The New York State Dental Journal

Volume 88 | Number 2 Article 4

3-1-2022

Orthognathic surgery and quality of life outcomes: findings from a hospital-based patient satisfaction survey

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Orthognathic Surgery and Quality-of-Life Outcomes

Findings from a Hospital-Based Patient Satisfaction Survey

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ABSTRACT

This study examined patient satisfaction and changes in quality of life (QoL) following orthognathic surgery performed to treat severe dentofacial deformities. The short form of the oral health impact profile (OHIP-14) instrument was utilized to measure the negative impact related to severe dentofacial deformities on QoL. Ninety-five patients participated in this survey. Respondents reported significant reduction in the overall OHIP-14 score following orthognathic surgery (p-value<0.0001). Approximately 92% of patients reported postoperative resolution of their chief concerns. In conclusion, orthognathic surgery was found to be beneficial, as it significantly reduced the negative impact of severe skeletal malocclusion on QoL of the patients we surveyed.

Severe dentofacial deformities may adversely affect patients' mental well-being and, consequentially, their quality of life. Orthognathic surgery is a well-recognized treatment, routinely performed for the correction of facial disharmony and skeletal malocclusion resulting from severe dentofacial deformities.[1] The primary goal of this surgery is to improve mastication, phonation, and dentofacial profile by harmonizing the facial skeletal structure and dental occlusion.[2] In doing so, orthognathic surgery may contribute to enhancing the QoL of those affected individuals who receive the surgical intervention. Therefore, in addition to the objective measures of occlusion and motor function, it is important to include the QoL appraisal in examining the outcomes of orthognathic surgery.

The QoL can be measured using generic or disease-specific tools. However, the generic instruments may not be sensitive to changes related to oral health on QoL and may exhibit limited construct validity. Although the concept of QoL is subjective, a sizeable range of questionnaires has been developed to examine this outcome.[3] Furthermore, these are proven tools for the evaluation of patients' perceptions.[3,4] One such commonly used questionnaire is the Oral Health Impact Profile (OHIP), which measures individuals' perceptions of the negative impact from oral disorders on their well-being and QoL.[3,5]

The OHIP was originally developed in Australia by Slade et al. to assess individual's perception regarding discomfort and dysfunction caused by oral conditions.[5] While the OHIP is quite comprehensive in nature regarding the perceptions of impact on

Patient Satisfaction Survey			
Did you feel that you were in need of corrective jaw surgery?	Yes	OR	No
Do you feel that your chief concern has been solved after surgery?	Yes	OR	No
Answer the following question on a scale of 0 (Worst) to 10 (Best)			
1. How well were your expectations met?			
2. How well did we manage you immediately post-operatively?			
3. How difficult was the time immediately after surgery?			
4. How satisfied you are?			
From what you know now would you do it again here at JMC?	Yes	OR	No
Would you recommend it to others who have the similar condition to receive this surgical treatment here at JMC?	Yes	OR	No

Figure 1: Patient Satisfaction Survey

well-being, it is not always possible to use this lengthy instrument of 49 questions, especially in health services research, which requires a more succinct instrument.[6] Therefore, subsequently, its short version, known as OHIP-14, was developed. It consists of 14 questions that examine the same seven dimensions as the original OHIP, and has been determined to be a valid and reliable instrument.[6]

In recent years, there has been growing interest in patient satisfaction and changes in QoL following dental treatment and orthognathic surgery.[7-10] Numerous studies have examined the postoperative changes in QoL of patients who had undergone orthognathic surgery for the correction of severe dentofacial deformities and reported improved self-confidence and overall QoL.[7,10-20] Patients' perceptions and expectations have become increasingly important in justifying health services delivery and ensuring overall healthcare quality.[12,13] The use of QoL measures is a valuable metric for determining the outcome of care.[21-23]

At Jacobi Medical Center (JMC), one of the safety-net hospitals of the largest municipal healthcare system in the United States, located in the Bronx, NY, orthognathic surgery is routinely performed on patients who present or are referred to this hospital for the treatment of facial disharmony and severe skeletal malocclusion. This study was undertaken to assess our hospital's effort in providing this surgical treatment. Its aim was to investigate patient satisfaction and postoperative changes in QoL using OHIP-14 questionnaire in a sample of patients diagnosed with severe forms of facial disharmony and skeletal malocclusion who received orthognathic surgery between January 2015 and December 2017 in the Department of Dentistry and Oral & Maxillofacial Surgery at JMC.

