Facial Soft Tissue Trauma

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ABSTRACT

Traumatic facial soft tissue injuries are commonly encountered in the emergency department by plastic surgeons and other providers. Although rarely life-threatening, the treatment of these injuries can be complex and may have significant impact on the patient's facial function and aesthetics. This article provides a review of the relevant literature related to this topic and describes the authors' approach to the evaluation and management of the patient with facial soft tissue injuries.

KEYWORDS: Facial trauma, soft tissue trauma, facial reconstruction

Soft tissue injuries, whether isolated or in combination with other injuries, are among the most common traumatic craniofacial injuries encountered by emergency department personnel and plastic surgeons. These injuries account for nearly 10% of all emergency department visits.[1–3] Despite this high incidence, there are few studies that systematically investigate the management of these injuries,[4] and therefore, no widely accepted classification scheme or treatment algorithms exist to guide evaluation and treatment. As a result, most critical management decisions are left exclusively to the discretion of the treating surgeon with limited prospective or retrospective data, beyond personal experience, available to guide treatment. This may lead to many disparate approaches to both short-term and long-term management.

EPIDEMIOLOGY AND ETIOLOGY

In general, injury patterns vary greatly depending on the patient population. Slips, trips, and falls, which commonly cause isolated soft tissue injuries such as laceration and contusions, are most common in children and the elderly.[1,5,6] Violence and motor vehicle accidents are the predominant causes of injury in individuals ranging from 15 to 50 years old.[3,7,8]

ASSESSMENT

Evaluation and management of a trauma patient requires a primary trauma survey and secondary assessment for concomitant injuries and specific factors that guide management. In the absence of craniofacial fractures, emergent airway stabilization is rarely indicated. In patients with isolated soft tissue injuries, the need for tracheostomy is associated with high mortality (11.5%) and a significantly longer hospital stay than patients with facial fractures.[9] These differences can be attributed primarily to neurologic injury, and therefore delay of procedures requiring operative repair should be considered until after the patient has been stabilized. The patient should be assessed for concomitant intracranial, craniofacial, ophthalmologic, and cervical spine injuries. Mechanism of injury and physical exam of the patient should determine if additional imaging is necessary to detect bony facial trauma, although a low clinical suspicion for fracture does not rule out significant soft tissue injury.[10,11]

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Information regarding the timing and mechanism of injury and any postinjury signs and symptoms (nausea, vomiting, loss of consciousness) should be obtained specifically as part of the history as this may guide further assessment and management. Although the increased vascularity of most craniofacial structures limits the risk of infection relative to other anatomic regions,[12] delays in treatment of craniofacial soft tissue injuries may be associated with an increased risk of infection.[13–15] Additionally, swelling may ensue within the early hours after an injury, making it more difficult to determine the definite boundaries of the wound. It is also critically important to ascertain the mechanism of injury, as certain injuries will be associated with significant debris or wound contamination and subsequently require additional debridement and/or antibiotic prophylaxis. The patient should be specifically asked about functional deficits that existed prior to the injury or about history of craniofacial surgeries. Preinjury photographs, when readily available from family, are useful in identifying preexisting facial morphology and/or deformities.

A thorough but focused physical exam should be performed to assess soft tissue damage and determine the initial steps in management. All wounds should be evaluated for size, depth, and status of the wound base (presence of gross contamination or infection, integrity, and viability of the wound edges). Next, exposed/injured structures or hardware should be identified and their stability evaluated. Evaluation and documentation of cranial nerve function, particularly the facial and trigeminal nerves, is critical in the conscious patient and must be done prior to the use of any local anesthetic. Parotid (Stenson's) duct injuries should be suspected in any patient with facial trauma extending from the pretragal region to the middle half of the ipsilateral upper lip. In patients with a suspected parotid duct injury, the duct can be cannulated intraorally at the level of the second maxillary molar. Injury is present if the cannula is visible through the wound or if a liquid (milk, propofol, methylene blue) injected into the duct is expressed in the wound. Additionally, the patient can use a sublingual lozenge or toothpaste to stimulate the parotid gland to secrete saliva. If saliva is subsequently expressed from the wound, then the duct and/or parotid gland is injured. Exposed cartilage should be dressed with mafenide acetate (Sulfamylon; Mylan, Canonsburg, PA) if it is available or silver sulfadiazine otherwise. Bone and neurovascular structures should be dressed with nonadherent dressings such as Xeroform gauze (Covidien, Mansfield, MA) or Adaptic gauze (Johnson & Johnson, New Brunswick, NJ) with or without bacitracin ointment. Abrasions or burns can be dressed with Adaptic gauze and bacitracin or silver sulfadiazene. Deeper wounds that cannot be closed can be packed/dressed with and normal saline wet-to-dry dressings or iodoform gauze packing strips. Finally, in the event of eyelid avulsion, antibiotic ointment and an occlusive eye shield should immediately be used to prevent exposure keratopathy.

