Oral health-related quality of life in orthognathic surgery patients

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Introduction: In the last decade, an increasing number of studies focusing on the impact of oral deformities and illnesses on quality of life have been published. Our goal was to evaluate the impact of oral problems on quality of life in 3 groups of adult patients in need of orthognathic-surgical treatment. Methods: A total of 117 patients were recruited from the Clinic of Oral and Maxillofacial Surgery of the State University of Rio de Janeiro in Brazil: 20 in the initial phase, 70 in the presurgical phase (presurgical orthodontic preparation), and 27 in the postsurgical phase. The impact of treatment phase on oral health-related quality of life was evaluated with the oral health impact profile (OHIP-14). OHIP-14 scores were calculated by an additive method, and the participants were divided on the basis of level of impact into 2 groups: high impact (scores, >11) and low impact (scores, ≤11). Results: Compared with patients in the postsurgical phase, those who needed orthognathic surgical treatment but had not yet begun it and those who were in the presurgical phase of treatment were 6.48 and 3.14 times more likely, respectively, to experience a negative impact of their oral condition. Conclusions: Among those undergoing or anticipating orthognathic-surgical treatment, orthognathic surgery positively affects the patients’ quality of life. (Am J Orthod Dentofacial Orthop 2010;137:790-5)

In 1976, when sociodental outcomes were being adopted to evaluate the impact of oral problems on people’s lives, Cohen and Jago1 pointed out that, among all oral disorders, malocclusions are the most difficult to measure. This is basically because the diagnosis implies considerations that involve both professional views regarding deviations from “normal” occlusion and cultural values that influence body image and esthetic knowledge. The possible psychological repercussions and the effects of dentofacial deformities and their treatment on body image have been the subject of numerous studies. García-Rodríguez et al.,2 in a prospective study about some psychological aspects of adults with severe dentofacial deformities treated by orthognathic surgery, assessed the body image of surgical patients before and after treatment. The results showed that, despite the severity of the dentofacial deformity, presurgical mean scores of both subscales of a body image test were normal. On the other hand, longitudinal research by Kiyak et al.3-6 reported significant improvements in body image after conventional and surgical orthodontics, particularly self-evaluations of facial and dental appearance. In addition, several retrospective studies have identified the psychological benefits of orthognathic surgery, including improvements in interpersonal skills, self-confidence, and positive life changes, such as in personal relationships.7 Kiyak et al.8 studied the psychological impact of orthognathic surgery 9 and 24 months after surgery. The results highlighted the importance of completing postsurgical orthodontic treatment within 6 months after surgery and maintaining contact with orthognathic surgery patients for at least 2 years after surgery. Another study reported improvements in oral health-related quality of life (OHRQOL) and psychosocial function 2 years after surgical mandibular advancement in patients with Class II malocclusion.9

Even though demand for orthodontic treatment is mostly related to personal concern about appearance and other psychosocial factors, measures of orthodontic need and outcomes of orthodontic treatment place relatively little emphasis on patients’ perceptions of need and the differences that orthodontic care would bring to their OHRQOL.10 The relationships between objective orthodontic indexes and patients’ perceptions of their own appearance and oral health status have been studied.11,12 It is important to understand the patient’s
perceptions because they are central to the assessment of overall need and satisfaction with treatment. Primarily because of this concern, several OHRQOL measures have been developed to assess the impact of the mouth on quality of life.\textsuperscript{3,13} Subjective indexes to measure OHRQOL might be useful for practical, political, and theoretical purposes.\textsuperscript{14} Such measures have been increasingly used in various countries, since they add important complementary information to traditional oral health indexes.

The oral health impact profile (OHIP) was developed by Slade and Spencer\textsuperscript{15} to measure the dysfunction, discomfort, and disability attributed to oral conditions in older adults and elderly populations. A short form consisting of 14 items (OHIP-14), 2 of each dimension, was developed by Slade\textsuperscript{16} and translated into several languages. The Brazilian version of the OHIP-14 showed psychometric properties similar to those of the original questionnaire.\textsuperscript{17}

In this study, we aimed to evaluate the impact of oral health related problems on quality of life in young adults with dentofacial deformities, using the OHIP-14. Patients in 3 distinct phases of the treatment were assessed: initial stages, before any orthodontic procedures; presurgical, having completed orthodontic preparation for the surgery; and postsurgical, after surgery but still receiving orthodontic treatment.

