Original Article

Satisfaction Level of Patients with the Outcome of Genioplasty

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ABSTRACT

Background: We aimed to assess the satisfaction level of patients with the outcome of genioplasty and the influential parameters in this respect.

Methods: This retrospective study was conducted on 70 patients between 18 to 59 years, who underwent genioplasty in the Oral and Maxillofacial Surgery Department at Shariati and Sina Hospitals, Tehran, Iran, between 2010 and 2020. Patient records were evaluated and a questionnaire was filled out over the phone to assess the influential parameters on the satisfaction level of patients with the outcome of genioplasty. Data were analyzed by PASS 11 (alpha=0.1).

Results: Seventy patients were evaluated including 56 (80%) females and 14 (20%) males. Forty patients (52.6%) had no complaint with regard to the outcome of genioplasty. Postoperative chin deviation (not correcting the initial complaint) (10.52%), postoperative pain in the chin area (10.52%), and lower lip paresthesia (9.21%) were the most common patient complaints. The minimum and maximum satisfaction scores were 22 and 80, respectively. Number of follow-up sessions had a significant effect on satisfaction with the outcome of genioplasty (P=0.076). Patients who underwent advancement genioplasty alone had the highest level of long-term satisfaction with the outcome while those who underwent setback genioplasty alone had the lowest level of long-term satisfaction.

Conclusion: Advancement genioplasty had the highest rate of patient satisfaction, and chin asymmetry in the frontal view was the most common patient complaint after genioplasty.

KEYWORDS
Genioplasty; Chin; Facial Asymmetry; Paresthesia; Patient Satisfaction; Orthognathic Surgery

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INTRODUCTION

The chin has a prominent role in facial attractiveness, and chin height can significantly affect the overall perception of observers from one's facial beauty. The chin form has a pivotal role in having a long or a short facial profile as well. Genioplasty or mentoplasty can improve facial harmony by correcting the chin deformities[1]. Genioplasty changes the three-dimensional anatomy of the chin, and can significantly improve facial esthetics by correcting the skeletal form of the chin and the disharmonies in the lower third of the face[2-4].

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The indications for genioplasty include:

(I) Long vertical facial height influenced by the anterior mandible, which requires bone mass reduction in this region. In most cases, in addition to the increased lower facial height, the chin is rotated backward. Thus, such cases require advancement genioplasty. Such patients have several clinical symptoms such as lip incompetence at rest, open bite such that the tongue is located between the upper and the lower teeth, mentalis muscle contraction for closure of the lips causing skin wrinkles and decreasing the depth of the mentolabial fold, and thinning of the alveolar bone covering the buccal root surface of mandibular anterior teeth.

(II) Short vertical facial height: such patients have a deep mentolabial fold, and excess tissue may be present in the submental area (double chin)

(III) Chin prognathism which can be associated with a deep mentolabial fold, and lip incompetence at rest. This problem requires chin setback by sliding genioplasty.

(IV) Chin retrognathism that requires advancement genioplasty

(V) Correction of a short upper lip (due to upper lip deformity or cleft lip and/or palate)

(VI) Transverse facial asymmetry (genioplasty can correct asymmetries of the lower third of the face in transverse and vertical dimensions)

(VII) Surgery after orthodontic treatment (genioplasty can stabilize the results of orthodontic treatment)

(VIII) Advancement of the genioglossus muscle: by advancing this muscle through advancement of the anterior part of the mandible, the tongue is directed forward, causing opening of the oropharyngeal airway, and decreasing the signs and symptoms of sleep apnea[5].

Three analyses are commonly performed to determine the need for genioplasty namely soft tissue analysis on 2D profile photographs, skeletal analysis on lateral cephalograms, and advanced analysis by computed tomography, plus bite registration, and assessment of the maxillary and mandibular study casts[5].

Two common methods of genioplasty include augmentation by using alloplastic materials[6] and osteotomy or ostectomy. Alloplastic chin implants have limitations in increasing the vertical bone height and improvement of function. Several genioplasty techniques with osteotomy/ostectomy of the anterior mandible are present, which include sliding genioplasty, Tenon or Mortise functional genioplasty, and sagittal split genioplasty[7].

