

Hybrid rhinoplasty: beyond the dichotomy of rhinoplasty techniques

La rinoplastica ibrida: oltre la dicotomia chiusa/aperta negli approcci della rinoplastica

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SUMMARY

Although rhinoplasty and the development of facial aesthetic criteria can be traced to several millennia, contemporary techniques have passed through a rapid evolutionary process in the past century^{1 2}. Although understanding human anatomy and the consequences of surgical excision occupied the minds of the founders of rhinoplasty, the process moved towards preservation of supporting structures, and maintaining the physiological functions of the nose. Initially, this endonasal approach created its own series of problems due to excessive tissue removal. External rhinoplasty provided a new impetus for growth in this field, and since its inception, has swung the pendulum of reconstruction firmly into its own sphere of influence. However, as no rhinoplasty technique holds all the answers, hybrid rhinoplasty seeks to combine the best achievements of 20th century rhinoplasty, from all schools of thought, in order to provide a safe, sensible and planned approach to the most demanding operation for the facial plastic surgeon.

KEY WORDS: Rhinoplasty • External • Endonasal • Closed • Hybrid approach

RIASSUNTO

Le tecniche di rinoplastica hanno conosciuto un'evoluzione tumultuosa nel corso degli ultimi due decenni del ventesimo secolo. Se nella mente dei fondatori della rinoplastica la comprensione delle basi anatomiche e delle conseguenze delle escissioni chirurgiche occupò un posto preminente, negli ultimi decenni del secolo scorso hanno avuto grande rilievo i concetti finalizzati alla preservazione delle strutture di sostegno allo scopo di mantenere la funzione ventilatoria del naso. La rinoplastica fino agli '80 del secolo scorso è stata prevalentemente approcciata con tecnica chiusa, e gli aspetti escissionali vi giocavano un ruolo prevalente. L'avvento della tecnica aperta ha avuto il grande merito di migliorare le conoscenze anatomiche e di inserire, sia in termini sia concettuali sia di tecnica operatoria, fondamentali elementi di ricostruzione del supporto indebolito dalle manovre chirurgiche. Nessuno dei due approcci è scevro da limiti nè contiene le risposte alle domande di un intervento di per sé unico e diverso da caso a caso. La rinoplastica ibrida, fondata sull'uso flessibile delle tecniche rese popolari dalla tecnica aperta – in primis suture e innesti – ma attuate per via endonasale, può essere il punto d'incontro delle due scuole di pensiero, essendo finalizzata ad un approccio "su misura" a quella che rappresenta la più complessa procedura della chirurgia plastica facciale.

PAROLE CHIAVE: Rinoplastica • Approccio aperto • Endonasale • Chiuso • Ibrido

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Introduction

Modern rhinoplasty started in the early part of the 20th century with the pioneering work of Jacques Joseph (1865-1934), a German surgeon who not only laid the foundations of reconstructive surgery, but who also had deep insight into the psychological needs of his patients. Understanding facial anatomy formed the basis of his rhinoplasty practice. This revolutionary approach to facial

plastic surgery, found its way from Europe to the USA thanks to the efforts of Fomon and others, who also promulgated the practice of surgery based on anatomical appreciation and research.

The approach used by these 'founding fathers' of rhinoplasty has often, and incorrectly, been called "closed" rhinoplasty. The term "closed" is profoundly misguided as it implies a blind approach to nasal structures, and should be laid to rest with many other misnomers in current prac-

tice. Endonasal rhinoplasty is a much more sensible term as it describes the surgical approach more accurately, and is not weighed down by implications of unseen structures, and guess work in the dark. Correct dissection of the nose, carried out in defined planes, and with due attention to important support structures, exposes every aspect of the nose for surgery in the vast majority of rhinoplasty patients.

In the first half of the 20th century, endonasal surgery often involved removal of excessive amounts of septum and cartilage. Killian's septoplasty involved submucous resection of large amounts of the septum. Initially, the short-term adverse effects of such an approach were not obvious. However, over time, it became apparent that this approach had major limitations. In the 1960s, Cottle introduced cartilage-sparing techniques. This led to a rethinking of rhinoplasty from reduction to conservation of the septum. Despite its problems, the process of reducing the nose continued until the 1970s and formed a backdrop for the next big leap forward.

