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A case report of an arthroscopic-assisted fixation of a small Hoffa fracture in a young patient

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ABSTRACT

INTRODUCTION: Hoffa fracture is a type of rare tangential supracondylar distal femoral fracture. The most common mechanism of this fracture injury is high energy trauma. In some cases, its poor visibility on X-rays makes its diagnosis difficult and needs more than routine X-rays. Treatment methods include conventional ORIF, or arthroscopy-assisted fixation as a more challenging method.

CASE REPORT: We present a case of a young female patient who sustained a low energy injury trauma to her left knee, which caused in a small minimally displaced lateral unicondylar Hoffa fracture.

DISCUSSION: Although it needs more experience and special tools, arthroscopy-assisted fixation of Hoffa fracture provides a good method of treatment, and it has many advantages over open method.

CONCLUSION: Our aim here is to confirm that Hoffa fracture may occur even with low energy knee trauma, and that arthroscopy-assisted fixation is a successful, applicable and alternative method to ORIF for small and thin osteochondral fragments, and could provide good stability and union even when using only one screw for fixation.

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1. Introduction

Hoffa fracture is a type of supracondylar distal femoral fracture. It's a rare injury characterized by a tangential fracture line in the coronal plane [1,2]. The incidence of Hoffa fractures accounts for 8.7–13.0% of distal femoral fractures [3]. It has different possible types including unilateral and bilateral condylar. Lateral condylar and bilateral condylar fractures are more common than medial condylar fractures [4]. Although the most common mechanism of Hoffa fracture injury is high energy trauma, but the specific mechanism of injury is still unknown. Lewis et al., suggested that axial load to the femoral condyle when the knee is flexed to >90° produces posterior tangential fractures [5]. There are some difficulties in diagnosis of unicondylar Hoffa fractures because of its poor visibility on standard X-rays especially in non-displaced fractures [6], so they may be missed. Therefore, computed tomography (CT) is often required for preoperative diagnosis and planning [4]. Non-operative treatment of these fractures has been associated with poor outcomes [7,8]. The arthroscopic reduction with percutaneous osteosynthesis of Hoffa fractures has the advantages of being a minimally invasive technique with minimal morbidity. It also offers a good control of the reduction and allows an appropriate treatment

at the same time [9]. This case report has been reported in line with the SCARE 2020 criteria [10].

2. Case report

A 14-year-old female patient presented to our orthopaedic department in Al-Assad University Hospital with a history of left knee injury 3 weeks ago. She was a schoolgirl with no familiar or personal histories. She was walking when she had twisting injury, fell down and hit the lateral aspect of her knee to a stair. The knee was swollen and painful but with no serious dysfunction or neurovascular compromise. AP X-ray of the knee revealed a minimally displaced Hoffa fracture of the lateral femoral condyle which was clearly identified on the oblique view (Fig. 1).

Computed tomography (CT) confirmed the diagnosis and revealed a small osteochondral fracture in the posteromedial aspect of the lateral femoral condyle (Fig. 2). Knee MRI revealed the injury with an intraarticular knee effusion and intact menisci and cruciate ligaments (Fig. 3). The patient was planned for an arthroscopic-assisted fixation of her fracture. In the operating room, she was positioned supine and a tourniquet was used to the upper thigh. Arthroscopy was performed through standard anteromedial and anterolateral portals. After the clots and fibrosis were removed by the shaver, we started diagnostic arthroscopy. Joint investigation showed a small Hoffa fracture which measures approximately 22 × 15 mm (The dimensions was estimated using hook tester which measures about 2 mm). Menisci and cruciate ligaments were intact (Fig. 4).

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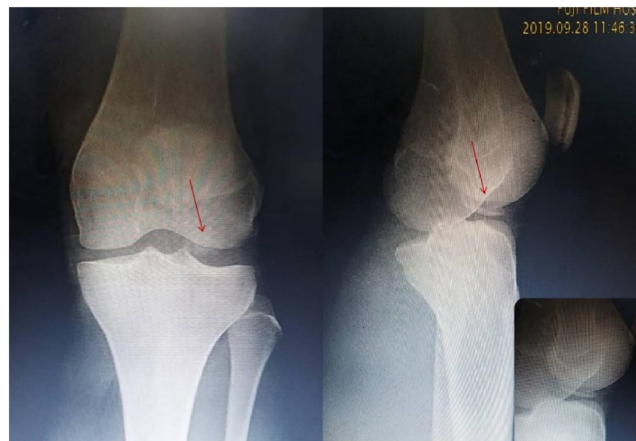


Fig. 1. Preoperative AP and oblique X-ray.

