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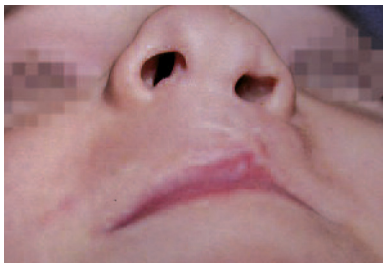
Some comments on surgery of nasal septum and turbinates in children



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ABSTRACT

Every day orthodontists observe the consequences habitual mouth breathing has in their patients' oral cavities and the limitations this dysfunction places on their orthopedic and orthodontic treatments. Orthodontists can enlist the assistance of their ENT colleagues for the elimination of hypertrophied adenoidal and tonsillar tissue, but when asked to perform surgical correction of malformed nasal septa and turbinates for young children most otolaryngologists usually advise strongly against such procedures. Even surgery for labio-maxillo-palatal clefts is still entangled in the same web of dogmatic disapproval. For these unilateral or bilateral cleft patients, 75 % of whom breathe primarily through their mouths, the potential for growth is considered to be limited and unpredictable. This belief, we feel, is related to the tendency of workers in our field to pay insufficient attention to nasal breathing. But in our practice, for the past thirty years we have been re-establishing it for patients at about the age of 6 and now we are doing it for children between the ages of 4 and 5. For the last 13 years we have helped affected children to breathe nasally at the age of 6 months by means of an ambitious but rigorous surgical procedure on all patients with total clefts. The current results on the nasal and maxillary growth of these children are good enough to encourage us to continue along the same lines, with the expectation of very soon being able to confirm our results as they reach the end of their growth periods.

KEYWORDS

Nasal surgery

Turbinates

Growth of the face

Nasal septum

Nasal breathing.

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1 – INTRODUCTION

Conservative views about nasal surgery for children still prevail discouraging any operations that might threaten nasal and facial growth. Parents of children with nasal deformities are still advised to wait for the end of the growth period before having a deviated septum corrected! *For many orthodontists this lack of action makes no sense and constitutes a lost opportunity for the patient,* while otolaryngologists, the specialists in nasal surgery, usually argue that postponing surgery would eliminate the risk of interfering with facial growth. As a result a certain confusion infects the debate between interventionists and the advocates of wait and see[17] who have a field day scoffing at the caricature they paint of aggressive surgical procedures performed with unthinking regularity to re-open upper airways, an action they deride as ''little chimney sweep'' therapy[5]. To enhance their argument they describe themselves as valiant defenders of functional therapy[7] to justify their sturdy opposition to septal surgery in children, emphasizing that Delaire[2] as well as Scott[6] ''consider that the septum is the center of the early expansion controlling the development of the facial skeleton in vertical and antero-posterior directions.'' With the greater understanding of the role played by the intra-uterine ventilation of the fetus in the development of the upper airways[9], *we have concluded that Moss's functional matrix theory[4] that affirms that the cartilaginous septum plays only a passive role in growth conforms better to the best informed current observations.*

In practice, for a number of reasons, the field of nasal surgery for infants remains a no man's land where the combatants debate powerful taboos stemming from the specter of underdevelopment of the nose that follows septal hematomas and severe trauma to the nose, making for many practitioners serious anterior resections of septal cartilage a no-no during the growth period. The few studies on the topic that have thus far appeared are not only rare but they have engaged only a limited series of disparate cases and have included no long-term follow-ups. Our notion of just what constitutes childhood remains, in many ways, as imprecise as the criteria for the evaluation of the consequences of septal surgery on nasal or facial growth.

How can this situation be explained? First of all many authorities have advised against nasal surgery for many years and, as a result, it has been performed very infrequently. And when it is undertaken the difficulties accompanying it are formidable: visual and instrumental access are limited, the structures involved are fragile, a major risk of stenosis caused by scar tissue constricting the very small nostrils is ever-present, and so is the not entirely rational fear that surgery on an infant's nose will somehow have a deleterious effect on that organ's supposed role as a growth center. However, it must be admitted that the majority of surgeons who are experienced in nasal surgery on adults quite reasonably consider it to be a delicate intervention, *but have not sufficiently taken into account the*

influence nasal functions, particularly that of breathing or more precisely of ventilation, have on facial growth and have not admitted that this role might be reason enough to undertake septal surgery. So the interventions that have been made for extreme cases in children are not only rare but are also poorly followed. The same pattern prevails among our English and Scandinavian colleagues and is, in effect, virtually universal. In such a context it is not surprising that a widespread, un-nuanced dogmatic attitude persistently condemns septal surgery with as much vehemence as it deplores sub-periosteal and sub-perichondrial dissections of facial tissues during the growth period.