In early 1970, Ivo F. Padovan, a surgeon from Zagreb, presented his external approach rhinoplasty at the first meeting of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS)³. Surgical techniques from Yugoslavia were not high on the agenda on an international level at the time; nevertheless, Canadian, and later American surgeons soon realized the importance of his work and adopted Padovan's techniques. The tidal wave of change soon swept across the North American continent and reached Europe. Since its advent, external approach rhinoplasty has been the workhorse in the hands of some of the best rhinoplasty surgeons, and formed the foundation of rhinoplasty teaching in the most renowned academic centres of excellence worldwide.

In essence, external approach rhinoplasty allows the surgeon to visualize, assess and modify the structures of the nose^{4,5}. This process involves deconstruction of the nose, and necessitates reconstruction to achieve its aims. Grafts form the backbone of this reconstructive procedure. These grafts are often held in place with sutures, and require a high degree of technical expertise to achieve excellent results. Proponents of the external approach often cite many other advantages to this type of surgery including the rarely visible columellar scar, full exposure of the operative field that allows the assistant or trainee surgeon to appreciate the surgical steps and meticulous alteration of tip cartilages⁶⁻⁸.

Unfortunately, no school of rhinoplasty is absolutely perfect for every scenario, otherwise, all surgeons would adopt a single approach and set of techniques. Students of surgery are often exposed to one technique only, and duplicate their mentor's methods. With time, they gain confidence in the technique they have been taught, and are reluctant to start another path, and go through another learning curve. In this manner, the foundations for stagna-

tion are strengthened with every generation, and surgical progress becomes less likely.

There are good reasons for reflection on rhinoplasty and its evolution in the past few decades. First, neither reduction rhinoplasty nor a purely external rhinoplasty has provided all the answers required in this field of surgery. In particular, the vast majority of aesthetic rhinoplasty surgeons do not wish to make large changes in the appearance of the nose. The commonest complaints, such as a large dorsal hump, or disproportionate tip, do not require an external approach for modification. The same results can be gained through an endonasal approach without the incumbent risks of prolonged tip oedema and multiple grafts to reconstruct the nose.

The number of grafts described for rhinoplasty now stretches into the distance and begs the questions about the necessity of such a plethora of materials and methods used for the reshaping of surface lines and shadows.

Grafting creates a large number of problems. The choice of graft material is essential as best results require adequate amounts of septum that have probably been removed during primary rhinoplasty. Pinna and rib are other options, but are mechanically different from the endogenous cartilage of the nose. While these grafts may be used to recreate surface aesthetics, they do not feel the same to the patient. Furthermore, grafts are difficult to hold in place and have been known to move with time, creating undesired results. They can be seen through skin, and create a rigid feel to a structure that has evolved to be semi-flexible. The terminal demise of the shield graft is a timely reminder of the pitfalls of routine grafting.

The aim of aesthetic rhinoplasty is to restore the subtle interaction of lines, proportions and a smooth light-shadow interplay. In other words, as long as these criteria are fulfilled by reconstruction of surface aesthetics, deeper anatomical anomalies do not necessarily need to be addressed. However, this does not mean that surface landmarks and lines are not a reflection of a deeper problem. In some patients, achieving correction of these surface anomalies requires a combined deep and superficial approach. Once seen in this light, the routine use of an external approach for every case becomes questionable.

Other potential problems with the external approach include a longer period of tip oedema and soft-tissue swelling. Facial plastic surgery has undergone major changes in the past two decades, and many operations are now carried out as day surgery. Patients look for shorter recovery periods and less evidence of facial surgery before returning to work.

Clearly, both the demands of facial plastic patients for shorter operations and periods of absence from work, combined with better understanding of surgical practice, acts as an impetus to constantly question our own practice and the teachings of our mentors, despite their past

achievements. Self-assessment and constant evaluation of results have led to the creation of a third way in rhinoplasty: a hybrid approach that seeks to combine the best elements of both.

Pre-operative work-up

The tortuous process of rhinoplasty starts and ends with detailed attention to the history and the patient's wish list for change. It forms the basis of a successful outcome. The techniques involved in patient communication can take many years to master and should initially be taught in medical school, and perfected in post-graduate years through continuous education. Whether using simple clinical questions or the latest edition of the SNOT questionnaire, history forms the foundation for all other steps in rhinoplasty. In aesthetic rhinoplasty, many patients present with rhinological symptoms in addition to cosmetic deformities. The rhinoplasty surgeon must be able to collect a comprehensive ENT history, and perform nasendoscopy with efficiency and ease. Photographic documentation of internal nasal pathology has now become routine in many rhinoplasty centres. Failure to pre-treat nasal pathology prior to aesthetic rhinoplasty will result in a disappointing outcome for patients as their nasal symptoms will continue despite surgery. Indeed, rhinoplasty can sometimes exacerbate pre-existing symptoms and create a major loss of trust in the surgeon.

