



ORIGINAL ARTICLE

Septoplasty and rhinoplasty, a descriptive study

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Received January 7, 2009; accepted June 3, 2009
Available online September 22, 2009

KEYWORDS

Rhinoplasty;
Nasal septum/ surgery;
Outcomes

Abstract

Introduction and objectives: This is a retrospective study on patients who underwent septoplasty and septorhinoplasty at Hospital Dr. Peset in Valencia. Surgical procedures are described and results evaluated.

Material and methods: Forty-nine septorhinoplasties and 6 rhinoplasties were aesthetic and functionally evaluated after surgery. Variables such as type of deformity, age, gender, previous surgery and surgical results were described and compared. Fisher exact test was used to find statistic significance between variables.

Results: Septum remained centered after 91%(45) of septoplasties. There was no statistical significance between septal deviation type and results. Straight nasal pyramid was obtained after 76%(42) of septorhinoplasties and also in this procedure we did not find statistic significances between deformity and final result. Female gender and secondary surgery were predictive factors of worse surgical results.

Conclusion: Septopyramidal surgery seeks to obtain good nasal function and aesthetic results. Starting with Cottle's principles, more specific techniques have been developed to resolve the different deformities.

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PALABRAS CLAVE

Rinoplastia;
Tabique nasal/cirugía;
Resultados

Septorhinoplastias, un estudio descriptivo

Resumen

Introducción y objetivos: Realizamos un estudio retrospectivo de los pacientes intervenidos de septoplastia y rinoplastia en el Hospital Universitario Dr. Peset de Valencia que describiera la técnica empleada y evaluara los resultados de la intervención.

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Material y métodos: Cuarenta y nueve pacientes intervenidos de septorhinoplastia y 6 de rinoplastia fueron examinados funcional y estáticamente después de la cirugía. El análisis de los resultados consta de un estudio descriptivo y uno comparativo de las variables: tipo de deformidad, edad, sexo, cirugía previa y resultados posquirúrgicos. Para establecer la relación entre las variables se empleó el test exacto de Fisher.

Resultados: Después de realizar la septoplastia, el septum quedó centrado en el 91% (45) de los casos. En nuestro trabajo no hemos podido encontrar diferencias estadísticamente significativas entre el tipo de desviación septal y los resultados tras la septoplastia. En el caso de las septorhinoplastias, se obtuvo una pira mide centrada en el 76%(42) de los casos. Tampoco llegamos a la significación estadística entre el tipo de deformidad de la pira mide nasal y su estado final. El sexo femenino y los casos de septorhinoplastia secundaria predicen peores resultados tras la operación.

Conclusión: La cirugía septopiramidal persigue conseguir el buen funcionamiento nasal y un resultado estático. Partiendo de los principios quirúrgicos de Cottle se han desarrollado otras técnicas más específicas orientadas a la corrección de las distintas deformidades.

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Introduction

The aim of this paper is to describe the technique and results of septoplasty and rhinoplasty employed in our service. The controversy that exists in assessing the functional outcome of this surgery¹⁻⁴ and the few descriptions of the techniques and procedures used in everyday practice⁵⁻⁸ have prompted us to conduct this study.

The correction of septal deviation is one of the most common interventions performed by the otolaryngologist (9% of total operations performed by our service). Currently, septoplasty is used, a technique that involves the remodeling of the bone and cartilaginous septum with a functional purpose while attempting to preserve the septal architectural elements.⁹ The technique of septoplasty has many variations, but as a whole is based on the principles described by Cottle for the maxilla-premaxilla approach.¹⁰

In septorhinoplasties, a series of maneuvers designed to correct deformities of the pyramid that alter nasal function are added to septal work, and there are many different techniques and procedures, due to the multiplicity of abnormalities of the nasal structures affecting nasal ventilation. Osteotomy is one of the steps of greater responsibility, since it requires a modification of the bony structures of the nasal pyramid that will very specially determine the aesthetic and functional outcome.¹¹

Material and methods

We conducted a descriptive observational study of 55 patients undergoing rhinoplasty, 49 of whom also had to undergo septal procedures, from April 2005 to December 2007 at the Department of Otorhinolaryngology, H. U. Dr. Peset, in Valencia (Spain).

All interventions were performed by 2 surgeons (LMR and MCL).

The average patient age was 28 years (median 26), with a maximum age of 51 years and a minimum of 16. Of these, 32 were men and 23 were women.

