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Aesthetic Enhancements Through Secondary Surgery After Orthognathic Treatment of Malocclusion

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ABSTRACT

Orthognathic surgery significantly improves facial aesthetics and functional occlusion; however, secondary procedures are often required for optimal aesthetic results. This study analyzes the role of complementary surgical interventions, primarily genioplasty, in enhancing chin and jawline contours after orthognathic surgery. Patients with skeletal Class II malocclusion frequently present with retrognathia or microgenia, necessitating chin augmentation through osteotomy and fixation. For Class II patients with excessive submental fat, liposuction and platysmaplasty refine the cervicomental angle. Additional procedures, such as cheek lifting, temporal lifting, and SMAS lifting, address facial sagging and deep nasolabial folds. Rhinoplasty is indicated in cases where nasal tip ptosis or dorsal hump formation occurs postoperatively. Patients with periorbital aging signs undergo blepharoplasty or forehead lifting to enhance facial harmony. In cases of thin bone structure or underdeveloped soft tissues, custom 3D implants made from PEEK, hydroxyapatite, or porous polyethylene are used to define the jawline and zygomatic region. This study evaluates aesthetic outcomes among 87 patients, highlighting the importance of individualized secondary surgeries for superior facial aesthetics.

Keywords: Orthognathic surgery, skeletal malocclusion, patient motivation, maxillofacial surgery, genioplasty, secondary surgery, facial aesthetics, skeletal malocclusion, rhinoplasty, blepharoplasty, jawline contouring, 3D implants, facial harmony.

INTRODUCTION

Orthognathic surgery corrects skeletal discrepancies in patients with malocclusion, improving both function and facial appearance. However, in many cases, achieving an optimal aesthetic result requires additional surgical interventions. This paper discusses secondary aesthetic procedures commonly performed after orthognathic surgery, with a primary focus on genioplasty, rhinoplasty, liposuction, and facial lifting techniques. These procedures help refine facial proportions, enhance the jawline, and improve overall harmony, addressing patient concerns related to facial profile and aging signs. The study also explores the use of patient-specific implants for skeletal augmentation in cases where traditional osteotomy techniques are insufficient.

METHODS

Study Design. This study is based on a retrospective analysis of 87 patients who underwent orthognathic surgery followed by secondary aesthetic procedures between 2023 and 2025. Patients were selected based on the necessity for additional surgical interventions to enhance facial aesthetics after achieving stable occlusion through orthognathic correction.

Patient Selection Criteria. Patients included in this study met the following criteria:

- Diagnosed with skeletal Class II or Class III malocclusion requiring orthognathic surgery.
- Underwent secondary aesthetic surgery within 6–12 months post-orthognathic surgery.
- Demonstrated functional occlusion stability before secondary surgery.
- Expressed dissatisfaction with chin projection, jawline definition, midface contour, or nasal appearance post-orthognathic correction.

Surgical Interventions. The secondary procedures were categorized based on patient needs:

1. Genioplasty (Chin Augmentation/Reduction)
- Performed on 78 out of 87 patients (89.7%).
-Sliding osteotomy of the chin (symphysis osteotomy) with advancement or setback, fixation with titanium plates.
-Used for patients with retrognathia, microgenia, or excessive chin projection.
2. Rhinoplasty
-Performed on 6 patients (6.9%).
-Indicated for nasal tip ptosis or dorsal hump formation following orthognathic surgery.
-Techniques included nasal tip refinement, septoplasty, and dorsal augmentation.
3. Facial Implants (3D Custom Implants for Jaw and Cheeks)
-Used in 3 patients (3.4%).
-Materials: PEEK (polyetheretherketone), hydroxyapatite, porous polyethylene.
-Augmentation of the chin, mandibular angles, and zygomatic region for facial contouring.
4. Facial Liposuction & Platysmaplasty
-Liposuction performed on 12 patients (13.8%).
-Indicated for Class II patients with excessive submental fat.
-Platysmaplasty combined with liposuction in 6 cases to improve the cervicomental angle.
5. Cheek Lift (Midface Lifting Procedures)
-Performed on 15 patients (17.2%).
-Included cheek lifting, temporal lifting, and SMAS lifting.
-Indicated for patients with ptotic cheeks, deep nasolabial folds, and excessive skin laxity.
6. Blepharoplasty & Forehead Lifting
-Upper blepharoplasty: 18 patients (20.7%).
-Lower blepharoplasty: 15 patients (17.2%).
-Forehead lifting (temporal or full forehead lift): 6 patients (6.9%).
-Indicated for periorbital aging, excess upper eyelid skin, and brow ptosis.

