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Perioperative Care In Maxillofacial Surgery- An Updated Review For Healthcare Professionals

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Abstract:

Background: Facial lacerations are common injuries that pose significant functional and aesthetic challenges if inadequately managed. Their proximity to critical neurovascular and glandular structures necessitates meticulous perioperative care to minimize complications and long-term morbidity.

Aim: This review aims to provide an updated, anatomy-based overview of perioperative assessment, repair techniques, and multidisciplinary considerations in facial laceration management.

Methods: A narrative review of facial anatomy, indications, contraindications, equipment, techniques, and complications relevant to facial laceration repair was conducted, integrating current clinical standards and operative principles.

Results: Optimal outcomes depend on detailed anatomical knowledge, appropriate wound preparation, layered closure guided by relaxed skin tension lines, and early identification of injuries involving the facial nerve, parotid duct, eyelid margin, and lacrimal system. Adjunctive measures, including proper anesthesia, suture selection, and postoperative scar management, significantly reduce infection, dehiscence, and poor cosmetic outcomes.

Conclusion: Structured perioperative planning and anatomy-based repair enhance functional recovery and aesthetic results in facial laceration management.

Keywords: Facial lacerations, perioperative care, facial anatomy, wound repair, aesthetic outcomes.

Introduction:

Facial lacerations are a frequent presentation in emergency and primary care settings, with an estimated 2 million cases annually in the United States alone [1][2]. These injuries often result from blunt or sharp trauma, falls, or interpersonal violence and can vary in depth, complexity, and involvement of underlying structures such as nerves, muscles, or salivary glands. Effective management of facial lacerations is essential, as inadequate repair may lead to functional deficits, including impaired mastication, speech, or eyelid closure, as well as permanent aesthetic deformities that negatively affect psychosocial well-being [3]. Optimal management requires an integrated approach that combines precise anatomical knowledge, technical proficiency in wound closure, and attention to adjunctive care measures. Thorough wound cleansing, irrigation, and debridement are critical to minimizing infection risk, while tetanus prophylaxis and antimicrobial strategies ensure systemic safety. In addition, thoughtful alignment of facial subunits, meticulous suture placement, and appropriate selection of closure materials are essential to reduce tension, prevent scar widening, and achieve favorable cosmetic outcomes [4]. Beyond procedural skills, clinicians must consider the holistic care of patients, including pain control, counseling on wound care, and early recognition of complications such as infection, dehiscence, or hematoma formation. Mastery of these principles allows providers to restore both function and aesthetics, ultimately enhancing patient satisfaction and long-term quality of life. Understanding the interplay between facial anatomy, wound physiology, and clinical techniques is therefore fundamental for safe and effective management of facial soft tissue trauma.

Anatomy and Physiology

The soft tissues of the head and face can be systematically conceptualized as eight discrete aesthetic and functional regions, each possessing distinctive anatomical features and biomechanical behaviors that bear directly on clinical decision-making and outcomes in laceration repair. An advanced understanding of these subunits—encompassing their layered organization, vascular architecture, innervation patterns, and key surgical landmarks—enables the clinician to preserve form and function while minimizing scarring and complications. These units differ in skin thickness, connective tissue composition, muscular attachments, and fascial relationships; collectively, they guide orientation of incisions, selection of closure techniques, and identification of structures at risk during acute repair. Appreciating the subtleties across these territories is essential for optimizing both cosmetic integration and physiological restoration in the context of traumatic soft tissue injury [5][6]. The scalp exemplifies a highly structured, multilaminar soft tissue envelope arranged from superficial to deep as skin, subcutaneous fat, galea aponeurotica, loose areolar tissue, and periosteum. The commonly utilized mnemonic "SCALP" encapsulates these layers. The skin, harboring densely distributed hair follicles, overlies a richly vascularized fatty connective tissue layer that supports follicular metabolism and dermal health. Deep to this lies the galea aponeurotica, a fibrous sheet spanning the calvarial vertex, serving as the insertion site for the frontalis and occipitalis bellies of the occipitofrontalis muscle and conveying vessels to the subdermal plexus. Lateral continuity is maintained as the galea coalesces with the temporoparietal (superficial temporal) fascia, a loose areolar plane that is superficial to the temporalis muscle fascia and the subcutaneous compartment. Beneath the galea, a thin layer of loose areolar tissue permits glide and is susceptible to potential space formation. The innermost layer, periosteum (pericranium), is tightly adherent to the osseous calvarium, providing a robust anchoring interface and participating in osteogenic response after injury. The scalp's perfusion derives from extensive anastomoses between external and internal carotid branches. As a region supporting approximately 100,000 hair follicles, its circulatory demand is considerable. The superficial temporal, posterior auricular, and occipital arteries—branches of the external carotid system—supply the lateral frontotemporal, postauricular-superoposterior, and posterior territories, respectively, while the ophthalmic artery (from the internal carotid) contributes the supraorbital and supratrochlear branches to the forehead and anterior scalp. Venous outflow is via superficial veins that mirror their arterial routes. Owing to the rigid attachment of vessels to the galea aponeurotica, vasoconstrictive reflexes are limited in response to injury, rendering scalp lacerations prone to brisk and persistent hemorrhage [7].