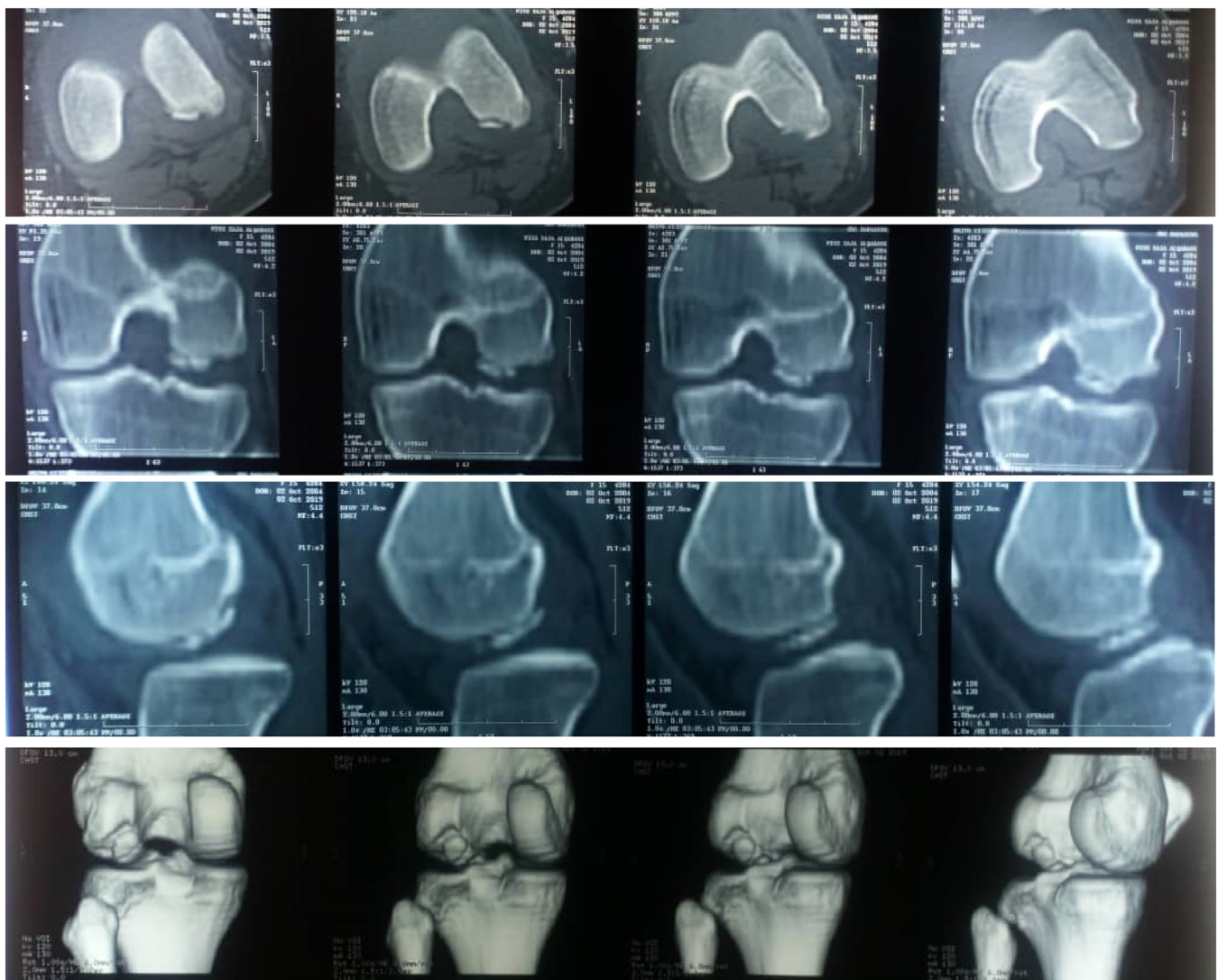


Fig. 2. Preoperative CT.

