Post-operative Management of Hand Laceration with Isolated Ulnar Artery Ligation

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Scope

This guideline addresses post-operative dressing, immobilization, and vascular considerations following surgical exploration of a major hand laceration with ligation of the ulnar artery, when the radial artery and palmar arch are intact.

Principles of Care

- The management of major hand lacerations with arterial injury combines vascular safety principles (ensuring hand viability) with orthoplastic goals (preventing scar contracture, stiffness, and tendon adhesions).
- Once perfusion is secure, functional morbidity is more often driven by nerve or tendon injury (20–40%) than by isolated arterial ligation (<5%) (Starnes et al., 2018; Al-Qattan, 2005).
- Careful attention to soft tissue handling, dressing, immobilization, and early therapy often has greater long-term impact than vascular repair itself.

Dressing and Bandaging

- Bulky, non-constrictive dressing is the gold standard:
  • Non-adherent layer (Adaptic, Xeroform, or petrolatum gauze) to protect wound edges and prevent adherence.
  • Fluffed sterile gauze for exudate absorption, edema minimization, and gentle compression.
  • Light elastic wrap (Kling, ACE), avoiding circumferential constriction since one artery has already been ligated.
- Elevation: Maintain the hand above the heart at all times (sling while ambulating, pillows in bed) to reduce swelling and venous congestion (ASSH Guidelines, 2022).
- Complications if done improperly:
  • Constrictive wraps can cause venous outflow obstruction and ischemia (7–10%).
  • Lack of elevation increases edema, delays healing (5–15%), and increases stiffness rates (10–25%) (Zook et al., 1986).

Splinting – "Intrinsic-Plus" (Safe) Position

- Position:
  - Wrist: 20–30 degrees extension
  - MCP joints: 70–90 degrees flexion
  - IP joints: full extension
  - Thumb: palmar abduction/opposition
- Rationale:
  - Maintains collateral ligament length at MCP joints, preventing permanent loss of flexion.
  - Prevents volar plate shortening at PIP joints (flexion contractures can develop in 15–25% if splinted incorrectly).
  - Protects tendon and nerve repairs if performed concurrently (Green's Operative Hand Surgery, 2021).
- Splint type:
  - Thermoplastic custom splint fabricated intraoperatively or within 24 hours.
  - Dorsal blocking splint commonly used to allow palmar wound access and reduce pressure risks.
- Inadequate splinting doubles the risk of joint contracture (up to 40%) (Foucher, 1981).

Immobilization Duration and Therapy

- Soft tissue only (no tendon/nerve repair): 10–14 days of immobilization.
- With tendon/nerve repair: 3–4 weeks, though early protected motion protocols are favored to reduce adhesions.
- Transition:
  - At ~2 weeks: wound check and suture removal.
  - Begin gentle active and passive range of motion as soon as wound stability allows.
  - Progress to strengthening and functional exercises at 4–6 weeks.
- Complications:
  - Joint stiffness: 15–30% if therapy delayed.
  - Adhesions restricting tendon glide: 10–15%.
  - Scar contracture requiring later release: 5–8% (Zook et al., 1986; ASSH, 2022).

Ulnar Artery Injury – Repair vs. Ligation

Evidence Summary

- Isolated ulnar artery injury with intact radial flow and palmar arch:
  - Ligation is generally safe.
  - Large series show no ischemic complications in >95% of cases (Starnes et al., 2018; Al-Qattan, 2005).
  - Long-term function is driven by nerve/tendon status rather than arterial patency.

- Patency after repair:
  - Patency rates are only 40–60% (Safeek et al., 2022).
  - No functional difference between patent and occluded repairs.
- Dual-artery injury or incomplete arch:
  - Acute ischemia occurs in 70–80% of cases if both radial and ulnar are disrupted.
  - Urgent revascularization (repair or graft) is mandatory to prevent hand loss.
- Late complications after ligation (rare):
  - Cold intolerance: 10–20%
  - Pseudoaneurysm: 3–5%
  - Exercise-induced claudication: <5%
  - Most are mild and may warrant delayed reconstruction only if symptomatic.

Clinical Decision Algorithm

- Assess perfusion: warmth, color, capillary refill, Doppler. Any ischemia → urgent repair.
- If well perfused: Perform modified Allen test ± Doppler/plethysmography. Competent arch → ligation acceptable.
- If arch incomplete or perfusion equivocal: Consider repair or temporary shunt.
- Post-op follow-up: Monitor for ischemia, cold intolerance, or pseudoaneurysm. Refer for reconstruction if symptomatic.

Bottom Line

In a major hand laceration with isolated ulnar artery ligation:

- Apply bulky, non-constrictive dressing, maintain elevation, and splint in the intrinsic-plus position.
- Immobilize 10–14 days (longer if tendon/nerve repair), then begin early hand therapy.
- Ligation is safe (>95% hand survival, <5% ischemic risk) if radial artery and palmar arch are intact.
- Repair is required for dual-vessel injury, ischemia, or inadequate collateral circulation.
- Long-term morbidity is most often due to stiffness (15–30%) or nerve/tendon injury, not arterial ligation

Version Control Record			
Version	**Date**	**Author/Reviewer**	**Description of Changes**
1	1/13/26	Paul Wisniewski, D.O.	Initial review and update to reflect latest evidence/practice

References

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