



## REVIEW ARTICLE

### Different Concepts Based on Literature in Acquiring Facial Aesthetics in Hidden Orthognathic Patients

#### Gizli Ortognatik Hastalarında Yüz Estetiğinin Kazanılmasında Literatüre Dayalı Farklı Kavramlar

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#### ABSTRACT

**Objective:** Due to the large number of patients with slight skeletal disorders but without any functional limitations and the fact that these patients resort to achieving a more aesthetic appearance by permanent, simple and less risky methods, it was aimed to evaluate the feasibility and success of different facial shaping surgeries and their current conditions for these types of patients according to the literature.

**Materials-Methods:** This review was prepared by examining the literature and existing scientific studies, focusing on facial contour reshaping and facial fat pad repositioning surgeries. Surgical techniques, indications, advantages-disadvantages, results and patient satisfaction were evaluated.

**Results:** To alter the shape of the face, malarplasty (Intraoral bony shaving, Bicornal I-shape osteotomy, Intraoral I- or L-shape osteotomy, Intraoral and preauricular I- or L-shape osteotomy, Intraoral and preauricular wedge-sections osteotomy, Percutaneous osteotomy, and Transposition of fat pads), mandibular angloplasty (Mandibular lateral outer cortex splitting osteotomy, Mandibular angle osteotomy, V-line osteotomy), as well as Genioplasty may be performed. However, each procedure has its own risks and complications. Therefore, patient selection, presurgical evaluation, and postsurgical follow-up are important. Successful outcomes in face contouring surgeries can be achieved with proper patient selection and appropriate surgical planning.

**Conclusion:** In achieving facial harmony, facial contour reshaping and fat pad repositioning surgeries have been found to be easier to perform, both in terms of patient satisfaction and because they are less invasive surgeries. These surgeries can also be designed customized for the patient and will be performed in combination

**Keywords:** Fat pads, Orthognathic; Reshaping

#### ÖZET

**Amaç:** Hafif iskeletsel bozukluğu olan ancak fonksiyonel açıdan bir sınırlaması olmayan hasta sayısının fazla olması ve bu hastaların kalıcı, basit ve daha az riskli yöntemlerle daha estetik bir görünüm kazanmaya yönelmeleri nedeniyle, bu tip hastalar için farklı yüz şekillendirme ameliyatlarının uygulanabilirliği, başarısı ve güncel durumlarının literatüre göre değerlendirilmesi amaçlandı.

**Gereç-Yöntem:** Bu derleme, literatür ve mevcut bilimsel çalışmalar incelenerek, yüz konturunun yeniden şekillendirilmesi ve yüz yağ yastıklarının yeniden konumlandırılması ameliyatlarına odaklanarak hazırlandı. Cerrahi teknikler, endikasyonlar, avantaj-dezavantajlar, sonuçlar ve hasta memnuniyeti değerlendirildi.

**Bulgular:** Yüz şeklini değiştirmek için, malarplasti (Ağız içi kemik traşı, Bicornal I-şekilli osteotomi, Ağız içi I- veya L-şekilli osteotomi, Ağız içi ve preauriküler I- veya L-şekilli osteotomi, Ağız içi ve preauriküler wedge-sections osteotomi, Perkütan osteotomi ve yağ yastıklarının transpozisyonu), mandibular angloplasti (Mandibular lateral dış korteks bölme osteotomisi, Mandibular açığı osteotomisi, V hattı osteotomisi) ve Genioplasti yapılabilir. Ancak, her prosedürün kendine özgü riskleri ve komplikasyonları vardır. Bu nedenle hasta seçimi, cerrahi öncesi değerlendirme ve cerrahi sonrası takip önemlidir. Doğru hasta seçimi ve uygun cerrahi planlama ile yüz şekillendirme ameliyatlarında başarılı sonuçlar elde edilebilir.

