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Unusual total knee immobilization in an elderly patient due to inferior patella dislocation: Case report and review of the literature

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ABSTRACT

Inferior dislocation of the patella is a rare cause of a blocked knee and occurs typically in elderly patients. In most cases the mechanism is an osteophyte on the superior pole of the patella that becomes entrapped into the femoral trochlea, keeping the patella horizontally rotated and inferior localized. Advanced age and osteoarthritic changes of the knee are the main risk factors. Reduction should be performed under general anesthesia. We describe a case of an elderly lady with a type II inferior patella dislocation after direct blunt trauma. The therapy entailed reduction, knee arthroscopy, arthroscopic resection of osteophytes and smoothing of the articular surface. No recurrence occurred and range of motion was satisfactory at time of follow-up.

Introduction

Patellar dislocations most commonly occur laterally or medially. Inferior dislocation of the patella is uncommon, but may become more frequent with the demographic change towards an elderly society. The concomitant impaction of the patella into the femoral trochlea is very rare and may cause a total knee immobilization [1]. This pathology was first described by Midelfart in 1887 [2].

Banks and Eastwood described two different types of inferior patella dislocation. Type I occurs in young patients, especially men, that suffer from a direct impact on the superior pole of the patella while the knee is in flexed position. This leads to a rotation of the patella in the horizontal plane and the articular surface faces inferior. The quadriceps tendon is dislocated and tears off the superior pole of the patella. The patella becomes entrapped in the intercondylar notch [1,3,4].

Type II occurs typically in elderly, female patients. Osteophytes on the superior patellar pole create an impression type fracture in the femoral groove or femoral condyle - similar to a Hill-Sachs lesion in shoulder dislocations - thus making it impossible to extend the knee. A defect zone results in the area of entrapment at the femoral trochlea. There is usually no detachment of the quadriceps tendon from the superior pole of the patella [4].

Case report

A 95-year old woman presented with pain and a locked knee at an angle of 90° flexion after a left sided fall. On initial clinical examination the knee and the patella were immovable. There were no other signs of trauma such as skin abrasions or subcutaneous

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hemorrhage. The clinical status pointed towards a rupture of the quadriceps tendon. The initial X - Ray showed the inferior dislocation of the patella and the impaction of a superiorly located osteophyte of the patella into the femoral trochlea (Fig. 1, a & b). Closed reduction was attempted but proved impossible due to deep impaction into the femoral trochlea and the tension of the quadriceps muscle.

To rule out partial rupture or avulsion of the quadriceps tendon and additional defects an urgent magnetic resonance imaging (MRI) scan of the knee was initiated. The MRI scan confirmed the diagnosis and revealed no pathologies of the quadriceps tendon, but a severe osteoarthritic knee. The patient underwent knee arthroscopy after reducing the impacted patella under general anesthesia

