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Original Research Article

Radiological outcome following proximal realignment procedure for habitual dislocation of patella

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ABSTRACT

Introduction: Instability of the patellofemoral joint may manifest as acute patellar dislocation, recurrent patellar dislocation or subluxation, habitual patellar dislocation or chronic patellar dislocation. Habitual dislocation of patella is a condition where the patella dislocates whenever the knee is flexed and spontaneously relocates with extension of the knee. We conducted this study to know the radiological outcome following proximal realignment procedure (Campbell procedure) for habitual dislocation of patella.

Materials and Methods: The study was conducted from June 2017 to January 2019 with a minimum follow up of 6 months and a maximum follow up of 2 years.

Inclusion Criteria: All patients with habitual patellar dislocation, age between 5 to 40 years.

Exclusion Criteria: Patient age less than 5 years and aged above > 40 years, past history of knee surgery, acute patellar dislocation and knee effusions. Radiological assessment was done by measuring sulcus angle and congruence angle.

Conclusion: we conclude that following proximal realignment procedure (Campbell procedure) for habitual dislocation of patella radiological parameters were brought back to normal. There were no significant changes in sulcus angle. Congruence angle was brought back to normal, which was statistically significant ($p<0.001$).

1. Introduction

The incidence of patella dislocation ranges from 6 per 100,000 in the adult population to 43 per 100,000 in the pediatric population. Habitual dislocation of patella is a condition w here the patella dislocates whenever the knee is flexed and spontaneously relocates with extension of the knee. The causes of habitual patellar dislocation include contracture and fibrosis of the quadrice ps femoris, vastus lateralis, and lateral retinaculum, abnormal iliotibial band attach ment, repeated intramuscular injections into the thigh, genu valgum, patella alta due to the abnormal position of an elongated patellar tendon, systemic ligament laxity and dysplastic lateral femoral condyle.[4] Campbell developed the Campbell's procedure as a method of proximal realignment for habitual patellar dislocation. We conducted the present study to evaluate the radiological outcome following Campbell's procedure.

2. Materials and Methods

This is a prospective study conducted on 15 patients with habitual patellar dislocation, who presented to BIRRD Hospital between June 2017 to January 2019. In all cases patellar dislocation was treated by Campbell's procedure.

2.1. Inclusion Criteria

All patients with habitual patellar dislocation, age between 5 to 40 years.

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2.2. Exclusion Criteria

Patient age less than 5 years and aged above > 40 years, past history of knee surgery, acute patellar dislocation and knee effusions. All patients were clinically evaluated for medial joint line tenderness, ROM at knee, Q angle, apprehension test, Positive J sign (lateral Subluxation) and ligamentous laxity. Radiological assessment was done by measuring S ulcus angle, Congruence angle. Following radiographs are taken for all the patients - Knee-anteroposterior view with full weight bearing, Knee-lateral view with full weight bearing in 30 degree flexion, Merchant view (45 degree skyline view), Laurin view (30 degree skyline view). Post-operative radiographic evaluation was done periodically at 6 weeks, 3months, 6 months and yearly.

Sulcus Angle: Sulcus angle defined as the angle formed between lines joining the highest points of the bony medial (B) and lateral condyles (C) and the lowest bony point of the intercondylar sulcus (A). The mean sulcus angle (138* +/- 6*).

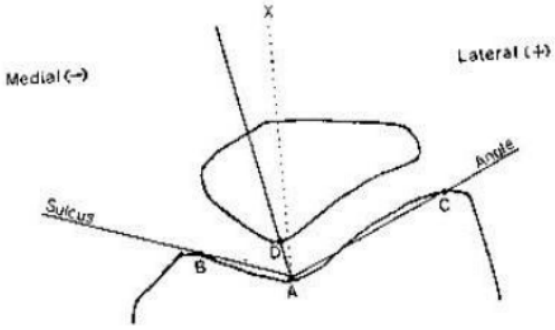

Fig. 1:

2.3. Congruence Angle

Identify the highest point of the medial (B) and lateral (C) condyles and the lowest point of the intercondylar sulcus (A). Bisect the sulcus angle (BAC) to establish the zero reference line (AX). Identify the lowest point on the articular ridge of the patella (D) and draw a line from A to D. The angle DAX is the congruence angle. All values medial to the zero reference line AX are designated as negative and those lateral as positive. All values medial to the zero reference line AX are designated as minus and those lateral as plus. Normal angle is defined as < -16 degrees.

