

## Why do I favour the endonasal approach?

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**Abstract.** The endonasal approach to rhinoplasty can deal adequately with the vast majority of nasal problems that present to the facial plastic surgeon. Adequate training of surgeons can overcome the rigid dichotomy of “endonasal” versus “external” approaches and pave the way for a combination of the best of both worlds towards the concept of hybrid rhinoplasty.

### Introduction

#### *Historical perspective*

The practice of rhinoplasty can be traced back to at least 600 BC in India. While Sushruta created an elegant method for reconstructing major defects of the nose,<sup>1</sup> this knowledge did not transfer to the West and the development of rhinoplasty had to wait until the 20<sup>th</sup> century. Since the pioneering work of Jacques Joseph, two major categories of septorhinoplasty have emerged. Initially, the septum and the supporting cartilages of the nose were tackled without exposing the nasal dorsum to direct vision. This technique gained the unfortunate and incorrect name of “closed” rhinoplasty, as if the cartilages could not be seen or manipulated. The current term is “endonasal” septorhinoplasty; it describes this technique adequately and the term “closed” should no longer be used. The advent of “open” or “external” septorhinoplasty led to the almost total abandonment of the older endonasal techniques, especially in the USA. By the end

of the 20<sup>th</sup> century, it became apparent that the pendulum had swung too far in favour of the external approach and that the vast majority of patients would benefit from endonasal surgery.

#### *Rhinoplasty in the modern era*

Jacques Joseph is considered by many to be the father of modern cosmetic surgery. His *Nasal Plastic Surgery and Other Facial Reconstructive Procedures*, published in 1931, became a cornerstone of modern plastic surgical practice. Under his tutelage, the endonasal technique became the standard for surgery in the first half of the 20<sup>th</sup> century. Joseph very quickly realised that patient satisfaction can be achieved through an adequate understanding of the patient’s desires and that plastic surgery acts on the patient’s psyche.<sup>2</sup>

These basic principles have remained with us since his innovative days in Berlin. An American anatomist, Samuel Fomon, travelled to Berlin and learnt Joseph’s techniques. He brought the new ideas to the USA, and was

instrumental in disseminating them. Further progress became possible following the pioneering work of Irvin Goldman who, in his landmark paper of 1957, described the division and reconstitution of the domes as a means of refining the tip. His aim was to create a predictable way of altering the lower lateral cartilages without having to rely on post-operative fibrosis in conjunction with horizontal excision as a means of achieving a change in the nasal tip. Although later modified by Simons and Adamson, his basic ideas have resonated into the 21<sup>st</sup> century.<sup>3</sup>

By the beginning of the 20<sup>th</sup> century, Killian had described the sub-mucous resection of the septum. This technique included resecting significant amounts of septal cartilage and leaving a dorsal and anterior strut behind. With time it became apparent that large resections of cartilage could lead to a loss of dorsal height and saddle nose deformity. Further progress was made with the arrival of Cottle’s technique that sought to preserve cartilage, blood flow through intact submucoperichondrial flaps, and to release the

cartilage from the posterior tethering points. With this "maxilla-premaxilla" approach to septoplasty, Cottle and Loring presented their case for a more conservative technique by the late 1950s.<sup>4</sup> In Europe, Cottle's techniques superseded Killian's submucous resection. However, with time, his work, and that of the members of the "Cottle School" such as Huizing, Masing, Sulsenti, Guillen and Montserrat-Viladiu, went into gradual decline. By contrast, Joseph's approach to septorhinoplasty gained enormous popularity and acquired even more exposure through the pioneering work of Bull, Jost, Kastenbauer, and Ponti. Owing to the ingenious and innovative approaches of these ENT surgeons, septorhinoplasty made great strides in the 20<sup>th</sup> century.

As the endonasal technique was the only way of operating on noses at the time, plastic surgeons were trained solely in this approach. Soon, the principles of reduction were applied universally to all septorhinoplasty patients. This resulted in unfortunate deformities that were both apparent and widely recognised, such as bossa, notching, and "inverted-V" deformities. The time had come for a significant change in practice.