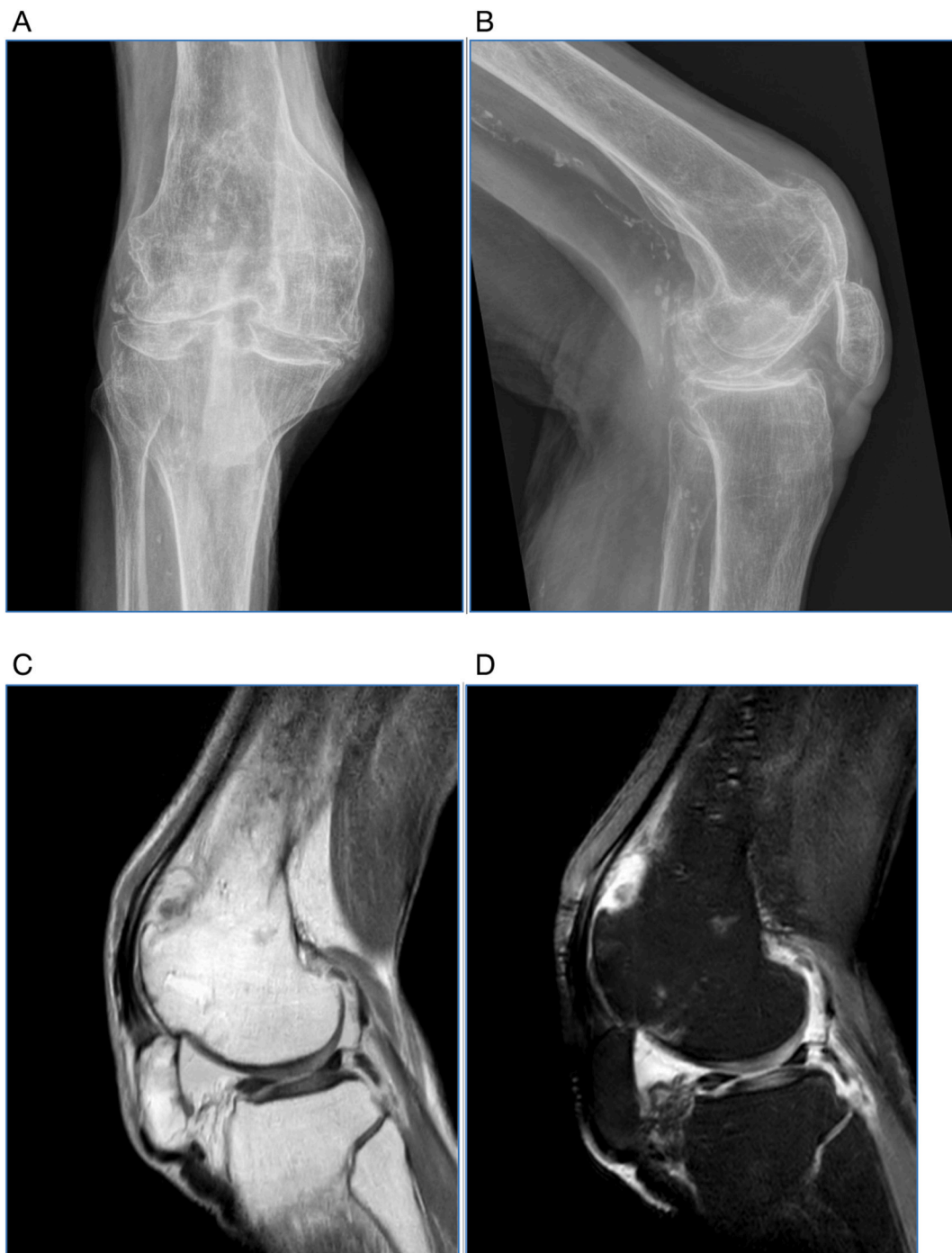


Fig. 1. Preoperative findings: Severely destroyed osteoarthritic knee with low bone density in the anterior-posterior (a.p.) view (a). Impacted superior pole of the patella on the lateral X-Ray view (b). Findings on the MRI (c, d) with intact quadriceps tendon.

(Fig. 2, a). In forced flexion above 90° the patella locked again in the femoral trochlear defect (Fig. 2, b–d). Arthroscopic findings revealed an arthritic destroyed joint with the large osteophyte at the superior edge of the patella as seen in X-ray and MRI. This osteophyte was removed using a burr in arthroscopic technique. At the area of impaction a substantial defect zone with an articular edge (similar to an engaging Hill-Sachs lesion) at the femoral trochlea extending to the lateral femoral condyle was seen (Fig. 3, a). The edge was shaved and smoothed as much as possible. Additionally, because of low bone density the area of the former edge was compressed with a blunt chisel to further improve the sliding of the patella (Fig. 3, b). Postoperatively, the knee was immobilized in an extended position for three weeks. For another five weeks flexion up to 60° was allowed in a protect brace system (G II Extreme Knee Brace, Diamond Athletic Medical Supplies©) with full weight bearing under physiotherapeutic instruction.

At the eight-week-clinical and radiological follow-up the patient was pain free and walking with the help of a rollator walking frame. Knee flexion was possible up to 90° and similar to the contralateral side (Fig. 4). The lateral X-Ray showed no defect at the femoral trochlea and a smoothed femoral articular surface (Fig. 5). No recurrence of the inferior patella dislocation had occurred.

