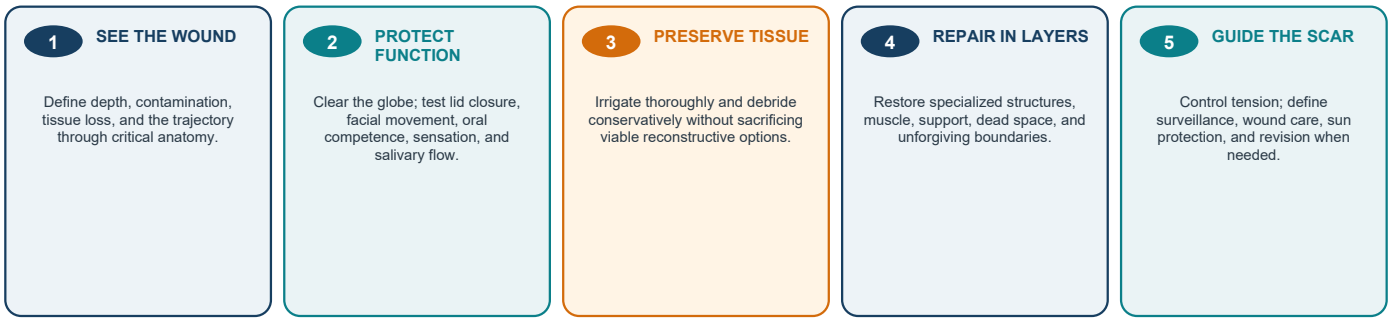
FACIAL TRAUMA

VOLUME V

Repairing the Facial Envelope

Soft-tissue wounds, eyelids and lacrimal drainage, facial nerve, parotid duct, specialized landmarks, and scar rehabilitation

The facial soft-tissue trauma workflow



Preserve function and anatomy before making the wound look closed.

Figure 0.1. Volume V moves from recognition of hidden functional injury to precise layered repair and long-term scar rehabilitation.

> VOLUME QUESTION
> How do you close a facial wound without missing the nerve, duct, canaliculus, muscle, cartilage, or landmark that determines function?

Resident-level study guide - Prepared July 2026

How to Use This Volume

Volume V treats the facial soft-tissue envelope as a functional organ rather than decorative coverage. A wound may interrupt eyelid closure, tear drainage, facial animation, oral competence, salivary drainage, nasal contour, or the relationship between skin and the skeleton beneath it. The resident must therefore understand the wound before making it look closed.

The volume begins with the universal sequence of examination, irrigation, conservative debridement, injury mapping, and layered closure. It then follows the specialized structures most likely to be missed: the eyelid and canaliculus, extratemporal facial nerve, and parotid duct. Regional repair of the lip, cheek, nose, and ear is organized around free borders and aesthetic landmarks. The final chapters address bites, ballistic injury, scar maturation, complications, and secondary revision.

> **CLINICAL BRIDGE**
> Use the same order in every consultation: stabilize, examine function before anesthetic, expose the true depth, repair critical structures, align landmarks, close dead space, and define follow-up. This sequence is more reliable than memorizing a different recipe for every facial subunit.

Learning objectives

- Classify facial wounds by depth, contamination, tissue loss, and involvement of specialized structures rather than by length alone.
- Perform and document ocular, facial nerve, parotid duct, lacrimal, oral competence, sensory, and vascular examinations before local anesthetic obscures localization.
- Use copious irrigation and conservative debridement to reduce contamination while preserving viable facial tissue and reconstructive options.
- Repair muscle and deep support before skin, eliminate dead space, and prioritize exact alignment of eyelid, vermilion, alar, commissural, and auricular landmarks.
- Recognize eyelid lacerations requiring oculoplastic repair and localize canalicular disruption.
- Differentiate facial nerve neurapraxia from likely transection and describe primary neurorrhaphy, grafting, delayed repair, and rehabilitation principles.
- Diagnose and manage parotid gland and Stensen duct injury, including delayed sialocele and salivary fistula.
- Manage mammalian bites, tetanus, rabies risk, antibiotics, contaminated wounds, and ballistic tissue loss using evidence-calibrated principles.
- Counsel patients through scar maturation and recognize when contracture, hypertrophy, malposition, or functional loss warrants early intervention or delayed revision.
- Present a coherent soft-tissue trauma plan for written boards, oral boards, and call.

Abbreviations

Abbreviation	Meaning
CN VII	Facial nerve
HRIG	Human rabies immune globulin
MCT	Medial canthal tendon
PEP	Post-exposure prophylaxis
RSTL	Relaxed skin tension lines
SMAS	Superficial musculoaponeurotic system
TIG	Tetanus immune globulin

Contents

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Use the PDF bookmarks or click a row in this contents table to move directly to a chapter. On call, start with Appendices A-C for the one-minute examination, repair order, and exposure decisions.

CHAPTER 1

The Facial Soft-Tissue Envelope

CENTRAL QUESTION

What is the wound disrupting beneath the visible skin edges?

A facial laceration is the surface expression of a three-dimensional injury. The face is thin enough that a short wound may cross skin, subcutaneous tissue, mimetic muscle, sensory nerves, facial nerve branches, salivary structures, cartilage, eyelid support, lacrimal drainage, oral mucosa, and bone. The resident's first task is therefore not to choose a suture. It is to determine which functions have been interrupted.

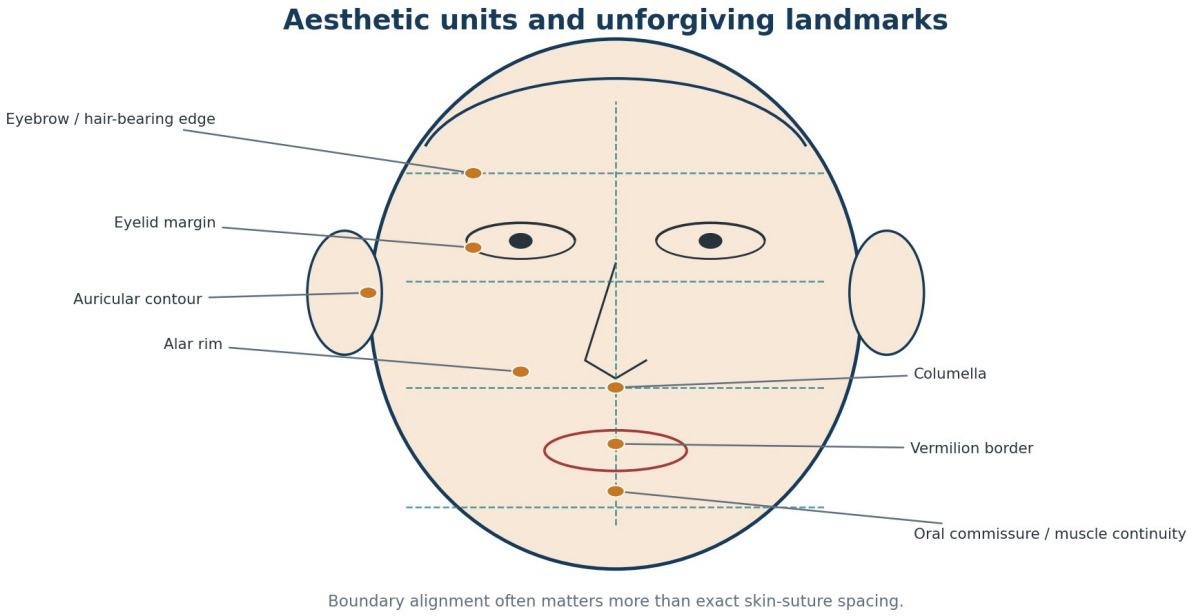


Figure 1.1. Facial wounds are judged by the landmarks and boundaries they distort. The eyelid margin, vermilion, oral commissure, alar rim, eyebrow, hairline, and auricular contour are particularly unforgiving.

The five layers that matter clinically

The superficial skin layer determines scar visibility, but the deeper layers determine whether the face functions. Subcutaneous tissue contains vascular plexuses and sensory nerves. The SMAS and mimetic muscles transmit facial movement directly into the skin. The parotid duct and distal facial nerve branches traverse the cheek in close proximity. Cartilage gives shape to the nose and ear, while eyelid tarsus and canthal tendons maintain globe protection and tear-pump mechanics.

Table 1.1. Finding–mechanism–consequence: translate the wound into an injury map.

Finding	Likely damaged structure	Why it matters
New asymmetric smile or brow movement	Facial nerve branch or mimetic muscle	May require early exploration or meticulous muscle repair.
Saliva appearing in the cheek wound	Parotid gland or Stensen duct	Unrecognized transection may become a sialocele or salivary fistula.
Medial eyelid wound	Canaliculus, punctum, or MCT	Primary skin closure can make later identification and repair harder.
Orbital fat in an eyelid wound	Orbital septum violation	Signals a deep injury and need for specialist evaluation after globe clearance.
Vermilion or eyelid-margin step	Misaligned free border	Even minimal mismatch produces a conspicuous deformity.
Exposed cartilage with tissue loss	Nasal or auricular support injury	Cartilage survival and contour depend on vascularized coverage.
Deep wound over a fracture	Open skeletal and soft-tissue unit	Repair sequence must coordinate debridement, bony stabilization, and soft-tissue closure.

Aesthetic units are reconstructive boundaries

Scars tend to be less conspicuous when they lie within RSTL or at the borders of aesthetic units. Traumatic wounds rarely cooperate. The surgeon may use or extend an existing laceration when it improves exposure, but extension should be planned along a favorable line and should serve a specific reconstructive purpose. Contamination alone is not a contraindication to using the wound for exposure; inadequate cleansing, devitalized tissue, and distorted closure are the true problems.

Free borders magnify small errors

The vermilion border, eyelid margin, alar rim, columella, oral commissure, helical rim, eyebrow, and hairline are visual reference lines. A small step at a free border is often more noticeable than a longer scar elsewhere. Mark these landmarks before infiltration and swelling obscure them, then place the key alignment suture before routine skin closure.

DIAGNOSTIC TRAP

Do not equate a normal-appearing skin edge with preserved deep anatomy. A clean knife wound may transect a nerve or duct with little tissue destruction, whereas a ragged wound may leave important structures in continuity.

RESIDENT SYNTHESIS

Think in layers and functions. The visible wound tells you where to look; the injury map tells you what must be repaired.

CHAPTER 2

Wound Assessment, Irrigation, Debridement, and Closure

CENTRAL QUESTION
How do you convert a contaminated, distorted wound into a safe and precise reconstruction?

