

Thoracodorsal Artery Perforator Free Flap for Mangled Hand Injuries

- 2 Cases Report -

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Introduction

- ✓ Mangled hand injury involved multi digits
- ✓ A decision of **what needs to be salvaged is critical**
- ✓ Initial surgery, **debridement, fracture stabilization, replantation of vessels** should be achieved
- ✓ **Subsequent soft tissue reconstruction** with early functional recovery should be considered
- ✓ Numerous free flaps are available for the reconstruction of hand defects: the radial forearm flap, the ALT flap, the TDAP flap and the circumflex scapular artery perforator flap
- ✓ We treated the mangled hand after the press machinery injury with **the TDAP free flap** in two patients

Case Presentation

Case 1

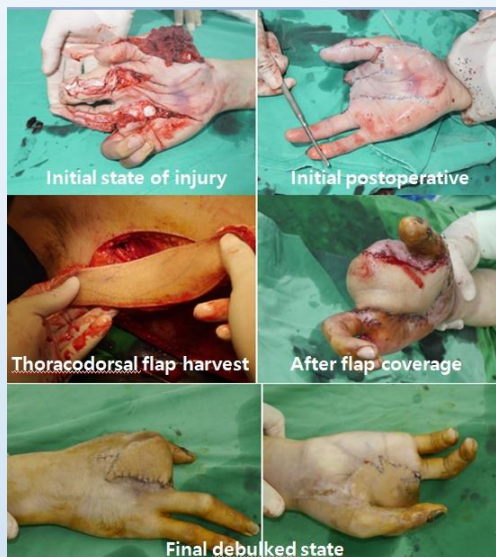
- ✓ M/46
- ✓ Power press machine accident



The thumb was amputated at the interphalangeal joint, the index and middle finger was amputated at the proximal phalanx and the ring finger was amputated at the distal phalangeal tip with proximal phalangeal fracture. In an emergency operation, wound debridement and k-wire fixation of index and ring finger were performed. Ring finger showed arterial insufficiency so we anastomized both digital artery. After one week of post trauma, angiogram was performed to assess the vascularity of the injured hand and showed an intact radial artery and its dorsal branch. We subsequently performed TDAP free flap to resurface thumb index and middle fingers. Preoperatively, perforating artery from the thoracodorsal artery was identified with an audio Doppler machine. The perforating sites were detected, then, the most reliable perforating artery was marked. The flap was designed on the basis of the most reliable perforating artery about a 18.0 × 11.0 cm size. With the identified intermuscular perforating artery from the descending branch of the thoracodorsal artery, 10 cm length pedicle was harvested to cover the defect. The flap was harvested approximately 1.5 cm thickness by flap elevation excluding the deep adipose layer. The dorsal branch of radial artery was identified and used as a recipient artery. Vessel anastomoses were done by the end to side anastomosis between thoracodorsal artery to recipient artery and end to end anastomosis between one vena comitantes to cephalic vein. We deided thumb and other two fingers, four weeks later. Finally, We performed debulking and scar excision of palmar and dorsal side, three months later.

Case 2

- ✓ M/22
- ✓ Power press machine accident



The carpometacarpal joint of thumb was open dislocated with ruptured thenar muscle. The index and middle finger was fractured and dislocated at metacarpophalangeal joint and distal portion was severely injured. We performed open reduction and internal fixation with k-wire of dislocated carpometacarpal joint of thumb and myorrhaphy of ruptured thenar muscle. Index and middle fingers were amputated because replantation was impossible due to severely injured status. And we performed microsurgery of anastomosis of fourth common digital artery and anastomosis of princeps pollicis artery using vein graft. Partial necrosis of index and middle metacarpal area developed, we performed debridement, four weeks later. We subsequently performed TDAP free flap for coverage of thumb, index and middle fingers. A 15.0 × 7.0 cm sized flap was harvested in the same technique as the above case. The flap was harvested under 1 cm thickness by flap elevation excluding the deep adipose layer. Vessel anastomoses were done by the end to side anastomosis between thoracodorsal artery to recipient artery and end to end anastomosis between one vena comitantes to cephalic vein. Postoperative recovery was successful and the flap survived completely. Finally, We performed debulking and Z platy procedure, three months later. The patient was able to key pinch and grasp objects with thin flap.

Discussion

- ✓ A main reason for selecting **the TDAP free flap is its thinnes** and **the less exposed donor site in the back** for resurfacing;
- ✓ TDAP flap could be harvested approximately **5 mm thickness** by flap elevation excluding the deep adipose layer
- ✓ A thin flap facilitates **rapid sensory recovery and the earlier ability to pinch and grasp**
- ✓ The donor site on the back is **less exposed and more wide flap harvesting** is possible.
- ✓ It is not as difficult as was previously experience, **even TDAP flap takes less time**, because of its short transmuscular dissection through thin latissimus dorsi muscle
- ✓ **TDAP free flap** can be a reliable option for soft tissue reconstruction of the hand.