

## Case reports

# Quality of life after orthognathic surgery: a case report

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## ABSTRACT

This case study aims to describe the effects of orthognathic surgery on the quality of life of a patient with class III dentofacial deformity. The protocols *Oral Health Impact Profile*, short version, and *Orthognathic Quality of life Questionnaire* were applied before and after orthognathic surgery to measure the quality of life of a subject. The data were collected from a clinical case report. We observed that, by the Oral Health Impact Profile, the quality of life was not affected by dentofacial deformity (score = 1), and that there was a 30-day postoperative score increase (score = 9), indicating a worsening of quality of life and an improvement after 90 days (score = 4). On the other hand, by the *Orthognathic Quality of life Questionnaire*, it was noticed that dentofacial deformity negatively affected the patient's quality of life (score = 34), and that there was a progressive improvement in scores after surgery, i.e., from score 15 to 2, showing a positive impact on quality of life. The orthognathic surgery positively influenced the patient's quality of life, requiring the application of specific protocols that accurately measure the impacts of the procedure on the individual's life.

**Keywords:** Quality of Life; Orthognathic Surgery; Malocclusion; Oral Health; Questionnaires

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## INTRODUCTION

Dentofacial deformities (DDFs) are defined as serious problems of dental malocclusion associated with skeletal changes that require a combined treatment of orthodontics with orthognathic surgery<sup>1</sup>. They may be caused by environmental or genetic interference in craniofacial growth and development, causing changes in the structures and functions of the stomatognathic system<sup>2</sup>.

DDF determines specific myofunctional characteristics, which vary according to the existent disproportion. Such muscular changes are adaptations of the stomatognathic system to enable phono-articulation, chewing, swallowing and breathing<sup>3</sup>.

By conducting a literature review<sup>4</sup>, we sought to identify the adaptations of the stomatognathic system in individuals with maxillomandibular disproportions. We observed that subjects with prognathism and retrognathism present adaptations in all functions performed by the oral motor system before orthognathic surgery. In mandibular prognathism, the most suitable function is chewing, characterized by vertical movements using the back of the tongue for kneading the food and by little use of the masticatory muscles. In mandibular retrognathism, studies show that swallowing is quite adapted, with the presence of an anterior mandibular slide plus an anterior-posterior movement of the tongue with participation of the perioral musculature.

Functional characteristics and the presence of signs and symptoms of temporomandibular dysfunction (TMD) have been studied in patients with DDF<sup>5</sup>. The main initial complaints were related to the functions, TMD symptomatology and aesthetics. In the assessment before orthognathic surgery, unilateral mastication was observed in all groups. In class II subjects, the anterior mandibular slide predominated in mastication and speech. In the class III group, vertical masticatory movements and a higher percentage of phonetic distortions predominated. In subjects with laterognathism, few masticatory cycles were observed.

The chewing of individuals with class III DDF was evaluated through surface electromyography quantitatively and qualitatively, seeking associations between functional and occlusal characteristics. We concluded that individuals with class III DDF presented more disorganized masticatory cycles and low electrical potentials in temporal and masseters, quantitatively evidencing a low muscle activation during mastication<sup>6</sup>.

A study<sup>7</sup> characterized the respiratory function in individuals with DDF, and observed the phonation

aspects of breathing. It was found that individuals with DDF presented a similar vital capacity, but less respiration support for phonation when compared to the group control.

In a study conducted with the purpose of analyzing the relation between body image and quality of life (QoL) in subjects with DDF<sup>8</sup>, the protocols Body Dysmorphic Disorder Examination<sup>9</sup> (BDDE) and Oral Health Impact Profile<sup>10</sup> (OHIP-14) were used. The results showed that the group with DDF had a higher level of dissatisfaction with body image and a worse QoL compared to the control group. It was concluded that there was a correlation between body image and QoL, and that the greater the dissatisfaction with body image, the worse the QoL in the group with DDF.

