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RESEARCH ARTICLE

EXTERNAL RHINOPLASTY: ANALYSIS OF 50 CONSECUTIVE CASES.

Dhinakaran Natarajan, Saravanamuthu Subiah and Raghuram Nataraj.

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Abstract

The study presents a comprehensive statistical analysis of a series of 50 consecutive rhinoplasties of which 38 were primary and 12 were secondary cases. All cases were operated upon using the external rhinoplasty technique; simultaneous septal surgery was performed in 35 of the cases. Deformities of the upper two-thirds of the nose that occurred significantly more in the secondary cases included; dorsal hump dorsal saddling, dorsal irregularities, valve collapse, open roof deformities. In the lower third of the nose; secondary cases showed significantly higher incidences of tip over-rotation, tip asymmetry and retracted columella. Suturing techniques were used significantly more in primary cases, while in secondary cases grafting techniques were used significantly more. The complications encountered intra-operatively included; septal flap tears (2 cases) and alar cartilage injury (1 case), while post-operative complications included; nasal trauma (one case), epistaxis (1 case), infection (1 case), prolonged oedema (8 cases), and nasal obstruction (1 case). The overall patient satisfaction rate was 95 per cent and the transcolumellar scar was found to be unacceptable in none of the cases.

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Introduction:-

The modern era of rhinoplasty started in 1887 by using 'only' intranasal incisions.^{1,2} In the early 20s the columella appealed to surgeons as presenting the best avenue of approach to the nose and many authors described using external columellar incisions for rhinoplasty.³⁻⁵ However, it was not until 50 years later that Goodman⁶ revived, refined, and popular-ized the use of the external approach in rhinoplasty. Since then, a progressive increase in popularity of the external approach has been noted as evidenced by the huge number of publications discussing indications, modifications, advantages, and expanded applications of that approach.

On reviewing the rhinoplasty literature, numerous reports⁷⁻¹⁰ are found presenting valuable statistical analysis of large series of rhinoplasty cases that were operated upon using the closed approach, however, it is rare to find similar reports on external rhinoplasty.

The aim of the current study is to present a comprehensive statistical analysis of a series of 100 consecutive rhinoplasty cases operated upon using the external approach.

Patients and methods:-

A retrospective analysis was carried out of 50 consecutive external rhinoplasties performed in the Department of ENT, Govt. Rajaji Hospital and Madurai medical college, Madurai between May 2015 and April 2017. Of the 50

cases, 35 were females, with an average age of 25.3 years (range, 15.5–55), and 15 males, with an average age of 27.5 years (range, 17–45).

Of these cases 38 were primary rhinoplasties while 12 were secondary cases who had received one or more previous rhinoplasties.

The primary and secondary cases were reviewed and compared as regards duration of surgery, presenting nasal deformities, surgical techniques used, and complications encountered. The results were statistically analysed and any significant differences between both groups were calculated.

All cases were operated upon using the external rhinoplasty approach, where bilateral alar marginal incisions and an inverted V-shaped transcolumellar incision were used to expose the nasal bony cartilaginous framework. At completion of the necessary dorsal and tip modifications, the skin flap was redraped to its normal anatomical position and the external rhinoplasty incisions were closed starting with the transcolumellar incision which was closed in two layers using a deep 6/0 PDS transverse mattress suture to take the tension off the skin edge

Table 1:-Distribution of deformities of the upper two-thirds of the nose among primary and secondary cases. (*) significant at $p < 0.05$ Primary cases(n = 38)Secondary cases(n = 12)

Deformity	No.	%	No.	%	χ^2
Dorsal hump	27	71	4	33	4.02*
Dorsal saddle	3	8	5	42	5.43*
Dorsal deviation	18	21	4	33	0.271
Dorsal irregularities	10	26	8	67	4.813*
Wide bridge	26	68	6	50	0.663
Open roof	2	5	5	42	7.24*
Pollybeak	15	39	7	58	0.662
Valve collapse	2	5	4	33	4.406*

which were then approximated using interrupted 6/0 Prolene sutures. The marginal incisions were closed using 5/0 catgut interrupted sutures.