EARLY MANAGEMENT AND PLANNING

Isolated soft tissue wounds should be closed as soon as possible; early repair of soft tissue injuries, even in the setting of significant concomitant injuries, has been associated with improved postoperative aesthetic results.[16,17] Delays in treatment can result in increased soft tissue swelling, obscuring landmarks and making primary closure more difficult. Increased soft tissue wound exposure is associated with an increased risk of infection. Ideally, closure should occur within the first 8 hours after injury. Initially, all soft tissue injuries that can be primarily closed in the emergency room should be meticulously cleaned of debris under local anesthesia. Contraindications to primary closure in the emergency room include tissue damage whereby primary closure can only be performed under significant tension or with complex tissue rearrangement. Surgical intervention rather than primary closure is also indicated when concomitant injuries require surgery and when adequate hemostasis or appropriate wound visualization cannot be achieved in the ER setting. Smaller lacerations can be anesthetized using local field blocks, whereas larger injuries that occur along a nerve distribution can be treated using regional blocks. Pediatric patients may not tolerate infiltration with local anesthesia, therefore conscious sedation may be indicated for proper management (evaluation/irrigation/closure) of soft tissue injuries. If significant wound contamination is present, wounds can be cleaned with a surgical scrub brush and antiseptic, preferably chlorhexidine gluconate.[18,19] Subsequently, copious irrigation should be performed in all contaminated wounds and any wounds treated more than 6 hours after injury; however, clean, noncontaminated wounds treated early do not benefit from irrigation.[20] Broad-spectrum antibiotic coverage is necessary in bite wounds and in patients with impaired wound healing due to smoking, alcoholism, diabetes, or other forms of immune compromise. Tetanus prophylaxis should be given according to the patient's immunization history.

After cleansing, any jagged wound edges and devitalized tissues should be debrided. In cases such as crush injuries where the extent of injury is unclear, tissues can be loosely reapproximated. Adherence to several key principles is necessary to achieve an optimal result when primarily closing traumatic wounds. First, a layered closure is critical to obliterate dead spaces and also to relieve tension on the epidermal layer. This can be accomplished with a variety of suture types; however, generally a 4-0 resorbable suture is appropriate for muscle layers, and 4-0 or 5-0 resorbable and 5-0 to

7-0 nonresorbable monofilament sutures are used for deep and superficial skin layers, respectively. Tissue adhesives such as Dermabond (Ethicon, Inc., Somerville, NJ) or Steri-Strips (3M, St. Paul, MN) should be considered in pediatric patients with uncomplicated, clean lacerations as they have been shown to be time saving, cost effective, and are less painful for the patient.[21–23] Wounds covering facial nerve or parotid duct injuries should not be closed until operative management of the deeper injury is complete.

When operative intervention is required, other injuries may require more urgent attention, although early intervention is preferred. Ideally, definitive repair of bony and soft tissue injuries can be achieved in a single operation, as successive operations rarely improve functional outcomes.[24–26] In high-velocity or blast injuries, this is often not possible due to the need for multiple debridements; however, early soft tissue reconstruction should be attempted to prevent significant soft tissue contracture and provide coverage for osseous reconstruction.