During examination, particular attention should be given to the quality and texture of the soft-tissue envelope as this layer has a significant impact on the final result and can lead to major changes in pre-operative planning. Very thick skin and subcutaneous layers can dampen the external result of lower lateral cartilage (LLC) resection, and inherently weak or damaged cartilages may require strengthening through various means. Palpation of the nasal spine should also be carried out as it may elucidate one of the causes for an over-projected tip.

Facial photography should be carried out by the surgeon in a highly organized and systematic manner. The results of photography should be consistent in their colour quality and light exposure. Excellent texts by well-known authors have already described the ideal settings for photography and a detailed description of these criteria is beyond the scope of this discussion.

Before the patient leaves the office for the first time, the surgeon should have already established a good rapport, performed a full ENT and nasendoscopy examination, taken photographs to a very high standard, and requested ancillary investigations based on the patient's rhinological symptoms. No major decisions are ever made based on a single visit. Both the patient and surgeon now require time to fully appreciate the consequences of their meeting and form a plan for further discussion and planning. Patients cannot be expected to understand every aspect of

a detailed and often-difficult operation based on a single visit. For this reason, providing them with written literature, and possibly information on the Internet, gives them the chance to deliberate the possible results of their decision to alter their appearance.

The clinical photographs now form the basis for facial analysis. The hybrid rhinoplasty (HR) surgeon must strike a reasonable balance between measuring the seemingly unlimited number of angles and facial contours, and not obtaining enough information for the decision making process. In other words, facial analysis for rhinoplasty must have clinically-relevant applications that will have a bearing on operative planning. The frontal view provides basic information on facial proportions, and the subtle interplay of light and shadow on the nose. With the light shining from a central source, the midline of the nose should appear bright as it reflects the light back towards the camera. The borders with the lateral shadows signify the observed brow-dome lines (BDLs): a key landmark that is often skewed by an underlying crooked septum, and whose restoration forms one of the major tasks in re-establishing surface aesthetics. The brow-dome line starts at the medial head of the eyebrow, also called the mace's head, turns inferiorly, and in parallel with its partner from the other side, heads towards the dome of the LLCs. These two BDLs should ideally form the border of the light-shadow border. While the inferior aspect of the BDLs in females can end parallel to each other, it is not uncommon to notice a slight lateral divergence in males just before they reach the domes. The alar-columellar relationship, also dependent on the anatomy of the septum, has been compared the wings of a gull in flight. Its distortion can be a reflection of abnormal anatomy of the septum, LLC, columella, soft-tissue envelope or any combination of these factors.

The lateral photograph is a vital view as it provides information about key landmarks that must be reformed. These include the radix, nasion, maximal dorsal height, supratip area, pronasale and the effect of the depressor nasi septi muscle on the upper lip and tip position in the dynamic phase. There are several well-known formulae for the calculation of ideal rotation and projection; however, these must be analyzed within the framework of the nose under review. Facial analysis is not simply a mathematical formula: the face and nose are mobile structures whose dimensions must be considered as part of a dynamic, harmonious whole.

The base-radix, base and helicopter views form a triad designed to show the major abnormalities of the tip, alar-columellar relationship, alar flare, alar width and bony bridge width. In current practice, the hybrid rhinoplasty surgeon must be familiar with the range of racial features, as the variety of nasal tips, and ala, is truly staggering. One formula does not fit all cases.

The results of facial analysis create a list of nasal fea-

tures that are amenable to change, and sometimes suggest supplementary alterations to neighbouring structures that could assist in obtaining the desired results. A good example of such an extra procedure is chin implantation for retrognathia. These results and plans are conveyed to the patient during the second consultation. The surgeon then reconsiders the patient's wish list and compares it to the results of facial analysis. A tailor-made operation based on these desires for change and physical finds is then created for the patient. Each rhinoplasty becomes a unique operation that reflects sober reflection, calculation and discussion, and must not be repeated for another patient. Simply repeating the same operation on every patient is no longer acceptable in current practice and must be strongly discouraged.

