

# Quality of Life of Patients with Dentofacial Deformities Undergoing Orthognathic Surgery

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## ABSTRACT

Orthognathic surgery has seen increasing demand. Facial deformities and skeletal problems cause disturbances to physiological functions and lead many patients to seek such treatment, which causes important changes in the quality of life. This longitudinal observational study measured the size of the effect, and compared the quality of life before and after orthognathic surgery with the following factors: sex, age, income, schooling, main complaint, type of deformity, type of surgery and degree of satisfaction with the postoperative facial aspect. An identification and socio-demographic form and the Brazilian Orthognathic Quality of Life Questionnaire were applied to 17 patients seen in a private dental office, one week before and six weeks after surgery. The sample was calculated by the prevalence of impact. Descriptive analysis was performed using the Graphpad Prism software (Graphpad Software) and the Sperman correlation test applied at a significance level of 0.01. Most of them (76.47%) were very satisfied with the outcome of the procedure. The size of the effect calculated with the total score of the questionnaire was 1.57. Significant preoperative correlations were found between the social domain and satisfaction with facial aesthetics and between deformity awareness and type of deformity; in the postoperative period, between the facial aesthetic domain and the type of deformity and between oral function and sex and satisfaction with facial appearance. Orthognathic surgery has a positive impact especially on satisfaction with facial appearance, and may be conditioned to schooling.

*Key Words:* Quality of life; Dentofacial deformities, Orthognathic Surgery.

## Introduction

Orthognathic surgery has an increasing demand in situations where orthodontic correction, which is increasingly accessible, presents limitations [1]. Facial deformities and congenital or acquired skeletal problems, associated or not to malocclusions, cause disturbances to physiological functions, aesthetic dissatisfaction and difficulties in the social sphere, which leads many patients to seek such treatment [2].

Although most studies on the subject demonstrate the positive effect of orthognathic surgery, it requires the patient to adapt almost immediately due to a rapid change in his facial appearance [3]. Due to the psychological condition of the patient (who may or may not be favorable to treatment), and its probable change, given the impact on quality of life [4], it needs a comprehensive and adequate assessment, as it involves objective and subjective, environmental and personal elements, and also their interactions [5].

It is important to compare preoperative and postoperative perceptions, including to guide future patients [6]. Among the results observed after the end of the treatment process is a level of quality of life similar to that of individuals without dentofacial deformity [1,7,8].

In addition to measuring the magnitude of the effect, this study investigated the correlation between the quality of life before and after orthognathic surgery and demographic aspects (age, sex, income and schooling), clinical aspects (main complaint, type of deformity and type of surgery) and the degree of satisfaction with the facial appearance obtained after the procedure.

## Materials and Methods

### Ethical Principles

The volunteers were given clarifications about the study and they signed the Informed Consent Form. The research followed

the bioethical norms related to human studies and its project was submitted and previously approved by the Research Ethics Committee (CEP) of the Federal University of Piauí (UFPI) through the number of opinion 1.431.207.

### Sample

The study is of the longitudinal observational type. The sample calculation was made considering the following factors: impact prevalence of 35%, estimation error of 5, 95% confidence level and test power of 80% [9]. The population (N) of individuals who underwent orthognathic surgery in Teresina-PI in 2014 was 28 individuals, according to a survey conducted by this study in all hospitals and public and private healthcare plans. An adjustment was made for finite populations. The minimum sample number required for the study was 27 individuals.

We included all patients with dentofacial deformities (regardless of sex, age, social class, level of education, main complaint, type of surgery and type of deformity) who underwent orthognathic surgery, attended in a private office located in Teresina-PI, in 2015. Those who refused to participate in the study or who for any reason did not complete the form or questionnaire before and/or after the surgical procedure were excluded. The sample obtained consisted of 17 individuals (10 men and 07 women) between 20 and 57 years (mean age 31.83 years). All participants had started orthodontic treatment before surgery and continued it after a recovery period of 6 weeks.

### Data Collection

An identification and socio-demographic form and the Brazilian Orthognathic Quality of Life Questionnaire (B-OQLQ) were completed by the participants one week before and six weeks after the orthognathic surgery. The form contained the question Regarding his facial appearance, o (a) Mr. (Mrs) is he?, followed by alternatives and answered only in

the post-operative phase-represented in this study by the term facial aspect.