In the stabilized patient with complex facial injury requiring free flap reconstruction, immediate definitive treatment is indicated. Immediate reconstruction decreases the number of operations required without compromising aesthetic or functional outcomes.[27,28] The presence of contamination has not been associated with an increase in perioperative or long-term complications after early definitive repair of facial injuries with free flaps, therefore contamination should not be considered a contraindication to this treatment approach.[27] Imaging for facial soft tissue injuries is only necessary if there is a need to evaluate recipient vessels for free flap reconstruction. Although computed tomography (CT) angiography has been shown to be beneficial in the planning of nontraumatic free flap craniofacial reconstruction[29,30] and in traumatic lower-extremity injuries,[31,32] its utility in other traumatic wounds has not been evaluated. If palpable pulses are not appreciable and recipient vessels lie in the zone of injury, then CT angiography or Doppler ultrasound can be used to evaluate vessel patency and integrity.

Although these general principles are useful in many simple soft tissue injuries, several special considerations must be made depending on the specific facial anatomy involved.

SCALP

In general, scalp defects under 3 cm in size can be closed primarily. Defects over 2 cm may require galea scoring to have the necessary laxity for closure.[33] Larger defects require hair-bearing tissue for reconstruction. Tissue expansion, in general, is a valuable tool for scalp reconstruction as it can allow resurfacing of up to 50% of the scalp; however, it is a poor choice in an open soft tissue defect. Subsequently, the remaining options for hair-bearing scalp reconstruction include local rotation advancement flaps. For defects where hair-bearing scalp reconstruction is not possible, skin grafting can be performed provided the pericranium is intact. If the pericranium is not intact, galeal, pericranial, or temporoparietal fascia flaps can be rotated into place to provide a vascularized bed prior to grafting. Alternatively, the exposed bone can be burred or curettaged down to a bleeding surface and allowed to granulate, with the resulting granulation tissue providing a vascularized bed for subsequent skin grafting. Once the wound is closed, other options such as tissue expansion can be used to improve aesthetic outcome.

Pedicled or free flap reconstruction of the scalp can also be performed to reconstruct large scalp defects not amenable to tissue expansion. Pedicled flaps are generally used for the repair of lower scalp defects, whereas free flaps cover large defects. Donor site morbidity should be considered in flap selection. Finally, if an underlying calvarial defect exists, autologous bone grafts from rib or intact calvarium are frequently used. Alloplasts are rarely used in traumatic defects involving significant soft tissue loss due to the possibility of infection.

FACIAL AESTHETIC UNITS

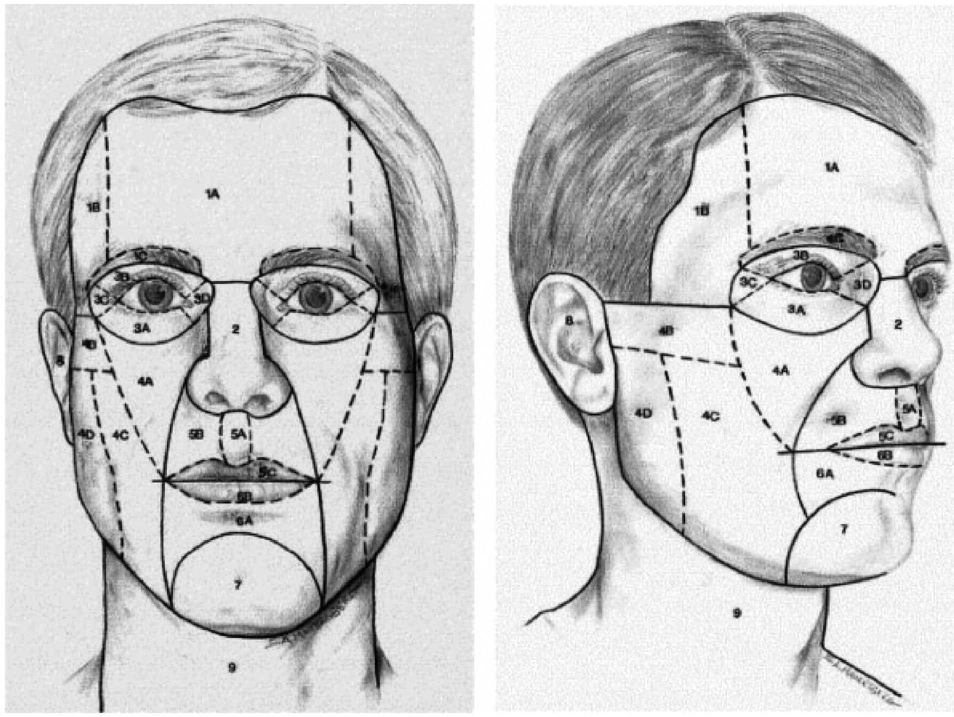
The following sections detail reconstruction of facial aesthetic units and subunits, as shown in Fig. 1. Major facial trauma often involves multiple units or subunits, and reconstruction is preferably planned for each unit such that incisions and local tissue used for advancement are within or along the border of the unit being reconstructed.