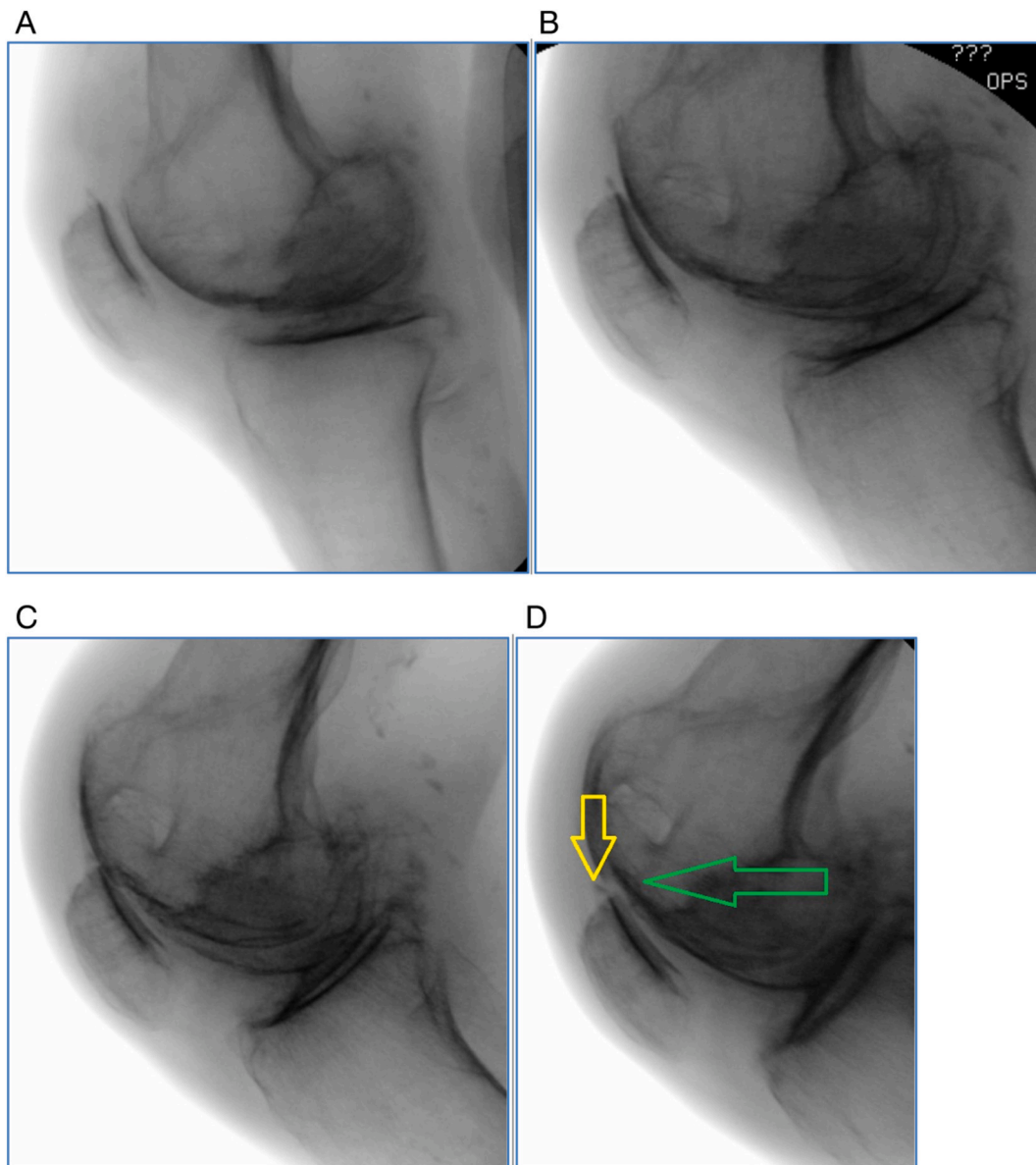


Fig. 2. Intraoperative lateral X-Ray: a.) After reduction b.) In 60° flexion c.) In 90° flexion d.) In 110° flexion. Large defect zone at the femoral trochlea (green arrow) and the fractured osteophyte from the superior pole of the patella (yellow arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