2.4. Surgical technique

A midline skin incision was made from the quadriceps tendon to the tibial tubercle. Deep tissue dissection was extended from quadriceps tendon to tibial tubercle. A lateral retinacular release was then performed. The exposure was deepened to the level of the medial capsule and the retinaculum. A proximally based strip of medial capsule, 10x2cm wide, was then developed. This is followed by closure of the medial arthrotomy. The proximally based strip of medial capsule is then passed over the quadriceps tendon at the superior pole of the patella from a medial to lateral direction. The flap then passed medially under the quadriceps tendon and sutured to the fascia in the region of the adductor magnus tendon. The wound was then closed in a routine fashion over hemovac drain. Postoperatively, the knee is immobilized for four weeks in the cast with knee in 30 degree flexion and then rehabilitated.

2.5. Post op protocol

Cast is opened on 12 day and suture removal will be done, and cast is reapplied with knee in 30 flexion, with well padding at pressure points.[48] They were asked to review after 1 month. Patients were evaluated clinically for wound status, range of motion, patellar tracking, deformity correction, ligament laxity and neurological status. Radiological assessment is done by measuring sulcus angle and congruence angle. Subjective evaluation was done by Kujala index scoring.

2.6. Postop radiological assessment

Radiographs

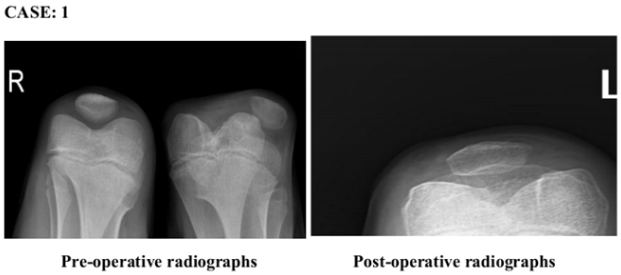

Fig. 2:

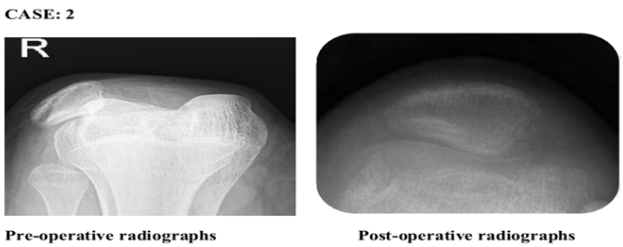

Fig. 3:

3. Conclusion

Our prospective study consisted of 15 cases, (9 male, 6 female). No patient missed the follow up during

Table 1: Sulcus angle

N	15
Pre-op	133.39 +/- 8.37
Post-op	133.39 +/- 8.37
significant	No significance

Table 2: Congruence angle

N	15
Pre-op	61.79 +/- 4.54
Post-op	16.07 +/- 4.27
significant	P<0.001 statistically significant

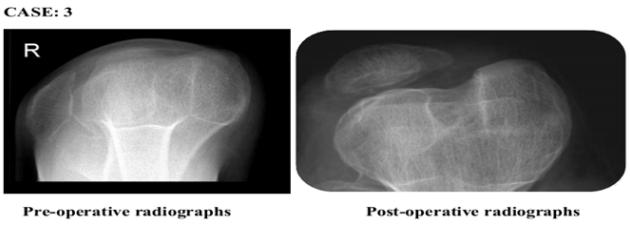

Fig. 4:

this study series. The average follow up period was 6 months. All cases were treated with Campbell's procedure for habitual dislocation of patella. Of all the 15 knees operated with lateral release and medial plication, 12 knees had significant improvement in functional scores and congruence angle on radiographs. There were no stati stically significant changes in sulcus angle as trochleoplasty procedure was not done and there was inadequate study time to notice bony changes in growing patients. In our study preoperative and postoperative range of motion was unchanged. Radiological assessment showed statistically significant changes in congruence angle. No improvement of sulcus angle on X-rays doesn't always correlate with poor functional outcome. Of three cases that had recurrence, one was revised with modified Galeazzi's technique[38] and one patient underwent modified Roux Goldthwait procedure[31] and last one was revised with trochleoplasty and modified Roux Goldthwait procedure. Thus we conclude that Campbell procedure is a safe and effective procedure for treating habitual patellar dislocation. Future study to quantify a medial laxity (amount of medial soft tissue to be imbricated and/or additional dynamic stabilization procedure) is desirable. Further no single procedure is fully effective in the surgical treatment of all cases of lateral patella dislocation. Long term follow-up is desirable to evaluate distal femur remodeling.

4. Source of Funding

None.

5. Conflict of Interest

None.