Forehead

Forehead reconstruction is similar to scalp reconstruction; however, the aesthetic considerations are of far greater importance. Small defects can be managed with local flaps based off of the supraorbital or supratrochlear vessels. For more significant defects, tissue expansion is preferable because of the potential for color mismatches associated with skin grafting. Consequently, skin grafting is generally used to allow temporary wound closure until tissue expansion can be performed or for near complete forehead defects.

Ear

Most ear injuries can be managed in the emergency room, with the exception of subtotal or complete avulsion, which requires immediate surgical management. Simple lacerations should be conservatively debrided to avoid unnecessary cartilage exposure; however, potentially injured cartilage should be debrided due to the



A B

Figure 1 (A) Frontal and (B) profile views of the aesthetic units and subunits of the face. 1, Forehead unit (1A, central subunit; 1B, lateral subunit; 1C, eyebrow subunit); 2, nasal unit; 3, eyelid units (3A, lower-lid unit; 3B, upper-lid unit; 3C, lateral canthal subunit; 3D, medial canthal subunit); 4, cheek unit (4A, medial subunit; 4B, zygomatic subunit; 4C, lateral subunit; 4D, buccal subunit); 5, upper-lip unit (5A, philtrum subunit; 5B, lateral subunit; 5C, mucosal subunit); 6, lower-lip unit (6A, central subunit; 6B, mucosal subunit); 7, mental unit; 8, auricular unit; 9, neck unit. (Reprinted from Fattahi TT. An overview of facial aesthetic units. *J Oral Maxillofac Surg* 2003;61:1207–1211, with permission from Elsevier.)

possibility of chondritis after closure. The perichondrium and skin can be closed in one layer using nonabsorbable suture. Small skin defects with an intact perichondrium can be repaired by skin grafting in most cases. If the perichondrium is not intact, the underlying cartilage can be resected or a postauricular flap can be used to provide a vascularized bed for repair. Small avulsed segments can be replanted as a graft if surgery is performed in the first 12 hours after injury. In the past, larger avulsions have been treated using a pocket technique where the avulsed cartilage is buried in a retroauricular skin pocket for 2 weeks. This allows vascularization of the graft allowing re-epithelialization or skin graft placement. Recently, multiple authors have recommended abandoning this technique due to the technical challenge, need for repeated operations, resorption of cartilage, and poor aesthetic results. Instead they recommend using either rib cartilage or the avulsed ear cartilage as a lattice for later fascial coverage and skin grafting.[34,35] Total or near total ear avulsions should be immediately microsurgically replanted if donor and recipient vessels are available.

For complete auricular destruction or avulsion without the possibility of replantation, three general options exist. First, autologous costal cartilage can be harvested along with the perichondrium and used to create a framework that can be implanted and covered with temporoparietal fascia and advanced, expanded skin or grafted skin. Alternatively, a porous polyethylene framework covered with a temporoparietal fascia flap can be used. Finally, a complete prosthetic device can also be used if reconstruction using autologous tissues is not possible.

Eyelid

There are several key principles to the management of eyelid lacerations. Eyelid or periocular injuries can be classified into four classes based on the injured region (upper eyelid, lower eyelid, medial canthus, and lateral canthus)[36] and based on whether or not there is a partial- or full-thickness injury. First, simple eyelid lacerations should be closed in three layers: conjunctiva, tarsus, and skin. Additionally, for lacerations involving the lid margin, the gray line and tarsal plate must be carefully reapproximated and the lid margin everted with a vertical mattress suture to prevent notching. For lower-lid lacerations, proper alignment also minimizes the risk of ectropion, and in upper-lid lacerations, the levator muscles should be carefully evaluated as the muscular insertions onto the tarsal plate may be damaged. With injuries occurring medial to the pupil, lacrimal duct