Methods

The study protocol was reviewed and approved by the Institutional Review Board of the Albert Einstein College of Medicine. A convenience sample of patients diagnosed with severe dentofacial deformities who presented for treatment from January 2015 to December 2017 was recruited to participate in the patient satisfaction survey in 2018. All patients were otherwise systemically healthy and had established diagnosis of severe Class II or Class III skeletal malocclusion, necessitating surgical orthodontics. Informed consent procedure was executed, and participants were assured of the confidentiality of the survey data.

TABLE 1:
Characteristics of Survey Participants

Characteristics	n (%)
Gender	
Female	48 (50.53%)
Male	47 (49.47%)
Age	
Mean Age (SD)	20.86 (6.33)
Median Age	19.00
Range	14 to 48 years
< 20 years (Teen age population)	52 (54.74%)
≥ 20 years	43 (45.26%)
Diagnosis	
Class II	22 (23.16%)
Class III	73 (76.24%)
Type of Surgery	
Maxilla	7 (7.37%)
Mandible	17 (17.89%)
Both Jaws	71 (74.74%)

[SD = Standard deviation]

A structured telephone survey was conducted. Multiple attempts were made to contact the patients to obtain their responses to our survey. Our attempts included calling multiple times on different days and at different times of the day, leaving voice messages, accommodating responders' request to call on a specific day at specific times per their convenience, etc. Technology such as answering machines and caller ID increased the amount of time and effort required to acquire patients' responses to the telephone surveys.

Patients who participated in this project responded to preoperative and postoperative questionnaires via telephone survey. The 14-item Oral Health Impact Profile (OHIP-14) instrument was utilized to measure the impact of orofacial conditions on QoL before and after orthognathic surgery.

OHIP-14 included 14 questions divided into seven evaluation domains (two questions per domain): functional limitation (questions 1 and 2); physical pain (questions 3 and 4); psychological discomfort (questions 5 and 6); physical disability (questions 7 and 8); psychological disability (questions 9 and 10); social disability (questions 11 and 12); and handicap (questions 13 and 14).[6] Each question evaluated a frequency with five possible answers, ranging from "never" (score zero) to "very often" (score 4).[6]These scores were multiplied by the weight assigned to each question in the original OHIP-14 instrument to compute standardized scores comparable to the results obtained with the standardized OHIP-49.[6] Accordingly, the total OHIP-14 score ranged from 0 to 28, with higher scores indicating a worse impact on QoL.

TABLE 2.

Percentage Distribution of Responses to each Question of the OHIP-14, Preoperative (S0) and Postoperative (S1) (n = 95)

Questions	0		1		2		3		4	
	S0	S1	S0	S1	S0	S1	S0	S1	S0	S1
Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	46.32	89.47	21.05	5.26	24.21	1.05	5.26	3.16	3.16	1.05
Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	85.26	96.84	5.26	1.05	4.21	1.05	5.26	0	0	1.05
Have you had painful aching in your mouth?	58.95	90.53	8.42	3.16	16.84	1.05	12.63	4.21	3.16	1.05
Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	35.79	87.37	13.68	5.26	23.16	3.16	21.05	3.16	6.32	1.05
Have you been self-conscious because of your teeth, mouth or dentures?	8.42	50.53	0	40.00	7.37	3.16	22.11	4.21	62.11	2.11
Have you felt tense because of problems with your teeth, mouth or dentures?	9.47	81.05	5.26	13.68	11.58	3.16	23.16	1.05	50.53	1.05
Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	41.05	94.74	28.42	3.16	22.11	1.05	0	1.05	8.42	0
Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	37.89	92.63	28.42	5.26	18.95	0	4.21	1.05	10.53	1.05
Have you found it difficult to relax because of problems with your teeth, mouth or dentures?	20.00	82.11	4.21	12.63	12.63	3.16	30.53	1.05	32.63	1.05
Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	14.74	87.37	2.11	6.32	7.37	4.21	25.26	1.05	50.53	1.05
Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	34.74	90.53	32.63	5.26	24.21	2.11	5.26	1.05	3.16	1.05
Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	82.11	96.84	15.79	2.11	1.05	0	1.05	0	0	1.05
Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	41.05	94.74	15.79	3.16	29.47	1.05	11.58	0	2.11	1.05
Have you been totally unable to function because of problems with your teeth, mouth or dentures?	98.95	96.84	1.05	3.16	0	0	0	0	0	0

[0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, 4 = very often]

In addition to the questions of the OHIP-14, participants responded to a separate questionnaire, developed by the investigators to evaluate postsurgical patient satisfaction (Figure 1).

