Surgical approaches in rhinoplasty

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SURGICAL APPROACHES IN RHINOPLASTY

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Abbreviations:

ASA- Anterior Septal Angle

BDD- Body Dysmorphic Disorder

CPAP- Continuous Positive Airway Pressure device

OSA- Obstructive Sleep Apnea

PUSH -Pull Up Spreader High

SSTE- Skin and Soft Tissue Envelope

ULC- Upper Lateral Cartilages

Summary

A common surgical operation called a rhinoplasty involves altering the nose to enhance either its beauty or functioning. Open and closed rhinoplasty are the two primary rhinoplasty methods. In terms of surgery, closed rhinoplasty is regarded as a sophisticated procedure that calls for a high degree of ability and knowledge. On the other hand, because to the expanding usage of nasal cartilage, bone, and other tissue-grafting procedures, open rhinoplasty has grown in popularity. Patients who require revision rhinoplasty might also benefit from open rhinoplasty. However, for the majority of simple rhinoplasties, closed rhinoplasty is preferable.

It's crucial to remember that the differences between open and closed rhinoplasty are only surgical specifics. The surgeon's competence and talent are the most important factors in the procedure's success. Both methods can result in good outcomes and which method is used is determined by the patient's particular requirements and the surgeon's suggestions.

While there might be some differences between the two techniques in terms of the healing time and scarring, these are typically momentary problems. What counts most is how the process turns out in the end. The distinctions between open and closed procedures lose their significance after three to four months, when healing for a primary rhinoplasty is around 80–90% complete.

Both open and closed rhinoplasty procedures are skills possessed by some doctors. Patients should be aware of these while selecting the technique that is most effective for them. Each strategy has benefits and drawbacks. It is simpler for the surgeon to make accurate changes with open rhinoplasty since it provides better view of the nasal anatomy. While the recovery time might be longer, it might also result in scarring that is more obvious. The healing time, edema, and apparent scarring are all reduced with closed rhinoplasty. Since the nasal structures are not as readily visible, it might be more difficult for the surgeon to make precise adjustments.

In conclusion, both open and closed rhinoplasty methods have the potential to yield superb outcomes despite their different approaches. The surgeon's competence and knowledge are the most important determinants of the procedure's outcome, therefore patients should pick an expert who can suggest the best strategy for their particular needs.

SAŽETAK

Jedan čest kirurški zahvat pod nazivom rinoplastika uključuje kirurške intervencije na nosu s ciljem poboljšanja njegove estetike ili funkcionalnosti. Otvorena i zatvorena rinoplastika predstavljaju glavne metode izvođenja rinoplastičkih postupaka. U kontekstu kirurškog pristupa, zatvorena rinoplastika se smatra sofisticiranim postupkom koji zahtijeva visoku stručnost i široko znanje. S druge strane, otvorena rinoplastika je postala sve popularnija zahvaljujući širem korištenju presađivanja nosne hrskavice, kostiju i drugih tkiva. Pacijenti koji zahtijevaju korektivnu rinoplastiku također mogu imati koristi od otvorene rinoplastike. Međutim, u većini slučajeva jednostavnih rinoplastičkih zahvata, zatvorena rinoplastika se smatra preferiranim pristupom.

Važno je naglasiti da su razlike između otvorene i zatvorene rinoplastike isključivo kirurške specifičnosti. Ključni faktori uspjeha ovog postupka su stručnost i talent kirurga. Obje metode mogu rezultirati izvrsnim rezultatima, a konačan odabir metode ovisi o specifičnim potrebama pacijenta i preporukama kirurga.

Iako postoje razlike u vremenu oporavka i vidljivosti ožiljaka između ove dvije tehnike, takvi problemi su obično privremenog karaktera. Ono što je najvažnije jest konačni rezultat postupka. Nakon tri do četiri mjeseca, kada je zacjeljivanje primarne rinoplastike već 80-90% završeno, razlike između otvorene i zatvorene metode gube na važnosti.

Sposobnost izvođenja i stručnost kirurga imaju ključnu ulogu u postupku bez obzira na odabrani pristup. Pacijenti bi trebali biti svjesni da i otvorena i zatvorena rinoplastika mogu rezultirati izvrsnim rezultatima. Otvorena rinoplastika omogućuje kirurgu bolji uvid u anatomijske strukture nosa, što olakšava precizne prilagodbe, dok je vrijeme oporavka možda malo dulje i može rezultirati vidljivijim ožiljcima. Zatvorena rinoplastika smanjuje vrijeme oporavka, oticanje i vidljivost ožiljaka. Međutim, budući da su nosne strukture manje vidljive, kirurgu može biti teže napraviti precizne korekcije.

Contents

Introduction

Rhinoplasty, or nasal surgery, is a highly popular cosmetic procedure that aims to improve the aesthetic appearance and functionality of the nose. Over the years, numerous surgical approaches have been developed to address various nasal deformities, including structural abnormalities, nasal asymmetry, and breathing difficulties. These approaches range from closed and open rhinoplasty techniques to more specialized procedures such as septoplasty, alar base reduction, and tip refinement.

While the ultimate goal of rhinoplasty is to achieve a balanced and natural-looking result, the surgical approach used can significantly impact the final outcome. The choice of technique largely depends on the patient's individual needs, the surgeon's preference and expertise, and the complexity of the case.

In this thesis, we aim to provide a comprehensive overview of the different surgical approaches used in rhinoplasty. We will explore the indications, advantages, and limitations of each approach, as well as their potential complications and outcomes. Through a critical analysis of the current literature and our own experience, we hope to provide a valuable resource for surgeons and patients alike in making informed decisions about the best surgical approach for their rhinoplasty procedure.

When discussing about rhinoplasty it is important to know that today, is one of the most popular operations. In 2018, more than 200 000 procedures were carried out exclusively in the United States, making it the third most popular cosmetic surgery in the nation. Since John Roe's initial description of the first aesthetic treatment in 1887, the process has undergone significant changes. A more proportional approach combining careful reduction and grafting gradually replaced the reduction-only approach to nasal surgery in the pursuit of better and more reliable results. Our knowledge of anatomical structure has improved, and renowned medical minds like Joseph and Sheen have made significant contributions to these developments. Numerous of the strategies they described are still in use today. Despite this paradigm shift, rhinoplasty remains one of the trickiest medical procedures in cosmetic surgery today. Facial beauty is closely correlated with nasal symmetry and proportions, which serve as a key facial marker. (1)

Due to technical difficulties, the wide range of techniques described, and other variables, even highly experienced surgeons might find it challenging to produce reliable results. Because each patient's internal structures are anatomically unique and has a different soft tissue exterior breadth, it is difficult to make every patient's nose look exactly the same. Additionally, there is no such thing as an ideal nose because a patient's facial features may match one nasal configuration while being totally inappropriate for another. Rhinoplasty serves more than just cosmetic purposes. The treatment also aims to maintain or repair nasal function if it has been damaged by an obstructive process in the patient. The process is more difficult because internal nasal structures must be changed to handle practical issues. All of these factors working together can explain why rhinoplasty is also such a rewarding operation with possibly excellent outcomes. Thorough preoperative planning and study are essential to enhance the outcomes of rhinoplasty and avoid pointless follow-up operations.

In order to offer the reader a basic grasp of the topic and help them develop a logical and attentive approach to it, I will discuss many pertinent aspects of cosmetic nose surgery in this paper, with an emphasis on different surgical options.

History of the procedure

The history of rhinoplasty dates back to ancient times, where it was performed for both functional and aesthetic purposes.

Ancient Rhinoplasty:

The first known description of rhinoplasty dates back to ancient India in 600 BC, where it was performed using skin from the forehead to reconstruct the nose Ancient Egyptian hieroglyphics also show evidence of rhinoplasty procedures. In the Middle Ages, rhinoplasty was performed in Europe to reconstruct noses that had been amputated as a form of punishment.(2)

Modern Rhinoplasty:

In the 19th century, rhinoplasty techniques were refined and began to focus more on cosmetic improvements. In 1887, Dr. John Orlando Roe introduced the external rhinoplasty approach,

which involved making incisions on the outside of the nose, allowing for greater visibility and precision during the procedure. In the 20th century, rhinoplasty became increasingly popular and techniques continued to evolve. The development of the endoscope in the 1980s allowed for a less invasive approach to rhinoplasty.(3)

Contemporary Rhinoplasty:

Today, rhinoplasty is a highly specialized and widely practiced procedure. Techniques have continued to evolve, and new approaches such as computer-assisted rhinoplasty and injectable fillers have been introduced. Rhinoplasty has become one of the most common cosmetic procedures performed worldwide, with an estimated 352,555 procedures performed in the United States in 2021 alone (4).

