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Case Report

Clinical outcome of lateral release and medial reefing in recurrent patellar dislocation: Case report

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Abstract

In the population of underage children and young adults, recurrent patella dislocation is widespread, with limited studies examining the effectiveness of medial soft tissue strengthening and lateral release procedures in averting recurrent dislocation. A 16-year-old male with Down syndrome presented with a chief complaint of pain and deformity at the left knee, with a history of recurrent falls while walking, and was unable to sit cross-legged. Patient evaluated with the Kujala score which is of 57. X-ray revealed lateral patellar dislocation on the patellar skyline view. The patient was operated on for right-sided Recurrent patellar instability with lateral retinacular release and medial soft tissue reefing and had a good clinical outcome 4 years back, and had no residual deformity or recurrence occur for the right lower limb. A surgical approach involving the same procedure of Lateral release and medial soft tissue strengthening was employed to address the condition, keeping the MPFL repair as the standby procedure.

An 8 cm vertical midline patellar incision was made, followed by transection of the patellar retinaculum and synovium along the lateral border of patella and Medial retinacular reefing aka soft medial tissue strengthening was then performed through advancement of vastus medialis obliquus muscle and medial retinacular complex over the patella. Post-operative management included compression dressing and cylinder splinting, followed by gradual weight bearing and knee exercises. A considerable improvement in Kujala score was observed, increasing from 57 pre-operatively to 91 at 6-month and 1-year follow-ups. The study demonstrates the effectiveness of lateral retinacular release and medial soft tissue strengthening procedures in preventing recurrent patellar instability in young adults and underage patients. The procedure yields the favorable outcome with No re-dislocation of the patella. This surgical approach is particularly beneficial in low-resource settings where access to advanced orthopedic care and specialized facilities may be limited, making it a viable treatment option for patients in various healthcare environments.

Keywords: Lateral retinacular release, Medial retinacular reefing, Recurrent patellar instability, Recurrent patellar dislocation.

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1. Introduction

Patello-Femoral Instability: A complex condition occurs commonly in adolescents, incorporating a range of clinical signs and symptoms. According to Dejour's classification system, these entities include objective patellar instability, potential patellar instability, and painful patellar syndrome. Patellofemoral pain syndrome is marked by anterior knee pain and perceived instability, yet patients typically don't have or significant structural anomalies in the knee joint.

1.1. Anatomical abnormalities and predisposing factors

Patellar dislocation is a common acute knee injury.[1,2] Multifactorial involvement is seen in pathophysiology of patellar dislocation, with patients often having anatomically prone factors for recurrent dislocation, Several key anatomical abnormalities among those contribute to patello-femoral instability, including trochlear dysplasia, patella Alta, excessive tibial tuberosity-trochlear groove distance, and vastus medialis obliquus dysplasia. These factors increase the risk of episodic patellar instability (EPI), marked by confirmed patellar dislocations.[3] Patients with Patellar post impingement exhibit symptoms similar to those with painful patellar syndrome, but also have signs and symptoms similar to it without a radiologically evident patellar dislocation.

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1.2. Treatment approaches

The first line of approach for patello-femoral instability is the conservative management including bracing, rest and pain management. When conservative management fails, surgical options are considered to address the osseous or soft tissue repair for the patello-femoral joint. These include realignment of the tibial tuberosity, tracheoplasty, and medial soft-tissue realignments and reconstructions. Medial soft-tissue procedures, such as medial capsule plications or reefing, have been proposed as treatment options.

1.3. Medial soft-tissue surgery

Insall's work on medial proximal realignment has shown positive outcomes. Minimally invasive methods have been suggested by some researchers, using as arthroscopic repair, to tighten the knee's medial capsule. Despite numerous surgical techniques existing for patello-femoral instability, the standard procedure for repair remains always remains debated, especially regarding medial soft-tissue procedures.

2. Case Report

A 16-year-old male with Down syndrome presented with a chief complaint of pain and deformity at the left knee, with a history of recurrent falls while walking, difficulty in cross leg sitting, Kujala score of found to be 57 for the patient suggesting patient is having knee condition with significant functional limitation. Radiographic evaluation revealed lateral patellar dislocation on a skyline view x-ray (**Figure 1)**

Figure 1: Pre-operative x-ray

The patient was operated on for right-sided recurrent patellar dislocation with lateral retinacular release and medial soft tissue strengthening and had a good clinical outcome 4 years back, and had no residual deformity or recurrence occur for the right lower limb. A surgical approach involving the same procedure of Lateral release and medial soft tissue strengthening was employed to address the condition, keeping the MPFL repair as the standby procedure to achieve sufficient tension in the medial soft tissue and vastus medialis obliques muscle.

