International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Case Report

Physiotherapy in Recurrent Dislocation of Patella-Wiberg Type II

Farzana Alam, Subhadeep Roy Choudhury

BPT, COMT, Physiotherapist at Almedica Clinic & Physiocare, Kolkata, West Bengal, India.

Corresponding Author: Farzana Alam

ABSTRACT

Objective: To find the effect of physiotherapy in recurrent dislocation of patella-Wiberg Type II
Design: A case report.
Setting: Physiotherapy department at Almedica Clinic & Physiocare, Kolkata, India
Subject: A young girl aged 10 years experienced patella dislocation causing severe pain during school sports with similar episodes experienced during the following weeks. The patella would move back into position with gentle pressure application.
Intervention: A physiotherapy programme of 15 sessions of electrotherapy and exercises was planned which consisted of faradic stimulation of the quadriceps, followed by supervised exercises of the knee. Home exercises, which were similar to the supervised exercises, were advised to be done twice, daily.
Outcome measures: Lysholm knee score, Norwich Patellar Instability (NPI) score, Knee extensor strength.
Result: The apprehension in activity and frequency of dislocation of the patella had reduced by the 15th session of physiotherapy with significant improvement in strength of knee extensors. Home exercises were continued regularly and at six months of follow up the patient had reported no episodes of dislocation following the treatment sessions.
Conclusion: Recurrent dislocation of patella-Wiberg Type II, can be controlled by physiotherapy which includes a course of faradic stimulation to quadriceps and regular strengthening exercises of the knee extensors.

Key Words: Recurrent dislocation, Patella-Wiberg Type II, Physiotherapy, Quadriceps.

INTRODUCTION

Recurrent dislocation of the patella refers to those instances where the patella has, on at least two occasions, momentarily left its usual place in the intercondylar groove and for a longer or shorter time been displaced on to or over the lateral condyle. [1] Patellar subluxation is more common than patellar dislocation and is just as disabling. [2] The stability of the patellofemoral joint is maintained by a complex interaction between soft tissues and bony structures. Skeletal as static, ligamentous as passive and muscular as active stabilizers interacts to provide patellofemoral stability. [3,4]

Patellar dislocations account for 2% - 3% of the knee joint injuries, mainly affecting young and active people with an almost equal distribution between male and female and a peak age of 10 - 20 years. [5] Most of the first-time patellar dislocations occur during sport activities, with reported incidence of 55% - 72%. [5] After an acute patellar dislocation, the risk of recurrent dislocation has been reported to be up to 40%, irrespective of the treatment. [6]

Recurrent dislocation of the patella could occur due to anatomical abnormalities, laxity of ligaments or weak muscles stabilizing the knee. Regarding the anatomical abnormalities which may facilitate patellar dislocation, several anatomical changes in the skeleton have been described by some authors as cause of patellar dislocation, by others as result of patellar dislocation: genu valgum, increased Q Angle, changed femur torsion, patella alta, patella shape etc. [1]

Wiberg classification is a system for describing the shape of the patella based mainly on asymmetry between the patellar medial and lateral facet on axial views of the patella. Wiberg [7] in his classic and widely accepted article in 1941, proposed a three-part classification to encompass the majority of patellae encountered. It is based upon the radiologic form on the axial view

- **Type I:** the facets are concave, symmetrical, and of equal size.
- **Type II:** the medial facet is smaller than the lateral facet and flat or only slightly convex. The lateral facet is concave.
- **Type III:** the convex medial facet is markedly smaller than the concave lateral facet,

The treatment for recurrent patella dislocation could be surgical or non-surgical. While there are various literatures on the surgical management of the case, not much literature supports the physiotherapy management for recurrent dislocation of patella-Wiberg Type II. The purpose of this study is to evaluate the effect of physiotherapy management in a case of recurrent dislocation of patella-Wiberg Type II. The results will help medical professionals in planning rehabilitation strategies for the effective treatment in such case.

METHODOLOGY

A young girl aged 10 years during school sports, experienced a sudden click in her left knee with sharp pain. She saw that the patella was displaced laterally and as gentle pressure was applied by her, the patella went back into its position and the pain instantly reduced. Similar episodes were experienced in the next few weeks, with the frequency being 4 to 5 times per day.

On consultation with the orthopaedician she was referred for physiotherapy after bony or ligamentous injury was ruled out. Examination revealed slight apprehension on medio-lateral glide of patella on the left side. Quadriceps strength as evaluated in accordance with the Manual Muscle Testing procedure on the left knee was Grade 4 as compared to the right knee which had Grade 5 muscle strength. Radiological findings of the knee at 30 degree flexion on skyline view suggested the patella to be Wiberg Type II. (Figure 1)

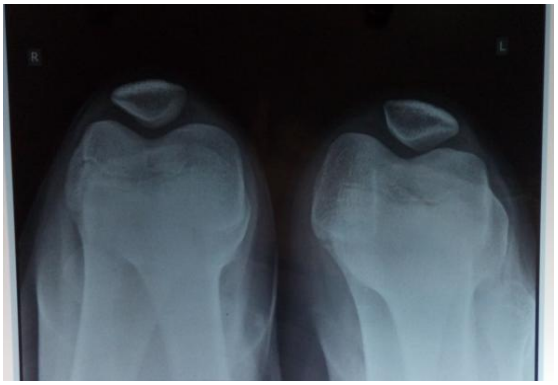

Figure 1: Patella Wiberg Type II

A physiotherapy programme of 15 sessions of physiotherapy, five days a week for three weeks was planned which included faradic stimulation to the quadriceps, followed by supervised exercises of the knee extensors. Home exercises, which were similar to the supervised exercises, were advised to be done twice, daily.