The non-parametric Kolmogorov–Smirnov test was used to inspect the normality of data. Fisher's exact test was used to examine the associations of gender and age with the type of deformity and the type of surgery. The Wilcoxon matched-pairs test was used to evaluate significant changes in OHIP-14 scores between S0 (preoperative) and S1 (postoperative) in each domain and overall for all patients. An effect size was also calculated to indicate the impact of orthognathic surgery.

A p-value < 0.05 was considered statistically significant. SAS software *(SAS Institute, Cary, NC)* version 9.4 was utilized to conduct all data management procedures and statistical analyses.

TABLE 3.

Comparison of OHIP-14, Preoperative (S0) and Postoperative (S1), by Domains and Individual Questions for All Patients

Domain	S0 (Median)	S1 (Median)	P-value*	Effect size (r)
Functional limitation	0.51	0.00	<.0001	0.56
Physical pain	1.32	0.00	<.0001	0.67
Psychological discomfort	3.55	0.45	<.0001	0.84
Physical disability	1.00	0.00	<.0001	0.70
Psychological disability	3.00	0.00	<.0001	0.81
Social disability	0.38	0.00	<.0001	0.58

Results

The total number of patients who underwent orthognathic surgery at JMC between January 2015 and December 2017 was 108. In order to receive the maximum response rate possible, we attempted to contact each patient from three to five times on a different day at a different time of the day. Non-response was made up of refusal to respond and lack of current contact information. Common comments included "Call back," "Busy," "Bad time" and "Not interested," with a hang-up even before complete introduction.

Our survey response rate was 87.96% (n = 95). Descriptive statistical analyses revealed the demographic characteristics of the patients who participated in this survey (Table 1). The gender distribution was almost equal in our study sample. The average age of the patient at the time of surgery was 20.86 years, ranging from 14 to 48 years old. Nearly 75% of total study participants received surgery in both the maxilla and mandible. Fisher's exact test revealed that variables such as gender and age had no significant association with the type of deformity or type of surgery performed.

Descriptive statistics further revealed the frequency of obtained answers to preoperative and postoperative OHIP-14 questionnaire (Table 2). At S0 (prior to surgery), there was variable distribution of the answers, showing that the evaluated items frequently worried patients ("very often," "often," "occasionally," etc.). At S1 (postsurgery), most of the evaluated items were no longer a problem for these patients, as they did not frequently worry them ("hardly ever" or "never").

A statistically significant reduction (p-value<.0001) in the overall score of the OHIP-14 (n = 95) was observed between the preoperative and postoperative assessments (Table 3). In addition, there were significant decreases in scores in all seven domains examined through OHIP-14 (p-value<.0001). The significant reduction that we observed in overall OHIP-14 and in the individual domain scores after orthognathic surgery was similar for the two sexes, among age groups and among the types of surgery performed. Although the negative impact score was reduced in all seven domains of the QoL, maximum effect size was observed in psychological discomfort, followed by psychological disability.

Out of 95 patients who participated in this survey, 96.8% felt that they were actually in need of corrective jaw surgery. Overall, 91.58% of the patients responded that their chief concerns were resolved after orthognathic surgery. From the total sample we surveyed, 80% of the respondents stated (from what they know now) they would consider having this surgery done all over again here at JMC, and 84.21% would recommend it to others who have the similar condition.

Discussion

Findings from this study revealed significant decrease in the negative impact resulting from severe dentofacial deformities on overall QoL, as well as in each individual domain assessed by the OHIP-14 in our study sample following the orthognathic surgery. This reduction was almost similar for both genders, across age groups and between the type of surgery performed.