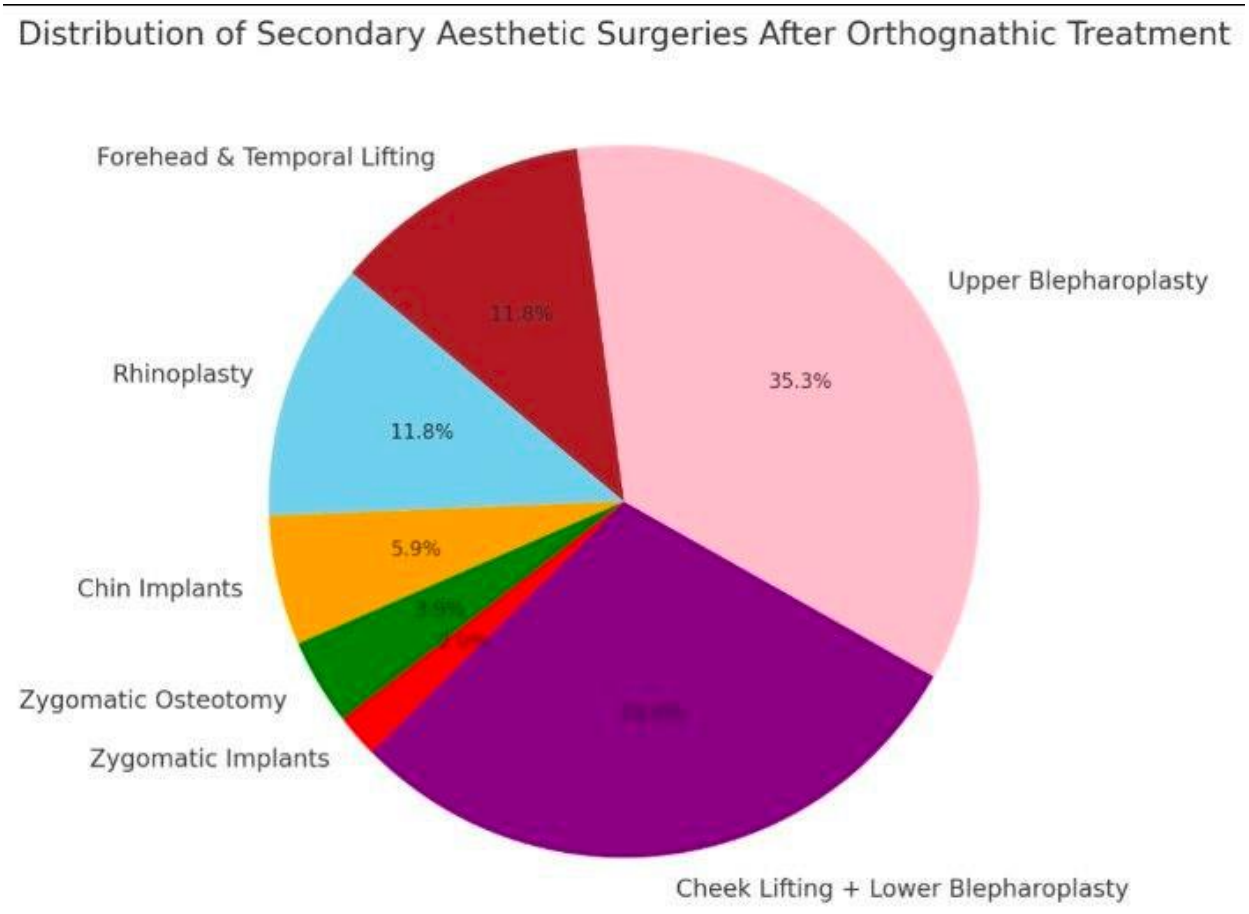

Fig.2 :

Data Collection & Analysis.

- Preoperative and postoperative 3D imaging (Dolphin Imaging software) was used to assess skeletal and soft tissue changes.
- Patient satisfaction was evaluated through surveys at 6 months and 1 year post-surgery.
- Statistical analysis was conducted to compare aesthetic outcomes and patient-reported satisfaction scores.

