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Treatment Outcomes of Patients undergoing Secondary Rhinoplasty

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ABSTRACT:

Background. Secondary rhinoplasty is one of the most challenging procedures in aesthetic and reconstructive nasal surgery due to pronounced scar tissue formation, limited availability of autologous cartilage, and distortion of anatomical landmarks. Improving surgical strategies and objectively evaluating treatment outcomes remain important challenges in contemporary rhinoplasty.

Objective. To evaluate the clinical efficacy of secondary rhinoplasty in patients with unsatisfactory functional and aesthetic outcomes following primary surgical intervention.

Materials and Methods. The treatment outcomes of patients who underwent secondary rhinoplasty were analyzed. Treatment efficacy was assessed based on a comprehensive clinical examination, nasal endoscopy, photographic documentation, evaluation of nasal breathing, and patients' subjective satisfaction with the aesthetic and functional outcomes of treatment. Preoperative and postoperative parameters were compared.

Results. The use of an individualized surgical approach enabled restoration of the anatomical integrity of the external nose, improvement of nasal breathing function, and achievement of favorable aesthetic outcomes. The majority of patients reported a significant improvement in quality of life and high satisfaction with the treatment outcomes. The incidence of postoperative complications and revision procedures was minimal.

Conclusion. Secondary rhinoplasty, when performed with thorough preoperative planning, individualized selection of reconstructive techniques, and the use of modern surgical technologies, is an effective approach for correcting functional and aesthetic abnormalities following primary rhinoplasty. This approach provides stable long-term outcomes and a high level of patient satisfaction.

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INTRODUCTION

Rhinoplasty is one of the most widely performed procedures in modern plastic and reconstructive facial surgery. Despite continuous advances in surgical technologies, preoperative planning methods, and postoperative patient management, unsatisfactory functional and aesthetic outcomes following primary procedures remain a significant clinical problem that may require secondary rhinoplasty [1]. According to the contemporary literature, the rate of revision surgery following primary rhinoplasty ranges from 5% to 20%, depending on the complexity of the initial deformity, the surgeon's experience, and the characteristics of postoperative scar formation [2, 3].

Secondary rhinoplasty is considered one of the most challenging procedures in rhinoplasty because the surgeon must operate in the setting of altered anatomy, pronounced scar tissue formation, deficiency of structural support, and limited availability of autologous cartilage graft material [4, 5]. Furthermore, distortion of the natural anatomical landmarks considerably complicates the reconstructive stages of surgery and increases the risk of recurrent complications [6].

The main reasons for patients seeking secondary rhinoplasty include unsatisfactory aesthetic outcomes, impaired nasal breathing, external nasal asymmetry, deformities of the nasal tip and dorsum, internal or external nasal valve collapse, and postoperative scar-related changes [7, 8]. In many cases, functional impairments are accompanied by significant psychological distress, decreased self-esteem, and reduced quality of life [9].

In recent years, the capabilities of reconstructive rhinoplasty have expanded considerably owing to the introduction of advanced computer modeling techniques, precision surgical techniques, endoscopic guidance during selected stages of the procedure, and the use of various auto-, allo-, and biomaterials for reconstruction of the nasal structural framework [10, 11]. Autologous cartilage grafts harvested from the nasal septum, auricle, and rib remain the preferred options because of their high biocompatibility and long-term structural stability [12].

Comprehensive preoperative assessment is of particular importance and includes clinical examination, nasal endoscopy, computed tomography of the paranasal sinuses, objective assessment of nasal breathing, and standardized photographic documentation [13, 14]. The combination of these diagnostic methods makes it possible to identify the underlying causes of an unsatisfactory outcome following the primary procedure and to develop an optimal surgical strategy [15].

Current studies demonstrate that the success of secondary rhinoplasty depends not only on the surgeon's technical expertise but also on the appropriate selection of reconstructive techniques, an individualized approach to each patient, and meticulous adherence to the principles of preserving the structural support of the external nose [16, 17]. Furthermore, the assessment of treatment efficacy should encompass not only aesthetic outcomes but also restoration of physiological nasal breathing, quality-of-life measures, and patient satisfaction with the achieved results [18].