In the spring of 1970, Ivo F. Padovan presented his external approach technique for septorhinoplasty to the first international conference of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS).<sup>5,6</sup> Although highly innovative, his work did not lead to a change in practice until other ENT/facial plastic surgeons from Canada and the USA presented their results using the new external approach. By the mid-1980s,

the pendulum had swung firmly to the side of the external approach. While the external approach provides for direct visualisation of nasal structures under "an open sky" or "ciel ouvert," it was also felt to be a superior teaching tool for the appreciation of anatomical structures, or to be better for handling complex nasal deformities. The overwhelming emphasis on the external approach led to the underexposure of trainees to the misnamed "closed" technique.<sup>7-9</sup>

Proponents of the external approach often cite as advantages the improved diagnosis of deformities through the direct inspection of the cartilages during the operation, and its superiority as a teaching tool.<sup>9</sup> However, this approach to septorhinoplasty may result in the inadequate pre-operative analysis of the nose. While the more junior surgeon may rely on intra-operative analysis for planning the procedure, the more experienced surgeon appreciates that plans for surgical intervention should have already been meticulously formulated pre-operatively. Furthermore, with the availability of teaching courses on cadaveric specimens it seems hardly justifiable to jeopardise the stability of supporting nasal structures just for the sake of teaching trainees. The teaching of septorhinoplasty techniques only cannot justify the open approach. Other claims for the advantages of external septorhinoplasty include the possibility of a lower revision rate. However, a closer look at the statistics of such claims show that they are uncertain.<sup>10-12</sup>

A survey by Kanodia and Dayan of all American Academy of Facial Plastic Surgery graduates from 1997-2007 has shown that the majority of surgeons are

being exposed only to the external approach. Upon starting their careers, almost 90% would practice the external approach only for their primary cases. This has led to many patients receiving too much surgery for small problems. Given the numerous potential problems involved in the external approach, it seems clear that rhinoplasty surgeons need to rethink this approach and include the endonasal technique in their armamentarium.

### *Time for change*

Over the past twenty years, there has been a significant shift in the management of surgical patients.<sup>13</sup> Lengthy operative times generate an appreciable economic burden for health-care providers and patients. Following the recent global economic downturn, reducing surgical costs has become an important issue. Patients are not only demanding shorter hospital stays, they are moving towards smaller, less invasive procedures and this has, in turn, led to a reduction in demand for cosmetic surgery.<sup>14</sup> Following admission to hospital, the patient not only has to face several days of lost earnings but also, in many cases, losses in paid annual leave and general productivity. Many hospitals and health-care providers are therefore seeking to reduce the length of stay in hospital by turning to less invasive operations that can provide the same results.

The trend towards day-case surgery in Europe has mirrored developments in the USA, but has not become firmly established. In 1992, the Royal College of Surgeons in England published its Guidelines for Day Case Surgery. Following its recommendations, many day-case units have been

established in the UK, and the proportion of operations carried out as day-case procedures has increased. Similar trends have been noted in Western European countries. Pressure is now growing on many surgical units to perform septorhinoplasty as a day-case procedure. While the percentage of septorhinoplasty cases discharged on the same day is still small, the trend is changing. A key factor that can bring about this change is to perform most, if not all, cases of septorhinoplasty using the endonasal technique.

In order to restore the pre-eminence of the endonasal technique, and therefore reduce hospital and patient costs, many changes to current practice need to be considered. First, a revolution is required in surgeon training in this field. In the early 1970s, the external approach became firmly established, in part as a valuable teaching tool, and it became so popular that many surgeons now routinely use this technique for most of their patients. As a result, their trainees have poor access and exposure to the endonasal approach and perpetuate the same methods as their predecessors. In addition, the external approach provides the novice surgeon with a less taxing method for the direct visualisation of nasal deformities. In the highly competitive and risky field of septorhinoplasty surgery, the younger surgeon will seek refuge in this technique rather than attempt the more demanding analysis and techniques involved in the endonasal approach.