Anatomy of the nose

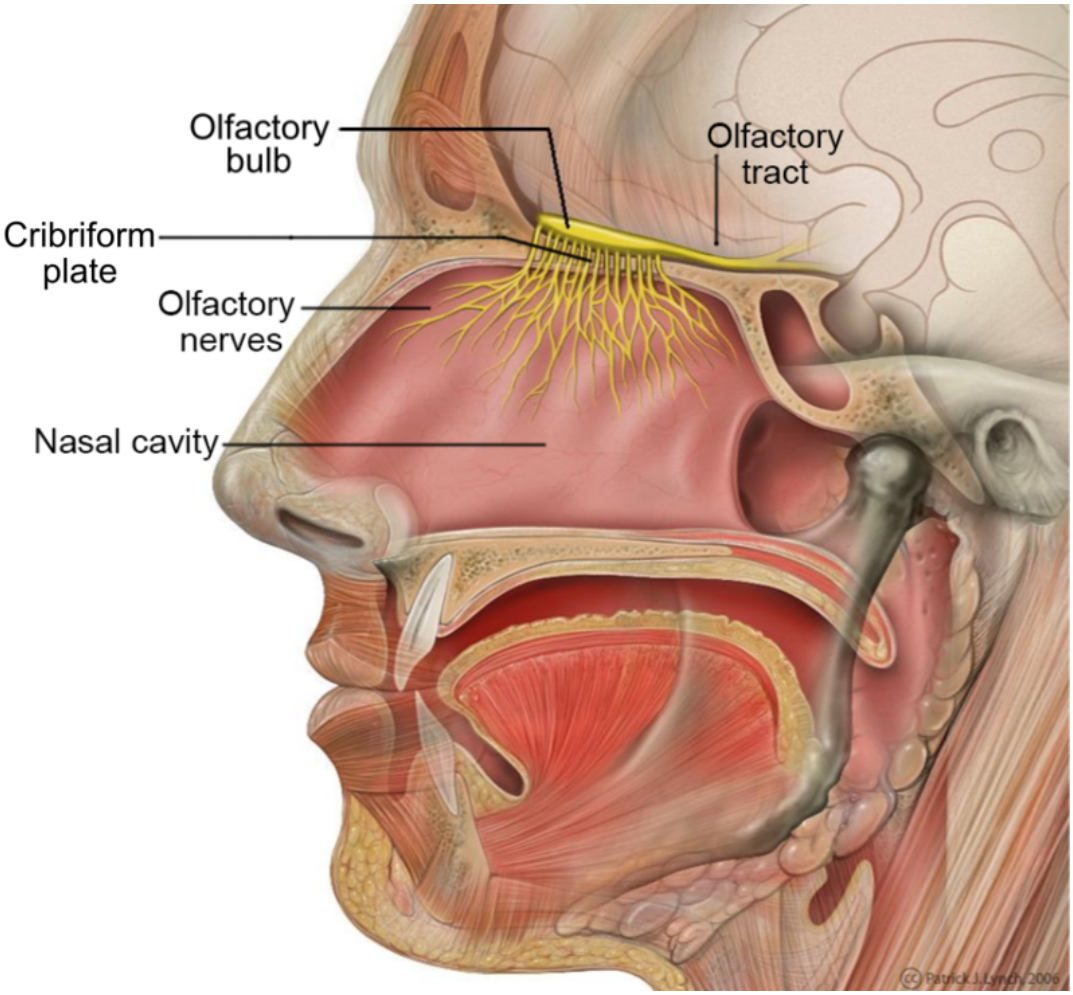
The human nose is a complex and intricate organ that plays a vital role in our respiratory system and sense of smell. It is made up of various structures, including bone, cartilage, mucous membranes, and skin, all of which work together to perform its functions. Understanding the anatomy of the nose is essential for anyone interested in fields such as medicine, biology, or even cosmetic surgery. To achieve a successful outcome in rhinoplasty, it is essential to have a thorough understanding of the normal anatomy and its potential variations. Additionally, it is important to appreciate the relevance of the anatomy to the external appearance and function of the nose and how modifications to the structure can affect both.

The nose comprises three anatomic layers. The external layer includes the superficial epidermis, dermis, subcutaneous fat, nasalis muscle, and associated fascia. The external envelope is separated from the underlying support layer by a loose areolar layer, which provides a safe and relatively avascular dissection plane. By elevating the nasal cover, the osteocartilaginous support can be exposed.

The mid-layer is composed of cartilage and bone, covered by perichondrium and periosteum, which provide support and shape to the external skin. Fibrous ligaments extend between the adjacent upper lateral, alar, and septal cartilages, which fix the position of the nasal tip.

The innermost layer of the nose consists of vestibular stratified squamous and septal and nasal mucosa, which line the inner nose. In most cases, the lining layer should be preserved during rhinoplasty surgery. Significant alteration of the lining layer is rarely indicated.

By understanding the anatomy of the nose and how its different layers are interconnected, a surgeon can perform precise and safe modifications to the nasal structure to achieve optimal functional and aesthetic outcomes.(5)



Head anatomy with olfactory nerve, including labels for the nasal cavity, olfactory nerves, cribriform plate, olfactory bulb, and olfactory tract (6)

When it comes to the nose, the thickness and quality of the skin vary across different regions. Specifically, the skin covering the tip and ala of the nose is typically thicker and contains more oil glands than the skin on the dorsum and sidewall, which tends to be thinner and more mobile. Thin skin can contract and red rape more easily over the underlying framework, while thicker, more sebaceous skin contracts less and requires a stronger and more angular framework to make the underlying support visible through the overlying skin envelope. However, in some cases, very thick skin may not be suitable for a rhinoplasty procedure.

The support of the nose is provided by a mid-layer, which can be divided into three vaults: the upper bony vault, the middle upper lateral cartilage vault, and the lower alar cartilage vault. The lower lateral vault, which includes the tip and ala, is composed of the external valve, consisting of the nostril rim and inner nostril, made up of the caudal edge of the alar cartilage, the soft tissue ala, the membranous septum, and the nostril sill.

The nasal tip cartilage framework is provided by the alar cartilages, with each ala consisting of a medial, middle, and lateral crus. These are bound together by continuous perichondrium, which provides stability to the entire cartilage complex. The position and shape of the distal nose depend on the thickness of the skin and soft tissues, the underlying tip cartilages, and the suspensory fibrous attachments to the adjacent septum and upper lateral cartilages. These ligamentous connections lie between the cephalic margin of the lower lateral cartilages, passing over the septal angle, and connect with the upper lateral cartilages.(5) (7)

Additional ligaments connect the accessory cartilages to the piriform aperture. The medial crura are supported by fibrous attachments connecting them to the caudal septum, as well as the soft tissue that lies between the inferior aspect of the feet of the media crura and the premaxilla. These suspensory ligaments can be disrupted by the surgical incisions and excisions used to expose and modify the tip cartilages. The overall tip support can be diminished by several factors, including the elevation of the skin off the underlying cartilage framework, inter-cartilaginous transfixion incisions and rimming incisions, cephalic trim of the alar cartilage, excision of the septal angle and caudal septum, and disruption of the various suspensory ligaments.

The nose tip's three-dimensional structure is made up of numerous slopes and angles. Support and tip shape are provided by the basal alar cartilages. On the skin's surface, the paired alar

cartilages can be seen in their size, form, and position. The medial crus, middle crus, and lateral crus are the three parts that make up each alar cartilage, and they each have an impact on the appearance and functionality of a different section of the nose. The medial genu, also referred to as the columellar hinge, is where the medial crus connects to the middle crus in the columella. The location and ratio of the columella and lobule are determined by the central crus. It connects the medial and lateral crus, affecting the infratip lobule's growth, height, and form. The length, shape, and angularity of the columellar/lobular junction affect its angle of spin and intracrural distance. The point projection, breadth, and definition are determined by the lateral genu or domes, which connect the middle crus with the lateral crus.(5)

The lateral crura, which abut and partially penetrate the superior ala, occupy the tip lobule. The inferior center leg of the tripod is supported by the medial crura, which are attached to the columella by fibrous tissue. The two superior spreading legs are formed by the paired lateral crura.

Any leg of the tripod can be strengthened or lengthened by adding grafts or struts, whereas reducing or eliminating a leg diminishes the tripod's support. The tip travels inferiorly and backward in the direction of the shorter lower limb, and superiorly and backward in the direction of the shorter upper leg. Shortening all three legs causes the tip to slide back, lengthening the lower limb causes the tip to progress forward and superior.(8)

It's crucial to remember that the lower nose, which is made up of epidermis, compact fat, muscle, and alar cartilage, may block if support is gone. The seventh nerve paralysis, scarring of the vestibular membrane, or over- or under-resection of supporting structures can all result in the external valve collapsing.

To perform a successful rhinoplasty while preserving the major arterial, venous, and lymphatic vessels, the nasal skin flap should be elevated in the deep areolar plane, just above the cartilage and bone. This approach allows for a safe dissection while avoiding excessive soft tissue scarring or tissue necrosis, which can compromise the surgical outcome.