The outcome measures were the Lysholm knee score, the Norwich Patellar Instability (NPI) score, and knee extension strength evaluated by Manual Muscle Testing procedure. The Lysholm knee score or questionnaire is a patient completed questionnaire constituted of eight questions, with closed answers alternatives, of which final score is expressed nominally and

ordinally, with a score ranging from 95 to 100 points regarded as "excellent"; 84 to 94 points, "good", from 65 to 83 points, "fair", and "poor" when values were equal or below 64 points. [8] The Norwich Patellar Instability score, a 17-item instrument that list various activities, where only those activities actually undertaken are included in the measurement e.g., cutting and running when playing sports The final score is calculated as a percentage; 0% being perfectly stable and 100% the worst score. [9]

Knee extension was measured by the Manual Muscle Testing procedure. The patient was seated at the edge of the treatment table with hips and knees flexed to 90°, a pad was placed under the distal thigh to maintain the femur in the horizontal position. Her hands were resting on the table on either side of her body for stability and she was allowed to lean slightly backwards to relieve hamstring muscle tension. Therapist was standing at the side of the limb to be tested, with the hand giving resistance contoured over the anterior surface of the distal leg just above the ankle. The patient was instructed to extend her knee in the available range of motion but not beyond 0° while the therapist applied resistance given in a downward direction (in the direction of knee flexion) (Figure 2). The evaluation started with the extensor muscles of the right knee, followed by the extensor of the left knee to compare both the muscle groups. Before the evaluation, the patient received standardized verbal information on the test procedure and she was encouraged verbally during the test. [10]

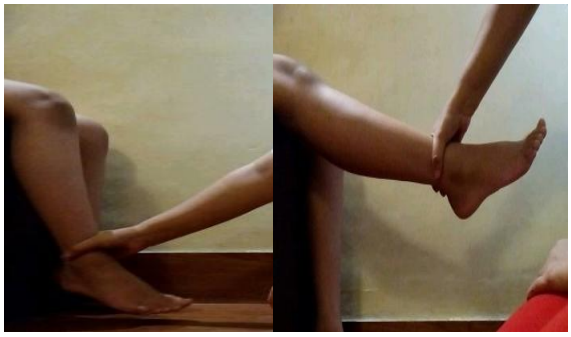

Figure 2 : Knee extension strength measured by Manual Muscle Testing procedure.

Data was collected at baseline, end of 15th session and six months following treatment, at the physiotherapy department by the same therapist.

INTERVENTIONS

The patient received Faradic stimulation from the Lifestim DT Unit (Lifeline Systems, Chennai). This unit was chosen because of its availability and capability of producing the desired prolonged tetanic contraction necessary for this technique. Rectangular wave stimuli were used to elicit a tetanic response. The rectangular wave form provided maximum activation of the motor units and brought about greater tension than voluntary effort alone. She received a 10-sec contraction at a frequency of 50 Hz with a 50-sec rest period and 15 repetitions per treatment. This was repeated five times per week for three weeks. The active electrode was placed over the femoral nerve trunk proximally and the other electrode was placed over the motor points of the quadriceps, the intensity was adjusted according to her tolerance. [11]

Strengthening exercises for the knee extensors was supervised by the therapists which included Multi Angle Isometrics, SLR, SLR with toe out and PRE of the quadriceps. Initial dosage of 8 reps and 1 set was gradually increased to 10 reps and 2 sets.

INTERVENTION	DOSAGE
ELECTROTHERAPY	
• Faradic Stimulation to Quadriceps	15 repetitions ,1:5 on-off cycle
EXERCISE THERAPY	
• Multi Angle Isometrics	10 sec hold,8-10 reps,1-2 set
• SLR in supine	6 sec hold,8-10 reps,1-2 sets
• SLR with toe out	6 sec hold,8-10 reps,1-2 set
• PRE of Quadriceps - concentric and eccentric	0.5-2kg weight, 8-10 reps.

RESULT

The apprehension and frequency of dislocation of the patella during sports activity had reduced by the15th session of physiotherapy. Muscle strength of the knee extensors had improved and the functional impairments experienced at baseline had reduced. Home exercises were continued

regularly which further improved the strength of the knee extensors and at 6 months of follow up the patient had reported no episodes of dislocation following the treatment sessions.

