Long term evaluation of "push down" procedures

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SUMMARY

The "push-down" technique for hump removal, or hump elimination, is just one maneuver of a number of surgical steps to obtain a more functionable and esthetic appearing nose. The maxilla-premaxilla Cottle approach to extensive nasal septum surgery is used, using techniques of his to modify the nasal dorsum.

The "push-down" procedure usually eliminates the bony hump. The cartilaginous hump, (the upper lateral cartilage area) remains intact, and produces little trauma to the subcutaneous tissue, the mucous membranes, the periosteum, the perichondrium, and preserves the nerves and blood supply of the area.

The amount of "push-down" that can be done depends on the nasal septum, which is the key to the surgical procedure.

One must know how to handle part or all of the septum; its reconstruction with the patient's own bone and cartilage, so that saddling and deformity of the external pyramid and lobule may not occur later.

In the repair of the roof, all anatomic relationships should be restored.

The upper lateral area should be spared, however, if modified, very conservatively done and with little or no shortening.

If there is partial removal of the hump, there should also be reparation of the nasal dorsum with crushed septal cartilage.

Further "push-down" depends upon the width of the nose, the location and number of lateral osteotomies and intra-septal osteotomies, incomplete or complete separation of the upper lateral cartilage, done chiefly through the intra-septum space; thus, the nose becomes narrower, smaller, and the roof remains an unimpaired insulating organ playing its important physiological role.

Secondary nasal revisions were minor in nature and were usually performed as outpatient procedures.

The hump removal concept of total excision should be changed to "push-down" elimination of the nasal bones with total preservation of the dorsum.

THE "push-down" technique for hump removal, or hump elimination, is just one maneuver of a number of surgical steps to obtain a more functionable and esthetic appearing nose.

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Cottle, first published his concept in 1954 on nasal roof repair and hump removal. His observations that practically every recent nasal fracture has a downward displacement factor in addition to a lateral one, and the "pushed-in" external nose caused fractures, dislocations, subluxations of the nasal septum, as well as of the bony lamina, which is made up of part of the nasal bone and part of the ascending processes of the superior maxilla. He gave indications, contra-indications and a series of techniques using physiological principles and reasoning for the reparative process.

Since the "push-down" is not fully understood, it is, therefore, not widely used by otorhinolaryngologists. Many do not allow themselves to retreat into this newly accepted field of rhinology. Rhinology commands the knowledge of anthropology, embryology, anatomy, all the surgical techniques of rhinoplasty, as well as, the sequalae which can occur following trauma from early or late injury, or from the surgery itself. It further requires the thorough understanding of ethnic variations, developmental complications, and then the selection of a surgical procedure or a combination of many, which is acceptable, conservative, meticulous and beneficial for the health of the patient.

Those of us, who through the years have performed the classical Joseph Rhinoplasty for hump removal, have been aware of the complications which can and often occur, even in the hands of the most skilled operator. Many of these undesirable results usually lead to undesirable esthetic and symptomatic problems which have sought us to leave the Joseph concept and to accept a more logical one. Humps are usually surgically removed for cosmetic reasons by a variety of techniques and all essentially use the basic principle described by Joseph some 75years ago.

In the routine Joseph technique, the failure to recognize congenital absence of all or even part of the nasal bones may exist, and the hump may be just all septum.

Other errors in diagnosis, such as failure to recognize partial or complete destruction or absorption of nasal bone after early childhood injuries and/or infections, which may cause an arrest or even an acceleration of growth of the septum which, when removed by this technique, produces shredding, tearing, injury to the blood vessels and nerves, over-packing with atrophy of the membranes, scarring and cicatrix formation and little or gross deformities which may cause sequalae and demand more surgical revisions.

A not too infrequent sequalae to the extensive removal of the nasal roof by the Joseph technique is that the nasal bones may fail to lie closely to the septum when healing is completed and the skin over the roof sinks into the nose to usually a mild or moderate degree and has an atrophic appearance.

Through the many years of nasal surgery, we have seen our own patients return, as well as others, because of many small or gross deformities. Often these deformities are associated with many nasal complaints and vasomotor disturbances of the nose, face, larynx, etc. These seem to follow unsuccessful nasal surgery and occur much too often for us to disegard as doctors.

