Critical Choices in Rhinoplasty: A 20-Year Single-Surgeon Retrospective Review of 1000 Cases

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ABSTRACT

Objectives: Highlighting certain convictions, techniques and tactics that can be crucial to surgical outcome of rhinoplasty, as an attempt to define clearer indications for what's termed "aesthetic" rhinoplasty.

Methods: A 20-year single-surgeon review of 1000+ diverse rhinoplasties.

Results: Surgical outcome was satisfactory in 90-97% of post-traumatic rhinoplasties, and in 82-90% of aesthetic rhinoplasties. Complications were minimal. Differences of satisfactory results between post-traumatic and aesthetic cases were found to be statistically significant, and there was disparity in assessment of results between the author and the other surgeons' panel.

Conclusions: Like fingerprints and iris pattern, each human being has a unique shape of nose, related to (and inseparable from) the other facial features, and any attempt to impose geometric dimensions or mathematical beauty measures in such case is like squaring the circle; simply impossible. Each nose has a limit for change, and successful rhinoplasty is not only in imagining this particular limit; let alone achieving it, but successful rhinoplasty is when our imagination meets the patient's expectations, which is not more than a mere probability. The dilemma in figuring out a suitable "new look" for the nose, whether it is driven by an exact science or by the passion of plastic surgeons, can blur the thin red line between a justifiable rhinoplasty and a medical malpractice. Therefore, the most critical choice in rhinoplasty is the decision to do a rhinoplasty in the first place. The nose is undoubtedly the most significant facial feature. It characterizes shape and shapes character of the human being. So rhinoplasty is a Psychosurgery and the worst pitfall in practice of rhinoplasty is failing to realize that success and failure will always have equal chances.

Key Words: Rhinoplasty – Nose – Aesthetic.

INTRODUCTION

The shape of the nose has always conflicted mankind throughout history. Cyrano De Bergerac (Fig. 1) is an iconic example of how the shape of the nose can dictate the fate of a human being. He spent most of his life fighting for the honor of his nose (whenever somebody insulted it). He never confessed his love to his cousin Roxane until the very last moment before he died.

![Cyrano De Bergerac](image_url)

The reason why the nose of Michelangelo; the legendary artist of renaissance period, had different shapes in the available portraits could be because it had been badly crushed in a fight with his friend; Pietro Torrigiano, who became known in the art history as the artist who broke the nose of Michelangelo. That's probably why Michelangelo carved the nose of his famous statute of David with such a very strong dorsal line (Fig. 2).

![The Statue of David](image_url)
Some may question the nose of Nefertiti; the famous pharaoh queen that was taken as a logo by the Egyptian and the American societies of plastic surgeons, and whether it was really that beautiful, or it could actually be a hypocrisy or courtesy from the sculptor to his beloved queen, or merely his own sense of beauty, because it appeared like this only in her solitaire bust at Berlin Museum, but not in any of her other stone reliefs (Fig. 3).

Figure (4) depicts how Van Gogh frequently changed the shape of his nose in his self portraits, perhaps to emphasize the impact of the nose on the shape of the whole face, and on the social impression and even the character of the person.
A pleasant face is important for social interaction, employment, and overall functioning of the human being. The nose is the most prominent facial feature and undoubtedly the most influential on facial aesthetics; therefore it has become a frequently adjusted, reconstructed, and enhanced part of human anatomy. Nowadays, rhinoplasty is one of the most commonly performed plastic surgeries worldwide [1-6]. It can be classified into two main categories; reconstructive rhinoplasty (e.g. cleft-lip rhinoplasty, Post-traumatic rhinoplasty, etc...) and aesthetic rhinoplasty, and while reconstructive rhinoplasty has a clearly defined etiology/pathology and hence an unquestionable indication, there is no such clear etiology/pathology for what is considered as (“non-aesthetic”) nose. Aesthetic rhinoplasty is not a “treatment for a disease” as much as it is a voluntary alteration of the shape of the nose (and whole face) stemming from the person’s own will and according to his/her own personality, anatomic characteristics and expectations [2]. Therefore, aesthetic rhinoplasty remains a complex issue encompassed by multiple surgical and ethical dilemmas.

Rhinoplasty is a formidable surgical challenge, which entails sophisticated pre-operative planning, accurate choice of surgical approach, and proper execution of surgical techniques [7-10]. Nevertheless, success can never be guaranteed!

Through a retrospective review of 1000 rhinoplasty cases performed by single surgeon over a period of 20 years, this article aims to highlight certain convictions, techniques and tactics that can be crucial to surgical outcome, as an attempt to define clearer indications for what’s termed “aesthetic” rhinoplasty.