### Data Analysis

Statistical analysis was performed using the Graphpad Prism software (Graphpad Software). The Spearman correlation test was applied at a significance level of 0.01 (99.9%) ( $p < 0.01$ ). The size of the effect was calculated by subtracting the mean of the post-treatment score by the mean of the pre-treatment score and then dividing by the Standard Deviation (SD) of the pre-treatment score.

## Results

### Sociodemographic Characteristics

The sample consisted predominantly of men (58.82%), aged 20 to 29 years (64.70%), white race (47.06%), 11 years of formal study (29.41%), and Household income between 1000 and 2000 reais (35.29%).

The most frequent dentofacial deformity was class III (82.35%) and three were the main complaints: facial appearance, difficulty chewing and irregular dentition (each 23.53%).

The predominant type of surgery was combined (70.59%) and when asked about how satisfied they were with the facial appearance obtained after surgery, most stated very satisfied (76.47%) (Table 1).

**Table 1:** Sociodemographic characteristics of the sample.

Characteristics	N	%
Age group		
> 40	3	17.65
30-39	3	17.65
20-29	11	64.7
Sex		
Feminine	7	41.18
Masculine	10	58.82
Coloured		
White	8	47.06
Sparrow	6	35.29
Negro	3	17.65
Major complaint		
Facial appearance	4	23.53
Difficulty chewing	4	23.53
Dentition	4	23.53
Pain	2	11.76
Other	3	17.65
Type of deformity		
Class II	3	17.65
Class III	14	82.35
Type of surgery		
Simple	5	29.41
Combined	12	70.59
Level of education/years of study		
5	1	5.88
8	1	5.88
11	5	29.41
13	1	5.88
14	2	11.76
15	4	23.53
> 16	3	17.65
Family income (in Reais)		
880	3	17.65
1000 - 2000	6	35.29
2500 - 4000	3	17.65
5000 - 6000	3	17.65
> 8000	2	11.76
Facial aspect		
Very pleased	13	76.47
Satisfied	4	23.53
Total	17	100

### Pre and Post-Operative Quality of Life

In the comparison between the total scores and each of the OQLQ domains obtained in the pre and postoperative periods, no statistically significant differences were found ( $p < 0.01$ ) (Table 2).

**Table 2:** Correlations between preoperative and postoperative OQLQ scores ( $p < 0.01$ ).

Scores	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Total	0.3169	-0.3634 to 0.7768	0.2134
Domain Aesthetics facial	0.4341	-0.07431 to 0.7635	0.0825
Domain Function oral	-0.1833	-0.7136 to 0.4805	0.4314
Domain Consciousness of deformity	0.2582	-0.4176 to 0.7501	0.3139
Domain Aspectos social	-0.0353	-0.6318 to 0.5874	0.8432

### Quality of Life and Socio-Demographic Characteristics

The social aspects domain did not find a significant correlation with any of the socio-demographic factors. However, there was a correlation in the preoperative period with satisfaction with facial appearance ( $p < 0.01$ ) (Table 3).

**Table 3:** Correlations between the socioeconomic form scores and the social aspects.

Socio-demographic factor	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Major complaint	0.05414	-0.6430 to 0.5749	0.7562
Age	-0.2458	-0.7443 to 0.4285	0.3272
Sex	0.1385	-0.5151 to 0.6903	0.6102
Type of deformity	-0.1844	-0.7142 to 0.4796	0.0496
Type of surgery	0.09246	-0.5486 to 0.6650	0.5899
Colour/Breed	-0.06265	0.6480 to 0.5692	0.5841
Rent	0.3243	-0.3563 to 0.7800	0.2025
Degree of Schooling	0.4816	-0.1819 to 0.8438	0.0518
Facial aspect	-0.3547	-0.7931 to 0.3259	0.0034

The type of deformity was the socio-demographic factor that, before surgery, presented significant correlation with the deformity awareness domain ( $p < 0.001$ ) (Table 4).

There was a significant correlation of the postoperative facial aesthetic domain only with the type of deformity ( $p < 0.01$ ) (Table 5).

