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Original Article

Reconstruction of the medial patellofemoral ligament in cases of acute traumatic dislocation of the patella: current perspectives and trends in Brazil☆,☆☆

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ABSTRACT

Objective: To evaluate the approaches and procedures used by knee surgeons in Brazil for treating medial patellofemoral lesions (MPFL) of the knee in cases of acute traumatic dislocation of the patella.

Materials and methods: A questionnaire comprising 15 closed questions on topics relating to treating MPFL of the knee following acute dislocation of the patella was used. It was applied to Brazilian knee surgeons during the three days of the 44th Brazilian Congress of Orthopedics and Traumatology, in 2012.

Results: 106 knee surgeons completely filled out the questionnaire and formed part of the sample analyzed. Most of them were from the southeastern region of Brazil. The majority (57%) reported that they perform fewer than five MPFL reconstruction procedures per year. Indication of non-surgical treatment after a first episode of acute dislocation of the patella was preferred and done by 93.4% of the sample. Only 9.1% of the participants reported that they had never observed postoperative complications. Intraoperative radioscopy was used routinely by 48%. The professionals who did not use this tool to determine the point of ligament fixation in the femur did not have a statistically greater number of postoperative complications than those who used it ($p > 0.05$).

Conclusions: There are clear evolutionary trends in treatments and rehabilitation for acute dislocation of the patella due to MPFL, in Brazil. However, further prospective controlled studies are needed in order to evaluate the clinical and scientific benefit of these trends.

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Reconstrução do ligamento patelofemoral medial na luxação traumática aguda da patela: perspectivas e tendências atuais no Brasil

Palavras-chave:
Joelho
Articulação do joelho
Ligamento patelofemoral medial
Reconstrução
Reabilitação

RESUMO

Objetivo: Avaliar as condutas e os procedimentos feitos pelos cirurgiões de joelho do Brasil no tratamento das lesões do ligamento patelofemoral medial (LPFM) do joelho na luxação aguda traumática da patela.

Materiais e métodos: Questionário de 15 questões fechadas que abordava tópicos relacionados ao tratamento das lesões do LPFM do joelho após luxação aguda da patela. Foi aplicado a cirurgiões brasileiros de joelho durante os três dias do 44° Congresso Brasileiro de Ortopedia e Traumatologia, em 2012.

Resultados: Preencheram completamente o questionário e fizeram parte da amostra analisada 106 cirurgiões de joelho. A maior parte era proveniente da Região Sudeste. A maioria (57%) relatou fazer menos de cinco procedimentos de reconstrução do LPFM/ano. A indicação do tratamento não cirúrgico após primeiro episódio de luxação aguda da patela é a preferida e feita por 93,4% da amostra. Somente 9,1% dos participantes relataram nunca ter observado complicações no pós-operatório. A radioscopia intraoperatória é adotada rotineiramente por 48%. Os profissionais que não a usam para determinação do ponto de fixação do ligamento no fêmur não observam estatisticamente mais complicações pós-operatórias comparados com os que usam essa ferramenta ($p > 0,05$).

Conclusões: Existem claras tendências de evolução no tratamento e na reabilitação da luxação aguda da patela com lesão do LPFM no Brasil. No entanto, mais estudos prospectivos controlados são necessários para avaliar o benefício clínico e científico dessas tendências.

Introduction

Acute dislocation of the patella is an injury typical of young and active patients of both sexes. The prevalence in the population is 6–77 cases per 100,000 inhabitants.[1,2] The overall recurrence rate after a first episode is close to 40%.[3]

Normal functioning of the femoropatellar joint is assured through static and dynamic stabilizers. However, over recent years, there has been growing interest in the orthopedic literature in studying the ligament structures that aid in stabilization of the patella.[4,5]

Among these structures, the one that has been most studied is certainly the medial patellofemoral ligament (MPFL). This extends from the medial and superior margin of the patella to the femur, where it is inserted between the adductor tubercle and the medial epicondyle. It is responsible for 50–60% of the lateral restriction strength of the patella.[6,7]

The MPFL is often damaged after episodes of patellar dislocation, and many different surgical reconstruction techniques have now been described in the literature.[3]

Over recent years, several studies have been conducted on this subject.[5,8,9] However, there is still no consensus in the literature, regarding a variety of issues.[3]

The high incidence of these injuries and the great importance of social and economic factors relating to them, along with the enormous divergences in the literature on this subject, make it extremely relevant to evaluate management and trends relating to this topic.