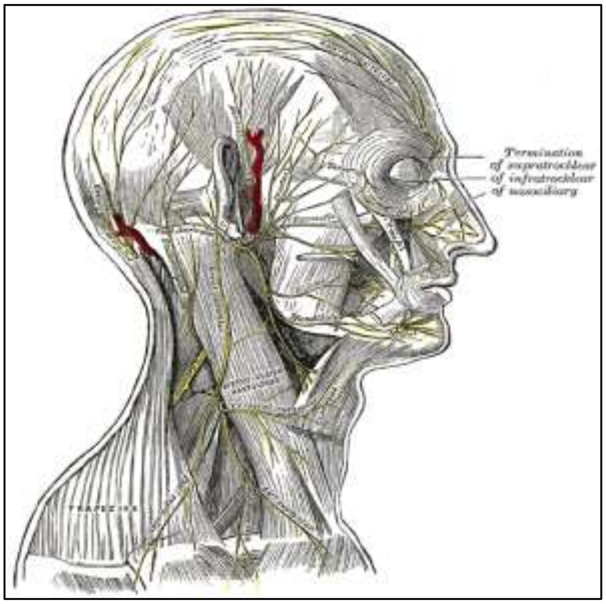

Fig. 1: Superficial Nerves of the Head and Neck.

The forehead spans from the supraorbital rims inferiorly to the hairline superiorly, or to the frontalis muscle's superior extent when the hairline is obscured. Its layered structure parallels that of the scalp: skin, subcutaneous connective tissue, the frontalis muscle contiguous with the galea, a loose areolar plane, and periosteum. The vertical contraction of the frontalis generates transverse relaxed skin tension lines (RSTL) and horizontal rhytids across most of the forehead, while the corrugator supercilii in the glabellar region produces vertical creases with corresponding RSTL. When reconstructing traumatic defects, aligning closure along natural RSTL, where feasible, can substantially attenuate visible scar formation and enhance aesthetic blending. Vascular inflow to the forehead integrates contributions from both internal and external carotid distributions. The paired supratrochlear and supraorbital arteries run alongside their namesake sensory nerves to supply the central forehead. The supratrochlear artery exits via a notch at the superomedial orbit approximately 2 cm from midline, traverses the corrugator supercilii, and reaches the frontalis and overlying integument [8]. The supraorbital artery exits through a notch in a large proportion of patients or via a foramen in a substantial minority before ascending the forehead [9]. Lateral perfusion is provided by the superficial temporal artery, an external carotid terminal branch. Sensory innervation to the forehead and anterior scalp is mediated predominantly by the supraorbital and supratrochlear nerves, branches of the ophthalmic division of the trigeminal nerve (CN V, V1), while motor innervation is supplied by the frontal (temporal) branch of the facial nerve (CN VII), coursing in the subgaleal plane to innervate the frontalis, the superior orbicularis oculi, and the corrugator supercilii. The trajectory of the frontal branch is often approximated by the Pitanguy line, extending from a point 5 mm below the tragus to another 15 mm above the lateral brow, a heuristic that assists in anticipating nerve location and mitigating iatrogenic injury during lateral forehead procedures [10][11][12].

