Improvement of Esthetic, Functional, and Social Well-Being After Orthognathic Surgical Intervention: A Sampling of Postsurgical Patients Over a 10-Year Period From 2007 to 2017

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Purpose: The objectives of this study were to evaluate the effect of orthognathic surgery on the long-term quality of life of patients who received this treatment and to delineate the common reasons for dissatisfaction.

Materials and Methods: In this retrospective cohort study, patients who underwent orthognathic surgery were studied. One hundred thirty-two patients who had undergone orthognathic surgery from 2007 to 2017 in the oral and maxillofacial surgery department participated in this study. They were divided based on their dentofacial deformity into those with Class II malocclusion and those with Class III malocclusion. Each participant completed a modified questionnaire used to assess the patient’s esthetic, social, and functional abilities after orthognathic surgery.

Results: The rate of esthetic improvement in orthognathic surgery patients was 91.7%. No significant difference between male and female patients was found regarding the changes in social, esthetic, and functional aspects before and after orthognathic surgery. Both genders recommended orthognathic surgery for patients with similar problems. One in four patients was dissatisfied with the nasal appearance after the surgical procedure (25.8%).

Conclusions: In this study the patients' satisfaction from the orthognathic surgical procedure was mostly a result of improvements in facial esthetics, followed by psychological well-being and then functional abilities. Most dissatisfaction after the orthognathic surgical procedure was related to nasal appearance.

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Facial esthetics markedly affects a person’s QOL, and its psychological impacts warrant recognition by maxillofacial surgeons. Researchers in this field have focused more on personal comfort and cognitive evaluation of the patients' lives rather than objective

Patients’ perception of dentofacial deformities is essential for the assessment of their treatment needs and ultimate satisfaction. Several health status indicators were developed to evaluate the patient’s quality of life (QOL) as to physical and behavioral aspects.

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This increased interest in the personal well-being of patients can be seen in studies assessing health conditions that are not necessarily fatal but can improve patients’ social, psychological, and physical impairements.4 Orthognathic surgery can remarkably change dento-facial deformities and enhance a patient’s social life by improving esthetics and function. Treating moderate to severe dento-facial deformities by a combination of orthodontic and orthognathic surgery is an accepted treatment plan.5 Orthognathic surgery aims to improve the patient’s esthetics and function. Therefore, assessing the patient’s QOL after surgery shows how he or she reacts to this treatment.6,7

Some previous studies reported that dental treatment and orthognathic surgery improved the patient’s QOL.8,9 Some other studies showed that patients seeking orthognathic treatment had more psychological problems,10,11 but no differences were found between these patients and the normal population.12,13 Patients with different dento-facial deformities might have differences in psychological measures. For example, comparison of skeletal Class II and III orthognathic surgical patients showed that skeletal Class III patients were more insecure about their facial appearance.14 It has been proposed that skeletal Class II patients have fewer psychological problems because they can mask their skeletal discrepancies by protruding the mandible.15 Nevertheless, Burden et al15 found no substantial differences in psychological issues between 2 groups of skeletal Class II and Class III orthognathic surgical patients. Although one of the goals of orthognathic surgery is correction of facial discrepancies and asymmetries, few studies have assessed the effect of this treatment on psychological well-being and QOL.16

Cunningham et al17,18 prepared the Orthognathic Quality of Life Questionnaire to evaluate the QOL of orthognathic surgical patients with different dento-facial deformities. It is composed of 4 components: social, facial esthetics, function, and awareness. Previous studies have validated the instrument for QOL measurements in dento-facial deformities and the impact of orthognathic surgery on QOL.19

This study aimed to assess patient satisfaction after receiving orthognathic treatment in an oral and maxillofacial surgery department from 2007 to 2017.

Materials and Methods

STUDY DESIGN AND SAMPLE

This study was conducted in the Department of Oral and Maxillofacial Surgery, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran. The study protocol was approved by the ethics committee of the university, and all the participants signed an informed consent agreement.

Patients who underwent orthognathic surgery from 2007 to 2017 in our department were asked to participate in the study. They were classified into Class II and Class III groups that had required orthognathic surgery combined with orthodontic treatment by the department staff. To be included in the study, patients had to meet the following inclusion criteria: age of 18 years or older, no congenital anomalies including cleft lip and/or palate, no reported medical problems, and completion of all pretreatment examinations (clinical and radiographic examinations).

The orthognathic surgical procedures included maxillary and mandibular surgical osteotomies (setback or advancement) with or without genioplasty. Each patient’s health status was evaluated according to American Society of Anesthesiologists criteria; patients with American Society of Anesthesiologists physical status I were enrolled in the study.

DATA COLLECTION AND INSTRUMENT

All participants were asked to fill out the modified questionnaire of Cunningham et al18 on how orthognathic surgery affects their QOL (Table 1). The questionnaire was modified according to the study patients’ culture. It consisted of 17 questions rated on a 5-point Likert scale and 1 question regarding their overall satisfaction with their operation. The questionnaire was used to measure 3 principal components (facial esthetics, social aspects, and functional abilities) and scored so that lower scores indicated better QOL.

