

Modified Sauve-Kapandji Procedure for Management of Distal Radioulnar Joint Synostosis - A Case Report

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Abstract: *Case:* An 18-year-old male patient came to us with restricted pronation and supination. He gave a history of fall 10 years back. The skin on the dorsal and solar aspect of the distal forearm had a secondarily healed contracture. On X-ray, distal radio-ulnar synostosis was seen. Ulnar bone excision was done in the diaphyseal region. Full pronation and supination were achieved after excision in the operation theatre.

Conclusion: The use of ulnar excision is a simple and effective way to achieve an adequate functional outcome with low risk of recurrence of the synostosis.

Keywords: Cross union, Radioulnar synostosis, Sauve kapandji technique, Radius, Ulna.

INTRODUCTION

Posttraumatic radioulnar bony synostosis is a rare complication of forearm fractures which can lead to limitation of pronation and supination movements [1]. The risk factors for this kind of synostosis are high energy trauma, same level both bone fracture, soft tissue crush injury with comminuted fracture, and in case bone fragments lie in the interosseous membrane [2-4]. Synostosis can also be iatrogenic which may be due to delay in surgery, Boyd approach used for surgery, very long screws, long immobilization. The incidence of post-traumatic synostosis is in the range of 0-9.4%. These are more common after high energy fractures especially road traffic accidents [2-5].

Cross union or synostosis is characterized by painless reduction of supination and pronation and sometimes reduction in the range of motion of the wrist joint [1, 3, 6]. X-rays are generally diagnostic. Radioulnar synostosis is classified by Vince and Miller into 3 types [2]. Type 1 is distal third, type 2 is middle third and type 3 is proximal third radioulnar synostosis. The most common is type 2 fracture and they have the best prognosis. Literature recommends the surgical management with the aim of restoration of range of motion. This is generally achieved with the help of the excision of the bony bridge. However, this is associated with the recurrence of the bony bridge. There are studies that indicate the importance of timing of surgery to prevent recurrence [3]. Surgery done between 6 months to 2 years after the Initial trauma gives maximum benefit. The treatment plan depends on the

location of the synostosis [4]. Type 1 synostosis with Distal Radioulnar degeneration can be managed with the Sauve-Kapandji procedure [7]. Type 2 synostosis can be managed with excision of the bony bridge with the insertion of inert material in between. Type 3 synostosis can be managed according to the location of the synostosis in relation to the joint.

However, the number of cases of distal radioulnar synostosis is very limited in the literature. In this case report management of type 1 synostosis has been described.

CASE REPORT

An 18-year-old came with restricted supination of the right forearm. The symptoms were present for 9 years. The patient was apparently alright 9 years back when he was involved in a motorcycle accident. He suffered an open fracture of distal third both bone. He was taken to a doctor where the soft tissue management was done thorough washing and an above elbow slab. After 3 days it was seen that it was getting infected. Multiple debridements were done with splinting with a slab. The wound eventually healed with secondary intention. The parents were drained financially and emotionally hence, nothing was done after the wound healed. The doctor also advised to wait and watch till the growth potential was over. The patient was distressed with the inability to supinate the forearm.

On physical examination right forearm, the pronation was terminally restricted and supination was till 20°. There was no restriction of movement of the left forearm (Figure 1).

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Figure 1: Showing the maximum range of pronation and supination preoperatively.

Radiograph of the Right forearm showed bony union between radius and ulnar at the distal end of both the bones. The distal radius ulnar joint was obliterated. There was also irregularity of the distal radius surface and the ulnar styloid. There was also slight osteopenia of the carpal bones seen (Figure 2).

Surgical Plan - On considering the soft tissue condition over the area of synostosis we decided to perform a variant of Sauve-Kapandji Procedure as the distal radioulnar joint is already fused. The ulna was planned for excision at a level where the soft tissue was normal.

We discussed the prognosis and what we can offer to the patient. After taking a written and informed consent the patient was taken up for surgery. A 2cm incision was given over the ulnar border and around 1cm of the ulnar bone was excised. Intraoperatively pronation and supination were done and full range of motion was observed. Subcuticular closure was done and above elbow slab was given for 3 weeks for the soft tissues to heal. Postoperative antibiotics were given for 1 day and painkillers were given as and when required. Postoperative Radiographs showed 1cm of ulna excised at the junction of middle and distal third of the ulna (Figure 3). After 3 weeks the slab was removed and the mobilization was done. The patient



Figure 2: Preop Xray of the wrist with forearm AP and Lateral view showing the Distal Radioulnar synostosis.



