

FRACTURES OF NASAL BONES IN CHILDREN

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For the purposes of this discussion, I would consider anyone who is sixteen years of age or under to be classed in the category of children and will limit my discussion to this age group. In addition, I would like to observe that a large percentage of the fractures in children are of the greenstick variety and are not complete fractures.

In considering the treatment of this trauma, one must be aware of the growth centers and growth periods of the nose and facial bones. While there is some disagreement in regard to the ages of growth periods in general, it is reasonably accurate to say that the growth between the first and seventh year is rapid. Between the seventh and eleventh year, the structures are relatively static and have only minimal or slow growth. Somewhere in the neighbourhood of the eleventh year, there again, is a rapid spurt in the growth continuing through the fifteenth year.

The nasal bones are formed in the external perichondrium of the cartilaginous capsule and contain at least one and usually more ossification centers. The cartilaginous capsule which develops in early embryonic life is the basis for the adult nose, including the septum and cartilaginous vault and is in intimate relationship with the nasal bones.

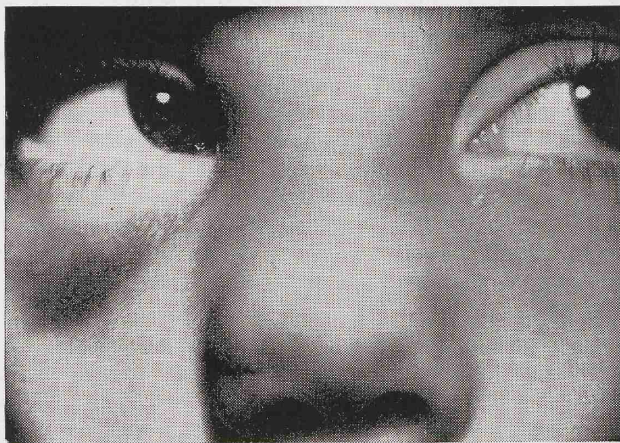
An ossification center develops on each side of the septal cartilage in the perichondrium near the lower border of the septum for the formation of the vomer. These ossification centers fuse under the edge of the septum. The bilateral plates unite from behind forward and the vomer is usually completely formed about the fifteenth year. This would indicate that when working on children under fifteen years of age, the perichondrium of the vomer with its ossification centers should not be disturbed if possible.

Ossification for the vertical plate of the ethmoid begins in the first year of post-natal life near the cephalic portion of the primitive septum with other centers of ossification developing later. The ethmoid is not completely ossified until the end of the seventeenth year.

In the management of these injuries, conservatism should be the primary rule, and one should not disturb the perpendicular plate of the ethmoid any more than the minimum to accomplish the purpose of the correction of the trauma. Trauma to ossification and growth centers may stimulate or inhibit growths of a part, a combination of parts, or of the total nose.

Since the maxillary bones form directly in the membrane of the maxillary process and the ossification or growth centers are lateral to the nasal optic groove, one may consider that fractures or osteotomies medial to this area or in the area of the groove will not cause inhibition or stimulation of these growth centers. The bones of the external nose and the maxilla are considered membranous bones and heal by fibrous union.

Poor functional and cosmetic results will result from improper diagnosis and management. It is mandatory that every effort be made to make the proper diagnosis of injuries in children and this is often very difficult as the patient is presented to the physician shortly after the painful experience of trauma to the face.



The type of case which demands open inspection for diagnosis and treatment
Le cas typique qui demande inspection opératoire pour la diagnose et le traitement

Where it is possible to do so, gentle but firm palpation is performed. Inspection of the nose within and without may be done without palpation and without the use of speculi if one has a cooperative patient and a good light. The internal examination is not usually hampered by vibrissae as in the adult.

In examining for the nasal fracture, one must keep in mind the greenstick qualities of this type of fracture in this age group and further that the nasal junction of the nasal bones with the nasal processes of the maxilla is a synostosis. Since this may buckle either inward or outward, one may have difficulty in the management of the injury if this is not clear to the surgeon.

If there is obvious injury or questionable injury to the nasal bones and/or the cartilaginous portions of the nose, then it is best to provide anesthesia for examination and treatment. We prefer anesthesia of the general type for all of these cases excepting the most mature of those who are fourteen to sixteen years of age. In comparing the anesthesia of this group with that of those not suffering recent painful trauma, it has been our observation that the latter group may be done under local anesthesia down to approximately twelve years of age.

After affecting a good general anesthesia, reduction of swelling may be accomplished or hastened by the use of hyaluronidase and a small amount of 1-30,000 Epinephrine infiltrated into the area with normal Saline. Seventy-five to one-hundred fifty turbidity units of the hyaluronidase may also be given into the buttocks intramuscularly. With firm gentle pressure to the contused area, one may reduce the swelling to a point where hard structural deformity becomes more evident. Examination should search for separation of the nasal bones from the upper lateral cartilages, hematomata over the upper lateral cartilage, tears in the nasal mucosa, lacerations of the cartilaginous components, and fractures of the nasal bones with distortion or displacement of any or all components. One must then decide whether open reduction is indicated and in any area of doubt open surgery should be encouraged.

Where this is not required, mild pressure dressings are of value. Contusions may be present as the sole result of injury or there may be signs of more extensive injuries. Where the cartilaginous vault is separated from the bony vault, simple elevation and splinting with internal and external dressings are required. Where there has been displacement of the nasal bones, they should be elevated and returned to their normal position and held by splinting. Where it is impossible to return the nasal bones to their proper position, then a single or multiple osteotomy must be done, avoiding the growth centers.

Conservatism is mandatory as injury in the area of the "septum mosaic" may result in far-reaching deformities of the teeth, dental arch, palatal arch, septum and the entire facial symmetry. The nose should be re-positioned into the mid-line so that it can grow straight rather than grow into more deformity during the growth periods. One must remember that in mobilization or freeing of growth components of the nose, they may be releasing the growth potential of a part from imprisonment. We frequently see that over-growth of one part occasionally will thwart the growth of another part.

In concept, it would seem to be desirable to give each growth component the privilege of growing in the direction for which it is intended and not have it warped nor encouraged to grow in the wrong plane.

In summary:

- (1) Conservatism is mandatory
- (2) Little or no treatment is needed for minimal injuries

- (3) Where the diagnosis is in question, anesthesia is always required
- (4) After anesthesia, if any doubt exists, open inspection of the parts will erase residual doubt concerning the diagnosis
- (5) Restoration of the growth components to a symmetrical position in the midline and splinting with physiological concepts in mind will result in the best long-range result.

LES FRACTURES DES OS NASAUX CHEZ LES ENFANTS

Lorsqu'on considère le traitement des traumatismes des os nasaux chez l'enfant de seize ans ou moins, il faut tenir compte des centres et des périodes de croissance du nez et des os de la face. Le moindre traumatisme nasal entraîne souvent des déformations importantes des dents, de l'apophyse alvéolaire, du palais, de la cloison et de la symétrie faciale.

Etant donné que la plupart de ces fractures sont des fractures en bois vert, il faut considérer l'articulation des os nasaux et des apophyses montantes des maxillaires comme une synostose. Il peut se produire un déplacement vers l'extérieur ou vers l'intérieur.

Partant de ces conceptions, il serait désirable de laisser à chaque centre de croissance la liberté de se développer dans la direction adéquate et d'empêcher les mauvaises consolidations. Les techniques conservatrices sont indiquées dans ce domaine de la chirurgie.

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