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Original Research Article

Quality of Life Measurement Following a Double Jaw Correction for Dentofacial Deformities: A Single-Center Retrospective Analysis

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Abstract: ***Background:*** Double jaw surgeries are performed to correct the deformities that involve both the maxilla and the mandibula. We aim to evaluate the perioperative process with cephalometric measurements regarding their motives and fulfilments following the double jaw surgery. ***Material and Methods:*** We evaluated the perioperative process retrospectively in double jaw surgery for dentofacial deformities in the last ten years at Istanbul Faculty of Medicine, Department of Plastic, Reconstructive and Aesthetic Surgery. The questionnaire of motives for the surgical treatment and the Postsurgical Patient Satisfaction questionnaire (PSPSQ) were investigated. ***Results:*** The majority of the patients (88.4 %) reported satisfaction, and 85.9 % reported an increase in their self-confidence following surgery. Both functional and aesthetic motivations were reported successfully satisfied following double jaw surgery. The data from the PSPSQ reported a high degree of post-treatment satisfaction for the patients. The younger patients had an influence on the degree of overall treatment satisfaction for appearance and social motives ($p<0.05$). The women patients expressed greater value for social and disease prevention motives than men ($p < 0.001$). ***Conclusion:*** Despite the various difficulties of the perioperative process, the patients expressed high levels of satisfaction following surgery. Besides, the increase in self-esteem, the improvement in masticatory functions, and the amelioration in the external appearance are expressed apparently by the female patients.

Keywords: Orthognathic surgery; Questionnaire; Motives.

INTRODUCTION

Orthognathic surgery is performed to restore the proper anatomical and functional structure by removing the deformations in the bone structure and teeth of the face. These dentofacial anomalies can be congenital, developmental, or acquired [1, 2]. Dentofacial abnormalities might cause inconsistency in the aesthetic appearance of the face, problems in chewing activity due to improper teeth closing, pain in the temporomandibular joint, poor oral hygiene, and psychological issues [3-8]. Currently, the most common orthognathic surgical procedures are Le fort one osteotomy for the maxilla and sagittal split ramus osteotomy for the mandible [5-10].

Generally, patients could be satisfied after orthognathic surgery. The low incidence of significant complications and minor complications can usually be corrected without the need for interventional procedures [9-11]. However, recurrence rates might increase depending on the direction and the number of jaw movements, cleft lip-palate, operative technique, and the bone fixation methods [8-12].

Patient satisfaction generally increased after orthognathic surgery, related to decreased recurrence rates during the postoperative period [10-16]. The most commonly performed orthognathic surgical interventions are bilateral sagittal split ramus osteotomy (BSSRO) for the mandible and Le Fort I osteotomy for the maxilla [7-11]. Also, the most common chin deformities that require orthognathic surgery are maxillary and mandibular retrusion [4-8].

Orthognathic surgery has been performed in our clinic, primarily for double jaw correction. We aimed to evaluate per-operative cephalometric measurements of the patients who had double jaw correction regarding their motives and fulfilments following the dentofacial deformity operations.

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MATERIAL AND METHODS

The Research Ethics Committee of the Istanbul Faculty of Medicine approved the study, which was conducted in conformity with the Declaration of Helsinki. Patients who underwent both Le Fort 1 osteotomy and BSSRO (double chin correction) due to developmental dentofacial deformity in the Department of Plastic Reconstructive and Aesthetic Surgery, Istanbul Faculty of Medicine between 2007 and 2018 were included in our study. Congenital anomalies such as cleft lip and palate and dentofacial deformities due to trauma were excluded. Inclusion criteria of patients in the study;

- Being over the age of 15
- Not having had maxillo-facial surgery before
- Being able to read and write enough to fill the questionnaire
- Without distraction due to orthognathic surgery
- Not having a cleft lip, congenital syndrome
- Without maxillofacial trauma
- At least six months have passed since the operation

The records of 228 patients who met the criteria were retrospectively reviewed, and 138 were accessed. Complicated patients and those who had a second surgery were determined. In addition to double chin operation, patients with genioplasty and septorhinoplasty due to septum curvature were recorded. Orthodontic treatments of the patients were carried out by orthodontists in different centers; operations were performed by other surgeons in our clinic. A total of 16 questions were asked by face-to-face or telephone interviews with the patients. The questionnaire of motives for the surgical treatment considered the potential justifications for undergoing treatment. An analysis of the modified 16-item questionnaire consisted of 4 motivation subscales such as oral function, social interactions, appearance, and disease prevention. After completing the postoperative orthodontic treatment, the patients answered the Postsurgical Patient Satisfaction questionnaire (PSPSQ) which was related directly to the outcome of surgical-orthodontic treatment [16]. The ages, gender, and educational status of the patients at the time of surgery were noted. The current education status was recorded. The education status of the patients who are currently studying at university was registered as graduates. The Likert 5-scale graded as survey responses; "I do not agree at all", "I completely agree", "not satisfied at all" and "completely satisfied" were used. The numerical values of the answers were statistically evaluated.