Despite the accumulated global experience, the selection of optimal surgical strategies for various types of postoperative nasal deformities remains the subject of active scientific debate [19]. The need for further improvement of diagnostic methods, reconstructive technologies, and objective assessment of treatment outcomes underscores the continuing relevance of research focused on secondary rhinoplasty [20]. Therefore, a comprehensive analysis of clinical treatment outcomes in patients undergoing secondary rhinoplasty is of considerable practical importance for improving the effectiveness of surgical correction and reducing the rate of subsequent revision procedures [21].

Materials and Methods

The study was conducted at the Department of Otorhinolaryngology of the Multidisciplinary Clinic of Tashkent State Medical University. The study included 28 patients who underwent secondary rhinoplasty because of unsatisfactory functional and/or aesthetic outcomes following primary surgical intervention.

All patients underwent a comprehensive preoperative assessment, including detailed medical history taking, clinical examination, endoscopic evaluation of the nasal cavity, standardized photographic documentation, and computed tomography (CT) when clinically indicated. The assessment focused on the morphology and structural integrity of the external nose, nasal airway function, and the type and severity of postoperative nasal deformities.

The effectiveness of surgical treatment was evaluated based on clinical findings, functional outcomes, the incidence of postoperative complications, and patient-reported satisfaction with the achieved aesthetic and functional results during the postoperative follow-up period.

RESULTS

Analysis of treatment outcomes in patients undergoing secondary rhinoplasty constituted an important clinical component of the present study. This group comprised 28 patients with a history of previous rhinoplasty, septoplasty, or septorhinoplasty who presented with persistent or recurrent aesthetic deformities of the external nose and/or impaired nasal breathing. For detailed clinical analysis, these patients were classified as a separate subgroup (Group I-B).

The primary objective of secondary rhinoplasty was not limited to correction of the external nasal contour. The surgical approach also aimed to reconstruct the osteocartilaginous framework compromised by previous surgical intervention, restore adequate structural support of the nasal tip, correct irregularities of the nasal dorsum, improve the patency of the internal and external nasal valves, and achieve stable long-term functional and aesthetic outcomes (Table 1).

Table 1. Main Clinical and Functional Findings in Patients Undergoing Secondary Rhinoplasty

Clinical and Functional Finding	Number of Patients (n = 28)	Proportion, %
Residual or recurrent deformity (deviation) of the external nose	19	67.9
Irregularity of the nasal dorsal contour	18	64.3
Inadequate dorsal support or saddle-nose deformity	11	39.3
Middle vault collapse or inverted-V deformity	12	42.9
Inadequate nasal tip support	24	85.7
Asymmetry of the nostrils and nasal base	15	53.6
Internal or external nasal valve insufficiency	21	75.0
Residual nasal septal deviation	24	85.7

Analysis of the data demonstrated that functional and aesthetic abnormalities frequently coexisted in patients requiring secondary rhinoplasty. The most common findings were residual nasal septal deviation, inadequate nasal tip support, and internal or external nasal valve insufficiency. These findings indicate that the surgical strategy for secondary rhinoplasty should not be limited to correction of the external nasal contour alone but should incorporate comprehensive reconstruction of the osteocartilaginous framework and restoration of functional nasal integrity.

To achieve stable reconstructive outcomes in secondary rhinoplasty, the anatomical structures of the nose were systematically assessed according to five principal functional–anatomical modules: dorsal support, the L-shaped septal framework, the middle vault and internal nasal valve, the nasal tip–columellar support complex, and the nasal alar–nostril complex. This modular approach enabled the identification of weakened, deficient, or structurally compromised anatomical components in each patient and facilitated selection of the most appropriate reconstructive technique to restore both functional and aesthetic nasal parameters (Table 2).

Table 2. Main Surgical Components Performed During Secondary Rhinoplasty

Surgical Component	Number of Patients (n = 28)	Proportion, %
Septal correction	24	85.7
Osteotomy	22	78.6
Nasal dorsal correction or augmentation	25	89.3
Restoration of nasal tip support	24	85.7
Nasal valve reconstruction or structural support	21	75.0
Use of autologous grafts	26	92.9

Note: Values are presented as the number and percentage of patients in the secondary rhinoplasty cohort (n = 28). Multiple surgical components could be performed in the same patient; therefore, the percentages are not mutually exclusive.