As a result, many patients undergo excessive surgery and, potentially, the negative repercussions. Over-manipulation of the nose, which can involve the almost routine removal of the sep-

tal cartilage for grafting purposes, the loss of structural support, and the potential for visibility of the external scar, may lead to detrimental long-term results and unhappy patients, and greatly increase the need for revision septorhinoplasty. In turn, this leads to a pool of patients seeking advice from more senior surgeons who, despite their best efforts, may not be able to reverse the problems caused by previous surgery. In effect, the excessive use of the external technique creates an unnecessary workload for rhinoplasty surgeons, renders important support structures unstable, and pushes up spiralling costs for patients and health-care providers.

While the external approach has gained immense popularity in the USA and some parts of Europe, its dominance has led to several glaring problems. During an external septorhinoplasty, the novice surgeon has almost total visualisation of the nasal structures and is able to deal with deformities without adequate prior analysis of the nose. With time, this practice can result in less rigorous pre-operative analysis by the surgeon and therefore lower surgery standards. While many patients do not wish for major changes in their nose, the external approach leads to excessively large or prolonged surgery for small problems that can be dealt with adequately with the endonasal approach. The destabilisation of major and minor support structures of the nose lead to the almost compulsory use of reconstructive techniques and obligatory grafting. The loss of cartilage from the septum leads to major long-term problems, such as further deformity. During revision surgery for this particular defect, septal cartilage is the best mate-

rial, but the shortage of this material forces surgeons to look for second-best options such as concha or rib. This can in turn lead to donor site morbidity. The reconstructed nose can be rigid and static, and feel unnatural to the patient, almost like another person's nose in place of their own.<sup>15</sup> The novice surgeon's external approach exposes a lot of anatomy. Once more of the nose is exposed, the surgeon may feel the need to do more than is actually necessary. This can lead to a cycle of deconstruction followed by obligatory reconstruction.

Some proponents of the external approach have claimed that the columellar scar is 'small' or negligible.<sup>16</sup> However, the scar is not always invisible and can in itself lead to a cosmetic blemish. In their meta-analysis of external approach septorhinoplasty, Vuyk and Olde Kalter analysed 986 patients described in seven articles. Only three had columellar flap necrosis leading to scarring.<sup>17</sup> While this may be a small percentage, columellar scarring can lead to a significant cosmetic blemish, and a very unhappy patient. Photographs of these adverse surgical effects are shared by patients on-line and in various blogs about the surgeon. In addition to the possibility of a visible scar, the external approach can result in a tendency towards damage in the soft tissue facets of the nasal tip. Other claims about the advantages of the columella approach scar relate to its short length when compared to the endonasal scar and the considerable distance between the columellar scar and the internal valve, which may be damaged by the intercartilagenous incision. However, when the intercartilage-

nous incision is placed correctly, it does not traumatise the internal valve. The main arterious, venous and lymphatic channels of the nasal tip run in, or just above, the superficial musculo-aponeurotic layer of the nasal tip. During open-approach septorhinoplasty, damage to this layer is not uncommon and can lead to tip oedema.<sup>18</sup>

While operative time, post-operative oedema, and recuperation times are all increased, the external-approach septorhinoplasty surgeon is increasingly plagued by the need for revision surgery, and a greater probability of medico-legal issues.

The time has therefore come for a renaissance in our approach to septorhinoplasty. The endonasal technique provides an excellent alternative to the more radical external approach. The pre-operative analysis of the nasal deformity plays an invaluable role in the endonasal approach. This is particularly important for younger surgeons embarking on a career in facial plastic surgery and will encourage them to abandon the notion of dealing with any deformity through the external approach. Most patients do not wish to make major changes in their noses and, for these patients, an endonasal approach is a more than adequate solution. Furthermore, as the septal cartilage and the major support structures of the nose are left unharmed, there is no threat to the stability of the nose. If necessary, grafting is still an option, although it is no longer obligatory in every case. Suturing techniques, when used appropriately, can result in excellent, subtle changes. With time, the endonasal rhinoplasty surgeon can achieve the ideal result: a natural-looking nose.