The cheek's soft tissue domain is bounded inferiorly by the infraorbital rim and jawline, laterally by the preauricular crease, and medially by the nasal complex. Its layered composition includes skin, subcutaneous tissue, the superficial musculoaponeurotic system (SMAS), a sub-SMAS areolar plane, and deep parotidomasseteric fascia [13]. The subcutaneous compartment houses regionally distinct facial fat pads that confer contour, projection, and age-dependent changes in the midface. Lacerations that penetrate to this depth may precipitate herniation of fat, necessitating meticulous reduction and layered closure to restore surface topography. The SMAS, juxtaposed deep to subcutaneous fat, is continuous superiorly with the temporoparietal fascia and anteriorly with the facial mimetic muscles, forming a key structural and functional scaffold for facial expression and soft tissue suspension [14]. Beneath the SMAS, the sub-SMAS areolar plane serves as a low-friction glide zone for dynamic muscular movement and accommodates the course of retaining ligaments that tether superficial tissues to the osseous framework. Cheek perfusion is diverse: branches of the ophthalmic artery—namely zygomaticofacial, zygomaticotemporal, and infraorbital arteries—supply medial segments; the transverse facial artery, arising from the superficial temporal artery, nourishes the lateral cheek; and the angular artery, the terminal branch of the facial artery, ascends along the nasolabial fold to vascularize the inferomedial cheek and lateral nasal soft tissues. Sensory input derives predominantly from branches of the maxillary division of the trigeminal nerve (CN V, V2), providing nuanced innervation across cheek territories.

A crucial consideration in cheek trauma is the proximity of the parotid gland and the extratemporal facial nerve in the lateral cheek. The facial nerve exits the stylomastoid foramen, enters the parotid gland, and divides it into superficial and deep lobes. Within the gland, the nerve bifurcates into the temporozygomatic (superior) and cervicofacial (inferior) divisions, which course beneath the SMAS superficial to the masseteric fascia as they arborize toward muscles of facial expression. Terminal branches include the frontal, zygomatic, buccal, marginal mandibular, and cervical nerves, and injury to any of these branches can result in focal weakness in the related mimetic unit [15]. Importantly, lesions proximal to the branching point can impair all downstream divisions, whereas injuries medial to the lateral canthus often do not necessitate repair due to robust cross-innervation that supports functional recovery and mitigates overt deficits [16]. The parotid gland is enveloped by parotidomasseteric fascia deep to the zygomatic arch and superficial to the masseter muscle. The Stenson (parotid) duct travels anteriorly, accompanied by the buccal branch of the facial nerve and the transverse facial artery; at the anterior border of the masseter, it turns medially, traversing the buccal fat pad, piercing the buccinator, and ultimately entering the oral cavity via a punctum adjacent to the second maxillary molar. A practical surface approximation for the duct's path is a line from the tragus to the upper lip's midline. Trauma to the lateral cheek that disrupts the gland or duct should be recognized and addressed before cutaneous repair to prevent salivary extravasation into subcutaneous planes, which can culminate in sialocele formation or a cutaneous salivary fistula, conditions that complicate healing and may require targeted interventional management [17][18][19][20][21][22].

Fig. 2: 19-year-old male struck in the face by the back end of a heavy machine gun that was dislodged from its mount when the barrel struck an overpass as the vehicle was driving.

The periorbital region, comprising the upper and lower eyelids, is architecturally complex, with each eyelid anchored medially and laterally to the orbital periosteum (periorbita) via canthal tendons. For operative clarity, the eyelids are commonly described in lamellae: the anterior lamella (skin and orbicularis oculi muscle), the posterior lamella (tarsal plate, levator apparatus or capsulopalpebral fascia, and conjunctiva), and, in some schemas, a middle lamella (orbital septum and tarsal plates). Eyelid skin is exceptionally thin and contains no subcutaneous fat, which mandates gentle handling to avoid tissue trauma and postoperative contour irregularity during repair. The orbital septum, a fibrous partition from periosteum to tarsus, functions to retain orbital contents and restrict anterior prolapse of orbital fat. The tarsal plates provide structural rigidity, house eyelash follicles, and maintain eyelid curvature and margin integrity [23][24]. Deep to the tarsus, the posterior lamella includes the levator palpebrae superioris (upper lid) and, analogously in the lower lid, the capsulopalpebral fascia; both are covered by a mucosal conjunctiva that lubricates and protects the corneal surface. Laterally, the lateral canthal tendon suspends the eyelid and secures alignment, while medially, the medial canthal tendon has a more intricate relationship with the lacrimal drainage apparatus, contributing to the lacrimal pump function. At the eyelid margins, a punctum in each lid communicates with superior and inferior canaliculi that converge into a common canaliculus, emptying into the lacrimal sac and channeling tears through the nasolacrimal duct to the nasal cavity beneath the inferior turbinate.