**Table 4:** Correlations between the scores of the socioeconomic form and the awareness domain score of the dentofacial aesthetics of the OQLQ, applied in the preoperative period ( $p < 0.01$ ).

Socio-demographic factor	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Major complaint	-0.2844	-0.7622 to 0.3940	0.2203
Age	-0.3117	-0.7745 to 0.3684	0.2110
Sex	0.07570	-0.5602 to 0.6555	0.6774
Type of deformity	0.07107	-0.5634 to 0.6528	0.3681
Type of surgery	0.2250	-0.4464 to 0.7343	0.3946
Colour/Breed	0.2417	-0.4321 to 0.7423	0.3474
Rent	0.4790	-0.1852 to 0.8428	0.0533
Degree of Schooling	0.3064	-0.3735 to 0.7721	0.2295
Facial aspect	-0.1421	-0.6922 to 0.5124	0.0546

**Table 5:** Correlations between socioeconomic form scores and OQLQ facial aesthetic domain scores, applied in the postoperative period ( $p < 0.01$ ).

	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Major complaint	0.2158	-0.4540 to 0.7298	0.4012
Age	0.01125	-0.6030 to 0.6171	0.9663
Sex	0.1661	-0.4940 to 0.7048	0.5495
Type of deformity	-0.3311	-0.7830 to 0.3496	0.0042
Type of surgery	-0.1876	-0.7158 to 0.4771	0.0934
Colour/Breed	-0.1934	-0.7187 to 0.4724	0.2075
Rent	0.2613	-0.4149 to 0.7516	0.3079
Degree of Schooling	0.3274	-0.3532 to 0.7814	0.198
Facial aspect	0.01439	-0.6190 to 0.6010	0.1538

The oral function domain demonstrated, after surgery, a significant correlation with sex, as well as satisfaction with facial appearance ( $p < 0.01$ ) (Table 6).

**Table 6:** Correlations between the socioeconomic questionnaire scores and the oral function domain score, applied in the postoperative period ( $p < 0.01$ ).

	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Major complaint	-0.1874	0.7157 to 0.4772	0.3390
Age	-0.3556	-0.7935 to 0.3250	0.1268
Sex	0.6934	0.1445 to 0.9160	0.0060

Type of deformity	-0.0868	-0.6618 to 0.5525	0.1118
Type of surgery	-0.05387	-0.6428 to 0.5751	0.2592
Colour/Breed	0.2977	-0.3817 to 0.7682	0.2469
Rent	0.388	-0.2910 to 0.8070	0.1238
Degree of Schooling	0.3093	-0.3707 to 0.7734	0.2249
Facial aspect	-0.3327	-0.7837 to 0.3480	0.0034

A significant correlation was found in the preoperative period between education level and the total OQLQ score ( $p < 0.01$ ) (Table 7).

**Table 7:** Correlations between the socio-demographic form scores and the total score of the OQLQ questionnaire, applied in the preoperative period ( $p < 0.01$ ).

	Correlation coefficient of Spearman (Rs)	Confidence interval	P-value
Major complaint	-0.1251	-0.6830 to 0.5250	0.5659
Age	-0.07569	-0.6555 to 0.5602	0.7601
Sex	-0.2516	-0.7470 to 0.4235	0.0732
Type of deformity	0.2409	-0.4328 to 0.7419	0.3655
Type of surgery	-0.1847	-0.7143 to 0.4794	0.0979
Colour/Breed	-0.0838	-0.6602 to 0.5546	0.5247
Rent	-0.05676	-0.6445 to 0.5732	0.8069
Degree of Schooling	0.6247	0.0236 to 0.8940	0.0086
Facial aspect	-0.2692	-0.7553 to 0.4078	0.0176

**Effect Size**

Regarding the size of the effect (total: 1.57), a positive effect was obtained in all domains: facial aesthetics (1.44) followed by social aspects (1.26), oral function (1.26) and deformity awareness (0.78), the latter being the only one not to have wide difference ( $> 0.8$ ) and therefore significance ( $p < 0.01$ ) (Table 8).