Internally, the nose is divided into two nasal cavities by a vertical partition called the nasal septum. The septum is composed of bone and cartilage and is covered by a mucous membrane that helps to moisten and warm the air as it passes through the nose. The walls of the nasal

cavities are lined with mucous membranes that contain millions of olfactory receptors, responsible for our sense of smell.

In addition to its role in smelling, the nose also serves as a filter, removing dust, dirt, and other particles from the air before it reaches the lungs. It also helps to regulate the temperature and humidity of the air we breathe.(9)

In this thesis, we aim to provide a detailed overview of the anatomy of the nose, including its external and internal structures, their functions, and their interrelationships. By understanding the complex anatomy of the nose, we can better appreciate its essential role in our overall health and well-being. The foundation of a successful rhinoplasty is a thorough knowledge of nose anatomy. A small adjustment to one nasal structure can have an effect on the others, drastically altering the face structure.

A bony and cartilaginous structure supported by musculature, soft tissue, and epidermis make up the external nose.

Nasal Bones and Cartilages.

The frontal process of the maxilla and the associated nasal bones, which together make up the bony pyramid, describe the top third of the nose. The vertical plane of the ethmoid bone is closely connected to the nasal bones. The top lateral cartilages, which are connected cranially to the nasal bones, make up the center third. The "Keystone area" is made up of the 4–5 millimeters overlap between the nasal bones and the top lateral cartilages. The dorsal contour's aesthetics depend on this anatomical marker, so care should be taken to preserve it during operation. Additionally, upper lateral cartilages connect to the septum dorsally at an inclination of roughly 10 to 15 degrees. The interior nasal valve is a term used to describe this small area of air resistance and has therapeutic significance. Maintaining this position during surgical procedures is crucial to ensuring a clear airflow. With their medial, middle, and lateral crura, the lower lateral cartilages delineate the lower third. The size and form of the nose tip region will depend on the anatomical arrangement of these cartilages. The exterior nasal valves' structure was also established by them. (10)

Muscles.

The nasalis, levator labii aleque nasi, and depressor septii are the three primary mimic muscles of the nostril. The nose superficial musculoaponeurotic system is a fibrous tissue that surrounds and connects these muscles. Although nose muscles are sometimes undervalued, they are crucial for maintaining a clear airway. Patients with face paralysis, in whom a closure of the external nasal valve can be seen, serve as evidence of this. (10)

Skin and Soft Tissue Envelope (SSTE).

The tissue lining the Rhinion zone is the thinnest when the upper, medial, and lower thirds of the nose are split, and the upper and lower thirds are the largest. SSTE can be either thinner or denser depending on a variety of factors, including sex, age, race, and others. This has an important bearing on surgery preparation. Small changes in the nose cartilage and bony structures will have a major effect on the form when working with patients who have very thin SSTE, and small irregularities of the grafts used can be very obvious. On the other hand, in patients with very thick SSTE, a more forceful approach is frequently required so that the changes can be seen and minor abnormalities won't have as much of an effect on the nose's looks after surgery.

The septum and turbinates, both of which are covered by mucosa, make up the interior nostril.

Septum.

In the middle of the nasal chamber, the nasal septum is a brittle, quadrangular-shaped structure coated in mucosa. It serves as the nose's main structural support and divides the two openings. The anterior septal angle, which affects nose projection, is located at the intersection of the dorsal and posterior septa. Additionally, it aids in defining the dorsal and columellar regions of the nose structure. It plays a crucial part in keeping an open airway through the internal nose valve. The maxillary crest, vomer, and the vertical plate of the ethmoid bone are among the bones that make up the septum's skeletal and cartilaginous elements, respectively. The large thick cartilaginous region serves as a major supply of cartilage for nasal surgery.

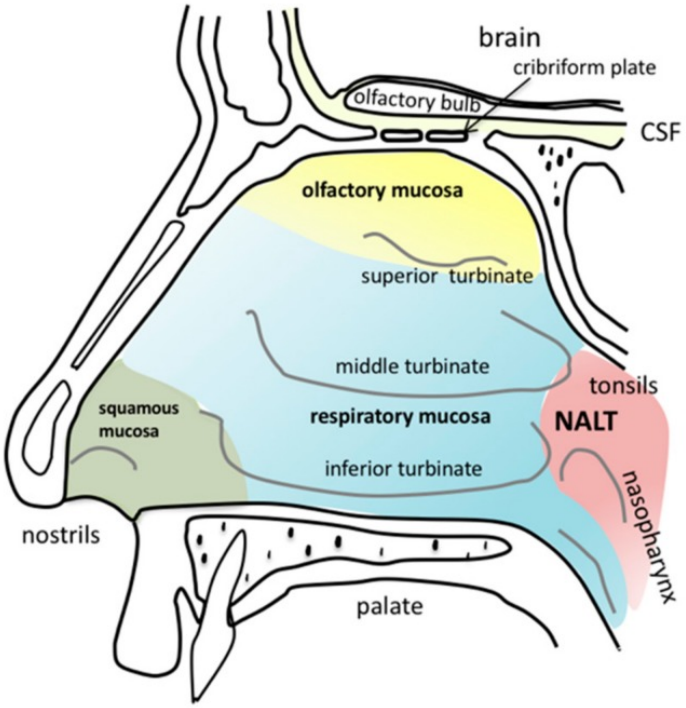
Turbinates.

Bony protrusions called turbinates are coated in mucous. These constructions create channels through which air moves and is heated and humidified. Additionally, by constricting and extending, they aid in removing particulates from the inspired air and regulate the circulation. Superior, intermediate, and inferior turbinates make up this group. The intermediate and lower turbinates handle the bulk of the airflow. Turbinate enlargement can be brought on by various factors, including asthma and septal deviation, and it can block the air passage to varying degrees. If a blockage is discovered, it needs to be removed during operation to enhance nasal function.

The blood supply to the nose.

The circulatory system of the nostrils is extensive. This makes it possible to undermine widely without endangering tissue perfusion. The facial artery and supratrochlear artery are the major nose vessels (branches of the internal and external carotid, respectively). Both of these arteries will extensively anastomose, creating a network with branches of the ascending columellar arteries. The septal branch of the superior labial artery, the sphenopalatine artery (a branch of the external carotid artery), and the ocular branch all contribute blood to the nasal septum. This network, known as Kiesselbach's Plexus, where all these branches anastomose, is where nosebleeds most frequently occur. Most arteries anastomose to the facial vein, which is how venous draining occurs. (10)

The anatomy of the nose illustration.



Anatomy of the nasal cavity. Nasal-associated lymphoid tissue labelled NALT (6)

Indications for rhinoplasty

It is possible to use rhinoplasty to address both functional and aesthetic issues. It is important to emphasize that patients who originally only want to enhance their function commonly show worries about the appearance of their noses during interviews and, after surgery, prioritize the aesthetic results above their capacity to breathe correctly. One of the reasons a thorough conversation with the rhinoplasty patient is so important is because of this.

Even though much has been written on the challenges of selecting the best candidate for surgery, there is no reliable way of accurately identifying the high-risk patients who will probably be dissatisfied with the outcomes of the procedure.

The surgeon must assess the patient's other, less obvious characteristics and utilize instinct to decide whether or not the operation would be useful.(11)

Since postoperative patient satisfaction decides whether the operation was successful, it is important to probe the patient at the early consultations to ascertain whether their expectations can be met. By asking open-ended questions about the patient's life and history, the doctor may listen for and interpret nonverbal signs that assist to create a full picture of the patient. (family structure, social ties, etc.). For patients who shouldn't be considered for surgery, the acronym SIMON (single, immature, male, over-expectant, narcissistic) is frequently used, while SYLVIA (secure, young, listens, verbal, intelligent, attractive) has been used to characterize the perfect applicant.

After a thorough evaluation, it's important to discuss the specific features of their nose that bother them (such as the dorsal hump, nasal deviation, tip issues, etc.) and to lay out step-by-step the possible fixes. To do this, one can utilize computer simulation. This helpful tool assists in identifying patients with unrealistic expectations by using genuine images of the patient and simulating a poor surgical result.(12)

The functional analysis includes anterior rhinoscopy to check for typical obstruction causes including turbinate hypertrophy and septal anomalies. In order to find hidden obstructions like polyps in persons with airway blockages for which there is no apparent cause, a nasal endoscopy may be helpful. The Cottle method can be performed to analyze nasal valves by gently sliding the face laterally with two fingers to open the ipsilateral nasal valve. A valve collapse might impair nasal function if airflow is increased. Previous hospitalizations, cocaine or drug use, a history of mental illness, and any history of sinusitis or obstructive sleep apnea should all be documented. Preoperative images must be collected for early planning, analysis, and medical-legal requirements. A frontal view, both profiles, and a basal view are the absolute necessities. They should be captured on camera with suitable lighting and a dark background. Informed consent must be thoroughly addressed with the patient, just as it is with any surgical procedure, to ensure that he or she is aware of all the stages involved in the procedure, including the benefits and drawbacks, available choices, and probable outcomes.