Our septoplasties all began with the hemitransfixiant incision, loosening the mucoperichondrium. We then built

the left and right upper tunnels along the quadrangular cartilage and the perpendicular plate of the ethmoid. In some cases, we extended this pocket in the cranial direction to the top of the nose and in the caudal direction to the junction of the chondroid and the ethmoid-vomer. It was not usually necessary to create access to the premaxillary plane ("magic plane") or to create lower tunnels.

If the deviation was anterior, we carried out the lower horizontal chondrotomy and the posterior vertical chondrotomy of the quadrangular cartilage, replacing the axial septum on the spine. With posterior deviations, we performed lower vomerine and upper ethmoidal osteotomies that enabled us to mobilize and subsequently centre the deformed bony portion.

Lastly, we closed the hemitransfixiant incision and placed a silica plate, should there have been a tear of the mucosa or a resection of a synechia or in those situations in which the surgical technique, acting on the septum, caused its instability.

In cases of septoplasty surgery, data was collected using a protocol (Figure 1: donated by Dr J. García Polo from Hospital La Paz, Madrid) that described the mode of intervention (primary or secondary), surgical approach, type of anesthesia, tunnels and planes created, osteotomies and chondrotomies practiced, technique used, sutures employed, and whether a packing was made with gauze or Merocel® with or without Slastic®.

In the case of septorhinoplasty, we began with the completion of the fifth tunnel to separate the back, and subsequently remodelled it according to the existing deformity; if there was a hump, it was resected, and if the problem was a deviation, 1 or 2 of the triangular cartilages of the septum were separated.

We carried out medial oblique osteotomies, increasing the inclination of the osteotome into the maxillary and then we performed the lateral osteotomies. The latter were made by cutting the ascending apophysis of the maxillary in a curved shape up to its junction with the cephalic portion of the nasal bones, where the line of the oblique osteotomy already made should be met.

As with septorhinoplasty patients, data was collected using a protocol (Figure 2: donated by Dr J. García Polo

Date _____
 Surgeon _____

Informed consent
 Rhinomanometry

Analysis of the deformity:

 Surgical plan

TYPE <input type="checkbox"/> Primary <input type="checkbox"/> Review <input type="checkbox"/> Secondary	PLANES <input type="checkbox"/> Magic plane <input type="checkbox"/> Prespinal plane	SUTURES <input type="checkbox"/> Transfixiant <input type="checkbox"/> Hemitransfixiant <input type="checkbox"/> Caudal edge anchoring <input type="checkbox"/> Other
APPROACH <input type="checkbox"/> Hemitransfixiant <input type="checkbox"/> Trasfixiant <input type="checkbox"/> Other	CHONDROTOMIES <input type="checkbox"/> Posterior vertical <input type="checkbox"/> Inferior horizontal <input type="checkbox"/> Caudal edge <input type="checkbox"/> Anterosuperior edge <input type="checkbox"/> Other	BLOCKING <input type="checkbox"/> Impregnated gauze <input type="checkbox"/> Meroceel <input type="checkbox"/> Silastic plates <input type="checkbox"/> Other
ANESTHESIA <input type="checkbox"/> General <input type="checkbox"/> Local <input type="checkbox"/> Upper infiltration (5 tunnel)	OSTOMIES <input type="checkbox"/> Posterior <input type="checkbox"/> Inferior <input type="checkbox"/> Other	TURBINATES <input type="checkbox"/> Turbinectomy <input type="checkbox"/> Turbinoplasty <input type="checkbox"/> Cautery <input type="checkbox"/> Radiofrequency <input type="checkbox"/> Other
TUNNELS <input type="checkbox"/> Right superior <input type="checkbox"/> Left superior <input type="checkbox"/> Right inferior <input type="checkbox"/> Left inferior	TECHNIQUE <input type="checkbox"/> Grafts <input type="checkbox"/> Resection <input type="checkbox"/> Incision <input type="checkbox"/> Rotational movement	

SCHEME 2.
 Intercolumellar pocket

Notes:

Figure 1 Septoplasty protocol.

from Hospital La Paz, Madrid) with characteristics similar to the previous one, which also included the mode of intervention and the surgical approach. The following were also contemplated: 1) modifications in the nasal tip at the height of the lateral and medial cruras, the refinements made (columellar profiling, grafts, resections, and unusual sutures) and the effects such as increasing or decreasing the projection, the rotations and the elongation; 2) the manipulation of the back; 3) the osteotomies; and 4) grafting, specifying the material used.

This protocol included graphs in which the surgeon represented the procedures performed to correct the deformity (Figure 3: donated by Dr J. García Polo from Hospital La Paz, Madrid).

