

## PRESERVING SOFT TISSUES IN NASAL SURGERY

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When surgery of the nasal septum or external nose is planned, our first thoughts are all too often directed to the bones and cartilages, while our consideration of the soft tissues is merely that of mucous membrane or skin to be incised, or severed, or elevated in order to get to these bones and cartilages. But let us dispense with these tissues so abruptly. Let us first think of the various types of soft tissues in the nose, and their locations and their purposes.

Overlying the entire nose is of course the skin beneath which lies a subcutaneous layer. Both of these tissues vary in thickness. In some individuals they are very thin, while in others the skin is seborrheic and the subcutaneous layer very hypertrophied.

Beneath the subcutaneous layer is a layer of loose tissue, separating the subcutaneous tissue from the periosteum or perichondrium of the nasal bones or cartilages. The blood vessels in this loose tissue layer are longer and farther apart than in the dermal layer of the skin or near the periosteum and perichondrium where the blood supply is most abundant. Other soft tissue components over the nose are glands, muscle fibers, and nerves.

The nasal bones are enclosed by their own envelopes of periosteum, while each upper lateral cartilage and each lobular cartilage is enclosed in its own envelope perichondrium. These envelopes are separated from each other by further connective tissue. Each nasal vestibule is outlined by the medial and lateral crura of the lobular cartilage, the soft tissues covering the floor of the pyriform aperture, the membranous septum, and a cul-de-sac lying between the lateral crus and the upper lateral cartilage. These structures are all lined by thin, firmly attached skin. The membranous septum consists essentially of a layer of skin on each side with an intervening layer of firm but thin and flexible connective tissue.

The septal cartilage and the intranasal surface of each upper lateral cartilage are lined with respiratory mucous membrane, submucosa, and perichondrium. The various bones of the septum and the remaining bony intranasal surfaces of the nose are lined with respiratory mucous membrane, submucosa, and periosteum. The "mucoperichondrial" envelope of the septal cartilage is distinctly separate from the "mucoperiosteal" envelope of the premaxillary wing yet firmly attached to it by an elaborate syncytium of perichondrium, periosteum, and other connective tissue which form a slightly flexible joint. This joint is often deformed by injury and may contain much scar tissue. This mucosa is firmly attached to the connective tissue layers of this joint and is easily perforated during elevation unless the connective tissue is carefully cut and scraped from the underlying cartilage and bone by sharp dissection.

Now why do we concern ourselves with these soft tissues? Obviously they permit nasal participation in facial expression. This is made possible by the mobility of the skin over the nasal bones and upper lateral cartilages, by

action of the muscular components, by flexibility of the connective tissues separating the lobule from the upper lateral cartilages, and by the mobility of the membranous septum separating the columella from the septal cartilage. This mobility is limited if the skin is held tightly or under "tension" by nasal bones or cartilages which are too prominent for the amount of skin available. Mobility is also limited by scar tissue resulting from injury, from improperly placed incisions, from dissections in improper planes, and from unsatisfactory healing following surgery. Tension upon soft tissues and scarring may interfere with blood supply and may stretch nerve fibers causing a variety of symptoms ranging from subliminal discomfort to outright pain.

Proper flexibility of the upper lateral cartilages is of greatest importance to the regulation of breathing. This flexibility can be impaired if the skin lining the cul-de-sac between the upper lateral cartilage and the lobular cartilage is sacrificed at surgery or scarred following an incision in its center.

The mucosa of the nose is subject to tension for reasons similar to those causing tension of the external nose. Inadequate thickness of mucosa is associated with nasal atrophy. Following extensive submucous resection of the septum, the mucosa may contract, causing retraction of the columella and dipping of the cartilaginous dorsum. It may even atrophy to the point of creating a spontaneous septal perforation.

A sufficiently large perforation will interfere with the normal turbinate cycle of congestion and decongestion.

Too many incisions, placed too close together within the nose may result in cicatricial stenosis.

Preservation of soft tissues is not only important for reasons just described but is indeed useful in doing extensive nasal surgery. Such surgery requires preservation of attachments of mobilized bones and cartilages, preservation of blood and nerve supplies, preservation of substance of soft tissues, and preservation of normal soft tissue histology and physiology by minimizing post-operative reactions of edema, ecchymosis, and fibrosis.

Dr. Cottle presents the concept of the nose as a home, the mucosal lining serving as the wallpaper. If this lining is preserved and kept intact, and the other parts of the nose are kept attached to it, the other parts may be mobilized and altered in size and shape while being held by this mucosa which then needs only a light internal dressing for support.

Preservation of soft tissues begins with preparation of the patient. His physical condition should be as good as possible, and his mental status should be realistic and tranquil. Surgical principles of asepsis, proper anesthesia, gentle manipulation of tissues, and control of hemorrhage are mandatory.

The septum is approached by the hemitransfixion incision, placed one-eighth of an inch from the caudal margin of the septal cartilage on the right side. From this incision the mucoperichondrium is elevated from around the caudal margin of the cartilage and from the left side, and the mucoperiosteum is elevated from the premaxillary wings and from both sides of the rest of the bony septum. Elevation must be done beneath the perichondrium or periosteum. The septal cartilage may be trimmed or gridded while remaining attached to the mucoperichondrium of the right side. Inadvertent lacerations may be sutured or the edges held in place by gentle packing. Towards the



end of the procedure, the septum should be repaired with trimmed flattened pieces of bone or cartilage, either autogenous or preserved, to avoid flaccidity, contracture, and atrophy.