Given this arrangement, medial canthal lacerations should prompt a heightened suspicion for injury to the lacrimal drainage system; such damage must be identified and managed prior to cutaneous closure to prevent chronic epiphora and infection. Clinical signs suggesting medial canthal involvement include lateral displacement of the puncta, rounding of the medial canthal angle, telecanthus, and transverse shortening of the palpebral fissure [25][26][27]. The eyelid margin serving as a critical subunit boundary—requires precise reapproximation to avoid margin notching and the resultant mechanical and cosmetic sequelae [28]. The eyelids receive abundant arterial supply, mainly via branches from the internal carotid circulation: the lateral palpebral artery (from the lacrimal artery) and the medial palpebral artery (from the ophthalmic artery), which collectively sustain the delicate lamellae and support rapid wound healing [24]. The nasal soft tissue envelope comprises skin, SMAS, subcutaneous fat, periosteum and perichondrium, underlying bone and cartilage, and an internal mucosal lining. Functionally, the nose is divided into upper, middle, and lower thirds. The upper third forms the bony vault, constituted by the paired nasal bones and the frontal processes of the maxillae. The middle third, or midvault, is built from the paired upper lateral cartilages and the dorsal septum, while the lower third is sculpted by the paired lower lateral cartilages that define tip projection and contour. From a reconstructive standpoint, the nasal integument is commonly segmented into nine aesthetic subunits following the seminal framework of Burget and Menick: tip, dorsum, columella, two sidewalls, two soft tissue triangles (facets), and two alae [29]. Variation in skin thickness across the nose is clinically significant: the midvault and rhinion exhibit the thinnest integument, whereas thicker skin is seen over the nasal root and tip, a difference that influences flap selection, scar visibility, and contour matching during and after repair [30]. Arterial supply to the external nose is robust, with extensive anastomoses contributed by branches of the ophthalmic, maxillary, and facial arteries that ensure redundancy and resilience against ischemic complications [31]. Sensory innervation of the nasal dorsum and alae is provided by the external nasal nerve, a branch of the ophthalmic division (CN V1), while lateral nasal surfaces receive input from the infraorbital nerve (CN V2); motor influence, particularly affecting peri-nasal expressions, is mediated by zygomatic and buccal branches of the facial nerve [32].

The external ear (auricle) is anatomically organized into six subunits: the tragus, antitragus, helix (including the helical crus), antihelix (including the antihelical crura), the conchal bowl—which is divided into the cymba concha and cavum concha by the helical crus—and the lobule. Layering proceeds from skin to perichondrium to cartilage, except in the lobule, which is unique for its fibroadipose composition without cartilaginous support. The perichondrium is essential both as a structural interface and as the principal nutrient source for the relatively avascular auricular cartilage. The auricle's blood supply arises from the external carotid system, notably via the superficial temporal and posterior auricular arteries, which nourish the perichondrial envelope and thereby sustain chondral integrity and healing potential. Sensory innervation is distributed through several nerves: the auriculotemporal branch of the trigeminal nerve, the lesser occipital nerve, and the greater auricular nerve; together they confer complex tactile acuity and facilitate pain and temperature sensation around the pinna and external auditory structures [33][34]. The perioral domain is a dominant facial unit framed superiorly by the nasal base, laterally by the nasolabial folds, and inferiorly by the labiomental sulcus, with the lips constituting both a functional sphincter and a critical aesthetic focus. It is divided into six subunits—four in the upper lip and two in the lower. The upper lip comprises the vermillion (red lip) and the cutaneous portion, the latter subdivided into bilateral lateral segments and a central philtrum characterized by philtral columns and a philtral dimple that contribute to unique identity and symmetry. The lower lip includes the cutaneous white lip and the vermillion. The vermillion border marks the transition from cutaneous white lip to red lip and is a prominent aesthetic demarcation whose precise restoration is imperative in laceration repair; even submillimetric misalignment is conspicuous and cosmetically unacceptable. Just superior to this border lies the white roll, a subtle ridge more pronounced in younger individuals and central to surgical planning in cleft lip reconstruction. Internally, the wet–dry junction is the interface between the keratinized red lip and the non-keratinized labial mucosa, a transition zone that influences suture choice and mucosal handling during repair. Structurally, the lips are composed of three main layers: the external skin or outer mucosa of the dry lip, the core orbicularis oris muscle that provides circumferential closure and articulation, and the inner oral mucosa. Vascular supply is derived from the superior and inferior labial arteries, branches of the facial artery that run deep to the orbicularis oris; these vessels are typically compromised only in full-thickness lacerations, where meticulous hemostasis and layered closure are essential to prevent hematoma and optimize healing. Sensory innervation is segmentally organized: the infraorbital nerve (CN V2) supplies the upper lip, while the mental nerve (CN V3) serves the lower lip; motor control of perioral musculature is vested primarily in the buccal and marginal mandibular branches of the facial nerve, whose preservation is crucial for oral competence, speech, and expressive function [35][36].