Facial appearance influences body image, identity and self-esteem<sup>11</sup>. This suggests that DDF interferes not only with functional issues, but also with the awareness of one's own facial appearance and consequently self-esteem<sup>12</sup>. In cases of dentofacial changes, orthognathic surgery associated with orthodontics becomes essential to promote improvements in dental occlusion, facial aesthetics, stability of the stomatognathic system<sup>13</sup> and improvement of self-esteem and self-confidence, resulting in a positive impact on the patient's QoL<sup>14</sup>. To meet such objectives, a multi-professional action is necessary<sup>15</sup>. The Speech-Language Pathologist is an important professional in the orthognathic surgery team to assist and/or direct the reorganization of the muscular activity, which is important for performing stomatognathic functions after surgical correction<sup>16</sup> mainly in patients whose re-adaptations do not occur spontaneously<sup>15</sup>.

In this sense, several studies have reported a positive effect of orthognathic surgery on the QoL of individuals with DDF<sup>17-21</sup>.

There are currently several validated protocols for assessing QoL. There are protocols evaluating QoL related to general health, related to general oral health, and protocols evaluating the specific oral health. Some authors<sup>22,23</sup> recommend specific oral health protocols to evaluate the QoL of ortho-surgical patients, for example the *Orthognathic Quality of life Questionnaire* (OQLQ)<sup>24</sup>.

Changes in quality of life and patient's perception of the improvement of facial aesthetics after anterior maxillary osteotomy were studied using the OHIP-14 and OQLQ protocols. It was concluded that orthognathic surgery had a positive impact on patients' quality of life<sup>19</sup>.

The protocols OHIP-14 and OQLQ were used to evaluate the QoL of patients undergoing orthognathic surgery, and it was concluded that it is important to evaluate aspects related to the QoL of these patients for the success of the treatment<sup>25</sup>.

The objective of this study is to describe, through a clinical case report, the effects of orthognathic surgery on the QoL of an individual with class III dentofacial deformity, in addition to comparing the results obtained by quality of life questionnaires in general and specific oral health QoL questionnaires.

## Case Report

The research was approved by the Ethics Committee in research with human beings of the Health Sciences Center of the Federal University of Paraíba, under protocol no. 0512/13. An Informed Consent (IC) was signed by the patient.

We performed the case study of a 25-year-old male patient (K.S.A.) referred to the Treatment Service for Dentofacial Deformities of the Lauro Wanderley University Hospital who underwent a Speech-Language Pathology assessment because he presented maxillo-mandibular disproportion (angle class III), with indicative of orthognathic surgery. The case was selected because it presented a high-impact change in quality of life, and the subject agreed to voluntarily participate in the research.

K.S.A. attended the Speech Therapy Service. Initially, we conducted an interview to collect data on the development, general health, previous treatments, eating, oral and postural habits, and chewing, swallowing, speech and breathing functions.

A preoperative oral myofunctional evaluation was performed to collect data on the morphological aspects of the stomatognathic system and orofacial functions. In the evaluation of the structures of the stomatognathic system, we detected that, at the moment of evaluation, the patient's lips were open. In addition, the thickness and fixation of the upper and lower labial frenula on the alveolar ridge were adequately exposed. Upon evaluating the lips, we observed a decreased mobility of both lips, with lower lip hypotonia. The patient performed the movements of raising and lowering lips with a tremor of the lip musculature and difficulty in laterality movements, however with adequacy in the performance of protrusion and retraction movements. When analyzing the tongue, we observed an adequate symmetry, width and height, and habitual position in the floor of the mouth. With regard to movements,

he touched the apex sequentially on the right and left commissures, on the upper and lower lips, on the incisive papilla, snapped the apex and sucked the tongue on the palate properly. However, movements were observed with tremors.

In the evaluation of functions, discrete speech changes with distortions in the fricative phonemes /s/, /z/, /f/ and /v/ were observed. A predominantly right-sided unilateral chewing and breathing with oronasal mode was also observed.

The spontaneous oral opening was 55 mm, with the presence of articular noise bilaterally while opening and closing the mouth.

In the assessment of palpation pain, a mild pain in the submandibular region and right and left trapezius was observed, as well as a mild pain during TMA palpation with the mouth open, and moderate pain in the right and left sternocleidomastoid Mm. A M. temporal hypotonia was also observed.

Myofunctional dysfunction due to maxillomandibular disproportion was observed during the speech-language evaluation.

The patient's perception of QoL before and after the surgical correction was investigated after orthognathic surgery. The data collection was performed through a clinical case report of a patient of a public service specialized in the treatment of Dentofacial Deformities in a University Hospital in the city of João Pessoa.