PATIENTS AND METHODS

Throughout the period from December 2001 to December 2021, 1000 patients with diverse nasal morphologic characteristics were subject to rhinoplasty surgery. Being a lifetime experience report, the methods described herein were not all adopted in each and every case of this series, but they represent the cumulative standard methodology of the author.

Pre-operative workup:

- Detailed history taking with emphasis on previous nasal trauma and/or surgery, and acquiring any available photos depicting patient's nose before previous trauma/surgery.
- Thorough psychological evaluation to explore/exclude any major psychosis and to judge the relative impact of the shape of the nose on the overall psychological state of the patient.
- Meticulous physical examination of nasal structure and air-flow.
- Standard facial photography in 7 views (frontal, worm eye, sky, right & left lateral 90º/45º) (Fig. 5A).
- Photography (and Video imaging) of nasal breathing to depict nasal valve and nostril functions (Fig. 6) (Video 1).
- Three-dimensional computerized tomography (3D-CT) of all tissue planes (skin to bone) in the same views of standard photography (Figs. 5B,7).
- Thoughtful analysis of patient's personality and adequate computer-assisted study of data (photography/3D-CT) to figure out the surgical plan (Fig. 7).
- Sufficient discussion with the patient regarding diagnosis (anatomical and functional characteristics), surgical expectations, and hence concluding to informed consent (with special stress on using photographs, possible complications, and absence of guarantee of getting the desired results).

Surgical workup:

- Open approach rhinoplasty (or septo-rhinoplasty) using “inverted V” trans-columellar incision was adopted in all cases (Fig. 8, Video 2).
- Usual planes of dissection were: Supra-perichondrial at outer surface of lateral cartilage areas, sub-perichondrial at nasal septum and inner surface of lateral cartilage areas, and sub-periosteal at the bony dorsum area.
- Techniques addressed to nasal septum included: Scoring, resection(s), suturing, overlapping, detachment and reinsertion of antero-caudal end ± trimming of anterior nasal spine, caudal extension graft, and extracorporeal septoplasty.
- Techniques addressed to bony dorsum included: Osteotome resection of hump (± rasping), lateral/medial/middle osteotomies (Figs. 9,10 and Videos 3,4), and overlay cartilage grafting.
- Techniques addressed to med-vault area included: Upper lateral cartilage separation from septum and nasal bones (± trimming of their medial and/or superior edges), spreader grafts/flaps (Fig. 11, video 5), overlay cartilage grafts, and lower lateral cartilage transposition flap (Fig. 12).
- Techniques addressed to lower third (nasal tip and base) area included: Cephalic trimming of
lateral crus of lower lateral cartilage and its reattachment to upper lateral cartilage at scroll area (Video 6), lateral/medial crural steal/overlay, overlay cartilage grafts, lower lateral cartilage turnover flap (Fig. 13), cartilage shaping sutures (intra-domal / inter-domal / inter-crural) (Fig. 14A,B,C and Video 7), intermediate crura incision and overlay (Fig. 14D, and Video 8), trimming of subcutaneous fibro-fatty tissue at nasal tip area, and alar/nostril skin resection (Fig. 15).

- Source for cartilage grafts was mainly conchal cartilage, but septal and rib cartilages were also used.
- Internal nasal packing by merocele soaked by steroid spray, and external molding by steri-strips and aluminum splint.

**Post-operative workup:**
- Nasal packs removed after 2-4 days, followed by steroid spray for 10-15 days, and external splint removed after 7-10 days.
- Subcutaneous injection of steroid was occasionally needed.
- The results were assessed by panel of surgeons; other than the author, through comparing pre and post operative sets of photographs, and judging results as satisfactory or unsatisfactory (panel was composed of 3 surgeons and result of each case was based on majority of votes). Patient satisfaction was also judged and reported by the author (by reading the look in the patients' eyes as detailed in the "discussion" section).
Fig. (7): Overlapping Clinical and 3D CT Pictures.

Fig. (8): Oben Approach View.

Fig. (9): Block Resection of Bony Hump "A", Sequence of Osteotomy Strokes "B", Swing of Lateral Osteotomy "C".
Fig. (10): Planning Multiple Osteotomies "B", Pre-operative "A", Post-operative "C".

Fig. (11): Closing Upper Lateral Cartilage in a Spreader Flap Fashion.

Fig. (12): Transposition of Cephalic Portion of Lower Lateral Cartilage (2 cases); (A): Pre-operative, (B): Intra-operative, (C): Post-operative.
RESULTS

A total of 1000 rhinoplasty operations were included in this study. Aesthetic rhinoplasty accounted for 835 (83.5%) of cases [750 (75%) primary rhinoplasty; 398 females and 352 males, and 85 (8.5%) revision rhinoplasty; 51 females and 34 males], while reconstructive rhinoplasty (post-traumatic) rhinoplasty accounted for 165 (16.5%) of cases; 63 females and 102 males. Rhinoplasty of cleft lip nose was excluded from this study and was published in 2015 by the same author as a separate series of 800 rhinoplasty cases.