Curiously, in their training in the best schools, dentists and, especially orthodontists, receive thorough, well-founded information about facial growth and the influence that various functions, particularly breathing, have upon it. In sharp distinction, the balkanization of facial surgical specialties has cut up knowledge imparted to students about anatomy, functions, and growth into small parcels related to their specific turf and strictly limited communication between groups. As a result, *only an enlightened open-minded approach would make possible a global, multi-disciplinary agreement on what investigations are needed to kick start the facial domain of the young science of morphology that has not yet completed its own growth period.*

Our own, already mature, practice focused on labio-maxillo- palatal clefts has stimulated us to reflect carefully on the nasal malformations that accompany clefts, first in treating the numerous post-operative sequellae that afflicted adolescents and adults. Then we turned our attention to young children for whom, we became convinced, it was essential that we restore both good satisfactory esthetics and functioning so that good facial growth could take place in patients with nasal obstructions as young as six[11]. Thirty years have passed since our studies began and the results published, in 1982. As our experience in this delicate and difficult surgery progressed, we realized that an evaluation of its results was going to be more difficult than we had originally supposed.

The objective causes of nasal obstructions are multiple, intricate, and intermingled**.** They can be septal, turbinate, and alar deformities that appear at birth and, of course, persist if they are not corrected at the first operation. They may also be sequellae of surgery that are not limited to tight scar tissue of the nostril's sill or to deformation of the alar cartilage with a nostril web that obstructs the nasal aperture like a curtain. And they might depend on the size of the piriform orifice and thus be related to how the cleft through the alveolus was treated. The size of the nasal fossae plays a role and so does the width of the palatal vault, which faulty surgery may leave with a covering of retractile scar tissue that appears after the slow formation of secondary epithelium in the zones that were denuded by mobilization of the fibromucosa.

The stubbornness with which some patients persist in mouth breathing after the obstructions have been removed is another problem that cannot be eliminated with a simple

exhortation. It took us considerable time, effort, and serious contemplation in a multi-disciplinary research endeavor that included daily exchanges with our colleagues to formulate our current protocol for dealing with primary treatment of total unilateral or bilateral labio-maxillo-palatal clefts and the post-operative sequellae. Throughout, we were inspired by a guiding passion: *that was to establish nasal breathing as a first step as early as possible, which means that now we try to achieve that goal in the child's first operation.* This approach, we believe, is the logical result of our conviction that we should endeavor to prevent our patients from adopting dysfunctional habits and faulty postures, an outcome that can only be achieved by very radical nasal surgery with repositioning of the misplaced structures and rigorous control of post-operative scar tissue. If necessary, the protocol is completed by orthopedic anterior expansion of the maxilla and myofunctional therapy. Sometimes patients may wear chin caps with light strength just to help them keep their lips closed during sleep.

We are more than ever aware that in our extremely early surgical treatment of nasal deformities we are exploring an almost untouched field where the ''authorized scientific community'' has consistently marginalized the few pioneers who preceded us[1, 3, 8] and the more or less anonymous colleagues who accompany us. And they have done this without the support of any experience in the matter. But the long-term data and the experience we have accumulated, especially for labio-maxillo-palatal cleft patients have granted us serene confidence. In the next 4 or 5 years we shall have sufficient evidence to demonstrate, in the most rigorous possible manner, **the essential role that nasal breathing plays in normal facial growth.** Because of its importance, it will become necessary for us to synthesize this knowledge into the field of facial morphology and to train a sufficient number of surgeons able to perform excellent nasal surgery for children of all ages. It is crystal clear that we must no longer ignore this indispensable information about the physical development of a large cadre of our children. The protocols of the future for treatment of malformations and other nasal disorders in children must give the obtaining of good nasal breathing the important place that it deserves.