Two validated protocols (OHIP-14 and OQLQ) were applied to evaluate QoL. Both protocols were answered in two moments: one month after surgery, presenting questions regarding his state of life before the surgical procedure (T1) also considering his state of life at that moment, that is, thirty days after surgery (T2), and three months after surgery (T3), presenting questions regarding his state of life ninety days after surgery. Data were tabulated and analyzed qualitatively.

The *Oral Health Impact Profile* protocol (OHIP-14) is a short version of the OHIP-49, and corresponds to a transculturally semantic translation, adaptation and validation for the Brazilian population made by Almeida et al.<sup>10</sup> It comprises 14 questions assessing QoL regarding the general oral health in the previous six months. The questionnaire consists of 7 domains: functional limitation, physical pain, psychological discomfort, physical incapacity, psychological incapacity, social incapacity and social disadvantage.

The *Orthognathic Quality of life Questionnaire* (OQLQ) was translated and validated for the Brazilian population by Bortoluzzi et al.<sup>24</sup>. It comprises 22

questions assessing the impacts of dentofacial deformity on the quality of life of an individual through 4 domains: facial aesthetics, oral function, dentofacial aesthetic awareness and social aspects of dentofacial deformity. The answers were scored using a 4-point scale, with scores ranging from 1 for “slightly uncomfortable” to 4 for “very uncomfortable”. Higher scores indicate a lower quality of life, and lower scores indicate a good quality of life.

The speech-language therapy, during the preoperative phase, aimed to provide orientations related to functional and posture aspects to raise awareness, preparing the patient for a faster automation during the postoperative period. Also at this stage, isometric and isokinetic exercises were performed to work muscle tone in order to allow a greater control of movements, extra- and intra-oral manipulation, as well as exercises to reduce joint clicks.

The treatment proposed by the team of Service of Treatment of Dentofacial Deformity was a combined Orthognathic surgery of jaw advancement and jaw retreat.

During the postoperative phase, the attention was directed to the reduction of facial edema, stimulation of intra-oral proprioception and mobility of mandible. The work continued to increase the tonus of lips, tongue and mastication Mm., extra- and intra-oral manipulation, and stimulation of extra- and intra-oral sensitivity. The patient continued the speech therapy after the end of this study.

## RESULTS

The total score of the OHIP-14 at (T1) was 1 point on a total scale ranging from 0 to 56 points. This demonstrates that the DDF did not cause any negative impact on the patient’s QoL, since the lower the protocol score, the better the QoL. However, when it was reapplied at (T2), the score rose to 9 points, demonstrating that the patient had a worsening in QoL. At (T3), there was a reduction of the score to 4 points. The values of the OHIP-14 scores in the three periods studied are shown in Table 1.

**Table 1.** Differences before and after orthognathic surgery for each OHIP-14 domain

Domains	Scores		
	T1	T2	T3
Functional limitation	0	1	1
Physical pain	1	3	2
Psychological discomfort	0	2	0
Physical incapacity	0	1	0
Psychological incapacity	0	0	0
Social incapacity	0	1	0
Social disadvantage	0	1	1
Total score	1	9	4

T1 = Preoperative period, T2 = postoperative period (30 days), T3 = postoperative period (90 days)

The total score of OQLQ at (T1) was 34 points on a total scale ranging from 0 to 88 points, which means that, by this protocol, which is specific for orthosurgical patients, the quality of life was affected by the DDF. At T2, there was a decrease in the score to 15 points, and

at (T3) to 2 points, evidencing that the QoL had progressively positive results after the surgical correction. The comparison of OQLQ scores in the three periods studied is shown in Table 2.

**Table 2.** Difference before and after orthognathic surgery for each OQLQ domain

Domains	Scores		
	T1	T2	T3
Facial aesthetics	14	2	0
Oral function	5	10	1
Dentofacial aesthetic awareness	4	3	1
Social aspects of dentofacial deformity	11	0	0
Total score	34	15	2

T1 = Preoperative period, T2 = postoperative period (30 days), T3 = postoperative period (90 days)

## DISCUSSION

This study showed that orthognathic surgery was able to promote a positive impact on oral health-related QoL<sup>18,19,22,26,27</sup> in a patient studied within a short period, when pre- and postoperative results were compared after 3 months of surgery. Similar results were observed in the short term in a study that aimed to investigate changes in QoL and in the patient's perception of aesthetic improvements after orthognathic surgery. We observed that the improvement in the perception of facial aesthetics, oral function and patient satisfaction after surgery occurred 2 months after surgery, but even better results were observed 6 months after the surgery<sup>19</sup>. This evidences the importance of long-term evaluations to verify the stability of results regarding QoL.

