“Closed” Rhinoplasty: an Out-of-Date Procedure?
Luca D’Ascanio*

Abstract
The approach used by the founding fathers of rhinoplasty has incorrectly been called “closed” rhinoplasty, since the term “closed” suggests that the surgeon cannot see or access vital areas of the nose during surgery. The term “endonasal” more accurately describes this particular approach. However, with the advent of “open” or “external” septorhinoplasty in the late ’70s, the former “endonasal” techniques were progressively abandoned. “Open” rhinoplasty is the most commonly taught approach to residents in Otolaryngology, Plastic Surgery and Maxillo-Facial Surgery in western countries thanks to its advantages in terms of surgical exposure and consequent teaching/learning easiness. Furthermore, most medical literature now a days focuses on “open” procedure, thus making “closed” rhinoplasty appear an out-of-date approach not worthy to be learnt and developed. We describe the principles of “endonasal” rhinoplasty with respect to “open” approach, together with the present and potential future of such technique.

INTRODUCTION

Rhinoplasty is a fascinating and complex surgical procedure aiming at attaining a well-functioning and aesthetically pleasant nose. “Open” rhinoplasty is the most commonly taught approach to residents in Otolaryngology, Plastic Surgery and Maxillo-Facial Surgery in western countries thanks to its advantages in terms of surgical exposure and consequent teaching/learning easiness. Furthermore, most medical literature now a days focuses on “open” procedure, thus making “closed” rhinoplasty appear an out-of-date approach not worthy to be learnt and developed. Basing on such principles, the future of “endonasal” approach rhinoplasty seems the one of a minor “forgotten” surgical procedure, described only on books [1-6].

Jacques Joseph of Berlin pioneered modern rhinoseptoplasty in the early 20th-Century drawing inspiration from the experience of John Roe’s “endonasal” rhinoplasty. Joseph’s revolutionary approach was based on a fusion of “anatomy-based surgical techniques” and the “search for beauty characterizing modern facial plastic surgeons’ psychology. This revolutionary approach to rhinoplasty surgery found its way from Europe into the USA thanks to the work of Fomon, Aufricht, Kazanjian and others [1-3,7-9]. The approach used by these founding fathers of rhinoplasty has often, and incorrectly, been called “closed” rhinoplasty. The term “closed” is misleading since it suggests a blind approach to nasal structures. “Endonasal” rhinoplasty seems a much more appropriate term as it describes the surgical approach more accurately and is not weighed down by implications of unseen structures. At that time rhinoplasty surgery was mainly conceived and taught as reduction rhinoplasty, involving resection of the dorsal convexity, fairly aggressive management of the tip cartilages and shortening of the caudal lower third. The excessive removal of cartilages and support structures led to long-term problems and surgical stigmata. Despite its problems, the process of reducing the nose continued until the ’70s and formed a backdrop for the next big leap forward. The major change arrived in 1970 when Ivo F. Padovan, presented his paper on “external” approach rhinoplasty at the inaugural meeting of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPFR). Such approach was based on the incision proposed by Rethi (1929) as a modification of Gillies’ “elephant trunk” incision (1920) and further developed by Sercer (1958) in his “decoration” of the nose [1,8,10,11]. Canadian and later American surgeons soon realized the importance of Padovan’s work and soon adopted his technique. Within a few years, this revolutionary new approach, born in Europe, swept across the North American Continent, returned to Europe and established itself as the backbone of rhinoplasty education in many centers around the World.

In essence, “external” approach rhinoplasty allows the surgeon to visualize, assess, and modify the structures of the nose under an “open sky” [7,12,13]. Advantages of this “external” approach include full visualization of the operative field that allows the surgeon and assistant/traineer to appreciate the surgical steps, the ability to create minute changes to the tip, and a rarely visible columellar incision line [9]. The “deconstructed” nose is then reconstructed in order to regain its stability, usually with the aid of grafts held in place with sutures.

Rethinking the principles and lessons of “open” rhinoplasty

With the advent of “external” approach rhinoplasty and its meteoric rise, the vast majority of rhinoplasty surgeons were trained in this particular approach. However, since common experience shows no rhinoplasty technique is absolutely perfect for every scenario, a gradual appreciation of the problems associated with “open” rhinoplasty has entered our common experience [3]. The “external” approach proceeds through “destabilization” of the nose before it can be restructured into the desired shape with the use of grafts and non-reabsorbable sutures. This philosophy has led to the creation of an army of grafts, most of them not passing the test of time, to enable “nasal reconstruction”. However, several authors have underlined the reversible (displacement, warping, malposition, resorption, infection, extrusion, visible irregularities) and irreversible (soft-tissue deformation and atrophy) complications potentially related to grafts use [14,15] and requiring revision surgery.

In addition, one of the difficult problems frequently encountered by rhinoplasty surgeons is represented by revision surgery in septal cartilage-depleted patients. In this special category of patients, the septal cartilage had been removed for extensive grafting during primary “open” operation. Such a distinct lack of septal cartilage deprives the revision rhinoplasty surgeon from one of his most important reconstructive tools, obliging him to use various non-nasal tissues, like conchal or rib cartilage, which neither look, nor feel the same as indigenous nasal cartilage [7].