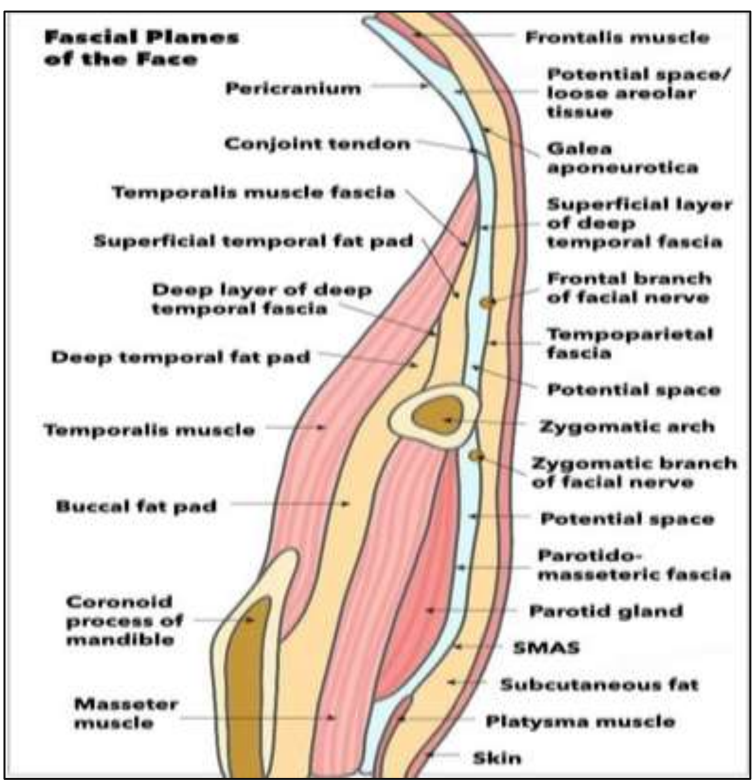

Fig. 3: Fascial Planes of the Face.

The chin, occupying the inferior central contour of the mandible below the labiomental sulcus, derives much of its projection and bulk from subcutaneous fibroadipose tissue and the mentalis muscle. The mentalis originates from the anterior mandible and inserts into the dermis, contributing to soft tissue elevation and lower lip eversion during functional movement. Sensory supply to the chin is provided by the mental nerve, a branch of the mandibular division (CN V3), exiting through the mental foramen typically anterior to the first premolar, an anatomic landmark of relevance in trauma and surgical procedures involving the lower face. Motor innervation to the mentalis is conveyed by the marginal mandibular branch of the facial nerve, a structure that courses along the mandibular border with variable position; injury can result in asymmetry of chin movement and lower lip depression, emphasizing the importance of careful exploration and layered repair in lacerations across the mentum [6]. Across all facial units, the principles of layered anatomical repair hinge on an appreciation of the interplay between skin tension lines, vascular territories, neural pathways, and fascial planes. Aligning closures with RSTL where feasible, respecting aesthetic subunit boundaries (such as the vermillion border and eyelid margin), and prioritizing preservation of critical conduits (for example, the parotid duct and lacrimal drainage system) are paramount. The surgeon must anticipate the consequences of violating specialized planes—such as the subgaleal or sub-SMAS glide zones—and account for region-specific tissue handling demands, as with the ultra-thin eyelid skin and the vascular scalp bed prone to hemorrhage. Finally, integrating neurovascular protection into operative strategy, especially in areas dense with functional structures like the lateral cheek and periorbital region, advances outcomes by safeguarding expression, sensation, and physiological drainage. A thorough grasp of these anatomical and physiological frameworks equips the clinician to achieve durable, aesthetically harmonious reconstructions that respect the face's complex form and its vital functions [23][24][25][26][27][28][29][30][31][32][33][34][35][36].