2 – OUR EXPERIENCE WITH NASAL BREATHING IN CLEFT LIP AND PALATE PATIENTS

The objective of this present work is to assemble the first lessons we have learned from thirty years of performing very early functional and esthetic nasal surgery. Our procedures were ambitious in the extent of the tissue dissection and repositioning we undertook that were at the very least serious and, in the end, useful. The number of these scrupulously consecutive cases and the long term follow-up we executed have, at last, provided

us with the data to draw more general conclusions that can be transposed to other pathological entities. Our extensive experience has given us the confidence to proceed with, and to recommend this surgery with discernment, in every case for which it is indicated, being careful to specify the technical modalities needed to put it into effect, its difficulties, and the precautions that must be taken. The road along which we have passed in this field can be divided into two stages. It began more than thirty years ago when we first performed corrective nasal surgery on infants aimed at restoring nasal breathing. Next we began to develop a reparative nasal surgical technique that was performed in younger patients, aimed at correcting anatomical defects and establishing normal function at the time of the initial operative procedure. In the account that follows, we present the details of the path that we traveled.

2 – 1 – Restoration of nasal breathing

2 – 1 – 1 – Specific characteristics of the cleft[12]

Before we begin discussing restoration of nasal breathing in the treatment of patients with labio-maxillo-palatal cleft sequellae, it is necessary first to discuss one of the particular characteristics of cleft lip and palate treatment that we have begun to understand after many years of observation is that correction of deformities of the nostrils and the septum even when clearly justified and expertly performed may have no effect on the habit of mouth breathing.

The crucial factor that provoked mouth breathing at the time of the first operation is almost always the surgical closure of the labio-nasal soft tissue that created an obstacle by obstructing the nostril on the side of the cleft, a blockage that was aggravated by the septal deformations of unilateral clefts or by the bilateral nostril deformity and the short columella in bilateral clefts.

We know that normal children whose upper airways are not blocked by any obstacles can become mouth breathers because of one functional behavior or another, such as finger sucking, which sets off a vicious circle. The mouth breathing provokes hypertrophied adenoidal and tonsillar tissues, even over-growth of nasal mucosa, so that blockages appear where there were none to begin with and the mouth breathing becomes more entrenched. Then the mouth-breathing complex habit can be eliminated only by orthopedic and myofunctional therapy.

Children with clefts confront the same functional and pathological disorders than other children in their age group do, but, in addition, two specific characteristics can impede their development, the cleft and, for many of them, post-operative nasal obstructions that may afflict them as early as the first few months of their existence. That observation is critical. In fact, a newly born child whose cleft is complete breathes through that cleft and, at that early stage, can have no representation of its nose in its cerebral cortex. It has not been able to get its mode of nasal breathing established from the moment of birth as normal children do. If the first surgical

procedure separating the nose from the oral cavity has created an obstacle in the nostrils, the child will be forced to install a pattern of mouth breathing that completely violates nature because new-born infants, like nursing infants, have virtually no oro-pharynx because of the shortness of their necks and can breathe naturally only through their noses. This initial programming of forced mouth breathing leaves an imprint in the cerebral cortex that we have found in our thirty years of experience in treating cleft lip and palate patients is very hard to erase.

So the treatment team must plan ahead to prevent this faulty programming from getting set up and, afterwards, to preserve the acquisition of correct breathing. For nasal breathing can be compared to language. Proper functioning must be restored at the time of the initial surgical procedure to prevent the establishment of malfunctions and faulty postural adaptations that, once ingrained, are so difficult to eradicate later and would be likely to continue their unhealthy influence even if a secondary operation had restored a good patency of the upper airway. Such cleft palate patients cling to the old faulty habits because of excess anterior vertical growth, incomplete lip closure, and low tongue posture with retention of an infantile swallowing pattern.

2 – 1 – 2 – Indication for re-establishing clear nasal passages

In the treatment of malformations like labio-maxillo-palatal clefts practitioners find many factors causing renewed nasal obstruction, often corresponding to the initial deformations and to the not infrequent sequellae of the initial surgical procedure. Often they accumulate, causing numerous repercussions. Professor D. Warren[18], who has published numerous studies in the field of breathing patterns of cleft palate patients, believes that 75% of the children treated for unilateral or bilateral clefts are predominantly mouth breathers. Practitioners dealing with them should acquire a profound knowledge of these deformities because no effective treatment can be provided unless a precise diagnosis has been made.