Post-operatively, a subjective evaluation of the degree of the patient's satisfaction was performed to assess the aesthetic as well as the functional outcome of surgery.

Results:-

Of the 50 cases included in this study; 38 (76 per cent) were primary cases and 12 (24 per cent) were revisions in patients who had had one or more previous rhinoplasties. The commonest deformities encountered in the upper two-thirds of the nose among primary cases were dorsal hump (71 per cent), wide bridge (68 per cent), and dorsal deviations (47 per cent). Mean-while among secondary cases, the commonest deformities were pollybeak (58 per cent), dorsal irregularities (67 per cent), wide bridge (50 per cent), and an open roof (67 per cent). On comparing the rate of occurrence of each deformity among the primary and secondary cases, it was found that the secondary cases showed a significantly higher incidence of dorsal saddling, dorsal irregularities, valve collapse and open roof. On the other hand, the only deformity that was significantly higher among primary cases was the dorsal hump.

The commonest deformities of the lower third of the nose among primary cases were bulbous tip (74 per cent), under-rotated tip (74 per cent), and hanging columella (48 per cent), while in secondary cases the commonest deformities were the under-projected tip (58 per cent), bulbous tip (58 per cent), and the under-rotated tip (58 per cent). The statistical analysis showed that secondary cases had a significantly higher incidence of tip over-rotation, tip asymmetry and retracted columella.

Surgical techniques:-

In primary cases, the surgical techniques depended mainly on the remodelling of the intact bony cartilaginous framework, as in lowering the nasaldorsum, or using alar cartilage suturing techniques.¹³⁻¹⁹

On the other hand, techniques that were used significantly more in secondary cases were those aiming at reconstruction and augmentation of the deficient nasal framework by various grafting techniques such as dorsal grafts, tip grafts,²⁰ spreader grafts,²¹ premaxillary grafts, medial crural struts, and lateral crural struts.²²

Grafting materials:-

Nasal grafts were used in 36 (72 per cent) of the cases. Autogenous cartilage was the graft of choice.

Table 2:-Distribution of deformities of the lower third of the nose among primary and secondary cases. (*) significant at $p < 0.05$ Primary cases (n = 38) Secondary cases (n = 12)

Deformity	No.	%	No.	%	X ²
Overprojected tip	12	32	2	17	0.402
Under-projected tip	17	45	7	58	0.241
Under-rotated tip	28	74	7	58	0.423
Over-rotated tip	2	5	4	33	4.406*
Bulbous tip	28	74	7	58	0.423
Tip asymmetry	8	21	7	58	4.63*
Hanging columella	18	47	4	33	0.271
Retracted columella	6	16	6	50	4.13*
Alar notching	2	5	2	17	0.434
Wide alar base	6	16	1	8	0.02

whenever available and it was used in 78 per cent of the grafted cases. The used autogenous cartilage was harvested from the nasal septum in 94 per cent of cases and from the auricle in six per cent. The second commonest graft material used was the irradiated cartilage homograft that was used in 15 per cent of the grafted cases; these were mostly revision cases in which insufficient autogenous cartilage was found. Mersiline mesh was the only alloplastic material used in this study; it was used in 14 per cent of the grafted cases mostly for dorsal or premaxillary augmentation.

Complications:-

Intra-operatively, septal flap tears were encountered in 2 cases during correction of major septal deviations. The tears occurred mostly at the apex of large impacted bony spurs or in cases of revision septal surgery. The inadvertent injury of the caudal border of the alar cartilage occurred in one revision case.

Early post-operative complications, within the first three weeks, included epistaxis that occurred in one within the first 48 hours. Nasal trauma in the early post-operative period occurred in one case. Post-operative infection occurred in one case.

The commonest late post-operative complication was the excessive and/or prolonged oedema of the nasal lobule that occurred in 8 cases (16 per cent), the incidence of such oedema was higher in cases with thick heavy nasal skin as well as in revision cases.

Table 3:-Operative and post-operative complications.