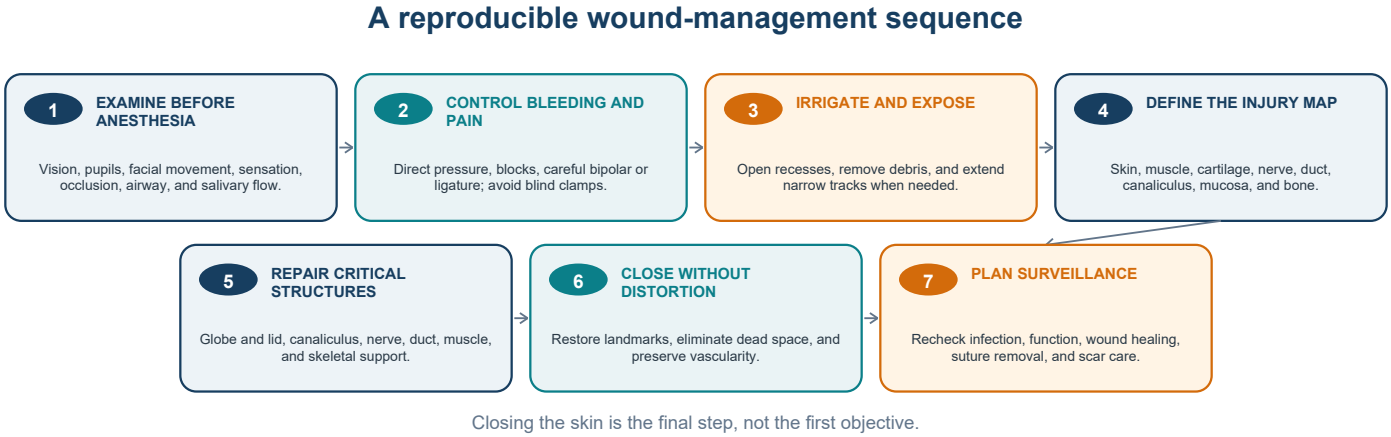


Figure 2.1. A reproducible wound-management sequence. Examination before anesthesia and repair of critical structures precede definitive skin closure.

Examine before the wound disappears under anesthetic

Before infiltration or sedation, document visual acuity and ocular findings when the orbit is involved; branch-specific facial movement; sensation; occlusion and oral competence; nasal airway; and salivary flow. Photograph the wound with consent when images may aid reconstruction or follow-up. Account for missing teeth, tissue, jewelry, glass, and projectiles. If the patient cannot participate, state which functions are unknown and plan serial reassessment.

SENSORY NERVE MAP
Test and document supraorbital and supratrochlear, infraorbital, and mental sensation side-to-side before anesthetic. New numbness helps localize injury and supports realistic counseling about recovery.

Analgesia, hemostasis, and preparation

Regional nerve blocks often provide anesthesia with less tissue distortion than direct infiltration. When infiltration is necessary, use the minimum effective volume and avoid injecting through gross contamination when a cleaner route exists. Control bleeding with direct pressure, careful bipolar or ligature hemostasis, and good illumination. Blind clamping risks facial nerve branches, ductal structures, and vessels that may retract into the wound.

VASCULAR DANGER
Escalate pulsatile or uncontrolled bleeding, an expanding hematoma, bruit or thrill, focal neurologic deficit, airway effect, or a trajectory near major vessels. Use direct pressure or packing; do not blindly clamp or probe. Unstable patients or uncontrolled hemorrhage proceed to definitive control without imaging delay. Stable patients with concerning findings or trajectory generally require CTA under the institutional penetrating head-and-neck pathway.

Irrigation does the microbiologic work

Copious irrigation mechanically removes bacteria, soil, saliva, glass, and devitalized debris. Potable tap water or isotonic fluid is appropriate for most wounds; the important variables are volume, access to all recesses, and removal of particulate contamination. Strong antiseptics are useful on surrounding skin but may be cytotoxic when poured into viable tissue. Punctures, bites, and narrow tracks may require extension or operative exploration because surface irrigation cannot reach the true zone of contamination.

Debride conservatively

The face is highly vascular, and tissue that initially appears marginal may survive. Remove clearly necrotic tissue, ground-in debris that cannot be cleaned, and nonviable foreign material, but avoid converting a ragged yet perfused edge into a larger defect for geometric neatness. Preserve avulsed tissue and cartilage. When viability is uncertain in a high-energy wound, staged reassessment may be safer than aggressive one-time excision.

Table 2.1. Wound features that change the plan.

Feature	Meaning	Response
Sharp linear wound	High likelihood of discrete nerve, duct, tendon, or muscle transection	Explore function carefully; repair cleanly divided structures.
Crush or avulsion	Broader zone of vascular injury and delayed necrosis	Preserve viable tissue, avoid tension, and plan serial assessment.
Gross contamination	Higher bacterial burden and retained foreign body risk	Increase irrigation and debridement; risk-stratify antibiotics and closure.
Large dead space	Hematoma, seroma, infection, and contour deformity	Layered closure, selective drain, pressure dressing, and surveillance.
Through-and-through oral wound	Communication with saliva and oral flora	Repair mucosa and muscle separately; prophylaxis is commonly recommended.
Delayed presentation	More edema, bacterial growth, and difficult structure identification	Individualize closure after cleaning; do not use time alone as an absolute rule.
Tissue loss	Closure may distort free borders or narrow an airway	Consider local tissue rearrangement, grafting, staged reconstruction, or transfer.

Repair from deep to superficial

Once specialized structures and skeletal support are addressed, restore each functional layer. Periosteum and deep fascia reduce dead space. Mimetic muscle must be reapproximated in its correct vector; skin closure alone cannot restore oral competence or animation. Deep dermal sutures offload tension but should not strangulate tissue or bury contaminated material. Skin sutures should approximate, not blanch, the edges.

Table 2.2. Practical layered closure framework. Exact material depends on the wound, patient, and surgeon.

Layer or region	Typical goal	Common approach
Oral or nasal mucosa	Watertight but not ischemic closure	Absorbable monofilament or braided suture; avoid bulky knots at contact surfaces.
Mimetic muscle / orbicularis	Restore continuity and vector	Interrupted absorbable sutures placed in healthy muscle, not fat.
Deep dermis / SMAS	Eliminate dead space and reduce skin tension	Buried absorbable sutures with minimal tissue strangulation.
Facial skin	Precise edge eversion and landmark alignment	Fine nonabsorbable monofilament or rapidly absorbing material when follow-up is uncertain.
Eyelid margin	Restore tarsal and margin anatomy	Specialized layered repair; avoid relying on skin sutures alone.
Cartilage-bearing regions	Maintain contour with vascularized coverage	Selective cartilage approximation, skin coverage, bolsters or splints as indicated.

Timing and closure

Facial wounds can often be closed primarily later than wounds in less vascular regions after thorough cleaning, and AO references describe closure up to approximately 24 hours in appropriate cases. This is not a guarantee of safety. Infection, devitalization, puncture geometry, contamination, patient comorbidity, and the need for staged debridement matter more than a rigid clock.

EVIDENCE NOTE

The 2024 AAST consensus advises against routine systemic prophylaxis for simple facial or scalp lacerations. It supports 24 hours or less for complex or high-risk wounds, antibiotics for through-and-through skin-to-oral lacerations, and a short 3-5 day course for mammalian bites. These are consensus recommendations built on limited heterogeneous evidence rather than universal mandates.

OPERATIVE PEARL

Before tying the final skin sutures, step back and recheck symmetry, free-border alignment, facial movement, lid position, oral competence, nasal contour, and the absence of trapped dead space.

RESIDENT SYNTHESIS

Clean first, define the injury second, repair function third, and close the skin last. Conservative tissue preservation is usually more valuable than creating perfectly straight edges.

CHAPTER 3

Eyelid and Periocular Trauma

CENTRAL QUESTION

Which eyelid wounds can be closed simply, and which threaten the globe, vision, lid margin, canthal support, levator, or orbit?

Periocular trauma: separate the emergencies from the repair

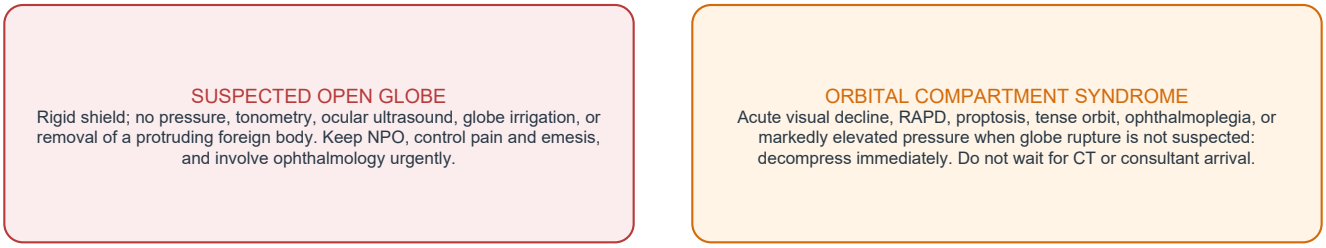


Figure 3.1. Periocular trauma has two time-critical pathways. A definitive eyelid repair begins only after the globe and orbit are safe.

Clear the globe and vision first

Document visual acuity when possible, pupils, globe contour, extraocular movements, and the reliability of the examination. Periocular swelling may conceal open globe, hyphema, retinal injury, traumatic optic neuropathy, or orbital compartment syndrome. Urgent ophthalmology involvement is appropriate for abnormal or unreliable findings, but a clinically indicated orbital decompression must not be delayed.

Anatomic structures that maintain lid function

The anterior lamella contains skin and orbicularis; the posterior lamella contains tarsus and conjunctiva. The levator elevates the upper lid, and the canthal tendons anchor lid position and lacrimal-pump mechanics. Injury can produce exposure, notching, trichiasis, entropion, ectropion, ptosis, or corneal irritation.

Table 3.1. Eyelid red flags that generally require ophthalmic or oculoplastic involvement.

Finding	Concern	Why simple skin closure is inadequate
Lid-margin involvement	Tarsal and mucocutaneous discontinuity	Misalignment produces notching, trichiasis, and poor globe apposition.
Wound medial to the punctum	Canalicular disruption	Drainage injury may be hidden by a small skin wound.
Canthal avulsion or laxity	Medial or lateral canthal-tendon injury	Lid position and lacrimal-pump function depend on stable anchoring.
Orbital fat prolapse	Orbital septum violation	Signals deeper injury and possible levator, globe, or orbital involvement.
New ptosis	Levator aponeurosis or muscle injury	Skin repair will not restore elevation.
Full-thickness tissue loss	Lamellar defect	Requires reconstruction that preserves support and vascularity.

Table 3.1 continued.

Finding	Concern	Why simple skin closure is inadequate
Foreign body, bite, or avulsion	Contamination and hidden structure injury	Needs exploration, prophylaxis decisions, tissue preservation, and often specialized repair.

When simple bedside closure is appropriate

A simple closure is limited to a superficial anterior-lamellar wound with a cleared globe, normal lid position, preserved levator function, no tissue loss, and no involvement of the margin, punctum or canaliculus, canthi, or orbital septum. When any boundary is uncertain, stop before burying the anatomy and obtain the appropriate specialist.