2.1. Surgical technique and rehabilitation

As there is limited literature reported the clinical outcomes of surgical procedures available to treat the patellar instability the procedure of lateral retinacular release and medial soft tissue strengthening underwent expecting the good radiological and clinical outcomes with to residual deformity and with lowest complication rate for the patient.

2.2. Lateral retinacular release

An 8-cm vertical midline patellar incision (**Figure 2**) taken over the skin, thick flap is raised over the both medial and lateral side of patella exposing the full patella along with the extending retinaculum borders. Long tunnel is created along the lateral pole of patella approximately of 5 cm with the help of Metzenbaum scissors and intraoperative deformity becomes visible,(**Figure 3**) after meticulous dissection. Then layers of patellar retinaculum and the knee joint synovium is dissected along the lateral border of patella up to the level extending up to 5 cm above the upper border of patella and the surgical lateral release procedure is completed.(**Figure 4**)

Figure 2: Intraoperative deformity

Figure 3: Midline parapatellar incision

Figure 4: Medial retinacular complex is advanced over the quadriceps

2.3. Medial reefing procedure

On the medial aspect of the patella, medial retinaculum and vastus medialis obliques muscle is identified. Medial retinacular complex is incised and separated leaving the edge of retinaculum over medial border of patella. Vastus medialis obliques muscle dissected and separated for easier manipulation. Using No. 5 Ethibond sutures, Edge of medial retinacular complex is advanced over the vastus medialis obliques muscle Proper suture tension was achieved when the lateral patellar edge was aligned with the lateral trochlear border. By keeping in 30° flexion and neutral rotation, the end suture of the medial retinacular complex was taken.(**Figure 5**) Intraoperative flexion and extension of knee performed to check for dislocation of patella. After confirming the proper repair and strengthening required to avoid recurrent dislocation with this maneuver the routine closure of subcutaneous tissue and skin done.

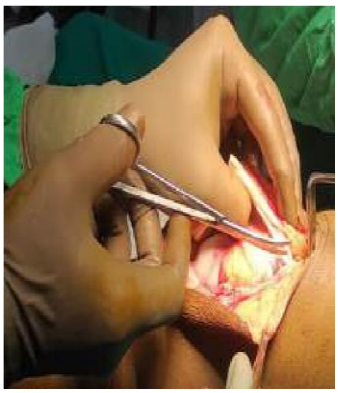

Figure 5: Lateral release

2.4. Postoperative rehabilitation

Patient underwent a standardized rehabilitation after the surgical procedure. Followed by compression dressing, by keeping the knee at 30°, the cylindrical splint is given for 2 weeks. Subsequently, partial weight-bearing crutch gait and tolerable range of motion exercises were permitted. Full weight-bearing is advised for the patient initiated 14 days postoperatively.

2.5. Outcome measurements and postoperative evaluation

Following surgical intervention, the effectiveness of the procedure was assessed through a comprehensive evaluation of patellar positioning and clinical outcomes. Postoperative skyline view X-ray (**Figure 6**) were utilized to confirm the restoration of the patella to its normal anatomical position, thereby ensuring optimal patellofemoral joint alignment. The clinical outcome was evaluated based on the change in Kujala scores, a widely accepted measure of patellofemoral function. Preoperative Kujala scores were recorded before surgical treatment, providing a baseline for comparison with postoperative scores.

Figure 6: Post-operative x-ray

2.6. Follow-up and functional assessment

Patients underwent follow-up evaluations at 6 months and 1 year postoperatively, during which time he demonstrated significant improvements in knee function. Notably, the patient exhibited a normal range of motion in the knee joint, with no evidence of stiffness or limited mobility. Functional assessment revealed that patient was able to perform various daily activities without limitations, including walking, running, sitting cross-legged, and squatting. (**Figure 7**) These findings suggest that the surgical procedure was effective in restoring patellofemoral function and improving overall knee function.

