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Modified midfacial degloving. A practical approach to extensive bilateral benign tumours of the nasal cavity and paranasal sinuses*

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SUMMARY

Midfacial degloving is a well-known technique for entering the nasal and paranasal cavities, the rhinopharynx and the base of the skull. We report our experience with a modification of midfacial degloving, applied to two patients with extensive bilateral benign tumours in the nasal cavities and the paranasal sinuses. No rhinoplastic procedure is necessary in this modification, and the access to the upper part of the nasal cavity is improved.

Key words: bilateral sinonasal papilloma, extensive nasal polyposis, bone destruction, exophthalmus, sublabial approach.

INTRODUCTION

In 1926 Denker and Kahler gained access to the nasal cavity by extending the Caldwell-Luc procedure medially towards the piriform aperture and removing the lateral nasal wall. However, the soft tissue of the nose and upper lip limited the access to the anterior and superior parts of the nasal cavity and the ethmoid sinus. The Weber-Fergusson incision (Conley and Price, 1979) and the lateral rhinotomy (Harrison, 1977) eliminated this problem when the lesion was unilateral, but left a visible scar in the midface. Casson et al. (1974) were the first to describe the so-called midfacial degloving.

This procedure consists of a bilateral sublabial approach and rhinoplastic release of the nasal soft tissue, exposing the whole bony midface. Midfacial degloving can be used for the removal of extensive tumours of the nose, rhinopharynx and paranasal sinuses, e.g. juvenile nasopharyngeal angiofibromas and sinonasal papillomas. A similar approach seems to have been used as early as the beginning of this century by Rouge and Ballenger (Adair Dighton, 1912) who performed sublabial bilateral lateral rhinotomy. The benefit of midfacial degloving has been established by Conley and Price (1979), Allen and Siegel (1981), Sachs (1984), Magniglia (1986), Berghaus and Jovanovic (1991), and Howard and Lund (1992).

A modification of midfacial degloving was the basic operative approach when we operated upon two patients with extensive bilateral benign tumours of the nasal cavity and the paranasal sinuses. The modification applied has two advantages: (1) no rhinoplastic procedure is necessary as the whole cartilaginous external nose, including the supporting triangle of the nasal septum, is elevated from the midface; and (2) the access to the nasal cavity is excellent as a whole piriform aperture is almost free, whereas in conventional midface degloving the lateral nasal cartilages are left undisturbed at the upper part of the aperture.

THE MODIFIED MIDFACIAL DEGLOVING METHOD

An upper sublabial incision from the seventh tooth (molar) on one side to the same region of the other side is performed. The periosteum of the midfacial bones is elevated to the infra-orbital rim and medially to the piriform aperture, leaving the infra-orbital nerves undisturbed.

The anterior nasal spine is separated from the maxilla with a saw after holes have been drilled through and behind (for later osteosynthesis). The mucous membrane of the piriform aperture is transsected laterally and upwards approximately to the syndesmoses between the nasal bone and the frontal process of the maxillary bone. The upper lateral cartilages are mobilized, but are left untouched with the mucosa below the nasal bones. The nasal septum with its mucosa is cut with a pair of scissors in a vertical direction, upwards under the tip of the nasal bones (Figure 1A), thus freeing the supporting anterior triangle of the tip of the cartilaginous septum. Now the whole cartilaginous tip of the nose is mobile and can be elevated hinged on the extend-

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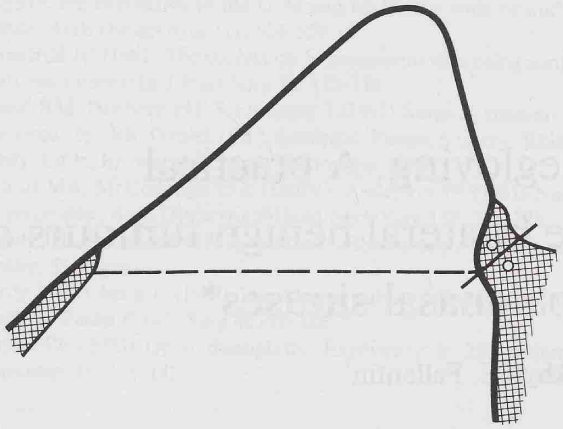

Figure 1A. Schematic lateral drawing of the anterior part of the nasal septum including the anterior nasal spine, showing the split of the nasal septum and the anterior nasal spine. Open circles represent the holes that are used for later fixation.