Principles of lid-margin repair

Margin repair is a geometric reconstruction. Reestablish the tarsal plate and posterior lamella, then precisely align the gray line, lash line, and mucocutaneous junction. Skin sutures alone permit the tarsal edges to heal with a step. Avoid excessive vertical tension on the lower lid because contraction can cause retraction or ectropion. Magnification, corneal protection, and careful knot placement reduce iatrogenic injury.

Tissue preservation

Eyelid tissue is highly vascular and should be preserved aggressively. Small avulsed segments may remain viable when gently handled and anatomically reapproximated. Do not trim jagged margin tissue merely to create a straight defect. True tissue loss requires replacement of both lamellae while maintaining a vascular supply.

CLINICAL BRIDGE
A patient who can close the eye in the trauma bay may lose closure after edema, pain, or temporary orbicularis compensation changes. Document gentle and forceful closure separately and repeat the examination after repair.

BOARD PEARL
"Eyelid laceration" is not a complete diagnosis. State whether the globe is clear, margin is involved, canaliculus is at risk, canthal support is intact, levator function is preserved, and orbital fat is present.

RESIDENT SYNTHESIS
The endpoint is a lid that protects the cornea, blinks, drains tears, and rests smoothly against the globe. Skin appearance is only one component of success.

CHAPTER 4

Lacrimal Drainage Trauma

CENTRAL QUESTION

How do you recognize and repair a canalicular injury before a small medial wound becomes chronic epiphora?

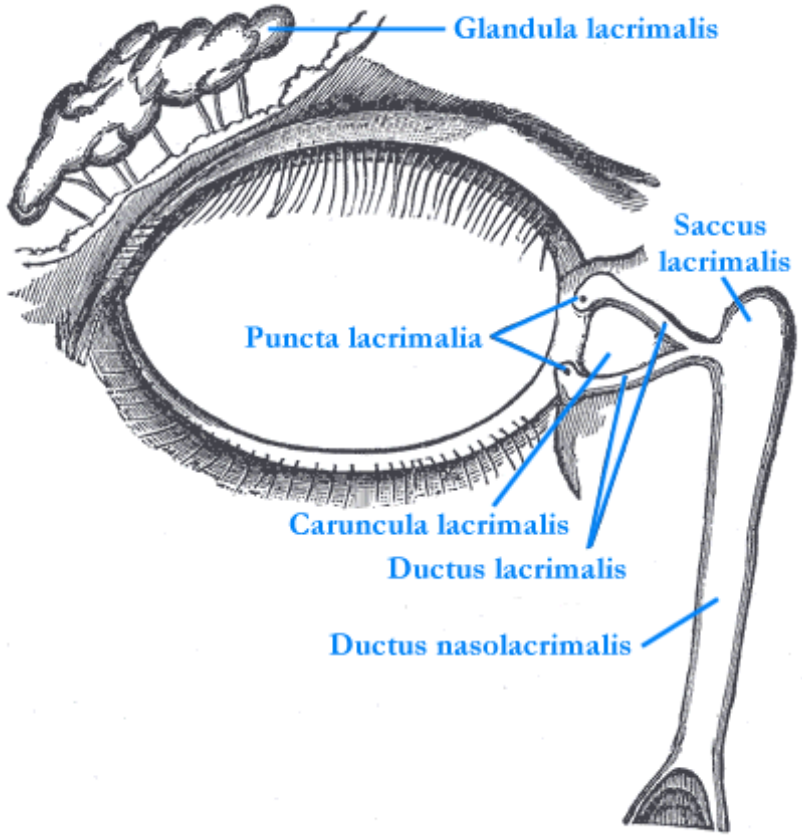


Figure 4.1. The puncta drain through superior and inferior canaliculi into the lacrimal sac and nasolacrimal duct. Medial eyelid trauma may disrupt the canaliculus even when the external wound is short.

Source: Gray's Anatomy plate 896, public domain, via Wikimedia Commons.

Why the medial wound is different

The canaliculi travel from the puncta toward the lacrimal sac within the medial eyelid. Dog bites and sharp lacerations can transect them with minimal external tissue loss. The proximal, nasal end retracts into the wound and becomes harder to identify as edema and fibrosis develop. A wound between the punctum and medial canthus should therefore be treated as a possible drainage-system injury until assessed.

Examination and localization

Inspect both puncta and the eyelid margin. Determine whether the laceration is medial to the punctum, whether the MCT is stable, and whether the lid remains apposed to the globe. Magnification, gentle probing, irrigation from the intact punctum, and visualization of the wound may identify the lacerated ends. Aggressive blind probing can create a false passage and should not substitute for expertise.

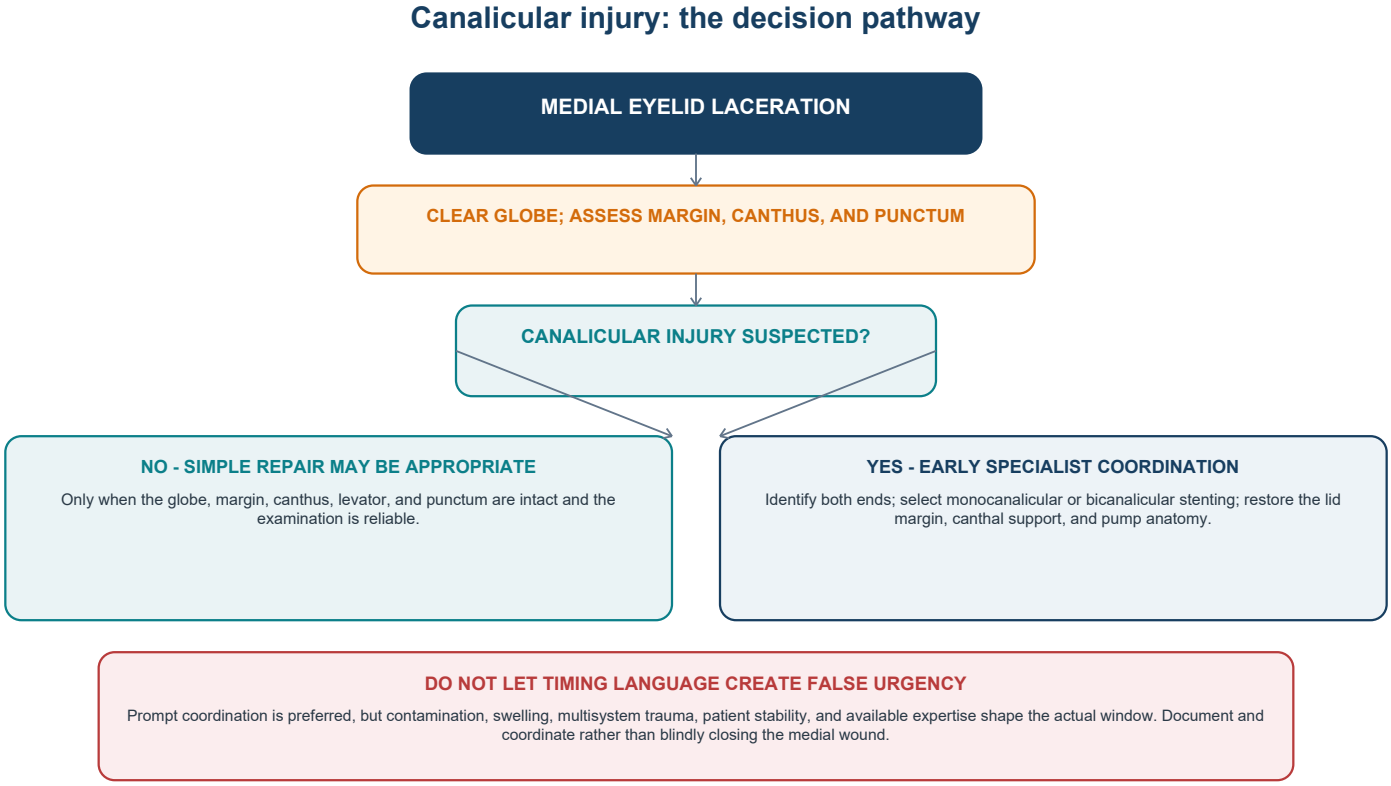


Figure 4.2. Canalicular injury is an anatomic and expertise-dependent problem. Prompt coordination is preferred, but the correct repair is more important than a rushed bedside closure.

Repair principles

The goal is to restore continuity while maintaining eyelid position and avoiding trauma to the intact drainage system. Monocanalicular stents are useful when one canaliculus is injured and may avoid manipulating the opposite system. Bicanalicular intubation can provide robust stabilization but carries risks of cheese-wiring, punctal injury, false passage, and nasal retrieval difficulty. The choice depends on injury pattern and surgeon experience.

Table 4.1. Canalicular decision points.

Question	Interpretation	Management implication
Is one or both canaliculi injured?	Bicanalicular injury threatens more total drainage capacity.	Repair and stenting are particularly important.
Is the lid margin or MCT also disrupted?	Drainage and lid-pump anatomy are coupled.	Reconstruct support and margin concurrently.
Can the proximal end be identified?	Retraction and edema increase difficulty.	Magnification, probing, irrigation, and experienced exploration may be required.
Is the wound contaminated or a bite?	Higher bacterial burden and tissue crush.	Irrigation, prophylaxis, and viable-tissue preservation remain essential.
Has repair been delayed?	Fibrosis may make identification harder.	Delayed repair may still be possible; balance urgency against stability and expertise.
Does epiphora persist later?	Stenosis, pump dysfunction, malposition, or sac/duct injury.	Evaluate anatomically before secondary lacrimal surgery.

Timing is important but not absolute

Prompt repair is traditionally favored because cut ends are easier to find before edema and fibrosis mature. Contemporary reviews emphasize that timing depends on associated injuries, contamination, swelling, surgeon availability, and the exact lesion. A delayed specialized repair may be preferable to an immediate nonanatomic closure that buries the canaliculus.

DIAGNOSTIC TRAP
Do not assume that one intact canaliculus guarantees an asymptomatic patient. Drainage depends on anatomy, lid position, pump function, and the individual contribution of each canaliculus.

RESIDENT SYNTHESIS
Any medial eyelid wound can be a lacrimal injury. Clear the globe, define the margin and canthal support, identify the canalicular ends, and restore drainage anatomy without sacrificing lid position.

CHAPTER 5

Extratemporal Facial Nerve Injury

CENTRAL QUESTION

When does facial weakness require observation, exploration, primary repair, grafting, or later reanimation?