The aim of this study was to evaluate the management and procedures implemented by knee surgeons in Brazil, in treating acute injuries of the MPFL. From the results of this study, we would be able to delineate national trends relating to this subject and guide future quality studies.

Materials and methods

This was a descriptive study consisting of applying a questionnaire to a sample of knee surgeons in Brazil. The questionnaire was drawn up and approved by the authors in such a way that it would be very easy to understand and simple. It consisted of 15 closed questions that addressed topics like the surgeons' number of years of experience and number of MPFL reconstructions performed per year and a variety of issues relating to indications and treatments using these methods (Annex 1).

The questionnaire was applied to Brazilian knee surgeons during the three days of the 44th Brazilian Congress of Orthopedics and Traumatology, in 2012. Only orthopedists who performed knee surgery filled out the questionnaire. A total of 116 questionnaires were filled out. Of these, ten were excluded because they had not been filled out completely. To resolve any doubts while subjects were filling out the questionnaire, three researchers were present throughout the application period.

From the data extracted from the questionnaires, descriptive statistics on the variables involved were produced, in order to characterize the sample.

The data were analyzed using the SPSS software for Windows, version 20.0, and the significance level was taken to be 5%.

Table 1 – Description of the length of experience of MPFL surgery professionals according to each characteristic of interest and the results from the comparisons.

Variable	No			Yes			*v*
	Mean	SD	N	Mean	SD	N	
1/3 Medial patellar tendon	5.66	6.01	89	7.93	6.18	14	0.195
1/3 Medial quadriceps tendon	5.74	6.09	87	7.25	5.86	16	0.360
Gracilis and semitendinosus flexor tendons	5.34	5.38	76	7.74	7.49	27	0.077
Direct repair of MPFL (arthroscopic or open)	5.86	6.10	96	7.43	5.59	7	0.512
Gracilis flexor tendon	5.94	6.20	84	6.11	5.54	19	0.915
Semitendinosus flexor tendon	5.90	5.74	69	6.12	6.74	34	0.864
Other	6.22	6.14	97	2.00	1.67	6	0.098
Femur							
Endobutton	6.02	6.12	96	5.29	5.50	7	0.758
Interference/Biotenodesis screw	5.03	5.99	33	6.41	6.08	70	0.281
Anchors	6.00	6.03	93	5.7	6.57	10	0.882
Screw (Post)	6.12	6.16	98	3.00	2.00	5	0.263
Clips (AGRAF)	5.97	6.05	103			0	[a]
Direct suturing	5.93	5.85	91	6.25	7.71	12	0.866
Others	5.97	6.05	103			0	[a]
Patella							
Endobutton	5.82	6.01	93	7.40	6.57	10	0.435
Interference/Biotenodesis screw	5.94	6.15	94	6.33	5.20	9	0.852
Anchors	5.71	5.72	75	6.68	6.93	28	0.471
Screw (Post)	5.97	6.05	103			0	[a]
Clips (AGRAF)	5.97	6.05	103			0	[a]
Direct suturing	5.66	5.70	86	7.53	7.61	17	0.247
Others	6.17	6.24	94	3.89	3.02	9	0.282
Surgical treatment indicated after first episode of patellar dislocation	5.65	5.85	96	12.00	6.93	6	0.012
Use of intraoperative radioscopy to determine fixation point for femoral "neoligament"	6.35	6.43	52	5.81	5.76	48	0.664

Result from Student *t* test.

[a] Not possible to calculate the absence of professionals who perform the procedure.

