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## Chapter 25

# FACIAL FRACTURES

### KEY FIGURE:

Ivy loops

Definitive treatment for most facial fractures requires advanced surgical skills and special equipment. However, certain interventions that may improve patient outcome do not require special skills. This chapter provides basic information about the initial evaluation and treatment of patients with a facial fracture. In addition, an easy-to-perform procedure specifically for the treatment of a mandible (lower jaw) fracture is described to assist the provider with no access to specialty care.

### *Initial Patient Evaluation*

The type of injury that results in a facial fracture can cause other significant injuries. When examining a patient with a possible facial fracture, you must be vigilant not to overlook a potentially life-threatening injury.

If the patient was reported to have lost consciousness or if the patient has any signs of altered level of consciousness, you must rule-out a **cerebral injury**.

Patients with a facial fracture also may have a **cervical spine injury**. Be careful with positioning of the patient's head and neck until you are sure that the cervical spine is not injured.

Be sure the patient is breathing easily and has a **stable airway**. Patients with a fractured lower jaw or severe fracture of the midface (cheekbones, nose, and/or upper jaw) may have difficulty with breathing. Difficulty with breathing can result from blockage of the airway by bleeding from the fracture site or by displaced bones.

Patients with **injury around the eye**, should have a thorough eye exam. See chapter 5, "Evaluation of the Acutely Injured Patient," for more specific information.

## ***Diagnosis***

### *Physical Exam*

Most patients who sustain any type of facial trauma have significant soft tissue swelling. However, swelling alone does not signify a fracture. Feel along the jaws, cheeks, orbital rim, and base of the nose. You are looking for bony instability or a “step-off” irregularity of the bones, which indicates a fracture.

If the fracture involves **tooth-bearing bone**, patients often report that their teeth do not seem to meet correctly or that the teeth do not feel “right” during biting down. Check to see whether the patient can adequately open and close his or her mouth.

### *Examining the Patient's Bite*

- Use a tongue depressor to pull each cheek away from the teeth.
- Have the patient gently close the mouth and bring the teeth together.
- Examine the vertical midline between the upper and lower central incisors. Does it line up?
- Look along the lateral side of the molars. Are the molars lined up equally, or do you see space between the upper and lower teeth on one side but not the other?
- Ask the patient whether any findings you note are new or old. New changes probably represent the result of a fracture involving tooth-bearing bone.
- If the jaw is fractured, look inside the mouth for a laceration of the gum overlying the fracture. If the gum is torn, the fracture is an open fracture that requires treatment with antibiotics.

Patients with a **fracture of the cheek bone or orbit** often report numbness of the inner cheek and upper lip on the side of the fracture. The numbness is due to injury of the infraorbital nerve ( $V_2$ ) as it emerges from the bone under the inferior orbital rim. Normal sensation often returns within 1–2 months of injury. The eyelids on the side of the injury show significant swelling, and the conjunctiva may be blood-stained.

### *Radiologic Studies*

The best way to evaluate the mandible is with a **Panorex radiograph** that shows the entire upper and lower jaws.

If you have access to a **computed tomography (CT) scanner**, order a face scan with axial and coronal views. CT is the best way to diagnose a fracture of the other facial bones. **Note:** To allow coronal views, the patient must hyperextend at the neck or lie prone with the neck bent. The cervical spine must be cleared of injury before obtaining coronal views on a CT scan of the face.

**Plain radiographs** of the face should be obtained if you cannot get a CT scan. When interpreting the radiographs, begin by looking at the maxillary sinuses (the large paired sinuses on either side of the nose). Usually, the sinuses are areas of black (air), surrounded by white bone and located on either side of the nose. If fluid is present in the sinus, it looks white instead of black. The presence of fluid may be due to a fracture and should alert you to check the radiographs carefully for a fracture on the same side of the face.

### ***Basic Initial Treatment***

If the patient has a **fracture of the jaw with laceration of the overlying mucosa**, start antibiotics—usually penicillin. The patient also should rinse the mouth with salt water several times each day to decrease bacterial content. These interventions are necessary to decrease the chance for infection of the bone.

**To decrease swelling:** When the patient is lying in bed, the head should be elevated with pillows or by raising the head of the bed. The patient should avoid bending and heavy lifting, which can worsen facial swelling. The application of cool compresses to the face also helps to decrease swelling.

If the patient has a **significant facial fracture**, especially with involvement of tooth-bearing bone, it is best to transfer the patient to a facility where specialty help is available. If transfer is impossible, most mid-face fractures will heal, although the patient's appearance may be altered significantly.

Patients with a **mandibular fracture and reasonably aligned teeth** who can open and close the mouth easily can be treated with a soft diet for 4–6 weeks.

