



Case report

The outcome of Sauve Kapandji procedure on patient with DRUJ arthritis: A case report

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ABSTRACT

Background: The distal radioulnar joint (DRUJ) is frequently involved in inflammatory diseases, both degenerative and notably traumatic, resulting in pain, wrist motion and strength loss, and severe functional impairment. DRUJ dysfunction can be highly incapacitating. The Sauve-Kapandji (SK) procedure can be indicated to address multiple etiologies of DRUJ dysfunction.

Case presentation: A 54-year-old woman presented with pain and difficulty moving the left wrist. X-ray imaging revealed the union of the distal radius with the plate still in there with subluxation of the distal radioulnar joint after surgery in 2005. Afterwards, she underwent the Sauve-Kapandji procedure. Follow-ups were done at periodic intervals, and wrist physiotherapy was instituted. We evaluated the range of motion and the VAS score as well. The patient had acceptable motion after four weeks of evaluation.

Discussion: The SK method has been advocated as a treatment for DRUJ derangement because, unlike the Darrach surgery, it preserves the ulnar head at the wrist. As with the Darrach operation, postoperative instability of the proximal ulnar stump or radioulnar convergence may occur despite the favourable clinical prognosis.

Conclusion: The Sauve-Kapandji procedure could treat wrist pain and deformity in DRUJ arthritis. It gives a good result in two weeks, four weeks, twelve weeks, and twenty after the procedure. The peak time of recovery is four weeks after the procedure.

1. Introduction

The distal radioulnar joint (DRUJ) is frequently involved in inflammatory diseases, both degenerative and notably traumatic, resulting in pain, wrist motion and strength loss, and severe functional impairment [1,2]. DRUJ dysfunction can be highly incapacitating. Multiple causes of DRUJ dysfunction, such as rheumatoid arthritis, osteoarthritis, post-traumatic arthritis, and congenital abnormalities, can be treated with the Sauve-Kapandji (SK) procedure [1]. There are numerous surgical treatment options, none of which have been demonstrated to be superior in the medical literature [1,3].

The SK method is a combination of three surgical concepts. The initial concept is distal ulna resection (the Darrach procedure). The second step involves creating a pseudarthrosis by removing a portion of the distal ulnar shaft. With the development of the distal ulnar pseudarthrosis, arthrodesis of the DRUJ keeps the ulnar head in a proper posture, provides support for the ulnar carpus, and permits pronation

and supination at the pseudarthrosis [4–6]. However, the SK treatment is more technically challenging and entails more proximal ulnar resection, with a greater risk of ulnar stump instability [5,6].

Maligne originally described ulnar head resection in 1855, and Darrach popularized it in 1912, earning him the namesake moniker. However, the long-term problems are loss of grip strength and instability of the proximal ulna. The Darrach procedure consists of distal ulnar excision and osteotomy at the proximal border of the sigmoid notch [7–9].

As the distal radioulnar ligaments and ulnocarpal ligaments are retained, the combination of arthrodesis of the DRUJ with ulnar resection-osteotomy proximal to the arthrodesis provides the benefit over ulnar head resection of keeping ulnar support of the wrist. It also permits ulnar head shortening, which is not usually possible with resection arthroplasties that preserve distal radioulnar ligaments, such as the Bowers, Feldon, and Watson operations. A further advantage of the S–K approach is a shorter period of immobilization after surgery

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[8].

Twelve months following surgery, SK considerably improves the functional outcomes of patients with DRUJ pathology, according to Giberson-Chen et al. Three months following surgery, the Quick-DASH scores improved beyond the preoperative baseline, with clinically and statistically significant improvements at 12 months [10]. However, there were no significant differences between Darrach and Sauvé-Kapandji patients regarding PROMIS UE Physical Function scores, discomfort, or patient satisfaction [10]. In this case report, we describe a case of DRUJ arthritis inpatient with pain and limited range of movement that we corrected using the SK procedure.

2. Case presentation

A 54-year-old lady presented to us with complaints of pain and difficulty in moving the left wrist. The complaint was not improved by analgesic. Clinical examination revealed dorsal protrusion of ulna. Range of motion in forearm pronation, wrist dorsoflexion, wrist plantarflexion, metacarpophalangeal (MCP) flexion-extension, proximal interphalangeal (PIP) flexion-extension, and distal interphalangeal (DIP) flexion-extension (as shown in Table 1). X-ray imaging showed a union of the distal radius with the plate still in there with subluxation and arthritis of DRUJ (Fig. 1).

She underwent arthrodesis of the DRUJ, with the creation of the distal ulnar pseudarthrosis (Sauve-Kapandji procedure) (Fig. 2). She was followed up regularly in the second, fourth, twelfth, and twentieth weeks (Table 1). In the second week, clinical examination revealed diminished bowing of radius deformity in the volar direction and loss of protrusion of styloid ulna. Range of motion in flexion of forearm pronation, forearm supination, wrist dorsoflexion, wrist plantar-flexion, MCP flexion-extension, PIP flexion-extension, and DIP flexion-extension was improved. However, there was a limited range of movement due to pain.

After four weeks, the patient could do daily activities generally with a better range of motion, as shown in Table 1 and Fig. 3. In the twelfth week, there was no increase in range of motion; however, the patient was stronger and more coordinated when moving. In the twentieth week, the patient could do daily activity normally with less pain, good power, and range of motion, as shown in Table 1 and Fig. 4.

