



A CASE STUDY OF CHRONIC POST TRAUMATIC DISORDER OF DISTAL RADIOULNAR JOINT TREATED BY SAUVE KAPANDJI METHOD

Orthopaedics

Dr. Kautilyakumar
V. Mahida*

*Corresponding Author

ABSTRACT

Aim : The aim of the study was to assess the radiological and functional outcome of disorder of distal radioulnar joint treated with sauve kapandji method.

Materials and method : In a retrospective study, a patient with post-traumatic derangement of the DRUJ that underwent the SK procedure was included. The radiologic outcome was evaluated using the assessment of union, ulnar variation, and radial deviation. The forearm range of motion and Mayo Modified Wrist Score (MMWS) was used for the clinical evaluation of the outcome. The grip strength of the injured hand was compared with the grip strength of contralateral hand.

Result : The extension, flexion, supination, and pronation of the patient was 70°, 70°, 80°, and 80°, respectively. The ulnar and radial deviations were 30° and 25°, respectively. The grip strength was 38 lb for the injured hand and 45 lb for the non-injured hand. The mean MMWS was 90. Based on the MMWS, the functional outcome was categorized as excellent. At the last follow-up, radiologic union was observed. No other complications were recorded.

Conclusions: The SK procedure could result in acceptable radiologic and functional outcomes for the management of post-traumatic DRUJ problems.

KEYWORDS

Sauve-Kapandji Procedure, Distal Radioulnar Joint, Fracture, Outcome

INTRODUCTION :

Fractures of the distal radius may result in several complications in the distal radioulnar joint (DRUJ) including ulnar pain, instability, subluxation, dislocation, reduced range of motion, post-traumatic osteoarthritis, and positive ulnar variance¹. Because of the broad spectrum of pathologies of this region, a variety of procedures have been described for the management of derangement of the DRUJ², of which Sauve-Kapandji (SK) procedure has shown promising clinical and radiologic results over a long period⁵.

The SK procedure that was described in 1936 includes arthrodesis across the DRUJ, resection of nearly 15 mm of the distal ulna, and creation of a pseudarthrosis of the ulna proximal to the fusion to restore the pronation and supination⁶. As the distal radioulnar and ulnocarpal ligaments are preserved, ulnar support of the wrist will be maintained through the SK procedure. The aesthetic appearance of the wrist is also preserved following the SK procedure, as the normal prominence of the ulnar head, most noticeable in pronation state of the forearm, is preserved⁷. Consequently, the SK procedure has been used in the treatment of many DRUJ disorders including rheumatoid arthritis, osteoarthritis, and various posttraumatic complications⁷.

Even so, like any other surgical technique, the SK procedure might have complications as well. The most potential complications of the SK technique include delayed union or non-union of the arthrodesis, painful instability at the proximal ulnar stump, and osseous or fibrous union at the pseudoarthrosis⁷. Moreover, it is probably contraindicated in some cases such as treating the unstable or frankly subluxated or dislocated DRUJ⁸. Besides, there is still some ambiguity regarding the optimal age of the patients undergoing this procedure. While some studies have argued that poorer bone stock and skin condition of older adults compromise the SK procedure, others have revealed poor results within a younger population⁹.

Descriptive studies of outcomes of the SK procedure are valuable approaches to further codify the indications and contraindications for this procedure. Thus, we here report the clinical and radiologic outcomes of the SK procedure in our patient with disorder of the DRUJ following history of trauma.

AIM

The aim of the study was to assess the radiological and functional outcome of disorder of distal radioulnar joint treated with sauve kapandji method.

METHODS

This study was approved by the review board of our institute and informed consent was obtained from the patient before their participation in the study. In a retrospective study, patient with post-

traumatic derangement of the DRUJ that underwent SK procedure was included in this study.

The preoperative and operative information were extracted from the patients' medical records. The radiologic outcomes were evaluated using the assessment of union, ulnar variation, and radial deviation. The functional assessment of the outcomes was performed through the evaluation of range of motion and grip strength. The range of motion was assessed using a goniometer and grip strength was measured by a dynamometer. Grip strength of the injured hand was compared with the grip strength of the contralateral hand. The combined subjective and objective assessment of pain, function, range of motion, and grip strength was obtained based on the Mayo modified wrist score (MMWS) with a range of 0 - 100 points¹⁰. Accordingly, a score of 90 to 100 points was regarded as excellent, while scores of 80 to 89, 65 to 79, and < 65 points were considered as good, fair, and poor outcomes, respectively. Range of motion, grip strength, and MMWS were assessed at the last follow-up session.

Surgical Technique

The SK procedure was performed as previously described with some modifications⁶. The surgery was carried out with the patient in the supine position under general anesthesia and tourniquet control. Briefly, through a dorsal exposure, a longitudinal incision of about 6 cm was made over the sixth extensor compartments. The fifth extensor compartment was opened and the extensor digiti quinti tendon was retracted. The extensor retinaculum and DRUJ capsule were raised as an ulnar-based flap. One guidewire were inserted into the head of extensor carpi ulnaris sheet. Subsequently, using an oscillating saw, the periosteum was excised around the ulnar neck and 1 cm of the ulnar neck was resected. The wire was driven into the radius, and adequate alignment was checked with fluoroscopy. Based on the size of distal ulna, one cannulated screw with the size of 4 mm was used for the fixation of the distal ulna to the distal radius. Cancellous chips from the removed ulnar segment was inserted into the sigmoid notch to help the solid fusion. The ulnar stump was stabilized using the Breen and Jupiter tenodesis technique¹¹. Then, the capsule was repaired and the pronator quadratus muscle was interposed into the osteotomy site.

