

*Case Report*

## Open Surgery for Patellar Tendon Rupture and Tibial Tuberosity Avulsion Fracture in Pre-existing Osgood Schlatter Lesion: A Case Report

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### ABSTRACT

**Background:** In Osgood Schlatter Disease, despite being a self-limiting disease during adolescence, various complications of Osgood Schlatter Disease could also present in adulthood. An uncommon injury pattern requires surgical treatment. This study aims to understand the implementation of surgery in managing complications case of Osgood Schlatter Disease.

**Case Report:** We present a rare case of complete patellar tendon rupture and tibial tuberosity avulsion fracture following a low-energy motor vehicle accident landing on his left knee in a 42 years old active male, who later discovered is having a pre-existing Osgood Schlatter Disease. This patient is treated with an open surgery fixating the tibial tuberosity using a single lag screw and eight tension wires, followed by primary repair of the patellar tendon, including its retinaculum.

**Discussion:** Weakened structure from pre-existing Osgood Schlatter lesion may cause uncommon and profound injury pattern that requires surgical treatment. Conservative treatment no longer has a place in this case. The various surgical treatment methods have been reported; however, surgical modification technique is performed accordingly due to the complicated case presentation.

**Conclusion:** Surgical treatment is the most suitable treatment option in managing this uncommon injury pattern complication of Osgood Schlatter Disease.

Keywords: Patellar tendon rupture; Tibial tuberosity avulsion fracture; Osgood Schlatter Disease; Human and medicine

### INTRODUCTION

Osgood Schlatter Disease, also called Tibial Tubercle Traction Apophysitis, is an inflammation of the patellar tendon insertion at the tibial tuberosity. It is very common among active, athletic adolescents who endure repetitive and strenuous activities on the knee, such as running and jumping. The main complaints include pain and swelling, with tenderness on palpation around the infrapatellar

region, in the absence of traumatic history. Treatment-wise, Osgood Schlatter Disease is a self-limiting disease that resolves spontaneously with skeletal maturity as the secondary ossification center in tibial tuberosity closes. Thus, conservative treatment provides good outcomes, and the patient becomes asymptomatic with ease.<sup>1,2</sup> Unfortunately, Osgood Schlatter Disease remains into adulthood in a certain small group of patients,

resulting in some long-term sequelae and complications, such as persistent knee pain, thickened or prominent tibial tubercle, and patellar tendinitis, patellar tendon rupture, tibial tuberosity avulsion fracture, secondary osteoarthritis, etc. In a retrospective study by Gulddhammer, persistent knee pain and impaired physical activity are common among patients with previous Osgood Schlatter Disease history. Lang reported a rare and unusual case of atypical patellar tendon rupture in a 65 years old male with a history of surgical intervention for symptomatic Osgood Schlatter Disease. The usual primary tendon repair alone cannot be performed due to poor tissue quality. Thus, open surgery with modified Krakow technique and semitendinosus allograft augmentation is done to secure the tendon. It is hypothesized that previous history of Osgood Schlatter Disease with chronic tendinopathy has predisposed the patient for traumatic rupture.<sup>3-5</sup>

An uncommon injury pattern in the complication case of Osgood Schlatter Disease requires surgical treatment. Mun performed open ossicle excision, tibial tubercleplasty, and patellar tendon repair among six athletes who failed conservative treatment. On the other hand, Júnior performed open reduction and internal fixation using screws and anchors in two tibial tuberosity avulsion fracture cases. The results are excellent with early return to sports and no postoperative complications. Conservative treatment is no longer appropriate in managing this type of complication case. This study aims to understand the implementation of surgery in managing complication cases of Osgood Schlatter Disease.<sup>6,7</sup>

## CASE REPORT

A 42 years old male is admitted to the Emergency Department with sudden excruciating pain on his left knee after landing on his knee following a low-energy motor vehicle accident. He mentioned having difficulty extending his knee. He also noticed an unusual bump and slight swelling on the upper part of his knee. He admitted a previous history of mild intermittent pain in both knees, especially after his daily running exercise that he had been practicing since he was young. He has tender and thickened tibial tuberosity on his right knee.

The primary survey is remarkable with no major injury, and he is declared stable. On the local examination of the left knee, there is a high riding patella consistent with minimal swelling on the anterior part of the knee, without any obvious lesion or wound found on inspection and palpation. The point of tenderness is dominantly seen in the tibial tubercle area. Patellar pulsation and distal pulsation are not interrupted. The knee range of movement is limited by extreme pain, and he cannot perform active knee extension. Neurologic examination and knee joint stability is within normal limits.

Radiographic imaging of plain x-ray and CT scan is done to evaluate the knee deformity (Figure 1). It confirms a patella Alta with Insall Salvati Ratio  $> 1.3$ , tibial tuberosity avulsion fracture with the remaining avulsed fracture is found within the infrapatellar region.