These vasomotor disturbances manifest themselves in many ways. Chessen and

Philpott (1955) mention these syptoms in a discussion of vasomotor disturbances which occur when an "open roof" is created by nasal injury or by the Joseph technique. Such symptoms as stuffiness, blockage, post-nasal drainage, neuritic pain involving the face and other areas of the head have been occasionally noted. Ptosis of one or both eyes has been seen a number of times by this observer. Many of these patients have the inability to expose themselves to cold and other atmospheric conditions and have been classified as "allergic".

Cottle mentions that often these same neuritic pains can be reproduced by placing ice on the surface and/or by passing a hypodermic needle through the skin directly through the mucous membrane and into the area of the nose where the bony nasal bridge once existed but is no longer present. Likewise, the use of flannel or tape on the nose may relieve these symptoms.

PHYSIOLOGICAL CONSIDERATIONS

Cottle's article states that the nasal pyramid may also serve as a "bumper" protecting, with the sinuses, direct forces that may cause injury to the brain and also that the external pyramid serves as an "attic" protecting the nasal chambers. The dorsum of the nose is actually the "roof" and is normally an efficient multi-layer insulating structure conserving heat, moisture and, consequently, energy. The internal nose or nasal chambers contain a functioning nasal mucous membrane draped over the septum, the turbinates, the olfactory area, the sinus ostium and the sinuses themselves. The septum divides all this into two great parts, each with an entrance, the nostril, which directs the air stream into the vestibule which may be altered by the lower lobular cartilage and upper lateral cartilages. Therefore, the stream of air is undergoing dynamic activity and turbulent resistance in the process of respiration. The internal chamber and dorsum or roof can alter this process.

Today, an electronic recording rhino-manometer can permit the measuring and recording of the dynamics of flow, pressure, compliance of each nasal chamber, and express, pattern, duration of inspiration and expiration, and arrive at some conclusions regarding work of breathing through each nostril.

ANATOMICAL CONSIDERATIONS

The dorsum, tegmen or "roof" of the nose consists of, from without inward, the skin, loose subcutaneous tissue, a superficial fascia, bone or cartilage, and its reflections covered by periosteum or perichondrium and the nasal mucosa. Throughout the total roof, there are many plexus of nerves (sympathetic, parasympathetic), blood vessels, glands, all meshed and interwoven into the tissue within the many layered insulating roof. Reflexes arise from the nasal mucous membrane which can affect the respiration and the cardiovascular system.

One must further think in terms of the hump as usually having seven parts. The bony roof is composed of the right and left nasal bones (and there may be none or more than two). The cartilaginous roof is composed of the right and left upper lateral cartilages attached underneath the nasal bones and behind the lamina. The other parts are; the bony and cartilaginous septum and the nasal frontal process of the frontal spine. If the hump is thus divided, each part can be handled individually

and then reassembled, and the newly created "roof" can be eliminated of its hump. Naturally, the best roof must be that one that is not taken apart, but in selected cases, he whole roof lowered into the nose. To allow this to happen easily, a thorough knowledge of the nasal septum is the "key" to the procedure.

TECHNIQUE

The maxilla-premaxilla approach, as previously described by Cottle and Loring in 1948 and later in 1958, is used to explore the septum. Under a local anesthesia, a right hemitransfixion incision is performed, and the necessary corrections of the septum through this space attempting to preserve one side of the mucous membrane anteriorly, and removing sufficient amounts of septal cartilage and bone, inferior strips, or obstructions of premaxillary wings, or impactions of the vomer.

In this technique, it is possible, therefore, to remove part, parts, or all of the septum, and later replace it as grafts to prevent sequalae. Through the septal space, the nasal bones can usually be separated from the nasal septum by small, low multiple medial osteotomies on the right and left without cutting mucosa or cutting through the nasal bones without disturbing the periosteum above.

Another modification of the "push-down" may incorporate no septal work at all, as in a previously performed classical submucous resection operation. In some procedures, the separation of only one nasal bone from the septum, as in a markedly twisted or displaced nose where one side may need to be mobilized, and by downward or outward rotation, further adjustment and realignment of the nasal pyramid with "push-down" may be incorporated.