3. Discussion

Initially, the SK method was a surgical therapy for DRUJ problems induced by rheumatoid arthritis. However, this surgery has frequently alleviated discomfort, range of motion, and grip strength in individuals suffering from DRUJ problems and osteoarthritis. SK could be a last

Table 1
Comparative function and pain evaluation in the selected time.

	Preoperative	2nd week	4th week	12th week	20th week
Pain level (Evaluation using Visual Analog Scale)	7	3	0	0	0
Forearm pronation	0°–50°	0°–70°	0°–90°	0°–90°	0°–90°
Forearm supination	0°–40°	0°–70°	0°–80°	0°–80°	0°–80°
Wrist dorsiflexion	0°–20°	0°–80°	0°–90°	0°–90°	0°–90°
Wrist plantarflexion	0°	0°–10°	0°–10°	0°–10°	0°–10°
MCP flexion-extension	20°–30°	20°–80°	20°–90°	10°–90°	10°–90°
PIP flexion – extension	20°–30°	20°–80°	20°–90°	10°–90°	10°–90°
DIP flexion - extension	20°–30°	20°–50°	20°–70°	10°–70°	10°–70°

resort after previous treatments for DRUJ problems or distal radius fractures have failed [6].

The SK method has been advocated as a treatment for DRUJ derangement because, unlike the Darrach surgery, it preserves the ulnar head at the wrist. As with the Darrach operation, postoperative instability of the proximal ulnar stump or radioulnar convergence may occur despite the favourable clinical prognosis [3,7]. Current medicinal management (such as the combination of methotrexate and novel biologics) decreases disease activity, improves patients' function, and delays radiographic progression. It prevents the deterioration of joints and soft tissues. Additionally, it decreases synovial proliferation, particularly for the SK technique [2,7].

Using the ECU tendon to stabilize the proximal ulnar stump can control its instability. Additionally, neither the radius's dorsal ulnar deviation nor dorsal displacement can be corrected. Consequently, discomfort in the proximal ulnar stump may be induced by various dynamic causes [6]. Using the shortened SK method, DRUJ discomfort can be successfully alleviated. It can help restore rotation and stop carpal migration. Results were comparable between rheumatoid and post-trauma groups, demonstrating the flexibility of the SK technique for painful and restricted DRUJ disorders [4].

According to the findings of Munaretto et al., the SK technique reliably reduces VAS pain scores in DRUJ pathology patients. The mean pain scores revealed statistically significant improvements, and 64 % of patients were pain-free following surgery (91 % showed some improvement in pain). This is consistent with other research that supports the legitimacy of the SK procedure's pain-relieving effects. In general, the SK technique continues to be a feasible therapy option for DRUJ dysfunction. This study reveals outstanding pain alleviation, enhanced postoperative grip strength, retained wrist pronation, supination, and extension, a high rate of successful arthrodesis, and a low incidence of significant sequelae [1].

The procedure was performed in April 2021 by using the SK procedure. We chose the SK procedure because this technique is better with good functional outcomes and easier to apply. However, Darrach treatments were advised for osteoarthritis more frequently than SK procedures for instability. In some studies, SK is superior to Darrach procedure in physical occupation or sports activities [2].

We evaluated the patient in the 2nd, 4th, 12th, and 20th week. VAS has improved; thus, the patient was able to perform daily activities better. Range of Motion (ROM) evaluation revealed better wrist motion, such as dorsiflexion and plantar flexion. The best outcome was seen in pronation and supination. However, limitations still exist in finger motion. MCP movement can be performed with a limited range of motion.

The evaluation is based on clinical performed that evaluation 2nd, 4th, 12th, and 20th week. This study found a significant recovery time in the 4th week when the patient can do the daily activity without pain and limited ROM. This case report has been reported in line with SCARE 2020 criteria [11].

4. Conclusion

Sauve-Kapandji (SK) procedure can solve wrist pain and deformity in DRUJ arthritis; this procedure gives a good outcome in evaluation for two weeks, four weeks, twelve weeks, and twenty weeks with the peak of recovery best in four weeks of assessment.

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.



Fig. 1. A. Preoperative radiograph. It showed union of the distal radius with plate, disruption of DRUJ with angulation to the dorsal side of the ulnar head, and arthritis of DRUJ; B. Clinical evaluation showed deformity from lateral and ulna styloid protrudes to the dorsal side. C. Functional preoperative assessment showed limitation of dorsiflexion and plantar flexion.



Fig. 2. (A) Intraoperative photograph shows osteotomy of proximal ulnar with arthrodesis using two screw-in DRUJ, (B) postoperative X-Ray after removal of distal plate radius and SK procedure.

Ethical approval

This study has been reviewed and approved by the Institutional Review and Ethical Board.

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Author contribution

Thomas Erwin Christian Junus Huwae: conceptualization, writing original draft preparation, supervision, project administrator, validation.

Agung Riyanto Budi Santoso: conceptualization, writing original draft preparation, supervision, validation.



Fig. 3. Post-operative clinical evaluation after four weeks, the patient can do daily activities with less pain and good ROM.



Fig. 4. Clinical evaluation postoperative in the twentieth week, the patient can do the daily activity with less pain, good ROM, and good motor power.

Aryc Oktarian Jaya: data collecting, data interpretation, writing original draft preparation, writing the paper and editing, validation.

Guarantor

Thomas Erwin Christian Junus Huwae.

Research registration number

This Case report is not “First in Man” Study.

Declaration of competing interest

We declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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