Hand Replantation and Rehabilitation

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Introduction

The following presentation will discuss:

• The rehabilitation and excellent functional outcome of a complete distal forearm avulsion amputation
• How and why our protocol differed from current practice
• A brief outline of our protocol
• Discussion of the main aspects we view as critical to the excellent outcome
• Conclude with potential for further research
Case Study

• Replanted with 2cm bone shortening
• Referred to OT for early *controlled active motion* on day 6
• Extensive OT in 1st year: this included
  • early controlled active motion (ECAM),
  • many custom moulded orthoses,
  • functional retraining
  • sensory re-education
• No additional reconstructive procedures were performed
• He completed two years of rehab last year
Case Study: 1 year post Surgery

- Excellent range of motion:
  - almost full flexion and extension of the digits
  - able to oppose thumb to all fingers
  - good intrinsic return
- 32% power grip strength
- Protective sensation
- Mildly impaired co-ordination (30 seconds on 9 Hole Peg Test).
- Subjectively, the patient was highly satisfied and was managing well at work.
Replantation after complete avulsion/ limited crush amputation (zone 5)
What did we do differently?

• Majority of protocols *postpone* active motion for up to 4 *weeks* post surgery. Few authors recommend ECAM.

• Most use orthoses in rehab, however some only in the acute stage. There is a paucity of literature detailing the rehab and the exact orthoses used.

• The integration of occupation based intervention is seldom mentioned.
Why did we differ?

- The surgeon hypothesized that chances of tendon ruptures were very minimal due to bone shortening.
- A 2 strand technique of tendon repair with 3/0 prolene was used.
- He placed more concern on preventing tendon adhesions as all were repaired at the same level.
- It is well documented that early active mobilisation is known to reduce adhesions.
Our Rehabilitation Protocol: Day 6

- Post surgical backslab:
  - Wrist 0-15° extension, MCP’s in 50-60° flexion & IP’s in extension.

- ROM:
  - Full protected PROM of digits, within limits of post surgical backslab
  - Followed by ECAM, including differential tendon gliding.

- Seen 1-2 x day in ICU/ general ward.
Our Rehabilitation Protocol

• Week 2:
  • Taught patient to do his own digit P/AROM 3 x day.
  • Very gentle blocking exercises FDS, FDP, EDC, FPL.

• Week 3:
  • Fit with dorsal orthosis
  • Edema management
  • Full forearm rotation (if doctor allows).
  • Begin wrist ROM (active-assisted)

• Week 4:
  • Light activities for digits in therapy.
Our Rehabilitation Protocol

• Week 5:
  • Gentle flexor tendon stretching if needed.
  • Remove dorsal orthosis for light self-care e.g.: feed self with thick grip on spoon

• Week 6:
  • D/C dorsal protective orthosis, except for protection when in public.
  • Orthoses to enhance function
  • Functional Retraining
Our Rehabilitation Protocol

Week 8:
- Strengthening
- Extensor tendon stretching & orthosis if needed.
- Initiate sensory evaluation & reeducation

Week 12:
- D/C dorsal protective orthosis in public.
- Goal: Return to light work
Discussion

We believe there are 3 components that have been essential in the rehabilitation of our Cases

• Recently published protocols advocate AROM at 3 or 4 weeks post upper limb replantation. We initiated ECAM on day 6.
• Several orthoses were custom fabricated according to each patient’s needs.
• The integration of occupation based intervention as a treatment medium, in combination with therapeutic exercises
Conclusion

• ECAM at 5-7 days post, has been previously described by Papanastasiou in 2002.
• Our surgeon hypothesized that chances of tendon ruptures were very minimal due to bone shortening.
• No data was found on the influence of bone shortening and tension on tendon repairs.
• The author recommends a prospective trial.
• Our protocol is detailed in the article with the intention of allowing other therapists to replicate our rehab.