DISCUSSION

Embedded within the quadriceps muscle, the flat triangular shape patella is the largest sesamoid bone in the body. The posterior facet of the patella is divided by a vertical ridge into medial and lateral facets. Both the medial and lateral facets are approximately equally sized, slightly convex side to side and top to bottom. The posterior facet of the patella in the extended knee sits on the femoral sulcus of the anterior aspect of the distal femur. The lateral facet of the femoral sulcus is slightly more convex than the medial facet and has a more highly developed lip than the medial facet. In a fully extended knee the patella lies on the femoral sulcus. As the patella has not yet entered the intercondylar groove, joint congruency in the position is minimal and there is a great potential for patellar instability. [12]

The mobility and control of the patella in the frontal plane are dependent on the longitudinal and transverse stabilizers of the patella. The longitudinal stabilizers of the patella consist of the patella tendon and quadriceps tendon and the patellotibial ligaments. The transverse stabilizers are composed of the superficial portion of the extensor retinaculum, which connects the vastusmedialis and vastuslateralis muscles directly to the patella for improved muscular stabilization and the patellofemoral ligaments which provide passive stabilization. An additional passive stabilizer is the large lateral lip of the femoral sulcus which acts like a buttress to excessive lateral patellar shift. [12]

In Wiberg patella Type II the medial facet is smaller than the lateral facet and flat or only slightly convex. The lateral facet is concave. A Wiberg patella may produce increased lateral stresses due to a hypoplastic medial facet and a more developed lateral facet whereby it might be easier for the patella to become displaced laterally. This may also cause unbalance between dynamic medial and lateral stabilizers which acts as an additional factor for knee imbalance and patella dislocation. A rehabilitation program aiming to reduce this unbalance thus decreases the incidence of patella recurrent dislocation. [13]

Resistance exercise is an essential element of rehabilitation programs with persons with impaired function and an integral component of conditioning programs to promote or maintain health and physical well-being, enhance performance of motor skills and prevent or reduce the risk of injury and diseases. [14] Concentric and eccentric exercise have distinct value in rehabilitation and to incorporate these exercises in the rehabilitation programme of recurrent patella dislocation-Wiberg Type II, improves muscle performance and necessary functional demands. [15]

CONCLUSION

Recurrent dislocation of patella-Wiberg Type II can be controlled by an extensive physiotherapy programme of strengthening the knee musculature. by faradic stimulation and exercises.

ACKNOWLEDGEMENT

The authors thank Dr. M. M. Alam (Orthopaedician) for his valuable advice.

REFERENCES

1. Brattstrom H. Shape of the intercondylar groove normally and in recurrent dislocation of patella: A clinical and x-ray anatomical investigation. ActaOrthop Scan. 2014; 35(68):1-148.
2. Ellison, A. E. et al. 1985. Athletic Training and Sports Medicine. New York: American Academy of Orthopedic Surgeons. First edition; second printing.
3. Amis AA. Current concepts on anatomy and biomechanics of patellar stability. Sports Med Arthrosc Rev. 2007; 15(2):48-56.
4. Bollier M, Fulkerson JP. The role of trochlear dysplasia in patellofemoral instability. J Am AcadOrthop Surg. 2011; 19(1):8–16.

5. Petri M, Ettinger M, Stuebig T et al. Current Concepts for Patellar Dislocation .Arch Trauma Res. 2015; 4(3): e29301.
6. Lewallen LW, McIntosh AL, Dahm DL. Predictors of recurrent instability after acute patellofemoral dislocation in pediatric and adolescent patients. Am J Sports Med.2013; 41:575–581
7. Wiberg G. Roentgenographic and anatomic studies on the femoro-patellar joint. ActaOrthop Scand. 1941;12 :319-410.
8. Peccin MS, Ciconelli R, Cohen M. Specific questionnaire for knee symptoms: The "Lysholm Knee Scoring Scale". Translation and validation into Portuguese. ActaOrthop Bras.2006; 14:268–72.
9. Donell ST. Individual anatomical risk factors for patellar instability. Ann Joint 2016; 1:13.
10. Hislop HJ, Montgomery J. Daniels and Worthingham's Muscle Testing Techniques of Manual Examination. 8th ed. New Delhi: Elsevier Publications;2007.
11. Johnson DH, Thurston P. Ashaoft PJ. The Russian technique of faradism in the treatment of chondromalacia patellae. Physiother Can. 1977; 29:266-268.
12. Levangie PK, Norkin CC. Joint Structure and Function: A Comprehensive Analysis. 4th ed. New Delhi: Jaypee Publications; 2006.
13. Panni AS, Cerciello S, Maffulli N et al. Patellar shape can be a predisposing factor in patellar instability. Knee Surg Sports TraumatolArthrosc. 2011; 19(4):663-70.
14. Francis, KT: Status of the year 2000 health goals for physical activity and fitness. PhysTher 79:405, 1999
15. Kisner C, Colby LA. Therapeutic Exercise Foundations and Techniques. 5th edition. New Delhi: Jaypee Publications; 2007.

How to cite this article: Alam F, Choudhury SR. Physiotherapy in recurrent dislocation of patella-Wiberg type II. Int J Health Sci Res. 2018; 8(7):389-393.

******