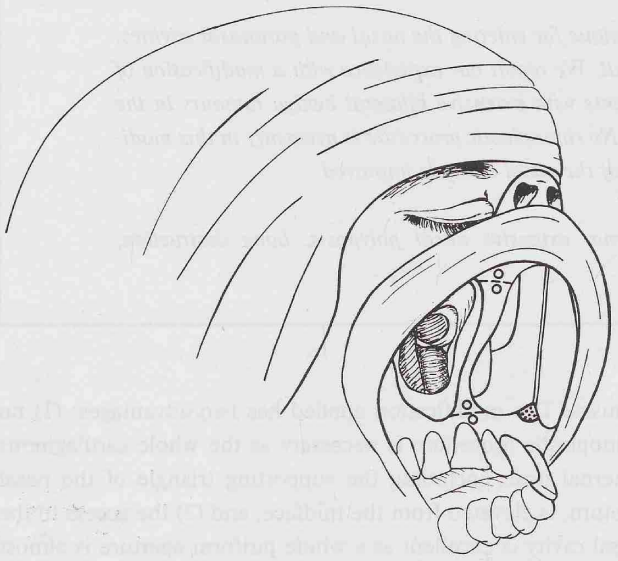

Figure 1B. Schematic drawing of the approach after cutting off the anterior nasal spine (dotted area), and cutting of the nasal septum and elevation of the cartilaginous part of the external nose. The right maxillary sinus is opened and the rim of the piriform aperture is transected (at the dotted lines) and removed. Open circles represent the holes that are used for later fixation.

ed medial part of the lateral cartilages with the mucosa below the nasal bones (Figure 1B).

The anterior wall of the maxillary sinus, including the edge of the piriform aperture, is now removed with a saw and kept for later use. The medial wall of the maxillary sinus including the inferior turbinate can now be removed. The procedure is repeated on the opposite side and in this way ample access to the whole nasal cavity, the rhinopharynx and both maxillary sinuses is obtained. The ethmoid sinuses can be included in the cavity and, if necessary, the middle turbinate can be removed. The sphenoid sinus is also easily reached by this approach.

The only sinuses that are inaccessible with this midface degloving procedure are the frontal sinuses and the nasofrontal ducts. Thus, if these have to be explored separate external incisions are necessary.

When pathological tissue has been removed, the edges of the piriform aperture are reconstructed by replacement and osteosynthesis of the medial part of the removed anterior walls of the maxillary sinuses. The external nose is re-positioned, and the septal split closed by two or three Dexon sutures. The anterior nasal spine is re-positioned and fixed to the anterior part of the septum with a steel ligature in the holes drilled earlier. The alar base is fixed to holes drilled into in the medial edge of the anterior wall of the maxillary sinuses by a single suture in each side in order to prevent later lateral drifting and flattering of the nose. The cavity is packed on each side with a hydrocortisone/tetracyclin gauze, which is left in place for five days. The patient is treated with parenteral antibiotics during the same period. The patient is allowed to eat and drink freely and can be discharged when the nasal packing has been removed.

CASE REPORTS

Case 1

A 36-year-old male with bilateral nasal stenosis during three years was referred by an ENT specialist, who had treated the patient with bilateral "polypectomy" several times. Histological examination of the specimens from the latest polypectomy showed bilateral papillomas including areas with inverted epithelium (i.e., inverted papilloma). At physical examination massive tumours were seen in both nasal cavities. CT scans (Figure 2) showed bilateral involvement of the nasal cavity and the frontal, ethmoidal, maxillary and sphenoid sinuses.

