Procedures in Family Practice

The Care of Facial Lacerations

Elvin G. Zook, MD
Springfield, Illinois

The final cosmetic and functional result of closure of a facial wound is many times determined by the promptness and appropriateness of initial care. This includes keeping the wound clean and not adding to the injury. A decision must then be made at the level of primary care to carry out the closure or refer the patient to someone with more expertise. This decision depends on many things including the condition of the wound, the type of wound, and the experience of the primary physician. It is important in the care of the wound that it be properly cleaned and debrided. Fine suture and accurate approximation of the wound edges are also extremely important. Careful follow-up of the wound for potential infection, suture reaction, etc, with removal of sutures as soon as possible, greatly enhances the healing of the wound. These points are discussed in detail with guidelines for making the decisions and providing good wound closure.

The cosmetic result of a sutured laceration depends upon the initial care and management of the wound. Although specific techniques are often necessary for some areas, such as the eyelids, nose, and ears, there are some general principles which should be followed in all wound care. This paper describes some basic principles for the management of facial lacerations.

Emergency Care of the Wound

The education of patients, paramedics, and ambulance attendants who are usually the first to see wounds is very important. Important aspects of wound care which should be stressed to the aforementioned as well as Emergency Room personnel are as follows:

1. Remove obvious debris from the wound such as sticks, large pieces of glass, or other objects which, in the transportation or movement of the patient, may cause further injury to surrounding structures.

2. Stop the hemorrhage. This is best done by elevation of the head and application of local pressure to the wound with a sterile or clean gauze. Point pressure can be used over the temporal artery, facial artery, or other peripheral arteries. Pressure on the carotid artery is dangerous and should be used only as a last resort.

3. Do not increase the injury. Increased injury may result from attempts to clamp bleeding vessels through nerve and/or duct injury. Also, application of soaps or other irritating agents into the wound may cause more harm than benefit.

4. Protect the wound by covering it. The wound may be covered by the use of sterile dressings or the cleanest dressing that is available. Sanitary napkins are often available at the scene of an accident and are excellent absorbent dressings to use on a wound.

From the Division of Plastic Surgery, Southern Illinois University School of Medicine, Springfield, Illinois. Requests for reprints should be addressed to Dr. Elvin G. Zook, Division of Plastic Surgery, 200 West Dodge Street, Southern Illinois University School of Medicine, Springfield, IL 62708.

Initial Care Decisions

Once the emergency care of the wound has been provided and the patient has been transported to a facility where definitive care can be given, a decision to treat the patient there or transfer him/her to a larger facility must be made. To assist in this decision, a history and physical examination is essential. The history of the accident or injury, including the agent of wounding, its size, and the method of wounding should be taken carefully to determine what structures may be injured and how they should be treated. For example, if the injury were a bullet wound, the history would include the caliber of the weapon, the distance of the muzzle from the patient, etc. The time that has elapsed since the injury is also important. If the elapsed time has been long, bacteria have had a chance to multiply and wound treatment may need to be modified. The site at which the injury occurred is also an important factor to consider. If it occurred in a relatively clean automobile, one method of care may be given, but if in a barn lot, a totally different approach may be needed.

The initial examination of the patient to determine the extent of injury and the structures injured requires a knowledge of the anatomy of the face. The two most important subcutaneous structures commonly injured in the face are the facial nerve and Stensen duct[1] (Figure 1). Any deep lacerations in this area should be suspected of injuring these structures. Also, deep lacerations in the area of the parotid gland should be suspected of perforating that gland. Examination should include evaluation of associated injuries, such as those of the brain, abdomen, chest, and extremities. Those injuries are many times life threatening and take precedence over facial wounds. The type of wound is also an important part of the examination. The examination consists of opening the wound gently with skin hooks to see whether it is a flap-type wound, a wound deep into the underlying tissue, or a through-and-through laceration, such as a wound into the mouth, nose, or eyelid.

Once this information is obtained, the physician must decide whether to treat the wound him/herself or transfer the patient to a secondary facility. This decision depends upon the physician's ability, training, experience, patience, and determination to spend the time necessary to do a good job, and the availability of referral sites. If he knows of another physician who can give better care or if he is in doubt regarding his ability to care for that type of wound, he is safest to refer it.