Complication	No. of cases (n = 50)	Percent
<i>Intra-operative</i>		
Septal flap tears	2	4
Alar cartilage injury	1	2
<i>Early post-operative</i>		
Major trauma	1	2
Epistaxis	1	2
Infection	1	2
<i>Late post-operative</i>		
Septal perforation	0	0
Nasal obstruction	1	2
Prolonged oedema	8	16

Unsatisfactory result	2	4
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Table 4:-Subjective evaluation of the surgical result.

	No. of cases (n = 50)	Percent
<i>Patient satisfaction</i>		
<i>Transcolumellar scar</i>		
Unnoticeable	48	96
Noticeable but acceptable	2	4
Unacceptable	0	0
<i>Aesthetic outcome</i>		
Very satisfied	43	86
Moderately satisfied	5	10
Unsatisfied	2	4
<i>Functional outcome</i>		
Improved	34	68
Unchanged	15	30
Worsened	1	2

On subjectively evaluating the scar of the transco-lumellar incision, 96 per cent (48 cases) of the patients found the scar to be unnoticeable, 4 per cent (2 cases) found the scar to be noticeable but acceptable, and none found it to be unacceptable.

Patients' satisfaction with the surgical outcome

Aesthetically, 48 cases (96 per cent) were satisfied by their aesthetic improvement, of these patients 86 per cent were very satisfied (their result met or exceeded their expectations) and 10 per cent were moderately satisfied (they would have hoped for more improvement but generally accepted their result and do not wish to have it revised). Finally, 2 patients (4 per cent) were unsatisfied with their result and underwent revision surgery. Functionally, 68 per cent reported that their breathing was improved, 30 per cent that it was unchanged, and one reported worsened by the operation.

Discussion:-

Selection of the approach to be used in a case of rhinoplasty should depend mainly on the nasal deformities present. The closed rhinoplasty approach can adequately handle most of the common straightforward nasal deformities such as a high dorsal hump, wide nasal bridge, and broad nasal tip. However, in more complex nasal deformities, the wide exposure provided by the external approach allows for more precise evaluation of the deformities and improves the surgical control over the corrective manoeuvres employed. In the current study, the exposure provided by the external approach had clear-cut advantages in correcting nasal tip deformities, straightening of crooked noses, proper placement and suture fixation of nasal grafts, as well as in revision rhinoplasties, which comprised 24 per cent of the cases.

The duration of surgery in revision cases was significantly more than in primary cases. This was mainly attributed to the difficulty encountered in the skin flap elevation as a result of the fibrosis and adhesions that obliterated the normal dissection planes. Additionally, the use of nasal grafts, which was significantly more in revision cases, required extra time to harvest, fashion, and suture the grafts in place.

On analysing the presenting nasal deformities, it was found that certain deformities occurred significantly more in revision cases (Tables I and II). These deformities can be aetiologically divided into two groups, the first of which is a direct result of over-resection or asymmetric excisions of the bony cartilaginous framework leading to deformities such as dorsal saddling, short over-rotated nose, open roof, and dorsal irregularities. The second group of deformities were healing related, due to excessive scarring or contracture forces that resulted in the distortion of the inadequately supported nasal framework, leading to deformities such as valve collapse, alar notching, columellar retraction, tip drop, tip asymmetries, and soft tissue pollybeak deformity. On reviewing the literature, most authors^{7,9,10,23} reported pollybeak to be the most common deformity in revision cases, while only a few^{8,24} found tip deformities to be the primary cause for revision. In the current study, the commonest deformities found in revision cases were pollybeak and dropped tip, followed by dorsal irregularities and bulbous tip. The pollybeak deformity