Results

The questionnaire was completely filled out by 106 surgeons, and these subjects comprised the sample analyzed. The majority of the surgeons (56.6%) were from the southeastern region. Regarding their length of experience, the mean obtained was 5.97 years (±6.054), with a minimum of one year and maximum of 30 years. The majority of the participants (57%) reported doing fewer than five MPFL reconstruction procedures per year. The types of graft most used were the tendon of the semitendinosus muscle, by 36%, and both of the flexor tendons (gracilis and semitendinosus), by 28%. The option of graft fixation at knee flexion of 30° or 45° was chosen by the greatest proportion of the sample (75%); 50% of the participants performed the fixation with the knees flexed at 30°. In relation to the graft fixation method, the majority used an interference/Biotenodesis screw (70%) for graft fixation to the femur and anchors (28%) for fixation to the patella. Indication of non-surgical treatment after a first episode of acute dislocation of the patella was preferred and was done by 93.4% of the sample. Preoperative evaluation with complementary examinations before performing MPFL reconstruction was done by 98.1%. A period of one to four weeks between the acute dislocation of the patella and the surgical procedure was considered ideal by the largest number of the participants (31.6%). Intraoperative radioscopy was performed routinely by 48%. The majority (60.8%) had a specific postoperative rehabilitation protocol. Regarding braces for immobilization during the postoperative period, 70.3% used them. The largest number of those who used immobilization after surgery did so for up to one week (30.7%). Failure of conservative treatment (86.9%) and presence of factors predisposing toward patellar instability (63.3%) were the factors that were considered to be most determinant in making a decision to operate on a patient. Pain (75.8%) and knee joint effusion (33.3%) were the complications most observed during the postoperative period. Only 9.1% of the surgeons reported never having observed postoperative complications. Table 1 shows that, on average, the professionals who indicated surgical treatment after a first episode of patellar dislocation had had statistically significantly longer experience of MPFL reconstruction surgery ($p = 0.012$). Table 2 shows that the time interval between the injury/dislocation and the surgery that the professionals judged to be ideal did not have any statistically significant influence on the types and frequencies of complications observed ($p > 0.05$). Table 3 shows that the professionals who did not use radioscopy to determine the ligament fixation point on the femur did not

Table 2 – Description of the time interval between injury/dislocation and surgery that was judged to be ideal, according to the complications observed and the results from the comparative tests.

Complications observed postoperatively	Time interval between injury/dislocation and surgery that was judged to be ideal												Total	p
	Up to 7 days		1–4 weeks		4–12 weeks		12–24 weeks		6–12 months		>1 year			
	N	%	N	%	N	%	N	%	N	%	N	%		
Pain														0.590
No	3	12.5	8	33.3	4	16.7	1	4.2	7	29.2	1	4.2	24	
Yes	2	2.8	23	32.4	16	22.5	13	18.3	15	21.1	2	2.8	71	
Quadriceps dysfunction														0.146
No	5	7.6	22	33.3	15	22.7	9	13.6	13	19.7	2	3.0	66	
Yes	0	0.0	9	31.0	5	17.2	5	17.2	9	31.0	1	3.4	29	
Presence of grip														0.701
No	5	5.5	29	31.9	19	20.9	14	15.4	21	23.1	3	3.3	91	
Yes	0	0.0	2	50.0	1	25.0	0	0.0	1	25.0	0	0.0	4	
Diminished knee range of motion														0.762
No	5	7.5	19	28.4	16	23.9	12	17.9	12	17.9	3	4.5	67	
Yes	0	0.0	12	42.9	4	14.3	2	7.1	10	35.7	0	0.0	28	
Lateral patellar subluxation/dislocation														0.274
No	5	6.1	29	35.4	15	18.3	11	13.4	20	24.4	2	2.4	82	
Yes	0	0.0	2	15.4	5	38.5	3	23.1	2	15.4	1	7.7	13	
Medial patellar subluxation/dislocation														0.854
No	3	3.4	31	35.2	20	22.7	9	10.2	22	25.0	3	3.4	88	
Yes	2	28.6	0	0.0	0	0.0	5	71.4	0	0.0	0	0.0	7	
Patellar fracture														0.298
No	5	5.6	31	34.4	19	21.1	10	11.1	22	24.4	3	3.3	90	
Yes	0	0.0	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	5	
Knee joint effusion														0.760
No	3	4.6	23	35.4	12	18.5	10	15.4	16	24.6	1	1.5	65	
Yes	2	6.7	8	26.7	8	26.7	4	13.3	6	20.0	2	6.7	30	
Infection														0.217
No	5	5.4	31	33.7	19	20.7	13	14.1	22	23.9	2	2.2	92	
Yes	0	0.0	0	0.0	1	33.3	1	33.3	0	0.0	1	33.3	3	
Without complications														0.238
No	3	3.5	28	32.6	19	22.1	13	15.1	20	23.3	3	3.5	86	
Yes	2	22.2	3	33.3	1	11.1	1	11.1	2	22.2	0	0.0	9	

Results from Mann–Whitney test.

observe statistically greater numbers of postoperative complications than were noted by those who used this intraoperative tool ($p > 0.05$).