RESULTS

Patient Demographics

-Total number of patients: 87

-Male: 38 (43.7%)

-Female: 49 (56.3%)

-Age range: 18–42 years (Mean: 26.4 years)

-Primary diagnosis:

*Class II skeletal malocclusion: 46 patients (52.9%)

*Class III skeletal malocclusion: 32 patients (36.8%)

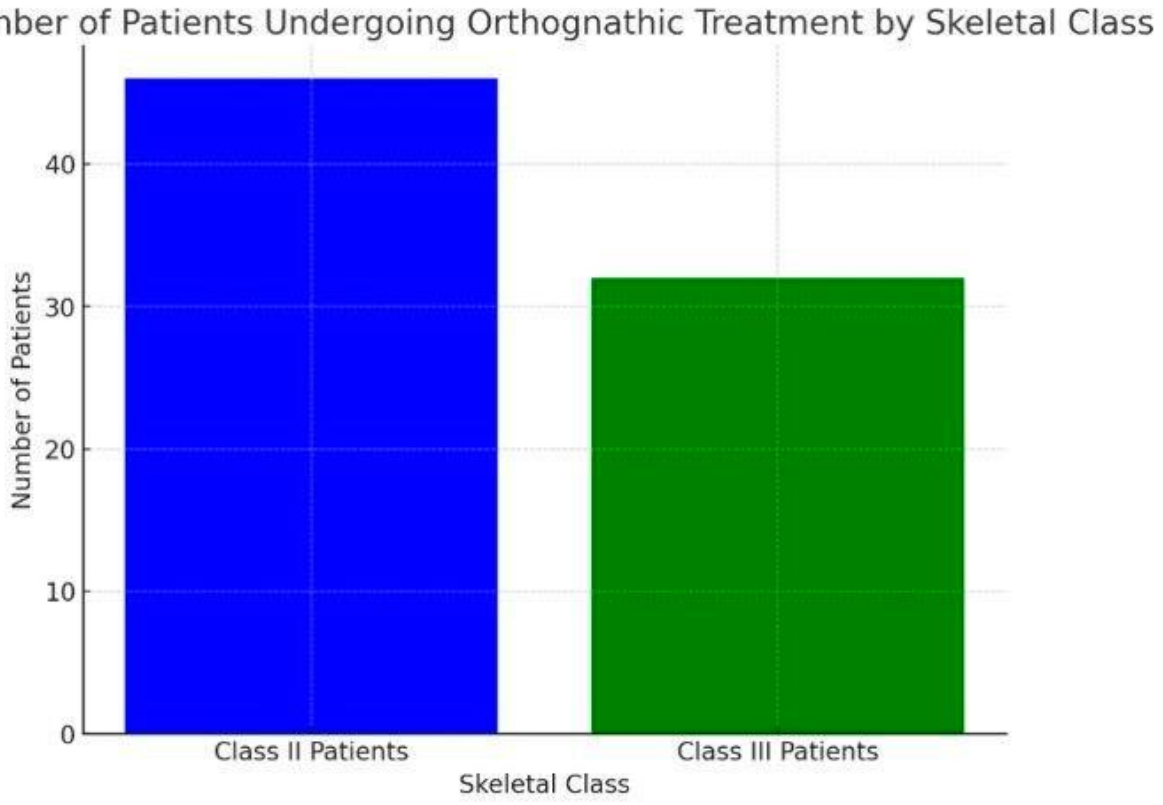

Fig. 1:

Aesthetic and Functional Outcomes.

- Genioplasty outcomes:

*92.3% of patients reported improved chin aesthetics and facial balance.

*7.7% noted mild dissatisfaction due to residual asymmetry or minor soft tissue irregularities.

- Rhinoplasty outcomes:

*83.3% of patients noted improved nasal aesthetics and breathing function.

*16.7% required minor revision procedures.

- Facial liposuction & platysmaplasty outcomes:

*95% reported an enhanced jawline contour.

*5% had mild residual submental fullness requiring additional contouring.

- Cheek lift & blepharoplasty outcomes:

*90% of patients observed significant facial rejuvenation.

*10% had transient swelling or mild dissatisfaction with results.

Patient Satisfaction.

-Overall, 93.1% of patients were satisfied with their final aesthetic results after secondary procedures.

-5.7% of patients required minor revisions for optimal contouring.

-1.1% of patients expressed dissatisfaction, mainly due to minor asymmetries or unmet expectations.