Table 1 Flaps for Eyelid Reconstruction

Name	Basic Description	Uses	Notes
Cutler-Beard flap	Full-thickness lower eyelid flap	Upper-lid defects up to 80% of lid length	Delay requires the affected eye remain closed for weeks
Fricke flap	Laterally based, monopedicled myocutaneous flap raised above the eyebrow	Shallow lower-lid defects of any length	May result in asymmetric brow height
Glabellar flap	V-Y advancement flap from median forehead	Medial canthal defect reconstruction	Based on supratrochlear blood supply
Hughes flap	Tarsoconjunctival flap	Central defects of the upper (reverse) or lower lid up to 60–80%	Reverse Hughes flap provides a much thinner tarsal strip for reconstruction
Tenzel flap	Lateral, semicircular advancement rotation flap	Lower-lid defects up to 50% of lid length	May also be used for upper-lid defects, can be extended with a z-plasty (McGregor flap)
Tripier flap	Bipedicled, innervated myocutaneous flap from upper lid	Lower-lid reconstruction	Muscle provides bulk but questionable functionality

injuries should be suspected and adequately ruled out (see later).

Upper and lower eyelid full-thickness defects involving less than 33% and 50% of the respective eyelid length can be closed primarily using the principles described above.[37] Some authors, however, more conservatively suggest primary closure only in upper-lid full-thickness defects less than 25% of the eyelid length.[36] A lateral canthotomy and cantholysis can be used to relieve tension when closing larger defects primarily.

Partial-thickness defects involving up to 50% of the eyelid length can, in contrast, be closed using local advancement flaps. Partial-thickness defects involving greater than 50% of the upper or lower eyelid length typically require a full-thickness skin graft to achieve a tension-free closure. For unilateral injuries, the contralateral upper eyelid provides an excellent color-matched graft. Donor site complications may significantly impair the function of the contralateral lid; however, most often the donor site can be closed primarily. Alternative sites for grafting exist, and when necessary, use of myocutaneous transposition flaps has been described (Table 1). Full-thickness upper and lower eyelid defects that cannot be primarily closed require composite grafts or flaps. Near complete defects of the upper or lower eyelid present a greater challenge for the reconstructive surgeon. Large upper eyelid defects are typically repaired using a switch flap, whereas near complete lower-lid defects are repaired by composite grafting and cheek flap advancement.

Injuries to the lateral eyelid commonly involve the lateral canthus and can require either a canthopexy or canthoplasty to repair the injured canthus. Depending on the degree of injury, primary repair may be possible, but frequently more significant injury necessitates alternate repair or re-creation of the ligament. When treating soft tissue defects in this region, cheek advancement flaps or full-thickness skin grafts can be used for coverage.

Injuries to the medial canthal region may involve the medial canthal tendon and/or lacrimal system. Medial canthus injuries without concomitant fractures are uncommon due to the relative protection provided by the maxilla and nasal bone. If present, these injuries should be managed with methods similar to those used for lateral canthal tendon repair or based on nasoorbitoethmoid fracture management principles if an underlying fracture is present. Injuries to the lacrimal canaliculi can also occur in this region and should be addressed with an ophthalmologic assessment and Jones dye test. A Jones I test is first performed by instilling fluorescein dye in the eye ipsilateral to the suspected injury. After 5 minutes, the patient is instructed to occlude the contralateral nare and blow his or her nose onto a clean, white tissue or towel. The presence of fluorescein on the tissue indicates a patent, functioning lacrimal system. In the absence of fluorescein, a Jones II test is performed by irrigating the nasolacrimal system with saline and having the patient expectorate the irrigation solution into a basin, where it is then checked for the presence of fluorescein. Alternatively, a cotton swab can be applied into the wound. Dye on the cotton swab indicates at least a partial lacrimal injury. After repair or in the absence of lacrimal system injury, soft tissue defects can be closed using local advancement flaps from the upper eyelid or glabella.

Complete eyelid and orbital reconstruction can be achieved using dorsalis pedis with septal cartilage,[38] radial forearm flaps,[39] and anterolateral thigh flaps,[40] but complete prosthesis should be considered for significant injuries.