**MATERIAL AND METHODS**

This report describes the findings of research carried out at the Clinic of Oral and Maxillofacial Surgery of the State University of Rio de Janeiro (HUPE) and approved by its Committee of Research Ethics. The participants were 20 patients who had consulted with the HUPE regarding orthognathic-surgical treatment, without having had any previous orthodontic or surgical treatment (the initial group), 70 patients who were currently in presurgical orthodontic treatment (presurgical group), and 27 patients who had completed orthognathic surgery and presurgical orthodontic treatment but were still in postsurgical orthodontic treatment (postsurgical group). They were not selected on the basis of gender, race, age, or any type of malocclusion. This sample was obtained by a process of nonprobabilistic selection from persons eligible for examination in the Clinic of Oral and Maxillofacial Surgery of the HUPE from January to March 2006, based on the following criteria: those in the initial group had no previous orthodontic treatment in the past, initial and presurgery patients had no previous orthognathic surgery, treatment could be provided by the orthodontics clinic of HUPE or by a dental professional of any other institution, and the postsurgery group comprised patients from the Oral and Maxillofacial Surgery Clinic of Pedro Ernesto University Hospital, Rio de Janeiro, Brazil, at least 4 weeks after surgery.

Potential participants were contacted personally by staff of the Clinic of Oral and Maxillofacial Surgery during routine appointments. Sociodemographic information and other relevant facts for the impact of OHRQOL problems were obtained from a self-administered questionnaire. Before completing the questionnaires, instructions were given regarding the work, and questions were answered; participants were guided to answer on their own and to ask if they had questions. As part of their participation in this study, patients from the initial group received a dental evaluation and instructions about the orthognathic-surgical treatment after filling out the questionnaire.

To characterize the study population regarding economic status, the Brazil Economic Classification Criteria developed by the Brazilian Association of Advertisers was used.\textsuperscript{18} The collected data refer to the level of education of the head of the family, essential assets, essential goods, monthly salary of their home employees, and vehicles.

OHRQOL was assessed with the Brazilian version of the OHIP-14.\textsuperscript{17} The original OHIP consists of 49 items organized into 7 subscales: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.\textsuperscript{16} The subscales are based on a conceptual framework suggested by Locker\textsuperscript{14} and derived from the World Health Organization’s International Classification of Impairments, Disabilities and Handicaps.\textsuperscript{19} A pretest was carried out with 30 patients to evaluate whether the OHIP-14 questions were fully understood by the participants, and whether any terms or expressions required replacement. The patients had been instructed to answer the OHIP-14 questions, taking into account their experiences regarding teeth, mouth, or dentures, during the 6 months preceding this assessment. The postsurgical patients were also instructed to consider the impact of surgery on their OHIP-14 responses.

**Statistical analysis**

The results of this research were tabulated in a statistical program (version 9, StataCorp, College Station, Tex), with bivariate and multivariate analyses (chi-square and Student $t$ tests, and simple and multiple logistic regressions).

OHIP-14 scores were obtained by adding the responses to all 14 items, ranging from never (0 point),
hardly ever (1 point), occasionally (2 points), fairly often (3 points), and very often (4 points). As a result, total scores could range from 0 to 56 points. Because of the skewed distribution of the values of OHIP-14, the sample was divided into 2 groups by using the median value: the high-impact group had scores $\geq 11$, and the low-impact group had scores $<11$. All subsequent analyses testing the association between OHRQOL, phase of treatment, and sociodemographic variables were based on this median split.

The frequency of answers in each of the 7 dimensions of the OHIP-14 was evaluated, with those who replied “very often” or “fairly often” representing the high-impact group and all others the low-impact group. Thus, the subjects who had chosen, in each dimension, the options “never,” “hardly ever,” and “occasionally” were placed in the low-impact group, and those who had selected “fairly often” and “very often” comprised the high-impact group. Internal consistency of the scale was assessed with the Cronbach alpha coefficient.

