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Letter to Editor

Natural Development of the Sauvé-Kapandji Procedure after Machete Injury

Masoud Yavari[1], Mehdi Koushkzari[2], Ali Tabrizi[3,*]

[1] Professor, Department of Hand and Microsurgery, Panzdahe Khordad Hospital, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran Iran
[2] Orthopedic Surgeon, Military Hospital, Urmia, Iran
[3] Associate Professor, Department of Orthopedics, Imam Khomeini Hospital Complex, Urmia University of Medical Sciences, Urmia, Iran

[*] Corresponding author: Ali Tabrizi; Department of Orthopedics, Imam Khomeini Hospital Complex, Urmia University of Medical Sciences, Urmia, Iran. Tel: +98-9148883851, Email: ali.tab.ms@gmail.com

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A 35-year-old man attended our hand clinic with a non-union of the distal ulnar. Based on his history, about six months ago, he was hit with a machete in the distal third of the forearm following a fight, resulting in a fracture in one-third of the distal ulnar and metaphyseal of the radius. The hit was from the dorsal-ulnar side. His damaged extensor tendons were repaired, and the ulnar fracture was managed using an external fixator and splint for six weeks. On the examination, he had no significant limitations of rotational movement in the forearm but expressed pain in one-third of the forearm. In conventional radiography, we found pseudoarthrosis in the distal third of the ulnar with synostosis of ulna radius of distal to the pseudoarthrosis (Figure 1). The distal radioulnar joint (DRUJ) was completely fixed. Due to the pseudoarthrosis at the ulnar fracture, there was no rotational restriction, and the result was similar to the Sauvé-Kapandji procedure.

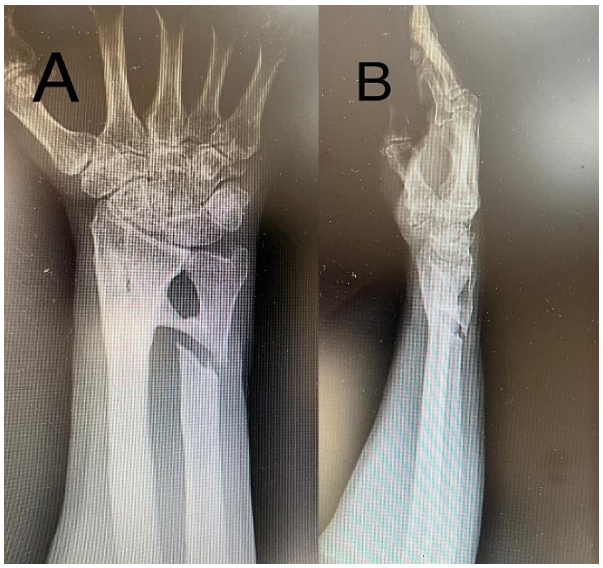

Figure 1. Anterior-posterior (AP) (A) and lateral (B) radiographs of the right wrist six months after direct injury indicated the development of the Sauvé-Kapandji procedure.

Post-traumatic radioulnar synostosis is a rare complication occurring after adult forearm or wrist fractures. Radioulnar synostosis can cause severe functional disability. Post-traumatic radioulnar synostosis in most patinets occurs when there is both bone fractures at the same level and especially in the proximal forearm. Due to the functional impairment, surgical resection with or without interposition material, either biologically or synthetically, is a gold standard of treatment to restore the rotational function of the forearm. Conservative management is preserved for patients with severe comorbidity, low demand, or enough rotational arc movement (1-3).

On the other hand, the wrist and DRUJ injuries cause the same functional disability, especially after the Colles fracture. Various surgical procedures have been developed to treat these cases, including Darrach's procedure and its modifications, pseudarthrosis of the distal ulna with or without fusion of the DRUJ, arthroplasty with hemiresection or interposition, and replacement arthroplasty (1, 4). Each invention of surgical procedure is based on a concept.

Louis Sauvé and Mehmed Kapandji were general surgeons who firstly published the DRUJ arthrodesis technique combined with the excision of a segment of the distal ulna to create pseudarthrosis in 1936 (4). However, historically, Berry was the first to use the DRUJ arthrodesis with pseudoarthrosis in the distal part of the ulna in 1931. This treatment was used for a 20-year-old carpenter with a Colles fracture and an ulnar styloid fracture who suffered from non-union of the ulnar styloid, induced pain, and functional disability. Berry created DRUJ arthrodesis using a dorsal approach and bone peg insertion. Finally, he removed 2.5 cm from the distal ulnar to obtain forearm rotational movements. Berry suggested this method to treat cases with malunited distal radius fractures or in patients with Madelung deformity (4, 5). Moreover, Steindler reported two cases with malunited Colles fracture and DRUJ instability in 1932 and 1941 treated in a similar method, including DRUJ arthrodesis and proximal ulnar pseudarthrosis (5).

In our patient, ulnar fracture with interosseous membrane damage and hematoma caused post-traumatic radioulnar synostosis. At the same time, with the non-union of the distal third of the ulna, the forearm rotation movement was not restricted. Post-traumatic radioulnar synostosis is a rare complication occurring after forearm fractures. Open reduction and internal fixation (ORIF) of forearm bones should be performed through separate approaches to prevent a mixture of fracture hematomas and the development of synostosis (5). In the current

patient, the mixed hematoma of the ulnar and radial fractures through the damaged interosseous membrane created synostosis between the radius and ulna; therefore, a pseudarthrosis was developed at the ulna fracture site to preserve the forearm rotation. The final result is similar to a Sauvé-Kapandji procedure. The Sauvé-Kapandji procedure is a popular treatment method among the salvageable interventions for the wrist with DRUJ injuries, especially for young and active patients (6). Perhaps a similar patient had played a role in creating the concept of using the Sauvé-Kapandji procedure. However, based on historical data, there have been some controversies regarding the origin of the Sauvé-Kapandji procedure, with similar techniques described by Berry in 1930 and Steindler in 1932. Nevertheless, the natural development of the Sauvé-Kapandji procedure technique without surgical intervention is thought-provoking.

The report was confirmed by the Ethics Committee of Urmia University of Medical Sciences, Urmia, Iran. Written informed consent was obtained from the patient for publication of this case report.

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Conflict of Interest

The authors declare no conflict of interest in this study.

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The authors have confirmed that they obtained written informed consent from the patient.

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