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## The atraumatic septorhinoplasty

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**Abstract** While a large number of studies have been published on the surgical techniques used to obtain optimal functional and esthetic results in the field of septorhinoplasty, less attention has been devoted to techniques for minimizing postoperative trauma. In this connection, the authors highlight a number of intraoperative methods, such as microosteotomy, extramucosal approach, hemostasis, careful suture placement, and endonasal splints, the use of which has led to an overall improvement in postoperative recovery and swifter attainment of esthetic objectives.

**Keywords** Rhinoplasty · Microosteotomy · Extramucosal approach · Endonasal splint

### Introduction

The progress achieved in nasal surgery over the last few years is related to improvements not only in esthetic and reconstructive surgical techniques but also, and above all, in postoperative recovery.

Patients who have undergone septorhinoplasty very frequently complain in the immediate postoperative period of severe discomfort that can largely be traced to the use of highly traumatic techniques. The most significant problems appear to be pain, ecchymosis, hematoma, edema, bleeding, lacrimation, and impeded nasal respiration, which necessitate a protracted postoperative period of absolute rest lasting many days.

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Patients are thus obliged to take long periods of absence from work and their lives are severely disrupted (Fig. 1).

The postoperative effects of septorhinoplasty can, however, be far less traumatic and the patient's appearance can be pleasing and socially acceptable even on the very next day (Figs. 2 and 3). This can be achieved through the use of atraumatic intraoperative methods such as microosteotomy, the extramucosal approach, hemostasis, careful suture placement, and the use of endonasal splints.

### Review of the literature

Tardy and Denny [25] were the first to propose a gradual and conservative approach to the correction of nasal anomalies. The performance of lateral and median-oblique microosteotomies with osteotomes of 2–3 mm is fully in line with this atraumatic philosophy. The extramucosal approach makes it possible to skeletonize the bony and cartilaginous vault in order to remodel the profile while respecting the integrity of the underlying nasal passages. Fomon [10] and Cottle [8] were the first to underline the importance of detaching the mucoperichondrium extensively from the septum and the triangular cartilage so as to obtain better access to these structures. Meyer [16] restricted the use of this method to the more difficult cases, e.g. crooked nose and the nasal sequelae of cleft lip + palate. Anderson [1] was the first to highlight the importance of the extramucosal method as a routine systematic approach in rhinoplasty. Meyer also reported its routine use in both primary and secondary rhinoplasty. Robin [19–21], Pollet and Baudelot [17], Jost [12] and Jost et al. [13] adopted the extramucosal technique and strongly emphasized its positive aspects. Converse [6] and Regnault and Daniel [18] have stressed the virtues of this approach, as have Anderson and Ries [2].

Toriumi [27] regards the integrity of the mucoperichondrium of the nasal passages as indispensable to prevent inferomedial collapse of the median nasal vault



**Fig. 1** Patient the day after an operation using highly traumatic techniques



**Fig. 2** Frontal view of patient the day after an operation using the atraumatic technique

subsequent to dorsal hump excision. Rohrich and Hollier [22] have highlighted the numerous positive aspects of this technique as regards minimization of scarring, avoidance of bleeding, and the provision of a closed space to allow the insertion of spreader grafts, if required. Tebbets [26] has adopted the extramucosal method but restricts its use to dorsal resections smaller than 3 mm in order to avoid a superfluity of mucosa in the nasal passages. Finally, Trenité [28] maintains that the integrity of the mucoperichondrium on the rear section of the cartilaginous vault prevents postoperative irregularity in the dorsal area.

In regard to nasal packing, studies by Von Schoenberg et al. [29] and Camirand et al. [4], based, respectively, on 95 and 812 patients, demonstrate that systematic nasal packing serves no purpose in routine nasal surgery. Endonasal splints can be used in place of far more bothersome nasal packing in most cases and prove just as effective in preventing turbino-septal synchia [5]. Many authors have adopted this method with satisfactory results over the last few years and stressed its positive aspects [3, 7, 11]. Guastella et al. [15] recently proposed a new type of “septo-valvular” endonasal

splint, so-called because of its particular anatomical shape, which fits snugly into the area of the internal nasal valve.