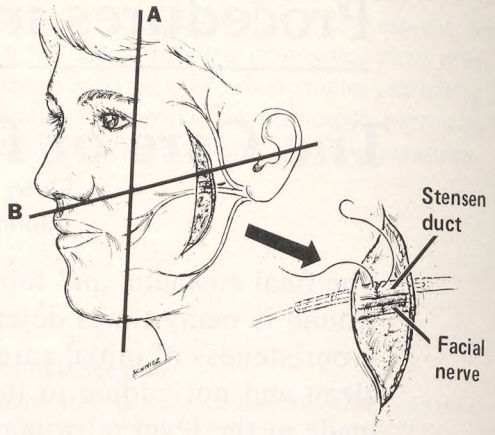


Figure 1. The location of the major branches of the facial nerve are seen. Stensen duct runs along line B, from the junction of lines A and B posteriorly for approximately 4 cm.

Tetanus prophylaxis should be given, if appropriate, prior to referral of the patient.[2] In the confusion of transfer, administration of tetanus toxoid may be forgotten.

To Close or Not to Close

Many times the condition of the patient or the condition of the wound is such that immediate closure is not advisable. The patient may need to be admitted to a hospital until his condition is such that closure may be carried out safely, or a delayed closure performed. The following are instances in which the wounds should not be closed immediately.

1. If the wound is extensively contaminated, particularly with earth, or the wound is several hours old, allowing bacterial growth, it should be treated with normal saline soaks and secondary closure in three to four days.

2. If there are foreign bodies in the wound which cannot be removed, the wounds should be left open until the foreign bodies can be removed.

3. If the patient is unruly or inebriated, local anesthesia is often impossible and general anesthetic unsafe. This patient should be hospitalized with moist saline dressings on the wound

until either able to cooperate or a general anesthetic is safe.

4. If there are fractures of the underlying facial bones which are going to require transportation of the patient to another facility for care, it is best to transfer the patient with moist saline soaks over the wound. This allows the "referred to" physician to make the decision regarding fracture repair at the same time as wound closure.

5. Human bites, as a rule, should be treated with frequent changes of saline soaks and secondary closure in 72 to 96 hours. Animal bites other than puncture wounds, if seen early, may be closed after trimming the wound edges, debridement, and copious irrigation. Broad spectrum antibiotics should be given and the possibility of rabies taken into consideration.[3]

Local Anesthesia

In the vast majority of cases, lidocaine (Xylocaine) one percent with 1:100,000 epinephrine is used. This is injected through the open portion of the laceration since this causes less pain than passing the needle through the intact skin surface. A 25 gauge or smaller needle is used for the injection of the local anesthetic. Gentle pressure is used to pass the fluid into the tissue to prevent distention of the tissues and the resultant pain. Epinephrine gives control of bleeding and allows one to accurately evaluate and approximate the tissues. If there are flaps of skin of doubtful viability and vasoconstriction is not desired, then one percent Xylocaine without epinephrine should be used. Field block anesthesia of the supraorbital, infraorbital, or mental nerves often will allow closure of the wound without having to infiltrate the wound itself (Figure 2). One to 2 cc of local anesthetic injected into the area of nerve exit from the bone will be rapidly effective.