When the nasal components are fully developed and the nasal morphology won't change dramatically in the future, this surgery is frequently performed. This would be around the age of 15 for females and about the age of 17 for boys.

Contraindications for rhinoplasty

Rhinoplasty, also known as nose surgery or nose job, is a popular cosmetic procedure that aims to improve the appearance and function of the nose. However, like any surgical procedure, it is not suitable for everyone. Certain medical conditions and individual factors may make a person ineligible for rhinoplasty or increase the risks associated with the surgery. These factors are known as contraindications and are important to consider before undergoing the procedure. In this context, it is essential to understand the contraindications associated with rhinoplasty to make an informed decision and ensure optimal outcomes.

Body Dysmorphic Disorder (BDD).

This psychological condition is characterized by obsessive fixation on a fictitious or insignificant physical abnormality. These make patients less sociable, have a lower quality of life, are more prone to depression, and have greater rates of suicide thoughts. In order to prevent postoperative symptoms from getting worse and to ensure patient satisfaction, surgeons must identify this type of patient as soon as possible. There isn't a validated questionnaire available now that can accurately diagnose these people. It is crucial to submit someone for mental assessment if clinical suspicions are raised.

Obstructive Sleep Apnea (OSA).

Airway blockages during sleep occur repeatedly in this disorder with a high incidence. Perioperative problems are more likely to occur in patients with this disease. Although a diagnosis may be asymptomatic, it might be suspected based on the patient's symptoms. While screening questionnaires can be utilized, their accuracy is restricted. Polysomnography is the diagnostic gold standard. Patients with this condition should be informed of the dangers and

preoperative treatments like the use of a continuous positive airway pressure device (CPAP) might be undertaken in order to lower complication rates, even if it is not a strict contraindication.(13)

Cocaine abuse.

Patients that misuse cocaine are a unique subset of patients. Because of the multiple contaminating components, cocaine inhaled causes severe vasoconstriction and long-term mucosal irritation. Mild inflammation to serious septal perforations can all be seen during rhinoscopy. These individuals should be discouraged from having nose surgery because they run a higher risk of developing postoperative problems including septal collapse or slowed septal mucosa repair.(14)

Smoking.

Despite the fact that it seems like smoking does not impair the results of septoplasty, patients should be encouraged to give up the habit before the treatment due to other negative consequences.(15)

Bleeding disorders.

Postoperative problems due to impaired coagulation are possible. Patients should be questioned about their history of bruising or bleeding excessively, their use of medications, dietary supplements, or vitamins that affect the coagulation cascade, and any prior thrombotic events. Preoperative suspension may be required for any medication, vitamin, or dietary supplement that interferes with coagulation. (13)

Open rhinoplasty-preparations

Open rhinoplasty is a surgical procedure performed to reshape the nose. It is also known as external rhinoplasty, as it involves making incisions on the outside of the nose to access the underlying nasal structures. This procedure allows the surgeon greater visibility and access to the nasal framework, allowing for more precise and controlled reshaping of the nose.

During open rhinoplasty, the surgeon creates a small incision at the base of the nose, and then lifts the skin and soft tissue to expose the underlying cartilage and bone. This allows the surgeon to make more precise adjustments to the nasal structure, including modifying the size and shape of the nasal tip, reducing the size of the nostrils, or correcting any asymmetry in the nose.

Open rhinoplasty is a complex procedure that requires a skilled and experienced surgeon to achieve the desired results. While the procedure does involve a longer recovery time compared to other types of rhinoplasty, it is often considered the gold standard for achieving significant nasal reshaping. It is necessary to acquire medical clearance, including preoperative risk classification and medical optimization. In order to properly capture the position and form of the nose, facial asymmetries, and the impact of the grin on the nose, pre-operative photography should include both static and dynamic photographs in frontal, three-quarter, lateral, base (worm's eye), and dorsal (bird's eye) perspectives. Digital imaging software helps patients and surgeons communicate better and establishes reasonable expectations for surgery by seeing prospective surgical outcomes that are otherwise difficult to describe.(16)

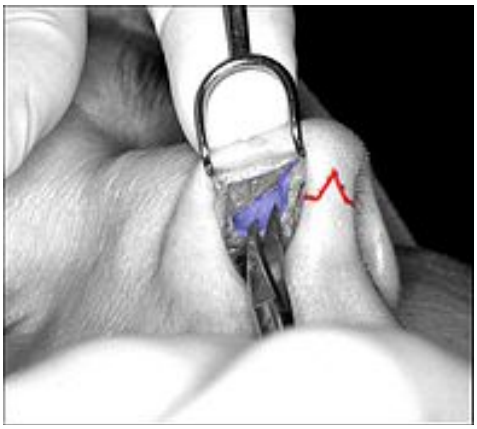
When compared to transverse incisions, inverted-v incisions provide better scar development and less notching because they are placed at the narrowest part of the columella. If planned, the osteotomy course is also shown on the diagram. Alar base reduction marking incisions are normally saved until the conclusion of the surgery. Specific nasal features, such as the rhinion (keystone), upper lateral, and lower lateral cartilages, may be marked, however this is not a common practice. During the open rhinoplasty, general anesthetic or intravenous methods (such propofol) are advised. Muscle relaxants are a possibility if general anesthesia is used.(17)

Before surgery, it's necessary to receive a single dose of intravenous antibiotics that cover skin flora. Additionally, to help with swelling, a single dose of an intravenous steroid injection (such as 8 mg of dexamethasone) may be given, and a single dose of intravenous tranexamic acid (10 mg/kg) may be administered to reduce bleeding during the procedure.

To minimize discomfort during the operation, local anesthesia is injected along the septum, columella, margin, soft tissue triangle, sidewalls, and dorsum, taking care not to cause any distortion of the nose's appearance. Nasal pledgets soaked in a nasal decongestant are then placed in both nasal cavities. Finally, vibrissae are trimmed to aid with visualization and to reduce crusting after surgery. (18) To produce a complete external and internal nasal block, local

infiltration of 1% Xylocaine with 1:100,000 epinephrine is used to start the anesthesia process. Endonasal packings containing 4% cocaine are added to this.

Open rhinoplasty: The columellar incision delineated as a red-dot guideline, will assist the surgeon in the precise suturing of the nose. (19)



Open rhinoplasty: The right lower lateral cartilage (blue) is exposed for correction. (19)

Necessary vasoconstriction is provided by careful infiltration and packing placement for at least 10 minutes, which reduces bleeding inside the operating field. Field preparation is done with iodine, and draping is done according to protocol.

Performing an open rhinoplasty requires careful identification of risk factors and a thorough patient assessment. To minimize complications, a team approach is recommended, and the patient should undergo the following evaluations prior to surgery:

Evaluation by a surgeon experienced in selecting appropriate candidates for open rhinoplasty. Evaluation by a family physician and/or anesthesiologist/nurse anesthetist to ensure the patient is fit for anesthesia. Coordination of care by a perioperative nurse to monitor the patient and provide pre- and post-operative education to the patient and their family.

During the open rhinoplasty procedure, an interprofessional team consisting of an experienced surgeon, anesthesiologist, surgical assistants, and operative nurses should be involved to maximize outcomes. Close follow-up during the initial post-operative period by a wound care nurse or clinician experienced in post-operative care should monitor the patient for possible complications, including a septal hematoma. Patient education on proper surgical wound care is crucial, including avoiding nose-blowing, strenuous activity, heavy lifting, or bending over during the first several days post-operatively to minimize complications. (20)

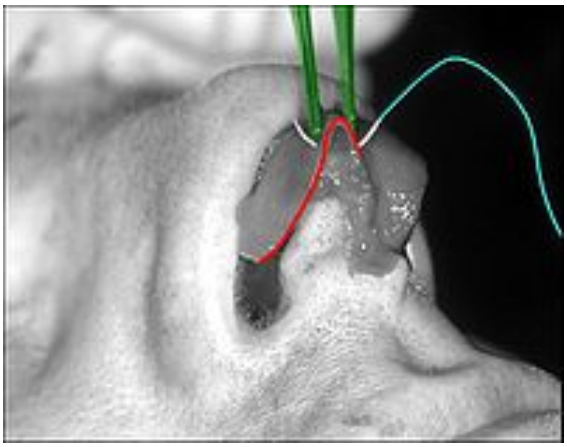
Open rhinoplasty- technique

Open rhinoplasty is a particularly challenging surgery since there may be several ways to accomplish the same goal, each with nuances that must be incorporated into the final outcome. The M-arch model, which expands on Anderson's tripod theory, can be utilized to aid the surgeon in comprehending how the various operations interact dynamically, particularly with regard to how they affect the appearance of the tip.

