

# Irreducible Lateral Patellar Dislocation: A Case Report and Literature Review

Balvinder Grewal, MBBS, Devlin Elliott, MBChB, Luca Daniele, MBBS, James Reidy, MBBS, FRACS

Department of Orthopaedics, Gold Coast Health Service, Gold Coast University Hospital, Gold Coast, Queensland, Australia

**Background:** Acute patellar dislocation is a common injury in young people, especially in adolescent females and athletes. Lateral dislocation is the most common form of patellar dislocation and often reduces spontaneously or with simple manipulation and closed reduction. We report a rare circumstance in which the patella was irreducible and required manipulation and closed reduction in the operating room.

**Case Report:** While dancing, a 32-year-old female was knocked by a fellow dancer on her left knee, and she fell to the nightclub floor. She was unable to stand or bear weight because of the pain, and her knee was in fixed flexion with lateral displacement of the patella. Multiple attempts at closed reduction under sedation failed in the emergency department. Computed tomography (CT) images revealed a medial border patellar fracture and lipohemarthrosis that required closed reduction and manipulation in the operating room. The patient was placed in a Richards splint for follow-up and referred to a physiotherapist for conservative management.

**Conclusion:** This case highlights the fact that some lateral patellar dislocations are irreducible on initial attempts, particularly if a fracture is present or another mechanism of impingement impedes relocation. CT imaging is a valuable diagnostic tool, and manipulation under anesthesia or open reduction in the operating room may be necessary. Our review of the literature further highlights the complexity and potential problems associated with treatment of locked lateral patellar dislocations.

**Keywords:** Dislocations, intra-articular fractures, patellar dislocation

Address correspondence to Devlin Elliott, MBChB, Department of Orthopaedics, Gold Coast Health Service, 1 Hospital Blvd., Southport Queensland 4215, Australia. Tel: (+61) 0449-770-717. Email: devlin.elliott@gmail.com

## INTRODUCTION

Acute patellar dislocation is relatively common in the young population and is a medical emergency. Lateral dislocations account for the vast majority of patellar dislocations and make up approximately 3% of all knee injuries.<sup>1</sup> People aged <20 years, particularly athletes, adolescent girls, and tall overweight males, appear to be predisposed.<sup>1</sup> The annual incidence of patellar dislocation is 5.8 per 100,000 in the general population, with an average incidence of 29 per 100,000 in the 10- to 17-year-old age group.<sup>2</sup>

Most patella dislocations spontaneously reduce or reduce with simple manipulation in the emergency department (ED). Irreducible dislocations are rare; most irreducible cases tend to have an element of patella rotation involved, particularly of the vertical axis.<sup>3</sup>

The mechanism of injury for a typical lateral dislocation is indirect trauma occurring when a patient plants the foot and applies an internal rotatory force or tibial valgus force to a flexed knee. Approximately 10% of acute patella disloca-

tions are the result of a direct blow to the medial side of the knee.<sup>1,4</sup>

We present the case of a patient who sustained an irreducible lateral patella dislocation that required prolonged manipulation under anesthesia to achieve a closed reduction.

## CASE REPORT

A 32-year-old female presented to the ED minor injury unit with the inability to stand or bear weight on her left leg after a fellow dancer knocked her left knee at an unknown angle and the patient fell to the nightclub dance floor. She had instant severe pain and felt the left kneecap move laterally. The paramedics had managed her injury with an inflatable splint. Her main complaint was of pain. She had no other neurologic symptoms, no history of dislocations, and no predisposing risk factors.

Examination revealed a laterally dislocated patella, with the knee held in slight flexion and tenting of the skin over the superolateral patellar surface (Figure 1). Peripheries were warm and well perfused with distal pulses intact. The patient had no obvious long bone deformity or bruising, and she



**Figure 1. The appearance of the left knee in the emergency department showing lateral patella dislocation and skin tenting.**

had normal light-touch sensation. She was refusing attempts at relocation because of the pain.

The patient was initially begun on nitrous oxide and oxygen, and an ED physician unsuccessfully attempted closed reduction. Intravenous (IV) access was established, and the patient was administered 2.5 mg IV morphine. After morphine administration, the ED physician attempted closed reduction for the second time, again unsuccessfully, followed by a third failed attempt by the orthopedic physician.

X-ray images revealed a left lateral patellar dislocation with no obvious associated fracture (Figure 2). The radiographer could not obtain skyline views because the patient was unable to sufficiently flex her knee. Postimaging, after the ED physician and another senior physician made 2 further attempts at closed reduction without success, the patient's leg was placed in a Richards splint, and the plan was to reattempt reduction in the morning.