The most frequently performed surgical component in secondary rhinoplasty was the use of autologous grafts, which were employed in 26 patients (92.9%). Nasal dorsal correction or augmentation was performed in 25 patients (89.3%), whereas septal correction and restoration of nasal tip support were each performed in 24 patients (85.7%).

These findings indicate that a key objective of reconstructive surgery for secondary nasal deformities is the restoration and reinforcement of the supporting structures of the nasal osteocartilaginous framework. This approach facilitates simultaneous improvement in both functional and aesthetic outcomes by re-establishing structural stability and appropriate nasal support (Table 3).

Table 3. Types of Autologous Grafts and Outcomes of Their Use in Secondary Rhinoplasty

Type of Autologous Graft	Number of Patients	Proportion, %	Purpose of Use
Residual septal cartilage	7	25.0	Restoration of septal support and correction of minor contour irregularities
Auricular cartilage	9	32.1	Reconstruction of the nasal alae and nostrils and correction of localized contour defects
Costal cartilage	10	35.7	Dorsal augmentation and reconstruction of a robust structural support framework
Diced cartilage wrapped in fascia	6	21.4	Smoothing of dorsal irregularities and stabilization of the nasal dorsal contour

Selection of the appropriate autologous graft was based on the available anatomical donor resources, the extent of dorsal support deficiency, the condition of the nasal valve region, and the integrity of the nasal tip support complex. Costal cartilage was used predominantly in patients with substantial dorsal support deficiency and in cases requiring reconstruction of a robust structural framework. Auricular cartilage was primarily employed for reconstruction of the nasal alae and nostrils, as well as for correction of localized soft-tissue contour defects.

This individualized approach to autologous graft selection enabled reliable reconstruction of deficient nasal anatomical structures, improvement in nasal function, and achievement of stable aesthetic outcomes (Table 4).

Table 4. Concordance Between 3D Modeling Data and Intraoperative Findings

Parameter	Planned Based on 3D Modeling, n	Confirmed Intraoperatively, n	Concordance, %
Need for septal correction	24	23	95.8
Nasal dorsal reconstruction	25	24	96.0
Restoration of nasal tip support	24	23	95.8
Nasal valve reconstruction or structural support	21	20	95.2
Need for autologous grafting	26	26	100.0

The analysis demonstrated a high degree of concordance between the reconstructive procedures planned on the basis of preoperative 3D modeling and the corresponding intraoperative findings. The need for autologous grafting was confirmed intraoperatively in all cases (100%). Concordance between preoperative planning and intraoperative findings for septal correction, nasal dorsal reconstruction, restoration of nasal tip support, and nasal valve reconstruction ranged from 95.2% to 96.0%.

These findings demonstrate the high accuracy of three-dimensional modeling as a preoperative planning tool in secondary rhinoplasty. The use of 3D modeling enabled objective assessment of the required extent of reconstructive intervention and facilitated optimization of the surgical strategy (Figure 1).