Modern open rhinoplasty emphasizes on cartilage preservation and small, gradual adjustments to the bone foundation. Although it is outside the scope of this study to discuss every known procedure related to open rhinoplasty in detail, the following quickly outlines key crucial elements needed to complete a successful open rhinoplasty.(21)

Opening the nose: The mid-columellar inverted-V incision used in the open approach to the nose should be placed where the underlying cartilage is closest to the skin to prevent scar visibility and contracture. The transition from the mid-columellar incision to the marginal incisions is performed with the use of skin hooks and precise dissection (such as Converse scissors), being careful to protect the medial and lateral crura. To reveal the upper lateral cartilages (ULC), the soft tissue envelope is further reflected superiorly in the mostly avascular supra-perichondrial

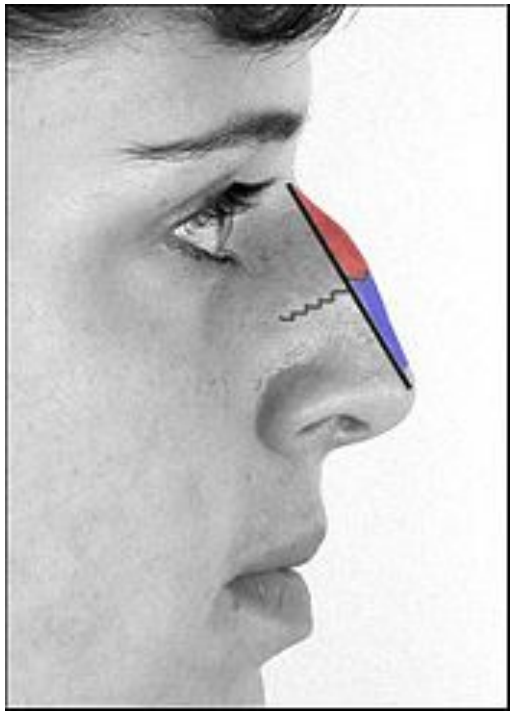
plane. Sharp dissection is now used to change the dissection plane over the ULC to a sub-perichondrial plane. The periosteum above the nasal bones is then raised to the nasofrontal angle using a periosteal elevator (such as the Joseph elevator). In order to expose the anterior septal angle (ASA) for septoplasty and/or septal cartilage harvesting, the lower lateral cartilages are then divided in the midline. With tenotomy scissor dissection, the columellar flap is lifted to the superior side of the medial crura. The skin on the nasal tip is then gently retracted and scissor dissected away from the alar cartilages. Dissection at the alar cartilage perichondrium level is a crucial component of this process. Necrosis of the columellar flap can occur on a superficial plane of dissection.By severing the intracrural ligament and raising the flap off the osseocartilaginous pyramid in the supraperiosteal plane, the nasal dorsum is more exposed. When necessary, undermining is done to the upper lateral cartilages and along the piriform borders to complete the exposure.



Open rhinoplasty: the nasal tip is sutured to narrow the nose.(19)

Septoplasty- The ASA is abruptly exposed, and a sub-mucoperichondrial pocket is formed bilaterally posteriorly beyond the septal bony-cartilaginous junction and caudally to the nasal spine. The top lateral cartilages may be abruptly released from the dorsal septum up to the nasal bones if the surgeon plans to use spreader grafts. At this time, septal cartilage can be removed, being careful to leave a 1.5 cm L-strut to maintain enough structural support. Basic septoplasty concepts are used to eliminate bony irregularities and/or spurs. Furthermore, any caudal septal irregularities can be fixed by a "swinging-door" operation combined with the excision of surplus inferior-caudal septal cartilage.(22)

Dorsal hump reduction- Osteotomes (like Rubin) and rasps are used in tandem to treat a noticeable bony hump. Under direct view, the cartilaginous dorsum is quickly decreased without damaging the nasal mucosa or upper lateral cartilages (which will be cut later or utilized as spreader flaps). Because of the thin skin that covers this area, the hump at the level of the rhinion should be left somewhat higher than the rest of the dorsal skeleton in order to achieve a straight dorsum. The surgeon should also be cognizant of the visual illusion created by nasal dorsal reduction, which is cephalad tip rotation. Spreader grafts or flaps: These are typically made of previously harvested septal cartilage grafts that are stitched in a sub-mucoperichondrial pocket between the native cartilaginous septum and ULC using a series of horizontal mattress sutures in order to address middle vault (internal nasal valve) collapse and reconstruct disrupted dorsal aesthetic lines. In contrast, spreader flaps (auto-spreaders) are a possibility if sufficient ULC height is still present following the cartilaginous dorsal hump reduction procedure.



Rhinoplastic correction: A nasal-hump excision plan; the black line delineates the dorsal plane of the new nose. (19)

Stabilizing the nasal base is something that should ideally be done before shaping the nasal tip. If the projection, rotation, and nasolabial angle do not need to be changed, a columellar strut (cartilage inserted end-to-end with the caudal septum into a pocket between the medial crura) can be utilized to give support to the tip without changing the location of the tip. In addition, the caudal septal extension graft (cartilage put end-to-end or side-to-side with the septum) or the tongue-in-groove procedure may be used to treat projection and rotation.(23)

The nasal tip- The open tip strategy allows for the most effective tip modification. Depending on the deformity, tip augmentation, elevation, support, projection, and/or alteration may be necessary. Depending on the desired effect, the columella can be lengthened or made smaller. The septum or the angle can be deepened or enhanced to change the nasolabial angle. Columellar strut or on lay grafts can be implanted, and under close supervision, suture fine-tuning or cartilage scoring can be done as necessary to further shape the tip. According to research by Bitik et al, primary open rhinoplasty may not require columellar strut grafts if the natural anatomical support systems of the nose tip are preserved or rebuilt. In the study, 100 patients underwent the procedure without the use of strut grafts, and it was discovered that postoperatively, the nasal tip projections and rotations achieved in these patients, as well as the nasal profile proportions obtained, statistically significantly matched preoperative goals.(24) According to a research by Bertossi et al., the pull-up spreader high (PUSH) approach improves nasal airflow while also offering long-term stability with regard to cosmetic alterations following open rhinoplasty. 50 patients who had PUSH rhinoplasty were included in the research, and the cosmetic outcomes—upward rotation and definition of severely depressed nasal tips—were still regarded as appealing at the 3-year follow-up. Three years after surgery, patients felt that their nasal airflow had improved, however acoustic rhinomanometry revealed that in one patient, airflow had deteriorated from its preoperative condition.

Dorsal augmentation- To enhance the appearance of the nose, the surgeon should make adjustments to the dorsum after setting the tip projection/rotation. If there is a need for dorsal augmentation, the surgeon can use a radix graft made of soft tissue such as temporalis fascia or diced cartilage in fibrin glue to lift the starting point of the nose. For minor dorsal augmentation, the surgeon can use a single or stacked septal cartilage onlay graft. For more significant augmentations, diced cartilage wrapped in surgical or temporalis fascia is preferred. However, if

the surgeon desires to further reduce the dorsal height, they can do so by using gentle push rasping or by excising the dorsal cartilage with precision(18)

The alar cartilages- Depending on the desired change, parts of the alar cartilages can be removed or added to. With the help of sutures or excisional procedures (such as for cleft lip and nasal deformity), the domes can be made symmetrical. Alar collapse and internal nasal valve blockage can both be treated with grafts.

Osteotomies- An open book deformity (caused by a previously removed hump) is closed, deviated nasal bones are straightened, and the breadth of the bony dorsum and sidewalls are narrowed using precise incisions in the bone. Depending on the existing bone abnormalities and intended goal, this can be accomplished using a mix of several osteotomy procedures (such as medial, intermediate, and lateral).(25) To achieve the desired contour of the nasal bones, the surgeon can perform lateral osteotomies in the same way as with a closed rhinoplasty. This involves making a small incision over the piriform fossa and using a 2-mm guarded osteotome to create a greenstick fracture of each nasal bone. The degree of osteotomy is determined by the surgeon and is performed in a low-to-high fashion. In some cases, the surgeon may also need to perform medial osteotomies to contour the rhinion appropriately.

Closure- As long as a sufficient coapting of the septum was achieved, it is optional to sew a septal splint (for example, cut silicone sheet) in place. Following that, the transcolumellar incision is stitched shut with either interrupted permanent (6-0 or 7-0 nylon) or fast-absorbing sutures, the latter of which provides a similar cosmetic result without the pain of suture removal. Interrupted absorbable sutures (5-0 fast) are used to seal the marginal incisions. (18)

Taping and casting: To assist lessen postoperative edema, adhesive flesh-colored tape is softly placed from the nasofrontal angle to the supratip. In order to support the tip at the desired level of rotation, a longer strip is wrapped around the infratip lobule. Next, a thermoplastic splint material that softens and becomes malleable when exposed to hot water and solidifies when it cools is used to apply a nasal cast. Both nares are covered with antibiotic ointment, and a

mustache dressing is added. Nasal packing, which is generally discouraged, could be used in situations where there is severe bleeding.(20)

Open rhinoplasty- complications

Less than 0.7% of people experience major problems during rhinoplasty, including hematoma, infection, pulmonary difficulties, and venous thromboembolism. Epistaxis, ecchymosis, edema, and patient discontent due to ongoing or new functional and/or aesthetic impairments are more frequent postoperative consequences following rhinoplasty.(26)

The following are some potential complications that may arise from open rhinoplasty:

Tombstone deformity: when a rigid shield tip graft causes a visible graft under the nasal soft tissue envelope.