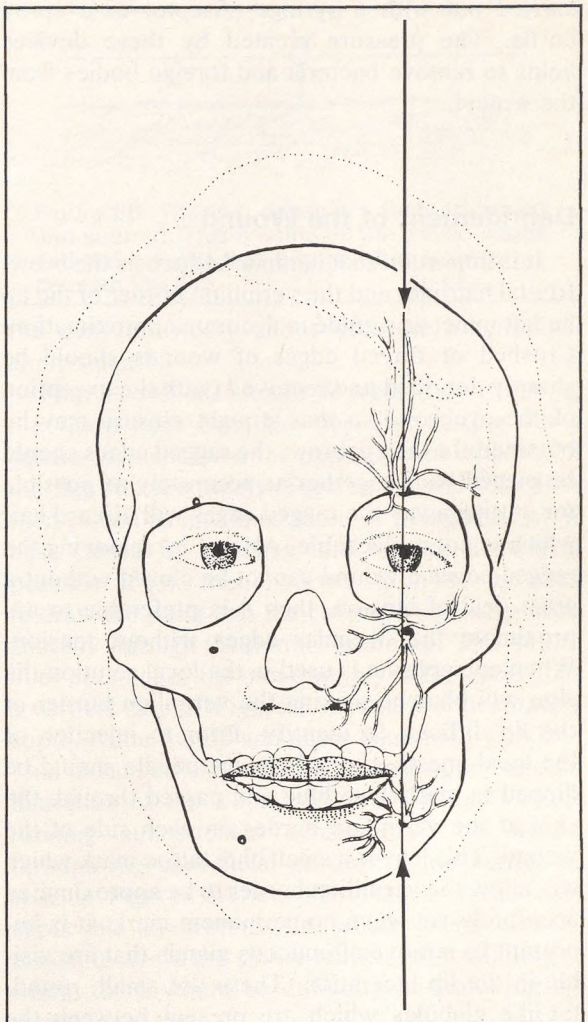


Figure 2. The supraorbital, infraorbital, and mental nerves can be seen to make their exit from the bone on a line dropped through the pupil and lateral commissure. This line will help in locating the bony orifice for a block anesthesia.

Preparation of the Wound for Closure

It is important not to shave the eyebrow for hair growth may be inhibited. Also, if the hair has been removed, accurate approximation of the brow is difficult. It is only necessary to shave approximately 1 cm away from the wound in scalp lacerations. Larger areas of hair removal are unnecessary and undesirable to most patients.

The facial wounds should be prepared by washing around the wound with a surgical soap. It is best not to scrub in the wound with soap since it is irritative and will cause tissue damage. After the skin is clean, sterile towels should be placed around the wound. Irrigation into the wound with copious amounts of normal saline solution, Ringer lactate, or other physiological solution should be

carried out with a syringe (Asepto) or a spray bottle. The pressure created by these devices helps to remove bacteria and foreign bodies from the wound.

Debridement of the Wound

It is important that landmarks such as the brow, frontal hairline, and the vermilion border of the lip be left intact as a guide to accurate approximation. Crushed or frayed edges of wounds should be sharply debrided and removed (with the exception of the eyebrow) so that straight closure may be obtained. In the eyebrow, the ragged edges should be pieced back together as accurately as possible for cutting away the ragged edges will discard hair which is not replaceable. Also, if by removing the ragged edges a wound cannot be closed without a great deal of tension, then it is preferable to approximate the irregular edges without tension. When epinephrine is used in the local solution the skin will blanche making the vermilion border of the lip difficult to identify. Prior to injection of the local anesthesia, a 25 gauge needle should be dipped in methylene blue and passed through the skin at the vermilion border on each side of the wound. This leaves a small blue tattoo mark which will allow the vermilion border to be approximated accurately yet leave no permanent mark. It is important to remove all mucous glands that are visible in the lip laceration. These are small, round, fat-like globules which are present between the mucosa and orbicularis oris muscle (Figure 3). The glands may be picked up with fine forceps and trimmed away with small sharp scissors. If they have been injured and are not removed, they will expand giving a permanent swelling in the area of the scar.

Suture Material

The deep structures of the face should be approximated with absorbable sutures. Remember that a subcutaneous suture is only as strong as the fat through which it is passed. Therefore, it will only approximate the deep tissues and obliterate the dead space, not hold the deep structures of the wound together under tension. Absorbable sutures

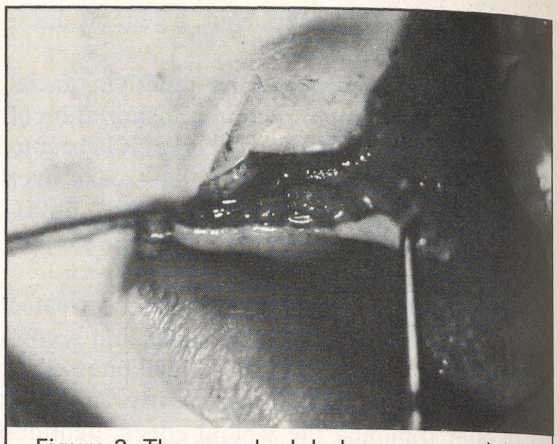


Figure 3. The round, globular, mucous glands can be seen to the left of the lower skin hook. These should be removed if they are seen in the wound.