2 – 1 – 3 – Septal deviations are quite different in unilateral cleft patients than in bilateral cleft patients

Patients who have symmetrical total bilateral clefts have median sagittal vomers and septums that are undeviated or only slightly mal-aligned, with normal sized turbinate bones but with greatly deformed nostrils when the columella is short and the alar cartilages are locked in their caudal rotation by the constraint of the myrtiform muscles that draw them toward the mid line like a curtain that closes the nasal orifice from the outside. The narrowness of the nasal valve on each side encourages an inspiratory collapse that completes the obstruction.

In unilateral clefts lack of symmetry is the rule. The septum takes the form of a double curvature, with the anterior segment twisting into the nostril opposite the cleft. Then it becomes even more contorted in the nasal

fossa that is divided where a small vertical septal convexity at the anterior extremity near the nasal valve is added to a sharp, protruding horizontal crest that lies beside the lateral nasal wall from one end of nasal fossa to the other just above its floor. The highly inclined vomerian groove directs this crest toward the side with the cleft, and the lower edge of the septal cartilage is luxated away from the gutter from the anterior nasal spine to the posterior nasal spine.

2 – 1 – 4 – Hypertrophy of the inferior turbinate

The anatomic arrangements described above contrive to make the nasal fossa opposed to the cleft quite large but it is filled with the hypertrophied inferior turbinate that lodges itself in the enormous septal concavity. On this side the middle turbinate is also often very large. An examiner can easily determine the extent of the deformity on frontal sections of scanner images. This will help surgeons to determine how much turbinate tissue to remove because they cannot restore the septum in its correct sagittal position without making a partial, but substantial reduction of the hypertrophied inferior turbinate on the side opposite the cleft.

2 – 1 – 5 – Malposition of the alar cartilage

The deformation of the nostril with a curtain like obstruction on the side of the cleft is like the deformity occurring in bilateral clefts that results from the persistence of the downward rotation of the lateral crus of the alar cartilage and the action of the myrtiform muscle. The surgeon cannot fully correct the deformed nostril without completely dissecting the alar cartilage in order to permit its upward rotation toward the cranium and its projection. Then the surgeon can place the alar cartilage into its normal position above and astride the upper lateral cartilage.

2 – 2 – Surgery re-establishing nasal breathing on 4 to 5 Year-old children

2 – 2 – 1 – Septoplasty

Septoplasty if very often indicated for children with unilateral clefts and not for those with bilateral clefts except in the rare instances when these deformities are asymmetrical. In our protocol, the septoplasty is a procedure that we like to add to other interventions so that in one anesthetic administration we can perform as many procedures as appropriately possible and spare the child from additional visits to the operating room. Usually we correct a deviated septum on 4 to 5 year-old children at the same time we close the gingivo-alveolar cleft with a gingivo-periosteoplasty and a bone graft. For these children the orthodontist had begun orthopedic expansion therapy a few months previously to re-establish canine function on the side of the cleft by increasing the distance between maxillary canines to **an** amount more than 4 mm greater than mandibular inter-canine width. At this young age, maxillary expansion works quickly and effectively on basal bone and restores proper dimensions to the piriform orifice and the floor of the nasal fossa

on the cleft side, a crucial factor in making nasal breathing comfortable.

Sometimes, when we are closing the gingivo-alveolar cleft, after dissection and suturing of the nasal and palatal mucosal planes, we may find that the extent of the deviation of the vomerian groove and the fragility of the nasal mucosa related to it are so great that we think it would be difficult to cover safely the bone graft. So we decide to postpone correcting the septal deviation.

