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RHINOPLASTY: MODERN SURGICAL APPROACHES, FUNCTIONAL AND AESTHETIC RESULTS

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Abstract
Rhinoplasty, one of the most complex and in-demand procedures in plastic and reconstructive surgery, aims to correct the shape of the nose and restore its respiratory function. This article presents a comprehensive review of modern principles, techniques, and clinical aspects of rhinoplasty. The aim of the study is to analyze the evolution of surgical techniques, compare open and closed approaches, evaluate indications for surgery, and systematize data on preoperative planning, postoperative management, and potential complications. Particular attention is paid to the integration of functional and aesthetic goals, a key principle of modern rhinoplasty. Based on a review of the literature and clinical data, it is concluded that the success of rhinoplasty directly depends on a thorough diagnosis, an individualized surgical approach, realistic patient expectations, and strict adherence to rehabilitation protocols. The study results emphasize the role of rhinoplasty not only in improving patients' quality of life by restoring nasal breathing but also in achieving a harmonious aesthetic result that corresponds to the anatomical features and the patient's wishes.

Keywords: Rhinoplasty, septoplasty, plastic surgery of the nose, open rhinoplasty, closed rhinoplasty, functional aesthetics of the nose, deformation of the nasal septum, postoperative complications, surgical approaches.

Introduction

The nose, occupying a central position on the face, plays a decisive role in the formation of facial aesthetics and is a critical organ for respiratory function. Rhinoplasty, a surgical discipline at the intersection of art and science, has a dual purpose: correcting the external shape of the nose and optimizing its internal anatomy for unimpeded breathing [1, p. 10]. Historically, the development of rhinoplasty has evolved from purely reconstructive procedures, described in ancient Indian texts, to highly precise aesthetic and functional surgeries using digital modeling and minimally invasive techniques.

The relevance of this topic is driven by the high prevalence of both congenital and acquired nasal deformities, as well as the growing social demand for aesthetic correction. According to international plastic surgery societies, rhinoplasty consistently ranks among the top 5 most frequently performed cosmetic surgeries worldwide. At the same time, a modern approach dictates a rejection of cookie-cutter solutions in favor of personalized surgery that takes into account the unique ethnic, anatomical,

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and functional characteristics of each patient [2]. The choice of surgical strategy (open vs. closed approach, techniques for working with the osteochondral framework) is a complex decision that determines both immediate intraoperative monitoring and the long-term stability of the result.

Therefore, the aim of this study is to systematically analyze modern rhinoplasty techniques, their advantages, limitations, and clinical outcomes. The study's objectives include:

1. Comparative characteristics of open and closed surgical approaches.
2. Analysis of indications and contraindications for rhinoplasty, including age criteria.
3. Overview of the key stages of the operation: osteotomy, correction of the bridge and tip of the nose, septoplasty.
4. Assessment of the postoperative period, possible complications and factors influencing patient satisfaction.

LITERATURE REVIEW

A historiographic analysis of the development of rhinoplasty demonstrates the evolution from crude reconstructive attempts to precise, predictable, and anatomically sound surgery. Classic works such as those of J.R. Anderson and M.E. Tardy laid the foundation for understanding the biomechanics of the nasal framework and the importance of preserving supporting structures [3]. A.E. Belousov and K.P. Pshenisnov made fundamental contributions to the Russian school of plastic surgery , detailing the principles of reconstruction for post-traumatic and congenital deformities [4, p. 215].

A central topic in contemporary literature is the debate about the choice of surgical approach. Proponents of **closed rhinoplasty** (endonasal approach) emphasize such advantages as the absence of an external scar, less postoperative swelling, and a faster recovery [5]. However, this approach provides limited visualization of the surgical field, which places the highest demands on the surgeon's experience. **Open rhinoplasty** , popularized in the 1970s , involves making a small incision along the columella (bicolumellar incision), which ensures direct and complete exposure of the osteochondral skeleton of the nose. This approach is recognized as the "gold standard" for complex primary and all secondary (revision) rhinoplasties, as it allows for accurate diagnosis, complex reconstruction, and stable fixation of grafts [6, p. 45].

A separate area of rhinoplasty is **functional rhinoplasty** , which is inextricably linked to **septoplasty** . A deviated septum, hypertrophy of the nasal turbinates, and collapse of the internal or external nasal valves are the main causes of nasal breathing problems. Modern research confirms that isolated correction of aesthetic problems without consideration of functional impairments can lead to deterioration of breathing in the long term [7].

