Management of Nasal Fractures

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The nasal bones are the most commonly fractured bones in the body. Accurate diagnosis and appropriate surgical intervention are key in the management of nasal fractures. While these injuries are not life-threatening, mismanagement of nasal fractures can lead to both aesthetic and functional deformities. A thorough history and careful physical examination are adequate for the diagnosis of nasal fractures. Literature in the field does not support the use of x-ray films to aid in the diagnosis. The majority of injuries are seen after significant edema becomes present and cannot be accurately reduced at that time. Therefore, with the exception of grossly displaced fractures, open fractures, and septal hematomas, most nasal fractures should be definitively treated after 3 to 10 days once swelling has resolved. This article will review pertinent nasal anatomic structure, pathophysiological characteristics of nasal fractures, diagnostic techniques, treatment modalities, and common controversies associated with nasal fractures. Arch Fam Med. 2000;9:738-742

The nasal pyramid is composed of thin bone located prominently in the central portion of the face. Consequently, the nasal bones are the most commonly fractured bones in the body. Blunt trauma such as motor vehicle crashes, sports injuries, and physical altercations are the most common causes of nasal fractures. Accurate diagnosis and appropriate surgical intervention are key factors in the management of nasal fractures. While these injuries are not life-threatening, mismanagement of nasal fractures can lead to both cosmetic and functional deformities.

NASAL ANATOMY

The paired nasal bones support the upper half of the nasal pyramid. Each nasal bone articulates laterally with the frontal process of the maxilla and projects anteriorly to the midline. Superiorly, the nasal bones are thick and articulate with the frontal bone. Inferiorly, the nasal bones become thin, and articulate with the upper lateral cartilages (Figure 1). Consequently, the majority of nasal fractures occur in the lower half of the nasal bones.1 The posterior septum is composed of the vomer and the perpendicular plate of the ethmoid bones and is positioned in the midline deep to the nasal bones. Unfortunately, these bones are thin and provide little support to the upper half of the nose (Figure 2).

The lower half of the nose is supported by 2 upper lateral cartilages, 2 lower lateral cartilages, and the quadrangular cartilage (Figures 1 and 2). The upper lateral cartilages have fibrous articulations with the nasal bones superiorly, the quadrangular cartilage medially, and the lower lateral cartilages inferiorly. This gull-wing configuration provides critical support for the “internal nasal valve,” the region of greatest resistance to inspiratory airflow. The lower lateral cartilages are composed of medial and lateral crura in a similar gull-wing configuration (Figure 1). There are fibrous attachments to the upper...
per lateral cartilages superiorly, and to each other medially. The lower lateral cartilages are thick and define the contour of the nasal tip and nostril. The quadrangular cartilage acts as a “tent pole,” providing support for the nasal tip and dorsum (Figure 1).

**PATHOPHYSIOLOGY OF NASAL FRACTURES**

Traumatic disruption of the nasal bones and cartilages can result in significant external deformity and airway obstruction. The type and severity of nasal fracture is dependent on the force, direction, and mechanism of injury. A small object with a high velocity can impart as much damage as larger objects at a lower velocity. Lateral nasal trauma is most common and may result in the fracture of one or both nasal bones. This is often accompanied by dislocation of the nasal septum off the maxillary crest (Figure 3, A and B). Septal dislocation can result in an S-shaped nasal dorsum, tip asymmetry, and airway obstruction. Direct frontal trauma to the nose often results in the depression and widening of the nasal dorsum with associated nasal obstruction (Figure 3, C). More severe injuries may result in comminution of the entire nasal pyramid (Figure 3, D). If these injuries are not properly diagnosed and corrected, the patient will have a poor cosmetic and functional outcome.

**DIAGNOSIS**

An accurate diagnosis of nasal fractures depends on a thorough history and physical examination. A complete history includes assessment of (1) the force, direction, and mechanism of injury; (2) the presence of epistaxis or cerebrospinal fluid rhinorrhea; (3) any history of previous nasal fracture or surgery; and (4) nasal obstruction or external nasal deformity after the injury. The physical examination is most accurate when performed prior to posttraumatic edema. The examination requires adequate lighting (headlight or otoscope), instrumentation (nasal speculum), and suction (preferably Frasier-type). Inspection of the internal nose is essential. All
clots should be gently suctioned and minor bleeding should be controlled with either 4% cocaine or 0.25% Neo-Synephrine spray or solution. Any mucosal lacerations, septal disruptions, or septal hematoma should be documented. Septal hematomas require immediate evacuation and drainage. Examination of the external nose may reveal lacerations, bony stepoffs, or cartilage disruption. Palpation of the nasal bones may reveal mobility or crepitus, indicating a nasal fracture. After adequate anesthesia with a 4% cocaine solution, “bimanual” palpation can be performed by placing a finger externally on the nasal bones and a hemostat through the naris on the internal surface of the nasal bones. Periorbital ecchymosis, epiphora, or diplopia must raise suspicion for associated orbital injuries.