When they do perform septoplasty, surgeons should minimize their incisions and their resections. Most often an approach between the septum and the columella on the non-cleft side will be all that is needed, if the operator is sufficiently well trained. With this approach the surgeon can dissect the perichondrium and the periosteum tissue generously enough to expose the vomerian groove and the cartilaginous septum. The surgeon makes a green stick fracture of the vomer and aligns the septum, which has, in the straightening of its curvature, become too long, at the side of the vomer without resecting it or resecting **it** minimally on its lower edge so that it can be placed within the vomerian groove. Surgeons can straighten the curvatures of this infantile cartilage simply by ''combing'' it with the back of a spatula, rather than by making no**n**-perforating incisions in its concavity. As Anderl[1] has said, dissection of structures is the key element in this re-positioning procedure. Cartilaginous septum must be preserved for normal function and **as a** possible donor graft site if a future esthetic harmonizing rhinoplasty is anticipated. These are performed at the end of the growth period, at the earliest for 13 to 14 year-old girls for 14 to 15 year-old boys

2 – 2 – 2 – Partial resection of the inferior turbinate

Surgeons can reduce the hypertrophy of the inferior turbinate on the side opposite the cleft by first crushing the tissue to be removed and then cutting it out with scissors. Only rarely do they have to perform this turbinate procedure on the cleft side. Nasal surgery on children has proven to be consistently effective and generally without undesirable side effects. Its goal is to restore nasal breathing without adversely affecting other nasal functions like humidifying inspired air and creating in that inspired air temperatures appropriate for the pulmonary alveoli, the site to which it is directed, correctly affecting cerebral temperatures, and maintaining nasal resistance to a level as close to normal as possible so that phonation becomes normal and comfortable. So it is out of the question to consider that the turbinates as structures that interfere with nasal breathing are therefore of no use to patients. We must conduct our surgical interventions only in ways that respect normal structures, particularly when our patients are children.

2 – 2 – 3 – Repositioning the alar cartilage

Before suturing the intra-nasal incisions and stabilizing the septum with nasal splints and packing, we correct the residual nostril and columella

deformations with direct marginal incisions. We then elevate the perichondrium from the superficial surface of the alar cartilage, which had been largely exposed. Then we excise this perichondrium if it is easy, without forcing the procedure because at this age the perichondrium is quite delicate and very adherent. When this work is completed, the dome, which had been retracted, spreads out. We never directly fix the lower lateral cartilage by sutures to the septum or to the upper lateral cartilage, relying instead on our own method of shaping and closing dead spaces with a series of transparent 0.5 mm thick silicone sections that can be trimmed to allow deep positioning of splints on each side of the septum that prevent any adhesions between it and the inferior turbinate. We do not believe it is advisable to use the thicker 1 mm silicone leaves that are generally employed because their rigidity makes their placement likely to cause compression lesions. Thinner, more manageable 0.5 mm sheets function well, even in adults. The septal splints provide a continuous circular support in each nostril. We secure this complex with 2 or 3 nylon sutures through the septum. Then we place a final sheet at the tip of the nose, locking it into place with both two endo-nasal splints with transfixing sutures identical to those closing the dead spaces. As this modeling is being accomplished, we can use direct visual control to accurately restore proper nasal shape and nostril rim level by sliding the external layer of skin into conformity with endo nasal lining, securing arrangement with judiciously placed sutures. The surgeon must take pains to tie the sutures loosely so they will leave no permanent marks. We finish this construction work with packing placed more generously on the side of the cleft. We remove all the scaffolding under general anesthesia about six days later and replace it with a removable nasal retainer, made of the same material, and individually adjusted to fit the patient. This device, which is quite discreet in appearance and provides maximum comfort for the patient's ventilation, is worn for 4 months. We find our young patients extremely cooperative, their often surprisingly good motivation stimulated by the esthetic improvement, keeping them content in their home life and at school. In the current state of our knowledge, we do not see how such an ambitious surgical procedure could be performed without the elaborate precautions we have outlined and without a scrupulous long term follow up of every patient.