**RESULTS**

As stated earlier, 20 (17%) of the participants were in the initial group, 70 (60%) in the presurgery group, and 27 (23%) in the postsurgery group. The sample consisted mostly of single, unmarried subjects (83%); only 20 (17%) were married or divorced. They were also more likely to be female (55.6%). According to the Brazil Economic Classification Criteria, those who belonged to economic classes B ($n = 49, 41.8\%$) and C ($n = 46, 39.3\%$) represented the majority of this sample. The 3 groups did not differ in these sociodemographic characteristics, as shown in Table I.

Internal consistency for the OHIP-14 was high (Cronbach’s coefficient $\alpha = 0.88$; lower limit 95% CI, 0.90).

The OHIP-14 total scores from all participants varied between 0 and 45, with no standard pattern of distribution. There was a tendency of scores to decline from the initial to the presurgical groups, and from the presurgical to the postsurgical groups (Fig). The OHIP-14 mean value was 14.7 (SD, 10.4) for the total sample, with a median value of 11 (95% CI, 8.5-13.5). Among all variables of interest in this study (ie, economic status, marital status, gender, phase of treatment), only phase of treatment was significantly related to OHRQOL. That is, patients who reported high impact

| Table I. Distribution of the sample based on sociodemographic characteristics and phase of treatment according to OHIP-14 scores |
|--------------------------------------------------|-------------------|-------------------|-------------------|
|                                               | **OHIP $\leq 11$** | **OHIP $>11$** | **Total**         |
|                                               | $n$ (%)            | $n$ (%)           | $n$ (%)           |
| Economic status                               | 0.86               |                   |                   |
| Class A                                       | 7 (58.3)           | 5 (41.7)          | 12 (100)          |
| Class B                                       | 25 (51.1)          | 24 (48.9)         | 49 (100)          |
| Class C                                       | 23 (50.0)          | 23 (50.0)         | 46 (100)          |
| Class D                                       | 4 (40.0)           | 6 (60.0)          | 10 (100)          |
| Marital status                                | 0.71               |                   |                   |
| Single                                        | 48 (49.4)          | 49 (50.6)         | 97 (100)          |
| Married                                       | 7 (50.0)           | 7 (50.0)          | 14 (100)          |
| Divorced                                      | 4 (66.7)           | 2 (33.3)          | 6 (100)           |
| Gender                                        | 0.07               |                   |                   |
| Male                                          | 31 (59.6)          | 21 (40.4)         | 52 (100)          |
| Female                                        | 28 (43.1)          | 37 (56.9)         | 65 (100)          |
| Treatment stage                               | 0.02               |                   |                   |
| Initial                                       | 6 (30.0)           | 14 (70.0)         | 20 (100)          |
| Presurgery                                    | 34 (48.6)          | 36 (51.4)         | 70 (100)          |
| Postsurgery                                   | 19 (70.4)          | 8 (29.6)          | 27 (100)          |
| Age (y) (mean $\pm$ SE)*                     | 0.85               |                   |                   |
| Total                                         | 59 (50.4)          | 58 (49.6)         | 117 (100)         |

*Chi-square test; †Student $t$ test.

**Fig 1. Distribution of OHIP-14 scores by study groups**
(high scores represent more negative impact).
Table II. Adjusted and unadjusted odds ratios (OR) with 95% CI above 11 points on the OHIP-14 by study group and gender

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Initial</th>
<th>Presurgical</th>
<th>Postsurgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical pain</td>
<td>6 (15%)</td>
<td>33 (23.5%)</td>
<td>6 (11.1%)</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>17 (42.5%)</td>
<td>31 (22.1%)</td>
<td>7 (12.9%)</td>
</tr>
<tr>
<td>Physical disability</td>
<td>6 (15%)</td>
<td>11 (7.8%)</td>
<td>3 (5.5%)</td>
</tr>
<tr>
<td>Psychological disability</td>
<td>13 (32.5%)</td>
<td>20 (14.2%)</td>
<td>3 (5.5%)</td>
</tr>
<tr>
<td>Social disability</td>
<td>7 (17.5%)</td>
<td>12 (8.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Handicap</td>
<td>4 (10%)</td>
<td>6 (4.2%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Presurgery and initial groups did not differ statistically (chi-square test, \( P = 0.19 \)).