The average age of patients at time of surgery was 24.3 in females and 25.8 in males.

The average duration of surgery was 3.1h in primary rhinoplasty, and 3.7h in revision and post-traumatic rhinoplasty.

Follow-up visits were routinely scheduled on 1, 3, 6, 12, 18 months after surgery (and/or on demand of patient concern or doctor request), and average follow-up period was around 10 years).

Complications were few and included minor skin excoriation from adhesive tapes (5 cases; healed spontaneously with no scars), mild to moderate surgical emphysema at cheek area (4 cases; resolved within a few days), and excessive hump resection with open roof deformity (2 cases; discontinued follow-up with the author).

Results were satisfactory to panel assessors in 97% of post-traumatic cases and in 90% of aesthetic cases, while the author assessed patient satisfaction to be 90-93% of post-traumatic cases and 82-85% of aesthetic cases. Differences of satisfactory results between post-traumatic and aesthetic cases were found to be statistically significant (p=0.03).

Fig. (16) depicts clinical results of some post-traumatic rhinoplasty cases. Fig. (17) depicts clinical results of some aesthetic rhinoplasty unsatisfied cases, and Figs. (18,19) depict clinical results of some aesthetic rhinoplasty satisfied cases.
Fig. (16): Clinical results of some post-traumatic rhinoplasty cases. (A): Pre-operative, (B): Post-operative.
Fig. (17): Clinical results of some aesthetic rhinoplasty "unsatisfied" cases. (A): Pre-operative, (B): Post-operative.
Fig. (18): Clinical results of some aesthetic rhinoplasty "satisfied cases". (A): Pre-operative, (B): Post-operative.
Fig. (19): Clinical results of some aesthetic rhinoplasty "satisfied" cases. (A): Pre-operative, (B): Post-operative.
DISCUSSION

Based on a retrospective study of methodology and results in 1000 cases of rhinoplasty, certain beliefs, techniques, and tactics are considered by the author to be crucial for success in rhinoplasty surgery. Some thoughts and decisions (choices) might considerably affect the ultimate outcome of rhinoplasty. These critical choices can be summarized herein.

The most pragmatic way to get around the conflicts of rhinoplasty types, pathologic classifications, or surgical indications, is to think of rhinoplasty patients as either one of two things; those patients who lost the original shape of their noses and want them back “on” their faces (the “nose on” group), and those patients who hate their original shape of their noses and want them “off” their faces (the “nose off” group). The reason for this distinction is that in the former group the indications are totally clear, the expectations of patient are absolutely real (not imaginary), so a successful rhinoplasty is quite possible, and patient satisfaction can be achieved. While in this later group, each human being has a unique shape of nose, related to (and inseparable from) the other facial features, and any attempt to impose geometric dimensions or mathematical beauty measures in such case is like squaring the circle; simply impossible. Each nose has a limit for change, and successful rhinoplasty is not only in imagining this particular limit; let alone achieving it, but successful rhinoplasty is when our imagination meets the patient’s expectations, which is not more than a mere probability. It’s not an exact science, it’s mostly art, and in art, beauty is in the eye of the beholder, so rhinoplasty is in the eye of the patient. The patients judge the result by their own eyes and we can see that judgment in their eyes. That’s how the author judged the satisfaction/dissatisfaction of patients (compare the look in patients’ eyes between Figs. (17-19). This also explains the disparity in assessment of results between the author and the other surgeons’ panel. Many patient-oriented questionnaires that measure outcome of rhinoplasty have been reported in literature, yet the author believes they can be biased by patients’ compliments to their surgeon especially when it is an unpaid surgical job; like it was the case for most of the patients in this review.

In pre-operative planning, computer-based simulations of anticipated results can be misleading to patients because it is impossible for a computer to simulate a unique handcraft of a particular surgeon for a unique tissue nature and healing forces of a particular patient. Instead, computer-assisted study of clinical and 3D CT pictures is very helpful tool (Fig. 5).

By overlapping the layers of the face and meditating them simultaneously (Fig. 7), we can add perspective to facial analysis and appreciate the relative share of each tissue element (bone, cartilage, muscles, skin, etc...) in the nasal form and nasal deformity, leading to better visual calculation of the required job.

Video imaging is a frequently underrated tool in pre-operative and postoperative analysis despite its value in providing comprehensive assessment of nasal morphology from all 360º views, and in providing solid documentation of nasal valve and nostril functions (Video 1) which is difficult to document by still images (Fig. 6).