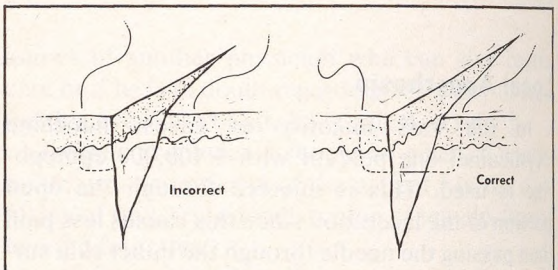


Figure 4. For accurate approximation of the skin edges, the deep extension of the suture must be at the same level on each side of the wound.

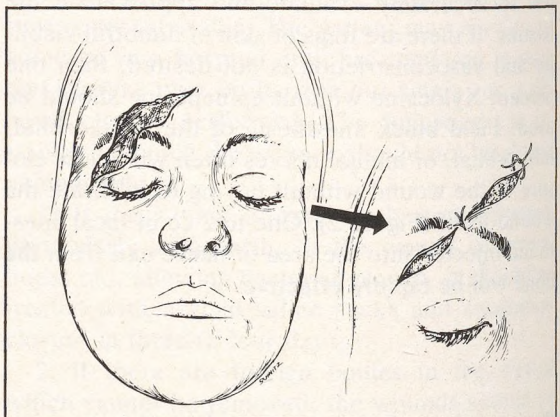


Figure 5. If a laceration crosses the eyebrow, vermilion border, forehead wrinkles, or other obvious landmarks, the first suture should be placed there to accurately approximate these points. This makes the remainder of the closure much easier.

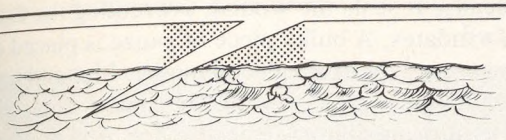


Figure 6A. In a slanting laceration, the sharp edge should be trimmed away as well as the angled portion of the opposite side, as shown. The dotted portion will be discarded.

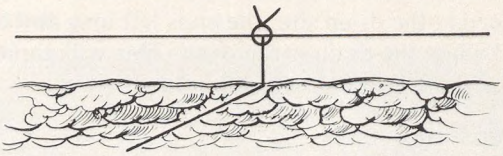


Figure 6B. The two edges are then advanced and sutured. This eliminates the frayed edges and the bulging that occurs when scar forms beneath the flap.

such as Vicryl, Dexon, or chromic catgut should be used in as small a number and as small a size as will adequately obliterate the dead space. Remember that all sutures act as a nidus of infection and the more placed in a wound, the greater the chance of infection.

Nonabsorbable sutures are then used to close the skin. The best suture for the face is 6-0 nylon suture on the smallest possible needle, usually a P-1. Never use absorbable suture on the skin since it will cause more inflammation and subsequent stitch marks. If silk is preferred, it should be of a very fine caliber and should be removed in four to five days before the increased reactivity of silk can cause suture marks. Nylon suture used should be a monofilament which allows less migration of bacteria around the suture and into the skin.

Technique of Closure

To perform a good closure with minimal tissue trauma, it is essential that the proper equipment be available. This includes a fine nontooth needle holder, a fine tooth Adson forceps, a plastic tissue scissors, and a small skin hook. Use of the minimum size and number of sutures to accurately close a wound's edges is equally important. On the face, 6-0 monofilament nylon placed 2 to 3 mm away from the skin edge and 2 to 3 mm apart is ideal. It is important that these sutures be passed through the skin at a 90-degree angle to the surface, brought directly across and back out through the skin of the opposite side at 90 degrees, so the wound edges are everted rather than inverted. The sutures should be placed at the same depth on both sides of the wound so that the skin edges are accurately approximated (Figure 4). The most important landmark on the laceration should be accurately approximated first (Figure 5). The remainder of the laceration may then be sutured without the constant worry about accurate longitudinal approximation.