Nose

Nasal reconstruction has historically been of great interest to reconstructive surgeons, and a wide variety of reconstructive approaches have been developed to treat traumatic nasal injuries. Multiple algorithms have been devised for the evaluation and reconstruction of nasal defects.[39,41–43] Successful reconstruction of soft tissue defects in this region also requires addressing any underlying osseocartilaginous injuries or defects.

Conflicting viewpoints exist regarding reconstruction of the aesthetic subunits of the nose. It is commonly held that if greater than 50% of a subunit is compromised, then the remainder should be excised so that the entire subunit can be reconstructed en bloc. This view has, however, been challenged in favor of retaining a maximum amount of native tissue.[44]

Local and regional factors also make decisions regarding reconstruction more complicated. The skin and soft tissues of the nasal tip and alar rim tend to be thick and relatively stiff, making primary closure of these regions more difficult. Partial-thickness defects over subunits with thinner skin can be closed using postauricular and supraclavicular full-thickness skin grafts; however, results are frequently suboptimal due to poor color match.

More commonly, local and regional flaps such as dorsal nasal, cheek advancement, nasolabial and paramedian forehead flaps are used to repair soft tissue defects. Tissue expanders can also be used to expand the available tissue without compromising the ability to close the donor site but require an additional stage of repair.

Large defects, often resulting from severe, high-velocity trauma and extending beyond the nose, cannot be closed entirely with local or regional flaps and thus often require the use of distal free flaps. Unfortunately, these patients tend to require multiple operations and frequently have poor functional and aesthetic outcomes compared with those of patients with other craniofacial injuries.[45]

Cheek

Divided into three overlapping aesthetic subunits (infraorbital, preauricular, and buccomandibular), the cheeks are by surface area the largest subunit of the face. This size correlates with both a high frequency of injury to the cheek and underlying structures as well as a multitude of approaches that can be used for posttraumatic reconstruction.

Many cheek wounds can be repaired primarily due to the laxity and availability of surrounding soft tissue. Very small wounds in inconspicuous areas may be allowed to heal secondarily, but often, primary closure is preferred. If primary closure is not possible, local advancement, transposition, or regional flaps can be used to repair many defects due to the skin excess and laxity in the cheek and are generally preferred to skin grafting to gain soft tissue coverage (Table 2). In cases where this is not possible, full-thickness skin grafting

Table 2 Flaps for Cheek Reconstruction

Name	Basic Description	Uses	Notes
Cervicofacial flap	Posteriorly based flap incorporating SMAS and based on transverse branches of facial artery and superficial temporal arteries	Reconstruction of suborbital (zone 1) cheek defects, typically larger than 3 cm	Usually require w- or z-plasty revision if crossing inferior mandibular border, must be anchored to anterior zygomatic arch and inferolateral orbital rim to prevent ectropion
Cervicopectoral flap	Medial flap based on perforators from internal mammary artery or lateral flap based on thoracoacromial artery perforators	Reconstruction of large preauricular (zone 2) defects	Zone 2 defects may also be repaired using deltopectoral, trapezius, pectoralis, and latissimus dorsi flaps
Radial forearm	Free flap based on radial artery/cephalic vein, and may include lateral antebrachial cutaneous nerve	Typically zone 2 or 3 (buccomandibular) defects	Can provide both intraoral lining and cheek coverage, may be brought with vascularized bone if needed
Tensor fascia lata	Myocutaneous or myofascial free flap based on ascending branch of lateral circumflex artery and vein and superior gluteal nerve (motor) and lateral femoral cutaneous nerve	Typically zone 2 or 3 (buccomandibular) defects	May also include vascularized bone from iliac crest
Parascapular	Fasciocutaneous free flap based on the circumflex scapular artery	Typically zone 2 or 3 (buccomandibular) defects	Can be contoured to fill soft tissue defects; may be brought with vascularized bone if needed

SMAS, superficial musculo-aponeurotic system.