The use of radiographs for the diagnosis of nasal fractures is controversial. Some authors have cited a need for medicolegal documentation of nasal fractures. However, previous studies have shown poor sensitivity and specificity of radiographs in diagnosing nasal fractures. To determine if radiographs were helpful, Delacey et al (1977) reviewed 100 patients with nasal injuries who were admitted to an emergency department. The study compared normal x-ray films with the x-ray films of patients with known nasal fractures. The authors concluded that there was no diagnostic efficacy in nasal x-ray films because of the high incidence of “bony abnormalities” found on normal x-ray films. Mayell et al (1973) reviewed 107 patients with nasal fractures and concluded that even if nasal x-ray films were negative for abnormalities, this did not change the management of a clinically fractured nose, nor was it helpful in the majority of reductions. Clayton and Lesser presented a prospective study of 54 patients with nasal fractures. Patients were assessed clinically, radiographically, and under anesthesia to correlate the need for x-ray films in the management of nasal fractures. Radiographs were not found to be useful in the routine management of nasal fractures and did not influence treatment.

Nasal fractures can be accurately diagnosed with a thorough history and

physical examination. Literature in the field does not support the use of routine x-ray film for the diagnosis of nasal fractures.

TREATMENT

Timing

The primary treatment goal in the management of nasal fractures is to reestablish the premorbid function and cosmetic appearance of the nose. There is some controversy as to the most appropriate timing of treatment. Assessment of nasal fractures is most accurate immediately after the injury, before there is significant tissue edema. Unfortunately, patients are rarely evaluated this rapidly. Soft tissue edema usually masks mild to moderate nasal fractures and makes immediate closed reduction difficult. Therefore, most patients should be reevaluated in 3 to 4 days. If swelling persists, it is reasonable to reexamine the patient in another 3 to 4 days. Closed reduction within 7 to 10 days can be accomplished under local anesthesia. Delays longer than 7 to 10 days result in greater bone healing and increase the potential need for surgical osteotomies. Bone healing may occur more rapidly in the pediatric population. More severe injuries such as open fractures, septal hematoma, and injuries with gross external deformity require immediate surgical intervention.

An attempt should be made to surgically reduce a known nasal fracture whenever swelling and edema allow for an accurate diagnosis and reduction. This can be done immediately if the injury is severe; however, mild to moderate fractures are more easily assessed and accurately reduced 3 to 10 days after injury. Depending on the degree of comfort and experience, closed reduction of uncomplicated nasal fractures with local anesthesia is well within the scope of the family physician. For moderate to complex nasal fractures, open fractures, or septal hematomas, a surgical consultation should be sought. While most nasal fractures can be managed via closed reduction, some injuries may ultimately require open reduction via septorhinoplasty. This is usually performed at 6 to 12 months after the posttraumatic scar has softened.

Anesthesia

Reduction of nasal fractures can be performed under local or general anesthesia, depending on the surgeon’s preference. Cook et al performed a prospective randomized study of 50 patients with nasal fractures, comparing the results of closed reduction under local vs general anesthesia. There was no difference found between treatment groups for airway patentcy or cosmetic results. The advantages of local anesthesia include reduced cost, greater flexibility in timing of the procedure, and elimination of risks associated with general anesthesia. However, treatment of children, young adults, or anxious patients may require a general anesthetic. The authors advo-
cate the use of local anesthetic when possible.

**Technique**

Reduction of nasal fractures can be accomplished with either an open or closed technique. The majority of nasal fractures can be managed adequately with closed reduction. The supratrochlear nerves, infraorbital nerves, and nasal dorsum are anesthetized with 1 part 1% lidocainehydrochloride to 100,000 parts epinephrine. Four percent cocaine solution (on 0.5×3.0-cm cotton pledgets) is used for intranasal anesthesia. Many surgeons also use intravenous sedation or analgesia as an adjunct to the local anesthetic.

Instrumentation is often required as an aid in reduction. The depressed nasal bone is stabilized between a Boies elevator intranasally and a finger externally. The elevator reduces the depressed nasal bone as the opposite thumb pushes the contralateral nasal bone into its correct position (Figure 4). The Walsh and Asch forceps can also be used to reduce septal fractures and dislocations. External splints and nasal packing are commonly used postoperatively. Splints can be contoured to the external nose and should be kept in place for 7 to 14 days. Common materials include plaster of paris, aluminum, and heat-malleable plastic splints. With extremely mobile nasal bones, an antibiotic-coated strip gauze can be placed intranasally to stabilize the reduction. The gauze is packed high into the nasal vestibule beneath the nasal bones, and should be kept in place for 4 to 7 days. The patient is to be given oral antibiotics while the packing is in place.6

**SUMMARY**

In summary, a thorough history and careful physical examination are adequate for the diagnosis of nasal fractures. Literature within the field does not support the use of x-ray films to aid in the diagnosis. The majority of injuries are seen after significant edema is present and cannot be accurately reduced. Therefore, with the exception of grossly displaced fractures, open fractures, and septal hematomas, most nasal fractures should be definitively treated within 3 to 10 days once swelling has resolved. Some injuries may require open reduction via septrhinoplasty. This is most effectively accomplished at 6 to 12 months by an experienced surgeon. Patients should be followed up for 6 to 12 months postoperatively to assure that adequate results are obtained.

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**REFERENCES**


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**Clinical Pearl**

Gonorrhea Rates Higher With More “Broken Windows”

Gonorrhea rates were higher in physical locations with deteriorated conditions, such as more broken windows, trash and abandoned cars, than in locations with high poverty but less physically deteriorated conditions (46.6 per 1000 versus 25.8 per 1000 people). (Am J Public Health. 2000;90:230-236).