

## The midfacial degloving approach to sinonasal disease

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### Abstract

The midfacial degloving approach was first described by Casson *et al.* in 1974 but despite a number of papers in the American literature advocating its use, it has not gained popularity in Europe. The advantages and application of the technique are presented in 36 patients, ranging from 7–78 years of age. The approach is ideally suited for extensive benign lesions in the nasal cavity, ethmoid and sphenoid sinuses and enables access to the nasopharynx and infratemporal fossa whilst avoiding an external incision. These lesions have included angio-fibroma (13 cases), inverted papilloma (five cases), a variety of cysts (three cases) and six miscellaneous cases of benign pathology. Malignant lesions which have not breached the anterior cranial fossa may also be removed, up to and including bilateral maxillectomy (nine cases) and this can be combined with orbital clearance. The approach may be repeated if necessary and is associated with few significant complications though vestibular stenosis, oro-antral fistula, nasolacrimal damage and upward rotation of the nasal tip may occur. Strategies to avoid these problems can be undertaken and long-term cosmetic results are excellent.

### Introduction

In 1906 Denker described a modification of the Caldwell-Luc approach which allowed access to the nasal cavity and maxillary sinus simultaneously by continuing the sublabial incision medially as far as the frenulum. In 1927 Portmann and Retrouvey described the sublabial-transoral radical maxillectomy for the treatment of malignancy. Complete exposure of one side of the midfacial skeleton was described by Converse in 1950 through an intraoral exposure with subperiosteal elevation. He later extended this technique to include elevation of the external nasal tissues via intercartilaginous and transfixion incisions in continuity with the intraoral approach which allowed mobilization of the soft tissues of the entire middle third of the face (Casson *et al.*, 1974). This technique was first employed for remodelling of bone in cases of fibrous dysplasia and was later used in midfacial fractures, craniofacial dysostoses and selected cases of maxillary sinus malignancy.

Several publications in the American literature attest to the implementation of the technique since the 1960's (Allen and Siegel, 1981; Anand and Conley, 1983; Mangilia, 1986) though these articles generally appeared two decades later and documented relatively small numbers of patients. The technique was popularized by Price (1986) and has remained essentially unchanged save for the modification of a bipediced flap of lateral nasal wall mucosa described by Sachs *et al.* (1984).

### Material and methods

The midfacial degloving approach has been used during the last eight years on 36 patients with a considerable range of pathological conditions (Fig. 1).

### Surgical Technique

The procedure is performed under general anaesthesia with the endotracheal tube positioned centrally in the mouth. The patient is supine in the reversed Trendelenberg position with approximately 15° of head-up tilt. Vasoconstriction of the soft tissues is aided by instilling Moffat's solution\* into the nose and injecting 1:200,000 adrenaline into the sites of incision: intercartilaginous, columella and buccogingival sulcus. It is advisable to carefully tape the eyes or perform temporary tarsorrhaphies.

A bilateral sublabial incision is made straight down to bone, running from maxillary tuberosity to tuberosity to gain maximum access (Fig. 2). The periosteum and soft tissues of the cheek are raised as for a Caldwell-Luc approach, exposing with care the infraorbital nerves and allowing the inferior orbital margin to be identified (Fig. 3).

Intercartilaginous incisions, made as in a routine rhinoplasty, give access to the soft tissues on the dorsum of the nose which are elevated and the dissection is extended laterally onto the maxillae. The incisions are continued into a transfixion incision along the dorsal and caudal borders of the cartilaginous septum, separating it from the medial crura of the lower lateral cartilages. This incision is continued across the floor of the nose to join the intercartilaginous incisions laterally (Fig. 4). It can sometimes be helpful to enter the nasal cavity from the oral incision to allow better placement of the cut. Further lateral dissection now enables the skin and soft tissues of the middle third of the face to be degloved completely.

It is now possible to gain excellent access to both nasal

\*Moffat's solution. Cocaine solution 4 per cent and sodium bicarbonate 1 per cent in equal parts to 1/4 part 1; 1,000 adrenaline.



(a)



(b)

FIG. 1

(a) Coronal CT scan and (b) axial CT scan showing large neurolemmoma arising from the maxillary nerve and filling the maxillary sinus.

cavities, maxillary sinuses and thence ethmoids, sphenoid, infratemporal and pterygopalatine fossae and nasopharynx. Thus the posterior wall of the sphenoid sinus, pterygoid plates and attached muscles and posterior wall of the nasopharynx are the posterior limits of the resection. The superior limit is formed by the cribriform plate and roof of ethmoids and that laterally by the coronoid process of the mandible. The extent of the resection will obviously be determined by the pathology but a bilateral radical maxillectomy can readily be performed and may be combined with orbital clearance if required.

The approach is particularly appropriate for excision of juvenile angiofibroma as excellent exposure of the lesion and direct control of the internal maxillary artery in the pterygopalatine fossa can readily be achieved.

