with and without initial stabilizing surgery for primary traumatic patellar dislocation. A prospective randomized study. The Journal of bone and joint surgery American volume; **91**(2):263-73 (2009).
6. Smith TO, Davies L, Chester R, Clark A, Donell ST. Clinical outcomes of rehabilitation for patients following lateral patellar dislocation: a systematic review. *Physiotherapy*; **96**(4):269-81 (2010).
7. Dou K, Xu Q, Han X. The association between XPC Lys939Gln gene polymorphism and urinary bladder cancer susceptibility: a systematic review and meta-analysis. *Diagn Pathol.* **8**: 112 (2013).
8. Ahmad CS, Stein BE, Matuz D, Henry JH. Immediate surgical repair of the medial patellar stabilizers for acute patellar dislocation. A review of eight cases. *The American journal of sports medicine.* **28**(6):804-10 (2000).
9. Carney JR, Mologne TS, Muldoon M, Cox JS. Long-term evaluation of the Roux-Elmslie-Trillat procedure for patellar instability: a 26-year follow-up. *The American journal of sports medicine.* **33**(8):1220-3 (2005).
10. Fithian DC, Paxton EW, Cohen AB. Indications in the treatment of patellar instability. *The journal of knee surgery.*; **17**(1):47-56 (2004).
11. Merican AM, Kondo E, Amis AA. The effect on patellofemoral joint stability of selective cutting of lateral retinacular and capsular structures. *Journal of biomechanics.* **42**(3):291-6.12 (2009).
12. Brown DE,Alexander AH,Litchman DM,The Elmslie-Trillat procedure:evaluation in patellar dislocation and sublulation .*The journal of sport medicine.* **12**(2):104-9 (1984).
13. Chen SC, Ramanathan EB. The treatment of patellar instability by lateral release. *The Journal of bone and joint surgery British*

volume.; **66**(3):344-8 (1984).
14. Dandy DJ, Griffiths D. Lateral release for recurrent dislocation of the patella. *The Journal of bone and joint surgery British volume.*; **71**(1):121-5 (1989).
15. Toritsuka Y, Amano H, Mae T, Uchida R, Hamada M, Ohzono K, et al. Dual tunnel medial patellofemoral ligament reconstruction for patients with patellar dislocation using a semitendinosus tendon autograft. *The Knee.* **18**(4):214-9 (2011).
16. Nomura E, Inoue M. Hybrid medial patellofemoral ligament reconstruction using the semitendinous tendon for recurrent patellar dislocation: minimum 3 years' follow-up. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. **22**(7):787-93 (2006).
17. Schottle P,Schemling A,Romero J,Weiler A.Anatomical reconstruction of the medial patellofemoral ligament using a free garacilis auto graft.*Archives of orthopedic and truama surgery*; **129**(3);305-9 (2009)
18. Kujala UM, Jaakkola LH, Koskinen SK, Taimela S, Hurme M, Nelimarkka O. Scoring of patellofemoral disorders. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. **9**(2):159-63 (1993).
19. Arendt EA, Dejour D. Patella instability: building bridges across the ocean a historic review. Knee surgery, sports traumatology, arthroscopy : *official journal of the ESSKA* **21**(2):279-93 (2013).
20. Simone Cerciello,Sebastien Lustig,Giuseppe Costanzo,Philippe Neyret.Medial retinaculum reefing for the treatment for patella instability.Knee Surg Sports Traumatol Arthrosc. **22**:2505-2512) (2014).
21. Panni AS,Vssoo M,Cerciello S.acute patella dislocation.what to do?*Knee Surg Sports Traumatol Arthrosc* **21**:275-278 ((2013)
22. Howells NR,Barnett AJ, Ahearn N,Ansari N,Eldridge JD.,Medial patellofemoral ligament reconstruction:a prospective outcome assessment of a large sigle centre series.*J Bone Joint Surg BR.* **94**: 1202-1208 (2012).
23. Lind M,Jacobsen BW,Lund B,Christiansen SE.Reconstruction of the medial patellofemoral ligament for treatment of patellar instability. *Acta Ortho*. **79**:354-360 (2008).
24. Smith TO,Walker J,Russell N.Outcomes of the medial patellofemoral ligament reconstruction for patellar instability:a systematic review. *Knee Sutg Sports Traumatol Arthrosc.* **15**:1301-1314 (2007).
25. Ronga M,Oliva F , Longo UG,Testa V,Capasso G,Maffulli N.Isolated medial patellofemoral ligament reconstruction for recurrent patella dislocation. *Am J Sports Med.* **37**:1735-1742 (2009).
26. Panni AS,Alam M,Cerciello S,Vasso M,Maffulli N.Medial patellofemoral ligament reconstruction with a divergent patellar transvers 2-tunnel technique. *Am J Sports Med*; **39**: 2647-2655, (2011).
27. Christiansen SE,Jacobsen BW,Lund B,Lind M.Reconstruction of the medial patellofemoral ligament with gracilis tendon auto graft in transvers patellar drill holes. *Arthroscopy.* **24**(1):82-87(2008).
28. Si Young Song,In Song Kim,Ho Genu Chang,Jae-Hyuk Shin,Hyung Jin Kim,Young-Jin Seo.Anatomic medial patellofemoral ligament reconstruction using patellar suture anchor fixation for recurrent patellar instability. Knee Suegery Sports Traumatology Arthroscopy. ; **22**:2431-2437 (2014).
29. Hapa O,Aksahin E,Ozden R,Pepe M,Yanat AN,Dogramaci Y,Bozdag E,Sunbuloglu E.Aperture fixation instead of transverse tunnel at the patella for medial patellofemoral ligament reconstruction. *Knee Surg Sports Ttraumatol Arthrosc.* **20**: 322-326 (2012)
30. Schottle PB,Fucentese SF,Romero J,.Clinical and radiologic outcome of medial patellofemoral ligament reconstruction with a semitendinous autograft for patella instability. *Knee Surg Sports Traumatol Arthrosc.* **13**:516-521 (2005).