Techniques of hybrid rhinoplasty

As a surgeon practicing in the 21st Century, re-assessing dogma passed down by generations of teachers, flexibility in thinking processes and self-assessment form the foundations of progressive rhinoplasty. As junior surgeons learn their skills, they inevitably emulate their teachers and pass through a learning curve that leaves them feeling comfortable with a particular style of surgery. Relearning the difficult techniques of rhinoplasty requires time and energy. However, if we are to make progress, the axioms of surgery must be re-visited in the light of current experience and scientific progress. At present, most rhinoplasty surgeons in North America use an external approach almost exclusively and would find a change in practice difficult and time consuming.

In good hands, external approach rhinoplasty can achieve excellent results⁹⁻¹². Nevertheless, it is far from perfect. Mentioning all the problems of this approach is both misleading and counterproductive. The general consensus amongst rhinoplasty surgeons points to greater tip oedema, longer recovery time, a plethora of grafting techniques and a small risk of a visible scar as some of the negative aspects of external rhinoplasty¹³. Conversely, a purely endonasal approach that only reduces support structures and leads to long-term adverse effects is equally undesirable. These problems associated with dogmatic surgery have set the background for a new, more balanced approach in the form of hybrid rhinoplasty (HR).

HR is not simply a reduction rhinoplasty under a new guise. Similarly, it does not negate the achievements of external rhinoplasty. A dialectical approach to the problems posed by rhinoplasty leads us towards flexibility in our technical choices that are individualized for the reconstruction of surface aesthetics, and obtaining what the patient has specifically asked us to achieve. Although HR deals with surface aesthetics, its range of techniques allows the surgeon to undertake major structural changes or create subtle effects when necessary.

The planning and photo-analysis results are displayed within eyesight of the surgeon and the assistant for constant monitoring. CT scans of paranasal sinuses must also be displayed for patients undergoing simultaneous endoscopic sinus surgery and HR. Every step of the operation is pre-determined, and followed meticulously. A major rethink in the middle of the operation points to poor facial analysis and planning, and should alert the surgeon toward greater self-appraisal.

Incisions and approaches

The issue of the initial incision is of vital importance in HR, and requires detailed attention¹⁴. As HR begins with an endonasal approach, the surgeon avoids the remote possibility of a visible or undesirable scar. Access to the septum and dorsum can be gained through a variety of hemitransfixion, intercartilagenous, intracartilagenous and infracartilagenous incisions.

At the beginning of the operation, a small volume of local anaesthetic with adrenaline is injected along the osteotomy lines, infraorbital nerve and hemitransfixion incision. The volume has to be kept low, as distortions of surface anatomy are particularly unhelpful in the final stages of surgery.

The intracartilagenous incision not only provides direct access to the desired point of access, but also for sculpting the scrolls as required. In about 60% of cases, grafts and sutures can also be used through the transcartilagenous approach. Such an "extended" transcartilagenous approach, allows for greater flexibility in dealing with complex tip problems and the recreation of surface aesthetics. Overall, about 20% of cases require a delivery approach, 15% are carried out through an infracartilagenous incision and 5% need a hemitransfixion incision for problems located in the midline, such as a saddle nose.

It must be emphasised that the approach on one side may be completely different from the other, as noses are usually asymmetric. Performing the same operation on both sides in such cases reflects poor pre-operative facial analysis. For example, one side may require an intercartilagenous approach laterally that becomes intracartilagenous medially, while the other only needs a margin incision. Short incisions designed to reconstruct important surface landmarks are of great practical value in HR. Also known as "slot" incisions, they may be used inferior to the LLC to recreate a natural looking ala through contour grafting, rim grafting, or the placement of lateral crura shaping sutures. Columellar slot incisions provide access for plumping, infra-tip grafts and columelloplasty.

