

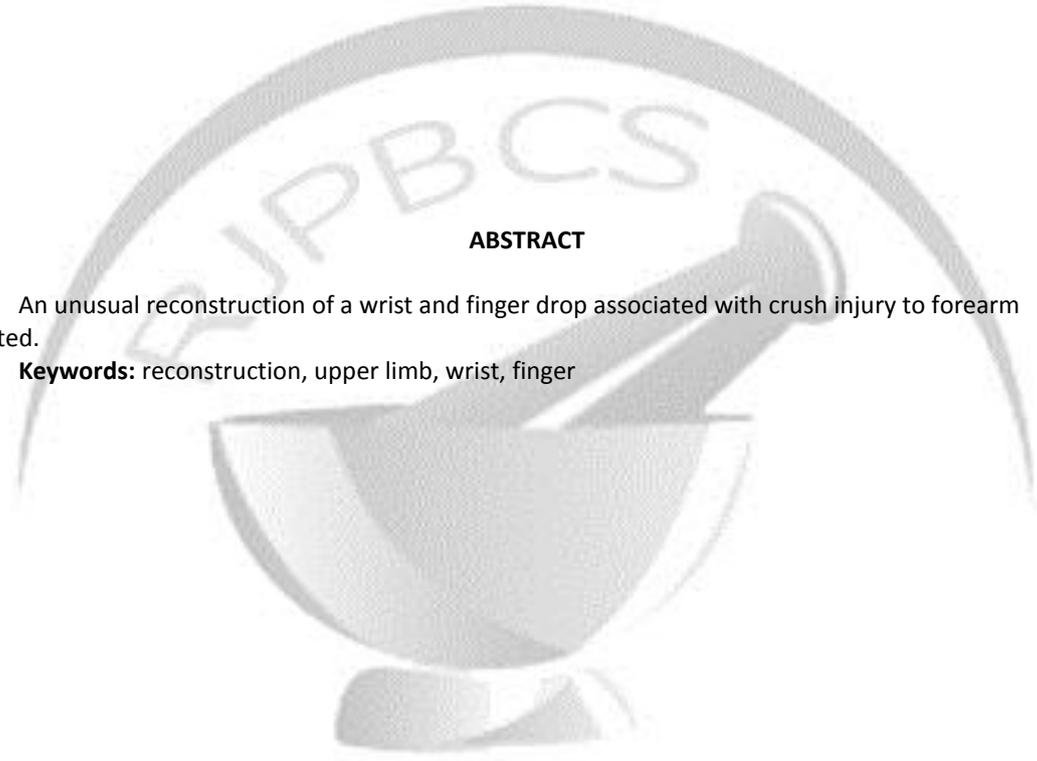
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## Four Year Follow Up of Reconstruction of an Adult Upper Limb Crush Injury with Wrist and Finger Drop.

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### ABSTRACT

An unusual reconstruction of a wrist and finger drop associated with crush injury to forearm presented.

**Keywords:** reconstruction, upper limb, wrist, finger

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**CASE REPORT**

A 42 year old gentleman had a freak accident with his right forearm caught in coveyor belt in a quarry, while working in Singapore. He had an initial resuscitation, debridement of the wound, microsurgical repair of the radial artery and had fixation of fractures of both bones of his right forearm at Singapore. Later he left for India. He presented on Feb. 2010 with a raw area of right forearm with a wrist and finger drop. In the first sitting a split thickness skin grafting was done for the raw area of his right forearm on 22-2-10. After the wound settled we reassessed him Figure.1 to 5.His problems are poor soft tissue of the forearm with wrist and finger drop. His X-rays on presentation are seen in figure 6.