The endonasal technique is an adequate way of dealing with even the most complex of cases. While proponents of the external approach often cite its potential for managing the challenge of a difficult revision rhinoplasty, there is no reason why the same should not apply to the endonasal approach. The patient in Figures 1 and 2 had a history of nasal surgery and bilateral cleft lip repair. This complex and challenging case was tackled first with meticulous pre-operative planning and facial analysis. The game plan based on a list of detailed problems was established beforehand and followed meticulously in the operating theatre. The operation consisted of a tip-delivery approach, columella narrowing, crescent-shape excision of right vestibular lining of the ala, asymmetric trimming of cephalic lower lateral cartilages, tip sutures (trans- and interdomal), scoring of the lower lateral cartilages on the vestibular side to reduce convexity, dorsal humpectomy, multiple osteotomies, columellar strut, and shaving of the middle vault. The second patient in Figures 3 and 4 would almost certainly have been a candidate for an external approach in many centres given the markedly twisted nose. However, this nose was operated upon endonasally. The patient first underwent total septal reconstruction by septal extraction and repositioning, followed by a transcartilagenous approach, asymmetric cephalic trimming, multiple osteotomies (left side), paramedian osteotomy (right side), basal osteotomy (right side), shaving of the middle vault, rasping of nasal bones (left side), onlay graft (right side of the middle vault and tip), and narrowing of the columella.

With time, the expectations of septorhinoplasty patients have become more sophisticated. Typically, they search the internet, compare websites and photographs, and have already decided on their surgeon before making their first trip to the consultation room. Their demands for more subtle changes with more rapid recovery times and a non-surgical, natural look can be met with the endonasal technique. Faster recovery times have become a major concern for many patients and this in itself is a major advantage for the patient, the doctor and the health-care provider. As the endonasal technique is scar-free, leading to less post-operative oedema and fewer revision cases, the authors recommend its return as the most prevalent technique for septorhinoplasty.

However, this does not mean that one technique should be completely abandoned in favour of the other. Trainee surgeons should reconsider the rigid classification of septorhinoplasty along simplistic "external" and "endonasal" lines. Marrying the "old" and the "new" can lead to progress in this field. The combination of these two techniques could be described as "hybrid" rhinoplasty, as it seeks to incorporate the best of both worlds. This can only happen if trainees are versed in both the external and the endonasal approaches to such a level that they can switch easily from one to the other depending on the particular situation. The division of septorhinoplasty along external and endonasal lines does not preclude a dialogue between the techniques. For example, grafting techniques from external septorhinoplasty can be used in the endonasal approach, strengthening