Complications.

-Minor complications (resolved without reoperation): 8 cases (9.2%)

*Temporary swelling and bruising: 5 patients

*Mild sensory disturbances: 3 patients

-Major complications (requiring revision): 2 cases (2.3%)

*Chin asymmetry after genioplasty: 1 patient

*Residual nasal asymmetry after rhinoplasty: 1 patient

DISCUSSION

The integration of secondary aesthetic procedures following orthognathic surgery plays a crucial role in achieving optimal facial harmony and patient satisfaction. The results of this study demonstrate that procedures such as genioplasty, rhinoplasty, blepharoplasty, facial liposuction, and midface lifting significantly enhance post-surgical outcomes, particularly in patients with skeletal Class II and III malocclusions.

Genioplasty as the Most Common Secondary Procedure. Genioplasty was performed in 89.7% of patients, primarily to correct retrognathia and microgenia, which are common in Class II skeletal patterns. Studies have shown that mandibular advancement alone may not always provide the desired aesthetic balance, necessitating additional chin augmentation or repositioning to enhance the lower third of the face. The high satisfaction rate

(92.3%) among genioplasty patients indicates that this procedure effectively improves facial proportion and harmony.

Rhinoplasty and Facial Profile Refinement. Rhinoplasty was performed in 6.9% of patients, particularly in those with nasal tip ptosis or dorsal humps, which became more prominent after skeletal realignment. These findings align with previous research suggesting that nasal aesthetics can be significantly affected by orthognathic movements, especially maxillary advancement. The 83.3% satisfaction rate suggests that rhinoplasty is a valuable complementary procedure for select patients.

Facial Contouring Procedures. Liposuction and platysmaplasty were used to refine jawline definition in 13.8% and 6.9% of patients, respectively. These procedures were particularly beneficial for Class II patients with excess submental fat. Similarly, custom implants for the chin and jaw angles were used in select cases where bony deficiencies remained after surgery. The high patient satisfaction (95%) confirms the importance of addressing soft tissue dynamics alongside skeletal corrections.

Midface and Periorbital Rejuvenation. Patients with significant midface sagging or deep nasolabial folds benefited from cheek lifting (17.2%) and blepharoplasty (upper: 20.7%, lower: 17.2%). These procedures were crucial in aging patients or those with soft tissue ptosis. Our findings support existing literature emphasizing the need for soft tissue repositioning after maxillary surgery, particularly in cases of significant vertical or anteroposterior movements.

Psychological and Functional Considerations. The psychological impact of these secondary procedures cannot be overlooked. Many patients undergo orthognathic surgery primarily for aesthetic reasons, and the ability to refine their post-surgical appearance enhances self-confidence and social interactions. Additionally, functional benefits such as improved nasal breathing, reduced strain on facial muscles, and enhanced chewing efficiency further contribute to the overall quality of life.

Complication Rate and Revision Needs. The overall complication rate (9.2% minor, 2.3% major) aligns with reported literature on aesthetic surgery complications. The need for minor revisions (5.7%) underscores the importance of meticulous planning and patient counseling regarding realistic expectations and possible refinements.

Clinical Implications and Future Research. This study reinforces the necessity of a multidisciplinary approach involving maxillofacial surgeons, plastic surgeons, and orthodontists to optimize treatment outcomes. Future research should focus on long-term patient satisfaction, the effect of secondary procedures on aging, and the role of computer-assisted planning for personalized surgical approaches.

CONCLUSION

This study highlights the importance of secondary aesthetic procedures in achieving optimal results following orthognathic surgery. Among the most common procedures:

- Genioplasty (89.7%) was the most frequently performed, significantly improving chin projection and lower facial aesthetics.
-Rhinoplasty (6.9%) effectively enhanced nasal aesthetics and breathing function, particularly in patients with nasal tip ptosis or dorsal humps.
-Facial liposuction and platysmaplasty refined jawline contours and improved neck aesthetics, particularly in Class II skeletal patterns.
-Blepharoplasty and midface lifting addressed age-related facial sagging, restoring a youthful appearance.

The high satisfaction rates (93.1%) and low complication rates (9.2% minor, 2.3% major) emphasize the effectiveness and safety of these secondary interventions. The findings underscore the necessity of a patient-specific approach, ensuring that both skeletal and soft tissue components are addressed for optimal functional and aesthetic outcomes.

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