Flap lacerations should be treated by trimming the sharp edge from the flap and cutting out a square segment from the opposite side into which the flap fits accurately (Figures 6A and 6B). It is then closed as any laceration. A triangular flap is best closed by excising and closing linearly if possible. If not, then a corner stitch may be used to draw the point into the corner, by passing horizontally through the dermis of the tip. This suture does not impede the blood supply to the tip as does a vertical suture (Figure 7A). This will accurately approximate the tip and allow continued viability. This technique may vary depending upon the configuration of the wound (Figures 7B and 7C). A running subcuticular suture may be woven through the superficial portion of the dermis as seen in Figures 8A and 8B. This is particularly applicable in wounds in which some tension exists, to avoid the suture marks, or in children in whom there would be difficulty in removing the sutures.

Deep abrasions or avulsions, such as may occur from the automobile windshield, are best treated by incision of the edges and overlying flaps of the larger lacerations and closure as previously described (Figure 9). Larger simple lacerations should also be closed. It is important to clean all dirt and foreign particles from the wound with a toothbrush, needle, or knife before they become incorporated in the wound and require a secondary procedure to remove them. Small incomplete lacerations of the dermis and superficial avulsions should be treated by application of antibiotic gauze such as povidone-iodine (Betadine) or nitrofurazone (Furacin) and allow epithelialization to occur.

Drains should be used if bleeding cannot be controlled or infection is anticipated. A small sterile Penrose drain or rubber band inserted into

the end of the closure will suffice. A suture may be placed at the drain site, the ends left long and then tied when the drain is removed. This will approximate the edges held apart by the drain.

Dressings

The wound may then be treated by either the closed or open technique. Adaptic or other nonadherent gauze may be used to prevent the dressing from sticking to the wound and to make its removal easier. Vaseline should not be used because it seals the wound, preventing the escape of exudates. A bulky piece of gauze is placed over the wound, benzoin placed on the skin, and nonallergic tape placed over the dressing to apply slight pressure and obliterate dead space. The dressing is usually removed in 48 hours and the wound left uncovered.

In the open technique, no dressing is applied. The wound may be cleaned two to three times a day with an applicator stick and hydrogen peroxide or soap and water. Care must be taken if

Types of Corner Stitch

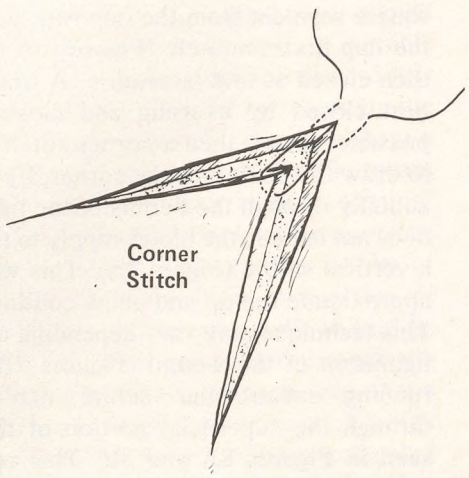


Figure 7A. A fine suture placed on one side at the corner, passed transversely through the tip of the flap and back out on the other side of the corner will pull the corner of the flap into place without compromising its blood supply.

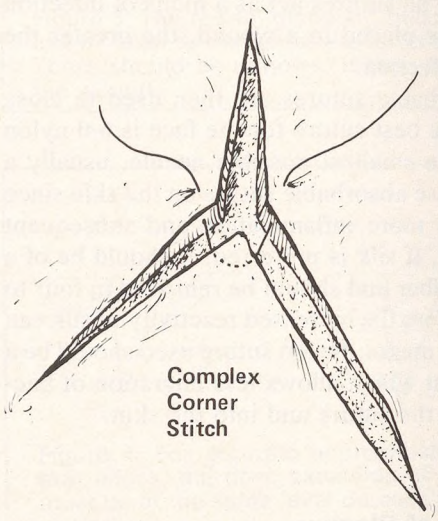
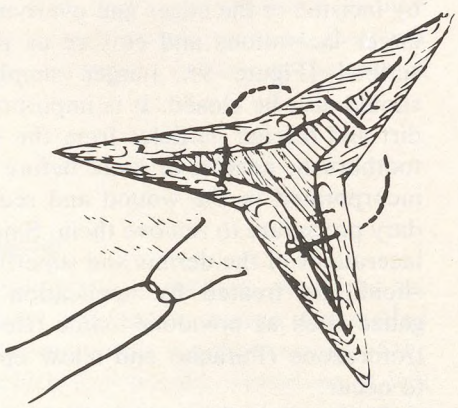


Figure 7B. A similar type stitch to that of Figure 7A can be used to approximate the wound which has three corners, as seen here.