Genioplasty is a safe and simple surgical procedure with excellent long-term results that can profoundly improve the chin form[8]. In orthognathic surgery, particularly genioplasty, the final form and shape of the chin from the frontal view is the main and most important factor determining the success of the procedure[9]. In order to meet patient expectations and satisfy the patient with the outcome, the surgeon should perform a precise and comprehensive preoperative assessment of the face and must master the anatomy of the region[10].

Chin deformities include excessive retrognathism, excessive prognathism, asymmetry of the chin, or a combination of these conditions[11]. Evidence shows that 21% to 67% of patients with chin prognathism or retrognathism have facial asymmetry as well[12], which can be related to the chin morphology. The chin may be short in vertical dimension, which causes esthetic problems. Such patients have a deep mentolabial fold and a prominent chin, and their inferior border of the mandible has an upward rotation[13]. Such patients often seek genioplasty.

Horizontal movement of the chin during advancement genioplasty causes unwanted soft tissue changes in some patients particularly those with short facial height and a deep mentolabial fold. In such patients, advancement genioplasty causes prominence and shallowness of the mentolabial fold[4].

Neurological problems such as lower lip paresthesia are among the main postoperative patient complaints, which often occur due to poor expertise of the surgeon. Postoperative hematoma and infection, and in rare cases, periodontal problems or formation of respiratory mucocele have also been reported[14, 15].

Satisfaction of patients with the outcome of genioplasty has been the topic of many investigations. The FACE-Q scale is among the most commonly used tools for assessment of the level of satisfaction of patients with their appearance after cosmetic surgical procedures. Surgeons often pay more attention to the profile view of the chin after surgery, and often show the pre and post-operative profile view of patients; whereas, the frontal or three quarter view of the chin may not be as desirable, and the patients may not be satisfied with the postoperative

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frontal or three quarter view of their chin. Thus, in genioplasty, esthetic parameters and vertical height and width of the chin should be assessed three-dimensionally[16]. Moreover, assessment of the overall facial view, occlusion, speech, and resolution of jaw pain should be performed after a certain period postoperatively. Satisfaction with the outcome is believed to be correlated with gender[16]. Female patients are often more satisfied with the results than males. Also, males mostly prefer a more prominent, wider, and square-shaped chin, while females prefer a narrower chin with less prominence[17]. Improvement of facial esthetics is often the main reason for patients undergoing genioplasty, and their satisfaction with the outcome improves their self-confidence and social relations. However, some degrees of dissatisfaction have also been reported mainly due to decreased masticatory forces, difficult mastication, lower lip paresthesia, postoperative edema (more than expected), and unmet expectations[16-21].

We aimed to assess the satisfaction level of patients with the outcome of genioplasty and the influential parameters in this respect.

MATERIALS AND METHODS

This retrospective study was conducted on 70 patients who had undergone genioplasty in the past 10 years. The inclusion criteria were patients who had undergone genioplasty alone, genioplasty plus monomax surgery of the maxilla, and genioplasty along with rhinoplasty during 2010 to 2020. A minimum of 6 months had to be passed since their genioplasty. Patients who had undergone orthognathic surgery of the mandible were excluded. The sample size was calculated according to a study by Deshpande and Munoli[2] assuming alpha=0.05, study power of 85%, and 95% CI of 0.15 using the confidence interval for one proportion feature of PASS 11.

The study protocol was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.DENTISTRY.REC.1398.131). All methods were carried out in accordance with relevant guidelines and regulations. The patients were informed about the study, ensured about the confidentiality of their information, and entered the study by signing the questionnaire.

Ninety-one eligible patient records were retrieved from the archives of Shariati and Sina Hospitals, Tehran, Iran. The selected patients were contacted and a questionnaire was used to collect the required information. Informed consent was obtained from all patients or their legal guardian. The FACE-Q scale was used as a template to design a questionnaire, and the number of questions was increased to 16 by using different sources and the opinion of expert oral and maxillofacial surgeons[18-21]. The content validity of the Farsi version of the questionnaire was evaluated by its translation to Farsi and back-translation to English by another translator. Five oral and maxillofacial surgeons and an epidemiologist evaluated the quality and quantity of the questions, and 10 patients evaluated the validity of the Farsi version of the questionnaire. To assess its reliability, 10 patients who initially completed the questionnaire filled it out again after 4 weeks (test-retest reliability). Since the answers to the questions remained unchanged, the reliability of the Farsi version of the questionnaire was confirmed.