STATISTICAL ANALYSIS

SPSS 20.0 package program was used for statistical analysis of the data. Categorical measurements were summarized as numbers and percentages, and continuous measures for normal distributed as mean and standard deviation (median and minimum-maximum for non-normal distribution). Chi-Square test or Fisher test statistics were used for comparison of categorical variables. For the comparison between groups, a T-test or ANOVA test was used for parameters showing normal distribution. Mann-Whitney U test or Kruskal Wallis test was used for parameters without normal distribution. The statistical significance level was reported as 0.05.

RESULTS

The patients' descriptive data, 37 patients between 2007 and 2012, 8 patients between 2012 and 2015, and 93 patients between 2015 and 2018, were included. The gender distribution was 79 women (41.3%) and 59 men (58.7%). The average age of the patients was 22.56 (16-41). The education level of the patients was reported as 42 middle school (30.4%), 89 undergraduates (64.1%), and 9 graduated (5.4%) (Table 1).

The distribution of answers to each question regarding the treatment motives listed in Table 2.

The prevention of pain in the jaw joint was highly unsatisfactory by the patients (48.9%). Improvement of chewing ability (33.7%), improvement of fit of upper and lower teeth (41.4%), improvement of work or school performance (40.2%), Improvement of general health (57.6%), improvement of sinus problems (26.1%), improvement of overall appearance (53.3%), modification of a headache problem (58.7%), prevention of damage to the jaw joint (48.9%) were primarily reported very satisfied by the patients.

The fulfillment of motives for the treatment questionnaire was reported in Table 3. The patients for oral functional explanations had no difference for treatment satisfaction. The same was seen for social motives for the education groups ($p>0.05$). In contrast, giving a high prominence to appearance, social reasons, and disease prevention, women influenced overall treatment satisfaction. Given the increasing importance to build and social motives, younger patients influenced the degree of overall treatment satisfaction. The patients of the graduate group have more motivation for appearance than others ($p=0.019$). The aesthetic reasons were more likely important for younger patients ($p=0.038$). The aesthetic reasons in seeking treatment were more likely seen for women ($p = 0.046$). The younger patients expressed more likely social motives ($p=0.046$). The women patients said more excellent value for society and disease prevention motives than men ($p < 0.001$).

The distribution of responses for each of the four questions is listed in Table 4. The data from the PSPSQ reported a high degree of post-treatment satisfaction for the patients without a significant difference in treatment satisfaction. High degrees of

motive fulfillment correlated positively with all aspects of treatment satisfaction.

Table-1: Demographics of the patients

	Overall (n=138)
Years of surgery	
2007-2012	37 (27.2%)
2012-2015	8 (5.4%)
2015-2018	93 (67.4%)
Age	22.56(16-41)
Gender (man)	59 (41.3%)
Education	
Middle school	40(30.4%)
Under-graduate	89 (64.1%)
Graduate	9 (5.4%)

Data presented as numbers, with percentages in parentheses.

Table-2: The results and the treatment questionnaire of motives

Questions	**1.Very Unsatisfied**	**2. Not Satisfied**	**3. Neutral**	**4. Satisfied**	**5. Very Satisfied**
1. Improvement of chewing ability	9 (6.5%)	18(13%)	33(23.9%)	30(21.7%)	46(33.7%)*
2. Improvement of appearance of teeth	21(15.2%)	14(9.8%)	38(32.6%)*	24(19.6%)	31(22.8%)
3. Improvement of fit of upper and lower teeth	3(2.2%)	6(4.3%)	26(18.5%)	45(32.6%)	57(41.4%)*
4. Prevention of periodontal disease	27(19.6%)	15(10.9%)	19(14.1%)	42(30.4%)*	35(25%)
5. Prevention of future tooth loss	8(5.4%)	21(15.2%)	31(22.8%)	40(29.3%)	38(27.2%)
6. Improvement of facial profile	39(28.3%)	13(9.8%)	47(33.7%)*	21(15.2%)	18(13%)
7. Prevention of pain in jaw joint	68(48.9%)*	27(19.6%)	21(15.2%)	13(9.8%)	9(6.5%)
8. Improvement in speaking ability	5(3.3%)	9(6.5%)	24(17.4%)	62(44.6%)*	39(28.3%)
9. Improvement of work or school performance	9(5.4%)	10(7.6%)	35(25%)	28(20.7%)	56(40.2%)*
10. Improvement of general health	6(4.3%)	8(5.4%)	19(14.1%)	25(18.5%)	70(57.6%)*
11. Improvement of sinus problems	31(22.8%)	20(14.1%)	33(23.9%)	18(13%)	36(26.1%)*
12. Improvement in breathing	13(9.8%)	23(16.3%)	39(28.3%)*	36(26.1%)	27(19.6%)
13. Feeling better about myself	31(22.8%)	17(12%)	47(33.7%)*	24(17.4%)	19(14.1%)
14. Improvement of overall appearance	4(3.3%)	2(1.1%)	19(14.1%)	39(28.3%)	74(53.3%)*
15. Improvement of a headache problem	0(0%)	4(3.3%)	15(10.9%)	38(27.2%)	71(58.7%)*
16. Prevention of damage to jaw joint	0(0%)	7(5.4%)	21(15.2%)	42(30.4%)	68(48.9%)*

