PART 2

**Surgical Correction of the Long Face Syndrome, In a Non-Growing Individual**

The Le Forte surgical procedure (maxillary impaction) reduces facial height, in these cases, and invariably widens the nasal base. Simultaneously, the Le Forte procedure rotates the alar cartilage laterally. In addition, Maxillofacial and ENT surgeons may perform partial resection of the inferior turbinates, to insure a good nasal airway, postoperatively, in their LeForte patients.

*Before LeForte procedure*  
*After LeForte procedure*

*Figure 20.*  
*Figure 21.*
Figure 22.
Vertical Maxillary Excess

Figure 23.
After LeForte procedure

Figure 24.

Figure 25.
(Before and After LeForte Procedure)
The most common findings, in cases of long-face syndrome (LFS), are visible increases in the lower third of the face. Because of the downward rotation of the mandible, the angle of the mandibular plane is steeper than normal. In the normal skull, the tangent to the inferior border of the mandible, when extended, is inferior to the cranium (occiput). In cases with steep mandibles, this tangent enters the cranium. The mandibular border can be palpated and an assessment made of the angle, in relation to the Frankfort plane. The average mandibular plane angle is approximately 27 degrees. A lateral cephalometric tracing will show the steeper mandibular plane.

LFS patients frequently show a lip-incompetent posture. Nevertheless, this posture should not be regarded as pathognomonic for nasal obstruction because some of these patients can be nasal breathers, obtaining a posterior oral seal between the tongue and soft palate. Excessive appearance of the maxillary incisors is also a sign of LFS. On smiling, many of these patients show large amounts of gingiva, the so-called “gummy smile.”
Either bilateral, or unilateral posterior cross-bite, may be present in LFS. Mandibular shifts can be seen in many of these cases, because interfering cusps are common when vertical growth is excessive. A characteristic marginal gingivitis can be seen around the anterior maxillary anterior teeth, because of the drying effect that accompanies chronic mouth breathing.

(Figure 26 – Chronic Mouth Breathing Patient)
As the posterior teeth erupt, and the alveolar bone develops vertically, it is necessary for the anterior teeth to erupt sufficiently, to prevent an anterior open-bite from developing. The anterior teeth must erupt approximately 3.0 mm for each 1 mm of posterior eruption, to maintain the same relationship. If the position of the tongue prevents this from occurring, an open bite may be produced (i.e. anterior tongue thrust).

Figure 27 (a)

Enlarged tonsils and an associated forward tongue posture
We have found that very large faucial tonsils are a relatively common cause of an anterior tongue position.

Kissing faucial tonsils, in time, can exert significant forward pressure on the tongue, and thus the lower jaw (Figure 27).

Long-standing nasal airway obstruction can lead to a “disuse” atrophy of the lateral crus of the lower lateral cartilage. The result is a slit-like external nares associated with a narrow nasal vault. After the airway obstruction is corrected, and a normal nasal airway is established, certain patients may still experience nasal collapse on inspiration, making reconstructive nasal surgery necessary.
Hyrax appliance has just been placed. Note patient’s left but especially, right nasal alar collapse. Cottle termed this the “tension nose”.

Figure 29 (a)

Photo of fixed Hyrax in the Mouth.
Excising an ellipse of skin, and subcutaneous tissue, in the nasofacial fold, can open the nasal valve by rotating the alar cartilage laterally… much like a Breathe Right nasal strip does for football players, and persons with head colds or nasal allergies.

Because patients with LFS are more likely to have facial asymmetries, Quinn\textsuperscript{16} suggested that keeping the mandible in a lowered position would decrease the action of occlusal determinants, of mandibular growth, and thus allow uncoordinated growth. No cross-sectional, or longitudinal studies, have been reported to support this theory.
Figure 30 (a)

*(High Palatal Vault)* with severe dental crowding

Figure 30 (b)

*Patient with maxillary compression, blocked out canines and posterior cross bites.*
**Mechanism of LFS**

To understand the influence of nasal obstruction, on facial growth, it is necessary to review current concepts concerning the normal interactions between bone and adjacent soft tissues. Although bone is the second hardest substance in the human body, it is extremely pliable when subjected to even the smallest forces, esp over prolonged periods of time (as exemplified by the grooving of the inner surface of the calvarium, by small arterioles and venules).

Teeth move through bone, under the smallest forces. It has been suggested that all forces are capable of moving teeth. Pathologic examples support the concept that the skeletal configuration of the face is influenced by the forces acting on the maxillomandibular complex. Many cerebral palsy patients have poorly innervated muscles of mastication, and perioral musculature. They develop the long face because of unrestrained vertical growth and excessive molar eruption. Patients with congenital hypotonia, involving the facial muscles, demonstrate similar changes. In contrast, patients with heavy facial musculature, such as football linemen and
competition weight lifters, often show low mandibular planes, and deep dental overbites.

Contractures after facial, and cervical burns, produce elongation of the dentofacial skeleton. In contrast, the Milwaukee Brace, used in cases of spinal scoliosis, can produce a compressed facial appearance (“short face” syndrome) as a result of the upward forces generated by the chin rest. The facial skeleton is very mouldable, and is predictably responsive to muscular forces acting on it.