on the OHIP-14 were most likely to be in the presurgery or the initial phase group (Table I). The only sociodemographic variable with a \( P \) value <0.20 was gender, so it was included in the multivariate analysis to evaluate the strong association between high impact and phase of treatment (Table II).

Even after controlling for gender, patients who needed orthognathic surgical treatment but had not yet undergone it were 6.48 times more likely to have OHIP-14 scores above the median value (11) compared with patients who had already had surgery. Those who were in the presurgical orthodontic phase were 3.14 times more likely to report high impact compared with patients who had already had surgery. When gender alone was considered, women were 2.36 more likely than men to report high impact of their oral condition on their quality of life (OHIP-14 scores above 11), whether or not they had undergone orthognathic surgery.

Finally, the frequency of answers indicating high impact—ie, “fairly often” (3 points) and “very often” (4 points)—in the 3 groups was evaluated in each dimension of the OHIP-14 (Table III). Consistent with total scores, the initial group showed more impact related to psychological discomfort and disability. However, the presurgery and postsurgery groups were more affected in the physical pain and psychological discomfort dimensions, with similar numbers answering “fairly often” and “very often” in these dimensions. The differences between the 3 groups were statistically significant in the functional limitation, psychological discomfort, and psychological disability dimensions (\( P <0.05 \)) and marginally significant in the physical pain dimension (\( P = 0.05 \)).

DISCUSSION

Over the last 2 decades, many studies have evaluated the impact of oral health problems on quality of life, applying both generic\(^{20}\) and specific\(^{21}\) indicators. Some studies have focused on the impact of malocclusions\(^{10,22}\) or on orthodontic treatment to correct malocclusions.\(^{13,23}\) Still others have addressed the combined effect of orthodontic treatment and orthognathic surgery.\(^{9,7,24}\) However, only a few studies used valid and reliable instruments for measuring such effects.\(^{3,24,25}\) We aimed to evaluate patients before and after orthognathic surgery, regarding the impact of these procedures on their OHRQOL, using the OHIP-14. Because a more generic instrument makes it possible to evaluate subjects who did not receive orthognathic surgery and compare the relative importance of malocclusion and the need for orthognathic surgery with other buccal issues in terms of impact on life quality.

The use of standardized instruments for measuring the impact of oral problems and their treatments on OHRQOL was essential because it allowed us to evaluate whether clinical procedures have a real benefit on people’s lives. The evaluation of possible benefits from correcting malocclusions, which have been found in previous studies to have a psychological impact, also requires the measurement of OHRQOL.\(^{26}\) Most researchers have found that patients benefit psychologically from combined surgical and orthodontic treatments that result in improved dental and facial appearance, social well-being, and oral function.\(^{5}\) These authors found high levels of satisfaction after orthognathic surgery, and patients scored higher on measures of body image (especially on the facial and dental image components) and self-esteem. It could be concluded that posttreatment satisfaction is generally high, resulting in a more positive self-image. This is consistent with our findings, with the initial and presurgical groups reporting more negative impacts of their oral condition on quality of life than the postsurgical group. Nevertheless, a limitation of this study was the lack of control samples to compare the studied groups with normal subjects, and the postsurgery group with those who had already
completed orthodontic treatment, to put in perspective the magnitude of the oral health impacts.