The questionnaire was then filled out by patients. The questionnaire had a demographic section asking for the age and sex of patients, and their chief complaint before and after surgery. The second part included 16 questions regarding the level of satisfaction of patients with different aspects of the surgical procedure. Each question was allocated a score, and the satisfaction of patients with each parameter, and overall was calculated and reported.

Data were analyzed using STATA 11 at $P<0.1$ level of significance.

RESULTS

Of 70 patients, 56 (80%) were female and 14 (20%) were male. The current mean age of patients was 33.19 years (range 18 to 59 years), and the mean age at the time of surgery was 28.39 years (range 16 to 52 years). Of all, 51 (72.95) had a history of orthodontic treatment.

The most common causes of genioplasty included mandibular retrognathism (n=42, 53.16%), chin fracture due to trauma (n=8, 10.12%), mandibular prognathism (n=7, 8.8%), high chin position (n=6, 7.5%), chin deviation (direction of deviation was not disclosed in patient records) (n=6, 7.5%), small chin width (n=5, 6.3%), respiratory apnea (n=3, 3.75) and lip incompetence (n=2, 2.5%).

Table 1 presents the frequency distribution of

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postoperative patient complaints. Of all, 52.6% (n=40) had no patient complaint. Postoperative chin deviation (primary complaint not resolved by surgery) (10.52%) and postoperative pain in the chin area (10.52%) were the most common patient complaints. The patient complaints were improving in 7 cases (10%) including 1 case of lip incompetence, 3 cases of lower lip paresthesia, 2 cases of chin pain, and 1 case of chin edema. The complaints had not resolved in 23 cases (32.9%).

Table 2 presents the duration of follow-ups in 40 patients who answered this question. A total of 47 patients answered the question regarding the frequency of follow-ups, which was twice in 18 (25.7%), 3 times in 9 (12.9%), once in 7 (10%), 4 times in 6 (8.6%), 7 times in 3 (4.3%), 6 times in 2 (2.9%), and 5 times in 1 patient (1.4%). One patient had not participated in any follow-up session.

Table 3 presents the frequency of patients based on their type of surgery. Fourteen patients (20%) underwent rhinoplasty as well; which was associated with monomax surgery in one case (7.1%).

Table 4 presents the frequency of different levels of patient satisfaction with the outcome of surgery. Of patients who underwent monomax surgery plus genioplasty (n=29), 21 (72.4%) did not have paresthesia, 4 (13.8%) had paresthesia in less than half of their lower lip, 3 (10.3%) had paresthesia of more than half of their lower lip, and 1 (3.4%) had complete paresthesia of the lower lip with no recovery. These values were 21 (51.2%), 4 (9.8%), 9 (22%), and 7 (17.1%), respectively in patients who underwent genioplasty alone, 38 (64.4%), 5 (8.5%), 10 (16.2%), and 6 (10.2%), respectively in those who underwent advancement genioplasty, and 4 (36.4%), 3 (27.3%), 2 (18.2%), and 2 (18.2%), respectively in those who underwent setback surgery. Regarding the improvement of wrinkles in the chin area and contraction of mentalis muscle after surgery, of patients in the monomax plus genioplasty

Table 1. Frequency distribution of postoperative patient complaints

Complaint	Frequency	Percentage
No complaint	40	52.6
Postoperative chin deviation (primary complaint not resolved by surgery)	8	10.52
Postoperative pain in the chin area	8	10.52
Lower lip paresthesia	7	9.21
Excessive chin prominence	2	2.6
Small size and width of the chin	2	2.6
Lip incompetence	2	2.6
Chin retrognathism	1	1.2
Chin resorption	1	1.2
Short chin	1	1.2
Postoperative permanent folding of the chin	1	1.2
High chin position	1	1.2
Respiratory problem	1	1.2
Chin edema	1	1.2