Post-Operative Protocol

After the surgery, the wrist was immobilized in a above elbow slab for two weeks. After two weeks, the dressing and sutures were removed and the patient was provided with hand therapist guidelines. A removable wrist orthosis was used for six additional weeks. Light strengthening exercises were started eight weeks after the surgery. Heavy lifting and forceful forearm torque were avoided for three months after surgery.

RESULT :

One 25 year old female patient with history of trauma 8 months prior to

first presentation was observed in the study. Patient had no symptomatic relief by conservative methods for disorder of distal radioulnar joint. Main indication for surgery was pain, decreased range of motion and DRUJ instability. Fixation device used was one 4mm cannulated cancellous screw.

The extension, flexion, supination, and pronation of the patient was 70°, 70°, 80°, and 80°, respectively. The ulnar and radial deviations were 30° and 25°, respectively. The grip strength was 38 lb for the injured hand and 45 lb for the non-injured hand. The mean MMWS was 90. Based on the MMWS, the functional outcome was categorized as excellent. At the last follow-up, radiologic union was observed. No other complications were recorded.

Table 1. The Outcome Measures Following the Sauve-Kapandji Procedure for the Post-Traumatic Derangement of Distal Radioulnar Joint

parameter	flexion	extension	supination	pronation	Ulnar deviation	Radial deviation	Grip strength compared to opp. side	mmws	outcome
value	70	70	80	80	30	25	38/45	90	excellent



Figure 1 : pre op, post op(first row), final follow up radiographs and final follow up clinical pictures

DISCUSSION

It is unlikely to completely restore the normal anatomy or function of the DRUJ once it is deranged as a result of a fracture. For this reason, several techniques including arthroscopic debridement, Darrach resection, Bowers interposition arthroplasty, and Sauve Kapandji (SK) procedure have been introduced². The SK procedure can correct excessive positive ulnar variance by shortening of the ulna and is able to restore rotation of the forearm by creating a pseudarthrosis. Retention of the ulnar head in the SK procedure secures an anatomic transmission of loads across the wrist, supports the carpal condyle and to the extensor carpi ulnaris tendon, and maintains the normal appearance of the wrist. These characteristics have made the SK procedure an interesting option for hand surgeons. Yet, some authors believe that the SK procedure is a salvage technique for very complex problems of the DRUJ^{3,9,12}, as it is not infallible. Thus, further codification of this technique for its indications and contraindications is crucial.

Here, we evaluated outcome of the SK procedure for the treatment of post-traumatic DRUJ problems in our patient. The SK procedure provided an acceptable range of motion along with favorable radiologic and clinical outcome in the patient. The extension, flexion, supination, and pronation were 70°, 70°, 80°, and 80°, respectively. The MMWS of the patient was 90. The functional result was excellent. However, the grip strength of the injured hand was 84% of the unaffected side that was a reduction.

Jacobsen and Leicht evaluated the results of the SK procedure for the management of post-traumatic disorders of the DRUJ in 20 patients at a mean follow-up of 76 months. The mean postoperative supination and pronation of their patients was 70° and 86° that was comparable to our study. The patients scored an average MMWS of 77 points that was less compared to our results. Functional outcome was poor in only one of their patients. The grip strength of the injured hand averaged 77% of the contralateral hand that was comparable to the grip strength of our patient. In line with our study, they reported no major complications in their patients⁹.

Carter and Stuart also evaluated outcomes of the SK procedure for post-traumatic disorders of the DRUJ in 37 patients at a mean follow-up of 32 months. According to their results, pain improved in 25 of the 37 patients. Range of motion of the forearm returned to within 7 degrees of the uninjured side. According to their results, age was not a contraindication for this procedure⁷.

Voche et al. evaluated the results of SK procedure in 21 patients with posttraumatic lesions of the DRUJ at a mean follow-up of 3.4 years. Based on their report, the subjective outcomes were excellent in eight, good in six, satisfactory in two, and poor in five patients. Pronation and supination averaged 87% of the contralateral side in their patients. Contrary to our results, grip strength of the injured hand averaged 55% of the contralateral hand in the study of Voche et al.¹³.

Failure of the SK procedure has also been reported frequently¹⁴⁻¹⁷. Based on the report of Gordon et al., the SK procedure could be considered as an effective treatment for patients with some combination of post-traumatic DRUJ disorders including arthritis, instability of the distal ulna, and ulna-plus variance¹².

Our study had some limitations. The main limitation of this study was the limited number of case that did not allow additional statistical evaluation of the data.

Altogether, our results show that the SK procedure could result in acceptable outcomes for the management of post-traumatic DRUJ problems. Yet, it might compromise some indices of the forearm such as grip strength. Thus, patients should be informed of the limitations before undergoing the SK procedure.

CONCLUSIONS:

The SK procedure could result in acceptable radiologic and functional outcomes for the management of post-traumatic DRUJ problems.

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