**Sonuç:** Yüz uyumunun sağlanmasında, yüz konturunun yeniden şekillendirilmesi ve yağ yastığının yeniden konumlandırılması ameliyatlarının hem hasta memnuniyeti açısından hem de daha az invaziv ameliyatlar olması nedeniyle daha kolay uygulanabilir olduğu bulunmuştur. Bu ameliyatlar aynı zamanda hastaya özel olarak tasarlanabilmekte ve kombine olarak uygulanabilmektedir.

**Anahtar Kelimeler:** Yağ yastıkları; Ortognatik; Yeniden şekillendirme

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## INTRODUCTION

In various studies, it has been observed that facial structures differ among different races and that beauty standards vary across different cultures. While surgical correction of facial bones has traditionally been predominantly for functional purposes, it has become dramatically popular in recent years for cosmetic reasons as well<sup>1</sup>. When the bone structure is not in the correct position, the soft tissue also does not align properly<sup>2</sup>. Therefore, alongside facial contouring surgeries, significant changes in soft tissue can also be achieved through techniques such as transposition of fat pads<sup>3,4</sup>.

Facial beauty balance can be achieved surgically through the correction of the three main prominences of the face: the nose, the mid-face (malar region), and the jawline. The use of the body's own tissues is a progressive technique to reduce the risk of post-op infection against foreign body, to prevent the negativities brought by repeated fillers and fat injection procedure whose results cannot be predicted<sup>5</sup>.

Surgical decisions can vary depending on the perception of the physician and the patient's treatment needs<sup>6</sup>.

In the past, surgeons have often focused on reducing the width of the lower face by neglecting the width ratio of the lower and middle thirds of the face in both frontal and lateral views. Therefore, for more balanced facial proportions and optimal results, surgeons should objectively evaluate the facial contour as a whole and prepare a comprehensive treatment plan<sup>7</sup>.

In 2014, Ireland et al. developed the Orthognathic Functional Need Index (IOFTN) to objectively evaluate dentofacial deformities, which has shown adaptability across different cultures and populations<sup>6</sup>.

Furthermore, Ellenbogen and Karlin defined criteria for the ideal neck appearance from the profile view, stating that a cervicomental angle exceeding 120° would create an aesthetically unfavorable impression<sup>8</sup>.

Today, patients tend to prioritize their social profiles over photographic and analytical records, focusing on how they perceive themselves in the mirror<sup>8</sup>.

The aim of this study is to explore, in the light of the literature, how we can address patients' increasing aesthetic expectations through alternative and more easily applicable methods such as facial contouring surgeries and transposition of fat pads, beyond the predominantly performed orthognathic surgeries.

## I-Malarplasty

The zygoma stands out in the midface, shaping its overall appearance significantly<sup>9</sup>. It's essential to ensure seamless integration with neighboring regions<sup>9</sup>. There are eight different ways to perform malarplasty<sup>3,10,11</sup>. The procedure or procedures to be performed depend on the zygomatic prominence<sup>12</sup>. Procedures aimed at reducing zygomatic prominence include: Intraoral bony shaving, bicoronal I-shape osteotomy, intraoral I- or L-shape osteotomy, intraoral and preauricular I- or L-shape osteotomy, intraoral and preauricular wedge-sections osteotomy, percutaneous osteotomy<sup>7,10,12</sup>.

### 1- Intraoral bony shaving

With a small intraoral incision, the zygomatic bone body and lateral orbital wall are exposed. Following the contouring and refining of the zygomatic body, the incision is sutured<sup>10</sup>.

This procedure is typically reserved for cases with mild zygomatic prominence. However, its popularity is relatively low because of limitations such as a high postoperative recurrence rate attributed to hyperosteogeny and periosteal proliferation. Additionally, flattening only the zygomatic body can result in the face appearing wider than desired. Postoperative asymmetry and inadequate correction are also concerns associated with this method<sup>10</sup>.