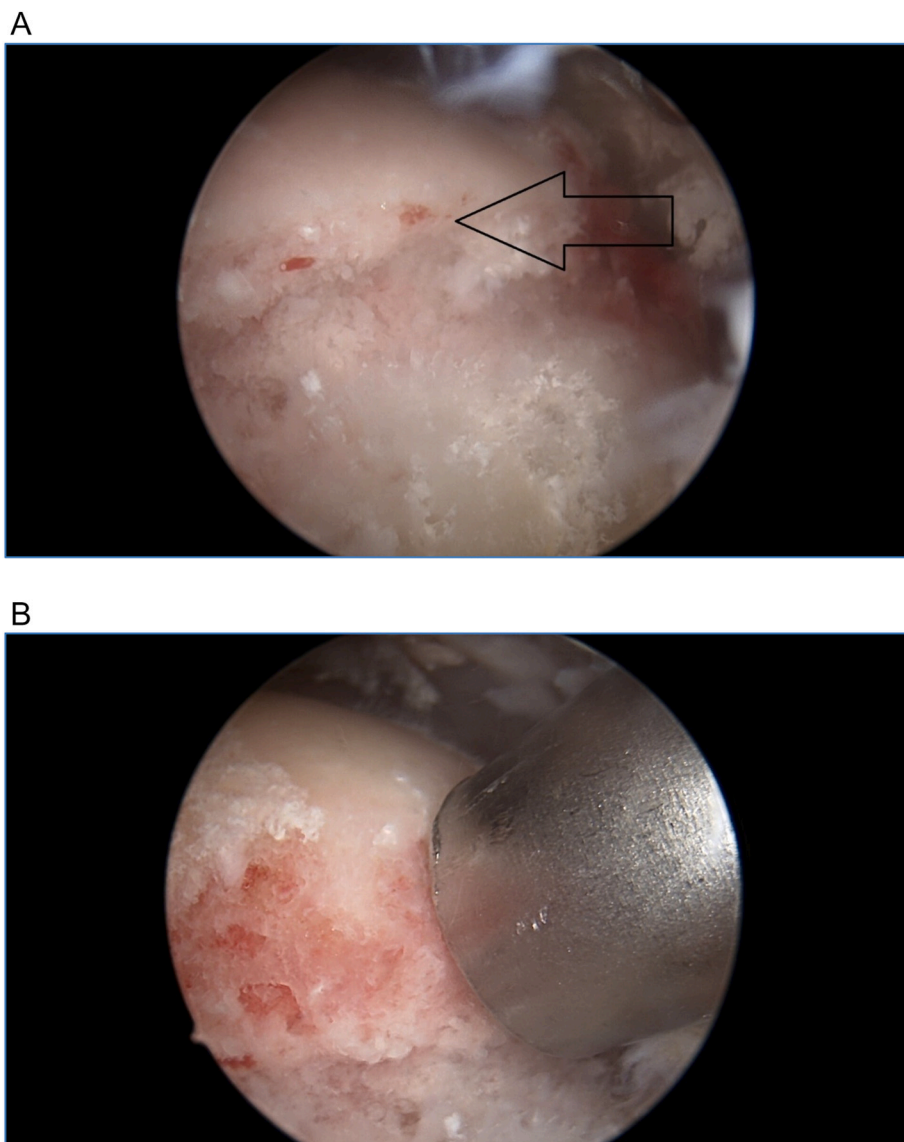


Fig. 3. a: Arthroscopic view: There is an articular edge (black arrow) at the superior border of the defect zone.
 b: Arthroscopic view: Compression of the osteoporotic bone with a blunt chisel after shaving of the articular edge of the femoral trochlea.

Discussion

The case presents a Type II inferior patella dislocation according to the Bankes and Eastwood classification [4]. The patella was impacted into the lateral condyle of the femoral trochlea. Due to the intact quadriceps tendon and the local osteophytes, reduction was not possible without anesthesia. This cause for a blocked knee is rare and should be considered as a differential diagnoses in the elderly.

Since Midelfart et al. first published a case in 1887, to our knowledge only 20 publications followed, all of them being case reports [1,3–15].

Type II inferior dislocations of the patella typically occur in elderly patients with low bone density after forced extension or blunt direct trauma [5,11,13]. Main risk factors are advanced age and severe osteoarthritic destruction of the knee with osteophytes that hamper the patella from gliding smoothly. Theodorides et al. described one case after previous wire fixation of the patellar ligament [6].

The diagnostic approach entails next to the clinical examination with a focus on the quadriceps tendon and the patellar ligament an anterior-posterior and lateral X-Ray. The location and rotation of the patella, bone density, the presence of osteophytes or concomitant fractures, respectively, must be assessed. If readily available, a MRI scan may be initiated to rule out rupture of the extension structures or additional knee injuries such as rupture of the cruciate ligaments, tears of the meniscus or osteochondral defects. However, a MRI scan should not delay the reduction.



Fig. 4. 8 weeks postoperative clinical examination: Knee flexion of 90° was similar on both sides.



Fig. 5. 8 weeks postoperative a.p. and lateral X-Ray: The shaved and compressed area is marked with a black arrow.

The therapy of an inferior patella dislocation is reduction under a nerve block or with a general anesthesia. To avoid rupture of the quadriceps tendon and the patellar ligament, respectively, or causing osteochondral damages, repeated attempts of closed reduction without adequate anesthesia should not be performed. According to the literature, in the majority of the cases closed reduction was not possible without anesthesia [6,8,9,11]. Closed reduction is usually feasible if the entrapment of the superior pole of the patella is caused by small osteophytes and without a large defect zone at the femoral notch [6]. The most important predictive factor whether closed reduction is possible is the depth and size of the osteo-chondral defect [1,6,16].

In case of proven or suspected additional injuries to the joint, or presence of osteophytes, knee arthroscopy at time of reduction is recommended. This will not only visualize any intraarticular damage but allows arthroscopic resection of the osteophytes, smoothing of the impression zone and direct repair of any intraarticular damage.