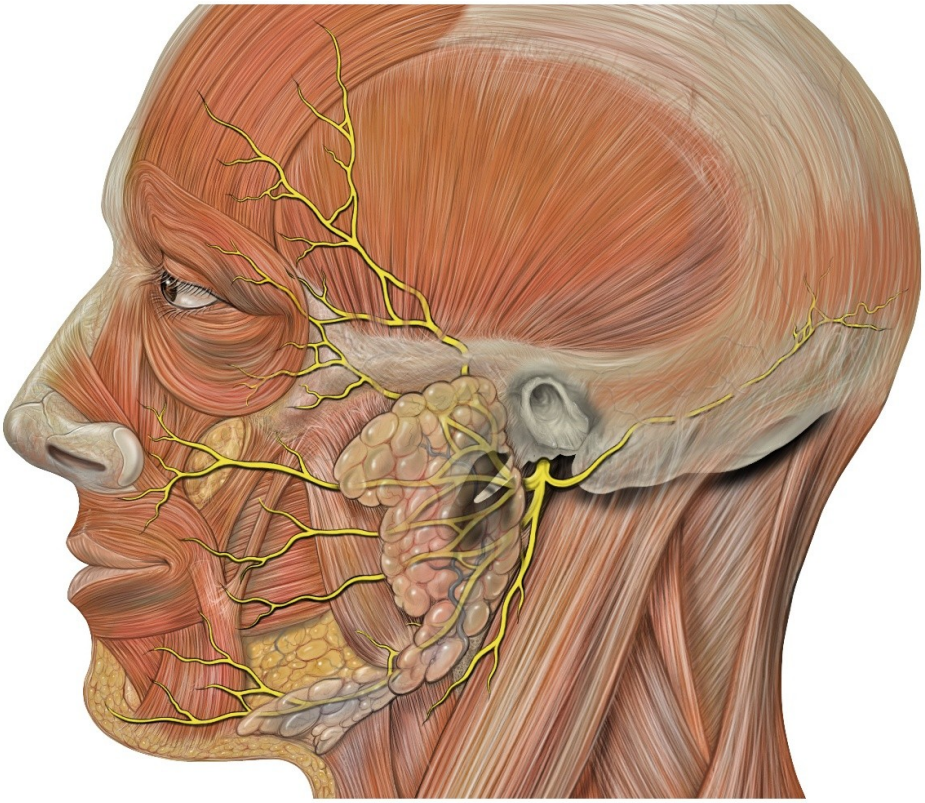


Figure 5.1. Extratemporal facial nerve branches traverse the parotid and fan across the face. Branching redundancy increases distally, but the frontal and marginal mandibular distributions remain functionally unforgiving.

Patrick J. Lynch, medical illustrator; C. Carl Jaffe, MD. CC BY 2.5, via Wikimedia Commons.

The examination must precede local anesthesia

Test each facial zone separately: elevate the brows, close the eyes gently and tightly, wrinkle the nose or flare the nostrils, smile and show teeth, purse the lips, depress the lower lip, and tense the platysma. Video or photographs can document subtle asymmetry. Distinguish true weakness from pain, edema, tissue loss, or muscle transection. The location and mechanism of the wound determine whether a nerve branch is likely to be stretched, contused, partially divided, or transected.

Table 5.1. Branch-oriented functional examination.

Movement	Predominant branch distribution	Clinical consequence of loss
Forehead elevation	Temporal/frontal	Brow ptosis and impaired upper facial expression.
Eye closure	Temporal and zygomatic	Exposure keratopathy and loss of blink.
Nasal flare / upper lip elevation	Zygomatic and buccal	Nasal valve and midfacial animation asymmetry.
Smile / oral sphincter	Buccal and zygomatic	Oral incompetence, dysarthria, drooling, and asymmetry.
Lower-lip depression	Marginal mandibular	Visible lower-lip asymmetry, especially with speech and smiling.
Platysma contraction	Cervical	Lower facial and neck asymmetry, usually less functionally severe.

Mechanism and timing

Immediate branch-specific paralysis after a sharp deep wound creates a high suspicion for transection. Partial weakness after blunt or crush injury may reflect neurapraxia, edema, hematoma, or incomplete injury and may be observed with serial examination when continuity is likely. When a branch is visibly divided or discontinuity is strongly suspected, restore continuity as early as the patient and wound permit, ideally in the acute period and within 72 hours when feasible. Distal stimulation is most reliable during the first 72 hours but may remain possible for approximately seven days depending on injury level; this possible window must not justify delaying repair.

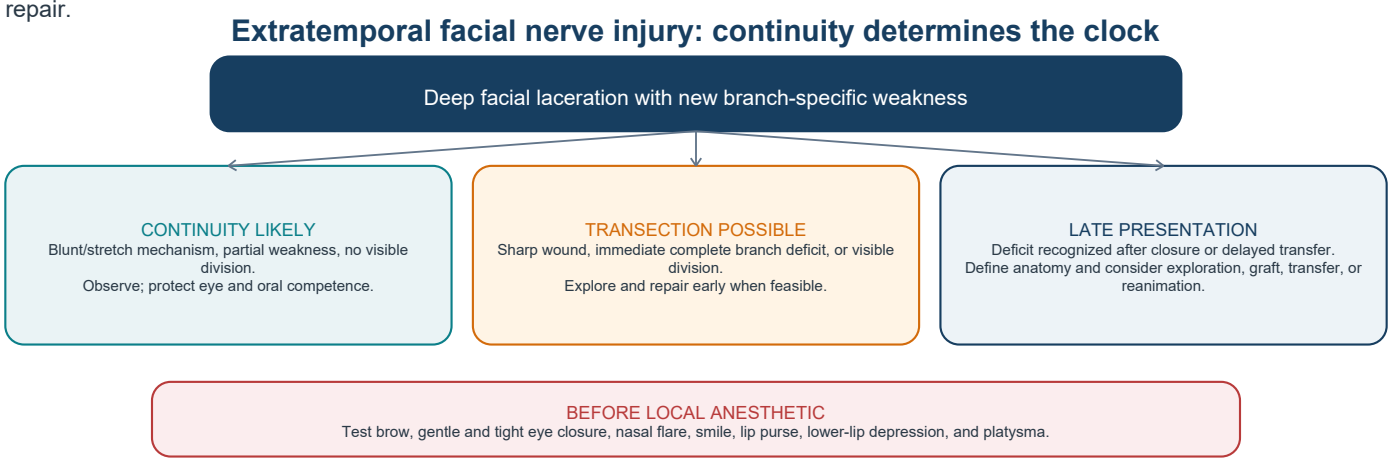


Figure 5.2. Mechanism, continuity, examination, and time from injury determine the repair strategy.

Primary neurorrhaphy

The ideal repair is tension-free end-to-end epineural coaptation under magnification with correct orientation. Excessive dissection devascularizes the nerve and sacrifices collateral branches. Use only short-acting or readily reversible neuromuscular blockade when stimulation is planned, and confirm adequate reversal or absence of residual blockade before testing. If the ends cannot meet without tension, an interposition graft is preferable to stretching the nerve.

Distal injuries, delayed recognition, and recovery

Distal midfacial branches interconnect, and injuries medial to a vertical line through the lateral canthus may recover through redundancy or be too small for practical repair. This is a guide, not permission to ignore a meaningful deficit. If weakness is discovered after closure, review the mechanism, pre-repair examination, photographs, and wound location. Options may include delayed exploration, grafting, nerve transfer, static support, and dynamic reanimation. Recovery is slow and may include weakness or synkinesis despite excellent repair.

IMMEDIATE EYE PROTECTION
With weak blink or incomplete closure, begin frequent preservative-free tears while awake, ointment with gentle lid taping or a moisture chamber at night, and corneal surveillance. Ensure that taping closes the lids without pressure; do not use a pressure patch. Arrange urgent ophthalmic evaluation for pain, redness, decreased vision, epithelial breakdown, impaired corneal sensation, or failure to maintain protection.

OPERATIVE PEARL
If primary repair cannot be completed during the initial operation, tag both nerve ends with durable identifiable sutures and document their location. A vague note that the nerve "may be injured" creates a much more difficult secondary exploration.

RESIDENT SYNTHESIS
Examine first, infer continuity from mechanism and deficit, explore early when transection is likely, and protect the eye and oral sphincter throughout recovery.

CHAPTER 6

Parotid Gland and Duct Trauma

CENTRAL QUESTION

How do you prevent a cheek laceration from becoming a sialocele, fistula, or missed facial nerve injury?

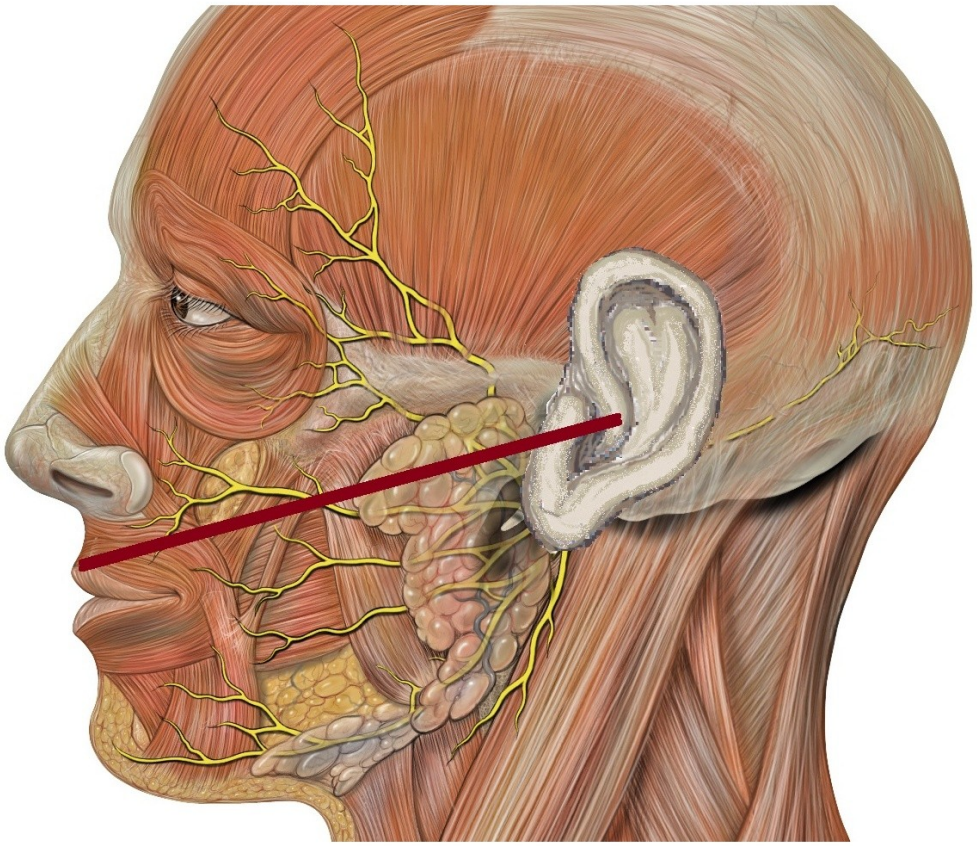


Figure 6.1. A wound crossing the middle portion of the line from tragus to upper lip lies over the typical trajectory of Stensen duct. Facial nerve branches travel in the same region.