Thus, any alteration in function, that changes the forces acting on the facial skeleton, may produce changes in facial morphology.
Figure 31. The **Milwaukee brace** has been used for years to treat scoliosis (curvature of the spine). There are a few variations to this brace but the most common type starts at the hips with a molded pelvic girdle (leather or plastic) and has 2 posterior metal bars that attached to the back of the pelvic girdle and one anterior bar in front. The metal bars run up the entire length of the spine and connect into a neck ring, which completely encircles the neck and has a small plastic throat mold in front and two small headpieces in back where the occipital portion of the skull rests.

In general, nasal airway obstruction is promptly followed by the establishment of an oral airway, to ensure survival of the individual. Newborns may not have the muscular agility to create an oral airway, so that nasal obstruction in the infant can be life threatening. Bilateral congenital choanal atresia requires prompt intervention, to re-establish an adequate airway, because infants are obligate nasal respirators.

The lowering of the mandible accompanies establishment of an oral airway, and alters the force system acting on the maxillomandibular complex. As the mandible is lowered, the hyoid bone also drops, thus removing the tongue from the palatal vault. The weight of the buccinator
muscles is no longer opposed, by the mass of the tongue, and thus unequal forces are created, which place constrictive forces on the palate.

Unilateral, and bilateral, cross-bites are seen frequently in nasally obstructed patients, as the maxilla narrows (Figure 30). Posterior tooth eruption and excess vertical alveolar development can occur if the mouth-breather allows the jaw to continuously hang open. Moller\textsuperscript{48} and Sassouni\textsuperscript{49} have shown that the forces between the maxilla and mandible, generated by the muscles of mastication, are partly responsible for the spatial relationship of the maxilla and mandible.

Some nasally obstructed patients may develop a rhythmic lowering of their mandibles, on inspiration, followed by elevation of their mandibles, on expiration. Harvold\textsuperscript{50} noted this response in some of his primate dentofacial studies. As expected, these patterns can be conductive to more normal facial growth. This may explain why some mouth-breathers do not develop LFS and only those patients whose mandibular posture is permanently altered may be at risk to develop the syndrome (Figure 26).
Treatment of LFS

Conventional orthodontic treatment has limited influence on the vertical dysplasia associated with LFS. Bell’s work on the blood supply of the palate has led to the development of the LeForte operation to intrude the maxilla, in the LFS (Figure 32).

Figure 32.

LeForte Impaction Procedure
Typically, a section of bone is removed from above the maxillary teeth to allow the maxilla to be raised. This allows the mandible to rotate upward, shortening the lower face height, and allowing the lips to meet in response. This change also allows the mandible to move anteriorly, contributing to the correction of a Class II malocclusion. Conventionally, LeForte procedures are performed after facial growth is complete (ages 17 to 18 years in girls, and ages 19 to 20 years in boys).

**Conclusion**

The largest increments of growth occur during the earliest years of life, so that by age 4 years the craniofacial skeleton has reached 60 percent of its adult size. By age 12 years (the age when many orthodontists initiate treatment) 90 percent of facial growth has already completed. To wait until 90 percent of a deformity is established, before instituting treatment, is not consistent with a “preventative philosophy”. Because successful treatment of anterior - posterior, and vertical, dentofacial discrepancies, is linked to growth changes, it is our philosophy that interceptive orthodontic, and early
ENT measures, should be initiated much sooner than is conventionally recommended.

Berman\textsuperscript{52} wrote: “Natural law did not divide man into three parts: dental, medical, and psychological. If Society chooses this division for the purposes of healthcare delivery, then each professional group bears a special responsibility to be sufficiently informed, about the others, so that integrated total-health-care is an achievable goal.” The otolaryngologist (ENT doctor) should be receptive to referrals from orthodontists, and dentists, who express concern about adequate function of the oropharynx and the nasal airway. A thorough history and a careful examination should be performed. If allergy is a major consideration, a subsequent referral, or allergy treatment programme, should be initiated.

After a diagnosis is made, the ENT clinician should confer with the orthodontist, and a risk-to-benefit analysis, regarding possible early intervention, should be performed. It has been our experience that the earlier the return to normal nasal respiration, and normal oropharyngeal function, the more likely normal dentofacial development will occur. Mouth breathing, of long-standing duration, may persist for a year or more after the
airway is restored and represents a “learned habit.” Nevertheless, within a year or so after re-establishment of normal oropharyngeal function, and normal nasal airway, the chronic mouth-breathing habit does revert to nasal breathing. Moreover, it is our belief that dentofacial development, for patients at risk, will proceed in a more normal fashion once chronic mouth-breathing ceases.

**Summary**

The establishment of a patent oral airway, subsequent to upper airway compromise, is accompanied by postural changes of the maxilla and mandible. This alteration introduces forces on the bones of the facial skeleton that may result in characteristic findings termed the “long-face syndrome”. Primary care physicians, and dentists, must develop cooperative relations with oral myologists, otorhinolaryngologists, allergists, and orthodontists to promote normal nasal respiration throughout a child’s early years of facial growth. Normal respiration may reduce harmful long face dysplasia.
Bibliography