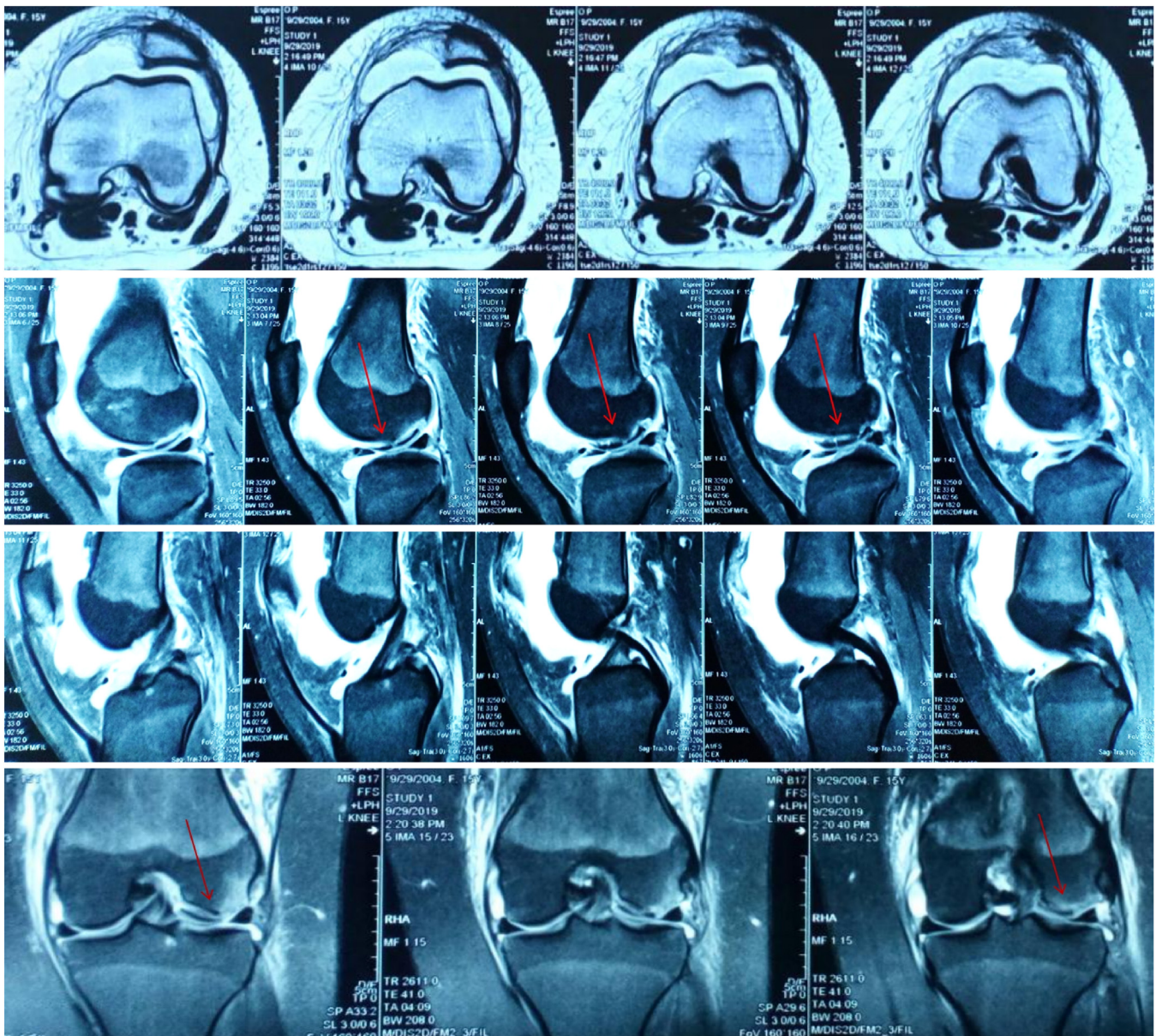


Fig. 3. Preoperative MRI.