A modified midfacial degloving was performed. The medial walls of the maxillary sinuses were resected. By this approach large tumour masses were resected easily on both sides from the nasal cavity, the maxillary and ethmoidal sinuses and from the lower part of the nasofrontal duct. The anterior walls of the sphenoid sinuses were resected, but only a swollen mucous membrane was found here. The frontal sinuses were explored

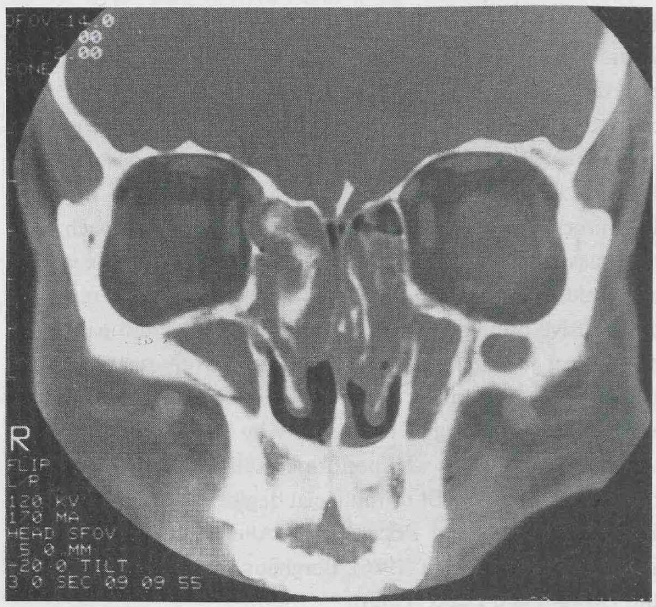

Figure 2. Case 1: Coronal CT scan showing an expanding tumour in the nasal cavity, the maxillary sinuses, and the ethmoidal labyrinths. The destruction of the right lamina papyracia with lateral displacement of the medial straight muscle of the eyeball is seen.

through a bilateral Lynch incision. Large tumour masses were removed from here and from the upper part of the nasofrontal duct on both sides. The nasal septum was without disease.
Histological examination confirmed the diagnosis papillomas with mixed exo- and endophytic growth from both sides of the nasal cavity, the maxillary, ethmoidal and frontal sinuses. There was no evidence of malignancy. The post-operative course was uneventful and on the seventh post-operative day the patient could be discharged from the hospital.

Case 2

A 45-year-old male was admitted with a tumour in the forehead. The patient had a 25-year history of hay fever. Through the last six years he underwent several polypectomies. In the same period the patient had developed asthma, which was not associated with aspirin intolerance. In addition, he had developed a labile *hypertensio arterialis*. During the last year the patient had developed an increasing bilateral exophthalmus and a growing tumour in the forehead. Clinical examination revealed an extensive grade of exophthalmus (the patient was not even able to wear his own glasses) and in the forehead a soft tumour measuring $6 \times 5 \times 3$ cm was seen (Figure 3). Both nasal cavities were obstructed by benign looking polyps. Examination by the ophthalmologist confirmed the above-mentioned exophthalmus and a *fundus hypertonicus* grade II was demonstrated. The initial blood pressure was 200/130 mm Hg. CT and MRI showed involvement of all sinuses including a large mucocele in the frontal sinuses (Figures 4A-B). Bone destruction was seen at the cranial basis, the anterior walls of the frontal sinuses and both orbital roofs which were depressed into the orbitas. Clivus appeared to be more or less destroyed.
Endocrinological examination was normal. Biopsies from the nasal cavities showed simple benign nasal polyposis. The patient was treated with per-oral 50-mg prednisone twice daily; he received intensive anti-hypertensive medical treatment as well. After one week the exophthalmus and the tumour of the forehead became clearly less pronounced. A modified midfacial degloving was performed. Polyps were cleaned from the nasal cavity, the maxillary and ethmoidal sinuses on both sides. Access to the frontal sinuses was achieved through a coronal

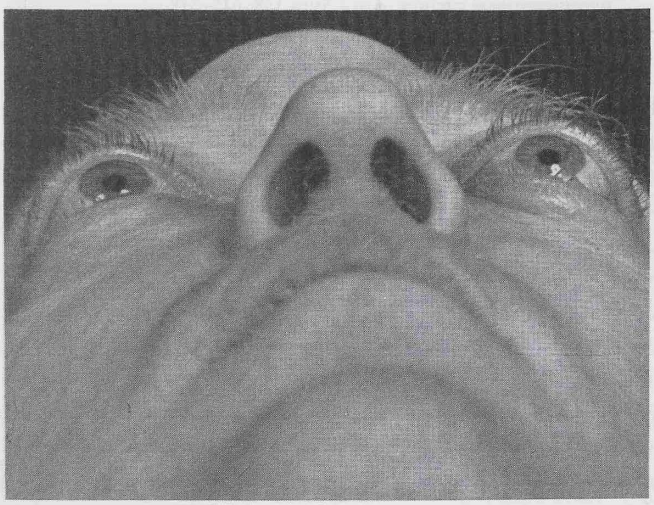

Figure 3. Case No. 2 seen from below.