Haemostasis is greatly facilitated by packing of the cavity with Whitehead's varnish gauze\*\* or similar antiseptic material. Considerable care must be exercised when suturing the incisions to minimize complications. Failure to do this will result in vestibular stenosis and oro-antral fistula.

\*\*Whitehead's varnish. Compound iodoform paint: iodoform, benzoin, prepared storax, tolu balsam, and solvent ether.

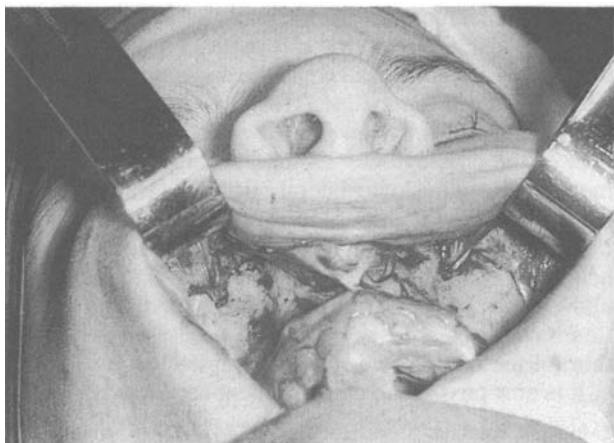


FIG. 2

Intra-operative photograph showing bilateral sublabial incision and elevation of soft-tissues to expose infra-orbital nerves.

A resorbable material such as plain catgut can be used. Routine rhinoplasty taping of the nose and a single intra-operative intramuscular injection of 8–12 mg dexamethasone will reduce the inevitable facial oedema and bruising. Indeed it is important to warn the patient and their relatives about the immediate post-operative appearances. The duration of packing will vary and may require a short general anaesthetic for its removal if a large amount is used.

The immediate post-operative complications include haemorrhage and paraesthesia of the overlying skin. The latter is temporary if the infra-orbital nerves have been preserved.

Crusting of the cavity is an inevitable consequence of altering the contours of the nasal cavity but will resolve to some extent once regrowth of mucosa has occurred. Similarly the facial swelling, though initially dramatic, settles quickly. More serious problems include oro-antral fistula, particularly if the maxillary pathology has caused gross distortion and previous surgery has been undertaken, and epiphora may occur if the nasolacrimal duct is

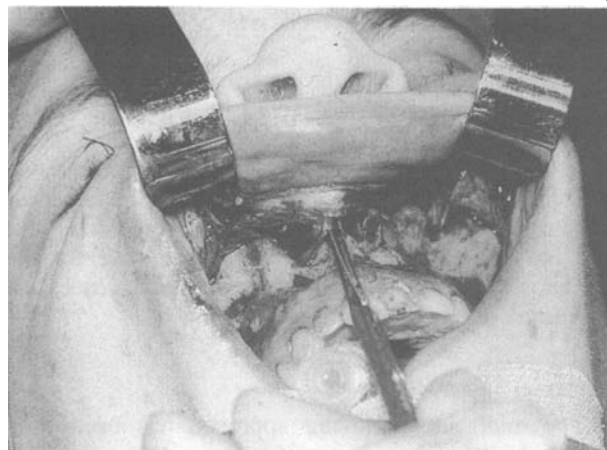


FIG. 3

Intra-operative photograph showing combination of intra-oral and nasal incisions to elevate soft tissues from columella, onto bridge of nose.

TABLE I  
BENIGN AND MALIGNANT PATHOLOGIES TREATED BY A MID-FACIAL DEGLOVING APPROACH

Benign conditions		Age	Sex	Previous treatment	Complications
1	Angiofibroma	8	M	Lateral rhinotomy	
2	Angiofibroma	11	M		
3	Angiofibroma	9	M		
4	Angiofibroma	19	M		
5	Angiofibroma	13	M	Lateral rhinotomy	
6	Angiofibroma	12	M	Partial maxillectomy	Oro antral fistula closed
7	Angiofibroma	18	M		
8	Angiofibroma	24	M		
9	Angiofibroma	16	M		
10	Angiofibroma	10	M		
11	Angiofibroma	18	M		Epiphora/DCR
12	Angiofibroma	15	M	Lateral rhinotomy	
13	Angiofibroma	13	M		
14	Inverted papilloma	79	M		
15	Inverted papilloma	44	F		
16	Inverted papilloma	36	M		
17	Inverted papilloma	57	M		
18	Inverted papilloma	68	M		
19	Neurolemmoma	32	M	Caldwell Luc	Oro-antral fistula closed
20	Ameloblastoma	12	F		
21	Haemangioliomyoma	20	F		
22	Odontogenic cyst	18	M	Caldwell Luc	Oro-antral fistula closed Revision × 2
23	Odontogenic cyst	38	F		
24	Dermoid cyst	21	M		
25	Fibrous dysplasia	7	M		
26	Hereditary haemorrhagic telangiectasia	78	M	Septodermoplasty	Septal perforation
27	Hereditary haemorrhagic telangiectasia	47	F	Septodermoplasty	Septal perforation
Malignant conditions		Age	Sex	Previous treatment	Complications
28	Adenoid cystic carcinoma	31	M		
29	Adenoid cystic† carcinoma	48	M		
30	Adenoid cystic† carcinoma	56	F		
31	Adenoid cystic†‡ carcinoma	57	M		
32	Malignant schwannoma	47	F		
33	Rhabdomyosarcoma	11	M		
34	Chondrosarcoma†	55	F		
35	Basal cell carcinoma	70	M		
36	Adenocarcinoma‡	68	M		