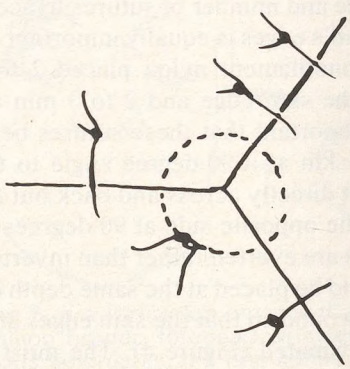


Figure 7C. This slight modification is sometimes preferable in a three-cornered laceration.

Subcuticular Stitch

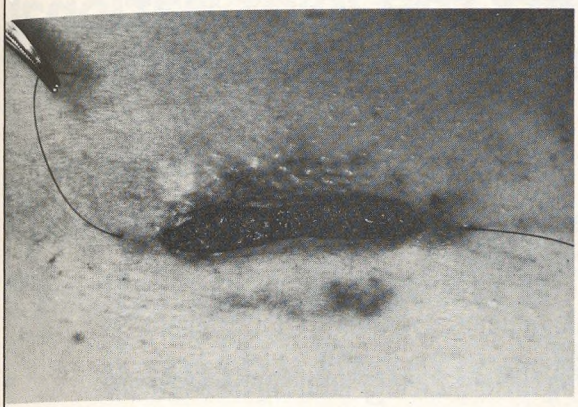


Figure 8A. A subcuticular suture has been woven into the dermis and can be seen with the incision open.

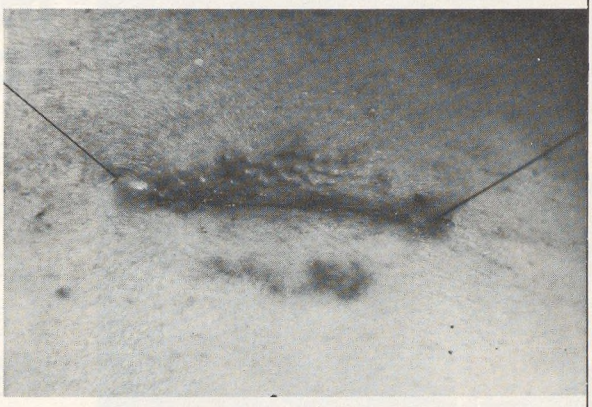


Figure 8B. The ends are pulled, approximating the wound edges, without danger of suture marks on the skin. If accurate approximation is not achieved, a few fine sutures may be placed and removed in a few days.

ointments are applied for the skin becomes quickly macerated if large amounts are used. Remember that a dressing which keeps out contamination may also keep wound exudates in.

Figure 9. A typical windshield injury is shown. The larger lacerations should be sutured, the deep tissue in the larger avulsions excised and closed primarily, and antibiotic gauze dressing placed over the more superficial abrasions to allow secondary healing as with a burn.

Suture Removal

One half of facial wound sutures placed without tension can be removed in three to four days. The remainder can be removed a day later. In areas where there is slight tension, one half of the sutures may be removed at four to five days and the rest a day later. Compound tincture of benzoin may be applied to the edges of the wound after the sutures are removed and Steri-strips or small pieces of nonallergic tape placed across the wound to splint and strengthen the closure for a few more days. Subcuticular running sutures may be left in place for up to ten days since multiple skin perforations are nonexistent. If a wound becomes infected, it is necessary to open all of the wound which is undermined and involved by the infection, not just a small portion of the wound. This will allow adequate drainage of the wound and quick healing.

Acknowledgement

Drawings by Don Biggerstatt and Gary Schmitz, Medical Illustrations, Southern Illinois University School of Medicine.

References

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