Anatomic relationships

Stensen duct exits the anterior parotid gland, crosses the masseter, turns medially at its anterior border, pierces buccal fat and buccinator, and opens opposite the maxillary second molar. Buccal facial nerve branches often parallel the duct. A deep cheek laceration may therefore injure skin, mimetic muscle, nerve, duct, gland, buccal fat, and oral mucosa in one track.

Bedside assessment

Examine facial movement before anesthetic. Inspect the intraoral papilla and gently milk the gland. Clear saliva expressed at the papilla supports continuity but does not exclude a partial injury. Blood from the papilla, saliva in the wound, or failure of flow raises suspicion. Cannulation with a small lacrimal probe, angiocatheter, or silicone tubing can define the distal duct; forceful instrumentation can create a false passage.

Table 6.1. Localize the salivary injury before choosing treatment.

Injury pattern	Typical finding	Management concept
Parotid parenchymal injury	Diffuse salivary ooze without discrete duct ends	Layered closure, pressure, selective drain, and surveillance.
Duct injury over masseter	Visible or cannulatable proximal and distal ends	Primary microsurgical repair over an intraoral stent when feasible.
Distal duct injury near buccinator	Short distal segment or papillary injury	Reimplantation or marsupialization into the oral cavity may be considered.

Table 6.1 continued.

Injury pattern	Typical finding	Management concept
Proximal duct injury near gland	Difficult proximal control and gland injury	Repair if possible; selective internal drainage or gland suppression may be required.
Delayed sialocele	Fluctuant painless collection that enlarges with meals	Aspiration, compression, reduction of salivary drive, and botulinum toxin in persistent cases.
Cutaneous salivary fistula	Clear meal-related drainage from the wound	Control infection, reduce salivary flow, define continuity, and treat the underlying pathway.

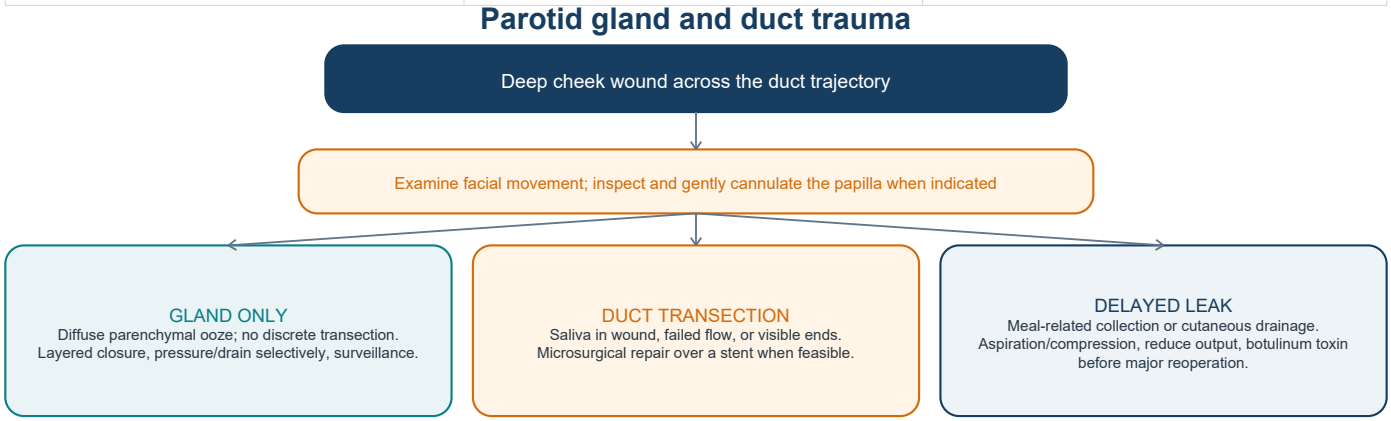


Figure 6.2. Separate gland injury, duct transection, and delayed leak; each requires a different response.

Primary duct repair

When both ends are available, stent the duct from the papilla through the distal segment and across the repair. Approximate the duct with fine sutures under magnification without narrowing the lumen. Secure the stent intraorally and document its material, fixation, expected duration, planned removal date, responsible service, and care instructions. At follow-up, assess position, migration or obstruction, meal-related swelling, sialocele, fistula, infection, and facial weakness. Repair associated facial nerve branches and muscle before final skin closure, and eliminate dead space. Stent duration is injury- and protocol-dependent rather than a universal number.

When direct repair is not possible

A very distal injury may be reimplanted into the buccal mucosa. In selected proximal injuries, rerouting or controlled internal drainage can be preferable to a tense repair. Ligation is rarely the first choice. Individualize according to location, contamination, tissue loss, and expertise.

Delayed sialocele and fistula

Most collections are diagnosed clinically and can be confirmed by aspiration of amylase-rich fluid. Serial aspiration, pressure, dietary modification, selective anticholinergic therapy, and botulinum toxin reduce salivary output while the tract seals. Infection, persistent high-output fistula, or a reconstructable missed duct injury may require operative management.

DIAGNOSTIC TRAP
Normal papillary flow does not exclude partial duct injury, and poor flow may reflect edema or clot rather than complete transection. Combine anatomy, exploration, and cannulation findings.

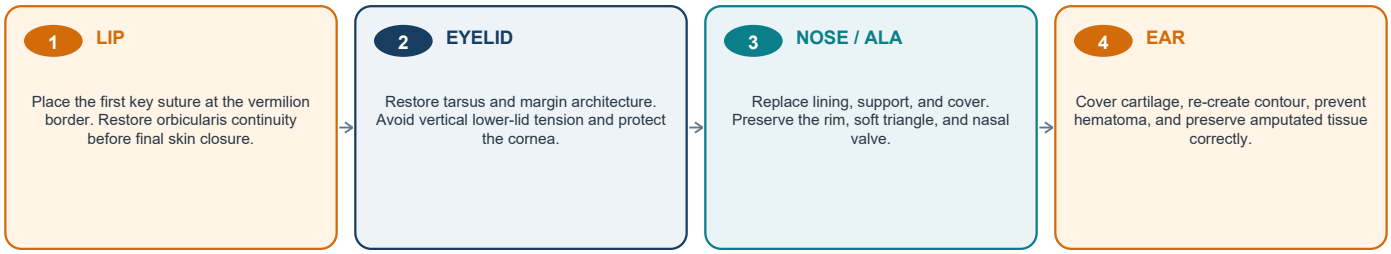
RESIDENT SYNTHESIS
Any deep cheek wound requires a paired facial nerve and parotid duct examination. Closing skin while ignoring the duct converts an acute repairable injury into a chronic salivary complication.

CHAPTER 7

Lip, Cheek, Nose, and Auricular Trauma

CENTRAL QUESTION
How do you restore oral competence, contour, and free borders while preserving vascularity and tissue?

Landmarks that should be aligned before the skin is "finished"



Repair sequence: support and muscle first; key boundary suture next; routine skin last.

Figure 7.1. The first key sutures belong at landmarks that cannot tolerate a step. Deep support and muscle are repaired before these boundaries are finalized.

Lip and oral commissure

Lip repair must restore three systems: mucosal lining, orbicularis continuity, and cutaneous-vermilion alignment. Mark the vermilion border before infiltration. Place the first key skin suture at the border, but do not let it distract from orbicularis repair. A lip closed only at the skin can look aligned initially yet develop notching, oral incompetence, whistle deformity, or animation asymmetry. Through-and-through wounds should be cleaned from both surfaces and closed in separate mucosal, muscle, and skin layers.

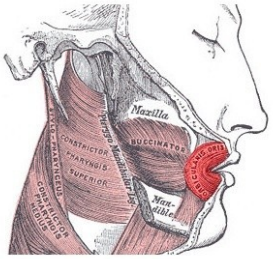


Figure 7.2. Orbicularis oris is a complex sphincter interwoven with elevators, depressors, and buccinator. Functional lip repair requires muscle continuity, not only vermilion alignment.
Gray's Anatomy, public domain, via Wikimedia Commons.

Cheek

The cheek contains facial nerve branches, Stensen duct, mimetic muscles, buccal fat, facial vessels, and the oral lining. Before closure, identify whether the wound crosses the duct trajectory or produces branch-specific weakness.

Cheek - continued

Buccal fat that herniates through a wound should be handled gently and replaced when viable rather than mistaken for devitalized tissue. Repair the buccinator and mimetic layers to restore oral competence and prevent contour depression.

Nose and ala

Nasal soft tissue is thin over the dorsum and thicker over the tip and alae. The ala is a three-layer structure of skin, cartilage or fibrofatty support, and mucosa. A small rim defect can notch dramatically as it contracts. Preserve cartilage and avoid tight closure that narrows the nostril. Full-thickness wounds require lining, support, and cover; true tissue loss may require a composite graft, local flap, or staged reconstruction.

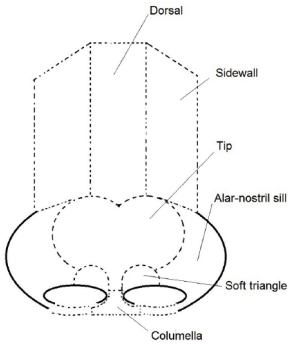


Figure 7.3. Nasal aesthetic subunits. Scar placement and replacement tissue should respect the dorsal, sidewall, tip, alar, soft-triangle, sill, and columellar boundaries.

ENT SAFETY CHECK - SEPTAL HEMATOMA
Inspect intranasally for septal hematoma, mucosal laceration, exposed cartilage, and airway obstruction. A septal hematoma requires urgent drainage and reliable follow-up to prevent cartilage necrosis and saddle deformity.

Auricle

The ear is skin over cartilage with little soft-tissue reserve. Preserve the helical rim, antihelix, concha, tragus, and lobule. Cartilage requires vascularized coverage and precise contour. A clinically significant auricular hematoma requires prompt evacuation, reapposition of skin and perichondrium with a bolster or equivalent compression, and early re-examination for recurrence. Amputated tissue should be wrapped in saline-moistened gauze, sealed in a bag, and cooled without direct ice contact.

Region	Reconstructive priority	Common failure
Vermilion lip	Exact border alignment and orbicularis continuity	Visible step, notching, drooling, speech asymmetry
Oral commissure	Restore position and converging muscle vectors	Microstomia, drift, oral incompetence
Cheek	Preserve nerve/duct; restore muscle and volume	Sialocele, weakness, depression, tethering
Nasal ala	Replace lining, support, and cover without tension	Alar notching, valve narrowing, asymmetry
Auricle	Maintain cartilage contour and prevent hematoma	Chondritis, rim deformity, cauliflower ear

RESIDENT SYNTHESIS
Restore the layer that provides function: muscle in the lip, nerve and duct in the cheek, lining and support in the ala, and vascularized cartilage coverage in the ear.