Regarding surgical approach, the last decade witnessed significant advancement in knowledge of nasal anatomy, sophistication of nasal endoscopes and fine electric osteotomes and piezoelectric instruments, resulting in renewed interest and popularization of Cottle’s school of dorsal preservation (preservation rhinoplasty, let-down technique, push-down technique, etc...) [9,10,12] it may be more physiologic approach that provides more natural look and stable result, yet it is very demanding technically and financially, not suitable for all cases but actually limited to particular noses (tension nose with high radix and narrow middle and base), and no studies reported functional or patient satisfaction differences between preservation and structural rhinoplasty [13,14]. Some surgeons combine preservation with structured rhinoplasty and a recent interesting article introduced the term “sequential rhinoplasty” describing beginning the rhinoplasty operation by preservation technique and not uncommonly ending it with open technique to complete the mission [15,16]. Open approach is the author’s choice that was used for all patients in this series, to gain full control of nasal anatomy, a clear view of the cartilaginous skeleton in its resting anatomic position (Fig. 8, Video 2); retaining its natural dynamics; undistorted by the skin envelop or by retractors, resulting in accurate judgment of what exactly should be done to produce the desired effects. The complex cartilage shaping and suturing maneuvers are very hard to achieve without the wide exposure of the open approach, least to say is that the tip work can definitely be finer through the open approach.

For de-projecting the nasal bony dorsum; after resection of the required strip of septal cartilage
(± inferior and/or medial strips of upper lateral cartilage), block resection of the bone humpy by osteotome rather than piecemeal reduction by rasp is more precise for taking out the exact amount of bone that was determined on 3D CT in pre-operative planning (Fig. 9A, Video 3). Osteotomy is better controlled when done on both sides simultaneously rather than completing one side at a time (Fig. 9B), and also by changing the swing of osteotomy to be oblique and inward rather than directly upwards (Fig. 9C, Video 4).

Refining osteotomy techniques can be fundamental in cases like the one depicted in Fig. (14); when it was possible to plan multiple fine osteotomies between the fragments of the shattered nasal bridge and rebuild it without any kind of grafts.

Much of the final result depends on the step of shaping the lateral cartilages, because it is the most variable (and the most irreproducible) step. The need for resection and the design of those resections are different in each case and can also be different in the same case from side to side. After shaping the upper cartilage, it’s usually better to close it in a spreader flap fashion rather than directly. This is not only good for the function of nasal valve, but also good for the strength and shape of the mid vault (Fig. 11, Video 5).

The cephalic portion of lower lateral cartilages, which are very commonly trimmed, can alternatively be used as transposition flaps to correct mid-vault deficiency (Fig. 12), or as turnover flaps to correct alar cartilage concavity (Fig. 13).

Apart from the commonly adopted techniques of tip refinement (Video 7); including intra-domal suture (Fig. 14A), inter-domal suture (Fig. 14B), and inter-cural suture (Fig. 14C), the intermediate crura incision and overlap technique (Fig. 14D, Video 8) is a single incision that produces maximum compound effect on length, rotation and projection, with minimal disturbance of tip dynamics. It can correct asymmetries, and strengthens the columnella, thus averting the need for columnellar strut. Last but not least in the process of shaping lateral cartilage is to reestablish connection between upper and lower cartilages at the scroll area by sutures (Video 6).

The final surgical step, after closure of vestibular and trans-columellar wounds, is to judge the need for alar lobule and nostrils reduction (Fig. 15). It is the least desirable step to the author, because it may affect natural look and may lead to visible scar, and because it is the most sensitive step to errors regarding accuracy and symmetry, so it was usually not performed unless it was absolutely indicated or it was the main job in the case.

**Conclusion:**

Like fingerprints and iris pattern, each human being has a unique shape of nose, related to (and inseparable from) the other facial features, and any attempt to impose geometric dimensions or mathematical beauty measures in such case is like squaring the circle; simply impossible. Each nose has a limit for change, and successful rhinoplasty is not only in imagining this particular limit; let alone achieving it, but successful rhinoplasty is when our imagination meets the patient’s expectations, which is not more than a mere probability. The dilemma in figuring out a suitable “new look” for the nose, whether it is driven by scientific principles or by the passion of plastic surgeons, can blur the thin red line between a justifiable rhinoplasty and a medical malpractice. Therefore, the most critical choice in rhinoplasty is the decision to do a rhinoplasty in the first place. The nose is the most significant facial feature. It characterizes shape and shapes character of the human being. So rhinoplasty is a Psychosurgery and the worst pitfall in practice of rhinoplasty is failing to realize that success and failure will always have equal chances.

**REFERENCES**