Table 2. Duration of follow-up in 40 patients who answered this question

Duration of follow up	Frequency	Percentage
1 month	10	14.3
2 months	10	14.3
3 months	6	8.6
12 months	5	7.1
5 months	3	4.3
1.5 months	2	2.9
6 months	2	2.9
24 months	1	1.4
No follow-up	1	1.4

Table 3. Frequency of patients based on their type of surgery

Type of surgery	Frequency	Percentage
Advancement genioplasty	50	60.9
Straightening	8	9.7
Reduction	7	8.5
Fracture repair	7	8.5
Chin width augmentation	4	4.8
Chin length reduction	3	3.6
Chin width reduction	1	1.2
Chin length increase	1	1.2
Double chin	1	1.2

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Table 4. Frequency of different levels of patient satisfaction with the outcomes of surgery

Question	Category	Highly satisfied	Somehow satisfied	I do not know	Somehow dissatisfied	Dissatisfied
How satisfied are you with the degree of your postoperative chin prominence from the frontal view?	Monomax surgery plus genioplasty (n=29)	20 (69%)	7 (24.1%)	-	1 (3.4%)	1 (3.4%)
	Genioplasty alone (n=41)	26 (63.4%)	10 (24.4%)	-	2 (4.9%)	3 (7.3%)
	Advanced genioplasty (n=59)	38 (64.4%)	15 (25.4%)	-	3 (5.1%)	3 (5.1%)
	Chin setback (n=11)	8 (72.7%)	2 (18.2%)	-	2 (18.2%)	1 (9.1%)
How satisfied are you with the degree of your postoperative chin prominence from the profile view?	Monomax surgery plus genioplasty (n=29)	20 (69%)	6 (20.7%)	-	2 (6.9%)	1 (3.4%)
	Genioplasty alone (n=41)	27 (65.9%)	9 (22%)	-	1 (2.4%)	4 (9.8%)
	Advanced genioplasty (n=59)	39 (66.1%)	14 (23.7%)	-	2 (3.4%)	4 (6.8%)
	Chin setback (n=11)	8 (72.7%)	1 (9.1%)	-	1 (9.1%)	1 (9.1%)
How satisfied are you with the postoperative shape and form of your chin from the frontal view?	Monomax surgery plus genioplasty (n=29)	20 (69%)	6 (20.7%)	-	1 (3.4%)	2 (6.9%)
	Genioplasty alone (n=41)	27 (65.9%)	9 (22%)	-	2 (4.9%)	3 (7.3%)
	Advanced genioplasty (n=59)	39 (66.1%)	13 (22%)	-	3 (5.1%)	4 (6.8%)
	Chin setback (n=11)	8 (72.7%)	2 (18.2%)	-	-	1 (9.1%)
How satisfied are you with the postoperative shape and form of your chin from the profile view?	Monomax surgery plus genioplasty (n=29)	23 (79.3%)	3 (10.3%)	-	2 (6.9%)	1 (3.4%)
	Genioplasty alone (n=41)	28 (68.3%)	9 (22%)	-	1 (2.4%)	3 (7.3%)
	Advanced genioplasty (n=59)	43 (72.9%)	11 (18.6%)	-	2 (3.4%)	3 (5.1%)