Avulsed and amputated tissue

Do not discard tissue that appears too small or traumatized. Photograph and preserve it. Microsurgical replantation may be possible for lip, nose, scalp, or ear amputations when vessels and ischemia time permit. Even when replantation is not feasible, tissue can provide cartilage, skin, or a composite graft. The reconstructive team should be involved early before tissue is trimmed or placed in formalin.

Choose the reconstructive method by the missing layers

A partially attached segment with a credible vascular pedicle is different from a completely amputated part. Primary reattachment may preserve specialized tissue, but a tenuous segment should not be used as the only lining or structural support for a critical airway or free border. Small composite grafts survive by plasmatic imbibition and revascularization and are less reliable as size, crush injury, smoking, ischemia, or recipient-bed compromise increase. Larger or multilayer defects may require a local flap, regional flap, free tissue transfer, or a staged combination of lining, support, and cover.

Preserve options while viability declares itself

Handle marginal tissue gently, release constricting sutures or hematoma, and reassess perfusion serially. Venous congestion does not automatically mean that tissue is nonviable, and aggressive early trimming can convert a potentially salvageable subunit into a larger defect. Conversely, clearly necrotic or heavily contaminated tissue should not be buried beneath a complex reconstruction. The goal is conservative debridement with a durable backup plan.

OPERATIVE PEARL

A wound crossing a free border should be approximated provisionally and viewed from conversational distance before final closure. Loupe-level perfection can still produce global asymmetry if the landmark vector is wrong.

RESIDENT SYNTHESIS

Regional repair succeeds when the surgeon restores the tissue layer that provides function: muscle in the lip, nerve and duct in the cheek, lining and support in the ala, and vascularized cartilage coverage in the ear.

CHAPTER 8

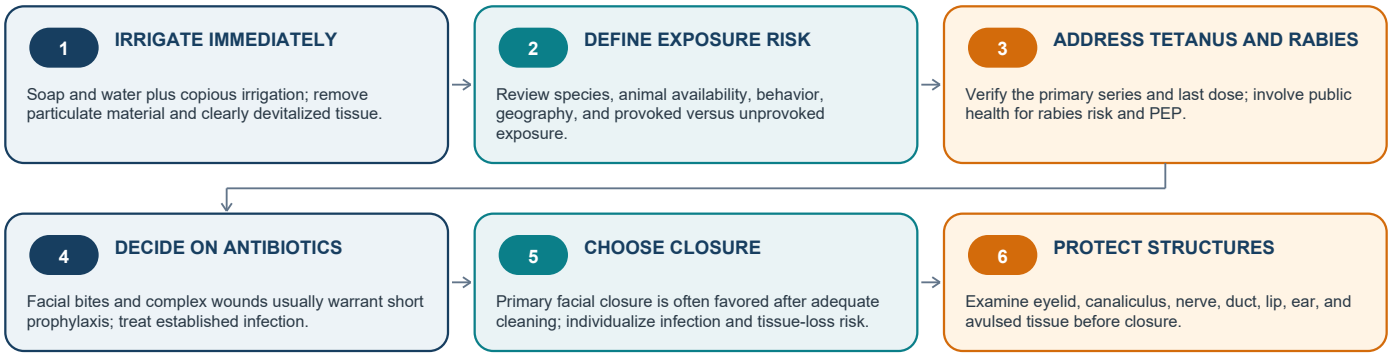
Bites, Contaminated Wounds, and Ballistic Injury

CENTRAL QUESTION
How should contamination and tissue destruction modify closure, antibiotics, and the timing of reconstruction?

Mammalian bites: clean aggressively, reconstruct thoughtfully

Facial bites are frequently crush-avulsion injuries rather than simple punctures. Young children may have associated eyelid, canalicular, lip, nasal, or auricular tissue loss. Immediate irrigation, removal of devitalized tissue, identification of missing structures, and careful primary reconstruction usually offer the best cosmetic result when infection is not established. Facial vascularity and the consequences of secondary contraction favor primary closure more often than in hand or foot bites.

Facial mammalian bites: infection prevention without sacrificing reconstruction



Rabies PEP is a public-health risk decision. Antibiotics do not replace irrigation, debridement, or tetanus prophylaxis.

Figure 8.1. Facial mammalian bites require simultaneous bacterial, tetanus, rabies, and reconstructive risk assessment.

Antibiotics

The AAST consensus recommends a 3-5 day prophylactic course for mammalian bites and specifically supports prophylaxis for facial bites and through-and-through skin-to-oral wounds. Amoxicillin-clavulanate is a common first-line oral regimen covering Pasteurella, streptococci, staphylococci, and anaerobes. Allergy alternatives must preserve aerobic and anaerobic coverage and follow local guidance. Established infection requires treatment rather than prophylaxis and selective culture when purulence or an unusual exposure warrants.

Tetanus and rabies

Tetanus: Classify bites as dirty or major wounds. Give a tetanus-containing vaccine for an unknown, absent, or incomplete primary series or, after a completed series, when the last dose was 5 or more years ago. For dirty or major wounds, add TIG for an unknown, absent, or incomplete series and for HIV or severe immunodeficiency. Antibiotics do not prevent tetanus.
Rabies: Risk depends on the exposure, not wound appearance, and should be reviewed with public health. If PEP is indicated, previously unvaccinated patients receive wound care, HRIG infiltrated in and around the wound as feasible with any remainder IM distant from vaccine, and vaccine on days 0, 3, 7, and 14; immune disorders add day 28. Previously vaccinated patients receive no HRIG and vaccine on days 0 and 3. Never give HRIG and the first vaccine in the same syringe or anatomical site.

Table 8.1. Bite decisions that should be explicit in the consultation note.

Decision	Questions	Documentation
Closure	Established infection, puncture geometry, crush devitalization, or major tissue loss?	Why primary closure, loose approximation, or delayed closure was chosen.
Antibiotics	Face/head location, through-and-through injury, immunocompromise, contamination, or infection?	Agent, prophylaxis versus treatment, duration, and allergy rationale.

Table 8.1 continued. Bite decisions that should be explicit in the consultation note.

Decision	Questions	Documentation
Tetanus	Primary series complete? Last dose? Dirty or major wound?	Vaccine and TIG decision.
Rabies	Species, animal availability, behavior, local epidemiology, and prior vaccination?	Public-health discussion and PEP plan.
Specialized structures	Eyelid, canaliculus, nerve, duct, lip, ear, or avulsed tissue?	Named structure examination and consultant involvement.
Follow-up	Can infection or tissue necrosis evolve after discharge?	Early wound review and return precautions.

Contaminated nonbite wounds

Road rash, agricultural injury, freshwater or saltwater exposure, and retained organic material create different microbiologic risks. Ground-in particulate matter causes traumatic tattooing unless removed early. Water-exposed wounds may require coverage beyond routine skin flora. Antibiotic choice should follow exposure-specific guidance, but no drug compensates for retained material or devitalized tissue.

Ballistic and blast injury

Ballistic wounds create a zone of cavitation, devitalization, mucosal contamination, bone fragmentation, and tissue loss larger than the entry wound. Initial management follows trauma priorities: airway, hemorrhage, brain and cervical spine, globe, and vascular injury. Thin-cut CT of the face and skull base defines osseous loss, projectile trajectory, and the relationships among oral, nasal, orbital, and intracranial spaces. Add CTA of the head and neck when trajectory, examination, associated fractures, or injury energy raises concern for vascular injury, or as required by the institutional penetrating face-and-neck protocol. Unstable or uncontrolled hemorrhage proceeds directly to definitive control without imaging delay.

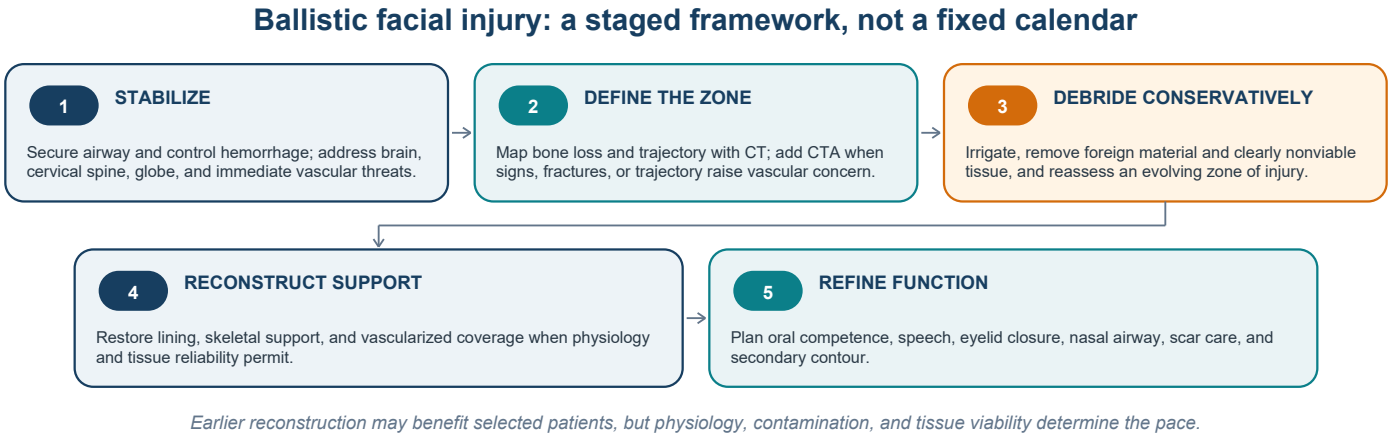


Figure 8.2. Ballistic reconstruction follows physiologic and tissue readiness rather than a rigid number of days.

Early versus staged reconstruction

Modern series increasingly support earlier definitive skeletal and free-tissue reconstruction in selected stable patients because early support can limit contraction, reduce operations, and improve function. Other injuries require temporary closure and staged reconstruction because necrosis is evolving, contamination is uncontrolled, or the patient is unstable. The principle is neither "always early" nor "always delay": preserve viable tissue, establish reliable lining and support, and avoid burying uncertain tissue beneath an elaborate reconstruction.

EVIDENCE NOTE

A 2025 meta-analysis of mammalian wounds generally favored primary over delayed closure for healing and cosmesis without a clear pooled infection penalty. The studies varied substantially in species, site, irrigation, antibiotics, and design; facial subgroup findings do not establish a universal rule. Apply this evidence to carefully selected facial closure after meticulous cleaning, not to infected, devitalized, or inadequately explored wounds.

RESIDENT SYNTHESIS

Contamination changes the intensity of cleaning, surveillance, and prophylaxis; it does not automatically prohibit facial closure. Stage ballistic reconstruction according to physiology, tissue viability, and the ability to restore durable support.

CHAPTER 9

Postoperative Care, Scars, and Secondary Revision

CENTRAL QUESTION

How do you distinguish normal scar maturation from infection, necrosis, contracture, hypertrophy, and structural failure?