Indications

Facial laceration repair is indicated for soft tissue injuries that compromise skin integrity and involve potential functional or aesthetic disruption. While superficial abrasions or minor epidermal injuries may heal effectively with local wound care and secondary intention, deeper lacerations necessitate active intervention [37]. All wounds should undergo careful assessment to identify involvement of critical structures, including underlying muscles, nerves, salivary ducts, and bony prominences, as well as to detect associated injuries such as fractures, contusions, or hematomas. Repair is particularly indicated for wounds that cross multiple tissue planes, as layered closure is required to restore structural integrity, prevent wound dehiscence, and optimize cosmetic outcomes. Prompt management also reduces the risk of infection, facilitates early functional recovery, and minimizes long-term scarring. Decisions regarding repair timing and technique should be guided by wound location, depth, contamination level, and the patient's overall clinical status, ensuring both functional and aesthetic preservation [37].

Contraindications

Immediate priorities in trauma care, such as securing the airway, stabilizing hemodynamics, and addressing life-threatening intracranial or intrathoracic injuries, take precedence over facial laceration repair. In a stable patient, laceration management should be delayed until thorough evaluation of associated bony or structural facial injuries is completed, particularly when operative intervention may be required [37]. Certain facial lacerations may serve as surgical windows to access underlying fractures, highlighting the need for careful sequencing of care. Cervical spine protection is mandatory, given the high-risk mechanisms often associated with facial trauma, including motor vehicle collisions, falls, and interpersonal violence. Lacerations exhibiting gross contamination, overt infection, or presenting more than 24 hours after injury should not be closed immediately, as premature closure increases the risk of abscess formation [38]. In such cases, delayed primary closure or secondary intention healing is preferred. Extensive soft tissue loss, complex wound geometry, or the inability to achieve tension-free repair at the bedside warrants operative intervention to optimize both functional and aesthetic outcomes.

Equipment

Effective management of facial lacerations requires a comprehensive set of equipment to ensure proper wound cleansing, hemostasis, and closure while minimizing infection risk and optimizing functional and aesthetic outcomes. Sterile saline, at least one liter, is essential for thorough irrigation of the wound, which can be administered using a bulb syringe or a catheter-tipped syringe ranging from 20 to 60 mL. Antiseptic solutions, such as povidone-iodine or chlorhexidine, are critical for pre-procedural skin preparation. Local anesthetics, along with 18- and 27-gauge needles and 10 mL syringes, allow for adequate infiltration and patient comfort during repair. Sterile gloves and gauze sponges maintain a clean field, while suction assists in removing debris and blood to enhance visualization. Precision instruments, including Castroviejo or Halsey needle drivers, 0.5-mm forceps such as Castroviejo or Adson-Brown, and Mayo or Iris suture scissors, facilitate delicate tissue handling. A variety of sutures, ranging from 3-0 to 6-0, absorbable and nonabsorbable, monofilament and braided, are selected based on wound depth, location, and tissue type. Finally, post-repair care requires antibiotic ointment or adhesive strip bandages to protect the wound, prevent infection, and support healing. Proper preparation of this equipment ensures an efficient, safe, and effective repair process [37][38].

Personnel

Repair of facial lacerations demands healthcare providers with a foundational understanding of suturing techniques, tissue handling, and wound management. Emergency medicine physicians and primary care providers are often capable of repairing simple, superficial lacerations where only epidermal or dermal layers are involved. However, complex injuries involving multiple tissue planes, significant tissue loss, or structures with specialized functions require specialist consultation. Injuries affecting the globe, eyelid margin, lacrimal drainage system, parotid duct, or facial nerve necessitate involvement of ophthalmologists, plastic surgeons, or otolaryngologists to prevent long-term functional impairment. Pediatric patients or those with comorbidities that complicate anesthesia or wound healing may require anesthesiology input to safely manage sedation and analgesia. Nurses and surgical assistants provide critical support in preparation, maintaining a sterile field, administering local anesthetics, and assisting with instrumentation and suture handling. Coordination among all personnel ensures optimal outcomes, minimizes complications, and addresses both aesthetic and functional aspects of facial laceration repair [39].