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	Chin setback (n=11)	8 (72.7%)	1 (9.1%)	-	1 (9.1%)	1 (9.1%)
How satisfied are you with your postoperative chin size?	Monomax surgery plus genioplasty (n=29)	22 (75.9%)	4 (13.8%)	-	2 (6.9%)	1 (3.4%)
	Genioplasty alone (n=41)	31 (75.6%)	6 (14.6%)	-	2 (4.9%)	2 (4.9%)
	Advanced genioplasty (n=59)	44 (74.6%)	9 (15.3%)	-	4 (6.8%)	2 (3.4%)
	Chin setback (n=11)	9 (81.8%)	1 (9.1%)	-	-	1 (9.1%)
How satisfied are you with your postoperative chin width?	Monomax surgery plus genioplasty (n=29)	22 (75.9%)	2 (6.9%)	-	4 (13.8%)	1 (3.4%)
	Genioplasty alone (n=41)	31 (75.6%)	6 (14.6%)	-	1 (2.4%)	3 (7.3%)
	Advanced genioplasty (n=59)	43 (72.9%)	8 (13.6%)	-	5 (8.5%)	3 (5.1%)
	Chin setback (n=11)	10 (90.9%)	-	-	-	1 (9.1%)
How satisfied are you with your chin on photographs?	Monomax surgery plus genioplasty (n=29)	22 (75.9%)	4 (13.8%)	-	1 (3.4%)	2 (6.9%)
	Genioplasty alone (n=41)	27 (65.9%)	5 (12.2%)	-	2 (4.9%)	7 (17.1%)
	Advanced genioplasty (n=59)	41 (69.5%)	8 (13.8%)	-	2 (3.4%)	8 (13.6%)
	Chin setback (n=11)	8 (72.7%)	1 (9.1%)	-	1 (9.1%)	1 (9.1%)
How satisfied are you with the harmony of your chin with the rest of your face?	Monomax surgery plus genioplasty (n=29)	23 (79.3%)	2 (6.9%)	-	2 (6.9%)	2 (6.9%)
	Genioplasty alone (n=41)	30 (72.9%)	6 (14.6%)	-	4 (9.8%)	1 (2.4%)
	Advanced genioplasty (n=59)	44 (74.6%)	7 (11.9%)	-	6 (10.2%)	2 (3.4%)
	Chin setback (n=11)	9 (81.8%)	1 (9.1%)	-	-	1 (9.1%)

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How satisfied are you with your lip competence after surgery?	Monomax surgery plus genioplasty (n=29)	22 (75.9%)	2 (6.9%)	-	2 (6.9%)	3 (10.3%)
	Genioplasty alone (n=41)	37 (90.2%)	1 (2.4%)	-	2 (4.9%)	1 (2.4%)
	Advanced genioplasty (n=59)	48 (81.4%)	3 (5.1%)	-	4 (6.8%)	4 (6.8%)
	Chin setback (n=11)	11 (100%)	-	-	-	-
How satisfied are you with your tooth show at rest?	Monomax surgery plus genioplasty (n=29)	17 (58.6%)	4 (13.8%)	1 (3.4%)	3 (10.3%)	4 (13.8%)
	Genioplasty alone (n=41)	33 (80.5%)	3 (7.3%)	-	3 (7.3%)	2 (4.9%)
	Advanced genioplasty (n=59)	41 (69.5%)	6 (10.2%)	-	6 (10.2%)	6 (10.2%)
	Chin setback (n=11)	9 (81.8%)	1 (9.1%)	1 (9.1%)	-	-
How satisfied are you with the depth of your mentolabial fold after surgery?	Monomax surgery plus genioplasty (n=29)	22 (75.9%)	3 (10.3%)	-	2 (6.9%)	2 (6.9%)
	Genioplasty alone (n=41)	30 (73.2%)	3 (7.3%)	-	4 (9.8%)	4 (9.8%)
	Advanced genioplasty (n=59)	43 (72.9%)	5 (8.5%)	-	5 (8.5%)	6 (10.2%)
	Chin setback (n=11)	9 (81.8%)	1 (9.1%)	-	1 (9.1%)	1 (9.1%)
How dissatisfied are you with the postoperative depression created below the mandible at the two sides of the chin (mandibular step) (if present)?	Monomax surgery plus genioplasty (n=29)[1]	-	3 (10.3%)	-	3 (10.3%)	3 (10.3%)
	Genioplasty alone (n=41)[2]	-	5 (12.2%)	1 (2.4%)	4 (9.8%)	3 (7.3%)
	Advanced genioplasty (n=59)[3]	-	5 (8.5%)	1 (1.7%)	4 (6.8%)	5 (8.5%) dissatisfied, 2 (3.4%) highly dissatisfied
	Chin setback (n=11)[4]	-	3 (27.3%)	-		1 (1.9%)

[1]20 (69%) patients did not have mandibular step in this group. [2]27 (65.9%) patients did not have mandibular step in this group;[3] 42 (71.2%) patients did not have mandibular step in this group.;[4] 5 (45.5%) patients did not have mandibular step in this group.