### 2- Bicoronal I-shape osteotomy

Through a bicoronal incision, the superior zygomatic arch between the deep temporal fascia and the superficial temporal fat pad is exposed. Then, osteotomy lines are adjusted according to the prominence of the malar complex and an I-shaped osteotomy is performed in the inferomedial direction from the frontozygomatic suture along the zygomaticomaxillary suture. The mobilized zygoma is subsequently repositioned superoposteriorly and fixed with mini plates or wires<sup>10</sup>.

It provides bilateral symmetry with ease, is precise and predictable, preserves zygomatic contour and curvature, and allows for more accurate positioning of the zygomatic junction. This approach may be suitable for patients with pronounced zygomatic prominence who prefer to avoid noticeable scars on the cheek and who need a facelift. Creates a wide scar on the head as a disadvantage<sup>13</sup>. Different methods have been considered to minimize significant local swelling, promote a prompt healing process, and reduce the risk of damage to vital tissues<sup>10</sup>. As a late complication, after bicoronal reduction



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malarplasty, Giant maxillary mucocele formation has been reported<sup>14</sup>.

### 3- Intraoral I-or L-shape osteotomy

The zygomaticomaxillary complexes are exposed through an intraoral incision. Subsequently, the middle segment is released with an I-shaped osteotomy from the lateral to orbital wall and and L-shaped (2 parallel vertical lines and 1 oblique line) osteotomy from the medial part of the zygomatic body. It is then separated from the posterior zygomatic arch using a long-handled oscillating saw, repositioned medially, and fixed with a miniplate<sup>7,10</sup>.

In a meta-analysis examining complications in intraoral approaches, the most common complication after malarplasty performed with only intraoral approach was cheek drooping, which is one of the serious complications that would require revision surgery such as facelift. This was followed by transient sensory deficit, non-union, restriction in mouth opening, facial nerve injury, and bleeding<sup>2</sup>. Additionally, it was observed that the medialized segment damaged the maxillary sinus and caused skin shadowing due to poor fit<sup>10</sup>.

### 4- Intraoral and preauricular I-or L-shape osteotomy

In addition to the method performed only through the intraoral I- or L-shape osteotomy approach, a small incision is additionally made in the preauricular area in order to reduce scar formation and facilitate the fracture of the posterior zygomatic arch with the help of an osteotome<sup>7,10</sup>.

In the same meta-analysis examining the complications, the most common complication in the sideburn incision made in addition to the intraoral approach was restriction of mouth opening due to masseter muscle involvement, followed by transient sensory nerve neuropraxia due to excessive traction and dissection, asymmetry, non-union, cheek drop, bleeding and facial nerve injury in the infraorbital and zygomaticofacial nerves<sup>2</sup>. In addition, fixation can be done incorrectly<sup>13</sup>. In another study, it was observed that edema was less and the operation time was shorter compared to malarplasty performed only with the intraoral method<sup>15</sup>.

### 5- Intraoral and preauricular wedge-sections osteotomy

A wedge shape of bone is ostomized from the body of the zygomatic bone through a small incision made in the vestibule between the first molar and the canine teeth. And then, to access the root of the zygo, complete osteotomy of the

zygomatic bone is performed via a preauricular incision. The mobilized bone is repositioned medially and then fixed with a microplate or wire<sup>1,10,12</sup>.

Wedge-section osteotomy facilitates better fitting of the infrafractured malar complex. The small preauricular incision reduces the risk of facial nerve and temporal artery injuries and preserves muscle connections without unnecessary dissection inside the mouth. Consequently, it has been observed that the likelihood of cheek sagging after the operation is reduced. To prevent displacement of the infrafracture point, the entry angle of the chisel must be inclined. Thus, it has been noted that this method does not offer an adequate solution for patients with extremely square faces and high malar protrusion. However, since fixation is necessary, it has sparked various discussions in the literature regarding the fixation method<sup>10,16</sup>. Bidirectional wedge osteotomy is recommended in patients with protrusion of both the zygomatic body and zygomatic arch<sup>13</sup>.