Moreover, the abundant use of grafts increases the stiffness of the nasal pyramid and tip. A nose must not only look good, but it must also feel like a natural nose rather than a rigid structure. Such stiffness is further increased by the use of non-reabsorbable sutures. Although suturing techniques with non-reabsorbable suture have the power to produce major changes in the shape and orientation of the lower lateral cartilages, they can also be too powerful in their effects and create an artificially rigid, “operated” looking nose. Other potential problems with the “external” approach include a longer period of tip-edema that many patients find undesirable as they wish to return to work as soon as possible, and the uncommon complaint of a visible columellar scar [15].

The “good sense” developed throughout a lifelong experience would lead us to agree with J. Tebbetts on primary rhinoplasty: if the most common tip deformities that present clinically in primary rhinoplasty require relatively small magnitude of movement or change for correction, then are there techniques for correction that can predictably accomplish these changes without structural disruption of the nose and without necessitating the variables involved with visible grafts? If such methods are available, could we not increase the predictability of primary tip rhinoplasty and decrease the necessity of reoperation [15] and potential litigation?

Most primary rhinoplasty patients complain about a large dorsal hump and an unsightly nasal tip. Neither of these two complaints really requires an “external” approach and can be dealt with adequately through an “endonasal” technique. For the majority of patients, who do not seek large changes in their nose, an “external” approach can be excessive. In addition, the vast majority of our patients and women in particular, do not ask for a broader nose, so the routine interposition of a cartilage spreader graft, as often performed during “open” rhinoplasty is not justified. Clearly, we are at a stage where a sober rethinking of the past decades has become imperative [7].

Perspectives on the principles and future of “endonasal” rhinoplasty

After a lifetime experience, almost all rhinoplasty surgeons would agree with Rollin Daniel, who starts his book “Mastering rhinoplasty” stating: “based on my25-year experience of practicing, teaching and writing about rhinoplasty surgery, I have come to the conclusion that we must simplify the rhinoplasty operation” [1]. Such simplification is one of the keys to obtain an aesthetically pleasing nose with the lowest risk of complications and need of surgical revision. The principle of “simplifying” is also considered in the long lasting debate between “closed” (“endonasal”) approach rhinoplasty and “open” (“transcolumellar”) rhinoplasty supporters. For both groups, the final purpose of rhinoplasty is a pleasing, natural nose with good breathing function: such result can be achieved with both the “endonasal” and “transcolumellar” approaches. “Open” rhinoplasty has become more and more popular in the last decades also thanks to its apparently more “simplicity” related to the superior anatomical exposure and control offered by this approach [9]. However, the inferior exposure of tip structures in “closed” rhinoplasties often has no relevant consequences during primary procedures or can be overcome with an “extended-incision” delivery technique [16], which can make anatomical visual control comparable to the one of “open” approach.

Moreover, modern surgery is continuously searching for minimally invasive techniques without visible scars, reduced surgical time, quicker postoperative healing, preservation of the natural anatomy and aesthetic appearance, and restoration of the physiologic elasticity of the operated structures. Basing on these principles, “closed” rhinoplasty seems extremely modern, since it allows the appropriate repositioning of nasal elements with modest anatomical modifications and minimal need of grafts. [17] The use of grafts in “closed” rhinoplasty, in fact, is substantially different from their application in “open” rhinoplasty. Such difference is mainly in primary rhinoplasties. According to Daniel, in “open” rhinoplasty grafts must be an integral part of the analysis and operative planning, not an intra operative necessity. In the “transcolumellar” approach, grafts have a “structural” role, thus becoming an essential part of the new modified anatomy of nasal structures: grafts are therefore used in almost all “open” rhinoplasties [4]. On the contrary, in “closed” procedures, grafts have a “defining” role and should be used only when necessary: preserving the skin integrity (and the “dynamic spring” function) of the columella enables an immediate assessment of the aesthetic effect provided by each surgical manner, which helps the surgeon realize the need of further intra operative refinements and grafts (“Sequential approach”) [17]. An example of the different “graft philosophy” in “closed” and “open” rhinoplasty can be represented by the columellar strut. I agree with Tebbetts on the possibility to attain tip projection, in most cases, with the
“simple” reshaping-suturing of nasal tip cartilaginous structures. In the “endonasal” approach, septal caudal edge and columella act as a pillar and represent a valid support for tip projection in most primary rhinoplasties without requiring columellar strut graft. On the contrary, the loss of tip support secondary to columellar incision (3.43 mm in “open” rhinoplasty vs 1.98 mm in “closed” approach) [5] makes it necessary to place a columellar strut in almost all “open” rhinoplasties in order to avoid tip deprojection a long time [5,15,17].

In conclusion, the aims of graft use in “closed” rhinoplasty can be summarized as follows: a) better definition of the result (already partially obtained with other procedures) in relation to an increase of tip projection; b) better definition of nasal tip rotation; c) modification and definition of the (acute) naso-labial angle; d) widening and definition of a (too deep) naso-frontal angle; e) defining the columellar “double break”; f) hiding minor irregularities of the dorsum after hump removal and osteotomies. Even though these aesthetic results can often be obtained without the use of grafts their employment enables to stress and better define these aesthetic elements [5,15,17].