Figure 3: Postop Xray of the wrist with forearm AP and Lateral view showing 1cm excised ulna at the junction of middle and lower.

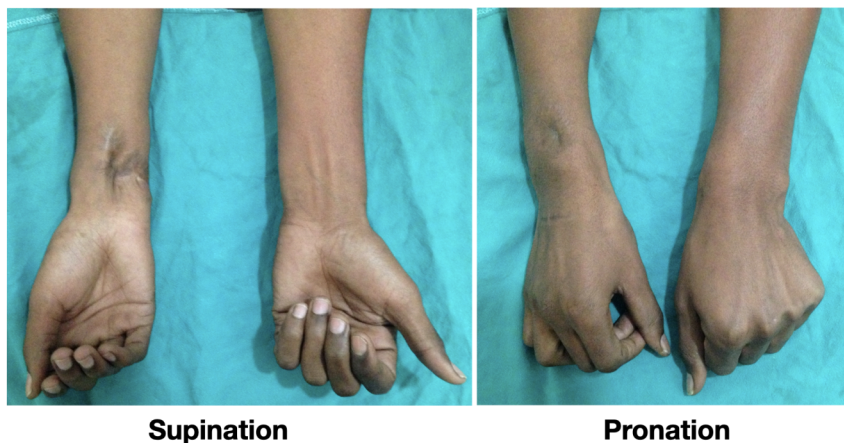


Figure 4: Showing the maximum range of pronation and supination 1 year postoperative.

was kept under regular followup and a rigorous physiotherapy regime was followed. After 6 and 12 months the range of motion of the forearm was assessed and it was noted that the patient had full supination, but pronation was still terminally restricted (Figure 4). The limitation of pronation was attributed to the soft tissue contracture.

DISCUSSION

Radioulnar synostosis is a type of heterotrophic ossification which is quite common in the upper limb trauma generally occurring after high energy trauma. Since there are so few cases of synostosis there is no gold standard of treatment so far. Especially the use of postoperative adjuvant therapy in the form of drugs to prevent recurrence from occurring.

Type 1 synostosis, like in this case report, is the rarest form of synostosis to occur. The occurrence may have been due to the involvement of the physal plate along with infection due to the open injury. This led to the fusion of the distal radio-ulnar joint around the physis. While planning for the surgery it was decided to do a variation of Sauve-Kapandji Procedure that is the excision of the ulna with stabilization of the Distal Radioulnar Joint (DRUJ) as it was already stable due to the synostosis. Also, the level of the ulna excision was as the level where the skin and soft tissues were normal. Intraoperatively, full ROM was achieved and it was due to the same principle as the Sauve-Kapandji procedure. Since the synostosis was not excised hence there was no chance of recurrence.

CONCLUSION

This is a case report demonstrating the successful management of a rare case of type 1 radioulnar synostosis.

REFERENCES

- [1] Dohn P, Khiami F, Rolland E and Goubier JN. "Adult posttraumatic radioulnar synostosis," Orthopaedics and Traumatology: Surgery and Research, 2012; 98(6): 709-714. <https://doi.org/10.1016/j.otsr.2012.04.018>
- [2] Vince KG and Miller JE. "Cross union complicating fracture of the forearm," The Journal of Bone & Joint Surgery-American Volume, 1987; 69: 640-653. <https://doi.org/10.2106/00004623-198769050-00002>
- [3] Friedrich JB, Hanel DP, Chilcote H, and Katolik LI. "Use of tensor fascia lata interposition grafts for the treatment of posttraumatic radioulnar synostosis," Journal of Hand Surgery 2006; 31(5): 785-793. <https://doi.org/10.1016/j.jhsa.2006.02.005>
- [4] Hastings H and Graham TJ. "The classification and treatment of heterotopic ossification about the elbow and forearm," Hand Clinics, 1994; 10(3): 417-437.
- [5] Jupiter JB and Ring D. "Operative treatment of post-traumatic proximal radioulnar synostosis," The Journal of Bone & Joint Surgery-American Volume 1998; 80(2): 248-257. <https://doi.org/10.2106/00004623-199802000-00012>
- [6] Cullen JP, Pellegrini VD, Miller RJ and Jones JA. "Treatment of traumatic radioulnar synostosis by excision and postoperative low-dose irradiation," Journal of Hand Surgery 1994; 19(3): 394-401. [https://doi.org/10.1016/0363-5023\(94\)90051-5](https://doi.org/10.1016/0363-5023(94)90051-5)
- [7] Lluch A, "The sauvé-kapandji procedure", J Wrist Surg. 2013; 2(1): 33-40.

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