The first week tests the repair

Early follow-up should assess bleeding, hematoma, infection, tissue viability, wound separation, eyelid closure, vision, facial movement, oral competence, salivary leakage, and nasal or auricular contour. Remove facial skin sutures early enough to avoid track marks, commonly around 5-7 days, while adapting to wound tension and patient factors. Eyelid and specialized repairs follow the responsible surgeon's protocol.

Table 9.1. Early postoperative findings and responses.

Finding	Possible mechanism	Response
Increasing pain, erythema, purulence	Infection, retained foreign body, devitalized tissue	Open/drain when needed, culture selectively, debride nonviable tissue, and treat infection.
Dusky wound edge or avulsed segment	Venous congestion or ischemia	Release tension/hematoma, optimize perfusion, and reassess serially before indiscriminate excision.
New facial weakness	Edema, anesthetic effect, nerve injury, or hematoma	Repeat branch examination, review operative findings, and address eye/oral protection.
Meal-related cheek swelling or drainage	Sialocele or parotid fistula	Confirm salivary source, aspirate/compress, reduce salivary flow, and define duct status.
Epiphora or lid malposition	Canalicular stenosis, pump dysfunction, canthal or margin malposition	Oculoplastic evaluation; treat anatomy rather than symptoms alone.
Vermilion, ala, or margin step	Landmark malalignment or early contracture	Early correction may be easier before mature scar fixation.
Auricular swelling	Hematoma or infection	Prompt drainage/bolster and cartilage-preserving treatment.

Scar biology is a timeline

Inflammation and epithelialization dominate the first days. Collagen deposition and vascular proliferation make the scar red, firm, and sometimes raised over the next several weeks. Remodeling then continues for many months. A normal immature scar may look worse at six weeks than at six months. The resident should reassure patients without dismissing functional contracture or progressive hypertrophy.

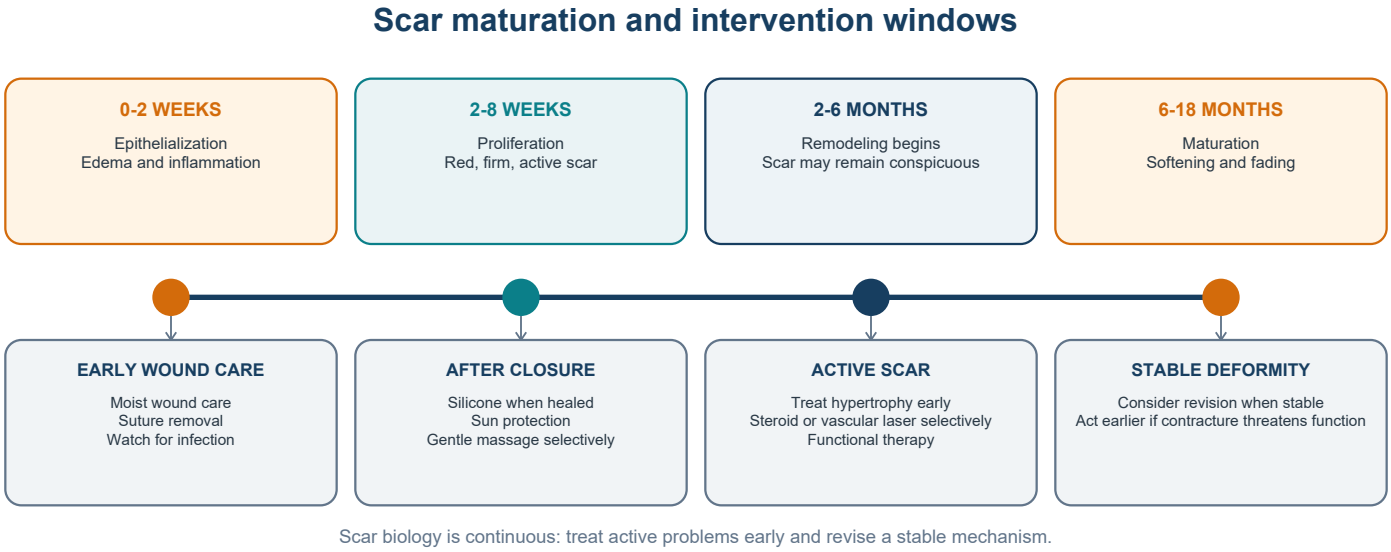


Figure 9.1. Scar interventions should match biologic phase and the specific problem rather than a single universal schedule.

Routine scar care

Once the wound is fully epithelialized, sun protection reduces persistent erythema and hyperpigmentation. Silicone gel or sheets are supported for prevention and treatment of hypertrophic scars, although adherence and skin irritation limit use. Gentle massage may improve pliability and desensitization after healing, but evidence is less robust than common teaching suggests. Avoid vitamin E as a default recommendation because benefit is unproven and contact dermatitis occurs.

Hypertrophic scar and keloid

A hypertrophic scar remains within the wound boundaries and may improve with time; a keloid extends beyond them and carries a higher recurrence risk. Intralesional corticosteroid, often combined with other agents, can reduce thickness and symptoms. Vascular laser may improve erythema and early hypertrophy; fractional laser, microneedling, or surgical revision can improve texture and contracture in selected cases. Treatment is individualized and often multimodal.

> KELOID WARNING
> Excision alone has a high recurrence risk. When surgery is selected, plan adjunctive therapy and longitudinal follow-up rather than excision as monotherapy.

When to revise

Purely cosmetic revision is usually delayed until the scar has matured enough to reveal the stable deformity, often many months. Earlier intervention is appropriate when the scar threatens vision, eyelid position, nasal airway, oral competence, neck or mouth opening, or a free border. Secondary planning should identify the actual lost function or dimension: contracture, tethering, volume loss, muscle discontinuity, nerve deficit, duct obstruction, or landmark malposition.

Table 9.2. Scar problem-mechanism-treatment concept.

Problem	Mechanism	Treatment concept
Persistent erythema	Active vascular scar	Sun protection; vascular laser selectively.
Raised pruritic scar	Hypertrophic collagen response	Silicone, steroid injection, pressure when feasible, and laser or revision selectively.
Free-border notching	Malalignment or contracture	Geometric release, local flap, cartilage/support graft, or layered revision.
Depressed tethered scar	Volume loss or deep adhesion	Subcision, fat grafting, local tissue rearrangement, or structural repair.
Functional contracture	Shortened skin/muscle or scar across a mobile unit	Early therapy and release when function is threatened.
Synkinesis after nerve injury	Misdirected reinnervation	Facial retraining, chemodenervation, and selective surgery.
Persistent epiphora or sialorrhea	Drainage-structure failure	Anatomic evaluation and targeted lacrimal or salivary intervention.

> DIAGNOSTIC TRAP - RESIDENT SYNTHESIS
> Do not promise disappearance. Aim for a soft, flat, well-positioned scar that preserves function; treat early threats promptly, allow normal maturation, and revise the specific mechanism of deformity.

CHAPTER 10

Integrated Cases and Final Workflow

> CENTRAL QUESTION
> Can the resident identify the hidden structure, choose the correct treatment clock, and defend a layered repair plan?

Case 1 - The short medial eyelid wound

A child is bitten near the medial lower eyelid. Vision and pupils are normal. The wound is only 8 mm but lies between the punctum and medial canthus.

Questions to answer	Teaching focus
- Is the globe definitively cleared? - Are the lid margin, medial canthal tendon, or canaliculus involved? - What infection, tetanus, and rabies decisions are required? - Who should repair the wound, and on what timeline?	Wound length is misleading. A small medial injury can interrupt drainage and lid-pump anatomy. Avoid routine skin closure before canalicular evaluation.

Case 2 - Normal smile after a deep cheek laceration

A glass laceration crosses the left cheek along the tragus-to-upper-lip line. Facial movement is symmetric and saliva is visible at the papilla.

Questions to answer	Teaching focus
- Does normal movement exclude nerve injury? - Does papillary flow exclude partial duct injury? - How will the duct be assessed? - Which layers require repair?	Normal function lowers but does not eliminate the probability of partial nerve or duct injury. Trajectory and depth still demand deliberate exploration.

Case 3 - Immediate brow paralysis

A sharp temporal laceration produces immediate complete loss of forehead elevation but preserved eye closure and smile.

Questions to answer	Teaching focus
- Which branch is injured? - Does the mechanism suggest neurapraxia or transection? - Can the nerve still be stimulated? - Is primary repair or grafting feasible?	A discrete sharp injury with immediate branch-specific loss creates a high suspicion for transection and a low threshold for early exploration. Early assessment improves identification and the opportunity for direct repair.

Case 4 - The aligned lip that leaks

A through-and-through lower-lip laceration was closed in the emergency department. The vermilion is aligned, but the patient has drooling and a palpable central defect.

Questions to answer	Teaching focus
- Which layer was likely missed? - Is infection present? - Should the wound be reopened early? - How will oral competence be restored?	Cosmetic alignment cannot substitute for orbicularis continuity. Early layered revision may prevent a fixed notch and chronic incompetence.

Case 5 - Meal-related cheek swelling

Ten days after repair of a cheek wound, the patient develops a painless fluctuant collection that enlarges during meals.

Decision questions and teaching focus continue on the next page.

Case 5 - continued

Questions to answer	Teaching focus
- How is a sialocele confirmed? - Was the original duct examined? - Which conservative therapies are appropriate? - When is reoperation needed?	Delayed salivary collections are usually managed by reducing salivary pressure and output while defining whether a repairable duct injury persists.

Case 6 - The contaminated alar avulsion

A dog bite removes a segment of the alar rim. The tissue arrives wrapped in dry gauze. There is no established infection.

Questions to answer	Teaching focus
- How should the tissue be preserved? - Should the wound be closed primarily? - What prophylaxis is needed? - Which three layers of the ala must be restored?	Preserve tissue, clean thoroughly, address bite prophylaxis, and reconstruct lining, support, and cover. Forced tension closure causes alar notching and nasal-valve compromise.

Case 7 - High-energy ballistic tissue loss

A stable patient has a submental ballistic path with mandibular and tongue injury, mucosal contamination, and uncertain viability of the lower-lip and floor-of-mouth tissues.

Questions to answer	Teaching focus
- What is the immediate airway and hemorrhage plan? - Which tissue is clearly nonviable? - What support and lining can be reconstructed reliably now? - What should be staged?	Early definitive reconstruction may be advantageous, but physiology and the reliability of the tissue zone determine the pace. Preserve options and avoid both radical debridement and premature closure over uncertain tissue.

Case 8 - The red scar at six weeks

A repaired cheek laceration is erythematous and firm at six weeks without pain, drainage, weakness, or contour distortion. The patient requests immediate excision.

Questions to answer	Teaching focus
- Is this normal maturation or hypertrophy? - What conservative care is reasonable? - Which findings justify earlier intervention? - When should cosmetic revision be considered?	An immature scar is expected to be visible. Reassure and treat biology, but intervene early for progressive hypertrophy, tethering, functional contracture, or landmark distortion.