The fragment was held and reduced using arthroscopy grasper and hook (Fig. 5), and then fixed in place by two k-wires. The k-wires were placed perpendicular to the fracture site in a retrograde direction. The position and length of the k-wires were confirmed by intraoperative fluoroscopy. One of the k-wires was used as a guide wire for the screw. Osteosynthesis was carried out by insertion a single 30 mm Herbert headless cannulated screw (Fig. 6). Because of the small size of the fragment, we couldn't use a second screw to provide more rotational stability. The second k-wire was then removed and we could achieve an anatomical and stable reduction of the fragment. A post-operative X-ray was taken to confirm the position of the screw (Fig. 7). The patient was put in an extension brace for 4 weeks and instructed to stay non-weight bearing for 6 weeks, after that she was allowed to start partial weight bearing with passive and active physiotherapy. Full weight bearing was allowed at 8 weeks. After 3 months from the surgery, the fracture was well united (Fig. 8) and we removed the screw arthroscopically.

Post removal X-rays are provided in (Fig. 9), and the patient returned to her normal daily life activities.

3. Discussion

Hoffa fractures are rare injuries usually occur as an isolated injury to the involved femur, and lateral fractures are more common than medial fractures by a ratio of 3:1 [11]. Diagnosis of this fracture is challenging and needs strong clinical suspicion because most of the time the standard X-rays may seem apparently normal. In cases of minimally displaced and isolated fracture without any associated fractures of the knee, diagnosis should be based on physical examination and careful radiological evaluation especially oblique views. A CT is also needed to describe the coronal fractures as they can be easily overlooked on conventional radiography [12]. Arthroscopy-assisted fracture fixation has many advantages over open method, such as better visualization, less soft tissue dissection, better evaluation of associated intraarticular injuries and

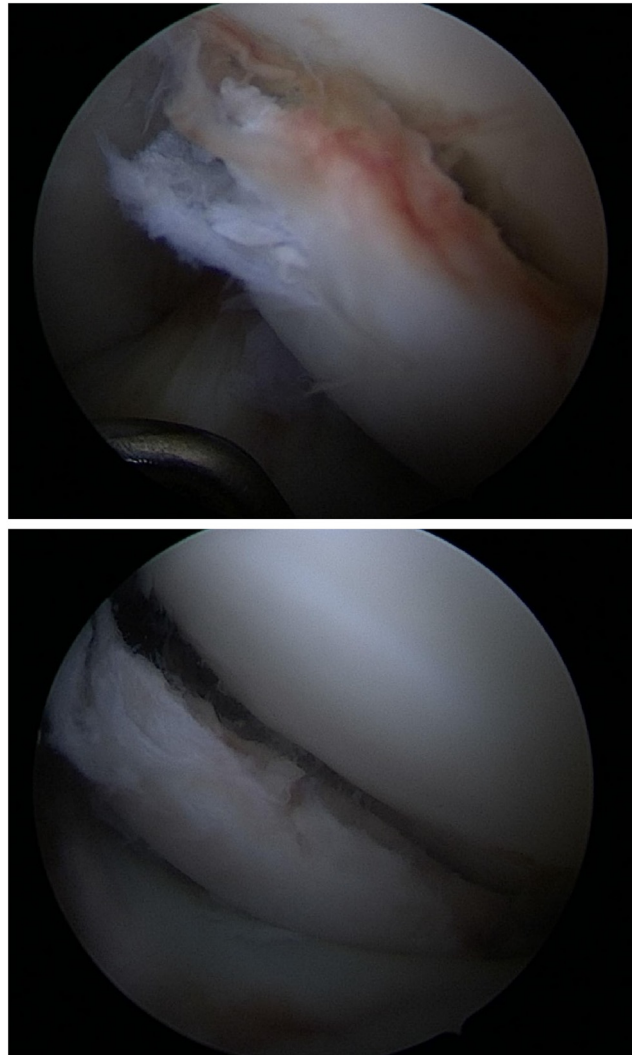


Fig. 4. Arthroscopic visualization of the fracture.