Preparation:

Preparation for facial laceration repair begins with obtaining informed consent, which must include a discussion of procedural goals, anesthesia type, immediate recovery expectations, and long-term outcomes. Patients should receive both written and verbal wound care instructions, reviewed with a caregiver when possible. Risk factors for impaired healing, such as immunosuppression, chronic illness, malnutrition, tobacco use, and poorly controlled diabetes, should be discussed, offering an opportunity to encourage interventions like smoking cessation or glucose optimization [40][41]. A thorough medical history and physical examination are essential, along with identification of concomitant injuries. Pre- and post-repair photographs provide documentation for medical, aesthetic, and legal purposes and help patients appreciate functional and cosmetic improvements despite residual scarring. Patient follow-up capacity must be assessed; dissolvable sutures may be preferable for those with limited access to care. Proper instrumentation and lighting are critical for optimal repair, and evaluation of the wound dictates whether bedside repair under local anesthesia or operating room intervention under general anesthesia is indicated. Baseline sensory and motor function should be documented before anesthesia to differentiate preexisting from iatrogenic deficits. Infection prophylaxis must be considered, particularly for animal or human bites, with amoxicillin-clavulanate recommended for standard coverage and tetanus vaccination or immunoglobulin administered as indicated. Finally, thorough irrigation and foreign body removal are mandatory. Puncture wounds, wounds older than 24 hours, or high-risk bites require reassessment to determine whether delayed closure or secondary intention healing is appropriate, ensuring both infection prevention and optimal functional and aesthetic outcomes [40][41].

Treatment:

Facial laceration repair begins with evaluation and adequate anesthesia to optimize patient comfort and procedural success. Topical anesthetics, such as lidocaine, epinephrine-tetracaine (LET), or tetracaine-adrenaline-cocaine (TAC) mixtures, can be applied before local infiltration [42][44]. Regional or single-nerve blocks are effective alternatives, particularly in edematous areas, because they provide anesthesia without distorting wound edges. Nerve blocks, including supraorbital, infraorbital, mental, zygomatic, auricular, and dorsal nasal nerve blocks, cover most facial regions [36]. Local infiltration with epinephrine-containing anesthetic improves hemostasis but may affect motor and sensory function; baseline function should be documented prior to administration. For nerve injuries, repair is best performed under general anesthesia to allow intraoperative nerve identification without the confounding effects of paralytics or local anesthetic [51]. Following anesthesia, thorough wound irrigation is essential to remove debris and blood, reducing infection risk and preventing traumatic tattooing from embedded particulate matter [45][47]. Warm sterile saline is usually sufficient, as antiseptics may impair fibroblast activity and delay healing. Hemostasis is achieved via direct pressure or vessel ligation. Surrounding hair can be trimmed for visualization, but care is taken with eyebrows and other slow-growing areas [48]. Tissue handling must be gentle, and undermining used conservatively to minimize devitalization while enabling tension-free closure.

Technical considerations vary by facial subunit. Scalp lacerations require evaluation for intracranial injury; staples or layered sutures are used depending on depth [49][50]. Forehead wounds need layered closure respecting relaxed skin tension lines, with nerve and muscle repair performed under microscopy if transected [51]. Cheek repair demands assessment of parotid duct, gland, and facial nerve; duct injuries can cause sialoceles and may be managed with drains or botulinum toxin injections [52][53]. Periorbital injuries necessitate ocular assessment, canthal ligament evaluation, and eyelid margin repair to prevent ectropion or exposure keratitis [55]. Nasal lacerations are repaired in layers, addressing cartilage and mucosa, sometimes requiring grafts to prevent alar or columellar distortion. Ear repairs address cartilage alignment and prevent auricular hematoma, with prophylactic antibiotics considered for exposed cartilage. Lip injuries require careful vermillion border alignment, layered muscle repair, and appropriate suture choice for wet versus dry lip; tension-free closure is critical to prevent microstomia [35]. Chin repair emphasizes mentalis muscle restoration to prevent ptosis. Suture selection is tailored to wound depth, tissue type, and patient follow-up. Absorbable sutures are preferable when follow-up is limited; non-absorbable monofilament sutures, including nylon or polypropylene, minimize tissue reactivity and are removed within approximately six days. Braided sutures and gut sutures dissolve at variable rates depending on composition. Staples and cyanoacrylate may be used for superficial lacerations but are inadequate for deeper layered closures [56][57]. Optimal repair involves cleansing, hemostasis, gentle tissue handling, tension-free edge approximation, and alignment of aesthetic subunits. Postrepair care significantly influences outcomes, with scars maturing over 12 months. Sun protection reduces hyperpigmentation, pulsed-dye lasers may treat early erythema, and steroids, ablative lasers, silicone sheets, or topical gels may manage hypertrophic or keloid-prone scars. Attentive repair technique, careful suture selection, and consistent postoperative care collectively ensure the best functional and aesthetic results.