ORAL-BOARD PEARL
Name the hidden structure, state what must happen before local anesthetic, define the treatment clock, and give the functional endpoint before discussing skin closure.

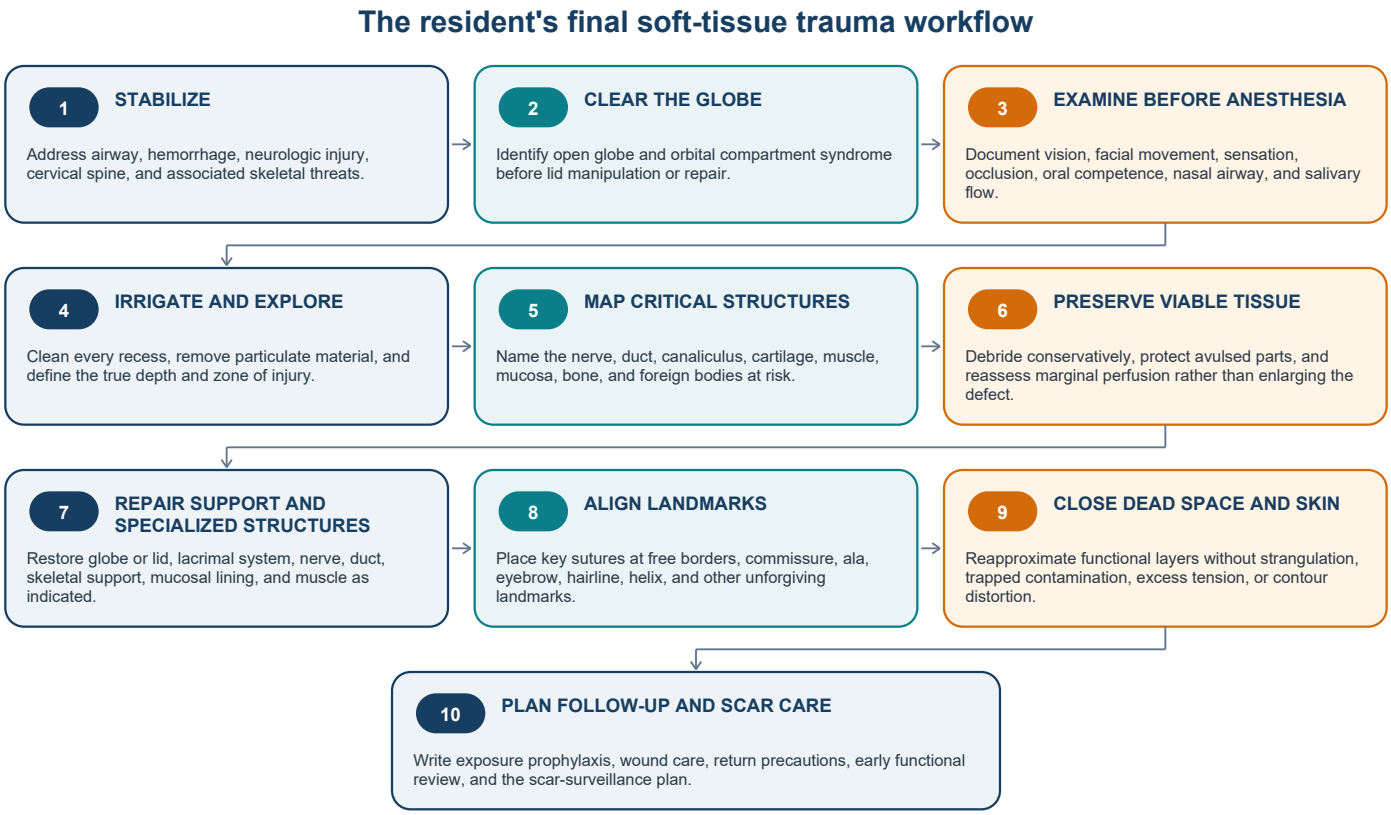


Figure 10.1. Final resident workflow for facial soft-tissue trauma.

The final oral-board presentation

Begin with physiologic stability and associated ocular, airway, vascular, neurologic, and skeletal threats. Then state the wound's location, depth, contamination, tissue loss, and examination reliability. Name the specialized structures at risk and the pre-anesthetic functional findings. Explain irrigation and debridement, repair order, landmark alignment, antibiotic, tetanus, and rabies decisions, disposition, and surveillance. End with complications and the plan to detect them.

BOARD PEARL
A strong answer is not "I will wash out and close the laceration." It is: "I will examine function before anesthetic, clear the globe, define nerve, duct, and canalicular involvement, preserve viable tissue, repair critical structures and muscle, align free borders, close dead space without tension, and arrange early functional follow-up."

RESIDENT SYNTHESIS
The visible wound is only the entry point. A complete plan names the hidden structures, defines the repair sequence, calibrates contamination management, and anticipates the scar and functional recovery.

Practical Appendices

Appendix A - One-minute facial wound examination

Domain	Document before anesthesia
Global	Mechanism, time, contamination, tissue loss, hemodynamics, airway, associated fractures, and reliability of the examination.
Eye / eyelid	Acuity, pupils, globe integrity, motility, lid margin, canthi, levator, orbital fat, puncta, and ability to close gently and tightly.
Facial nerve	Brow elevation, gentle and tight eye closure, nasal flare, smile, lip purse, lower-lip depression, and platysma.
Parotid	Wound relative to the tragus-to-upper-lip line, papilla, salivary flow, and blood or saliva in the wound.
Mouth / lip	Vermilion, commissure, mucosa, orbicularis, dentition, oral competence, occlusion, and intraoral foreign material.
Nose / ear	Nasal airway, alar rim, intranasal mucosa, septum, exposed cartilage, septal hematoma, tissue loss, auricular hematoma, and contour.
Neurovascular / sensory	Perfusion, capillary refill, active or pulsatile bleeding, expanding hematoma, bruit or thrill, and mapped V1 supraorbital/supratrochlear, V2 infraorbital, and V3 mental sensation.
Limitations	Pain, intoxication, intubation, age, edema, sedation, and every element that must be re-examined.

SEPTAL HEMATOMA
Inspect both nasal cavities. A fluctuant septal collection after trauma requires urgent drainage, reapposition or packing per local practice, and reliable early follow-up to prevent cartilage necrosis, abscess, and saddle deformity.

VASCULAR DANGER
Use direct pressure or packing for hemorrhage; do not blindly clamp a deep facial wound. Escalate for uncontrolled or pulsatile bleeding, an expanding hematoma, bruit or thrill, neurologic deficit, airway effect, or a high-risk trajectory.

Appendix B - Repair order checklist

Step	Action
1	Clear the globe, secure the airway as indicated, and control life-threatening bleeding.
2	Photograph the wound and mark free borders before infiltration.
3	Irrigate every recess and remove particulate contamination.
4	Define depth and identify nerve, duct, canaliculus, cartilage, muscle, mucosa, bone, and foreign body.
5	Repair globe or eyelid, lacrimal system, facial nerve, parotid duct, and skeletal support as indicated.
6	Restore mucosal lining and muscle continuity.
7	Eliminate dead space and approximate deep dermis without strangulation.
8	Place key landmark sutures at the vermilion, lid margin, commissure, ala, eyebrow, hairline, or helix.
9	Complete skin closure; then reassess perfusion, function, symmetry, hemostasis, and eye protection.
10	Write antibiotic, tetanus, rabies, wound-care, follow-up, stent or bolster, and return-precaution plans explicitly.

Practical Appendices - continued

Appendix C - Antibiotic and exposure quick reference

Scenario	General approach	Caveat
Simple clean facial or scalp laceration	No routine systemic prophylaxis.	Use judgment for unusual contamination, major tissue destruction, or a high-risk host.
Complex or high-risk facial wound	Consider prophylaxis for 24 hours or less.	Large dead space, devitalized tissue, gross contamination, or substantial immunocompromise increases risk.
Through-and-through skin-to-oral wound	Prophylaxis is generally recommended.	Layered repair, oral hygiene, and source control remain essential.
Mammalian facial bite	A 3- to 5-day prophylactic course is commonly recommended.	Use exposure-specific coverage and local allergy guidance; lengthen only for established infection.
Established infection	Therapeutic antibiotics plus drainage or other source control.	Culture purulence, treatment failure, or unusual exposures selectively.

TETANUS - CDC WOUND GUIDANCE

All wounds: vaccinate if history is unknown, absent, or incomplete. With a complete primary series, give a booster at 10 years for a clean minor wound or at 5 years for a dirty or major wound. TIG is never indicated for a clean minor wound. For a dirty or major wound, give TIG 250 IU IM for unknown, absent, or incomplete vaccination and for HIV or severe immunodeficiency. Antibiotics do not prevent tetanus.

RABIES - PUBLIC-HEALTH DECISION

Immediately wash and irrigate the wound and obtain a public-health risk assessment. If never vaccinated, PEP includes HRIG infiltrated around the wound when feasible, with any remainder IM distant from vaccine, plus vaccine on days 0, 3, 7, and 14; add day 28 for immune disorders. If previously vaccinated, give no HRIG and vaccinate on days 0 and 3. Never place HRIG and the first vaccine dose in the same syringe or site.

Appendix D - Patient-facing return precautions

Return urgently for	Why
Reduced vision, severe eye pain, new proptosis, or inability to close the eye	Globe, orbit, optic nerve, or eyelid-protection failure.
Increasing redness, pus, fever, rapidly worsening swelling, or severe pain	Infection, hematoma, or tissue necrosis.
New facial droop, drooling, numbness, or speech change	Nerve, sensory-nerve, or muscle dysfunction.
Clear cheek fluid or swelling that worsens with meals	Salivary leak or sialocele.
Persistent tearing down the cheek	Canalicular obstruction or eyelid-pump dysfunction.
Nasal or ear tissue becoming dark, pale, or increasingly painful	Compromised perfusion, cartilage infection, or recurrent hematoma.
Wound separation or bleeding that does not stop with firm direct pressure	Closure or hemostatic failure.

Appendix E - Oral-board structure

TEN-PART ANSWER

1. Stability and associated threats. 2. Examination reliability and pre-anesthetic function. 3. Location, depth, contamination, and tissue loss. 4. Specialized structures at risk. 5. Imaging and consultants. 6. Irrigation and debridement. 7. Critical-structure and layered repair sequence. 8. Landmark alignment and closure. 9. Antibiotic, tetanus, and rabies decisions. 10. Disposition, follow-up, complications, and scar plan.

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EVIDENCE NOTE

Online sources are included for current emergency and public-health guidance. They should be read with their access dates; treatment must also follow local protocols, available expertise, and the individual injury.

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FINAL RESIDENT TAKEAWAY

Identify the hidden functional injury, preserve viable tissue, repair specialized structures and muscle before skin, align unforgiving landmarks, and guide the patient through healing and scar maturation.