With a view to avoiding the use of nasal packing, particular importance attaches to the careful suture closure of all the incisions as well as the perfect joining of the two previously separated septal linings. To this end, many authors advocate the use of continuous transseptal mattress suture with 4.0 chromic catgut to stabilize the fragments of septal cartilage and prevent the formation of hematomas [9, 14, 23, 24].

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## Materials and methods

Atraumatic septorhinoplasty was performed on 70 patients (28 men and 42 women between the ages of 17 and 48 years, average age 32 years) at the Department of Maxillofacial Surgery of the S. Camillo-Forlanini Hospital, Rome, between January 1999 and April 2001. All the patients presented with septal deviation to differing degrees and deformation of the nasal pyramid due to the presence of an osteocartilaginous hump (38 patients) or



**Fig. 3** Basal view of patient the day after an operation using the atraumatic technique



**Fig. 4** The extramucosal approach

crooked nose (12 patients). Both conditions were present in 20 patients. Respiratory difficulties were present in 12 patients due to collapse of the median nasal vault leading to restriction of the internal nasal valve.

The operations took place under general anesthesia with orotracheal intubation and local-regional infiltration with 2% Xylocaine and 1:50,000 adrenaline. Surgery was begun after about 15 min.

After intercartilaginous and transfixion or hemitransfixion incisions, the dorsal nasal region was skeletonized in every case by means of a rigorously extramucosal technique and peeling of the subperiosteum (Fig. 4). In cases where dorsal hump excision was performed, care was taken not to damage the underlying mucosa of the nasal cavity. Conservative criteria were applied in all cases to correct septal deviations by means of repositioning, septoplasty and/or subperichondrial resection.

Gradual and conservative criteria were also applied in correcting deformity of the nasal tip, which was present in all patients. Access was obtained by means of the delivery or the (retrograde) non-delivery method as appropriate. The tip was remodeled through simple

cephalic resection of the lateral crus (34 patients), associated interdomal or intradomal suture (28 patients), or section of the dome (8 patients). The choice was based on careful analysis of the anatomical impairment presented.

Median-oblique and lateral osteotomies were always carried out endonasally with osteotomes of 2–3 mm. Double lateral osteotomy was required in six patients with a crooked nose to obtain correct median repositioning of the severely deviated nasal pyramid (Fig. 5).

In the 12 patients with respiratory problems due to collapse of the median nasal vault and narrowing of the nasal valve area, spreader grafts were placed bilaterally by means of the Sheen technique. In the six patients with the most seriously crooked nose, spreader grafts were placed unilaterally on the concave side.

An electrocoagulator was used with great care to ensure thorough hemostasis of the incisions, the nasal dorsum, and the area corresponding to the basal crest of the upper jaw, where bleeding of the subseptal artery often occurs. Equal care was taken with the continuous transseptal mattress suture and in suturing all the initial incisions, including the intercartilaginous (Fig. 6).





**Fig. 5** Drawing of double basal osteotomy performed in a patient with crooked nose using the endonasal approach

Guastella-Mantovani endonasal splints were used in 30 patients and secured with one or two transfixated sutures of 3-0 nylon (Fig. 7). This surgical technique was employed due to particularly high fragmentation of the cartilaginous septum, tendency to bleed, risk of synechiae, and impairment in the septovalvular region.

Fine Fitostimuline gauze was inserted into both nasal passages at the end of the operation, not for hemostatic-compressive purposes but in order to absorb the light exudation always produced for a few hours by surgical wounds. The gauze was removed within 24 h in all cases. The endonasal splints, for which a high degree of tolerance was registered, were removed on the fifth day, while the external splint was removed on the seventh day.

## Results

The patients were kept under careful observation for the first 10 days after the operation. This was followed by examinations twice a week over the next fortnight and



**Fig. 6** Suture of intercartilaginous incision

then once a month to the end of a total follow-up period of 6 months.

The observations most relevant to this study were those made in the first 10 days, during which the problems most commonly arising in the immediate postoperative phase (lacrimation, respiratory difficulties, pain, edema, ecchymosis, hematoma, and bleeding) were recorded on a scale of 0–3 corresponding to absent, slight, medium, and intense. The results obtained were then correlated with the type of operation involved and in particular with the intraoperative techniques employed in order to identify any causal link between them and the degree of postoperative discomfort (Table 1).