In our study, the functional outcome of the septoplasties was assessed by the same surgeon (LMR) one month after surgery through anterior rhinoscopy and nasofibrosco-

py. These were evaluated on the basis of the subjective sensation of the patient and, through the morphology of the nasal cavity as well, assuming that a sagittal and middle septum correspond to an adequate functional outcome.

In reference to the postoperative evaluation of the results of septorhinoplasties, the same assessment was carried out as well as a clinical examination and photographic documentation, 9 months after the intervention, to assess this type of surgery statically and functionally.

To conduct this study, we created a database including the study population variables using SPSS v.13 software. The analysis of results consists of a descriptive study and a comparative study of the variables: type of deformity, age, gender, prior surgery and postoperative results.

To establish the relationship among independent qualitative variables, we used Fisher's exact test. Sample

Date _____
 Surgeon _____

Informed consen
 Photographs

Analysis of the deformity:

Surgical plan:

TYPE <input type="checkbox"/> Primary <input type="checkbox"/> Review <input type="checkbox"/> Secondary <input type="checkbox"/> Partial	MEDIAL EDGE CRURA <input type="checkbox"/> Dome suture <input type="checkbox"/> Edge suture <input type="checkbox"/> Resection <input type="checkbox"/> Caudal margin <input type="checkbox"/> Vertical segment <input type="checkbox"/> Caudal edges <input type="checkbox"/> Other	BACK <input type="checkbox"/> Reduction <input type="checkbox"/> Increase <input type="checkbox"/> Height of naso-frontal angle <input type="checkbox"/> Increase <input type="checkbox"/> Deepen <input type="checkbox"/> Widen <input type="checkbox"/> Inserts <input type="checkbox"/> Other
APPROACH <input type="checkbox"/> Transcartilaginous <input type="checkbox"/> Delivery <input type="checkbox"/> Open <input type="checkbox"/> Other	REFINEMENT EDGE <input type="checkbox"/> Columella <input type="checkbox"/> Edge <input type="checkbox"/> Contour <input type="checkbox"/> "Plumping" <input type="checkbox"/> Insert in tip <input type="checkbox"/> Alar graft <input type="checkbox"/> Non-usual sutures <input type="checkbox"/> Resection caudal septum <input type="checkbox"/> Resection caudal base <input type="checkbox"/> Other	BONE PYRAMID <input type="checkbox"/> Middle-oblique osteotomies <input type="checkbox"/> Lateral osteotomies <input type="checkbox"/> Complete <input type="checkbox"/> Multiple <input type="checkbox"/> Unilateral <input type="checkbox"/> Percutaneous
LATERAL EDGE CRURA <input type="checkbox"/> Complete strip <input type="checkbox"/> Dome suture <input type="checkbox"/> In domes <input type="checkbox"/> Lateralized <input type="checkbox"/> Interruption <input type="checkbox"/> Medial <input type="checkbox"/> Lateral <input type="checkbox"/> Resection <input type="checkbox"/> Medial <input type="checkbox"/> Alar flap <input type="checkbox"/> Other	EFFECT EDGE <input type="checkbox"/> Increase projection <input type="checkbox"/> Decrease projection <input type="checkbox"/> Increase rotation <input type="checkbox"/> Long nose <input type="checkbox"/> Other	INSERTS <input type="checkbox"/> Septum <input type="checkbox"/> Rib <input type="checkbox"/> Auricular <input type="checkbox"/> Other
		VARIOUS <input type="checkbox"/> Septoplasty <input type="checkbox"/> Turbinoplasty <input type="checkbox"/> Mentoplasty <input type="checkbox"/> Closure of septal profile <input type="checkbox"/> Other

Notes:

Figure 2 Septorhinoplasty protocol.

differences were considered statistically significant when *P* values were less than .05.

Results

Of the 49 patients undergoing septoplasty, 36%⁸ showed a posterior deviation; 24%² a dislocation of the septal base; 18%⁹ an anterior deviation; 10%⁵ a dislocated base and a posterior deviation; and 6%³ an anteroposterior deviation (one patient presented a septal spur and another a collapse of the cartilaginous septum).

Primary surgery was carried out in 93% (46) and in 7% it was secondary surgery. The hemitransfixiant incision

was used in all patients. The upper tunnels were carried out in 98% (48) while the magic plane, the lower tunnels and the fifth tunnel were made in 38 (19), representing 36%⁸ and 32%¹⁶ respectively. The creation of the preseptal plane to completely uncover the anterior nasal spine was performed in only three patients. Finally, the creation of an intercolumnellar pocket to anchor the caudal edge of the septal cartilage took place in 24%² of the surgeries.

