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Lengthening-Realignment Osteotomy and Sauvé-Kapandji Procedure in Distal Radius Malunion: A Case Report

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ABSTRACT

Introduction: *Treatment of distal radius fractures by traditional non-medical bonesetters ("jbira") exposes patients to malunion, which is complex to manage. We report a case of extra-articular distal radius malunion treated with a combined approach: lengthening-realignment osteotomy, autologous bone grafting, and the Sauvé-Kapandji procedure.*

Case report: *A 38-year-old man with no significant medical history presented late after a distal radius fracture that had been treated traditionally, without reduction. Examination revealed a "radial windswept" deformity of the wrist with prominence of the ulnar styloid. Radiographs showed an extra-articular distal radius malunion with inversion of the radio-ulnar index and volar tilt of the radial articular surface. The patient underwent a lengthening-realignment osteotomy of the radius with a bone graft harvested from the resected ulnar segment, combined with a Sauvé-Kapandji procedure. The postoperative course was uneventful. At 8 months of follow-up, wrist mobility remained reduced but was functionally and aesthetically satisfactory.*

Conclusion: *This case illustrates the avoidable complications of traditional non-medical treatment of distal radius fractures and shows that a combined correction can provide a satisfactory functional and aesthetic result despite a long-standing malunion.*

Keywords
Malunion, Distal radius, Osteotomy, Sauvé-Kapandji procedure.

Introduction
Traditional bonesetters ("jbira") remain widely consulted for the initial management of limb fractures. Several African studies report that most complications observed after this type of care are nonunions and malunions [1,2]. At the wrist, the lack of reduction and appropriate immobilization leads to sequelae combining radial shortening, altered inclination of the radial articular surface, and disruption of the distal radio-ulnar joint. We report a case of extra-articular distal radius malunion with inversion of the radio-ulnar index, treated surgically with a combination of corrective-lengthening osteotomy of the radius, local bone grafting, and the Sauvé-Kapandji procedure. This combination is not the solution most commonly reported in the literature for this type of sequela.

Case Report
The patient was a 38-year-old man with no significant medical or surgical history. He had sustained a trauma to the left wrist resulting in a distal radius fracture, initially managed by a traditional bonesetter ("jbira") without reduction, medical immobilization, or radiographic follow-up. He presented late after the injury with a persistent wrist deformity and functional impairment (pain and paresthesia in the median nerve territory, limited grip, and impact on daily activities). Examination of the wrist revealed a "radial windswept" deformity with prominence of the ulnar styloid. Range of motion was limited in flexion-extension and in pronation-

supination, and the neurological assessment was consistent with carpal tunnel syndrome.

Standard anteroposterior and lateral radiographs of the wrist showed an extra-articular distal radius malunion with the following features (Figures 1 and 2):

- Inversion of the radio-ulnar index, with positive ulnar variance;
- Volar (anterior) tilt of the radial articular surface, visible on the lateral view;
- No extension of the fracture line into the radiocarpal joint, confirming the extra-articular nature of the malunion.



Figure 1: Anteroposterior radiograph of the wrist and forearm showing the extra-articular distal radius malunion, with comparison to the healthy contralateral side.



Figure 2: Lateral radiograph of the wrist showing the volar tilt of the radial articular surface.

These findings are consistent with the abnormalities classically reported after unreduced distal radius malunion: radial shortening, positive ulnar variance, and incongruence of the distal radio-ulnar joint, which cause ulnocarpal impaction and limit pronation-supination [3-5].

In view of this clinical and radiological picture, surgical treatment was proposed, combining the following (Figures 3 and 4):

- A corrective osteotomy of the radius with lengthening, aiming to restore radial length and inclination;
- A bone graft interposed at the radial osteotomy site, harvested from the ulnar segment resected during the Sauvé-Kapandji step;
- A Sauvé-Kapandji procedure, which addresses the distal radio-ulnar incongruence and restores pronation-supination while preserving ulnocarpal support, unlike a Darrach-type resection [6,7];
- Fixation of the radius with a cantilever plate;
- Fixation of the distal radio-ulnar joint with a screw-pin;
- Median nerve neurolysis.

The immediate postoperative course was uneventful, with no reported infectious, neurovascular, or skin-healing complications. At the last follow-up, 8 months after surgery, wrist mobility remained reduced compared with the contralateral side but was judged functionally and aesthetically satisfactory. Radiographic follow-up confirmed healing of the osteotomy site and restoration of radial length and axis, with a distal radio-ulnar appearance consistent with the Sauvé-Kapandji procedure.



Figure 3: Operative diagram drawn by Professor DRISS BENCHEBBA illustrating the principle of the technique (lengthening-realignment radial osteotomy, grafting with the resected ulnar segment, Sauvé-Kapandji procedure).



Figure 4: Postoperative control radiograph at 8 months showing healing and restoration of radial length and axis after lengthening-realignment osteotomy and Sauvé-Kapandji procedure.

Discussion

Distal radius malunion after unreduced traditional treatment classically combines radial shortening, altered inclination of the radial articular surface, and positive ulnar variance, causing ulnocarpal impaction and limiting pronation-supination [3]. Several studies conducted in Africa and other low-income regions report that malunion and nonunion are among the most frequent complications of consulting traditional bonesetters for fracture management [1,2].

Surgical correction of these sequelae classically relies on a realignment osteotomy of the radius, combined if necessary with lengthening when the shortening is significant. The associated distal radio-ulnar impaction can be treated with several techniques: simple resection of the ulnar head (Darrach procedure), isolated ulnar shortening, or the Sauvé-Kapandji procedure. Compared with the Darrach resection, the latter has the advantage of preserving ulnocarpal support and the stability of the ulnar column while restoring pronation-supination, which makes it an attractive option, particularly in young, active patients [6,7]. Several series report a significant improvement in pain and pronation-supination mobility after the Sauvé-Kapandji procedure performed for post-traumatic distal radius malunion, with a generally low complication rate dominated by instability of the proximal ulnar stump [4,5].

Using the ulnar segment resected during the Sauvé-Kapandji step as a graft to fill the radial osteotomy site is a pragmatic and elegant option in this context, as it avoids a remote bone harvest (iliac crest) and thus limits donor-site morbidity.

Informed consent

Written informed consent was obtained from the patient for the publication of this case and the associated images (clinical, radiographic, and schematic).

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