Lacrimation and impairment of nasal airflow were entirely absent in all patients. These normally arise due to the use of nasal packing; this was not used in any of our patients. While obviously not perfect over the first 2 days because of postoperative edema of the mucosa, nasal respiration was possible in all patients and soon reached the desired level. Few patients complained of pain, the results being 48% at level 0, 43% at level 1, and only 9% at level 2. The largely random distribution of this symptom over the various categories of patient indicates that there was no connection with the type of surgical technique employed. Edema was registered for only 26% of the patients and in no patients at a level



**Fig. 7** Placement of Guastella-Mantovani endonasal splint

higher than 1. More than half the patients had undergone double osteotomies to correct a crooked nose. One interesting point that is difficult to interpret is the slight increase in swelling observed in many patients on the second day, which disappeared completely over the next few days.

Ecchymosis was the most common problem, occurring in 41% of patients at level 1, in 15% at level 2, and in only 3% (two patients) at level 3. Analysis of the data suggests that the most obvious ecchymosis occurred in connection with the more complex forms of septorhinoplasty involving the correction of more than one severely deformed anatomical element (e.g. septoplasty + resection of the basal crest of the septum + extensive dorsal hump excision + osteotomy + radical remodeling of the nasal tip). Hematoma was, however, observed in none of the patients, even in these patients with the more complex procedures.

No increase was recorded in the incidence of any of the problems in connection with the use of spreader grafts during the operation or in with more radical remodeling of the nasal tip by means of the delivery technique. Attention must be drawn, however, to two complications arising in two different patients, namely epistaxis and septal perforation. In the first patient, the nose bleed, which occurred on the fourth day, was probably related to exertion by the patient and an ensuing state of nasal congestion. In the second, the perforation was related to excessively tight suturing of the endonasal splint resulting in ischemic necrosis due to compression.

Preoperative and postoperative photographs show the results obtained after 5 days and after 10 months in one representative patient operated on by means of the atraumatic technique (Figs. 8, 9 and 10).

**Table 1** Summary of the results of surgery with the atraumatic technique

Surgical treatment	No. of patients	Edema				Ecchymosis				Bleeding				Hematoma				Pain				Lacrimation				Respiratory difficulties			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
Septoplasty + remodel of the nasal tip + hump excision	38	30	8			22	12	4		33	5			38				20	18			38				38			
Septoplasty + remodel of the nasal tip + correction of crooked nose	12	9	3			2	8	2		10	2			12				6	5	1		12				12			
Septoplasty + remodel of the nasal tip + hump excision + correction of crooked nose	20	13	7			5	9	4	2	16	3		1	20				8	7	5		20				20			
Total no. of patients	70	52	18			29	29	10	2	59	10		1	70				34	30	6		70				70			
Percent of patients	100	74	26			41	41	15	3	85	14		1	100				48	43	9		100				100			



**Fig. 8** Representative patient before and after surgery with the atraumatic technique, frontal views: **a** preoperative, **b** 5 days after surgery, **c** 10 months after surgery



**Fig. 9** Representative patient before and after surgery with the atraumatic technique, lateral views: **a** preoperative, **b** 5 days after surgery, **c** 10 months after surgery





**Fig. 10** Representative patient before and after surgery with the atraumatic technique, oblique views: **a** preoperative, **b** 5 days after surgery, **c** 10 months after surgery



**Fig. 11** Positioning of the osteotome in the nasal cavity with no incision of the mucosa



## Discussion

The most significant aspect of atraumatic septorhinoplasty is the technique of median and lateral microosteotomy carried out with osteotomes of 2 or 3 mm. One of the first positive features is the fact that it is not necessary to make an incision in the mucosa before positioning the osteotome in the nasal cavity, thus avoiding a further source of bleeding (Fig. 11). Moreover, due to the absence of a guard on the instrument, the periosteum, the mucosa and the subcutaneous tissues contiguous with the nasal bones remain largely intact after the osteotomies have been carried out (Fig. 12). In particular, the periosteum acts as a sort of belt or internal splint giving the mobilized nasal bones greater stability and securing them more firmly to their new position over time.