**Table 8:** Effect size obtained in all domains ( $p < 0.01$ ).

Score	Pre-average operative (sd)	Post-media operative (sd)	Effect size
Total	45.5 (18.1)	17.0 (12.5)	-1.57
Dominion Facial aesthetics	11.0 (5.01)	3.8 (4.2)	-1.44
Dominion Oral function	8.9 (5.08)	2.6 (2.5)	-1.24
Domain Awareness of deformity	7.82 (4.01)	4.7 (4.6)	-0.78
Dominion Social aspects	14.8 (7.8)	4.8 (5.6)	-1.26

**Discussion**

The Orthognathic Quality of Life Questionnaire (OQLQ), used in this study in its validated version in Portuguese (B-OQLQ), has proved to be an instrument of outstanding ability to evaluate quality of life related to the specific condition [3,7,9-16]. However, we consider it pertinent to add to our identification and

socio-demographic form a specific question about satisfaction with the facial aspect and oriented to the postoperative moment, using scores similar to those of the OQLQ. Our results revealed that the sample had a degree of satisfaction similar to that previously reported in other studies, which also reconciles its correlation with the social function domain and the preoperative moment (*Table 3*) [4,13,17-20].

The present study verified the need to investigate the difference in quality of life not only between the operative times, but also its correlation with variables that, with the exception of satisfaction with post-operative facial appearancesurgical, were little or never before explored in the literature. Thus, in common with other research we had the following factors: sex, type of deformity, type of surgery and age [6,8,16,19, 21-23]. Nicodemo et al. and Stables et al., as well as this study, found a correlation between sex and postoperative time (*Table 6*), however due to different domains (facial aesthetics, deformity awareness and oral function, respectively) [16,21]. The same result was observed by Corso et al. and Yu et al., who used OHIP-14, however, respectively in all domains of quality of life and only in that of self-esteem [8,22]. All these studies showed a greater impact on the female group, however our sample was predominantly male.

The type of dentofacial deformity had an influence on the domain of deformity awareness before surgery and on facial aesthetics after surgery. These results corroborate those of Baherimoghaddam et al., who showed that in class II patients the greatest positive impact on quality of life is due to increased facial, mentolabial and convexity angles; and that in class III patients, due to the decrease of the same angles as well as the increase of the protrusion of the upper lip [19]. However, other studies have shown greater impact, especially in the short term, among class III patients, especially attributed by their abrupt aesthetic transformation compared to greater psychological discomfort before surgery and functional limitation after surgerySurgical class II [6,23].

Nicodemo et al., were the only ones to attempt to correlate quality of life to the type of surgery without, as in our study, finding statistically significant difference in this factor in any of the operative times [21]. And as in the evaluation of Corso et al., we found no significant correlation between age and total scores of the quality of life questionnaire used before and after surgery [8].

Among the other variables studied, our results indicated possible influence of the patient's level of education on the quality of life related to the specific pre-surgical condition. On the other hand, the factors that were not evaluated in previous studies (color/race, income and main complaint) did not present correlation in our study, which suggests that new research be performed using them.

The size of the effect, based on the Cohen scale, was also evaluated in previous studies [24]. Our results showed a wide difference (>0.8) in all domains (with the exception of deformity awareness) as well as in the total OQLQ score, in the comparison between before and after surgery. This corroborates the studies of Soh & Narayanan and Park et al., except that in the first study the domain with no large effect was that of the oral function and in the second, all domains had an effect size greater than 0.8 [3,15]. However, in the study by Murphy et al., the only significant effect found was in the domain of facial aesthetics [12]. In all cases, upper postoperative moments (beyond 12 weeks) were evaluated than the one used (6 weeks), which may explain such differences.

As this is a convenience sample (patients from a private practice), the number of orthognathic surgeries performed during data collection was not sufficient to reach the n of the sample calculation. However, other studies were performed with sample size similar to the [4,7,8,13-15,25].

## Conclusion

Despite not finding significant difference in quality of life related to the specific condition between the preoperative and postoperative moments (which may be attributed to the short postoperative period). The present study concludes that the impact of orthognathic surgery is positive, which can be confirmed by the size of the effect and the level of satisfaction of patients with the post-surgical facial aspect. Such impact may be conditioned to the individual's level of education and type of deformity. More studies are needed to assess the influence of clinical and sociodemographic factors on the quality of life of ortho-surgical patients.

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