

Non-Absorbable Sutures Technique for Distal Patellar Pole Fracture: A Case Report

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Abstract

Background: Patella fractures account for approximately 1% of all fractures and can be classified as simple or complex. Complex fractures often require surgical intervention due to bone fragment displacement. Rehabilitation focuses on restoring range of motion (ROM), strengthening muscles, and reducing knee stiffness, with recovery potentially taking several months. Treatment options for distal pole patella fractures include fragment resection, which may lead to complications such as patella baja and extensor mechanism weakness. Another method, the basket plate technique, has been associated with discomfort in about 30% of patients, often requiring implant removal surgery.

Case Report: We present a novel technique for stabilizing distal pole patella fractures using multifilament polyester non-absorbable coated braided sutures, offering an alternative to traditional fixation methods.

Conclusion: This technique provides stable fixation while avoiding the need for implant removal. Although further research is required to compare its efficacy with conventional approaches, initial results suggest it may be a promising option for managing distal pole patella fractures.

Keywords: Case Reports; Patella; Fractures

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Background

Acute fractures of the patella constitute between 0.8% and 1.5% of all bone fractures (1). The most common cause of the patella fracture is direct trauma (2). Patella fractures can cause extension complications. The purpose of treating patella fracture is to save the extension of the femoral quadriceps. If the displacement of the fracture is greater than 3 mm, or if a mismatch in particular surface greater than 2 mm or an abnormal extension function exists, surgery is the best treatment choice (3, 4).

A fracture of the inferior pole of the patella is a non-articular damage that makes up 5% of all patellar fractures and typically necessitates surgical intervention in case of displacement or complete disruption of the extensor mechanism. An extra-articular injury involving the inferior pole of the patella constitutes 5% of all patellar fractures and typically mandates surgical management if there is displacement or complete disruption of the extensor mechanism (5). Achieving anatomical reduction and maintaining it can be challenging due to the small and fragmented nature of displaced fracture fragments (6). Reestablishing the extensor mechanism while restoring articular congruency is crucial in surgically reconstructing the fracture fragment of the inferior patellar pole, which is contiguous with the patellar tendon. While partial patellectomy followed by repair of the patellar tendon has been a common approach for treating displaced comminuted inferior pole fractures, it may result in a shorter long axis of the patella that can affect the functionality of the patellofemoral joint. Fixation of displaced fragments has shown comparatively better outcomes (7, 8).

Surgical methods for inferior patellar pole fractures commonly involve using metallic fixation techniques like

tension band wiring (1, 9), separate vertical wiring (10, 11), cannulated lag screws (12), and basket plates (13, 14). However, such surgeries may lead to patients requiring reoperation for implant removal or experiencing soft-tissue irritation due to prominent hardware. In this study, we reported the use of multifilament polyester non-absorbable coated braided sutures technique in order to fix the fragments of distal patellar pole.

Case Report

A 22-year-old man presented to the orthopedic emergency on November 27, 2022, with left knee trauma due to a motor vehicle accident. He had been brought with the chief complaint of pain and inability to bear the weight on the affected leg. He mentioned no significant medical history or previous knee injuries.



Figure 1. Radiography before surgery

Swelling and bruising were seen in the first step of the knee examination. Tenderness over the patella and inability to do straight leg raise (SLR) were detected. Distal pulses, sensation, and motor functions were intact in the affected limb. After taking radiography, a comminuted fracture of the distal pole of his left patella was identified (Figures 1 and 2).

No associated fractures or dislocations were observed.



Figure 2. Computed tomography (CT) scan before surgery

Surgical Technique: Two multifilament polyester nonabsorbable coated braided sutures were used for Krackow type technique yielding four suture ends in the patellar tendon, and after reducing of major fragments, the reduction was maintained by passing the sutures through their attached soft tissue as the patellar tendon was sutured by using the Krackow technique. Then three parallel longitudinal tunnels were made using a 2.7 mm drill bit near the articular surface of the patellar proximal fragment. Then the sutures were passed through the tunnels by using a suture passer. Two central sutures were passed through the central tunnel and two lateral sutures were passed through the lateral tunnels (Figure 3).



Figure 3. Photography during surgery after using multifilament polyester non-absorbable coated braided sutures

After re-checking the overall reduction, tying was done firmly in 30 degrees of knee flexion over top of the patella. The fixation was then protected by a cerclage passed superior to the patella across the quadriceps tendon and through the proximal tibia. The same nonabsorbable braided suture was used for cerclage when the knee was flexed 90 degrees. The postoperative radiography is shown in figure 4.



Figure 4. Radiography after surgery

The knee range of motion (ROM) was examined finally. Postoperatively, weight bearing was allowed in knee extension, and a hinged knee brace was locked in extension. SLR and isometric quadriceps exercises were initiated early in a brace. Flexion up to 30 degrees gradually began and full ROM was achieved after six weeks.

Outcomes: The results of 11-month follow-up are given in table 1.

Table 1. The results of 11-month follow-up	
Insall-Salvati	1.07
ROM flexion	125 degrees
ROM extension	Full extension
Lysholm	84
BMI (kg/m ²)	24.69
Radiological union time (week)	11
Clinical union time (week)	6
Insall-salvati (uninjured knee): 1.00	
ROM: Range of motion; BMI: Body mass index	

Discussion

The current report presents a novel technique for managing distal pole fractures of the patella using non-absorbable sutures. Fractures involving the distal pole pose unique challenges due to the fragmented nature of the bone fragments. Traditional approaches, such as resection of fragments, may result in patella baja and decrease the sesamoid effect of the patella. Using basket plates may result in skin irritations and require plate removal.

Our study introduced a modified technique for fixing distal pole fractures using non-absorbable sutures. This method provides multiple benefits compared to traditional approaches. First, the non-absorbable nature of the sutures ensures long-term stability and eliminates the need for subsequent surgical procedures for implant removal. Additionally, the technique allows for early

mobilization and rehabilitation, facilitating faster recovery and return to normal activities.

Our results demonstrate promising outcomes with the utilization of this novel technique. The non-absorbable sutures provided secure fixation, resulting in favorable fracture healing and restoration of knee function. During the follow-up period, we found no suture-related complications or adverse reactions.

Further comparisons with established techniques, such as pole resection or bioabsorbable implants, are warranted to evaluate the efficacy and advantages of this new approach. Prospective studies with larger sample sizes and longer-term follow-up would provide more comprehensive evidence regarding the superiority or non-inferiority of this technique compared to existing methods.

It is essential to acknowledge the limitations of our study, including its low level of evidence. Therefore, future prospective studies are required to validate our findings and establish the broader applicability of this technique. Nevertheless, our initial results suggest that using non-absorbable sutures for distal pole fractures of the patella holds promise as an alternative surgical option.

Conclusion

Our report introduces a novel technique for fixing distal pole fractures of the patella using non-absorbable sutures. This approach offers advantages such as stable fixation, avoidance of implant removal procedures, and potential for improved patient outcomes. While further research is necessary to validate these findings and compare this technique with established methods, our preliminary results indicate its potential value in managing distal pole fractures of the patella.

Conflict of Interest

The authors declare no conflict of interest in this study.

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