**Figure 1.** Plain Xray of Left Knee (AP and Lateral View)

Upon surgical exploration, an irregularly torn retinaculum and complete patellar tendon rupture are discovered with so few tendon fibers left. A small avulsed fracture fragment from the tibia tuberosity is retracted into the anterior part of the knee joint capsule. Firstly, bone fracture fixation is done using a single lag screw and tightened with a figure of eight wires into the tibial tuberosity. Primary tendon repair is managed by non-absorbable combined stitches connecting all the tendon ends back into place. Fixation stability is checked and very well accomplished. Finally, the retinaculum is stitched up, followed by layer-by-layer wound closing. Postoperatively, the knee is put into extension with restricted knee flexion using a back slab for 4-6 weeks. There are no postoperative complications. Later on, gradual physical rehabilitation is reinforced using a locked knee bracing.

## DISCUSSION

Chronic ongoing inflammation and persistent, repetitive strenuous knee activity in Osgood Schlatter Disease develop into chronic tendinopathy of the patellar tendon and thickened tibial tuberosity. This type of Osgood

Schlatter lesion could remain into adulthood despite having no more apophysis. At this stage, the patellar tendon is highly weakened and brittle, characterized by increased irregular fibroblasts and disorganized collagen replacing the previous inflammatory cells. On X-ray, thickened tibial tuberosity seen as irregularity and fragmenting provides structural weakening of tibial tuberosity from repeated skeletal micro trauma in Osgood Schlatter Disease. Ultrasonography examination is suggested for reviewing this pathology.<sup>8,9</sup>

The unusual presentation of patellar tendon rupture alongside tibial tuberosity avulsion fracture in adulthood following a mild traumatic history is extremely uncommon in our patient. History of mild intermittent anterior knee pain after his daily running exercise, as well as the tender and thickened tibial tuberosity on his opposite healthy knee, raises suspicion to previous Osgood Schlatter Disease with remaining Osgood Schlatter lesion. A plain x-ray of the opposite knee joint is ordered and reveals a thickened but fragmenting tibial tuberosity (Figure 2), consistent with an Osgood Schlatter Disease lesion.



**Figure 2.** Plain X-ray of the Right Healthy Knee with Fragmenting Tibial Tuberosity (Lateral View)

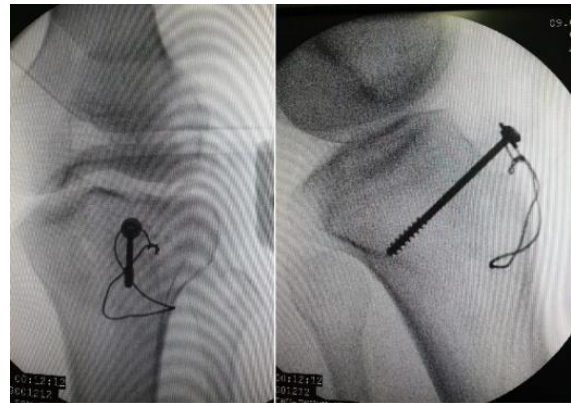


The recently discovered Osgood Schlatter Disease provides a better understanding of the pathology of this injury. When placed under great tensile strength, contracted quadriceps, alongside the pre-existing weakened structure with additional trauma low energy motor vehicle collision, it results in profound injuries complication case of Osgood Schlatter Disease. The patellar tendon is injured. Patella Alta measured using Index Salvatti Ratio  $>1.3$  indicates a complete rather than partial patellar tendon rupture. Intraoperative finding of complete patellar tendon rupture is seen with irregular tendon ends and few little tendon fibers left on the side. With patellar tendon rupture, the tibial tuberosity avulsion fracture is retracted further away, extending proximally through the joint.

Surgical treatment remains the preferred method for this type of complication case in Osgood Schlatter Disease. There is no precise guideline on how to manage this injury. Therefore, the combination of the procedure is performed according to the patient's injury and surgeon's skill. Moy reported a case of bilateral patellar tendon rupture in a 33 years old male with a previous history of Osgood Schlatter Disease. Immediate open patellar tendon repair is done using the Krakow method.

On the other hand, Soraya reported an open fixation using a screw is done for a tibial tuberosity avulsion fracture. The surgery went successfully with no postoperative complications. In our patient, open surgery is done with a single lag screw fixating the relatively small avulsed fracture back into its

place in tibial tuberosity. Stability is usually achieved very well using a single screw on the tibial tuberosity. However, in this patient, additional figure of eight wire is purposely placed on the tibia to secure the screw further considering the unstable tension on the ruptured patellar ends (Figure 3).<sup>10,11</sup>



**Figure 3.** Bone Fragment Fixation Using a Single Lag Screw and Figure of Eight Tension Wire (AP and Lateral View)

Patellar tendon repair is commonly performed using the Krakow technique, Krakow whip stitch, or less commonly suture anchor, bio screw, bone-patellar tendon-bone allograft. Additional augmented cerclage wire or tendon graft is sometimes used to secure the patellar tendon further. In our patient, the patellar tendon is repaired using a non-absorbable combined suture. The usual patellar tendon repair using the Krakow method was not suitable for this case regarding the multidirectional tendon rupture and poor soft tissue from irregular, highly fibrillated tendon end (Figure 4). The finished result is satisfactory and achieves stability. Lastly, the retinaculum is repaired accordingly.<sup>12</sup>

## CONCLUSION

Long-standing Osgood Schlatter Disease and ongoing patellar tendinopathy predispose patients for profound injury. Surgical treatment is the most suitable option for managing this uncommon injury pattern complication of Osgood Schlatter Disease.

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