In contrast, patients with an **unstable mandibular fracture** (i.e., with mobile bone segments or inability to open and close the mouth effectively) have a significant amount of pain and are unable to eat. This type of injury heals poorly without reduction of the fracture and immobilization of the jaws. Without proper treatment, the patient may be left with permanent pain and difficulty in eating.

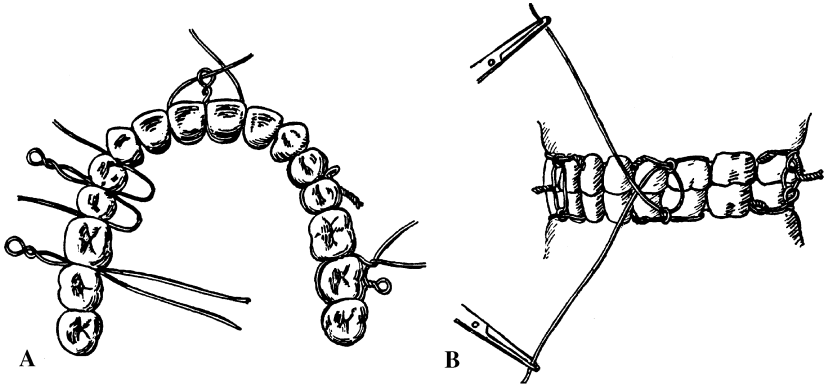
## ***Specific Treatment for Mandibular Fracture When No Specialty Care Is Available***

If there is a dead or decayed tooth at the fracture site, remove it.

To decrease pain and infection risk and to improve the chance for bone healing, the jaws should be wired together. Intermaxillary fixation stabilizes the fracture(s), brings the bones into proper alignment, and promotes healing.

Placement of Ivy loops is a relatively easy way to achieve intermaxillary fixation and requires little special equipment.

### *Ivy Loops Procedure*



Placement of Ivy loops for intermaxillary fixation. (From McCarthy JG (ed): Plastic Surgery. Philadelphia, W.B. Saunders, 1990, with permission.)

1. General anesthesia with nasal intubation is the best choice.
2. Cut a 24-gauge wire (or whatever you have) into at least 6 pieces, each 6 inches (15 cm) in length. Be careful, because the ends of the wire can easily pierce through the glove into your finger.
3. Bend the piece of wire in half. Grasp the midsection of the wire with a needle holder, and twist the wire 2–3 times, making a small loop at the bend in the wire.
4. Pass both ends of the wire between two teeth that seem to be stable and are located distal to the fracture. Be sure that matching stable teeth are available on the opposite upper or lower jaw. The wire goes through the gum from outside (the side nearest the cheek) to inside (the side nearest the tongue). The loop should be along the outer surface of the teeth.

5. Take one end of the wire and wrap it around the tooth in front by passing it through the gum, going from inside to outside.
6. Wrap the other end of the wire around the tooth behind in the same manner. Both wire ends should be on the outside of the teeth.
7. Pull on the ends to keep the wire snug along the teeth.
8. Pass one wire end through the loop.
9. Bring the wire ends together, and manually twist them in clockwise direction once or twice.
10. Use a needle holder to grasp the twisted wire a few centimeters away from the gum. Pull up on the needle holder, and twist the wire in a clockwise fashion until the wire seems snug. Look closely at the wire while doing so. If the appearance of the wire changes from shiny to dull, stop—or you will break the wire and have to start again.
11. Repeat this process on the corresponding teeth on the opposite jaw and on teeth on the other side of the fracture. You will need to place the wires around at least 4 pairs of teeth.
12. Use a wire cutter to shorten the twisted wire ends to a length of 1 cm. Bend the wire into the surface of the gum so that the wire ends do not cut into the cheek mucosa.
13. When all of the wires have been placed, bring the patient's jaws together and try to line up the teeth. Be sure that the tongue is not caught between the teeth.
14. Use additional wire to connect each pair of loops and thereby bring the top and bottom jaws together. This technique immobilizes the jaws and fracture sites. Twist the wire (as previously described) in place.
15. The jaws should stay wired together for approximately 6 weeks. To ensure adequate nutrition, the patient should eat pureed foods and drink lots of liquids. Most patients lose weight. Encourage patients to ingest sufficient calories. Be sure to discourage smoking. Poor nutrition and tobacco use impair fracture healing.
16. The teeth should be carefully brushed at least 1–2 times each day, and the mouth should be rinsed with salt water after meals and before going to bed.
17. When pain is no longer present at the fracture site (usually after 4–6 weeks), remove the connecting wires and allow the patient to eat nothing harder than soft foods for an additional 2–3 weeks.
18. If the patient develops pain at the fracture site, reconnect the jaws for another 2–3 weeks.

19. If, after removing the connecting wires, the patient can eat and the fracture site remains pain-free, remove the wires from the teeth.

**Note:** When the connecting wires are first removed, the patient's ability to open the mouth will be limited. This problem will improve over the subsequent days and weeks.

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