†Bilateral radical maxillectomies via mid facial degloving

‡Combined with orbital clearance

disturbed. In many patients a subtle upward rotation of the nasal tip can be seen but this rarely poses a cosmetic problem. More significant nasal deformity will result if the frontal process of the maxilla is extensively removed.

Vestibular stenosis constitutes the most difficult problem to rectify and is therefore, best avoided by careful repair of the circumferential intranasal incisions.

## Results

Table 1 outlines the 36 patients who have undergone this technique for a wide range of indications, both benign and malignant. The large number of angiofibroma cases accounts for the preponderance of males (28:8). Age range is wide, from 7 to 78 years (mean 34 years), half of whom were under 30 years. This again in part reflects the

pathologies treated but is also a consequence of our concern to avoid any external facial incisions.

Twenty-five per cent (9/36) had already undergone a variety of previous surgical approaches and one patient has required two revision mid-facial procedures for recurrence of an extensive calcifying odontogenic cyst. Revision in itself does not, however, present any technical difficulties. Complications include three cases of oro-antral fistula, all in patients who had undergone previous Caldwell-Luc procedures, and which were readily amenable to primary repair. One patient experienced persistent epiphora and underwent subsequent dacrocystorhinostomy. There have been no cases of vestibular stenosis.

Five of the patients with malignant disease underwent bilateral radical maxillectomies via this approach and the mid-facial degloving was combined with an orbital clear-



FIG. 4

Intra-operative photograph showing exposure of nasal septum and access to nasal cavity and both maxillary sinuses. Forceps point to infra-orbital nerve.

ance in two patients, one with adenocarcinoma and one with adenoid cystic carcinoma.

On a cautionary note, bilateral radical septodermoplasty was attempted in two cases of severe hereditary haemorrhagic telangiectasia but resulted in septal perforation so the authors would recommend staging such a procedure if required.

### Discussion

It is somewhat surprising that the mid-facial technique has received little attention and achieved limited popularity when it has the attraction of combining the facial plastic skills of the rhinoplasty surgeon with an oncologic approach. It offers excellent bilateral exposure of the nasal cavities, middle third of the face and central skull base and can be readily modified and extended. Comparison is clearly to be made with the lateral rhinotomy and Weber-Fergusson incisions which are quicker to perform but have the significant disadvantage of a facial scar and may both be associated with epiphora. The lateral rhinotomy incision can be associated with upward contracture of the alar margin and the Weber-Fergusson approach may give rise to upper lip and naso-maxillary groove asymmetry, medial canthal deformity, and lower lid oedema.

Thus indications include a wide variety of benign sinonasal conditions. The technique is particularly suitable for cases of inverted papilloma where a high recurrence rate is directly related to inadequate excision. Sachs *et al.* (1984) reported 46 cases with up to 10 years follow-up, two of which developed vestibular stenosis. As in our own series, Allen and Siegel (1981) reported the use of the technique in angiofibroma and fibro-osseous disease. The septum can be accessed for repair of septal perforations (Romo *et al.*, 1988) and with caution, for septodermoplasty (Allen and Siegel, 1981). A range of maxillo-facial conditions including fractures, osteotomies and bone grafting are amenable to this approach.

The application of the technique for sinonasal malignancy should only be attempted in those selected cases

which can be successfully encompassed by the exposure. If the anterior cranial fossa has been breached, a formal craniofacial resection is indicated though in those centres where a bicoronal flap is used for the anterior craniotomy, it would be possible to combine the two approaches. Indeed because there is no compromise of the mid-facial soft tissue blood supply, the approach may be combined with a wide variety of other facial incisions. Neither previous nor post-operative radiotherapy and chemotherapy offer any contra-indication to the approach and the use of modern prosthetic techniques such as osseo-integrated implants ensure excellent functional rehabilitation for those patients undergoing uni- or bilateral maxillectomies.

Despite the cosmetic advantages in the young, one possible concern has been the effects of such radical surgery on midfacial development, particularly when performed for benign disease. This has been the subject of a long-term study using standardized sequential photography and lateral cephalometry on all children undergoing radical sinonasal surgery by a range of approaches. The results so far do not indicate that any significant cosmetic sequelae result from such surgery as long as the integrity of the cartilaginous septum is preserved.

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