The score ranged from 0 to 68. After a brief explanation of the interview, each participant filled out the questionnaire. If participants could not understand the questions, they were asked to consult with the authors. Each item was rated on a 5-point Likert scale with responses of “much better than before the surgery” (0) to “much worse than before the surgery” (4), with a higher score indicating poorer QOL.

STATISTICAL ANALYSIS

Statistical analysis was performed through SPSS software (version 18; IBM, Armonk, NY), by use of an independent t test, Fisher exact test, Pearson correlation coefficient test, 1-way analysis of variance, and 2 test. A 2-sided P < .05 was considered statistically significant.

Results

SAMPLE AGE AND GENDER

From 2007 to 2017, 150 patients who underwent orthognathic surgery in our center participated in the study. Of these 150 patients who were eligible to enter the study, 15 withdrew from study participation and 3 did not meet the inclusion criteria, leaving 132
patients who signed the consent forms. Of these patients, 83 (62.9%) were women and 49 (37.1%) were men. No significant difference in the patients’ satisfaction from their orthognathic surgical procedure was found regarding esthetic (P = .67), functional (P = .54), or social (P = .39) criteria when we compared the responses of the men and women. Both genders had similar attitudes toward orthognathic surgery, and there was no gender predilection in recommending orthognathic surgery.

The participants’ mean age was 26.4 years. The patients were categorized by their preoperative skeletal deformity into Class II (n = 52, 39.4%) and Class III (n = 80, 60.6%) patients. There was no significant difference in age between the Class II and Class III patients (P = .38). Both skeletal deformity groups recommended surgery for patients with similar problems. Those who did not recommend the orthognathic surgical procedure, however, showed significant differences in the questions regarding social components on the questionnaire (P = 0.04).

**FACIAL ESTHETICS**

Regarding overall facial esthetics, 91.7% of patients had better or much better esthetics compared with before the surgical procedure. As to major components of facial esthetics such as facial appearance from the side and frontal views, 93.9% and 91.6%, respectively, had a better or much better esthetic appearance. When we compared minor components of facial esthetics, such as tooth show and smile, 76.5 and 75.7% of the patients, respectively, had a better or much better esthetic appearance compared with that before the surgical procedure.

An important finding was the patients’ opinion regarding their nasal appearance with one fourth of the patients (25.8%) expressing dissatisfaction with their nasal appearance after orthognathic surgery compared with before surgery. Although patients with Class III deformity reported more improvements in their esthetics than Class II patients, this was not statistically significant (P > .05).

**SOCIAL ASPECTS**

Self-esteem was improved after the surgical procedure (76.5%), and the patients stated that they were more comfortable when attending social events and family gatherings (61.4%). Comparison of social improvements showed that Class III patients were considerably more confident in attending social events after surgery compared with Class II patients.

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**Table 1. PATIENT SATISFACTION AND QUALITY OF LIFE AFTER ORTHOGNATHIC SURGERY QUESTIONNAIRE**

<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Much Better</td>
</tr>
<tr>
<td>Esthetics</td>
<td></td>
</tr>
<tr>
<td>1. Changes in my facial appearance from frontal view</td>
<td>46 (34.8)</td>
</tr>
<tr>
<td>2. Changes in my facial appearance from side view</td>
<td>58 (43.9)</td>
</tr>
<tr>
<td>3. Changes in how my gum and front teeth show</td>
<td>35 (26.5)</td>
</tr>
<tr>
<td>4. Changes in my smile</td>
<td>32 (24.2)</td>
</tr>
<tr>
<td>5. Changes in my nose appearance</td>
<td>13 (9.8)</td>
</tr>
<tr>
<td>6. Changes in my whole facial appearance</td>
<td>47 (35.6)</td>
</tr>
<tr>
<td>Social</td>
<td></td>
</tr>
<tr>
<td>7. My self-esteem and confidence</td>
<td>33 (25)</td>
</tr>
<tr>
<td>8. My confidence in attending social and family events</td>
<td>26 (19.7)</td>
</tr>
<tr>
<td>Functional</td>
<td></td>
</tr>
<tr>
<td>9. My ability to chew and to crush foods</td>
<td>14 (10.6)</td>
</tr>
<tr>
<td>10. My ability to move my jaw freely in any direction</td>
<td>4 (3)</td>
</tr>
<tr>
<td>11. The amount that I can open my mouth without any limitation</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>12. My speech and speaking abilities</td>
<td>10 (7.6)</td>
</tr>
<tr>
<td>13. My sense of smell</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>14. My hearing ability</td>
<td>0</td>
</tr>
<tr>
<td>15. My breathing</td>
<td>13 (9.8)</td>
</tr>
<tr>
<td>16. Snoring in sleep</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>17. My jaw joint pain and sounds</td>
<td>3 (2.3)</td>
</tr>
</tbody>
</table>

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FUNCTIONAL ABILITIES

Functional abilities such as chewing food, jaw movement without limitation, speaking, and improvement in the temporomandibular joint (TMJ) condition in Class III patients were significantly improved compared with Class II patients. Other functional factors were similar between the 2 groups.