Septal surgery

Septoplasty is fundamentally important for the final result, and can often be the most demanding part of the operation, especially in revision cases¹⁵. As the shape and size of the septum has a significant effect on surface

aesthetics, particular attention has to be paid to its anatomy¹⁶. The dorsum and caudal aspects of the septum form an extremely important area that must be treated with utmost respect. Any aggressive removal of cartilage in these two areas that roughly form an “L” shape leads to disastrous long-term results if not restored. The anatomy of the caudal septum also forms the basis of safe septoplasty. Particular attention must be paid to the three septal angles that are all amenable to surgical modification. The anterior septal angle is particularly important as some female patients desire to have a small supratip dip in this region. Very conservative removal of cartilage in this region is justifiable for this purpose. The intermediate angle is often neglected in rhinoplasty. Its removal results in a straight columella, and a very odd appearance on lateral views. This artificial appearance does not usually occur developmentally, and its presence points to one of the worst types of rhinoplasty stigma: an iatrogenic and ugly columella. If the septum needs to be trimmed back, as in a tension nose, the intermediate angle must be recreated to prevent this complication. This can be achieved by a precise trimming of the caudal septum. Sometimes the intermediate angle can be improved by gently crushed cartilages and placed in-situ through precisely placed pockets accessed through a small stab incision just posterior to the columella.

The posterior angle forms a very important joint with the spine and deserves special mention. Along with the “key-stone” area, it forms the second fulcrum of stability and should be treated with equal care. When harvesting cartilage from the septum, the source should be limited to an area posterior to the spine-posterior angle junction. In a tension nose, a larger amount of cartilage may be removed as a single piece that extends from the floor of the nose to the spine, intermediate and anterior angles. Operating on these areas can deproject the nose: an effect that might be desirable, but which must be carried out with careful planning. A posterior chondrotomy is an incision that starts inferiorly at the cartilaginous-bony septal junction, and can be extended superiorly towards the “key-stone” area, but never reaching it. The amount of deprojection gained is proportional to the length of the posterior chondrotomy: the longer the incision, the greater the deprojection gained in the long term. Surgery on the spine must also be considered in this regard. Pre-operative palpation of the nasal spine will give the surgeon some idea about length and symmetry of this structure. When excessively long, the spine can project the cartilaginous pyramid forward. It can be reduced in a number of ways. The aim should be to create a spine that is proportional to the amount of projection desired, and one that is symmetrical and capable of supporting the posterior angle. Asymmetry of the spine’s wings is not uncommon and must be addressed. Reduction and de-projection of the septum will not only reduce the amount of cartilage beneath the dorsum, but also have

an important effect on the overlying LLCs whose asymmetrical appearance can sometimes be attributed to septal malformation, rather than inherent deformity. By creating space inferiorly and posteriorly, the septum can be de-projected without resorting to major cartilage excision.

Tip surgery

HR of the tip is based on recreating surface aesthetics along with cartilage preservation. By preserving cartilage, the worst effects of reduction rhinoplasty are averted. Over the past 20 years two major practices in tip surgery rose in popularity, but have since diminished in their widespread acceptance. Placing multiple grafts in the tip is associated with problems: the source for grafting in many noses should be the septum; however, in revision cases, the septum is often missing. Conchal cartilage and rib neither look, feel nor behave like the LLCs. Rib grafts in particular can lead to a rigid tip, which is normally a semi-flexible structure. Other problems with tip grafting, specially shield grafts, include their visibility with thinner soft-tissue envelopes, and displacement with time. A nose looks beautiful when its surface lines and curves comply with aesthetic criteria. This can be achieved by placing gently crushed cartilage in precise pockets rather than resorting to large grafts. A certain amount of experience is necessary in deciding exactly how much crushed cartilage to use, and how to create precise pockets, but this technique circumvents the most glaring problems associated with older graft techniques. Suturing the LLCs also came into vogue, had its heyday and is currently undergoing a slow demise, as the results are often too severe. Pulling the LLCs into various shapes with permanent sutures can lead to an iatrogenic nose, and have undesirable features such as sharp angles, a “uni-tip” and alar notching. Increasingly, patients are demanding a natural, non-operated look. Although suturing techniques have the power to produce major changes in the shape and orientation of the LLC, they can also be too powerful in their effects and create a stereotypically “operated” looking nose. Despite their setbacks, sutures can also be used to good effect. Examples of useful suturing techniques in HR include the septo-columellar sutures (“wonderbra” and “anti-wonderbra” sutures to control tip rotation), basiocolumellar, tongue-in-groove and subdomal sutures, each providing unique opportunities for tip repositioning without harsh effects.