Obviously revision surgery often requires grafts use in “closed” as in “open” approach, in relation to the defects to be corrected. Also grafts positioning and fixation in place is different in “endonasal” vs “transcolumellar” rhinoplasty: a graft should be laid in its bed as a hand in a glove [17]. The preservation of skin continuity in “closed” rhinoplasty allows to allocate the graft in a precise envelope pocket, which can keep it in place avoiding any graft distortion or displacement; if needed, the graft can be fixed to the nasal structures with reabsorbable sutures (differently from the non-reabsorbable sutures used in “open” rhinoplasty) [17].

Almost all types of grafts used in “open” rhinoplasty can be adopted in “endonasal” procedures: the “rail-spreader” (figures 1-5) has taught that even those grafts traditionally considered preprogrammed of “open” rhinoplasty, like “spreader” grafts, can be easily used in “endonasal” surgery [6,18]. Despite the difference in the material used (usually absorbable in “closed” vs non-reabsorbable in “open” rhinoplasty), the suturing techniques commonly employed for tip modeling in the “transcolumellar” approach can be easily adopted in the “endonasal” surgery as well (i.e. domal-binding, septocolumellar, lateral-crural spanning, after etc) [17]. According to “closed” rhinoplasty supporters, these principles are the main reasons to define the efficacy, higher “safety” and “result predictability” of the “endonasal” approach with regards to the “transcolumellar” one [6,17].

CONCLUSIONS
Lessons for the future and teachings to our trainees

As a surgeon practicing in the 21st Century, re-assessing dogmas passed down by generations of teachers, flexibility in thinking processes, and self-assessment are the foundations of progressive Rhinoplasty [7]. As junior surgeons learn their skills, they inevitably emulate their masters, and pass through a learning curve that leaves them feeling comfortable with a particular style of surgery. Re-learning the difficult techniques of rhinoplasty requires time and energy. However, if we are to make progress, the axioms of surgery must be revisited in the

Figure 1 The “rail spreader”. The trapezoid cartilage base and two cartilage strips are cut.

Figure 2 The 3-dimension “rail-spreader” graft is composed with reaps.

Figure 3a Patient candidate to revision rhinoplasty with a “rail-spreader” graft through a “closed” approach. Preoperative frontal (a) view.

Figure 3b Preoperative lateral (b) view.
light of current experience and scientific progress. At present, most rhinoplasty surgeons in North America and Europe use the “external” approach almost exclusively and would find a change in their practice difficult and time consuming.

In good hands, “external” approach rhinoplasty can achieve excellent results [3, 9, 19, 20]. Nevertheless, it is far from perfect. It proceeds through destabilisation of the nose, before it can be restructured into the desired shape with the use of non-reabsorbable sutures and grafts. However, the more “destructive” the technique, the higher is the number of “healing variables” potentially causing secondary defects. Since destructive tip-shaping techniques compromise tip support and projection and increase risks of secondary deformities, we should wonder if the same aesthetic result may be obtained with a less destructive approach [15]. Also the routine use of grafts in primary rhinoplasty, when normal anatomic structures could produce the same or better results, introduces unnecessary variables that the surgeon cannot control and may increase the reoperation rate [15].

This does not negate the achievements of the “external” rhinoplasty. However, a dialectical approach to the problems posed by rhinoplasty leads us towards flexibility in our technical choices, which are tailor-made for their construction of surface aesthetics in order to obtain what the patient has specifically asked us to achieve.

In experienced hands, both “open” and “closed” techniques are valid and enable to reach good results. In most primary rhinoplasties, the “endonasal” technique allows to obtain the result desired with a safe, faster and less invasive approach. It enables the surgeon to access and mould the septum [21], dorsum and tip through a variety of hemitransfixion, transfixion, intercartilagenous, infracartilagenous and intracartilagenous incisions, avoiding the remote possibility of a visible or undesirable scar. However, in case of revision surgery or complicated cases requiring multiple grafting and reconstruction, the advantages of the “transcolumellar” approach are paramount. We stand poised over a new era in rhinoplasty. Patient’s demands have become increasingly more detailed and exacting. Clearly, a dogmatic approach to rhinoplasty cannot form the basis of a progressive surgical practice that must reflect contemporary scientific research and practice [7]. Each rhinoplasty is a unique operation that reflects sober reflection, calculation, and discussion and must not be repeated for another patient. Simply repeating the same operation for every patient is no longer acceptable in current practice and must be strongly discouraged. A “complete” nasal surgeon should know the principles and procedures of both “open” and “endonasal” approaches, together with the respective pros and cons, and select the surgical approach on the basis of each case and personal experience. As a surgeon, one can never know enough and has to spend the rest of one’s life learning. Do not forget that the harder the work, the happier its results will make you!

ACKNOWLEDGEMENTS

The support of Drs. Marco Manzini and Alberto Scattolin is greatly acknowledged.

REFERENCES