Discussion

Several studies on treatment of acute dislocation of the patella and MPFL reconstruction were found, but none of them had the aim of evaluating the perspectives and trends in treating and rehabilitating patients with injuries to this ligament after traumatic dislocation. Studies have recently been conducted in Brazil, but with the aim of evaluating the treatment methods used in cases of lateral ankle sprains, anterior cruciate ligament injuries and unicompartmental knee arthrosis.[10–12] In evaluating the regional frequencies of participating orthopedists, we noted that the southeastern region predominated, even though this study was conducted in the northeastern region (in Salvador). We believe that is may have occurred because there are greater numbers of knee surgery specialists in that region. The types of graft most used by our sample for MPFL reconstruction were the tendon of the semitendinosus muscle alone and both of the flexor tendons (gracilis and semitendinosus). A previous study showed that the MPFL has a mean resistance to traction of 208 N at a displacement of 26 mm.[13] Moreover, the various grafts used in the many surgical techniques that have been described in the literature for ligament reconstruction have produced good results, without greater incidence of failure with one graft than with another.[9] In relation to the graft fixation method for MPFL reconstruction, most of the surgeons used an interference/Biotenodesis screw in the femur and anchors in the

Table 3 – Description of the presence of complications according to use of intraoperative radioscopy for determining the fixation point for the neoligament in the femur and the results from the association tests.

Complications observed postoperatively	Use of intraoperative radioscopy to determine the fixation point of the neoligament in the femur				Total	*p*
	No		Yes			
	N	%	N	%		
Pain						0.680
No	13	26.0	11	22.4	24	
Yes	37	74.0	38	77.6	75	
Quadriceps dysfunction						0.099
No	30	60.0	37	75.5	67	
Yes	20	40.0	12	24.5	32	
Presence of grip						0.678[a]
No	46	92.0	47	95.9	93	
Yes	4	8.0	2	4.1	6	
Diminished knee range of motion						0.213
No	32	64.0	37	75.5	69	
Yes	18	36.0	12	24.5	30	
Lateral patellar subluxation/dislocation						0.076
No	46	92.0	39	79.6	85	
Yes	4	8.0	10	20.4	14	
Medial patellar subluxation/dislocation						0.160[a]
No	48	96.0	43	87.8	91	
Yes	2	4.0	6	12.2	8	
Patellar fracture						0.027[a]
No	50	100.0	44	89.8	94	
Yes	0	0.0	5	10.2	5	
Knee joint effusion						0.477
No	35	70.0	31	63.3	66	
Yes	15	30.0	18	36.7	33	
Infection						>0.999[a]
No	47	94.0	47	95.9	94	
Yes	3	6.0	2	4.1	5	
Without complications						0.741[a]
No	46	92.0	44	89.8	90	
Yes	4	8.0	5	10.2	9	

Results from Chi-square test.
[a] Results from Fisher's exact test.

patella. A recent study demonstrated that fixation with interference screws was just as strong as the technique of using transverse tunnels in the patella, for MPFL reconstruction.[14] Another study demonstrated that graft fixation using transosseous sutures in the patella provided loading similar to failure, but lower rigidity than with fixation using anchors, interference screws or transversal tunnels.[9] Indication of non-surgical treatment after a first episode of acute traumatic dislocation of the patella was preferred in our study (93.4%). There is still no consensus regarding this matter in the literature. However, most studies have recommended conservative treatment after a first episode of traumatic patellar dislocation, in the absence of osteochondral lesions and significant risk factors for recurrence. These studies did not show any difference between surgical and non-surgical treatments after a first episode of acute patellar dislocation.[15,16] However, Bitar et al. demonstrated that MPFL reconstruction using the patellar tendon produced better results, based on the incidence of recurrences and on the Kujala questionnaire, than shown by non-surgical treatment, with two years of follow-up.[8] Although only 48% of the surgeons used intraoperative radioscopy to determine the femoral insertion point of the ligament, several studies have suggested that this tool should be used during the surgery, given that the position of the femoral tunnel has now been shown to be critical in avoiding loss of isometry.[17–19] Previous papers have shown complication rates following MPFL reconstruction surgery ranging from 16.2% to 26.1% of the cases.[20,21] These numbers show that the number of complications is not insignificant, despite the excellent results observed postoperatively among the patients. These results may be related to the findings of our study, which showed that only 9.1% of the participants had never seen complications after this procedure. The complications most often observed in our study were pain and joint effusion. However, in the literature, loss of range of motion and recurrent instability have been the complications most observed.[21] In our study,

we did not find that the time interval until the surgery and use of intraoperative radioscopy showed any correlation with the complications observed after the surgery. However, previous studies have shown that around half of the complications are consequent to technical errors such as poor positioning of the femoral tunnel.[20]