A technological breakthrough in the last decade has been the introduction of **preoperative 3D computer modeling and simulation** , which significantly improves communication between the surgeon and the patient, helping to form realistic expectations [2].

DISCUSSION

1. Surgical approaches: comparative analysis of “open” and “closed” methods

The choice of approach is the cornerstone of surgical planning and should be based on individual anatomy, the goals of the procedure, and the experience of the surgeon.

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Open rhinoplasty provides unprecedented exposure of all nasal structures: the paired superolateral cartilages, the medial crura, and the caudal septum. This allows for precise manipulations, such as complex nasal tip reconstruction using suture techniques (suture). techniques), installation of spacers (spreader) grafts) and supporting (columellar strut) grafts, precise correction of asymmetry. The method is especially indispensable for secondary rhinoplasties, severe deviations, and the need for complex septoplasty . Its main disadvantages are longer-lasting swelling of the nasal tip (can persist for up to a year) and the presence of a minimal but visible scar on the columella, the quality of which depends on the suturing technique [6, p. 48].

Closed rhinoplasty is performed through intranasal incisions, eliminating external scarring. Recovery is generally faster. However, limited visualization makes the method less predictable for complex deformities requiring extensive framework reconstruction. This technique is optimal for isolated corrections (e.g., removal of a small hump on the nasal dorsum) in patients with elastic skin and simple anatomy [5].

2. Integration of aesthetic and functional objectives

The modern paradigm of rhinosurgery views aesthetics and function as two sides of the same coin. For example, narrowing the bony vault during osteotomy to improve aesthetics can lead to stenosis of the internal nasal valve and respiratory impairment. To prevent this, spreader grafts are used. Grafts , which simultaneously support the middle third of the nose and widen the valve angle, are used. Correction of a drooping nasal tip (ptosis) not only improves the profile but also often widens the nasal inlet area. Therefore, each stage of aesthetic correction should be analyzed for its impact on airflow dynamics.

3. Indications, contraindications and age aspects

Indications for rhinoplasty are divided into:

1. Functional: difficulty breathing through the nose due to septum deviation, turbinate hypertrophy, post-traumatic deformation, and valve insufficiency.
2. Aesthetic: congenital or acquired deformities (hump, saddle-shaped deformity, asymmetry), dissatisfaction with the size or shape of the nose (wide, long, fleshy tip, etc.).
3. Reconstructive: restoration of the nose after resection due to cancer, severe injuries, burns.

Absolute contraindications include unstable mental illnesses (dysmorphophobia), bleeding disorders, and decompensated somatic pathologies. **The age requirement** (14-16 years for girls, 16-18 for boys) is related to the need for the facial skeleton to complete growth. Surgery performed before this age may result in impaired nasal development.

4. Postoperative period, complications and satisfaction factors

Recovery after rhinoplasty is lengthy and requires patience. Significant swelling and bruising are observed in the first 7-10 days, and nasal packing is present. Swelling of the nasal tip with an open approach may take up to 12 months to resolve. Early complications include hematoma, infection, and suture reaction. Late complications include respiratory distress (15-20% of cases, often associated

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with an undiagnosed valvular problem), the need for revision surgery (5-15%), asymmetry, and residual dorsal deformity.

Research shows that key factors in patient satisfaction are [7]:

1. Achieving realistic, pre-agreed goals.
2. Restoration or improvement of nasal breathing.
3. A natural result that harmonizes with facial features, not a radical change.
4. Professional management during the postoperative period and honest information about the timing of the final result.

CONCLUSION

Rhinoplasty remains one of the most complex and highly skilled procedures in plastic surgery. Its success is determined not by the technical execution of individual techniques, but by a comprehensive approach integrating a deep understanding of nasal anatomy and biomechanics, accurate diagnosis of functional disorders, a clear understanding of the patient's aesthetic ideals, and impeccable surgical planning. Current trends indicate the prevalence of the open approach for most complex cases due to its predictability and controllability, while the closed approach retains its niche for limited corrections.

A major achievement of recent years is the definitive recognition of the inextricable link between nasal form and function. Techniques aimed at stabilizing the nasal framework and strengthening supporting structures have become the standard, achieving not only aesthetically pleasing but also durable and functionally complete results. The future of rhinoplasty lies in the continued miniaturization of instruments, the use of next-generation biocompatible and absorbable implants, and the increased use of artificial intelligence in preoperative planning and outcome prediction. The implementation of these innovations, while maintaining fundamental surgical principles, will improve the safety, effectiveness, and patient satisfaction of rhinoplasty.

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