Rocker deformity: when lateral osteotomies proceed too far upward, causing the superior nasal bone to be pushed outward while the inferior nasal bones are medialized.

Inverted-V deformity: following hump reduction, where there is a visible triangular shadowing due to a lack of continuity between the upper lateral cartilages and the nasal bones. This complication can be mitigated by routinely placing spreader grafts after hump removal.

Polly beak deformity: due to over-resection of the bony dorsum, under-resection of the cartilaginous dorsum, or relative deprojection of the lower nasal third. This creates tip/supra-tip fullness with no discernible supra-tip break.

Ski slope deformity: due to excessive hump reduction, creating a nose that appears overly scooped. This complication can be prevented by using cold compresses and frequently palpating the soft tissue envelope during surgery.

Saddle nose deformity: caused by loss of septal support, leading to middle vault depression, columellar retrusion, tip overrotation, tip deprojection, and nasal shortening. This complication can be prevented by preserving the 1.5 cm septal L-strut.

Nasal bossae: caused by asymmetries in the cartilaginous framework, resulting in a knob-like protuberance of the alar cartilages.

Open roof deformity: caused by incomplete lateral osteotomies, leading to a palpable or visible separation of the nasal bones over the dorsum.

It is important to note that the need for revision rhinoplasty in primary open rhinoplasty cases is relatively low at 3%.(27)

Closed rhinoplasty – preparations

There is often less damage of soft tissue support with endonasal rhinoplasty than with open procedures. Although visualization is less effective than these latter methods, it is still possible to improve the airway and achieve significant aesthetic benefits by applying and adhering strictly to a set of rules. Reduced operating times, quick recovery, less postoperative edema, little scar contracture, and a speedier return to normal look are all benefits of the endonasal approach. Due to the soft tissue envelope's preservation in an endonasal approach, profile adjustments are typically simpler to assess. When done correctly in a few cases, endonasal rhinoplasty usually leads to a quicker recovery after surgery. In general, open procedures will be more beneficial for patients who have significant nose tip abnormalities with obvious asymmetries. Both strategies will be successful for all other patients.

The preoperative study of the patient's problems and nasal abnormalities is crucial to a successful rhinoplasty. Correctly focused rhinoplasty techniques can then be facilitated by accurate identification of cosmetic and functional issues. The first step in the patient evaluation is to pay attention to the patient's key demands and concerns. Despite the fact that the majority of patients seek to have rhinoplasty for aesthetic reasons, it is important to remember the nose's functional role. It is crucial to ask about nasal function, particularly in individuals who may have undiscovered functional nasal issues. Many patients' nasal airways may be improved by nasal surgery if functional difficulties are identified before surgery. The patient's psychological stability, capacity to comprehend the dangers and advantages of the suggested operation, and feeling of body self-image must all be assessed, just as with any plastic surgery process.(28)

The patient's demands, the patient's nasal anatomy, and the surgeon's suggestions based on aesthetic standards all influence the rhinoplasty procedure's aesthetic aims. The patient's

preferences might not always align with the surgeon's ideal rhinoplasty result. During the preoperative consultation, the surgeon should go over the rhinoplasty plan and any recommendations with the patient. Only until both parties have a complete knowledge of the intended outcomes of the rhinoplasty should the surgeon move on.

The nose's cosmetic and functional attributes are related via anatomical study. The posterior septal deviations, septal spurs on the nasal floor, and larger turbinates brought on by allergies are frequently disregarded. The patient's worry about bilateral nasal obstruction may be a marker of external valve collapse brought on by a flail ala in the absence of severe nasoseptal deviation. In such circumstances, a nasal speculum supporting the lateral aspect of the nostril should enhance subjective nasal airflow. Significant nasal blockage can also be caused by an ineffective internal nasal valve. Internal nasal valve issues are more common in patients with narrow middle vaults, a history of prior rhinoplasty, or shorter nasal bones. The size and contribution of the nasal bones to the dorsum's shape can be determined by palpating them. Nasal humps often have a higher cartilaginous component and are osseocartilaginous. The degree of nasal tip rebound felt after pressing against the tip can be used to infer some information about the structural integrity of nasal tip structures and overall support systems. Bimanual intranasal examination with a gloved finger can assist in determining the size of the nasal spine and the orientation of the caudal septal cartilage. The nasal skin's soft tissue envelope's thickness can also be estimated by palpation.(29)

Closed rhinoplasty- technique

The two major kinds of endonasal methods are delivery approaches and nondelivery approaches. Patients with severe alar cartilage asymmetry, cephalic lateral crural placement, prior rhinoplasty, and extremely thin alar cartilages should be planned endonasal incisions with caution. In these circumstances, surgeons must craft their incisions more precisely in accordance with the existing anatomy. To prevent incorrect cartilage excision while adopting a nondelivery technique, the alar cartilages must be thoroughly palpated and delineated. The transcartilagenous approach continues to be the fundamental method for regular closed rhinoplasty. In this method, we first identify the cephalic and caudal margins of the lower lateral cartilage's lateral crus, then we make an intracartilaginous incision through the vestibular skin that is only 5 to 8 mm cephalic

to the caudal margin of the lateral crus. We use scissors to slice the vestibular skin free in a cephalic direction, just past the lateral crus' cephalic border. Then, by dissecting superficially to it in the supraperichondrial plane, we incise the lateral crural cartilage and release the cephalic portion from its remaining soft-tissue attachments. Indications for a cartilage delivery technique where these defects may be immediately observed and corrected include the need for grafting of the lower lateral cartilages, excess projection, abnormally angulated crura, or severely malformed alar cartilages. The delivery method, which is often identical to an open procedure, enables direct view of the lower lateral cartilages.(30)

An incision is made along the lower lateral crura's caudal edge and continues medially to the medial crus on both sides to expose the tissue. If necessary for exposure, it may extend down the columella. A bipedicled flap is supplied into the surgical area by an intercartilagenous incision, enabling the required tip modification. With cephalic trim, intradomal, and interdomal sutures as well as cross hatching techniques, the alar cartilages can now be improved. Much of the structural support necessary for the external shape of the nasal tip is provided by the lower lateral cartilages. Nasal tip support mechanisms must be sturdy enough to withstand the long-term contractile pressures caused by scarring as well as the red raping of the soft tissue skin envelope. Reduced nasal bulbosity, a modest supratip break, increased alar cartilage pliability for additional tip-defining operations, and minor degrees of cephalic tip rotation can all be achieved with cephalic excision of the lower lateral cartilages. The need to retain at least 6-8 mm of alar cartilage more with weaker cartilage must be highlighted. Alar collapse, supratip pinching, bosses, asymmetries, and other unpleasant outcomes may emerge over time as a result of excessive alar cartilage excision. Both nondelivery and delivery techniques can be used for cephalic resection. Common cartilaginous asymmetries may be easily observed when employing the delivery method. To achieve appropriate symmetry while removing cartilage, it is useful to concentrate on how much cartilage is left behind.(8)

The delivery method for surgical manipulation is necessary for suture fixation procedures. The domal angle between the lateral and medial crura can be reduced by inserting horizontal mattress sutures intra-abdominally. Tip narrowing, cephalic rotation, and a modest (1-2 mm) increase in projection may be accomplished in conjunction with a cautious cephalic trim. To enhance the symmetry of the newly formed domal outlines, intradomal sutures can be applied to each dome

separately. Alar domes are connected by interdomal sutures. Interdomal cartilages can shorten the space between the paired domes, aid in achieving ultimate symmetry, and strengthen the nasal tip structurally. Additionally, the medial crura can be suture-fixed to one another to provide additional support, address buckling, or straighten out other medial crural asymmetries. Alar cartilages can also be suture-fixed to the caudal septum to provide extra stability.