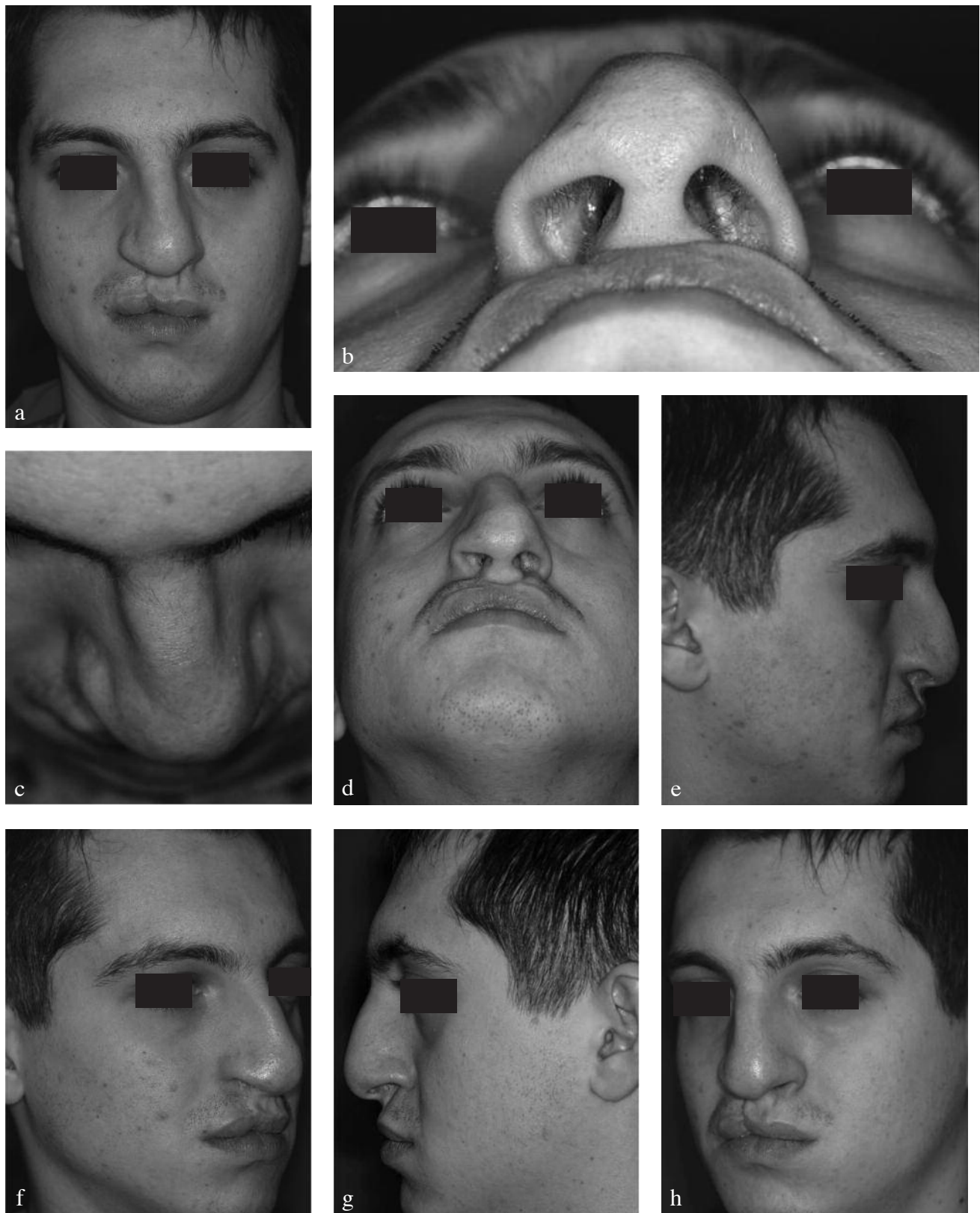