Through bilateral inter-or intra-cartilaginous incisions, the dorsum of the nose is uncovered, preserving (not elevating), in nearly all instances, the periosteum. Trimming or shortening of the lower border, or narrowing, or other modifications of the upper lateral cartilages is often done; preserving, in all instances, the vestibular skin and membraneous reflections. Much larger noses demanding more "push-down" and shortening, require separation, in part, of the upper lateral cartilages from the nasal septum through the intra-septal space. This separation may be done completely or incompletely (1/3 of the way). Later it may be necessary to trim redundant membrane or skin at the termination of the operation.

In over 50% of the 100 cases reviewed, complete retrograde uncovering of the lower lobular cartilages was done using curved upper lateral scissors. The dome of the lobular cartilage is identified and a 3/4 cut is made at the dome area, cutting through vestibular skin yet preserving the inferior rim or border of the lobular cartilage of the nose. Moderate trimming of 1-4 mm of cephalic border or other conservative modification may be further necessary to aid in the shortening or narrowing of the nasal tip.

In the remainder of patients, extensive "slot" or rim incisions were made in which very conservative modification of the dome of the lower lobular cartilage was performed. The vestibular skin may be separated from the cartilage and at the dome area, a triangular segment of cartilage may be removed to narrow and

shorten the tip, yet preserving or not cutting the inferior rim of the lower lobular cartilage.
In each instance where the crura was divided into a lateral and medial crus (3%), the vestibular skin was not sectioned. When divided, small crushed autogenous cartilage was placed into the area to prevent secondary scarring and future "nicking" of the rim of the nose.

The "push-down" of the dorsum may also be combined with a small amount of planing or shaving of the nasal bone using a thin, sharp chisel and not disturbing the upper lateral cartilage. This then involves elevating the periosteum which should be done prior to the lateral and transverse osteotomies. This does not violate the principles of the "push-down" procedure, provided an "open roof" is not created as evidenced by removal of mucous membrane with the planed or shaved segment of nasal bone.

It is necessary, in this technique, to perform lateral osteotomies at a pre-determined based line, or above the base line in an extremely large nose. The bony lamina are disrupted by the lateral osteotomies which may be placed as far upon the side as the amount of "push-down" that is desired. This can only be done by a saw first, followed by a thin, sharp, straight 6-7 mm chisel. A complete transverse osteotomy must then be done with a thin, curved osteotome. This is very essential and must be absolutely complete, going through the nasal bones, but also through the nasal spine of the frontal bone using the inner canthus of the eye as the site to begin the osteotomy and the nasion-nasale area for its exit. Always guard the skin with the fingers to prevent perforation of the skin. Otorhinolaryngologists should be discouraged from performing external transverse osteotomy through the skin except in most unusual circumstances.

If bony steps remain at the site of the laternal or transverse osteotomies, multiple small secondary lateral osteotomies can be done.

If all parts of the nasal pyramid have been separated, an infracture of the lateral lamina can now be easily performed. This can be dong with an Aufricht retractor placed under the skin, or by actually pushing in/or down the nose with the thumb into the face.

After "push-down" is accomplished, one must re-explore the septum space, evacuate the clots, adjust the septum for possibly more removal from the inferior area by strip removal. It may even be necessary, in large noses, to shorten the septum to relieve the stretch or tension of the skin. If necessary, try to keep the right mucous membrane flap with the perichondrium anteriorly attached to the septum for its blood supply.
Occasionally, variations may be necessary in which complete separation of the upper lateral cartilages and nasal bones may be done. Through the intercartilaginous incisions, and from above, an anterior strip of cartilaginous septum may need to be

removed with further narrowing of the upper lateral cartilages. I do believe that those who have experienced failures with the "push-down" technique have not satisfactorily removed enough anterior septum and this should be trimmed away to prevent the "polybeak" so characteristic of poor esthetic results of nasal surgery.

There are other variations whereby after the skin and subcutaneous skin has been elevated with periosteum attached to the bones, the nasal bones and lateral lamina with the upper lateral cartilages can, as a compound, each be separated from the septum completely preserving the reflections of the mucosa underneath followed by a "push-down" of each side.