### 6- Percutaneous osteotomy

**A) Double percutaneous incisions method:** Two percutaneous preauricular slit incisions are made on the malar prominence. Full and partial thickness oblique osteotomies are performed on the zygomatic body with osteotome. A green stick fracture is created by applying manual pressure to the zygomatic body medially. At the same time, the anterior part of the zygomatic arch transfers medially. In this method, there is no need for a fixation system and the surgery is completed in a very short time<sup>1,12</sup>.

It has been observed that it shortens the operation time and eliminates the need for fixation. It can be performed under sedation and local anesthesia. Although there are fewer complications compared to other methods, sagging cheek and hematoma are the most common complications. It is more suitable for patients with mild zygomatic body protrusion and prominent zygomatic arch<sup>12</sup>.

**B) Single percutaneous incision method:** In this method, unlike two preauricular incisions, a single small incision is made in the sideburn area. Initially, the zygomatic body is contoured through shaving.

Subsequently, the zygomatic arch is corticotomized and its cortical components are removed. Finally, a full-thickness osteotomy is performed in the anterior part of the articular tubercle, the zygomatic arch is fractured and reduced medially with finger or palm pressure. The posterior part of



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the osteotomized area is trimmed to prevent step deformity. Fixation is not required<sup>13</sup>.

It eliminates the need for intraoral incision in patients with high lateral projection who need only infracture. Thus, cheek sagging due to wide dissection and dietary restriction due to intraoral incision are minimized. It is a minimally invasive procedure thanks to the fact that it can be performed with only local anesthesia, minimal post-op edema, no need for fixation, and low risk of infection<sup>13</sup>.

Rare complications after preauricular incision have been reported as a arteriovenous fistula of the superficial temporal artery<sup>17</sup>, busitis after synovial membrane injury<sup>18</sup>, and lateral rectus muscle injury, facial palsy and restricted mouth opening with fracture of the lateral orbital bone due to improper use of the reciprocating saw<sup>19</sup>.

Zygomatic prominence can be attained through repositioning of the pedicled malar or buccal fat pads<sup>3,5,11</sup>.

## 7- Malar fat pad repositioning

The malar fat pad, anatomically indistinguishable from the subcutaneous fat of the infraorbital cheek skin, has been described as a superficial structure with less adherence to the superficial musculoaponeurotic system (SMAS) layer<sup>3</sup>. The transposition of the inferiomedially positioned malar fat pad plays a significant role not only in correcting midface ptosis and melolabial prominence but also in conservative lower face lifting<sup>3,20</sup>.

Instead of procedures with high morbidity requiring advanced surgeries such as deep- plane dissections, subperiosteal and endoscopic facelifts, transorbital lifts, various methods have been developed that are minimally invasive, with faster recovery potential and invisible incisions<sup>3</sup>. When determining the incision method along with the patient's age, facial integrity, and other procedures to be performed, options such as preauricular, temporal, blepharoplasty, and hidden forehead incisions are considered<sup>3,20,21</sup>. Regardless of the chosen methodology, the main objective is to reposition the freed malar fat pad to a posteriosuperior position and suture it to the fascia in the incision area using a two-vector technique<sup>3,20,21</sup>. The amount of edema and ecchymosis varies depending on the approach chosen and the patient, but no serious complications have been reported<sup>3,20,21</sup>.

## 8- Buccal fat pad repositioning

The buccal fat pad can be transferred in any direction thanks to its pedicle<sup>22</sup>. This method brings the fat pad from a relatively invisible position to a more visible one<sup>11</sup>. Additionally, as a result of the change in the position of the fat pad, the buccal area becomes concave while the malar area becomes more prominent<sup>5</sup>. For this purpose, two different methods are applied, namely intraoral and preauricular, according to the need<sup>5,11</sup>.