Table 3 Flaps for Lip Reconstruction

Name	Basic Description	Uses	Notes
Abbé flap	Lip-switch flap based on the labial artery	Reconstruct upper or lower (reverse) lip defects up to 50% of lip width and not involving the commissure	Two-stage procedure, flap is left tethered for 2 to 3 weeks
Bernard-Webster flap	Cutaneous-subcutaneous cheek advancement using triangular flaps along the nasolabial fold and paramental Burow's triangles	Repair large (up to 100%) lower-lip defects	Tension of the reconstruction helps maintain oral continence
Estlander flap	Full-thickness rotation advancement flap with incision along the nasolabial fold	Repair of defects along the commissure	Maintains vertical position of commissure but changes direction of muscle fibers resulting in dysfunction
Gillies fan flap	Rotation advancement flap moving lateral lip and commissure medially	Repair of upper- and lower-lip defects less than 65% of width	Distorts commissure, often requiring revision, results in microstomia when used bilaterally
Karpandzic flap	Innervated musculocutaneous rotation flap(s) with incisions along the nasolabial folds	Repair of medium-sized midline to total upper- or lower-lip defects	Results in significant microstomia
Nakajima flap	Rotation flap about the commissure based on the facial artery	Repair of large lower-lip defects	Does not result in microstomia because the commissure serves as the pivot point

can be performed with the cervical, preauricular, and postauricular skin being preferred donor sites for color matching; however, the potential for scarring and contour deformities limit the use of this technique. Split-thickness skin grafts should be used with caution due to the potential for contractures to deform adjacent structures.

Free flaps are also used for cheek reconstruction for more complex soft tissue defects (Table 2).

Lips

The keys to proper lip injury management are correct alignment of lip landmarks and a layered, tension-free closure to ideally restore the motor, aesthetic, and sensory functions of the lip. Markings should be made to identify the white roll, Cupid's bow, and philtral columns prior to injection of any local anesthetic to prevent obscuration. Primary closure should be considered when less than 30% of the lip is involved, and the layered primary closure should separately approximate the skin, orbicularis, and mucosal layers. For defects of the central upper lip, primary closure may disrupt the normal anatomy of the philtral columns and dimple. For wounds that cannot be primarily closed, the best method to achieve restoration is to use available lip tissue for the repair. Skin grafting can play an important role in management, although color mismatches may be an issue when grafting to vermillion defects. This can be corrected by later using an Abbé flap to reconstruct the central vermillion without moving the commissure. Larger defects or those involving other areas of the lip can be repaired using similar lip-switch procedures or a variety of local advancement flaps (Table 3).

NEUROVASCULAR INJURIES

Injury to vascular structures can result in significant hemorrhage and blood loss in the craniofacial complex and can typically be managed with suture ligation and packing. In certain cases, such as those where the cut vessel is located intraorally, treatment in the emergency room may not be possible, and other interventions are necessary. Severe cases may require angiography and subsequent embolization of craniofacial hemorrhage.[46]

Injuries to the facial and/or trigeminal nerve can also accompany soft tissue trauma. When present, sites of structural compression and/or injury need to be identified and addressed appropriately. If the facial nerve has been severed, initial management requires either primary repair of the injury, or if a defect exists, the nerve ends should be tagged so that formal nerve repair can be performed within the first 72 hours after injury.

PAROTID DUCT INJURIES

As previously mentioned, the parotid duct may be injured any time there is significant trauma to the cheek; however, not all injuries need to be repaired. Analysis of the wound depth is critical in these cases. In a more superficial wound resulting in laceration of only the parotid glandular tissue, the gland can be oversewn and subsequently repaired independent of the parotid duct. Parotid duct repair performed by suturing the duct over a stent has been described, but conservative treatment is generally well tolerated and is not associated with long-term functional consequences.[47] Patients with parotid duct injuries being managed conservatively should be warned to expect a significant degree of temporary swelling after the injury.

CONCLUSION

Reconstructive surgeons commonly encounter posttraumatic craniofacial soft tissue injuries in the emergency department. Case factors such as time of presentation in relation to injury, degree of injury, and anatomy involved play critical roles in determining the optimal method of management and whether management can be performed in the emergency room versus the operating room. The relative lack of clinical literature regarding soft tissue trauma management has led to physicians relying only on personal experience and pearls of wisdom to help guide them through this complex topic. Whereas this may be sufficient for simple injuries, more complex wounds may require standardized and/or evidence-based data to optimize outcomes. Injuries confronted in the emergency room require not only these principles but also the use of principles for trauma management and craniofacial fracture management to gain optimal functional and aesthetic outcomes in the long term.

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