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Case Report

Peri-Implant Fracture After Fulkerson Osteotomy — A Case Report

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Abstract

Peri-implant fracture is a rare but severe complication in Fulkerson osteotomy, it usually affects the young and sportive population with concern in return to sport. We report the case of a 26-year-old male who underwent MPFL (Medial Patellofemoral Ligament) reconstruction combined with Fulkerson-type anteromedial tibial tubercle transfer to address chronic patellofemoral instability. Close to 6 months postoperatively he presented a peri-implant fracture just below the osteotomy during a running session. This case was managed surgically with dual plating with complete consolidation for 3 months and good reported outcomes

Keywords: *Patellofemoral, Fulkerson, Peri-Implant*

Introduction

Patellofemoral instability is a common orthopedic condition, especially among young and physically active individuals. It involves abnormal tracking or recurrent dislocation of the patella, often resulting in pain, dysfunction, and decreased quality of life (1,2). Several surgical options exist for patients with recurrent instability, among which the Fulkerson osteotomy is well established. This distal realignment procedure involves anteromedialization of the tibial tubercle to improve patellar tracking, unload the lateral patellofemoral joint, and reduce the risk of future dislocations (1,3). By modifying the biomechanics of the extensor mechanism, the Fulkerson procedure addresses both malalignment and instability in selected patients.

Case Presentation

A 26-year-old male patient underwent MPFL reconstruction combined with anteromedial tibial tubercle transfer using the Fulkerson technique for recurrent patellofemoral instability. The immediate postoperative course was uneventful.

At 5.5 months postoperatively, the patient presented to the emergency department with acute knee pain after running. Radiographs confirmed a peri-implant proximal tibial fracture. Fig. 1, 2

Surgical treatment involved open reduction and internal fixation (ORIF) with a dual plating system, performed via an anterolateral approach for an anterolateral long plate in a minimally invasive way and a mini-open medial incision for a buttress plate preventing varus collapse and adding extra stability. Fig. 3

Postoperatively, the patient was kept non-weightbearing, progressing to partial weightbearing at 6 weeks upon radiographic signs of consolidation. Full bone healing was confirmed at 3 months, and the patient returned to sports at 6 months postoperatively. Good, reported outcomes and satisfaction of the patient was encountered at the end of the following.

Figure 1

Figure 2

Figure 2

Discussion

Tibial tubercle osteotomy (TTO) is a widely accepted adjunctive procedure in the management of recurrent patellofemoral instability, especially when combined with MPFL reconstruction. Among the various techniques, the Fulkerson anteromedialization approach is particularly favored for its capacity to address both maltracking and increased patellofemoral contact pressure. However, despite its benefits, this procedure is not without complications.

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In a systematic review by Payne et al., the overall complication rate following TTO was found to be significant, with hardware irritation, nonunion, and fracture among the most commonly reported adverse events. (4) Although fractures are less frequent compared to other complications, their potential to disrupt rehabilitation and compromise outcomes in young, active patients makes them particularly concerned.

Fractures occurring after TTO, and specifically following the Fulkerson technique, have been reported in limited cases. Stetson et al. described proximal tibial fractures resulting from immediate postoperative weightbearing, emphasizing the importance of restricted loading during the early healing period.(5) Similarly, Gödde et al. reported tibial fractures occurring six months postoperatively in two patients, both of whom had returned to athletic activity.(6) These findings underscore the stress susceptibility of the osteotomized tibia during the remodeling phase, particularly when subjected to premature mechanical loading.

Fulkerson himself reported four cases of proximal tibial fracture following his osteotomy technique, attributing these to inadequate bone healing, high activity levels, and possibly technical factors such as the depth or direction of the osteotomy. (7)

The present case adds to this limited body of literature, highlighting a peri-implant fracture 5.5 months after surgery in a young male who had resumed running. The fracture likely resulted from accumulated mechanical stress before complete cortical remodeling had occurred. Surgical management using dual plating provided sufficient stability, allowing full recovery and return to sport.

This case reinforces the importance of tailored postoperative rehabilitation protocols, especially in athletic populations. It also suggests that radiographic signs of healing may not always equate to biomechanical readiness for high-impact activity. Delaying return to sports and educating patients on gradual loading are essential preventive strategies.

Conclusion

- Fractures around the implant site after a tibial tubercle osteotomy represent a rare but significant complication, particularly in active young patients.
- ORIF with dual plating is a valid treatment strategy, offering good functional outcomes.
- Clinicians should consider delaying return to high-impact sports and emphasize a structured rehabilitation plan to reduce the risk of such complications.

Conflicts of Interest

The authors declare no conflicts of interest.

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