Figure 1 *shows the pre-operative status of a 7 and a half year old child for whom another team of surgeons performed an initial operation on his labio-maxillary- palatal cleft in his first post-natal week: a, b, c, d, e, f.*

He started to breathe through his mouth immediately after this intervention that was followed by an increase in the nasal malformation, lip and palatal scarring, and bilateral maxillary hypoplasia with bilateral maxillary retrusion. After orthopedic anterior maxillary expansion designed to restore correct canine functioning at the age of 8, the patient underwent a complete surgical revision of nose and lips with a re-positioning of the septum, an

Figures 1 a to l

Sequential pictures of treatment of a uni-lateral total labio-maxillo-palatal cleft on the left side. The 7 and a half-year-old patient was a mouth breather caused by a nasal obstruction that had appeared after the first surgical intervention. The lip and palate were heavily scarred; the maxilla was hypoplastic and bilaterally retruded.
a, b, c, d, e, f : before secondary treatment.
d, e, f : occlusion before labio-nasal revision at age 7 and a half.
Developments after maxillary and anterior expansion. The labio-nasal revision was completed when the patient was 8 years old. The alar cartilage was repositioned, a septoplasty performed, and an inferior turbinectomy on the opposite side was carried on, and a bone graft was placed.
g, h, k, j, k, l : patient at the age of 16 and a half, after the teeth had been aligned and the space maintained for the missing lateral incisor. Neither maxillary protraction with a mask of Delaire nor osseous distraction had been utilized.
j, k, l : patient's occlusion at age of 16 after labio-nasal revision and gingivoperiosteoplasty with placement of a bone graft (at the age of 8).

inferior turbinectomy on the side opposite the cleft and an alveolar bone graft. We carefully maintained space for the missing upper lateral incisor. The result at 16 years of age is shown in figures g, h, l, j, k, and l. Later, when he receives an implant in the lateral site we plan to perform a harmonizing rhinoplasty for him.

In bilateral clefts the septum and the inferior turbinates do not create the same type of nasal obstructions that occur in unilateral clefts. On the other hand, the nostrils are often severely deformed because of stress from the short columella.

For these conditions, we clear the upper airways with the same bilateral surgery of re-positioning the alar cartilages that is used for unilateral clefts and with the same post-operative shaping precautions.

3 – VERY EARLY INITIAL SURGERY FOR LABIO-MAXILLO-PALATAL CLEFTS

Very early nasal surgery has developed considerably since late 1997. We now completely correct nasal deformations in 6-month-old patients with bilateral clefts at the same time we reconstruct their lips[13-16]. We lengthen the columella by re-positioning the alar cartilages while we incorporate the philtrum whose vascular supply depends on the columella into the center of the lip that we have reconstructed by advancing the two lip stumps toward each other. This operation, whose technical aspects have been fully formulated since 1995 didn't give consistently good results until the routine use of a nasal retainer for 4 months post-operatively. In our four-month check-up visit, parents confirm that all our patients are breathing nasally after our surgical intervention. This operation achieves consistent and sometimes spectacular orthopedic effects with spontaneous improvement in lip closure and in the first four post-operative months a premaxillary remodeling without anterior cross bite. With the old techniques of repair for cleft palate patients where the columella was not lengthened until the time of a later, secondary facial plastic surgery, during the delay period patients became obligatory mouth breathers with persistent premaxillary protrusions that set up a vicious circle difficult to break.

This early nasal correction for patients with bilateral clefts has demonstrated such an impressive success rate that we incorporated it into our surgical protocol for patients with unilateral clefts as soon as possible.

3 – 1 – Technique for initial bilateral nasal correction[12]

The goal of this early intervention is to place the lower lateral cartilages in a position as anatomically correct as possible so as to restore its proper length to the columella.

To accomplish this mobilization, surgeons must make an extensive lateral sub-periosteal dissection that will permit them to advance and project the nostril insertion, using a counter incision along the length of the piriform orifice that they close with

the refreshing mucosal flap from the lateral edge of the lip.

On the median line, the surgeon makes a sub-perichondrial dissection of the two faces of the septum and of the upper lateral cartilages, completed by a sub-cutaneous dissection of the alar cartilages. This makes it possible to effectively mobilize them in relation to the upper lateral cartilages, with a considerable projection of the dome that facilitates on each side the use of a triangular lateral premaxillary mucosal flap based on the columella and transposed into the septal mucosa just under the upper lateral cartilage. The freed lateral maxillary sub-periosteal space and the sub-perichondrial nasal space communicate broadly with each other.

We mobilize the lower lateral cartilage in the same way for patients with a unilateral cleft as we do for bilateral cleft patients and then we can re-center the anterior border of the cartilaginous septum that had been generously exposed on both its surfaces.