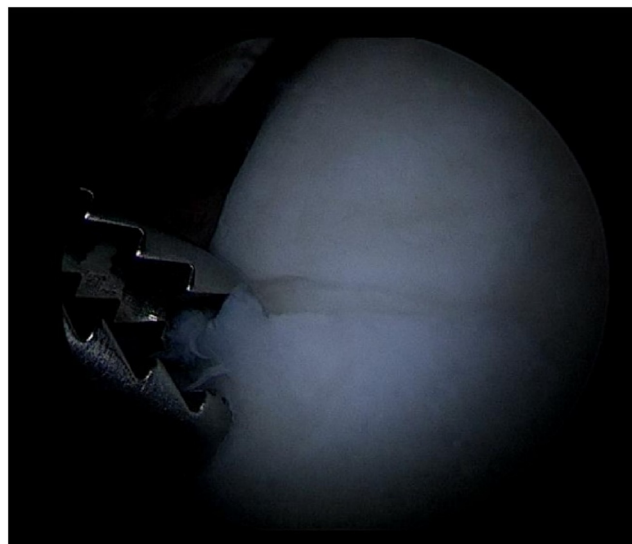


Fig. 5. Reduction of the fragment.

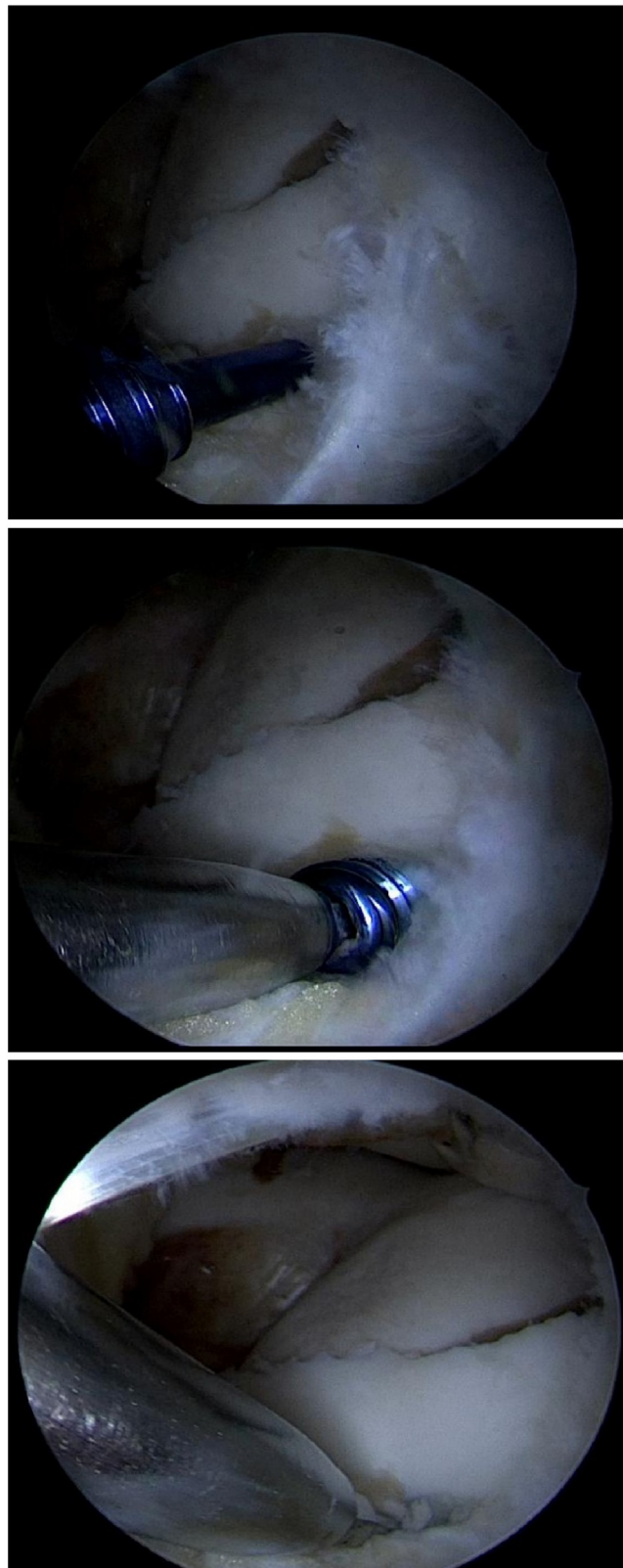


Fig. 6. Herbert screw insertion.