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group (n=29), 23 (79.3%) had contraction and wrinkles, 5 (17.2%) had moderate contraction and wrinkles, and 1 (3.4%) did not have contraction and wrinkles. These values were 29 (70.7%), 7 (17.1%), and 5 (12.2%), respectively in those who underwent genioplasty alone, and 44 (74.6%), 9 (15.3%), and 6 (10.2%), respectively, in those who underwent advancement genioplasty. Of patients who underwent setback surgery (n=11), 8 (72.7%) had contraction and wrinkles and 3 (27.3%) had moderate contraction and wrinkles.

Regarding the symmetry of the lips, of those who underwent monomax surgery plus genioplasty (n=29), 25 (86.2%) had complete symmetry, 1 (3.4%) had moderate symmetry, and 3 (10.3%) reported asymmetry. These values were 27 (65.9%), 9 (22%), and 5 (12.2%), respectively, in patients who underwent genioplasty alone, 43 (72.9%), 9 (15.3%), and 7 (11.9%), respectively, in those who underwent advancement genioplasty, and 9 (81.8%), 1 (9.1%), and 1 (9.1%), respectively, in those who underwent setback.

Of patients who underwent monomax surgery plus genioplasty (n=29), 26 (89.7%) reported that their level of satisfaction with the outcome did not change over time; this rate was 34 (82.9%) in those who underwent genioplasty alone (n-41), 53 (89.8%) in those who underwent advancement genioplasty (n=59), and 7 (63.6%) in those who underwent setback surgery (n=11).

The total score of the questionnaire ranged from 22 (minimum satisfaction) to 80 (maximum satisfaction). Among the assessed variables, number of follow-up sessions had a significant effect on satisfaction with the outcome of genioplasty (P=0.076; Beta=0.269). Other variables including age, gender, type of surgery, history of orthodontic treatment, simultaneous rhinoplasty, and chief complaint of patients had no significant effect on satisfaction with the surgical outcome.

DISCUSSION

This study assessed the satisfaction level of patients with the outcome of genioplasty and the influential parameters in this respect. To the best of the authors' knowledge, a standard questionnaire for assessment of the satisfaction level of patients with the outcome of genioplasty is not available, and previous studies on this topic are limited. However, in general, evidence shows that patients often have a higher level of long-term satisfaction with the results of combined maxillofacial surgeries. For instance, Schwitzer et al.[19] reported higher level of satisfaction of patients with their chin in those who underwent orthognathic surgery in addition to genioplasty, compared with those who underwent genioplasty alone. Their results were different from the present findings, since in the present study, patients who underwent advancement genioplasty had the highest level of long-term satisfaction with the results. This difference may be attributed to different cultural and regional perceptions from facial esthetics. Regarding long-term satisfaction with the results, those who underwent monomax surgery plus genioplasty ranked second after advancement genioplasty. Patients who underwent setback surgery showed the lowest level of long-term satisfaction. The present results were in agreement with those of Deshpande and Munoli[2] who discussed that genioplasty alone changes the morphology of the chin with minimum complications, and yields excellent stable results, and is a safe procedure to create a beautiful harmonic face. Also, Hunsinger et al.[22] reported maximum satisfaction level in patients who underwent advancement genioplasty. Rhinoplasty-genioplasty is an ideal procedure especially for patients with micrognathia; this combined procedure often brings about optimal patient satisfaction with low rate of relapse[23].

Regarding the formed step below the mandible, patients who underwent monomax surgery along with genioplasty had higher frequency of this complication. All patients, irrespective of their type of surgical procedure, were dissatisfied with mandibular step. This alarming finding indicates that all patients pay attention to the soft tissue of their chin area while surgeons mainly focus on correction of the bony structure of the chin[24].

In assessment of symmetry of the lips, maximum level of symmetry was noted in patients who underwent monomax surgery along with genioplasty followed by those who underwent genioplasty alone, and setback surgery. Those who underwent advancement genioplasty ranked last in terms of symmetry of the lips. These findings were in line with those of Jones and Vesely[8] who discussed that genioplasty alone can be associated with asymmetry. Thus, in the recent years, a novel technique of genioplasty was introduced to minimize such complications[25].