Data presented as numbers, with percentages in parentheses.

Oral function motives: item 1 and 3; appearance motives, items 2, 6, and 14; social motives, items 7-13, 15, and 16; disease prevention motives, items 4 and 5.

*Most common answers.

Table-3: The fulfillment of motives for the treatment questionnaire

	Gender		**Age**			**Education**		
Motive for Treatment	Female N=79	Male N=59	16-21 yo N=71	21-26 yo N=46	26-41 yo N=21	Middle school	Under-graduate	Graduate
Oral function	3.87±1.17	3.16±1.19	3.45±1.21	3.87±1.2	3.36±1.08	3.39±1.37	3.75±1.2	4.2±1.3
Appearance	3.48±1.27***	2.92±1.36	1.5±0.5**	1.74±0.44	1.42±0.51	2.64±1.25	3.49±1.29	3.8±1.3*
Social	2.54±1.38[a]	1.37±0.67	1.79±1.16[b]	2.52±1.36	1.93±1.26	4±1.01	4.31±1.19	4±1.22
Disease prevention	3.3±1.22[c]	1.97±1.17	2.6±1.48	2.94±1.26	2.86±1.16	3.16±1.06	3.2±1.3	3.87±1.18

Data presented as mean ± SD.

*: The patients of graduate group have more motivation for appearance, p=0.019.

**: Aesthetic reasons are more likely important for younger patients, p=0.038.

***: Aesthetic reasons in seeking treatment were more likely seen for women, p = 0.046.

[b] : Younger patients expressed more likely for social motives, p=0.046.

[a], [c] : Women expressed greater value for social and disease prevention motives than men, p < 0.001.

Table-4: The outcomes of the postsurgical patient satisfaction questionnaire (PSPSQ).

Questions	1. Very Unsatisfied/ Unlikely	2. Unsatisfied/ Unlikely	3 Neutral	4 Satisfied	5 Very satisfied
1 At present, how satisfied are you with the extent of healing you have had since surgery?	3(2.2%)	2(1.1%)	13(9.8%)	40(29.3%)	80(57.6%)*
2 If you had to make the same decision again, how likely would you be to undergo this same surgery?	6(4.3%)	2(1.1%)	21(15.2%)	28(20.7%)	81(58.7%)*
3 Considering this was an elective operation, how likely would you now be to recommend it to others?	6(4.3%)	7(5.4%)	20(14.1%)	24(18.5%)	81(57.6%)*
4 Considering everything, how satisfied are you now with the results of surgery?	2(1.1%)	5(3.3%)	15(10.9%)	46(33.7%)	70(51.1%)*

Data presented as numbers, with percentages in parentheses. * Most common answers.

DISCUSSION

Double chin correction is a comprehensive plastic surgery that aims to provide both functional and aesthetic improvement in patients with dentofacial deformity. In addition to operational problems, the facial appearance of the patients could lead to psychological and social issues [12-17]. Especially in our patient population, the treatment results showed high degrees of motive fulfillment and satisfaction. The patients of the graduate group and the younger people had more motivation for appearance than others.

Considering the process with challenges with the orthodontic treatment such as orthognathic surgery, the patients have motivations for multiple benefits of double chin surgery [18]. Thus, understanding the patients' causes and expectations is very important for the success of the treatment [15-18]. Currently, interest in the motivates and satisfaction of patients in health services has increased. The expectations of the patients have been provided a better quality of health service. Orthognathic surgery and double chin correction related to patient satisfaction have been less likely conducted in Turkey for psychological evaluation regarding the international studies and trials. In this study, we aimed to evaluate the outcomes of motives to treatment and the satisfaction in the process of double chin surgery.

It has been evaluated the change in the psychological status of orthognathic surgery patients before and at the end of the treatments and found that the improvements were promising [13-18]. Unlike our study, we had a lack of control group and prior evaluation as deficiency of our research.