The treatment after reduction entails immobilization for a few weeks, followed by restricted movement in a protective brace and

physiotherapy. Especially in elderly patients, a long period of immobilization should be avoided.

Conclusion

In elderly patients with a blocked knee an inferior dislocation of the patella must be suspected. After initial work-up with X-Rays and optional with a MRI scan, immediate closed reduction under nerve block or general anesthesia is necessary. Osteophytes should be resected arthroscopically to avoid recurrence.

Declaration of competing interest

The authors have no relevant financial relationship or conflict of interests to disclose.

References

- [1] S. Yoshioka, Y. Arai, K. Ikoma, et al., Two cases of inferior dislocation of the patella with impaction into the femoral trochlea of osteophytes on the superior pole of the Patella, *Case Rep. Orthop.* 2013 (2013) 1–4, <https://doi.org/10.1155/2013/691739>.
- [2] V. Midelfart, *En sjelden luxation of patella*, *Nor. Mag. Laegevidenskaben.* 47 (1887) 588.
- [3] M.A. Syed, P. Ramesh, Recurrent inferior patellar dislocation in an osteo-arthritis knee, *Knee.* 11 (2) (2004) 141–142, [https://doi.org/10.1016/S0968-0160\(03\)00112-1](https://doi.org/10.1016/S0968-0160(03)00112-1).
- [4] M.J.K. Bankes, D.M. Eastwood, Inferior dislocation of the patella in the degenerate knee, *Injury.* 33 (6) (2002) 528–529, [https://doi.org/10.1016/S0020-1383\(02\)00046-3](https://doi.org/10.1016/S0020-1383(02)00046-3).
- [5] Y. Murakami, *Intra-articular dislocation of the patella. A case report*, *Clin Orthop Relat Res.* 171 (1982) 137–139.
- [6] A. Theodorides, S. Guo, R. Case, Intra-articular dislocation of the patella: a case report and review of the literature, *Inj Extra.* 41 (10) (2010) 103–105, <https://doi.org/10.1016/j.injury.2010.06.006>.
- [7] T.A. McCarthy, B. Quinn, J.M. Pegum, Inferior dislocation of the patella: an unusual cause of a locked knee [2], *Ir. J. Med. Sci.* 170 (3) (2001) 209–210, <https://doi.org/10.1007/BF03173896>.
- [8] T.A. Brady, D. Russell, Interarticular horizontal dislocation of the patella. A case report, *J. Bone Joint Surg. Am.* 47 (7) (1965) 1393–1396, <https://doi.org/10.2106/00004623-196547070-00014>.
- [9] J. Colville, An unusual case of intra-articular dislocation of the patella, *Injury.* 9 (4) (1977) 321–322, [https://doi.org/10.1016/S0020-1383\(77\)80054-5](https://doi.org/10.1016/S0020-1383(77)80054-5).
- [10] L. Wight, D. James, Intra-articular patellar dislocation: a technique for closed reduction: a case report and review of the literature, *JBJS Case Connect.* 7 (4) (2017), e94, <https://doi.org/10.2106/JBJS.CC.17.00112>.
- [11] N.A. Mir, A.A. Kawoosa, G.R. Mir, *Intercondylar locked dislocation of Patella with vertical axis rotation: a simple method of closed reduction*, *JK Pract.* 9 (4) (2002) 223–226.
- [12] D.J. Gidden, K.M. Bell, An unusual case of irreducible intra-articular patellar dislocation with vertical axis rotation, *Injury.* 26 (9) (1995) 643–644, [https://doi.org/10.1016/0020-1383\(95\)00124-R](https://doi.org/10.1016/0020-1383(95)00124-R).
- [13] R.K. Choudhary, J.W.S. Tice, Intra-articular dislocation of the patella with incomplete rotation - two case reports and a review of the literature, *Knee.* 11 (2) (2004) 125–127, [https://doi.org/10.1016/S0968-0160\(03\)00042-5](https://doi.org/10.1016/S0968-0160(03)00042-5).
- [14] R.G. Donelson, M. Tomaiuolo, Intra-articular dislocation of the patella. A case report, *J. Bone Joint Surg. Ser. A* 61 (4) (1979) 615–616, <https://doi.org/10.2106/00004623-197961040-00026>.
- [15] R.C. Feneley, Intra-articular dislocation of the patella. Report of a case, *J. Bone Joint Surg. Ser. B* 50 (3) (1968) 653–655, <https://doi.org/10.1302/0301-620X.50B3.653>.
- [16] L. Wight, D. James, Intra-articular patellar dislocation, *JBJS Case Connect.* 7 (4) (2017), e94, <https://doi.org/10.2106/jbjs.cc.17.00112>.