In this study, patients who were awaiting surgery scored significantly worse on the OHIP-14 than did those in the postsurgical group. It is common knowledge that presurgical preparations make occlusal characteristics worse because they unbalance previous dental inclinations. Presurgical orthodontic preparation might improve the alignment of teeth, space closure, or excessive dental protrusions. However, patients can also experience greater anteroposterior discrepancies during the presurgical phase. It is therefore not surprising that presurgical patients reported significantly higher (worse OHRQOL) OHIP-14 scores than postsurgical patients and did not differ from those who had not started treatment. This finding shows that orthodontists should be aware of the negative impact of presurgical orthodontic treatment on their patients and regularly remind their patients of the positive results achieved at each stage of treatment. Nevertheless, the range of scores was relatively low, with a median of 11 of a possible 56 points. This suggests that, regardless of stage, malocclusion and its treatment might not have dramatic effects on adults’ OHRQOL.

In analyzing scores in each dimension of the OHIP-14 in the 3 groups, the dimensions related to emotional aspects of quality of life (psychological discomfort and incapacity) were most affected in eligible patients who had not yet begun treatment. As noted above, this component of OHRQOL is also important for those in the presurgical phase. Furthermore, no patients in the postsurgical sample rated themselves at 3 or 4 on items that comprised these dimensions. This indicates that treatment reduces the frequency and severity of impacts on OHRQOL. The dimension physical pain deserves special attention, because patients in the presurgical group were more likely than those in the initial group to score high on this dimension, indicating a negative impact on their quality of life. This can be explained by the aggravation of the anteroposterior discrepancies, typical of presurgical preparations, which, by correcting previous dental inclinations, make the relationship between the arches difficult in preparation for orthognathic surgery. This might also be why patients in the presurgical group reported more negative impacts of their oral condition in the dimension functional limitation than did those in the initial group.

Although patients were not analyzed by the type of orthodontic treatment they were undergoing or expecting because of the small samples in each subgroup, it is noteworthy that there was little variation in the groups. These findings suggest that active orthodontic treatment in preparation for surgery can have a negative effect on some aspects of quality of life, regardless of diagnosis and type of treatment.

When testing the association between orthodontic treatment and socioeconomic class, Oliveira and Sheiham\textsuperscript{23} found that patients in the lower social classes reported 1.27 times more dental impact than those of higher social classes. In our study, most patients were classified as social classes B and C. Our analyses demonstrated no significant associations between social class and OHIP-14 values in this study, suggesting that the impacts of presurgical orthodontics and surgery on OHRQOL are independent of social class.

Women were twice as likely to report negative impacts of their malocclusion on their OHRQOL than were men, regardless of whether they had already started orthodontic treatment or had orthognathic surgery. This is consistent with the findings of Oliveira and Sheiham,\textsuperscript{23} who reported that women were 1.22 times more likely to report negative oral impacts of malocclusion. Motegi et al\textsuperscript{24} reported that women who underwent orthognathic surgery began to be better dressed, wearing makeup and more colorful clothing. In contrast, men demonstrated more outgoing interpersonal styles after surgery but did not dress differently. This might also be consistent with the observation of Kurtz\textsuperscript{27} that it is easier for women to describe their characteristics, either positive or negative, whereas men tend to provide the same general descriptions about themselves.

This evaluation of OHRQOL among patients undergoing surgical orthodontic treatment has shown the importance of evaluating their self-reports during their experiences. Future clinical studies should examine patients longitudinally to assess the link between malocclusion and quality of life as the patient has surgical or conventional orthodontic treatment. It would also be useful to correlate changes in OHRQOL with observable changes in malocclusion, by using measures such as the index of orthodontic treatment need. Moreover, with a larger sample, subgroups could be analyzed according to their initial malocclusion and treatment method. Such an approach might improve patient care and patient-clinician communications during treatment.

CONCLUSIONS

Pretreatment patients showed the most negative effects on their OHRQOL compared with presurgery and postsurgery patients. Nevertheless, all 3 groups reported relatively low negative impacts on a measure of OHRQOL. Presurgery patients were moderately affected, and the least impact was found among postsurgery patients. This supports the findings of previous
studies that orthognathic surgery has many favorable effects. Gender analysis showed that female patients report a greater impact than male patients of their oral status on quality of life, whether or not they had started orthodontic treatment or completed orthognathic surgery.

REFERENCES