In studies evaluating orthognathic surgery patients, the number of individuals varies considerably. However, mostly the number of female patients is higher than male patients as in our study population. Espeland et al. included 516 patients and reported that they started treatment to improve tooth appearance in 83% and chewing function in 81% [19]. In our study, the factors that were directed patients to treatment were seen that functional reasons were more prominent than aesthetic reasons. Likewise, in many studies, Rivera, et al., Zhou et al. it was stated that aesthetics was the most important motivating factor for treatment [12, 19-20]. 41.3% of the patients decided to start treatment due to purely functional reasons, while 22.1% stated purely aesthetic reasons.

Lazaridou - Terzoudi et al. conducted that it was observed that the youngest patient group were the most critical group about facial aesthetics and their postoperative satisfaction [21]. Our study observed that the treatment motivations of patients in the 16-21 age group were related mainly with the aesthetic reasons without a significant difference in the comparison of postoperative satisfaction of patients.

Nicodemo et al. reported that a decrease in depressive symptoms was found with increased self-confidence after surgery in older female patients, without a change in male patients [22]. Consistent with our study, it was observed that female patients had more expectations of aesthetic improvement than male patients. Besides, it was found that the increase in self-confidence in female patients after surgery was higher than in male patients. Contrary to those studies, a classification was made according to educational status in our study, and it was observed that the aesthetic factors among the factors leading to treatment in graduate patients were more prominent than the patients with middle school education regarding the social environment. Those studies might indicate the effectiveness of the external influences among our decision-making [19-22].

It has been observed that most of our patients get used to the changes as the swelling and other problems on the face after the surgery and generally satisfied with the results. It has been shown that discomfort, pain, paresthesia, and oral function problems might occur following surgery regarding the postoperative mood of the patients [23]. For this reason,

it is essential to consider postoperative issues while evaluating patients' satisfaction with orthognathic treatment. Our study found no difference between male and female patients in terms of satisfaction with recovery. However, regarding the complications during the recovery period, women experienced more complaints such as nausea.

The personal thoughts of appearance impact his social and interpersonal relationships and his desire for orthognathic surgery. It has been reported that people thought that they had an ugly face, were less sympathetic, less popular, and less socially skilled [20-23]. Consistently in our study, 87.9% of the patients reported that their self-confidence was improved more likely. The increase in the self-esteem of female patients was higher than male patients. Besides, people who had an aesthetic concern improved their self-confidence after surgery.

Although it is stated that 92% -100% of orthognathic surgery patients are satisfied with the surgical result, and the range of 84% -92% satisfaction was considered to have surgery again [20-22]. Consistently, although the satisfaction following surgery was high, the approach to the idea of reoperation was unfortunately intolerable. Regarding septoplasty with orthognathic surgery, the third molar tooth extraction, and other minor corrections significantly increased patient satisfaction [24]. However, the increase in patients' happiness does not mean that those complex interventions could be performed simultaneously. Also, surgical interventions performed simultaneously with orthognathic surgery in our study were excluded from this survey.

Regarding the literature, individual malocclusion has adverse effects on chewing and the chewing efficacy following orthognathic surgery was found to be insignificant in the short-term follow-up [23-26]. Consistently, 79.8% of the patients reported that there was an improvement in chewing functions after surgery. In addition to that, facial pain improved significantly after surgery (68.3%).

In our study regarding the postoperative complications, the sensational modifications of the jaw tip had a lot of challenges for the patients' responses. However, Posnick et al. found that 80% of the patients were satisfied with postoperative phonation, according to the questionnaire results after the surgery and after the completion of orthodontic and restorative dental treatments [27]. Consistent with our study, 81.1% of the patients reported that they were satisfied with their speech, too.

There are several limitations to this study. First, this is a retrospective, observational study, and less information on different statistical approaches following the questionnaires in detail or the various type of scales used. The evaluation for the satisfaction and improvements among the personal statements following surgery is likely to impact treatment decisions significantly. We think that further studies on this subject will increase the psychological approach during follow-up and make an outstanding contribution to the physicians' decision-making easier. Finally, we believe the continued pursuit of research will clarify an appropriate process for this group of patients.

CONCLUSION

The subjective treatment satisfaction for the patients with dentofacial deformity who had double chin surgery was evaluated according to gender, educational status, and ages. After double chin surgery, most of the patients were satisfied with the results such as chewing, breathing, lip shape, speech style, and the closing of the teeth. However, the most excellent satisfaction of the patients is the improvement in chewing function and the increase in their self-confidence. The patients' chin tip sensations were the biggest problem, regardless of the time relapses after the surgery. The satisfaction of the patients during their stay in our hospital was reported very well. Subsequently, double chin surgery is an operation that the patients are delighted with despite all the process difficulties and recommended to patients with the same condition. Aesthetic improvements and increased self-confidence are the majority of the positive outcomes regarding patients' satisfaction following surgery.

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Conflict of interest
None declared.

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