6. References

1. Vavken P, Wimmer MD, Camathias C, Quidde J. Treating patella instability in skeletally immature patients. *Arthros* 2013;29(8):1410-1422
2. Nietosvaara Y, Paukku R, Palmu S, Donell ST. Acute patellar dislocation in children and adolescents. Surg Technique. *J Bone Jt Surg* 2009;91:139-145.
3. Bettuzzi C, Lampasi M, Magnani M. and Donzelli O. Surgical treatment of patellar dislocation in children with Down syndrome: a 3 to 11-year follow-up study. Knee Surgery, Sports Traumatology. *Arthros* 2008;17(4):334-340.
4. Kwak J, Sim J, Kim N, Lee B. Surgical Treatment of Habitual Patella Dislocation with Genu Valgum. *Knee Surg Related Res* 2011;23(3):177-179.
5. Wada A, Fujii T, Takamura K, Yanagida H, Surijamorn P. Congenital dislocation of the patella. *J Children's Orthop* 2008;2(2):119-123
6. Arendt E, Fithian D. and Cohen E. Current concepts of lateral patella dislocation. *Clin Sports Med* 2002;2(13):499-519.
7. Mikashima Y, Kimura M, Kobayashi Y, Asagumo H, Tomatsu T. Medial patellofemoral ligament reconstruction for recurrent patellar instability. *Acta Orthop Belg* 2004;70:545-550.
8. Deie M, Ochi M, Yasumoto M. Reconstruction of the medial patellofemoral ligament for the treatment of habitual or recurrent dislocation of the patella in children. *J Bone Joint Surg* 2003; 85-B: 887-890.
9. Hall JE, Micheli LJ, McManama GB. Semitendinosus tenodesis for recurrent subluxation or dislocation of the patella. *Clin Orthop* 1979;144:31-35.
10. Inoue M, Shino K, Maeda A. Computed tomographic evaluation of realignment surgery for patellar subluxation. *Seikeisaigaigeka* (in Japanese) 1994;37:43-47.
11. Madigan R, Wissinger HA, Donaldson WF. Preliminary experience with a method of quadricepsplasty in