Fig. 7. Postoperative X-ray.

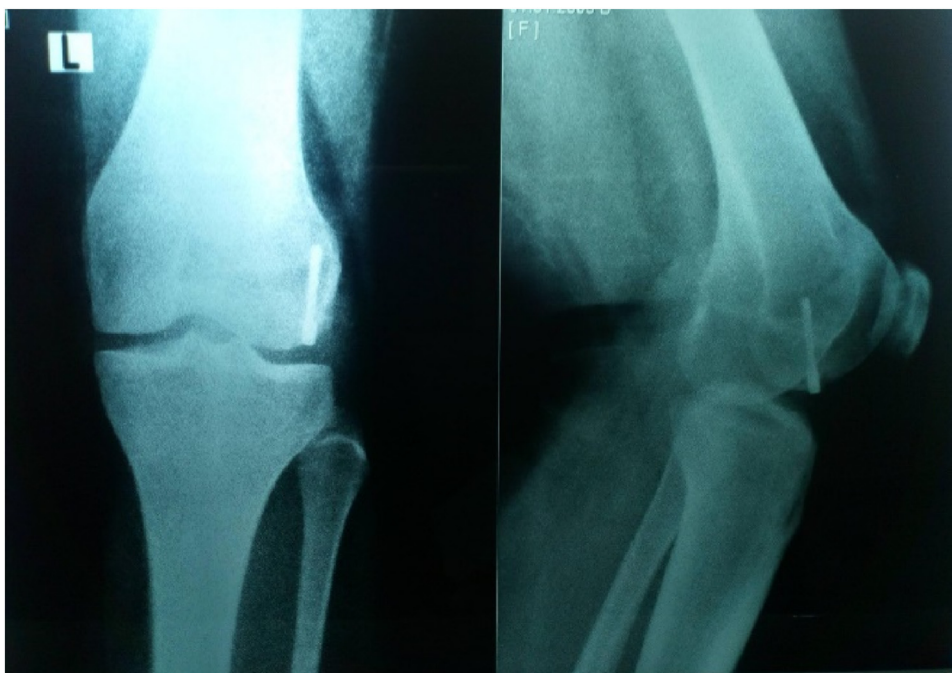


Fig. 8. After 3 months.

reduced morbidity. Limitations of this technique include the need for more experience, risk of fluid extravasation and the need for special equipment [1].

4. Conclusion

Hoffa fracture should be suspected in any knee injury even with low energy mechanism, and careful reading of AP, lateral and oblique series X-rays is the cornerstone in diagnosis of these fractures. In the medical practice, orthopedists tend to deal with small fragments of intra-articular fractures by using ORIF or percuta-

neous fixation with fluoroscopic assistance. In our case, we provide a practical evidence that arthroscopic-assisted fixation technique is a good alternative choice even in small osteochondral fragments and delayed presentation of the case (when fibrosis and callus are already present). Due to the small size of these tangential fractures, surgeon may not be able to use more than one screw for fixation which may put the stability – especially rotational stability – and union in doubt. Here we could confirm that using only one screw is applicable if the surgeon can achieve an anatomical reduction and good compression of the fragment, and the knee is immobilized postoperatively for enough period.



Fig. 9. After screw removal.

Declaration of Competing Interest

The authors have no conflicts of interest to disclose.

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Ethical approval

This study is exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Abdullah Noufal: conceptualization, investigation, data curation, writing and reviewing.

Muhammad Rafat Meda: conceptualization, investigation, data curation, writing, editing and reviewing.

Muhammed Faye Aboujaib: conceptualization, data curation, writing, reviewing.

Registration of research studies

Not Applicable.

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Muhammad Rafat Meda.

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