Figure 7: Post-operative follow-up images of range of motion at the knee joint at 1 year of follow up

3. Discussion

Our study showed that medium reefing and side release significantly ameliorate issues in cases with intermittent patellar disturbance. Excellent Kujala scores and radiologic advancements were observed at 6 months and 1 time postoperatively. This surgical approach is effective and particularly salutary for skeletally immature cases, offering a promising result for reducing patellar insecurity. This study's findings suggest that the combination of medium retinacular reefing and side retinacular release is an effective and resource-effective treatment approach for intermittent patellar disturbance, promoting optimal patellar shadowing, reducing pain and inflammation, and enhancing overall knee function, making it a realizable option for low-resource settings.

Following surgical repair of soft tissue around the patella to prevent recurrent dislocation in patients with known patellar instability, postoperative physiotherapy is crucial for optimal outcomes. Initially, pain and swelling management take priority, followed by strengthening thigh and leg muscles. As these muscles support soft tissue repair helping to build the strength and the knee and around the knee, normal range of motion and function can be restored. Physiotherapy involves a range of exercises to promote strength, flexibility, and mobility. This includes strengthening the hamstring muscles through controlled flexion and extension movements. Additionally, physiotherapists often target the vastus medialis oblique muscles to support knee health. Gentle patellar mobilization techniques are also used to promote smooth knee movement. Furthermore, passive stretching and range of motion exercises are incorporated to enhance flexibility and reduce stiffness, ultimately supporting overall joint function and mobility.[4]

3.1. Comparison with previous studies

Previous research by Nam et al. introduced a newer technique with lateral release technique via arthroscopic repair and a mini-open medial reefing for recurrent patellar dislocation. Although their surgical approach shared similarities with ours, there were distinct differences. Notably, this study is focusing on the percutaneous release of the lateral retinaculum, while Nam et al. have done this procedure via arthroscopy to release the lateral retinaculum, whereas our study employed a percutaneous lateral release. Furthermore, Nam et al. performed final sutures of the medial retinaculum in full knee extension, whereas we performed the final suture in 30° knee flexion. This decision was based on the understanding that medial soft tissue stabilizers, including the quadriceps muscle, medial retinaculum, and medial patellofemoral ligament (MPFL), primarily function as lateral patellar restraints from 0° to 30° knee flexion.[5]

3.2. Clinical outcomes and comparison with other surgical procedures

With the literature-reported outcomes of other surgical procedures, the result of our study is comparable for patellar dislocation. For instance, Nam et al. delineate a mean Kujala knee score of 88.2 ± 13.5 for the patient with patellar dislocation at a mean follow-up period of 4.4 years. Similarly, Cerciell et al. introduced all-inside arthroscopic techniques for medial reefing and reported a mean Kujala score of 88.4 ± 7.6 at the 6-year follow-up.[7] Liu et al. reported mid-term clinical outcomes of MPFL reconstruction, with a postoperative Kujala score improvement from 57 to 91 and no re-dislocation after surgery.[8]

3.3. Medial patellofemoral ligament (MPFL) reconstruction

MPFL reconstruction is currently considered the gold standard in the surgical management of recurrent patellar dislocation without severe bony abnormality. The As a soft tissue stabilizer, MPFL repair have a significant role from against patellar dislocation 0° to 30° knee flexion. While MPFL reconstruction has shown excellent mid-term and long-term clinical outcomes, it requires technical refinement due to potential complications, such as femoral tunnel malposition, graft anisometry, and patellar fracture.

3.4. Advantages of the medial reefing procedure

In contrast, the medial reefing procedure is a soft tissue surgery that does not require a patellar or femoral bone tunnel, thereby avoiding potential complications associated with bone tunnel creation. This approach has several advantages, including reduced risk of growth plate injury in paediatric or adolescent patients and no interference with other combined surgeries, such as ligament reconstruction or corrective osteotomy. Furthermore, soft tissue procedures eliminate the risk of patellar fracture associated with trans-osseous tunnel creation.

3.5. Role of vastus medialis obliquus (VMO)

The VMO plays a critical role in preventing patellar lateral translation, and its tension significantly affects patellar stability throughout the knee range of motion. Previous biomechanical studies have demonstrated that decreased VMO tension results in significant increases in lateral patellar tilt and translation. Therefore, medial reefing procedures, which aim to advance the VMO and proximal retinaculum, are essential in restoring patellofemoral joint stability.

4. Conclusion

Given the minimal medical resources and technical expertise required, our study demonstrates that medial retinacular reefing and lateral retinacular release can significantly improve radiologic outcomes, patellofemoral joint stability, and functional ability for patients with recurrent patellar dislocation, particularly in low-resource settings where access to advanced orthopedic care may be limited.

5. Source of Funding

None.

6. Conflict of Interest

None.

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