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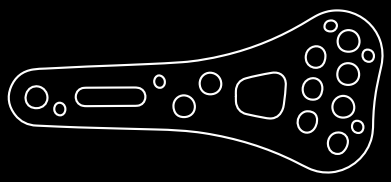
CASE REPORT



Arthroscopically Assisted Intraarticular Distal Radius Fracture Reduction with APTUS Wrist System 2.5 and ADAPTIVE Distal Radius Plate

The Surgeon

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Introduction

Wrist arthroscopy is a minimally invasive surgical technique increasingly used in the management of articular distal radius fractures (DRFs). This approach allows for direct visualization of the joint and commonly associated injuries, enabling accurate diagnosis and treatment of these types of fractures among the DRFs which particularly affect younger patients with higher functional demands on their daily lives. By providing enhanced precision and reducing the risk of complications, wrist arthroscopy facilitates the effective reduction and fixation of fractures, particularly in cases involving pure articular indipendent fragments, thereby improving overall outcomes and promoting faster recovery for patients.

The Case

Patient Profile
A 46-year-old male, who suffered a high-energy trauma while snowboarding. After receiving initial care at the ski station, the patient was referred to our unit for definitive surgical treatment of an intraarticular displaced distal radius fracture.

Clinical Findings / Preoperative Analysis

72 hours after the initial trauma, we assessed the patient, reviewed his clinical history and comorbidities, and based on the fracture pattern observed in the plain radiographs (Figure 1), we requested an immediate CT scan to properly assess the articular pattern of the fracture. This imaging revealed a central split affecting the lunate facet (Fig. 2 – 3).

Figure 1

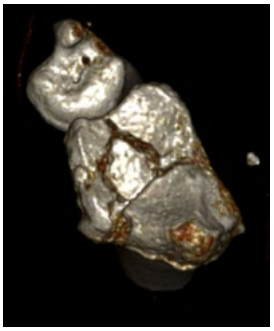

Figure 2

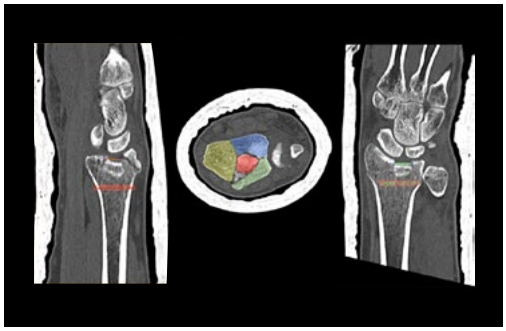

Figure 3

Surgical Treatment

Given the fracture pattern with a central articular split affecting the lunate facet, resembling a "die punch" fragment, we considered wrist arthroscopy essential, as only with wrist arthroscopic assistance is it possible to successfully achieve anatomical articular reduction. The die punch fragments function as independent pieces, with no ligament attachments, making reduction by ligamentotaxis unfeasible. This contrasts with other distal radius articular patterns, where ligamentotaxis might be effective.

Intraoperative Findings

Using a conventional volar approach, we tried to reduce the die punch fragment by going through the metaphyseal volar extension of the fracture under X-ray guidance. Then, we placed the ADAPTIVE distal radius plate in the correct position (Figure 4) with all the screws in the distal portion of the plate. During the X-ray examination, we observed a persistent gap with no continuity on the volar surface of the radius (Figures 5). Consequently, we immediately proceeded with wrist arthroscopy which revealed a misalignment of the articular fragment (Figure 6), which was depressed and with an articular gap exceeding 1 mm. To improve it, we removed the fourth distal locking screw that was securing the fragment. With the aid of arthroscopy, we anatomically reduced the fragment and then re-secured it using the same screw, adjusting its direction (Figures 7 and 8). As per protocol, we also examined for associated injuries using both the radiocarpal and midcarpal views, finding no additional lesions (Figure 9). The final X-ray assessment showed no signs of articular gap, with the volar surface of the radius restored to the desired length and the screws positioned correctly in both radiographs (Figures 10 and 11)

Before arthroscopic reduction

Figure 4

Figure 5

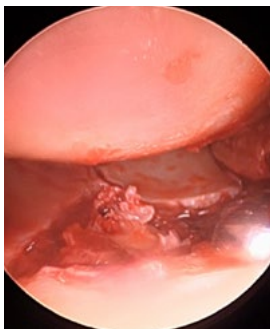

Figure 6

Figure 7

After arthroscopic reduction

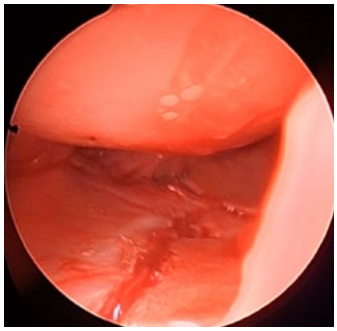

Figure 8

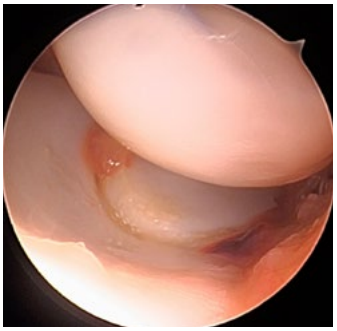

Figure 9

Figure 10

Figure 11

Postoperative Treatment

We applied a volar cast for 7 days and initiated PT from day one to address finger edema and swelling. We allow early passive and active range of motion once we remove the cast at day 7. We begin strength exercises around week 6 to 8, depending on patient's progress and mobility.

We schedule clinical appointments to review the patient at 3 weeks, 6 weeks, 12 weeks and 6 months. We recommend removing the hardware in all cases, once the fracture and soft tissues have healed.

Conclusion

Wrist arthroscopy is a minimally invasive surgical technique increasingly used in the management of articular distal radius fractures (DRFs). It allows for the evaluation of articular reduction and fixation of key fragments, the diagnosis and proper treatment of associated lesions, and the detection of intraarticular screw protrusion or misalignment of articular fragments. Pure articular fragments, such as the one in the case, require direct visualization to achieve anatomical reduction. In our case, wrist arthroscopy allowed us to correct the articular gap by removing the initial screw, performing the maneuver and then repositioning the screw in the right position. This was made possible by the TriLock locking mechanism in the APTUS distal radius system, which allowed us to easily remove or change the locking screws' direction without complications.

References

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2) Saab M, Guerre E, Chantelot C, et al. Contribution of arthroscopy to the management of intra-articular distal radius fractures: Knowledge update based on a systematic 10-year literature review. Orthop Traumatol Surg Res. 2019;105(8):1617-1625. doi:10.1016/j.otsr.2019.06.016

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