When we evaluated overall chewing abilities, about half of patients (48.5%) stated that their ability to chew foods had increased. The rate of patients’ improvement in jaw movement was 41.6%. The rates of improvement in speaking and breathing after surgery were 52.2% and 40.9%, respectively. The sense of smell and hearing ability showed no change in most patients (75% and 86.4%, respectively). The TMJ condition showed no change in 66.7% of the patients, and 28% of the patients were dissatisfied with the changes in the TMJ after the surgical procedure.

Discussion

This study aimed to determine esthetic, social, and functional improvements in orthognathic surgery patients. Patient satisfaction after orthognathic surgery helps to provide information regarding whether this treatment has benefited the patients. Many authors have reported psychological benefits of orthognathic surgery by improving the patient’s facial appearance, social comfort, and function.20-22

Previous studies found differences in self-esteem and QOL based on the patients’ gender and age.23-25 However, in our study, there were no differences between different genders and ages regarding the reported self-esteem or QOL. In addition, the Class II and Class III groups did not show significant differences in their satisfaction and QOL after the surgical procedure. The similarity in these groups of patients might be a result of the severity of their skeletal deformity, which required orthognathic surgery to correct these discrepancies regardless of their age, gender, and type of malocclusion. Other studies also reported a similar psychological status and level of an unattractive profile in Class II and Class III patients with no significant differences.15,26

Social acceptance of facial appearance is different in different parts of the world. For example, a convex profile with some degree of mandibular deficiency is more socially acceptable in Western societies than a Class III profile with maxillary deficiency or mandibular excess in the Asian population. It has been shown that patients with Class II deformity are more inclined to choose orthodontic surgery over jaw surgery27 whereas Class III patients choose combined jaw surgery.28

Regarding participation in social events and family gatherings, Class III patients had more confidence to attend these events after their operation. Published studies have shown conflicting results regarding the patient’s self-esteem after orthognathic surgery.15,29 Previous studies recommended a separate comparison of self-esteem for each gender,29,30 but in our research we found no differences between the 2 genders.

In our study, 1 in 4 patients (25.8%) was dissatisfied with his or her nasal appearance. Many factors can affect nasal appearance after Le Fort I osteotomy. This procedure has the potential to change the alar width and nasolabial morphology31,32; this might result in an undesirable esthetic nasal appearance. The alar base cinch suture has been recommended to reorient the perinasal musculature and control the alar base width.33 In our center, we routinely use the alar base cinch suture before maxillary osteotomy incision closure. However, using 3-dimensional measurements, van Loon et al34 found an increase in alar width regardless of whether an alar cinch suture was performed. Moreover, Howley et al35 found that the width of the alar base increased in all patients either with or without an alar cinch suture.

In our study, 18% of patients were not satisfied with their TMJ condition after orthognathic surgery. TMJ diseases are multifactorial, and the symptoms of TMJ disorder can have various manifestations, such as pain in the TMJ, noises (clicking, popping, or crepitus), and limitation in the mandibular range of motion.36 Any surgical procedure involving mandibular osteotomy can affect TMJ symptoms. These symptoms should be acknowledged before orthognathic surgery treatment planning. Usually, patients with dentofacial deformity desire improvement in their facial esthetics and oral function, as well as resolution of TMJ symptoms.37 The current literature is controversial regarding the effect of orthognathic surgery on TMJ complications.38 Some authors reported that orthognathic surgery could improve TMJ symptoms, whereas others claimed that a destructive impact on the TMJ could occur after the surgical procedure.39,40 Previous reports by Kerstens et al41 and White and Dolwick42 showed TMJ symptom aggravation in 11.5% and 8.1% of patients, respectively. Routine use of a sagittal split ramus osteotomy surgical technique in patients in this study could be one of the reasons for patients’ lack of satisfaction with their TMJ condition. The sagittal split ramus osteotomy surgical technique was found to cause reduced mandibular range of movement and no improvement in TMJ dysfunction in a few orthognathic surgical patients.33,44

The result of our study showed that the primary satisfaction of orthognathic surgical patients was related to improvement in esthetics, followed by social well-being and, finally, functional ability improvements. The most dissatisfaction was related to nasal appearance and limitation in opening the mouth.
Although all of the surgeons who operated on the patients were experienced in orthognathic surgery, their surgical skills might differ. In addition, it is worth mentioning that the patient’s perspective of a successful treatment might be different from that of the surgeon (objective); Another point of limitation was that orthognathic surgical patients with different facial deformities were compared equally. We did not evaluate psychological aspects of the patients’ personalities that might affect their response to orthognathic treatment. Moreover, the patients’ satisfaction with the outcome of their surgical procedure might change over time; thus, this was another limitation of our study. Despite these limitations, this study provides some insight into the opinions regarding orthognathic surgery of a relatively large number of patients (132 patients) from a specific ethnic group who underwent surgery over a 10-year period.

The results of this study showed improvement in patients’ overall satisfaction with their orthognathic surgical procedure. There were no significant differences regarding esthetic, social, and functional factors between Class II and Class III patients or between male and female patients after orthognathic surgery. Nasal appearance was the most undesirable esthetic consequence of orthognathic surgery.

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