By making exact niches for the insertion of the required grafts, cartilage grafts can be put using a nondelivery approach. Alternately, the access made possible by the delivery method may be advantageous for suture fixation of grafts or the implantation of a larger graft. To conceal or increase as necessary, several types of cartilage grafts can be inserted into small, targeted niches. Patients with thin skin should employ caution since such grafting may be visible through the skin. In these situations, contouring and sculpting the borders of the grafts might reduce the visibility of their shape through thin skin. A columellar strut could be required in individuals who are preoperatively severely under-projected in order to allow for proper projection. The positioning of columnar struts enables stronger projection of the nose. A columellar strut can be fastened using one of two main strategies. The strut is initially inserted through the marginal incision, over the nasal tip and domes, and then into a columellal pocket. This approach offers a fair amount of help. The second procedure is placing the strut between the medial crural space and dissecting through the medial crus on one side.(31)

Through the use of this technique, the strut can be restored or further projected at the nasal tip. Avoid keeping the strut in place for too long. The nasal tip's leading edge shouldn't be the strut. In situations of thick skin, Polly-beak deformities, revision rhinoplasty in cases of excessively resected original procedures, nasal tip hypoplasia, the plunging tip, and the cleft nasal deformity, tip grafting should be performed sparingly to promote tip projection and refinement. Use in those with thin skin should only be done very carefully. These grafts can be positioned precisely in pockets, fastened in delivery patients under direct vision, or fastened with a transcutaneous temporary suture at the proper location. In general, patients will experience a more natural-looking long-term result from broader, thinner grafts or multiple smaller grafts than from thicker, smaller grafts. On lay grafts are effective treatments that may help conceal imperfections in contour over the remaining osseocartilagenous structure. Most patients seem to have a good

long-term result with crushed or diced cartilage transplants put in exact areas without overcorrection. (29)

The tongue-in-groove method offers strong stability and extra support to the tip in patients with sufficiently projected noses or somewhat over-projected noses. The key idea is that the stable septum is fixed with the medial crura, which overlap and overlap with it. The tongue-in-groove corrects the tip ptosis, hanging columella, and extra nasal length. The dorsal line may be shortened and the upper lip lengthened as a result of the tongue-in-groove. Medial cartilage and septal overlap contribute to increased medial crural strength.(32)

The positioning of alar batten grafts in situations of lower lateral cartilage weakness varies from surgeon to surgeon. Preoperatively, the region of greatest collapse or weakening is often indicated. Dissection is done through a marginal incision to provide a precise space for the cartilage graft implantation. Additional sutures are frequently not required for additional stabilization after the batten has been fastened. Alar batten placement will improve the nose's triangularity and structure and stop the unwelcome squeal caused by exterior valve failure.

Sheen first proposed the use of spreader grafts to open the internal nasal valve and enhance the transition between bone and cartilage. The endonasal route is the best method for placing the transplant when there is a blockage of the airway. The internal nasal valve will be able to open up to its fullest extent because to the graft's submucosal insertion. Along the dorsum, between the septum and upper lateral cartilage, a select pocket is formed. A suture can be inserted slightly inferior to where the graft would lie to ensure that the pocket is not disturbed. The little pocket is then raised using a small freer. The upper lateral cartilage will be pushed laterally by the graft's placement. Suture stabilization is not essential in a precise pocket. After such a procedure, on lay grafts or an extramucosal technique might be necessary if the middle vault still appears to be narrow in relation to the nasal bone.(33)

Like the rest of the nose, the nasal base adds to the nose's cosmetic and functional qualities. Numerous variables, such as the alar cartilages' orientation, strength, angle of insertion onto the face, and nasal tip projection, can affect how much the alar base widens and how much the ala flares. A technique for narrowing the base is alar base resection. It entails complete excision of the skin and soft tissue underneath in the region of the nostril sill. Along with narrowing the base, a slightly more lateral placement of the excision into the insertion of the ala can also lessen

excessive alar flare. The medial crura and their footplates pressing into the nostrils may cause the columellar base to enlarge unattractively and, possibly, restrict airflow. Suture fixation or, in extremely rare circumstances, partial footplate amputations can be used to bring such significantly divergent medial crural footplates together. The medial footplates and medial crura can be suture-fixed to provide additional support for the lower section of the nose.(34)

In the nose, the middle vault plays a significant functional and cosmetic significance. Where the top lateral cartilages and septum converge in the middle vault is where the internal nasal valve is located. The interior nasal valve is where nasal airflow encounters the most resistance. Nasal blockage may occur if its function is affected. There is often a sizable cartilaginous component to the majority of dorsal convexities (humps). Any hump reduction may jeopardize and destabilize the upper lateral cartilages' connection, impairing valve function internally. Scarring, inferomedial displacement of the upper lateral cartilages, or excision of upper lateral cartilages can all lead to post-rhinoplasty nasal valve impairment. Long-term cosmetic issues such an inverted-V deformity, nasal sidewall asymmetries, middle vault constriction, and even saddling might be brought on by unstable upper lateral cartilages. Spreader grafts can be used to lessen or resolve such issues. Between the septum and the upper lateral cartilages, subperichondrial tunnels can be used to insert spreader grafts. Spreader grafts that are strategically positioned work to reduce the likelihood of inferomedial collapse of the upper lateral cartilages, retain or enhance middle vault width, and increase the internal nasal valve's cross-sectional area.(35)

Closed rhinoplasty- complications

Patients who have had rhinoplasty should get postoperative care that maximizes patient comfort, lowers nasal edema, and offers immobilization and stability of the nose. Steri-Strips or strips cut from medical brown tape are put on the nose right after the rhinoplasty to lessen swelling, firmly immobilize protruding bone fragments, and cushion the nasal cast. The surgeon can impact the healing and scarring of the nose by using tape. Typically, the nasal cast is worn for 5 to 6 days.

The nasal cast needs to be kept dry and should not be removed or touched by the patient. The unfavorable psychological effects of initial post rhinoplasty bruising and edema on the patient

can also be lessened with the use of nasal taping and casting. Some people recommend using nasal tape for a prolonged amount of time for several weeks to impact successful recovery.

Systemic antibiotics and nasal packings are not frequently utilized. Oral antibiotics are begun to lower the risk of toxic shock syndrome if nasal packs are used. Patients undergoing septal surgery or those who may be at risk of developing intranasal synechiae are fitted with plastic or silicone intranasal splints. The intranasal splints are removed after a simple septoplasty in 5–6 days.

Prior to surgery, patients are informed about the possibility of transient swelling and discoloration of the periorbital and nasal region following rhinoplasty. Along with offering emotional support during the first few days following surgery, reassure the patient once more that edema and ecchymosis typically go away in two to three weeks. Complete edema resolution in some cases might take up to 6 months. Small injections (0.3 mL) of Kenalog 20 can be used to treat supratip edema beginning in week 3 and continuing once a month. In order to reduce the chance of tissue loss and skin atrophy, these injections must be given deeply. The nasal skin is carefully cleaned with gauze and an adhesive solvent once the cast has been removed. Photographs of the early postoperative surgery outcome may be taken during this appointment. If additional trauma compromises the patient's surgical outcome, these early photos may become crucial medical evidence. (29)

Breathing problems: One of the most frequent side effects of endonasal rhinoplasty is trouble breathing through the nose. This may happen as a result of edema, the development of scar tissue, or incorrect repair of the nasal tissue. Additional surgery might be necessary in some circumstances to address this problem.

Infection: Endonasal rhinoplasty is no different from other surgical procedures in that it entails a risk of infection. An infection at the incision site can cause discomfort, fever, edema, and redness. An infection can develop and result in catastrophic problems if it is not treated.

While bleeding is a common side effect of any surgery, endonasal rhinoplasty patients may experience excessive bleeding. Numerous things, such as poor healing or the use of blood-thinning medications, can contribute to this. Endonasal rhinoplasty requires making incisions and

adjusting the nasal tissue, which may cause localized nerve injury. As a result, the nose or the surrounding regions may become numb or lose their sensibility.

Cosmetic concerns: Endonasal rhinoplasty is a challenging treatment that demands a high level of skill and accuracy. In rare instances, the surgery's outcomes could not live up to the patient's expectations, leading to aesthetic problems including asymmetry or an unnatural look.

Unfavorable scarring: Endonasal rhinoplasty aims to reduce visible scarring at the incision site, however there is still a chance of it happening. The aesthetic outcome of the treatment may be impacted in some instances if the scarring is more obvious or prominent than anticipated.(36)

It's important to remember that these consequences are quite uncommon and that with appropriate surgical technique and postoperative care, they may frequently be prevented or minimized. In order to get the greatest results, patients seeking endonasal rhinoplasty should have a detailed discussion with their surgeon about the risks and advantages of the treatment.

Conclusion

The popular cosmetic and reconstructive operation known as rhinoplasty, sometimes known as nose surgery, can enhance the nose's look and functionality. Choosing between an open or closed approach when considering rhinoplasty is one of the most important considerations that patients and doctors must make. The choice ultimately comes down to the particular demands and objectives of the patient because both treatments offer benefits and drawbacks.

Endonasal rhinoplasty, commonly referred to as closed rhinoplasty, is a procedure that leaves no outward scars after performing incisions inside the nostrils. As there is less trauma to the nasal tissues, this method enables quicker healing and less swelling. For individuals who just need modest alterations to their nose, closed rhinoplasty is a suitable alternative since it is less invasive than open rhinoplasty.