In the intraoral method, gentle dissection of the buccal fat pad is performed through a limited buccal incision. A subperiosteal pocket is created in the anterior and lateral directions of the malar bone. An absorbable, medium-thickness suture is used to hold the buccal fat pad. The buccal fat pad is then repositioned towards the upper and lateral regions of the pocket. After the needle is percutaneously retrieved, it is redirected through the same entry port to regrasp the buccal fat pad subperiosteally. Finally, the fat pad is secured in the proper position with a triple knot. Any resulting cutaneous concavity is addressed with local massage<sup>5</sup>.

Pedicule buccal fat pad transposition via intraoral dissection is a technique that provides minimal morbidity and high patient satisfaction, making it easily applicable in patients with low malar projection. In a study by Hernández-Alfaro F. et al., stable results were shown in a 12-month patient follow-up<sup>5</sup>.

While no complications have been reported from transposition surgery performed using the intraoral technique, possible complications include seroma, infection, asymmetry, flap mobility, nerve injury, and damage to the Stensen's duct<sup>5</sup>.

Surgical procedures performed extraorally are more frequently preferred in patients desiring facelift surgery, with low malar projection and buccal herniation. Following a wide incision from the preauricular region to the mandibular angle, all zygomatic ligaments and masseteric cutaneous ligaments are released until the SMAS flap is freed, revealing the buccal fat pad. The buccal fat pad is gently removed superiorly to avoid damage to vital tissues. The aim is to secure it to the SMAS with a loop-type suture at the superomedial corner. The vector orientation should be parallel to the lateral border of the zygomaticus major muscle. After the main suturing is secured, several additional sutures are made<sup>11</sup>.

In Bitik O.'s study, among the nine patients evaluated, one exhibited temporary paralysis in the marginal mandibular



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branch, and another experienced an early postoperative hematoma. Notably, no asymmetry complaints were reported by any of the patients, and no paralysis was observed in the facial nerve branches within the frontal, zygomatic, or buccal regions<sup>11</sup>.

In the study conducted by Lee T.S. and Park S., it was observed that transposition of the buccal fat pad, along with reduction malarplasty, resulted in successful outcomes

without complications in patients with excessive lateral malar projection but less pronounced malar body projection<sup>4</sup>.

In another study conducted by Khiabani, K. et al., the buccal fat pad lifting method has been successfully applied without complications in both patients undergoing aesthetic surgery and post-traumatic patients<sup>23</sup>.

## II-Mandibular Angioplasty

There are various surgical techniques for mandibuloangioplasty. The most commonly used of these are<sup>1</sup>:

### 1- Mandibular lateral outer cortex splitting osteotomy

Deguchi M. and colleagues reported in their study that angle division osteotomy reduces both the mandibular angle and lower facial width<sup>24</sup>. The anatomy of the mandibular outer cortex, performed by a surgeon with appropriate patient profile and good anatomy knowledge, adhering to the plan, gives very successful results<sup>24,25</sup>.

Surgical expertise is particularly necessary in cases where the mandibular angle is medially inclined<sup>25</sup>. Additionally, there is always a risk of inferior alveolar nerve damage<sup>25</sup>. Mandibular contouring surgery also allows for the correction of benign masseteric hypertrophy without damaging soft tissue and the masseter muscle<sup>24,25</sup>.

Angle division osteotomy is indicated for patients without alveolar arch deformities, with a wide lower face in the frontal view, and a gonial angle of less than 120 degrees in the lateral view<sup>24,26</sup>. Significant gonial asymmetry from the frontal view is not crucial for surgical intervention<sup>24</sup>. It can be combined with other techniques used in mandibuloplasty in some cases, as it may be insufficient alone<sup>26</sup>. The larger the bilateral mandibular protrusions, the more bone pieces are excised<sup>24</sup>.