Other techniques that have significant effects on surface aesthetics include sculpting of the scroll area, and tip SMAS thinning. An intercartilagenous incision placed laterally and drawn medially to become an intracartilagenous incision gives direct access to the scroll area that can be modified to give the distance between the lower border of the ULCs and the upper border of the LLCs a more sculpted appearance. Reducing the SMAS should only be attempted by the highly experienced surgeon and remain conservative in its extent. Access can be gained

though a marginal incision, an instead of following a supra-perichondrial plane, the surgeon continues into the SMAS and removes a small amount of soft tissue under direct visual control.

Mid-nose surgery

Whenever possible, maintaining the integrity of the septolateral cartilage forms one of the fundamental axioms of HR. The treatment of a high vault in a tension nose has often been approached by the dogmatic and routine splitting of the ULCs from their parent septum. Once the junction of the ULC and the septum has been cut, the standard teaching has been that it then needs to be immediately reconstructed with cartilage. This new triple layer sandwich (ULC-graft-septum) is then held together with permanent sutures. The evidence for spreader grafts or auto-spreader technique¹⁷. Restoring nasal airflow is not firmly established, and the addition of cartilage in this area can broaden the middle nasal vault: a rare request on behalf of primary aesthetic rhinoplasty patients.

In HR, the vital area of the internal valve is not disturbed. Sometimes in humpectomy, the junction of the ULC and the septum is excised, although this is not a routine step and is best avoided in order to maintain the anatomical continuity of the internal valve angle. A few decades ago, Robin, a French surgeon, introduced the idea of creating submucosal tunnels in the region of the ULC-septum junction. In HR, this technique is implemented bilaterally if necessary, especially in case of tension nose. The current thinking on this issue is that these redundant folds of mucosa between the transected medial end of the ULC and the septum create a spreader effect. The very rare occurrence of pinched cartilaginous vault and inverted-V appearance as long-term complications may be interpreted as objective evidence for this clinical impression. The vast majority of our patients, and women in particular, do not want to have a broader nose, so the routine interposition of a cartilage spreader graft is not justified.

Osteotomies

The preoperative planning of HR, tailor-made for the patient, will have detailed information on the type and number of osteotomies. Correct assistance in supplying hammer blows are very important and require mention. The mallet should hit the osteotome at 90° in order to ensure a level cutting plane. If the strikes are at angles that vary from the perpendicular, the tip of the osteotome will not progress in a level plane and veer off course. The first blow of the mallet should be gentler and allow the tip of the freshly sharpened instrument to engage the bone. The second and more forceful blow will then glide the tip along a pre-determined path. All osteotomies and chisels must be sharpened for each operation as blunt instruments shatter bone rather than cut through it.

As the vast majority of noses in rhinoplasty are asymmetric, osteotomies should reflect this finding. Asymmetrically placed osteotomies seek to redress the balance of unequal lateral nasal walls and at times may require several on each side, in paramedian planes to mobilise previously deformed bones. Intermediate osteotomies, whether single or double are particularly useful in treating twisted noses. At times, a single osteotomy alone may be sufficient to achieve the desired result. Conversely, on rare occasions, multiple osteotomies on both sides should be performed by an experienced HR surgeon.

Grafting procedures

The use of grafts to restabilize the nose after an external approach rhinoplasty has had substantial influence on the practice of rhinoplasty over the past 30 years. An external approach proceeds through destabilization of the nose before it can be restructured into the desired shape with grafts. The use of grafts has evolved over the past 30 years. While grafts are not a panacea, their judicious use in HR provides a bridge between the often-competing worlds of endonasal and external rhinoplasty. The basic difference in HR grafting lies in the purpose of the graft itself. In HR, grafts are not used to regain the structural integrity of the nose, as this has not been breached or damaged in the first place. Rather, HR grafts are employed to help recreate surface aesthetic lines, soften contours, and create the “not-operated”, naturally-beautiful nose that is the aim of rhinoplasty¹⁸.

Allograft and alloplastic materials are not used in HR. Instead, preference is given to the most useful material for graft harvesting, namely the septal cartilage. For this reason, all septoplasties should include a serious attempt by the rhinoplasty surgeon to conserve as much cartilage as possible. While the removal of small amounts of septal cartilage is often necessary, due attention must also be paid to the role of the spine and the maxillary crest in providing room for maneuverability. Many patients have had a less than desirable rhinoplasty in ‘Saint Elsewhere Hospital’, and want to regain their natural look or simply repair the damage that has been done. In these cases, the lack of adequate septal cartilage as graft material may force the HR surgeon to obtain conchal or rib cartilage: these materials are greatly inferior to the septum as their mechanical properties are different to the septal dorsum and the LLC. The best material for grafting nasal cartilage is the septal cartilage itself.