encountered in our cases was mainly secondary to the post-operative loss of tip projection due to inadequate tip support especially in cases with thick heavy nasal skin. Other factors that were found to contribute to the development of pollybeak included failure of the original surgeon to adequately lower the cartilaginous dorsum as well as excessive scarring in the supratip area. The dorsal irregularities in our revision cases were found to be due to multiple factors including comminuted nasal bones secondary to hump reduction or osteotomies, asymmetric excisions of upper lateral cartilages, and malpositioned or displaced dorsal grafts. Nasal grafts were used in 70 per cent of the cases with a significantly higher incidence in revision cases. Whenever available, autogenous septal cartilage was the graft of choice, followed by irradiated cartilage homograft that was used in 11 cases who were mostly revision cases in whom no useable septal cartilage was found. In these cases, using irradiated cartilage provided excellent structural support with no infection, extrusion, or resorption encountered throughout the full range of the follow-up period. The only alloplast used in this study was mersiline mesh that was used in 10 cases and provided excellent results with no significant resorption on long-term follow-up. The only complication associated with the use of mersiline mesh was infection that occurred in one of the cases and resolved only after removal of the mesh implant. This infection rate was greatly reduced by soaking the implant in antibiotic solution for a few minutes prior to insertion and by avoiding any communication between the implant pocket and the intranasal cavity.

Of the 36 cases that underwent septal surgery, inadvertent tears in the mucoperichondrial flap occurred in 2 cases; None of these tears resulted in septal perforations, as when-ever a tear occurred in one of the flaps, every effort was made to keep the contralateral flap intact, then the tear was sutured and a piece of cartilage was crushed and placed between the two flaps before mattressing the flaps together by a running 4/0 chromic suture.

Although it is virtually impossible to prepare the nose as a sterile field, the infection rates following septorhinoplasty are reported to be around three per cent.²⁵ This is mainly due to the excellent blood supply of the region. In the current study, post-operative infection occurred in one of the cases. Emergency treatment was started immediately to avoid local destruction of nasal cartilages, skin necrosis, or regional spread of infection. Such complications may not only be aesthetically devastating but also potentially life-threatening.

The infected case had mersiline mesh implants and the infection resolved only after removal of the mesh implant. Excessive and/or prolonged oedema of the nasal lobule was by far the commonest complication that occurred in 8(16 per cent) of the cases. The incidence was higher in cases with thick heavy nasal skin as well as in revision cases. Local injection with steroids (triamcinolone) proved very effective in the management of these cases, injected areas included the supratip, tip, and the columellar segment above the transcolumellar incision. The number of injections depended on the patient's response and ranged from one to five injections. To avoid complications, injections were never started before the sixth post-operative week, a minimum of three to four weeks was allowed before repeating the injection, the injection was done in the deep subcutaneous plane, and no concentration higher than 20 mg/cc was used in the first two months, however, higher concentrations were used later.

The cosmetic result of the transcolumellar scar was very favourable, as it was reported to be imperceptible in the vast majority of cases (96 per cent). This was mainly due to the meticulous multilayered closure of the incision. The scar was slightly raised in 2 case but eventually evened out with time, however, no keloid formation was encountered, not even in the four cases who had history of keloids elsewhere.

Regarding the aesthetic result of the operation, the overall satisfaction rate was 96 per cent. The remaining 4 per cent (2 patients) were unhappy with their results and required revision surgery to correct deformities such as dorsal irregularities, tip asymmetries, excessive columellar show, pollybeak, or columellar scar problems. These deformities were mostly corrected through the closed (endonasal) approach. As a general rule, one year was allowed before revising cases that were operated on elsewhere. However, a shorter interval was allowed for our personal revisions because of the minor nature of the required procedure and the complete knowledge of the previously used techniques.

Functionally, some authors reported the rate of persistent nasal obstruction following rhinoplasty to be as high as 10 per cent.²⁶ In the current study, this complication occurred in only one of the cases. This relatively low rate of post-operative nasal obstruction may be due to many factors; the first of which is that using the external approach eliminated the need for endonasal mucosal incisions that may have resulted in subsequent scarring and nasal obstruction especially if the nasal valve area was breached. Another important factor is that septoplasty was

combined with rhinoplasty to correct any minor septal deviations, even if they were asymptomatic pre-operatively, as such deviations may result in post-operative obstruction after narrowing the airway by hump reduction and/or infracturing the lateral walls by osteotomies. Finally, any necessary excisions of the upper or lower lateral cartilages were done in a very conservative manner to preserve the role of these cartilages in providing the structural support needed to avoid alar or nasal valve collapse.

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