The operation is generally performed under general anesthesia but can also be carried out under sedation and local anesthesia<sup>24</sup>. In this method, which can be performed

both intraorally and extraorally, the intraoral approach is usually preferred. A buccal sulcus incision is made from near the Stenon duct to the first premolar tooth. Care is taken to avoid the mental nerve and masseteric artery branch while dissecting the periosteum. The outer cortex is separated using a bur, oscillating saw, and osteotome,

starting approximately 10mm below the sigmoid notch and 10mm behind the mental foramen. Sharp edges are corrected, and any leakage of bone marrow is stopped with pressure dressing<sup>25</sup>.

In a study involving 29 patients, complications such as hematoma, infection, overcorrection, undercorrection, and condylar fracture were not observed. However, there is no guide to reduce the risk of inferior alveolar nerve damage<sup>25</sup>.

### 2- Mandibular angle osteotomy

The combination of mandibular angle prominence and masseteric hypertrophy results in square face syndrome. Among its causes, inheritance, bruxism, and prolonged unilateral chewing habits are considered<sup>27</sup>.

This surgical procedure is more suitable for patients with excessive posterior angle prominence in the lateral view rather than the frontal view<sup>28</sup>.

For patient comfort, this method is generally performed intraorally under general anesthesia but can also be carried out under sedation extraorally (postauricular) with local anesthesia<sup>27,29</sup>.

In the intraoral approach, an incision is made from the ramus to the second premolar. After exposing the mandibular angle, mandibular body, and medial-inferior part of the mandible, an osteotomy line is determined for the inferior margin of the mandible from the posterior ramus to the mental region. After the osteotomy line is cut with a reciprocating saw or burr, bone protrusions are corrected with osteotomy to prevent the formation of a second mandibular angle. During this process, medial pterygoid and mylohyoid muscle connections are cut and reattached. The incision line is sutured<sup>1,27</sup>.

In the extraoral approach, a post-auricular incision is preferred, which has shown faster healing<sup>29</sup>.

Additionally, the occurrence of masseter atrophy in patients with benign masseter hypertrophy also increases the effectiveness of the outcome<sup>27</sup>. Generally, patients, especially



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those not complaining about their frontal appearance, have been satisfied aesthetically with this method<sup>27,28,30</sup>.

In intraoral methods, complications such as bleeding due to arterial injury, mental nerve damage, temporary lip paresthesia, and limited mouth opening may occur<sup>27</sup>.

A 10-year retrospective review comparing the complications of surgeries performed by intraoral methods showed a complication rate of 5.87%. Serious complications such as condylar fracture, permanent nerve damage, massive bleeding, and significant asymmetry were not observed, but hematoma, severe swelling, infection, and facial sagging were seen in very few cases. Although the complication rate varies with the experience of the surgeon, it has been observed that it can be further reduced with preventive measures<sup>30</sup>.

In surgeries performed with the extraoral method, some patients experienced temporary numbness in the postauricular region, but no patient complained of perioral numbness or facial paralysis. While significant bleeding was observed in only 6 out of 175 patients during surgery, saliva leakage was experienced for 2 weeks in one patient. Complications lasted for one week or less in 69.2% of patients, and 94.7% of patients were satisfied with this operation<sup>29</sup>.

### 3- V-line osteotomy

If the cosmetic goal is to have a thinner and more oval-shaped face, resembling a "melon seed" or "goose egg", contouring may be desired not only in the posterior but also in the anterior mandibular margin. In such cases, the V-line osteotomy procedure is preferred. This helps prevent the formation of a second mandibular angle that could occur in mandibular angle osteotomy, resulting in a steeper, straighter, and more symmetrical inferior margin of the mandible<sup>31</sup>.

