



Research Article

JMR 2017; 3(4): 195-197
July- August
ISSN: 2395-7565
© 2017, All rights reserved
www.medicinarticle.com
Received: 21-06-2017
Accepted: 27-08-2017

Minimally invasive posterior knee release

Kevin Parfait Bienvenu Bouhelo-Pam^{1*}, Espoir Amour Mokoko Louckou¹, Saeed Abdulrazak² Badarou Chaibou¹, Mohamed Shimi¹, Mohamed El Idrissi¹, Abdelhalim El Ibrahim¹, Abdelmajid El Mrini¹

¹ Department of osteoarticular surgery B4, Hassan II university hospital, Fez, Morocco

² Department of Trauma and orthopedic Surgery B3, Hassan II University Hospital, Fez, Morocco

Abstract

Background: Management of knee stiffness remains a subject of debate among orthopedic surgeons. There is no gain saying that restoration of knee function greatly improves quality of life. Posterior approach offers an excellent view of underlying causes of knee stiffness. Overall improvement in surgical approach as well as a better understanding of knee anatomy has paved way to minimally invasive surgery. Some authors suggest a posterior release as a complement to knee arthroscopy. The following study reports a significant improvement in knee function after posterior minimally invasive knee arthrolysis. The authors intend by means of the present study and relevant literature to highlight the indications, advantages and limitations of this approach. **Methods:** Our prospective study involving eight patients presenting knee stiffness in flexion. They are treated by modified minimally invasive Trickey approach. Data was analyzed using IBM software SPSS version 2015. **Results:** The latest range of motion at follow-up mean was 0.2 to 105 degrees and postoperative Lysholm-Tegner score mean was 88. **Conclusion:** Our study suggests a safe and effective procedure for posterior knee release and the management of knee stiffness.

Keywords: Knee joint stiffness, Knee release surgery, Range of motion, Articular, Walking.

INTRODUCTION

Knee stiffness, pain related or not, constitutes a permanent limitation on range of motion. If the hamstring contracture progresses and is left untreated, the knee no longer comes to full extension^[1]. Because the knee is never fully extended, the posterior knee capsule shortens and a fixed knee flexion contracture develops. The knee must flex to 65° to walk along a level surface, 85° to negotiate a six-inch step and 95° to rise from a chair easily^[2]. The treatment of fixed knee contracture depends on age of the patients and the severity of the contracture. Structured physiotherapy and manipulation under anaesthetic may be helpful in the early treatment of resistant cases. However, once the scar tissue has matured, the best approach remains controversial. Posterior knee release or arthrolysis is a surgical procedure, which aims at releasing any posterior attachments of the knee, by excising inextensible fibrotic tissue thus restoring knee extension. It is indicated in the event of knee stiffness on flexion or on both extension and flexion, the latter often difficult to treat^[1, 3]. The posterior knee capsulotomy is especially used in severe contracture without the deformity of the femoral condyle. Our study aims to emphasize the medium and long-term functional outcomes of minimally invasive posterior release for knee stiffness.

MATERIALS AND METHODS

A prospective study involving eight (08) patients presenting knee stiffness in flexion without any history of infection, resistant to conservative treatment and physical therapy, spanning a period of four years, between 2012 and 2016. All cases with radiological evidence of ankyloses were excluded. Functional outcome was evaluated using Lysholm-Tegner scoring scale^[4]. Patients were installed in a prone position with a thigh tourniquet. A modified Trickey approach^[5] following a posterior infero-medial route of the knee on a 4-cm incision was used. Installation and approach have been shown in the picture 1. This approach allows a sufficient exposure of the posterior capsule and various elements responsible for retraction. Debridement is performed, as well as excision of adhesences, a posterior release, with or without semitendinosus tendon repair referring to the picture 2, which may or not be associated with posterior capsulotomy. Excision and the release of anatomical elements is performed gradually and depends on resulting functional outcome verified intraoperatively. Complementary knee immobilization in extension was maintained 48 hours after surgery. Small walking steps were authorized without

*Corresponding author:

Kevin Parfait Bienvenu
Bouhelo-Pam

Department of osteoarticular
surgery B4, Hassan II university
hospital, Fez, Morocco.