Each intercartilaginous incision is placed near the caudal margin of the upper lateral cartilage, to avoid cutting into the center of the skin of the cul-de-sac. The incision on the right does not communicate with the septal hemitransfixion incision but preserves an intervening tongue of intact mucosa. A transfixion incision is seldom necessary. If one is done, it should hug the caudal margin of the septal cartilage so as not to destroy any of the membranous septum. No implant should be placed in the membranous septum making it stiff. The columella, however, may be strengthened by some implant and by suturing. Elevation of skin from the upper lateral cartilages and nasal bones is done in the plane of the loose connective tissue layer. Work on the bony dorsum requires elevation of the periosteum from the midline laterally and repositioning of this periosteum at the end of the procedure.

Work on the lobular cartilages may require incisions near the rim of the nostril. Such an incision must be made exactly at the caudal margin of the lobular cartilage. If the skin is thin, its elevation must be beneath the perichondrium. If it is thick, its elevation may be in the dermis, and the underlying soft tissue removed. The lobular cartilages may be trimmed or cut without removing any of the underlying vestibular skin.

By way of the septal hemitransfixion, the nasal bones and the upper lateral cartilages may be separated from the septum without cutting the mucosa beneath them. The mucosa may be separated from beneath the upper lateral cartilage so that this cartilage may be modified without cutting that mucosa. No mucosa or vestibular skin is sacrificed unless it is definitely redundant.

Lateral osteotomies are done by way of external incisions in the alarfacial folds, thereby avoiding incisions inside the nasal vestibules. Such external incisions also enable modification of the alar feet and permit implants and stitching of the base. The subperiosteal grooves for the lateral osteotomies must not join the periosteal elevation of the dorsum.

Hump removal from above should not be so extensive as to remove some of the underlying mucosa. Part of a hump may be removed from above while the rest may be eliminated by pushing the nasal bones into the face, following medial and lateral osteotomies and removal of support by the septum.

Nasal dressing includes a light internal packing for gentle support. The skin is covered with collodion then strips of adhesive tape placed so as to cause a uniform apposition of the skin against the underlying structures. This purpose is aided by an external stent molded precisely to the shape of the nose. The dressing is changed as often as seems necessary and is reapplied as long as it is useful.

Post-operative healing is enhanced by rest and by the use of ascorbic acid. Other drugs which may be indicated include other vitamins, antibiotics, enzymes, heparin, and steroids.

Finally the proper handling of soft tissues must involve a long follow-up of the patient. Soft tissues never cease to change following surgery, and their controlled healing will decrease complications and will contribute to the patient's post-operative result.

## SUMMARY

Surgery of the nasal septum and external nose must take into consideration handling and preserving of soft tissues as well as modifying the nasal bones and cartilages. These tissues include skin, subcutaneous tissue, loose connective tissue, periosteum, perichondrium, mucous membrane, and sometimes scar. Failure to preserve these tissues invites undue edema and ecchymosis, delayed healing, scarring, contractures, and tissue tension, atrophy, and lessened mobility.

Incisions are planned so as to be separated from each other. Elevation of septal mucosa must be done beneath the perichondrium and periosteum. Sharp dissection is necessary where connective tissues are firm. Care is taken to avoid incisions in the mucosal lining of the nose. Dissection must not be done too close to the skin. Soft tissues are repositioned at the end of the operation. No vestibular skin and no mucosa is removed unless definitely over-abundant. The septum is repaired with replaced bone and cartilage to avoid contractures and atrophy. The packing and the internal dressing are carefully applied to give gentle, uniform pressure.

Care of the patient before and after operation must help establish tranquility and promote tissue healing.

## PRÉSERVATION DES TISSUS MOLLES DANS LA CHIRURGIE NASALE

La chirurgie du septum et de la pyramide nasale doit comprendre la manipulation et la préservation des tissus autant que la modification des os et des cartilages. Ces tissus comprennent la peau, les tissus souscutanés, les tissus conjonctifs, le périoste, le perichondre, la membrane muqueuse et parfois des cicatrices. Si l'on ne conserve pas ces tissus l'on peut causer des oedèmes et des échymoses inutiles, retarder la guérison, causer des cicatrices, des rétractions et de la tension dans les tissus et diminuer la mobilité.

Les incisions sont faites de façon à ce qu'elles soient séparées les unes des autres. Le décollement de la muqueuse septale doit être fait sous le périchondre et le périoste. Une dissection bien marquée est nécessaire là où les tissus de jointure sont fermes. L'on prendra soin d'éviter de faire des incisions dans la paroi muqueuse du nez. La dissection ne doit pas se faire trop près de la peau. Les tissus souples sont remis en place à la fin de l'opération. A moins d'être vraiment superflue aucune partie de la peau du vestibule nasal ou de la paroi muqueuse ne sera enlevée. Le septum est réparé par le remplacement avec de l'os et du cartilage afin d'éviter des retractions ou de l'atrophie. Le tampon et le pansement intérieur sont placés avec précaution afin de maintenir une pression douce et uniforme.

Les soins donnés au malade avant et après l'opération doivent contribuer à son calme et favoriser la guérison des tissus.

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