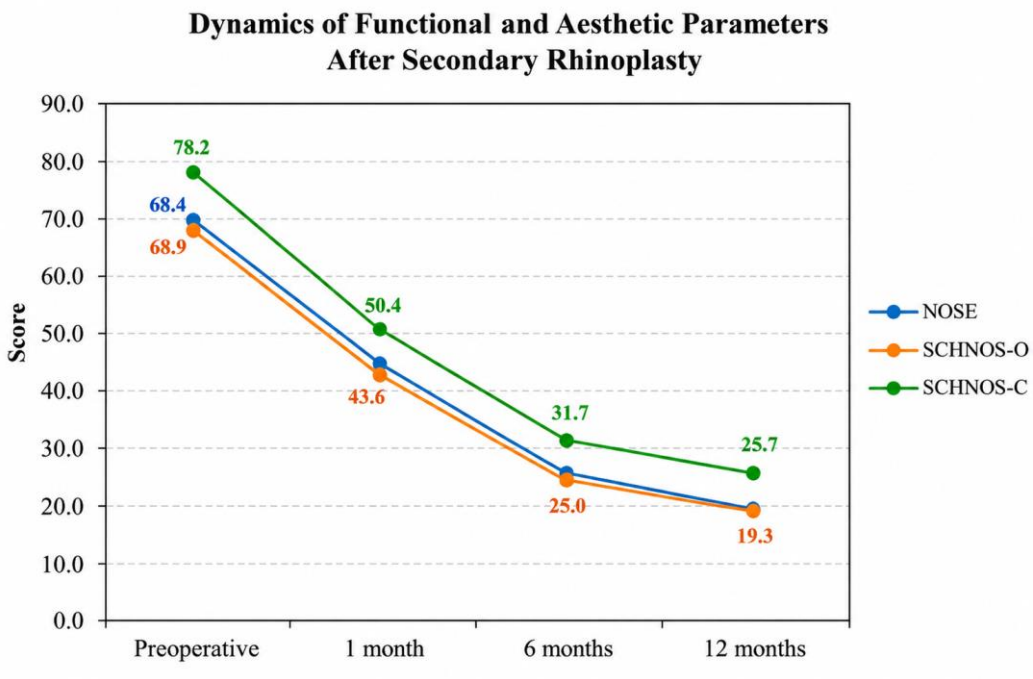

Figure 1. Changes in NOSE and SCHNOS Scores Following Secondary Rhinoplasty

Analysis of functional outcomes demonstrated a progressive improvement in nasal breathing during the postoperative follow-up period. The mean Nasal Obstruction Symptom Evaluation (NOSE) score decreased from 70.4 ± 8.1 points preoperatively to 19.6 ± 5.4 points at 12 months after secondary rhinoplasty, indicating a substantial reduction in the severity of nasal obstruction.

A similar favorable trend was observed for the SCHNOS-O and SCHNOS-C subscales, which reflect the functional and aesthetic domains of nasal outcomes, respectively. Both scores showed a consistent decrease throughout the follow-up period, indicating progressive improvement in nasal airway function and aesthetic appearance, accompanied by greater patient satisfaction with the surgical outcomes.

Overall, these findings demonstrate favorable functional and aesthetic outcomes following secondary rhinoplasty, with improvements maintained throughout the 12-month follow-up period. The observed changes support the effectiveness of secondary rhinoplasty in correcting functional impairment and achieving stable aesthetic outcomes (Figure 2).

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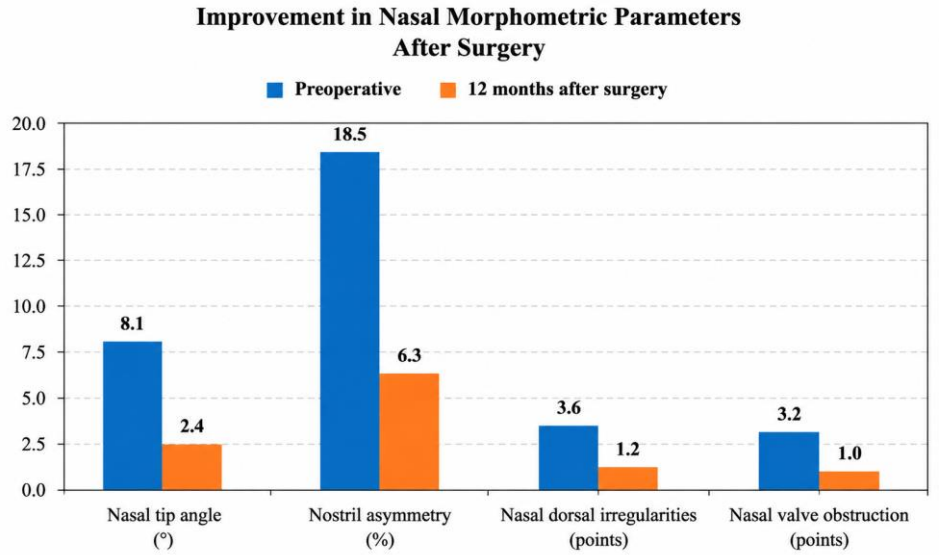

Figure 2. Changes in Morphometric Parameters Following Secondary Rhinoplasty

Morphometric analysis demonstrated a significant improvement in the principal parameters of the external nose following secondary rhinoplasty. The most pronounced improvements were observed in external nasal axis deviation, nostril asymmetry, dorsal irregularities, and nasal valve obstruction. Specifically, external nasal axis deviation decreased from **8.1 ± 1.7° to 2.4 ± 0.8°**, while the nostril asymmetry index decreased from **18.5 ± 4.2% to 6.3 ± 2.1%**. These findings indicate a substantial improvement in both frontal and basal symmetry of the external nose following reconstructive surgery.