Email: bopakev[at]yahoo.fr

exaggerated knee flexion during basic daily life activities. Knee flexion exercises was prohibited during the first week of recovery. A rehabilitation protocol was practiced immediately after surgery for up to 6 weeks involving mainly physiotherapy and proprioception and gradual weight bearing at least with walking aid in the beginning depending on pain tolerance and lymphatic drainage. Postoperative pain control was achieved using OMS analgesic ladder. Data was analyzed using IBM software SPSS version 2015. Quantitative data comparison was done using Student's t-test. Variation was considered statistically significant if p-value is less than 0.05.

RESULTS

A mean age of 31.6 years (ranging from 23 to 42) and a female predominance with a sex ratio of 1/7 was observed. A single patient had mixed stiffness while other seven patients had knee stiffness in flexion only. Lesions discovered intraoperatively were posterior capsular retractions in seven cases, adhesences in six cases, capsular shrinkages in four cases, and shrinkages of retinaculum in one case. Average delay before consultation was 74.1 months (between 6 and 168 months). An average deficit in extension of 17 degrees (from 10 to 30) while a fixed flexion deformity of 11.4 degrees (ranging between 0 and 25). Table I summarizes range of motion in our series. Postoperative gain in extension ranged from 13 to 18 degrees, with an average of 15 degrees. An example of functional recovery in a 19-year-old patient has been represented in the picture 3. No patient presented with more than 5 degrees of residual deficit in extension at follow-up. The following represents the overall function outcome: preoperative Lysholm-Tegner score: 62 (from 46 to 68); Postoperative Lysholm-Tegner score: 88 (from 78 to 94) ($p = 0.0001$). After a mean follow up of 18 months (range 6 to 38) postoperative recovery were marked by two cases of persistent pain.

DISCUSSION

Several authors recommend posterior knee arthrolysis as a complement to most arthroscopic procedures [6, 7, 8]. The above study demonstrates the advantages of open yet minimally invasive posterior approach. It offers a better view on the posterior elements of the knee. Functional outcome on deficit in knee extension was significantly improved in our series. Freiling D *et al.*, [7] found similar results: gain in extension: 17 degrees; Lysholm-Tegner score: 84 although their approach associated arthroscopic exploration with medial anterior parapatellar access, a postero-medial access, a section of the medial retinaculum of the knee and postero-medial arthrotomy. Posterior capsulotomy although unsystematic and excision of the various elements depended on intraoperative extension gain. Lobenhoffer *et al.*, [9] demonstrated an average improvement in extension of 2 degree after posterior capsulotomy. Hamstring tendon lengthening performed in all our patients was also practiced by Dhawlikar *et al.*, [10]. The authors reported a marked improvement in the popliteal angle after one year. No vascular nor nervous complications were recorded in our study. Residual postoperative pain reported by two of our patients was controlled with analgesics and physical therapy. Sciatic nerve palsy was reported in a similar series by Woratanarat *et al.*, [11] and so were cases of operating wound dehiscence and posterior cruciate ligament instability. Sciatic nerve palsy could be attributed to lengthening of gemelli muscles, which was not practiced in any of our cases. Open surgery offered considerably better results compared to arthroscopy in a knee posterior release. Mean postoperative knee extension gains after arthroscopic release was 0.7 degrees according to LaPrade *et al.*, [12]. These results are clearly inferior compared to ours as arthroscopy generally allows only posterior capsulotomy and no complete excision of retracted elements as well as fibrosis. Tardy *et al.*, [13] have described the surgical technique of posterior open knee release in extension deficit after anterior cruciate ligament

reconstruction with good range of motion and functional scores. But they used both posteromedial and posterolateral approaches.