3 – 2 – Bilateral reshaping

We reshape the tip of the nose with 0.5 mm transparent silicone splints rolled into each nostril and tied together with trans-septal sutures. In this way we can lengthen the columella and sharpen its tip. We affix an external splint at the tip of the nose and connect it to the internal nasal splints by piercing sutures identical to those used to close dead spaces. In this way we can completely control the shaping of the nose because we mobilize the cartilages in relation to each other, which allows up to:

– correct the downward rotation of the lateral crus and to eliminate the nostril web;
– project the dome while we are lengthening the nose and, if necessary, adjusting the external skin to fit the endo nasal lining.

After 5 to 7 days we remove the system of splints and put a removable nasal retainer in place for a 4-month period. This post-operative device, we have found, by greatly reducing scar formation, has vastly improved the quality of our esthetic and functional results. It has powerfully assisted patients in establishing consistent nasal breathing immediately after the first surgical intervention even though we may not have been able to achieve full correction of the deviated septum at this early age in patients with unilateral clefts because of the complexity of the osteo-cartilagenous deformation.

4 – RESULTS OF THIS EARLY NASAL SURGERY AND THE EXTENSION OF ITS INDICATIONS TO OTHER SEPTAL NASAL OBSTRUCTIONS CAUSED BY DEFORMATIONS

The evaluation of the results achieved in this approach can only be useful to the scientific community if the indications for it are rigorously defined, homogenous, and sufficiently frequent, and if they are followed up until the end of the growth period. These results will appear at their full value after we have been able to compare the quality of facial growth and the final

esthetic and functional result in patients treated by early surgery with the results in patients treated with protocols that postpone nasal surgery in the hope that this delay will preserve and encourage facial growth. To promote this eventuality, we have been very closely following two series of ten patients that we operated on consecutively after the last change of our current protocol. The first group consisted of patients with non-syndromic total unilateral labio-maxillo-palatal clefts and the other of patients with non-syndromic total bilateral labio-maxillo-palatal clefts. We anticipate no difficulties in continuing to follow these groups of 10 to 20, and more, consecutively treated cases during the years to come.

In comparison to patients now 20 to 35 years old for whom their functional surgery was not as ambitious but whose facial growth has been good enough not to justify orthognathic surgery, except in very rare instances, this new generation of patients now 12 to 13 years old has shown highly gratifying progress. Their early nasal surgery has had virtually no harmful effects on nasal growth, and the establishment of nasal breathing in the very first days after surgery, allows the continuation of facial growth that is as normal as possible.

From now on it seems to us highly desirable that we extend the indications for this surgery designed to open nasal passages by repositioning the septum and eventually reducing inferior turbinate unilaterally where indicated to children with post-traumatic nasal obstructions and to patients with similar deformations of unknown etiology. For all of them, of course, the same precautions are respected. The septal surgery should be conservative and the acceptable indications for partial inferior turbinectomies should be rare, limited to instances of hypertrophied turbinate that, unless reduced in size, would press a repositioned septum towards its original place.

5 – CONCLUSION

Our early treatment of labio-maxillo-palatal clefts promises to provide us with information of the very greatest interest in the next few years. Our patients achieved nasal breathing immediately after their very early ambitious and efficient preventive initial nasal surgical treatment at the age of six months. Then we continued their treatment with a curative surgical procedure when they were 4 to 5 years old. They maintained their nasal breathing throughout their growth periods. Our study of their progress is the first time these phenomena have been rigorously examined. We now have 12 to 13 years of accumulated observations on the series of consecutively operated-on patients after the last change in our protocol initiating a systematic post-operative re-shaping of the nostrils. This means that 4 or 5 years from now we shall be able to make an end of growth period evaluation that will provide invaluable information about the benefits of early nasal surgery for the septum and the lower lateral cartilages. We fully ex-

pect our data to confirm the findings of recent publications[1 to 8] that affirm that *early corrective surgery has no deleterious effects on nasal growth and, most important, that the post-operative growth potential of these patients remains normal. We hope to show clearly that nasal breathing is crucial for the maintenance of good facial growth, and that the taboos against nasal surgery for young children should be reconsidered in a less dogmatic way.*

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