

Isolated Ulnar Shortening Osteotomy for a Distal Radius Malunion in a Young Female: A Cosmetic and Functional Success Story

Burhanuddin F Chhatrivala¹, Aibin B Michael¹, Suyog Wagh¹, V S Sri Hari Ram¹, Priyanka Meena²

Learning Point of the Article:

Isolated ulnar shortening osteotomy is a viable alternative to distal radius osteotomy in appropriately selected patients with radial shortening and intact DRUJ anatomy.

Abstract

Introduction: Distal radius malunions are common complications of conservatively treated wrist fractures, often presenting with pain, deformity, and functional limitations. While corrective distal radius osteotomies are standard, isolated ulnar shortening osteotomy (USO) may offer a simpler alternative in select cases, particularly where radial shortening and positive ulnar variance are the primary issues.

Case Report: We report the case of a 20-year-old female who presented 3 years after a conservatively treated distal radius fracture. Her complaints included wrist deformity, reduced grip strength, and intermittent pain. Imaging revealed a distal radius malunion with dorsal tilt and radial shortening, resulting in a positive ulnar variance of +4 mm, while the distal radioulnar joint (DRUJ) remained congruent. Surgical intervention involved an USO, during which a 1 cm wedge of bone was resected. At 1-year follow-up, she demonstrated excellent range of motion, full grip strength, no pain, and was highly satisfied with the cosmetic outcome.

Conclusion: In selected cases of distal radius malunion with radial shortening and preserved DRUJ congruity, isolated USO can be an effective surgical solution to address both cosmetic and functional concerns.

Keywords: Distal radius malunion, ulnar shortening osteotomy, cosmetic deformity correction, grip strength restoration, joint preservation surgery.

Introduction

Distal radius fractures are among the most commonly encountered upper limb injuries, particularly in young adults and the elderly. Inadequate reduction or improper immobilization may result in malunion, leading to mechanical and functional impairment. These malunions may present with loss of wrist motion, pain, weakness in grip, or unsightly deformity. Conventionally, corrective distal radius osteotomy is the preferred intervention in such cases, aiming to restore normal anatomical alignment.

However, recent literature has highlighted the importance of evaluating the distal radioulnar joint (DRUJ) in the context of distal radius malunions, as dysfunction of this articulation can significantly influence outcomes [1, 2]. When DRUJ congruity is maintained and the primary deformity is positive ulnar variance due to radial shortening, isolated ulnar shortening osteotomy (USO) has been reported as an effective and less invasive alternative [3].

We present a case where isolated USO was successfully used to treat a young woman with a distal radius malunion, addressing

Author's Photo Gallery



Dr. Burhanuddin F Chhatrivala



Dr. Aibin B Michael



Dr. Suyog Wagh



Dr. V S Sri Hari Ram



Dr. Priyanka Meena

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¹Department of Orthopaedics, Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India,
²Department of Orthopaedics, GMC Mumbai (JJ Hospital), Mumbai, Maharashtra, India.

Address of Correspondence:

Dr. Burhanuddin F Chhatrivala,
Department of Orthopaedics, Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India.
E-mail: burhan110128@hotmail.com

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Figure 1: Pre-operative X-ray showing distal radius malunion with dorsal angulation and radial shortening.

both cosmetic and functional limitations.

Case Report

A 20-year-old right-handed female presented with complaints of wrist deformity, intermittent dorsal wrist pain, and a subjective decrease in grip strength. She had sustained a wrist injury 3 years earlier due to a fall and was managed conservatively with a plaster cast at a local clinic.

On examination, the left wrist showed a visible dorsal prominence and slight radial deviation. Range of motion was terminally restricted in extension and supination, and grip strength was reduced compared to the contralateral side. There were no neurovascular deficits.

Radiographs revealed a malunited distal radius fracture with approximately 12° of dorsal tilt and shortening relative to the ulna. Positive ulnar variance measured approximately +4 mm. The DRUJ was congruent, with no signs of subluxation or arthritis. Given the preserved DRUJ and the patient's desire for a cosmetically appealing and functionally improved wrist, we decided to proceed with an isolated USO.

A transverse osteotomy was performed at the diaphyseal region following traditional literature [6] through a standard subperiosteal approach between the extensor and flexor carpi ulnaris, and a 1 cm wedge of the ulna was excised. The contralateral radius was used as a template, and thus, a wedge size of 1 cm was decided. Fixation was done using a six-hole

dynamic compression plate. The patient was immobilized for 4 weeks in a volar splint, followed by guided physiotherapy.