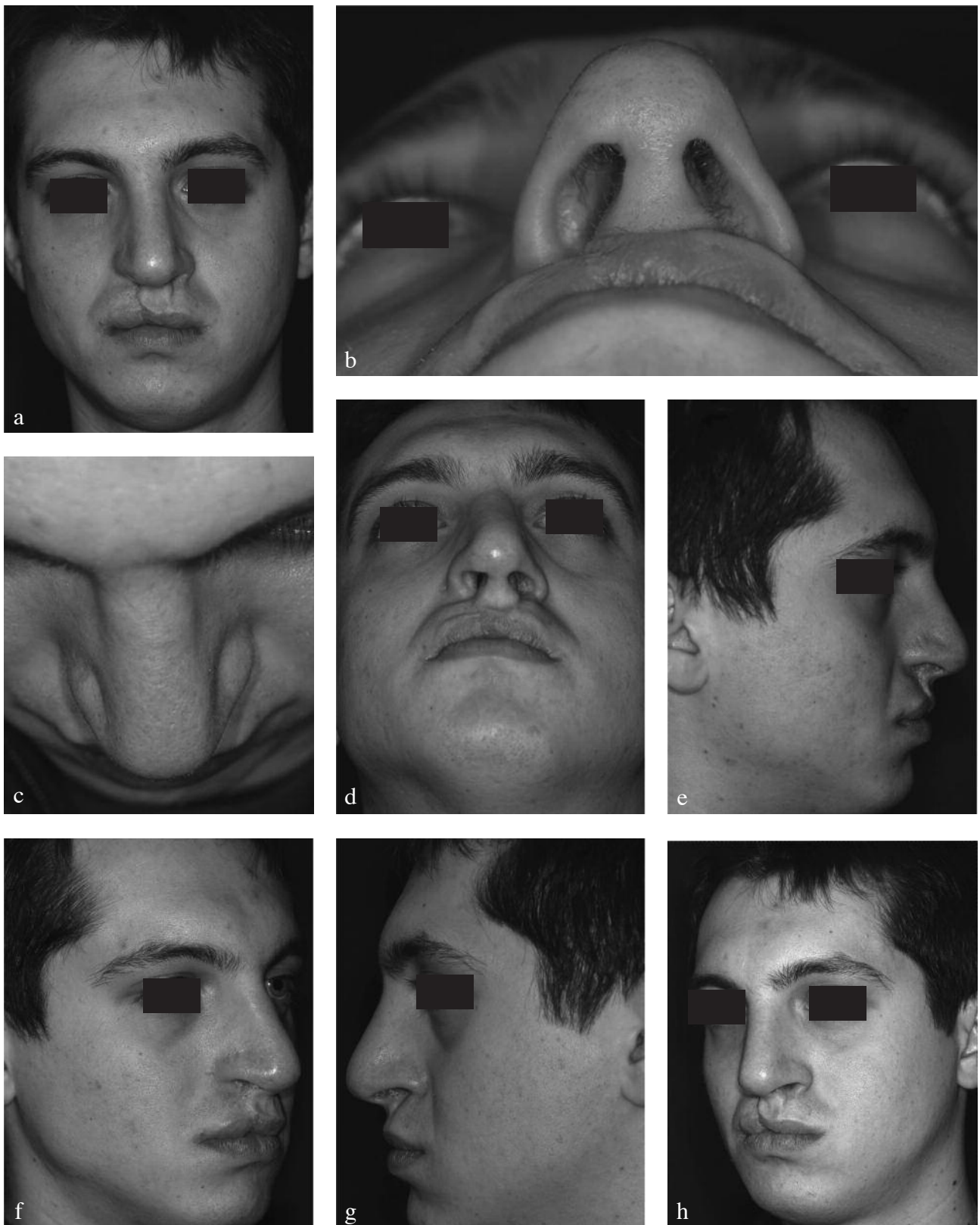