Regarding the chondrotomies, 98% (48) underwent a posterior vertical chondrotomy and 85% (42) an inferior horizontal. No patient underwent resection of the anterosuperior edge, while in 3 the caudal septal edge was sectioned. A superior chondrotomy was indicated in only 1 patient.

Figure 3 Graphs in which the surgeon represented the procedures performed to correct the deformity.

In 14% a posterior osteotomy was carried out in 3 patients; in addition to posterior osteotomy, an inferior one was also performed and only in 1 patient was it necessary to carry out an inferior osteotomy.

The most commonly used technique was osteochondral resection in 73% (36), although there were also cases of rotation-translation procedures in addition to resection; in 8% and in 3 patients, only incisions or rotations. A resection plus incision was used in 1 patient; in another, a graft plus rotation, and in 1 case, excision of a portion of the cartilage and its repositioning. On a more anecdotal level, 1 patient underwent a synechia between the septum and the middle turbinate.

The most commonly used type of suture was the transfixiant, in 93 % (46) of cases, while 3 patients underwent a hemitransfixiant suture. Silastic® was employed in 3 patients and the packing was made with gauze in all the septoplasties.

The frequencies of the most used surgical procedures of septoplasty are shown in Figure 4.

Referring to the septorhinoplasties, 36% (20) presented a deviated pyramid, ie, the 2 bones of the nose were deformed. In 25%⁴ there was a hump; in 20%¹¹ a nose in a "C" shape; in 5%³ a collapse of the back; 2 cases of "S" shape and 2 cases of lateralized pyramid, ie, one of the nasal bones that was longer than the other. In addition, there was a patient with fallen tip, one with a tensive nose and one with an osteochondral fragment.

The mode of surgery was primary in most of the operations (90% [49]) and secondary in 10%⁶. The incision used was the transcartilaginous in 94% (52), open in 2 cases and in one, hemitransfixiant.

Regarding tip surgery, 4 patients underwent resection of full strip of lateral crura. In one case the dome suture was medial and in another, lateralized. Complete section of the lateral crura was carried out in one intervention.

Resection of the caudal edges of the medial crura was performed on one patient and a graft at the top in another.

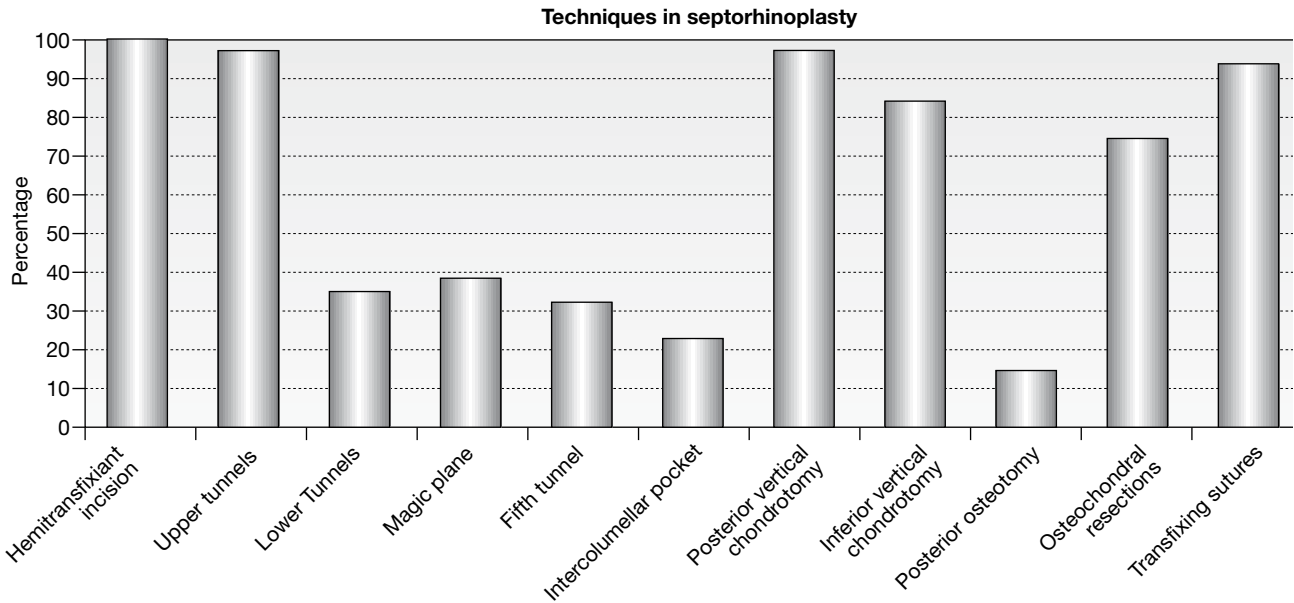


Figure 4 Percentage of the techniques used in septorhinoplasty.