The median microosteotomy was performed in the median-oblique direction in conjunction with a lateral microosteotomy curving slightly upward. The meeting point of the osteotomies was never above the intercanthal line. This made it possible to avoid a transverse osteotomy and to avoid meeting the bones of the nasal root, which are anatomically thicker, in the course of the microosteotomy. Leaving the nasal process of the frontal bone completely intact is very important with respect both to the prevention of customary postoperative discomfort and to the postoperative stability of the nasal dorsum. In any case, it is seldom necessary to plan an esthetic modification of nasal morphology at or above the intercanthal line.

Skeletonization of the nasal vault was always performed with great care by means of the extramucosal approach, i.e. preserving the anatomical integrity of the internal mucoperichondrial lining of the nasal passages. This is essential both in order to safeguard the area of the internal nasal valve and also to obtain improved postoperative recovery and faster healing. Use of the transmucosal approach has been found to involve a

considerable risk of synechiae and to cause a certain amount of intraoperative bleeding. Cutting through the flap also disrupts the delicate vascular equilibrium of



**Fig. 12** Comparison of microosteotome and traditional scalpel with guard

venous-arterial and lymphatic drainage between superficial and deep anatomical areas, thus causing tegumental thickening that is slow to disappear. The absence of bleeding, synechiae and edema in our patients together with rapid attainment of the esthetic objectives confirms that the extramucosal approach ensures rapid postoperative recovery.

If we are to avoid the use of nasal packing, it is important to identify the points of most frequent bleeding and carry out careful hemostasis by means of an electrocoagulator. To this end, the nasal dorsum should be inspected with care together with the mucosal incisions and the nasal crest of the upper jaw at the point of the subseptal artery. These are the points where our patients required hemostasis.

The transseptal mattress suture and meticulous suturing of all the incisions, including the intercartilaginous, are also important to avoid nasal packing. It should be born in mind, however, that this closure of all the drainage pathways can be performed if and only if all the surgical procedures described above have been carried out, otherwise there would be a high risk of hematoma.

The use of Guastella-Mantovani endonasal splints proved particularly effective in the patients in whom the correction of septal deviation required particular fragmentation of the cartilage and where the mucosa presented lesions in various areas with the risk of synechiae. Their compressive antihemorrhage effect and guiding effect on cicatrization made it possible to obtain rapid postoperative recovery with no complications in these patients who fell within the norm. As their original shape with a lateral wing fits snugly into the septal-triangular cartilage attachment area, it was considered very useful to employ these splints in patients who had undergone spreader grafts in order to ensure correct adhesion and cicatrization of the structures in the area of the internal nasal valve. They are so thin as to present no problems of tolerance and patients can even forget their presence in the nasal passages. Their removal is equally painless and simple. The septal perforation observed in one patient in whom these splints were used was unquestionably due to iatrogenic error in making the two fixation knots unduly tight as well as parallel and overlapping rather than horizontal.

In conclusion, the surgical protocol proposed for atraumatic septorhinoplasty proved effective particularly with regard to postoperative recovery which was essentially free of discomfort. The intraoperative procedures performed presented no particular difficulties. The only drawback was a slight increase in operating time.

The most frequent postoperative effect of atraumatic septorhinoplasty was ecchymosis, which remained, however, below the level of maximum intensity in nearly all the patients. A correlation exists between the intensity of the ecchymosis and the complexity of the operation, and it is primarily a function of the number of surgical corrections performed and probably the operating time. This fact must be taken into consideration by the surgeon

when planning to use a certain technique in the operation, in that traumatic surgical maneuvers can result in esthetic changes that are practically negligible but cause considerable postoperative discomfort. The adoption of a simple, gradual and conservative approach appears to be sensible also in this respect.

One further interesting point highlighted by our study is the fact that the use of spreader grafts and more invasive techniques to remodel the nasal tip makes no difference to postoperative discomfort. Guastella-Mantovani endonasal splints proved to be particularly useful in patients in whom the risk of complications was greatest and in whom correction of the nasal valve area was carried out.

Finally, it should be stressed that all patients in our study already displayed a pleasing and presentable appearance the day after the operation, resumed their customary interpersonal relations, and stated their readiness to take part in social activities.

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