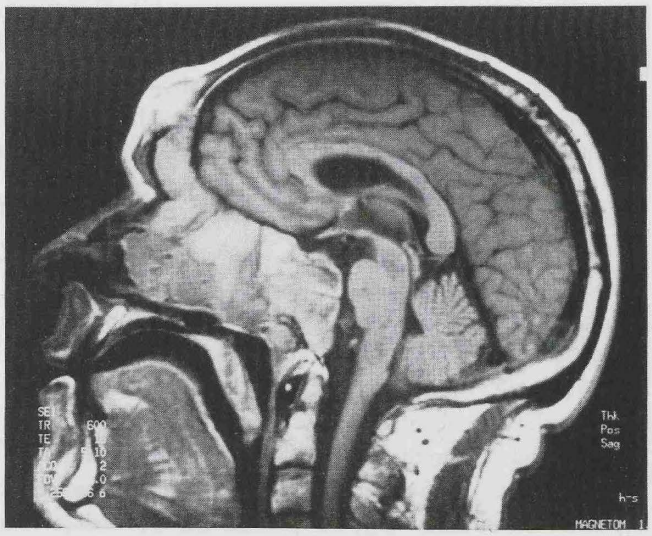

Figure 4A. Case No. 2: Sagittal T_1-weighted MR image (TR/TE 600/15) showing frontal sinus mucocele with destruction of the anterior sinus wall. Nasal and paranasal confluent polypoid masses posteriorly breaking through the clivus towards the brain stem.

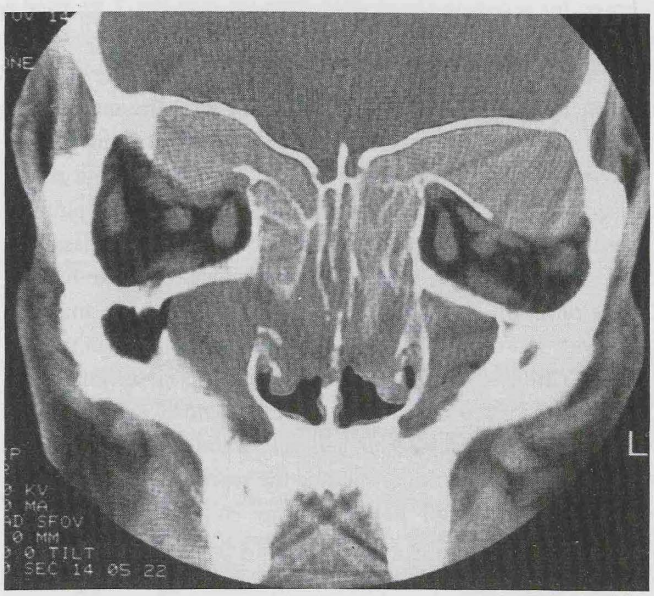

Figure 4B. Case 2: Coronal CT scan showing the large extensions of the ethmoids filled with hyperdense tumour, displacing the roofs of the orbits, as well as the superior straight and oblique muscles of the eyeballs.

incision. The bulging and partly defective anterior walls of the frontal sinuses were resected, giving ample access to the large frontal sinuses which were only partly filled with tumour. The mucocele had almost disappeared, probably due to the prescribed corticosteroids. By resecting the thin floor in the frontal sinuses access was gained to a large extension of the ethmoidal sinuses above the orbitae. All tumour tissue was removed from here and from the upper part of the nasofrontal duct on both sides. The orbitae were both decompressed by resection of a part of the roof. The anterior wall and the bottom of the sphenoid sinuses were resected, and the sinuses and their extension posteriorly towards the foramen magnum was emptied bluntly under microscopical magnification, taking great care not to traumatize the pituitary gland or the brain stem.