The suture of the medial crura was not used in any case, and neither were refinements of the columella, alar grafts, or alar base resection.

Projection increase and tip rotation were achieved in 7% and 38% (21), respectively, and projection decrease in 2. The nasolabial angle variation was used as a reference to measure rotation, and for projection, the height of the nasal pyramid in the basal view.

Eighty percent of patients had a reduction of the back and one had an increase. No resections of the back were carried out in 10 septorhinoplasties.

Oblique middle osteotomies were performed in 76% (42) and full lateral osteotomies in 78% (43), performing a multiple lateral osteotomies in 1 case. Septal grafts were developed in 2 patients, and in 1, a graft of the ear to increase the back.

The frequency of the most used surgical maneuvers in septorhinoplasty is shown in Figure 5.

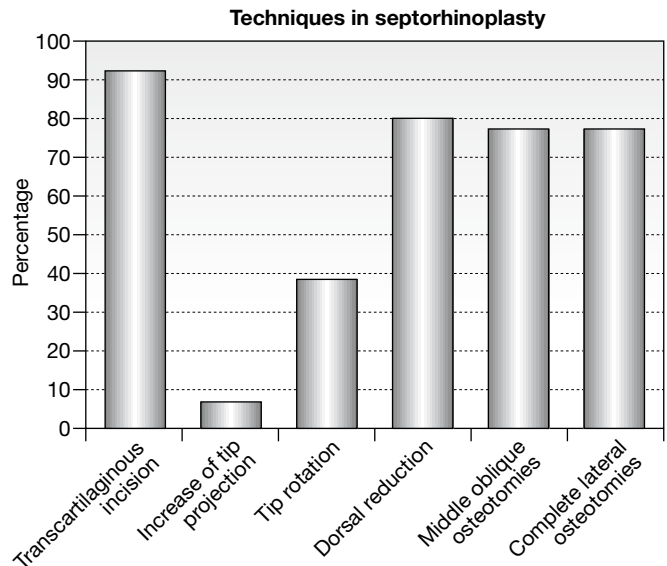


Figure 5 Percentage of the techniques used in septorhinoplasty.

Discussion

There is no ideal tool to evaluate septoplasty. Regarding the use of rhinomanometry and rhinometry for this purpose, although there is dispute about this subject, some authors argue that these tests are not definitive in predicting the results, since they do not always have a good correlation with the subjective feeling of the patient.¹⁻⁴

In any case, the fact of not carrying out an objective test that functionally tests flow and nasal volumes before and after surgery prevents us from evaluating these parameters in our study.

After performing septoplasty, the septum was centred in 91% (45) of the surgeries.

According to the medical literature reviewed, the success rate of septoplasty is between 63% and 85% depending on the method used to quantify the results.^{7,8,12-16}

In our work, we could not find statistically significant differences between the type of septal deviation and the results after septoplasty ($P=0.82$), probably due to the small number of patients for each type of deformity. In our study, a centered pyramid was obtained in 76% (42), with deviation persisting in thirteen patients, the hump in four and a small siver on the back in 5. However, in our daily practice, review surgery was only required in 7% of cases.

Equally, this success rate approaches that of the authors of the reviewed articles.^{17,18}

Neither did we reach statistical significance between the type of deformity of the nasal pyramid and the final condition after septorhinoplasty ($P=0.08$), although this can also be explained by the small sample size in each of the groups of the deformity variable.

Age, gender, and history of previous surgery did not appear to influence the outcome of the intervention, according to the articles surveyed.^{5,17}

However, in the present analysis, female gender and cases of secondary septorhinoplasty predict worse outcomes after surgery, with a statistical significance of $P=0.018$ and $P=0.042$, respectively.

By linking the different surgical procedures with the results of septorhinoplasty, we identified a lack of comparability, since the sample size of patients (although in principle it is high when compared with the literature) is insufficient for an analytical study.

It would be interesting, in the light of our results, to carry out subsequent studies that would enable comparison of surgical techniques and their variants with the postoperative status of patients; for such studies, the collaboration of services from other hospitals would be required to obtain sufficient sample sizes to perform the statistical comparisons.

Conclusion

Septopyramidal surgery seeks to achieve correct nose function and an aesthetic outcome. Based on the surgical principles of Cottle, other, more specific, techniques have been developed that are aimed towards the correction of various deformities.

Conflict of interests

The authors declare no conflict of interests.

Acknowledgments

Research Foundation of H.U. Dr. Peset of Valencia.

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