Conclusion

This study demonstrated that there are clear evolutionary trends in treating and rehabilitating cases of acute dislocation of the patella with MPFL injury. However, further controlled prospective studies are needed in order to evaluate the clinical and scientific benefit of these trends.

Conflicts of interest

The authors declare no conflicts of interest.

Annex 1. Knee MPFL surgery and rehabilitation questionnaire

Questionário Cirurgia/Reabilitação LPFM Joelho

Cidade/Estado:_____

1 - *Anos Experiência Cirurgia Ligamento Patelo Femoral Medial (LPFM)* :_____anos

2- Quantas reconstruções do LPFM você faz por ano?

Numero por ano	
< 05	
05-10	
11-15	
16-20	
>20	

3-Tipo de Reconstrução/Reparo que você utiliza:

1/3 Medial tendão Patelar	
1/3 Medial tendão Quadríceps	
Tendão flexores Grácil e Semitendíneo	
Reparo direto do LPFM (Artroscopicoouaberto)	
Tendão flexor Grácil	
Tendão flexor Semitendíneo	
Outros.Qual?_____	

4 - Com quantos graus de flexão do joelho você realiza a fixação do LPFM?

☐ < 30 graus ☐ 60 graus
☐ 30 graus ☐ > 60 graus
☐ 45 graus

5 - Tipo de Fixação utilizada:

	Fêmur	Patela
Endobotton		
Parafuso Interferência/Biotenodese		
Âncoras		
Parafuso(Poste)		
Grampos(AGRAF)		
Sutura Direta		
Outras:_____		

6 - Você sempre indica tratamento cirúrgico após o primeiro episódio de luxação da patela?

☐ SIM ☐ NÃO

7 – Você realiza avaliação pré-operatória com exames subsidiários?

☐ SIM ☐ NÃO

Se SIM: ☐ RX ☐ TC ☐ RM Outros:_____

8–Tempo que você julga ser o ideal entre lesão/luxação e cirurgia

	Ideal
Até 7 dias	
1-4 semanas	

4-12 semanas	
12-24 semanas	
6 meses-1 ano	
> 1ano	

9 - Você rotineiramente utiliza radioscopia intra-operatória para determinação do ponto de fixação do " neoligamento" no fêmur?

☐ SIM ☐ NÃO

10 – Você tem um protocolo específico de reabilitação pós-operatório para reconstrução do LPFM?

☐ SIM ☐ NÃO

11 – Você utiliza Brace no pós-operatório dos seus pacientes?

☐ SIM ☐ NÃO

12 – Se SIM, por quantas semanas?

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐>6semanas

*13-*Quanto tempo você considera ideal para retorno de um atleta para o esporte após a cirurgia?

☐ 4 meses ☐ 5 meses ☐ 6 meses ☐ > 6 meses

14 – Fatores que determinam sua decisão de operaro paciente :

1 – Sexo do Paciente	
2 - Ruptura do LPFM vista na Ressonância Magnética	
3 – Presença de dor e/ou desconforto anterior no joelho	
4 – Presença de fatores predisponentes a instabilidade patelar (Displasia da Tróclea, patela alta, TAGT aumentado,etc)	
5 - Proteção da Superfície Condral	
6 - Falha do Tratamento Conservador (instabilidade/nova Luxação)	
7 - Ruptura do LPFM vista na Artroscopia	
8 - Idade do Paciente	

15 – Complicações observadas por você no-pós-operatório dos pacientes:

1 -Dor	
2 –Disfunção Quadríceps	
3 – Presença de apreensão	
4 –Diminuição ADM joelho	
5 –Subluxação/Luxação lateral da patela	
6 - Subluxação/Luxação medial da patela	
7 – Fratura da Patela	
8 – Derrame articular do joelho	
9 – Infecção	
10 – Sem complicações	

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