An incision is made from the ascending ramus to the first or second premolar, and the osteotomy line is determined. The most critical aspect of this procedure is the osteotomy line. For a more natural and ideal outcome, the distance between the gonial angle and the auricular lobule should be approximately 2 cm. The inclination of the osteotomy line is decided based on the position of the mandibular canal, the angle of the mandibular plane, and the mental region. In the anterior aspect, the osteotomy line typically extends 3 mm below the mental foramen, at the apex of the canines, to the corner of the mental region. The excised bone piece is removed, and the incision line is sutured<sup>31,32</sup>.

V-line surgery is suitable for patients with a low-angle square jawline with a gonial angle-auricular lobule distance of more than 2 cm<sup>31</sup>. However, for patients with a gonial angle-auricular lobule distance of less than 2 cm, it is more appropriate to combine it with genioplasty. If the patient has a jawline that widens outward from the frontal view, mandibular outer cortex splitting osteotomy should be combined<sup>32</sup>.

In a study conducted by Hsu Y. et al., no serious complications were observed during the 6 to 24 months of follow-up, although temporary paresthesia in the mental nerve region healed within 4 months<sup>31</sup>.

### III-Genioplasty

The position of the jaw, which is the most defining feature of the lower third of the face, is crucial from an aesthetic perspective<sup>33</sup>. Genioplasty is a method used to correct the position and contour of the chin, either alone or in conjunction with other orthognathic procedures<sup>33,34</sup>. By moving the chin tip vertically, forward, or backward, it is possible to change its position in three dimensions and correct asymmetries<sup>34,36</sup>.

In the mandibular anterior vestibule, between the canines, approximately 5 mm above the buccal sulcus, a full-thickness incision is made, and the soft tissues are carefully dissected to expose the symphysis<sup>34,35</sup>. The midline of the chin is marked as a reference point, and osteotomy lines are designed according to the chin deformity to be corrected. This three-dimensional change can involve alterations in the anterior-posterior, vertical, and transverse directions, including narrowing, widening, and asymmetry correction<sup>35</sup>.

Among the fixation options are two tricortical screws, pre-bent genial plates, and bilateral 1.5 mm plates. Tricortical screws are suitable only for advancement procedures, while other fixation methods can be applied to all procedures. Finally, after evaluating the final position of the chin, the muscle tissue is carefully closed, followed by the mucosa. Soft tissue changes depend on the ideal closure of the mucosa. As a final step, a pressure bandage is placed to increase muscle-bone contact, reduce hematoma, and prevent soft tissue ptosis. It is removed three days after the operation<sup>35</sup>.

A systematic review examining the long-term stability of isolated advancement genioplasty found it to be a stable procedure, with no more than 2 mm of relapse reported in the studies reviewed. The relationship between the amount of



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relapse and the fixation method and amount of movement was not observed<sup>36</sup>.

Another systematic review examining the soft and hard tissue response after isolated genioplasty found that three years after the operation, soft tissue exhibited more relapse in the anteroposterior plane compared to hard tissue. Vertical corrections showed various changes in both soft and hard tissue<sup>33</sup>.

In a study of 59 patients, consisting of 38 males and 21 females, infection was observed in 3.4% of patients, hematoma in 8.5%, and temporary paresthesia in 6.8%. Complications are more commonly observed in males; however, as a procedure, they are most frequently seen in cases involving rotation/advancement surgery for chin asymmetry. Although temporary neurosensory disturbance of the inferior alveolar nerve was the most common complication, patients should be informed about this. Nevertheless, due to its lower complication rate compared to other orthognathic procedures, it is considered one of the most successful operations<sup>37</sup>.

To minimize complications, it is important to know the specific key points of each procedure. Nerve injuries should be handled with care to avoid potential overcorrection or undercorrection<sup>38</sup>.

## CONCLUSION

These concepts highlight the array of techniques available, each presenting distinct advantages and limitations. While minimally invasive and innovative approaches offer significant potential for improving aesthetic outcomes, the effectiveness and safety of these methods hinge on meticulous patient selection and the development of individualized treatment plans. Careful consideration of these factors is crucial for achieving optimal results and mitigating associated risks.

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None

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None

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