Figure 1

Pre-operative views of a young adult male patient with previous cleft lip repair. [1a: frontal, 1b: right lateral, 1c: left lateral, 1d and 1e: right and left ¾ views, 1f: base-radix, 1g: base view, 1h: helicopter view]



*Figure 2*

Post-operative views of the patient in Figure 1. Operation summary: tip-delivery approach, columella narrowed, crescent-shape excision of right vestibular lining of ala, asymmetric trimming of cephalic lower lateral cartilages, tip sutures (trans and interdomal), scoring of the lower lateral cartilages on their vestibular side to decrease their convexity, dorsal humpectomy, multiple osteotomies, columellar strut, and shaving of the middle vault [2a: frontal, 2b: right lateral, 2c: left lateral, 2d and 2e: right and left  $\frac{3}{4}$  views, 2f: base-radix, 2g: base view, 2h: helicopter view].

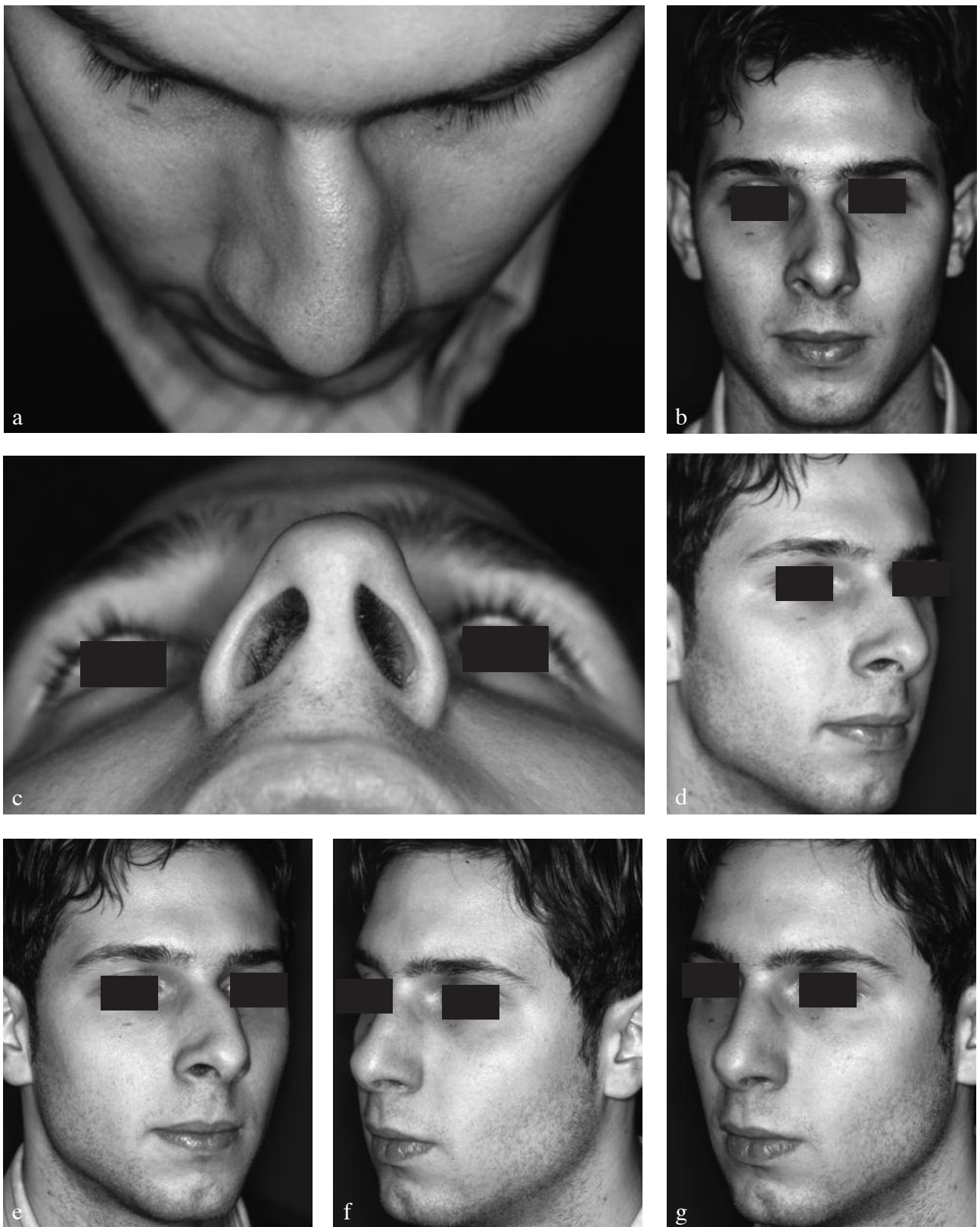
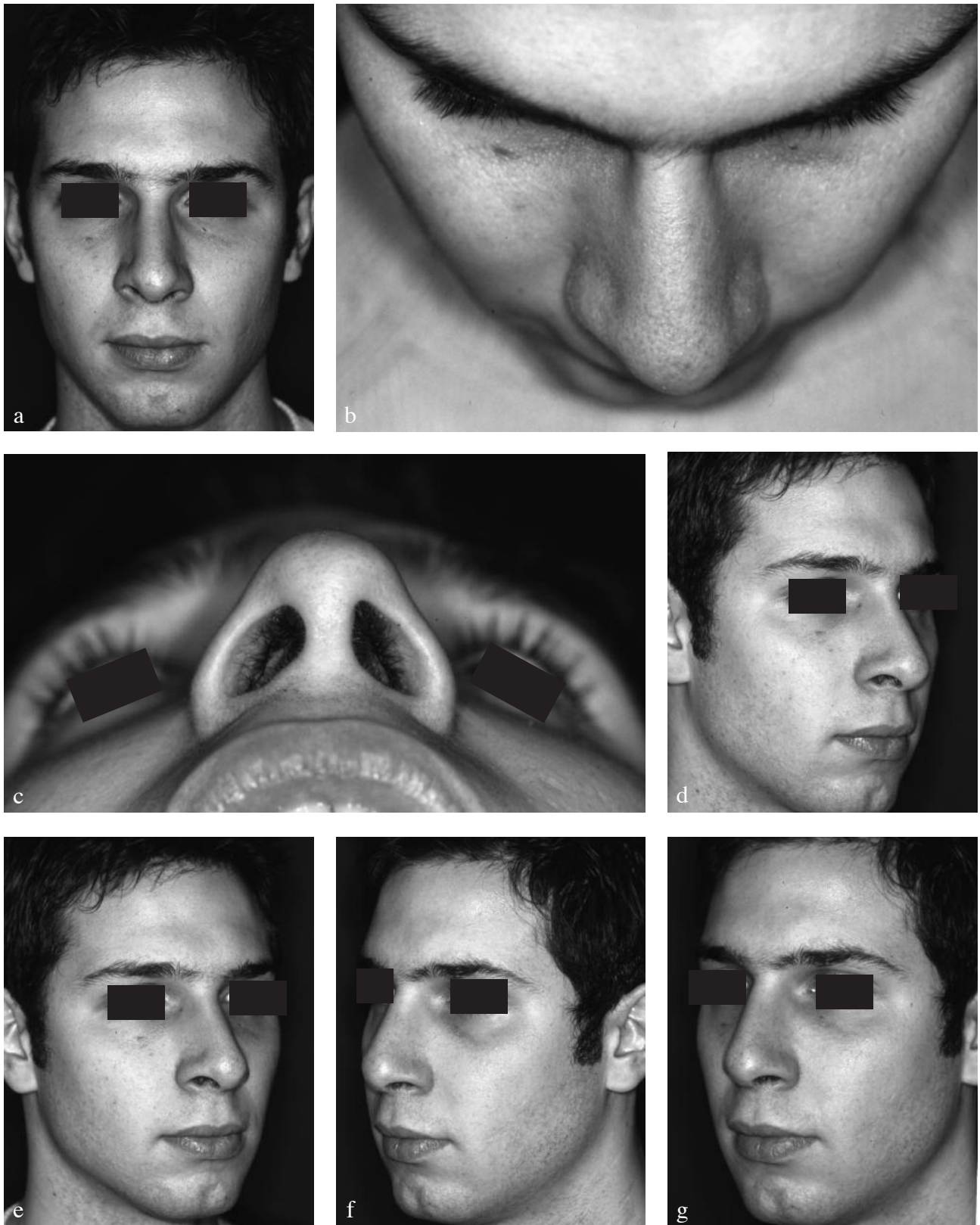


Figure 3

Pre-operative views of a young adult male with a twisted nose [3a: frontal, 3b and 3c: two right-sided  $\frac{3}{4}$  views, 3d and 3e: two left-sided  $\frac{3}{4}$  views, 3f: helicopter, 3g: basal view ].



*Figure 4*

Post-operative views of the patient in Figure 3. Operation summary: total septal reconstruction by septal extraction and repositioning, transcartilagenous approach, asymmetric cephalic trimming, multiple osteotomies left side, paramedian osteotomy right side, basal osteotomy right side, shaving middle vault, rasping nasal bones left side, onlay graft right side, narrowing columella [4a: frontal, 4b and 4c: two right-sided  $\frac{3}{4}$  views, 4d and 4e: two left-sided  $\frac{3}{4}$  views, 4f: helicopter, 4g: basal view ].



the mid-vault, ala, and tip.<sup>19,20</sup> Conversely, the emphasis on cartilage preservation and remodelling – rather than resection and reconstruction – can be used in the external approach. Ultimately, in an ideal world, the septorhinoplasty surgeon should be well versed in both techniques, using the endonasal technique for the vast majority of patients, reducing operating times, post-operative oedema and the number of revision cases, and increasing the number of satisfied patients.

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