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A higher percentage of patients who had genioplasty alone or setback complained of complete lower lip paresthesia while minimum rate of paresthesia was noted in those who underwent monomax plus genioplasty. This finding was different from the results of Kim et al.[26] who discussed that lip paresthesia was inevitable after corrective maxillofacial procedures. They also reported significantly higher rate of paresthesia in those who underwent genioplasty simultaneous with orthognathic surgery. Hunsinger et al.[22] evaluated 203 patients who underwent orthognathic surgery; out of which 101 underwent genioplasty as well. Most cases had height reduction along with chin advancement. The best results and maximum patient satisfaction were recorded in sliding genioplasty and jumping divided genioplasty. Of all, 5 patients (5.9%) had postoperative complications including mental nerve injury and dental trauma. No evidence of necrosis or hematoma of the floor of the mouth was noted. They concluded that genioplasty is a safe and reliable procedure, and can yield satisfactory results in combination with orthognathic surgery. They added that the complications of genioplasty are not serious, and patients often have higher level of satisfaction with combined surgical procedures[22]. The present results showed that number of follow-up sessions had a significant effect on satisfaction with the outcome of genioplasty (P=0.076; Beta=0.269). Other variables including age, gender, type of surgery, history of orthodontic treatment, simultaneous rhinoplasty, and chief complaint of patients had no significant effect on satisfaction with the surgical outcome. This finding was in contrast to the existing literature, which may be due to our relatively small sample size, using different questionnaires in studies, and cultural and regional differences of patients that can affect the level of satisfaction with the outcome of cosmetic surgical procedures.

With respect to the level of satisfaction of patients with chin prominence, those who underwent setback procedure had the maximum level of satisfaction with their chin prominence, and shape and form of their chin from the frontal view after surgery. Those who underwent monomax plus genioplasty ranked second. The least level of satisfaction in this regard was recorded in those who underwent advancement genioplasty. In a study by Chang et al.[27] a high percentage of patients were satisfied with the results of sliding genioplasty with advancement for 5 years (with respect to improvement of facial appearance), which was different from the present findings. Khalifa and Mohamed[28] evaluated facial esthetics of the lower third of the face in patients who underwent mandibular distraction osteogenesis (MDO) plus genioplasty. The patients all had a returned chin and were not satisfied with their chin position. After genioplasty, cephalometric analysis showed that soft tissue and hard tissue pogonion had a forward displacement, and the patients were satisfied with their postoperative chin position. In MDO plus genioplasty, compared with MDO alone, the soft tissue of the chin has higher sensitivity and better function. In general, satisfaction of patients with the outcome of surgery depends on their satisfaction with their level of esthetic appearance of the chin, and patients pay utmost attention to their soft tissue appearance. Kufta et al.[18] used a 16-item questionnaire to assess the influential factors affecting the level of satisfaction of patients with the outcome of surgery. They reported that maximum satisfaction of patients after orthognathic surgery depended on satisfaction with facial appearance, patient-physician communication, social status, and overall systemic health of patients. Pacheˆco-Pachêco-Pereira et al.[17] conducted a systematic review on the available evidence regarding factors affecting satisfaction of patients with the outcome of orthodontic treatment and orthognathic surgery. They concluded that in general, satisfaction of patients was affected by the esthetic treatment outcome, positive opinion of family and friends, type of orthognathic surgery, gender of patient, and changed self-image of patient after surgery. Also, dissatisfactions were mainly due to lengthy treatment period, paresthesia and impaired function after surgery, and lack of information regarding the risks of surgery.

This study is valuable in that studies on level of satisfaction of patients with the outcome of genioplasty are scarce. This study had some limitations as well. Patients were evaluated over a long period of time, which can affect their level of satisfaction. However, due to small sample size, level of satisfaction based on the time passed since surgery could not be evaluated. Also, patients who only picked the "I do not know" answer choice for all questions were excluded from the study. Furthermore, since the study had a retrospective

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design, all patients could not be contacted, which resulted in a relatively small sample size.
Future studies are required to develop questionnaires for assessment of satisfaction level of patients based on the type of surgical procedures. Also, further prospective studies on a larger sample size are required.

CONCLUSION

Advancement genioplasty had the highest rate of patient satisfaction, and asymmetry from the frontal view was the most common patient complaint after genioplasty.

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CONFLICT OF INTEREST

Not applicable.

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