During the postoperative period, patients underwent regular clinical, functional, and photometric follow-up. In the early postoperative period, soft-tissue edema, moderate nasal tip stiffness, and transient sensory disturbances were observed; however, these manifestations gradually resolved in most patients over the course of follow-up. **No serious infectious complications or cases of autologous graft rejection were recorded.**

Minor residual contour irregularities were identified in **2 patients (7.1%)**, while persistent functional discomfort was also reported in **2 patients (7.1%)**. Revision surgery was required in only **1 patient (3.6%)**, supporting the favorable effectiveness and safety profile of the secondary rhinoplasty technique employed in this study (Figure 3).

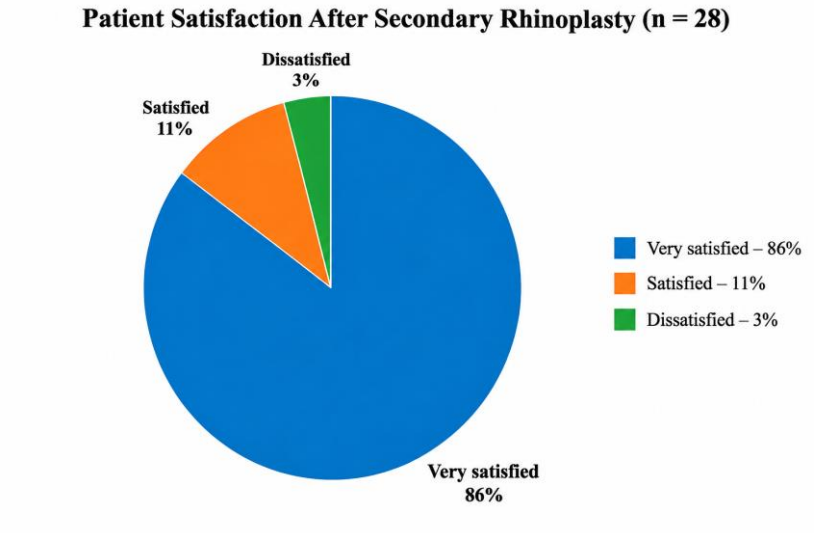

Figure 3. Patient Satisfaction with the Outcomes of Secondary Rhinoplasty

At the final assessment, **24 patients (85.7%)** achieved good or excellent functional and aesthetic outcomes. In **3 patients (10.7%)**, the treatment outcomes were rated as satisfactory. Only **1 patient (3.6%)** required additional follow-up. Comprehensive analysis demonstrated that the use of **3D modeling–based preoperative planning** facilitated more effective reconstruction of the nasal osteocartilaginous framework, stabilization of the nasal valve region, and improvement in functional outcomes following secondary rhinoplasty.

CONCLUSIONS

Analysis of secondary rhinoplasty outcomes demonstrated that the most common abnormalities following previous surgical interventions were weakening of the nasal osteocartilaginous framework, irregularities of the nasal dorsal contour, inadequate nasal tip support, and internal or external nasal valve insufficiency. Accordingly, the reconstructive strategy was directed not only toward correction of the external nasal contour but also toward restoration of the principal anatomical support structures of the nose.

The use of **three-dimensional modeling during preoperative planning** enabled prospective determination of the required extent of reconstructive intervention, objective assessment of the need for autologous grafting, and minimization of intraoperative modifications to the planned surgical strategy. The high degree of concordance between the reconstructive procedures planned on the basis of 3D modeling and the corresponding intraoperative findings supports the **clinical utility and practical reliability of this approach** in the surgical correction of secondary nasal deformities.

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