CONCLUSION

Minimally invasive open posterior knee release is a safe and effective procedure in the management of knee stiffness. It ensured a significant functional outcome in all our patients. It remains indicated in cases of chronic knee extension deficits. There are no notable complications associated when the procedure is carefully performed according to anatomical marks and direct intraoperative functional gain.

Conflicts of interests

The authors declare no potential conflict of interest in the conduct and submission of this study.

Contribution of the authors

All authors contributed in the study and approve final version of manuscript.

Tables and Figures

Table 1: Range of motion in our series.

Patient	Time before consultation (months)	Preoperative range of motion	Range of motion 6 months post-arthrolysis	Latest Range of motion at follow-up
1	6	5 - 75	0 - 115	0 - 125
2	105	25 - 65	2 - 100	0 - 100
3	53	0 - 75	0 - 125	0 - 120
4	49	20 - 40	5 - 95	2 - 100
5	73	10 - 90	2 - 115	0 - 105
6	168	15 - 95	2 - 130	0 - 110
7	68	0 - 70	0 - 85	0 - 80
8	71	5 - 80	0 - 90	0 - 100
Mean	74.1	10 - 73.7	1.3 - 106.8	0.2 - 105



Picture 1: Patient installation and surgical approach.



Picture 2: Arthrolysis and release of the semitendinosus tendon.



Picture 3: Functional outcome in a 19-year-old patient, two months after release surgery.

2. Schurman DJ, Parker JN, Ornstein D. Total condylar knee replacement. A study of factors influencing range of motion as late as two years after arthroplasty. *J Bone Joint Surg Am.* 1985;67(7):1006-14.
3. Achalandabaso J, Albillos J. Stiffness of the knee-mixed arthroscopic and subcutaneous technique: results of 67 cases. *Arthroscopy.* 1993;9(6):685-90.
4. Tegner Y, Lysholm J. Rating systems in the evaluation of knee ligament injuries. *Clin Orthop Relat Res.* 1985;(198):43-9.
5. Trickey EL. Rupture of the posterior cruciate ligament of the knee. *J Bone Joint Surg Bri.* 1968; 50(2):334-41.
6. Behrend H, Hertel P. Results of the surgical treatment of arthro-fibrosis of the knee. *Unfallchirurg,* 2003;106(6):483-91.
7. Freiling D, Lobenhoffer P. The surgical treatment of chronic extension deficits of the knee. *Oper Orthop Traumatol.* 2009;21(6):545-56.
8. Magit D, Wolff A, Sutton K, Medvecky MJ. Arthrofibrosis of the knee. *J Am Acad Orthop Surg.* 2007;15(11):682-94.
9. Lobenhoffer HP, Bosch U, Gerich TG. Role of posterior capsulotomy for the treatment of extension deficits of the knee. *Knee Surg Sports Traumatol Arthrosc.* 1996;4(4):237-41.
10. Dhawlikar SH, Root L, Mann RL. Distal lengthening of the hamstrings in patients who have cerebral palsy. Long-term retrospective analysis. *J Bone Joint Surg Am.* 1992;74(9):1385-91.
11. Woratanarat P, Dabney KW, Miller F. [Knee capsulotomy for fixed knee flexion contracture]. *Acta Orthop Traumatol Turc.* 2009;43(2):121-7.
12. LaPrade RF, Pedtke AC, Roethle ST. Arthroscopic posteromedial capsular release for knee flexion contractures. *Knee Surg Sports Traumatol Arthrosc.* 2008;16(5):469-75.
13. Tardy N, Thaunat M, Sonnery-Cottet B, Murphy C, Chambat P, Fayard J-M. Extension deficit after ACL reconstruction: Is open posterior release a safe and efficient procedure? *Knee* 2016;23(3):465-71.

REFERENCES

1. Pretzsch M, Dippold A. Results of surgical arthrolysis in treatment of restricted knee joint movement. *Z Orthop Ihre Grenzgeb* 1999;137(4):334-9.