Computed tomography (CT) scan of the left knee revealed a fracture of the medial patellar margin, associated lipohemarthrosis, and a small donor fragment of bone lying in the dependant portion of the lipohemarthrosis laterally (Figure 3).

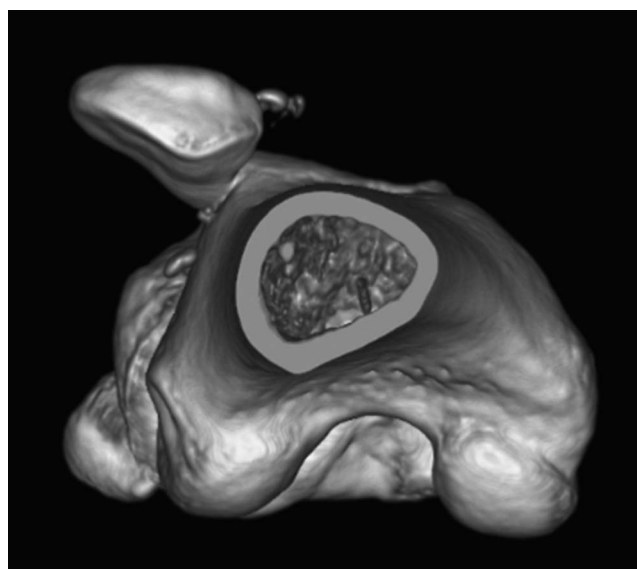
The patient was discussed in the morning trauma meeting, and the decision was made to take her to the operating room for closed or open relocation of the patella with or without stabilization with suture anchors of the medial patellofemoral ligament. An orthopedic surgeon



**Figure 2. Initial left knee x-ray after the failed reduction in the emergency department shows left lateral patella dislocation but no obvious fracture.**

performed manipulation under anesthesia and achieved a closed reduction after 20 minutes of firm manipulation (Figure 4). The patient had a large knee joint effusion postreduction, the patella tracked in correct alignment, and the knee was able to flex and extend in a full range of motion. Postoperative x-rays confirmed appropriate position and joint effusion but showed no other fractures or complications (Figure 5).

The surgeon reported that the reduction was particularly difficult and required significant force. He was only minutes



**Figure 3. Computed tomography image prior to manipulation in the operating room shows a fracture of the medial patellar border and a donor fragment in the lipohemarthrosis laterally.**



**Figure 4. Intraoperative manipulation was difficult, but effective closed reduction was achieved after 20 minutes.**

away from performing an open reduction when the patella was successfully reduced. The surgeon's opinion was that an incarcerated fat pad initially blocked reduction. His technique for reduction with an incarcerated fat pad included firm pressure to the lateral patella while lifting it anteriorly and medially to help alleviate the blockage. This case highlights how a bony fragment or incarcerated fat pad can cause irreducibility by locking the patella in a lateral position.

Postoperatively, the patient complained of moderate pain requiring analgesia. She was placed in a full-weight-bearing Richards splint for 2 weeks. When she was seen in the clinic at 2-week follow-up, the patient reported instability with stairs and some pain. She had a Beighton score of 9/9. On examination, both knees hyperextended >5 degrees with a grade I effusion of the left knee. She had no medial or lateral joint line tenderness, and her range of motion was 0-80 degrees. She was referred to a physiotherapist for vastus medialis exercises and conservative management in a hinged knee brace.

## DISCUSSION

We conducted a literature review for irreducible lateral patella dislocations and discovered that only limited case reports are available and no large case series, indicating how rare and atypical such a condition is and the importance of further research in this area.

We searched multiple medical databases including MEDLINE, Embase, Cochrane, TRIP, PubMed, and UpTo-



**Figure 5. Postreduction x-ray shows correct patellar position, joint effusion, but no further complications.**

Date for the period 1940-2014 using the keywords irreducible, lateral patellar dislocation, locking, and impaction. We found 15 case reports of irreducible lateral (extraarticular) patellar dislocations but no large-scale trials or systematic reviews (Table).