Following the "push-down" of the nose and reapplication of light saline soaked internal dressings to support the various parts, the nasal spine area is now examined and modified if necessary. Because of marked septal removal and replacement, the base of the nose may later widen. Therefore, moderate uncovering of this area should be done and Dexon/or gut-chromic sutures (2-0) can be used to narrow the base of the nose and to reinforce the anterior septum into the midline area. Reconstruction of the nasal septum is now performed by replacing of crushed bone to the septum and all incisions are closed with plain gut (4-0) or 4-0 Dexon. If irregularities occur at the nasal frontal angle, they are gradually removed by Kazanjian, Dufourmentel, or Lempert ronguers. It may then be necessary to iron out the irregularity of the periosteum on the dorsum with external and internal elevators to the nasal bones.

Tape and stents are applied; and the patient is covered by antibiotics, enzymes, vitamins, and usually dismissed after a total of three days of hospitalization.

DISCUSSION

The most common cause for the reappearance of the hump later is incomplete removal of the nasal septum, the incomplete, improperly planed lateral osteotomy, not done with a saw, not completed with sharp, thin osteotomies; no transverse osteotomies with a curved chisel; and the lack of midline or medial osteotomies. Other causes are the failure to re-examine the septum, to separate, incompletely or completely, the upper lateral cartilage, and the use of multiple incisions that cut through inadequately planed vestibular skin, mucous membranes that injure nerves and blood vessels that cause hemorrhage, over packing followed by scarring, cicatrix and moderate to gross deformities.

In the "push-down", the bony lamina are usually "in-fractured"; however, this may reduce the airway in a narrow, bony, thin nose, and, therefore, it may be necessary to perform an "out-fracture" of the lamina riding over the lacrimal and facial portion of the maxilla, thereby allowing the upper lateral cartilage to have a greater space from the septum.

In a review of the last consecutive 100 cases of corrective nasal septal surgery in which the external nose was mobilized, some modification of the upper or lower

lobular cartilage was necessary and some degree of "push-down" for the nasal roof was done.
In 12% of the cases reviewed in which "push-down" was used as part of the surgical technique, small revisions were necessary and were usually minor and easy to perform. Most were performed as outpatient surgery and consisted chiefly of a secondary removal of more septum, usually an inferior strip and relocation of the anterior septum with further "push-down" after osteotomies, out-fracture, or re-modification of the tip with small implants of septal cartilage removed from the patient.

RÉSUMÉ

La technique dite "push-down", pour l'élimination ou ablation de la losse nasale n'est qu'une de toute une série d'interventions chirurgicales destinées à assurer un meilleur fonctionnement du nez et à lui donner une apparence plus esthétique. La méthode maxillaire-prémaxillaire de Cottle qui consiste dans une intervention très importante pratiquée sur la cloison est appliquée avec ses propres techniques de transformation du dos du nez.
Le "push-down" élimine généralement la losse ossense. La protubérance cartilagineuse (zone superieure latérale du cartilage) reste intact, ce qui n'entraîne qu'un traumatisme limité pour les tissus subcutanés, les membranes muqueuses, le périostlum ou le périchondrium et épargne les nerfs et le système vasculaire.
La mesure dans laquelle le "push-down" peut être pratiqué dépend de la cloison, qui constitute la clé de l'intervention chirurgicale.
Il faut évidemment savoir comment travailler sur la cloison en entier ou en partie, et comment la reconstruire avec du cartilage ou du tissus osseux du patient lui-même, afin qu'il ne se produise par la suite ni affaissement ni déformation de la pyramide externe et du lobule.

Dans les réparations du toit il faut veiller à rétablir toutes les relations anatomiques. Il faut épargner la zone latérale supérieure, et en cas de modification, il faut procéder de manière très conservative et ne pas raccourcir, ou le moins possible. Soil y a ablation partielle de la losse nasale, il importe de réparer le dos du nez au moyen de cartilage spécialement traité à cet effet.
Pour le reste le "push-down" dépend de la largeur du nez, du nombre d'ostéotomies latérales et intra-septales et de l'endroit où celles-ci ont été pratiquées, de la séparation (complète ou incomplète) du cartilage latéral supérieur pratiquée essentiellement dans l'espace intraseptale. Le nez devient ainsi plus étroit et plus petit et le toit reste un organe isolant non-affaibli, capable de remplir son important rôle physiologique.
Les révisions nasales secondaires, d'ordre mineur, ont été le plus souvent pratiquées sans qu'il soit nécessaire d'hospitaliser le patient.
L'excision totale doit céder la place à l'élimination des os du nez par "push-down" avec maintien total du dorsum.

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