At 1-year follow-up, the patient had full, pain-free wrist range of motion, and grip strength equal to the contralateral side. She reported complete satisfaction with the esthetic and functional result (Fig. 1, 2, 3, 4). Radiographs confirmed union of the osteotomy site with corrected ulnar variance.

Discussion

Malunion of distal radius fractures can result in significant alteration of wrist biomechanics. The combination of dorsal tilt and radial shortening shifts load transmission to the ulna, causing ulnar-sided wrist pain and DRUJ dysfunction [1]. Restoring normal load distribution is essential to alleviate symptoms.

In cases with preserved DRUJ congruity and absence of major angular deformity in the radius, USO offers an elegant solution [2, 3]. It reduces ulnocarpal impaction and restores the mechanical balance across the wrist. Compared to distal radius osteotomy, USO is technically simpler, involves less soft-tissue dissection, and typically results in quicker recovery [4].

Our patient had a deformity in two planes – dorsal angulation and radial shortening – but the latter was more functionally significant. Correction of ulnar variance alone through USO led to symptom resolution, despite not addressing the dorsal tilt. This underlines the importance of individualized assessment based on symptoms and DRUJ congruity.

Studies by Delclaux et al. and Fujitani et al. have similarly highlighted the value of evaluating DRUJ involvement when managing distal radius malunions [1,2]. Furthermore, historical treatment approaches such as skeletal fixation in plaster, described by Cole and Obletz, demonstrated acceptable



Figure 2: Immediate post-operative X-ray showing 1 cm ulnar shortening osteotomy with plate fixation.

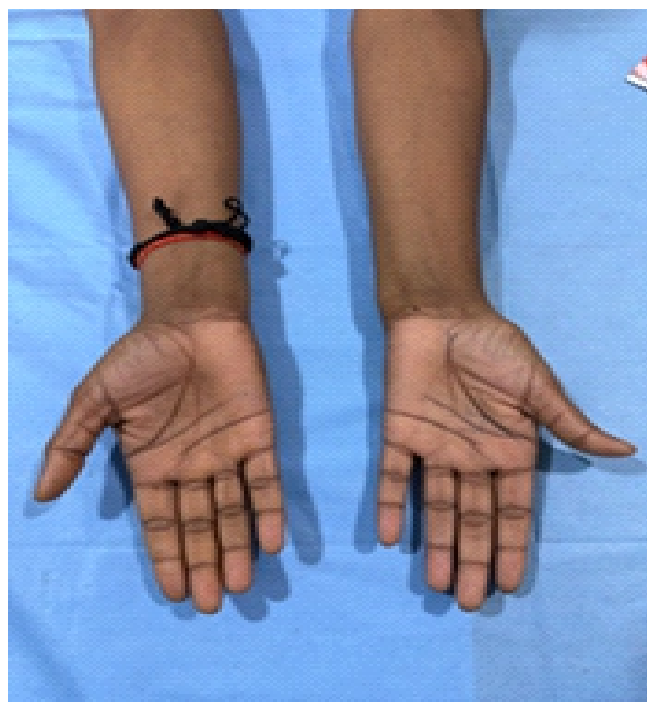


Figure 3: One-year follow-up clinical photo showing good cosmetic outcome and wrist contour.



Figure 4: One-year follow-up X-ray showing complete healing of the ulnar osteotomy and restored ulnar variance.

outcomes but did not address post-malunion deformities [5].

Studies by Stirling et al. [7] demonstrated that despite a complication rate of one in four cases, non-union being the most prevalent, the overall end results for excellent from a functional point of view.

Laane et al. [8] reported a systematic review of 12 cohorts with 185 participants with the major complication being implant irritation requiring implant removal but despite that patient had good functional outcomes. They noted that there was no difference in surgical approaches with respect to the functional outcomes of the ulna osteotomy. [9,10].

Conclusion

Isolated USO is a valuable tool in the management of distal radius malunion when the primary deformity is radial shortening with DRUJ congruity despite minor dorsal angulation. It offers pain relief, cosmetic satisfaction, and functional improvement with a relatively straightforward procedure.

Clinical Message

In patients with distal radius malunion and radial shortening, isolated USO can provide excellent outcomes in pain relief, function, and appearance – especially when DRUJ is preserved.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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