Complications:

Complications following facial laceration repair can be categorized into short-term and long-term outcomes. Long-term complications primarily involve scarring, hypertrophic scars, and keloid formation. Poor cosmetic results often arise from excessive tension on wound edges, inadequate eversion, or mismatched wound edge alignment. Patients with a history of keloid or hypertrophic scar formation are at increased risk, though keloids on the face are uncommon; they are more frequent on the scalp, posterior neck, and ears. Managing patient expectations is critical, emphasizing that even with meticulous technique, suboptimal scarring may occur. Scar revision strategies include intralesional corticosteroid injections, dermabrasion, laser resurfacing, and surgical revision. Steroid injections reduce fibrosis and soften scars but can cause dermal thinning, fat atrophy, and telangiectasia. Dermabrasion mechanically ablates superficial skin layers to promote re-epithelialization and collagen remodeling [58]. Laser resurfacing achieves similar outcomes through vaporization of intracellular water, with carbon dioxide and erbium: YAG lasers commonly employed [59][60]. Surgical revision may involve excision and scar reorientation using z-plasty, w-plasty, or geometric broken line closure [61], often combined with adjunctive therapies like steroids or lasers. Short-term complications include hematoma, wound infection, and dehiscence. Hematomas result from inadequate hemostasis and require careful intraoperative evaluation. Expanding hematomas necessitate wound exploration, hemostasis, and possible placement of suction drains with pressure dressings, while smaller hematomas may respond to conservative management with pressure and warm compresses. Wound infection mandates aggressive irrigation, debridement if needed, and potential delayed closure. Retained foreign bodies significantly increase infection risk, highlighting the importance of thorough wound cleansing prior to closure [62][41].

Clinical Significance

Facial laceration repair demands precise knowledge of facial anatomy and careful soft tissue handling to achieve optimal outcomes. Improper management can lead to functional impairments, such as oral incompetence or eyelid malposition, and aesthetic concerns, including misaligned scars, subunit distortion, or irregular contour. These physical outcomes often carry significant psychological consequences, ranging from anxiety and social withdrawal to body image disturbances. Counseling patients before repair regarding expected outcomes and potential limitations establishes realistic expectations and enhances trust in the clinician-patient relationship. Understanding the impact of facial appearance on social and emotional well-being emphasizes the importance of meticulous technique, proper suture selection, and layered closure when indicated. Moreover, thorough documentation, including photographs, supports both clinical decision-making and patient education. Optimal repair balances functional restoration with aesthetic goals, directly influencing long-term satisfaction, quality of life, and the overall perception of care [62].

Enhancing Healthcare Team Outcomes

Management of complex facial lacerations often requires a coordinated, interprofessional approach. Specialized injuries may involve ophthalmologists or oculoplastic surgeons for periorbital trauma, neurosurgeons for cranial vault involvement, and plastic or facial surgeons for facial nerve, parotid duct, or multi-layer soft tissue repair. Early involvement of these specialists ensures precise repair, minimizes complications, and improves cosmetic outcomes, which are directly tied to patient satisfaction and psychosocial well-being. The broader healthcare team—including nurses, anesthesiologists, and case managers—supports continuous monitoring, pain control, and adherence to postoperative care plans. Case managers facilitate psychosocial support and access to follow-up care, particularly in patients with polytrauma or limited resources. Effective communication and coordination among all team members allow for timely interventions, reduce the risk of adverse outcomes, and promote optimal functional and aesthetic recovery, ensuring that patient care is safe, efficient, and patient-centered [63].

Conclusion:

Effective management of facial lacerations requires more than technical suturing skills; it demands a thorough understanding of regional anatomy, wound physiology, and perioperative decision-making. Early assessment of associated injuries, meticulous wound preparation, and layered, tension-free closure tailored to facial subunits are essential to preserving both function and appearance. Recognition of injuries involving specialized structures—such as the facial nerve, parotid duct, and lacrimal system—is critical to preventing long-term morbidity. A multidisciplinary, patient-centered approach combined with proper postoperative care ultimately improves healing, aesthetic integration, and patient satisfaction.

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