Finally, a plate of chondroplast was fitted and sutured into the defect in the anterior wall of both frontal sinuses.
The post-operative course was uneventful and on the 10th post-operative day the patient could leave the hospital. Histological examination showed simple benign nasal polyps.

DISCUSSION

In cases like those described, with extensive benign tumours of the nasal cavity and paranasal sinuses, midfacial degloving has definite advantages when compared to transfacial approaches such as lateral rhinotomy, in which it would be necessary to perform bilaterally. Such a procedure might endanger the blood supply of the external nose, it leaves the patient with two rather large external scars in the midface, and it does not, in our opinion, give particularly good access to the lateral wall of the maxillary sinus. In contrast, the midfacial degloving approach gives a satisfactory access to the nasal cavity and all the paranasal sinuses, except the frontal. There will be no visible scars in the face except for small scars under the eyebrows, if a Lynch incision is chosen for access to the frontal sinus (in case No. 2 we used a coronal incision instead).
The modified midfacial degloving procedure, with elevation of the whole cartilaginous tip of the nose, including the anterior part of the nasal septum, has two definite advantages compared with the conventional procedure of midfacial degloving: (1) a rhinoplastic procedure is not necessary; and (2) the whole piriform aperture is almost free, whereas the whole upper lateral nasal cartilages are left in place in the conventional approach. Re-fixation of the cartilaginous part of the nose has to be accurate and careful – with suturing of the septal split and the spina and of the alar base – in order to avoid late complications, such as lateral drifting of the base of the nose, flattening of the nose, and vestibular stenosis. Theoretically, septal perforation could be a late complication as a consequence of splitting the septum with its mucosa.
None of our patients developed any surgical complications. After three months, the post-operative appearance of the nose is similar to that before surgery, and neither one of the patients has vestibular stenosis. They are both satisfied with the cosmetic result, and they are again able to smell. It is still necessary to remove some crusts from the very large cavities in both patients, but neither of them has developed ozoena. They have both returned to their work.
The indication for surgery was evident in both patients. Case No. 1 suffered from bilateral sinonasal inverted papillomas, which are known to be very aggressive with a tendency to rapid growth with bone destruction. In approximately 10% of the cases they degenerate malignantly (Buchwald et al., 1989). Sinonasal papillomas are generally unilateral and the usual approach is a lateral rhinotomy. In the present case we used modified degloving in combination with a Lynch approach to the frontal sinuses. By these approaches we were able to achieve an apparently radical removal of this aggressive bilateral tumour macroscopically, only leaving two minor visible scars close to the eyebrow.
Despite the benign nature of the basic rhinological disease of case No. 2, his general condition at the time of the initial examination was serious. He had severe exophthalmus and deformation and destruction of the frontal bone. Nasal polyposis had destroyed the sella turcica and most of the body of the clivus. He had serious hypertension, and CT scans of the brain revealed multiple cerebral infarcts. Prior to surgery it was necessary to stabilize the blood pressure and to diminish the tumour pressure by high-dose corticosteroid treatment. The major surgical problem was how to get access to the tumour tissue around the pituitary gland and in front of the brain stem without damaging these structures (Figure 4A). We decided to use a modified midfacial degloving approach and to resect the anterior and medial walls of the maxillary sinuses. By this ample access it was possible to remove the polyps around the pituitary gland and in front of the brain stem safely. Access to the frontal sinuses and the large extension of the ethmoidal sinuses around the orbita was obtained by a coronal incision, which also allowed decompression of the orbital contents by partly removing the deformed orbita roof. An attempt to perform an exclusively endonasal cleansing – including a decompression of the paranasal sinuses – was not considered in this case, because of the extension of the disease, obscuring all the usual landmarks. It would not have been possible to decompress sufficiently the large extended ethmoidal sinuses above the orbita, the large frontal sinuses and the extension through the clivus towards the brain stem.
Recurrency following treatment of sinonasal papillomas and nasal polyposis is common. However, we do hope by close follow-ups, including endonasal endoscopy and CT scans, to detect even minor recurrences and to be able to remove these by an endonasal endoscopic approach.

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