Septal cartilage may be used for structural reconstruction of the septum, as an onlay graft for dorsal defects, columellar struts or batten grafts; alternatively, it may also be utilized for contouring surfaces. Common HR grafts include: dome and vault onlay, rim and radix, batten and strut grafts.

Final touch-ups

By the end of the operation, the septum, tip and osteotomies have been dealt with in detail, and always in keeping with the desired result. Nevertheless, final touches are at times necessary. Alar base management is left for the end of the operation²⁰. A final checklist should include revisiting the game plan, and reviewing the most important aspect of rhinoplasty such as the new brow-dome lines, tip position, columellar configuration, osteotomies and lateral profile. Small deficiencies can be filled with gently crushed cartilage. By the end of the operation, the nose is a structurally sound structure that will not deteriorate over time due to poor supports. The new nose complies with the patient's wishes, and has a new set of surface aesthetics that reflect the results of facial analysis.

Conclusions

Progress in rhinoplasty over the past 100 years has changed direction several times due to our evolving knowledge of human anatomy, physiology and the effects of surgical intervention. This process requires continuous self-examination, and must attend the increasingly sophisticated and complex wishes of our patients. Once the tyranny of dogma has been overcome, growth in this field can continue. Hybrid rhinoplasty seeks to redress the balance between the two great, and often competing, approaches to a very difficult operation, maintain the structural integrity of the nose and reestablish surface aesthetics criteria without resorting to a plethora of grafts, and create a solid, functioning, aesthetically pleasing result for the patient and the surgeon¹⁹. After all, the end goal of aesthetic surgery remains an absolutely natural-looking and beautiful nose.



Fig. 1. Young female patient complaining of nasal hump as the main aesthetic concern. Operation summary: 1. Endoscopic septoplasty and septal cartilage harvesting. 2. Intercartilaginous approach, asymmetric retrograde trimming of cephalic lower lateral cartilages. 3. Humpectomy through "extramucosal" approach. 4. Onlay cartilaginous graft over left dome through left vestibular "stab" incision. 5. Bilateral rim grafts. 6. High-low-high basal osteotomies and infrafracture. 7. Contouring of the infratip through composite excision of vestibular/skin and septal cartilage. 8. Tongue-in-groove suture. (Above: pre-operative views, below: post-operative views).



Fig. 2. Post-rhinoplasty deformity. Young adult female revision rhinoplasty patient with poly tip, twisted tip, ACR (Alar Columellar Relationship) asymmetry, lateral crura asymmetry, poorly defined nasion. Operation summary: 1. Septoplasty – Perpendicular plate osteotomy – Harvest cartilage. 2. Narrowing of the base of the columella – creation of intracolumellar pocket. 3. Endonasal delivery approach. 4. Asymmetric (> on the right) excision of the cephalic borders. 5. Excision of the cartilaginous poly tip. 6. Rasping of the bony dorsum – Smoothing of the bony rails. 7. Osteotomies (basal – straight paramedian – backfracture). 8. Domes-defining sutures. 9. Wedge-shaped shortening of the caudal septal vestibular skin. 10. Suture-fixation of the caudal septum inside the columellar pocket. 11. Tongue-in-groove suture. 12. Subdomal suture. 13. Pedestal narrowing suture. (Above: pre-operative views, below: post-operative views).

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Fig. 3. Post-rhinoplasty deformity. Adult female revision rhinoplasty patient with a twisted nose, wide and amorphous middle third, hanging columella, alar-cheek junction asymmetry, high and irregular profile line. Operation summary: 1. Septoplasty and septal cartilage harvesting, caudal septum shortening. 2. Columelloplasty. 3. Asymmetric cephalic excisions of lower lateral cartilages & scrolls excision. 4. Shaving of the bony-cartilaginous hump. 5. Shaving of the left cartilaginous vault. 6. Left bony vault rasping. 7. High-low-high basal osteotomies & infrafracture. 8. Intermediate osteotomies. 9. Dorsal onlay "contour" grafts. 10. Septo-columellar "Wonderbra" suture. (Above: pre-operative views, below: post-operative views).

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