recurrent subluxation of the patella. *J Bone Joint Surg* 1975;57-A: 600.
12. Roux C. The Classic: Recurrent Dislocation of the Patella: Operative Treatment. *Clin Orthop Related Res* 1888;452:17-20.
13. Walmsley R. The development of the patella. *Amer J Anat* 1940;71(5): 360-368.
14. Macnab I. Recurrent dislocation of the patella. *J Bone Joint Surg [Am]* 1952;34-A: 957-967.
15. Heywood AWB. Recurrent dislocation of the patellar: a study of its pathology and treatment in 106 knees. *J Bone Joint Surg [Br]* 1961;43-B:508-517.
16. HNEVKOVSKY, 0.: Progressive Fibrosis of the Vastus Intermedius Muscle in Children. *J Bone Joint Surg* 1961;43-B:318.
17. Jeffreys T. recurrent dislocation of the patella due to abnormal attachment of the ilio-tibial tract. *J Bone Joint Surg Br* 1963;45-B(4):740-743.
18. Gunn DR. Contracture of the quadriceps muscle: a discussion on the etiology and relationship to recurrent dislocation of the patella. *JBJS [Br)* 1964:46-B :492-497.
19. Insall J Salvati E. Patella Position in the Normal knee Joint Radiology 1971:101(1):101-104.
20. Harris NH. Acetabular growth potential in congenital dislocation of the hip and some factors upon which it may depend. *Clin Orthop* 1976;119:99-106
21. Lindstrom JR, Ponseti IV, Wenger DR. Acetabular development after reduction in congenital dislocation of the hip. *J Bone Joint Surg [Am]* 1979;61-A:112-18.
22. Alvarez EV, Munters M, Lavine LS, Manes H, Waxman J. Quadriceps myofibrosis. A complication of intramuscular injections. *J Bone Joint Surg Am* 1980;62:58e60.
23. Bergman N. and Williams P. Habitual dislocation of the patella in flexion. *J Bone Joint Surg Br* 1988;70-B(3):415-419.
24. Dandy D, Griffiths D. Lateral release for recurrent dislocation of the patella. *J Bone Joint Surg Br* 1989;71-B(1):121-125
25. Gao GX, Lee EH, Bose K. Surgical management of congenital and habitual dislocation of the patellar. *J Pediatr Orthop* 990;10:255-e260.
26. Albuquerque R, Pacheco A, Hernandez A, Amatuzzi M, Pécora J. and Kokron, A. Appraisal of surgical treatment of 47 cases of patellofemoral instability. *Revista do Hospital das Clín* 2002;57(3):103-107.
27. Hui JHP, Torode IP. Changing glenoid version after open reduction of shoulders in children with obstetric brachial plexus palsy. *J Pediatr Orthop* 2003;23:109-113.
28. Mikashima Y, Kimura M, Kobayashi Y, Asagumo H, Tomatsu T. Medial patellofemoral ligament reconstruction for recurrent patellar instability. *Acta Orthop Belg* 2004;70(6):545-550.
29. Waters PM, Smith RGR, Jaramillo D. Glenohumeral deformity secondary to brachial plexus birth palsy. *J Bone Joint Surg [Am]* 1998;80-A:668-677.
30. Mikashima Y, Kimura M, Kobayashi Y, Miyawaki M, Tomatsu T. Clinical results of isolated reconstruction of the medial patellofemoral ligament for recurrent dislocation and subluxation of the patella. *Acta Orthop Belg* 2006;72(1):65-71.
31. Marsh J, Daigneault J, Sethi P, Polzhofer G. Treatment of Recurrent Patellar Instability with a Modification of the Roux-Goldthwait Technique. *J Pediatr Orthopaed* 2006;26(4):461-465.
32. Shen H-C, Chao K-H, Huang G-S, Pan R-Y, Lee C-H. Combined Proximal and Distal Realignment Procedures to Treat the Habitual Dislocation of the Patella in Adults. *Am J Sports Med* 2007.
33. Benoit B, Laflamme GY, Laflamme GH, Rouleau D, Delisle J, Morin B et al. Long-term outcome of surgically-treated habitual patellar dislocation in children with coexistent patella alta. *J Bone Joint Surg Br* 2007;89-B.
34. Wada A, Fujii T, Takamura K, Yanagida H. and Surijamorn, P. Congenital dislocation of the patella. *J Children's Orthopaed* 2008;2(2):119-123.
35. Panagopoulos, A., van Niekerk, L. and Triantafillopoulos, I. MPFL Reconstruction for Recurrent Patella Dislocation: A New Surgical Technique and Review of the Literature. *Int J Sports Med* 2008;29(5):359-365.
36. Pal A, Baksi D, Baksi D. Electromyographic investigation of unstable patella before and after its realignment operation. *Indian J Orthop* 2011;45(1):69.
37. Lin C-W, Wang C-J. Surgical treatment of recurrent habitual patellar dislocation associated with severe trochlear hypoplasia and generalized ligament laxity. *Formosan J Musculoskeletal Disord* 2011.
38. Aulisa A, Falciglia F, Giordano M, Savignoni P. and Guzzanti V. Galeazzis modified technique for recurrent patella dislocation in skeletally immature patients. *J Orthopaedic Sci* 2012;17(2):148-155.
39. Cootjans K, Dujardin J, Vandenneucker H. A surgical algorithm for the treatment of recurrent patellar dislocation. Results at 5 year follow-up. *Acta Orthop Belg* 2013 Jun 2013.
40. Camathias C, Rutz E, Götze M, Brunner R, Vavken P, Gaston MS. Poor outcome at 7.5 years after Stanisavljevic quadriceps transposition for patellofemoral instability. *Arch Orthop Trauma Surg* 2014.
41. Mackay N, Smith N, Parsons N, Spalding T, Thompson P. and Sprowson, A. Medial Patellofemoral Ligament Reconstruction for Patellar Dislocation. *Orthop J Sports Med* 2014;2(8):232596711454402.

42. Balcarek P, Oberthür S, Frosch S, Schüttrumpf J, Stürmer K. Vastus Medialis Obliquus Muscle Morphology in Primary and Recurrent Lateral Patellar Instability. *Bio Med Res Int* 2014
43. Batra S. and Arora S. Habitual dislocation of patella: A review. *J Clin Orthop Trauma* 2014;5(4):245-251.
44. Mittal R, Balawat A, Manhas V, Roy A. and Singh, N. Habitual patellar dislocation in children: Results of surgical treatment by modified four in one technique. *J Clin Orthop Trauma* 2017;8:S82-S86.
45. Miguel Sá P, Raposo F, Santos Carvalho M, Alegrete N, Coutinho J. and Costa, G. Congenital dislocation of the patella — clinical case. *Revista Brasileira de Ortopedia* (English Edition), 2016;51(1):109-112.
46. Claes S, Vereecke E, Maes M, Victor J, Verdonk P. and Bellemans J. Anatomy of the anterolateral ligament of the knee. *J Anatomy* 2013;223(4);321-328.
47. LaPrade R. The Anatomy of the Medial Part of the Knee. *J Bone Joint Surg (Am)*, 2007;89(9):2000.
48. Moorman C. and LaPrade R. Anatomy and Biomechanics of the Posterolateral Corner of the Knee. *J Knee Surg* 2005;18(02):137-145.

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