Adding this case to the cases identified in our literature search results in a total of 16 irreducible lateral dislocation cases. Of these 16 cases, 8 were due to lateral femoral condyle impaction,<sup>3-9</sup> 7 were due to long axis rotation,<sup>10-16</sup> and 1 was due to a combination of both.<sup>17</sup> Other irreducible dislocations we identified in the literature search included a superior dislocation<sup>18</sup> and an intra-articular dislocation.<sup>2</sup> In the 16 irreducible lateral dislocation cases, the sex of the patients was fairly even with 9 males and 7 females. The age range was 8-66 years. Eleven of 16 (69%) cases had a traumatic etiology, and 10 of 15 (67%) required an open reduction. Based on these findings, the typical patient with a locked lateral patellar dislocation is likely to be in his/her mid-20s, slightly more likely to be male, and most often has a traumatic mechanism requiring open reduction.

Lateral patellar dislocation is a common problem in the young athletic population and is an obvious clinical diagnosis. The knee is typically held in 20-30 degrees of flexion, and the patella is palpable laterally. Additional findings may include a swollen knee, hemarthrosis, and tenderness to palpation along the medial edge of the patella just proximal to the femoral epicondyle.<sup>1</sup> The dislocations usually reduce easily either spontaneously or via closed reduction by simultaneously extending the knee and directing the patella medially.<sup>19</sup>

In our case, multiple unsuccessful attempts were made at mechanical closed reduction of the patella. A CT scan

**Table. Cases of Locked Extraarticular Patellar Dislocation**

Author	Year	Age	Sex	Etiology	Mechanism	Treatment
Inman <sup>8</sup>	1941	43	M	Traumatic	Lateral femoral condyle impaction	-
Moed <sup>13</sup>	1982	18	M	Atraumatic	Long axis rotation	Closed reduction
Benjamin <sup>9</sup>	1984	38	F	Atraumatic	Lateral femoral condyle impaction	Open reduction
Corso <sup>17</sup>	1990	16	M	Traumatic	Lateral femoral condyle impaction and long axis rotation	Open reduction
Hackl <sup>6</sup>	1999	53	F	Traumatic	Lateral femoral condyle impaction	Open reduction
Gorczyka <sup>15</sup>	2000	13	M	Traumatic	Long axis rotation	Open reduction
ElMaraghy <sup>10</sup>	2002	30	F	Traumatic	Long axis rotation	Open reduction
Phaltankar <sup>3</sup>	2002	66	F	Atraumatic	Lateral femoral condyle impaction	Open reduction
Sherman <sup>16</sup>	2004	28	M	Traumatic	Long axis rotation	Closed reduction
Abdelhalim <sup>12</sup>	2007	8	M	Traumatic	Long axis rotation	Closed reduction
Huang <sup>14</sup>	2008	12	M	Traumatic	Long axis rotation	Closed reduction
Michels <sup>11</sup>	2008	16	F	Atraumatic	Long axis rotation	Open reduction
Louw <sup>7</sup>	2012	17	F	Atraumatic	Lateral femoral condyle impaction	Open reduction
Lowe <sup>4</sup>	2012	50	M	Traumatic	Lateral femoral condyle impaction	Open reduction
Yerimah <sup>5</sup>	2013	21	M	Traumatic	Lateral femoral condyle impaction	Open reduction
Grewal (this case)	2014	32	F	Traumatic	Lateral femoral condyle impaction	Closed reduction

was required to identify the bony abnormalities, and the surgeon's opinion was that an incarcerated fat pad initially created a mechanical block to reduction. The initial plan was for open reduction and fixation of the medial ligaments. However, manipulation under anesthesia was successful.

Several other articles have reported similar situations of a locked lateral patella, some requiring open reduction.<sup>3-6,9-11,17</sup> These dislocations can be associated with vertical axis rotation of the patella, avulsion fractures, and impaction on the lateral femoral condyle osteophytes. Such issues must be recognized because repeated mechanical attempts at closed reduction can further damage the joint by increasing the amount of bony impaction.<sup>19</sup>

In our case, CT images were a helpful diagnostic indicator that allowed the surgeon to visualize the bony fractures present and the associated lipohemarthrosis and to successfully manipulate the patella into the correct position while avoiding further damage or impaction to the joint.

## CONCLUSION

This case highlights how the combination of a patellar fracture and lipohemarthrosis, along with a proposed incarcerated fat pad, can cause irreducibility of a lateral patella dislocation. Other studies have demonstrated similar mechanisms, including lateral femoral condyle impaction and intercondylar locking, that result in locking of the patella. Lateral patellar dislocations are common, but clinicians should be wary of those that are irreducible because repeated attempts at closed reduction can lead to possible complications. CT imaging is a valuable tool to assess the level of impaction and indicate the necessity of an open reduction.

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