Open rhinoplasty, sometimes referred to as external rhinoplasty, on the other hand, entails creating an incision across the columella, the band of tissue that divides the nostrils. With improved access to the nasal structures provided by this method, more comprehensive alterations

and changes are possible. Patients who need significant alterations to the size, function, or appearance of their nose, such as repairing a deviated septum or rebuilding the nasal tip, benefit most from open rhinoplasty.

Open rhinoplasty may cause more obvious scars and a longer recovery period, although these risks have decreased thanks to improvements in surgical methods and technology. Additionally, open rhinoplasty enables more accurate and precise surgical outcomes, which may lead to more pleasing outcomes for patients.

The choice between open and closed rhinoplasty ultimately comes down to the patient's specific anatomy, the degree of the desired changes, and the surgeon's experience and preferences. To decide which method is best for their particular requirements and objectives, patients should speak with a board-certified plastic surgeon who has expertise with both procedures.

In conclusion, both open and closed rhinoplasty procedures have advantages and disadvantages, and the choice of which to employ relies on the patient's particular requirements and objectives. Patients may make an educated choice and get the greatest results from their rhinoplasty surgery by consulting with a skilled and experienced cosmetic surgeon.

References

1. Carvalho B, Ballin AC, Becker RV, Berger CAS, Hurtado JGGM, Mocellin M. Rhinoplasty and facial asymmetry: Analysis of subjective and anthropometric factors in the Caucasian nose. Int Arch Otorhinolaryngol. 2012 Oct;16(4):445–51.

2. Shaye DA. The history of nasal reconstruction. Curr Opin Otolaryngol Head Neck Surg [Internet]. 2021 Aug;29(4):259–64. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8270507/

3. PALMA P, KHODAEI I, BERTOSSI D, VASILENKO I, ALQAHTANI A, ALAA SHAWKAT S, et al. Hybrid rhinoplasty: beyond the dichotomy of rhinoplasty techniques. Acta Otorhinolaryngol Ital [Internet]. 2013 Jun;33(3):154–62. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3709530/

4. Plastic Surgery Statistics [Internet]. American Society of Plastic Surgeons. Available from: https://www.plasticsurgery.org/news/plastic-surgery-statistics

5. Tip Rhinoplasty: History of the Procedure, Problem, Indications. 2023 Feb 27 [cited 2023 Apr 6]; Available from: https://emedicine.medscape.com/article/1292616-overview#a10

6. Human nose. In: Wikipedia [Internet]. 2023. Available from: https://en.wikipedia.org/w/index.php?title=Human_nose&oldid=1151833847

7. Hafezi F, Naghipour R, Naghibzadeh B, Ashtiani AK, Forghani SF. Practical Classification of Upper Lateral Cartilage in Middle Vault Asymmetry. Plast Reconstr Surg. 2020 Jun;145(6):1410–7.

8. Basic Closed Rhinoplasty: Background, History of the Procedure, Problem. 2022 Aug 9; Available from: https://emedicine.medscape.com/article/1291976-overview#showall

9. Lund VJ, Stammberger H, Fokkens WJ, Beale T, Bernal-Sprekelsen M, Eloy P, et al. European position paper on the anatomical terminology of the internal nose and paranasal sinuses. Rhinol Suppl. 2014 Mar 1;24:1–34.

10. Fichman M, Piedra Buena IT. Rhinoplasty. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. Available from: http://www.ncbi.nlm.nih.gov/books/NBK558970/

11. Dinis PB, Dinis M, Gomes A. Psychosocial consequences of nasal aesthetic and functional surgery: a controlled prospective study in an ENT setting. Rhinology. 1998 Mar;36(1):32–6.

12. Khan N, Rashid M, Khan I, Ur Rehman Sarwar S, Ur Rashid H, Khurshid M, et al. Satisfaction in Patients After Rhinoplasty Using the Rhinoplasty Outcome Evaluation Questionnaire. Cureus [Internet]. 11(7):e5283. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6764642/

13. Shaydakov ME, Tuma F. Operative Risk. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Available from: http://www.ncbi.nlm.nih.gov/books/NBK532240/

14. Slavin SA, Goldwyn RM. The cocaine user: the potential problem patient for rhinoplasty. Plast Reconstr Surg. 1990 Sep;86(3):436–42.

15. Yazici ZM, Sayin I, Erdim I, Gunes S, Kayhan FT. The effect of tobacco smoking on septoplasty outcomes: a prospective controlled study. Hippokratia [Internet]. 2015;19(3):219–24. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938468/

16. Swamy RS, Sykes JM, Most SP. Principles of photography in rhinoplasty for the digital photographer. Clin Plast Surg. 2010 Apr;37(2):213–21.

17. Aksu I, Alim H, Tellioğlu AT. Comparative columellar scar analysis between transverse and inverted-V incision in open rhinoplasty. Aesthetic Plast Surg. 2008 Jul;32(4):638–40.

18. Raggio BS, Asaria J. Open Rhinoplasty. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Available from: http://www.ncbi.nlm.nih.gov/books/NBK546628/

19. Rhinoplasty. In: Wikipedia [Internet]. 2023. Available from: https://en.wikipedia.org/w/index.php?title=Rhinoplasty&oldid=1151150781

20. Ishii LE, Tollefson TT, Basura GJ, Rosenfeld RM, Abramson PJ, Chaiet SR, et al. Clinical Practice Guideline: Improving Nasal Form and Function after Rhinoplasty Executive Summary. Otolaryngol--Head Neck Surg Off J Am Acad Otolaryngol-Head Neck Surg. 2017 Feb;156(2):205–19.

21. Daniel RK. The Preservation Rhinoplasty: A New Rhinoplasty Revolution. Aesthet Surg J. 2018 Feb 17;38(2):228–9.

22. Heppt W, Gubisch W. Septal surgery in rhinoplasty. Facial Plast Surg FPS. 2011 Apr;27(2):167–78.

23. Open Rhinoplasty - StatPearls - NCBI Bookshelf [Internet]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK546628/#

24. Revisiting the role of columellar strut graft in primary open approach rhinoplasty. [Internet]. Read by QxMD. Available from: https://read.qxmd.com/read/25811564/revisiting-the-role-of-columellar-strut-graft-in-primary-open-approach-rhinoplasty

25. Azizzadeh B, Reilly M. Dorsal Hump Reduction and Osteotomies. Clin Plast Surg. 2016 Jan;43(1):47–58.

26. Layliev J, Gupta V, Kaoutzanis C, Ganesh Kumar N, Winocour J, Grotting JC, et al. Incidence and Preoperative Risk Factors for Major Complications in Aesthetic Rhinoplasty: Analysis of 4978 Patients. Aesthet Surg J. 2017 Jul 1;37(7):757–67.

27. Spataro E, Piccirillo JF, Kallogjeri D, Branham GH, Desai SC. Revision Rates and Risk Factors of 175 842 Patients Undergoing Septorhinoplasty. JAMA Facial Plast Surg [Internet]. 2016 May;18(3):212–9. Available from: https://www.liebertpub.com/doi/full/10.1001/jamafacial.2015.2194

28. Becker DG, Ransom E, Guy C, Bloom J. Surgical Treatment of Nasal Obstruction in Rhinoplasty. Aesthet Surg J [Internet]. 2010 May 1;30(3):347–78. Available from: https://doi.org/10.1177/1090820X10373357

29. MD CC MD, Murat Songu. The Endonasal Approach [Internet]. Rhinoplasty Archive. 2011. Available from: https://www.rhinoplastyarchive.com/articles/rhinoplasty-fundamentals/endonasal-approach-overview-personal-philosophy

30. Rhinoplasty Tip-shaping Surgery - StatPearls - NCBI Bookshelf [Internet]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK567750/

31. SCATTOLIN A, D'ASCANIO L. Grafts in "closed" rhinoplasty. Acta Otorhinolaryngol Ital [Internet]. 2013 Jun;33(3):169–76. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3709525/

32. Kridel RW, Scott BA, Foda HM. The tongue-in-groove technique in septorhinoplasty. A 10-year experience. Arch Facial Plast Surg. 1999;1(4):246–56; discussion 257-258.

33. Samaha M, Rassouli A. Spreader graft placement in endonasal rhinoplasty: Technique and a review of 100 cases. Plast Surg [Internet]. 2015;23(4):252–4. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4664141/

34. Park SS. Fundamental Principles in Aesthetic Rhinoplasty. Clin Exp Otorhinolaryngol [Internet]. 2011 Jun;4(2):55–66. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3109328/

35. Nasal Aerodynamics: Overview, Nasal Resistance, Clinical Evaluation of the Nose [Internet]. Available from: https://emedicine.medscape.com/article/874822-overview

36. Rettinger G. Risks and complications in rhinoplasty. GMS Curr Top Otorhinolaryngol Head Neck Surg [Internet]. 2008 Mar 14;6:Doc08. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3199839/