While analyzing the distribution of answers to each question (Table 2), it became apparent that a few patients still gave scores of 3 or 4 after surgery. However, those higher scores were mainly related to the characteristics of feeding and chewing, which might have been skewed because those patients were still in recovery and adapting to the new occlusion. Previously conducted research has shown that in the initial postoperative period, approximately up to six months, there may be a transient and significant deterioration in OHIP-14 scores, especially in the fields of appearance and functional limitation.[21] It is linked to immediate postoperative morbidity, when the presence of pain, edema, neurosensory disorders, limited mouth opening and decreased masticatory efficiency are common.[21,24] However, eventual continuous improvement in QOL and decreasing OHIP-14 scores over time in-

dicate gain in the health outcomes and support the hypothesis that orthognathic surgery improves the QoL.[16,19] A few patients who participated in our survey in 2018 received orthognathic surgery in the second half of 2017. Therefore, they were still within the postoperative period of six months.

Data analysis by the OHIP-14 domains revealed that although significant improvement was achieved in all domains of QoL following the orthognathic surgery, the highest improvement was noticed in psychological domains. The effect size was greatest in psychological discomfort and psychological disability, whereas the effect size in each remaining domain of the QoL was comparatively smaller. However, considering the effect size in overall OHIP-14 score for the patients we studied, it is possible that the benefits of this surgical treatment in oral health-related QoL could have been identified clinically. Our findings are supported by the number of studies that reported similar changes in psychological domains and overall improvement in quality of life following the surgical intervention of skeletal malocclusion. [7,10-20,25]

Moderate-to-severe dentofacial deformities may physically, psychologically and socially affect those who are afflicted. Such patients may demonstrate and report benefits from orthognathic surgery in all these dimensions of the QoL. However, surgical correction of the severe dentofacial deformity may lead to an extreme change in appearance and a radical alteration in facial profile.[11,19] This may contribute to a significant delay in becoming accustomed to the new appearance,[26] but that was not reported by any of the patients in our study.

Participants' responses to the patient satisfaction survey revealed that patients, for the most part, were quite satisfied and felt that orthognathic surgery was worth the effort. Unfortunately, 20% of respondents said that they would have not gone through this treatment if they had prior knowledge of how their recovery would be, and 15% would also not recommend this treatment to others who have similar condition. While this represents a small number, it is not insignificant and indicates that preparation and management of expectations prior to surgery are necessary parts of this protocol and should be provided to all patients.

This was a cross-sectional study, in which both pre- and post-intervention data were collected at the same time from our survey respondents. Our phone survey was very challenging to conduct for a number of reasons. In today's world, people are extremely busy, and it seems that a phone survey may interrupt the personal time of the respondents. Therefore, they may avoid responding to a survey questionnaire. Furthermore, with the availability of caller ID feature, many people tend to use call screening to accept only calls they are expecting and avoid answering any other calls. On the other hand, one big advantage of telephone surveys is the ability to reach a large number of individuals due to the widespread utilization of cell phones.

Although OHIP-14 is a valid and reliable questionnaire to measure the QoL,[6] it is a subjective evaluation and may have deviation in answers. Furthermore, the format of the answers in OHIP-14 questionnaire is based on frequency, which may often lead the survey respondents to the biased evaluation because it is not always possible to know whether the patients think in terms of absolute numbers or an average number of the events occurring in a given period. Depending upon the respondents' answers, it may either underestimate or overestimate the true level of impact, especially in cases when the respondents have forgotten the experienced impacts, leading them to underestimate the true levels. Therefore, these findings must be interpreted carefully.

The use of a valid standardized questionnaire for measuring the impact of severe dentofacial deformities and their treatments on QOL is necessary because it allows researchers to study the actual benefit of a clinical procedure to patients' lives. [4,21-23,27] The major strength of this study was the high response rate to our survey. However, this design is prone to major risk of recall bias. Therefore, no claim can be made regarding the cause-and-effect relationship. A prospective longitudinal study may help in measuring change over time, eliminating recall bias.

Conclusion

By reducing the negative impact related to severe dentofacial deformities, orthognathic surgery was associated with substantial post-surgical improvement in the overall quality of life within our study population. This benefit should be highlighted when discussing the surgical treatment with patients suffering from skeletal malocclusion resulting from moderate-to-severe dentofacial deformities.

Queries about this article can be sent to Dr. Badner at victor.badner@nychhc.org

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