**Figure 1: The finger and thumb drop at four weeks after original injury.**



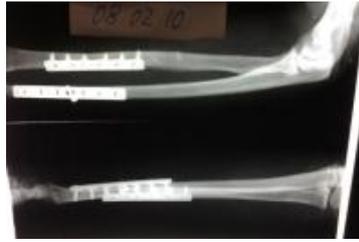
**Figure 2 .The poor forearm skin condition 4 weeks after original injury.**



**Figure 3. The degree of elbow flexion 4 weeks after original injury.**



**Figure 4. The degree of elbow extension 4 weeks after original injury.**



**Figure 5: X -rays of the patient's forearm taken 4 weeks after original injury showing the plating for the both bones fracture done at Singapore.**

Patient was given a splint in slight dorsi flexion to make out if he is contented in opening his hand and fingers with action of his intrinsic muscle. He was able to extend his fingers comfortably with the splint. On 29-4-10, His wrist was fused by a dorsal incision and reconstruction plate between 3rd metacarpal and the radius augmented with G bone. figures 6,7, 8a,8b .He had transfer of Flexor Carpi Radialis transfer to the Extensor Digitorum Longus of the second, third ,fourth and fifth fingers. Palmaris Longus was transferred to Extensor Pollicis Longus. (Figures 8 to13)



**Figure 6: Intra operative photograph showing the patient's dorsum of the wrist with plate spanning the wrist fusion site.**



**Figure 7: The bone nibblings from the arthrodesis bed and G-bone is mixed to be kept across the fracture.**



**Figure 8a and 8b: The C-arm pictures showing the previous plates and the reconstruction plate bridging the wrist between the radius and the third metacarpal.**



**Figure 9: Harvesting of the Palmaris longus tendon**



Figure 10: Harvesting of the Flexor Carpi Radialis



Figure 11: Both Flexor Carpi Radialis and Palmaris Longus brought out by a proximal wound



Figure 12: The Flexor Carpi Radialis is brought to the dorsum of the forearm to be sutured to the extensor tendons



Figure 13: The end of the wrist arthrodesis and tendon transfers .

The four year post operative clinical status is seen in the figures 14to 18 . His power of hand grip was 80 percent of the left side compared with a sphygmomanometer cuff and his present X-rays are seen in figure 19.



Figure 14: Elbow extension at 4 years follow up



Figure 15: Elbow flexion and flexion of fingers in the arthrodesed position at 4 years follow up



Figure 16: Elbow flexion and extension of fingers in the arthrodesed position at 4 years follow up



Figure 17: The patient is able to grip a pen and write comfortably at 4 years follow up



**Figure 18: The patient is able to do a strong hand grip at 4 years follow up**



**Figure 19: The patient's radiographs of the wrist and forearm with plate and fusion at wrist, and the forearm fractures which have now completely healed at 4 years follow up. The site of fusion under the plate is marked by the arrow.**

### DISCUSSION

Wrist fusion for pediatric wrist paralysis is sometimes described. The major advantage is that after the wrist fusion, the wrist flexors are functioning and are available for transfers to improve the hand function as after the fusion they have no action at the wrist. Also a good grasp is possible if finger flexors are strong with a secure stable wrist. In general wrist fusion in radial nerve palsy is not advised because it forfeits the tenodesis effect of finger extension and hand opening that is possible with wrist flexion. In general, the flexor carpi muscles do not have an excursion like the Extensor Digitorum Communis. Thus results in incomplete digital extension as the tenodesis like effect advantage of wrist flexion is now unavailable to compensate for finger extension. Thus usually if fusion of the wrist is chosen then transfer of flexor digitorum superficialis (FDS) to digital extension is preferred as FDS has more excursion with no wrist flexion available for the tenodesis effect to extend the fingers [1,2]. Since we were not sure of the common flexors due to severe crush injury we preferred the flexor carpi radialis muscles for the transfer. To our surprise in this patient the hand opening is good as seen in the figure 16. The success may be due to the fact that we avoided dorsiflexion more than 20 degrees. This type of reconstruction is described for pediatric nerve lesions and we have found only a few description of this combination of wrist fusion and tendon transfer.

### SUMMARY

This case was presented to highlight 1. the timing of arthrodesis with tendon transfer in one stage for proper rehabilitation. 2. planning all the reconstruction procedures at and distal to the wrist as there is poor forearm skin condition. Stabilization of the wrist by fusion with same stage flexor transfer to finger extensors offers a good option in this otherwise difficult.



**REFERENCES**

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