In the OQLQ, at (T1), the total score was 34 points, close to that found by another study<sup>22</sup>. The most favored domains were facial aesthetics and social aspects of DDF<sup>23</sup>, followed by oral function. Therefore, patients seeking treatment for DDF usually do so because of functional problems and dissatisfaction with aesthetics<sup>22</sup>. During the postoperative period of 30 days, the total score decreased to less than half<sup>19,22</sup>.

At (T2), the domain social aspects of dentofacial deformity were not a cause for concern for the patient, and the most scored domains were oral function and dentofacial aesthetics awareness. There was a worsening in oral function. A worsening of QoL is expected in the immediate postoperative period probably due to consequences inherent to the surgery, such as pain and facial edema, which cause discomfort to the patient, as well as making it difficult to perceive the surgical outcome<sup>26</sup>. These factors hinder the performance of stomatognathic functions.

At (T3), the only domains that obtained a score were also oral function and dentofacial aesthetic awareness. However, the scores were much lower than at T1 and

T2, evidencing a considerable improvement. This shows that the perception of the improvement of these aspects occurs in a later postoperative period.

By the OHIP-14 (T1), the total score was 1 point. We may observe that, by this protocol, the DDF did not generate a negative impact on the patient's QoL; in contrast, several studies reported much higher scores, with a mean score between 13 and 16<sup>8,19,27,29</sup>. The only domain scored was physical pain. Other studies report that, in this period, the greatest impact was in the domains psychological discomfort and limitation and physical pain<sup>8,27,29,30</sup>.

At (T2), there was an increase in the score, indicating a worsening of QoL. The most scored domains were physical pain and psychological discomfort. A recent post-surgical evaluation suggests a worsening in the quality of life<sup>28</sup> due to inherent consequences of the post-surgical recovery period.

At (T3), the total score decreased to less than half in relation to the previous period, and the most scored domain remained physical pain, but with a lower score. It can be seen that there was worsening in some domains during the recent postoperative period, and then an improvement over time.

There was a difference in scores between the protocols applied. By OHIP-14, the QoL was not affected by DDF. At (T2), the scores increased, indicating a negative impact on QoL<sup>28</sup>. At (T3), the score decreased, indicating a positive impact on quality of life, unlike OQLQ, by which the scores indicated a negative influence on quality of life at T1, with a progressive improvement in the scores during subsequent periods. In this sense, we could also observe in the studied patient that the specific orthosurgical instrument OQLQ had a better discriminatory power to evaluate QoL. We could notice progressive changes in the QoL at the different moments evaluated, which could not be observed by OHIP-14. In a study, we

verified an association between generic and specific questionnaires in the evaluation of QoL between class III and control groups. We also observed that specific instruments of quality of life assessment had a better association with each other than generic instruments, which, according to the author, could reinforce the greater discriminatory power of specific instruments<sup>29</sup>. Conversely, changes in the quality of life of patients with DDF using the OHIP-14 and OQLQ protocols were reported by a study<sup>25</sup>, and there were no significant differences between the scores of both protocols. However, the authors recommended OQLQ for orthopedic patients. In another study, it was demonstrated that there were no significant differences between the scores of general and specific oral health protocols<sup>27</sup>.

New studies are suggested taking into account longitudinal delineation in a control group using a greater number of subjects to evaluate this effect in the long term. In addition, studies evaluating quality of life protocols for other types of maxillo-mandibular disproportions, such as class II cases, could also be conducted.

## CONCLUSIONS

We conclude that, even though orthodontic and surgical treatments are modalities of intervention that provide good results for facial aesthetics and reorganization of orofacial structures, and consequently promote improvements in stomatognathic functions, the analysis of such gains in the individuals' quality of life is paramount. Therefore, it is necessary to apply sensitive protocols to measure gains in the quality of life of ortho-surgical patients. This study established that the use of specific protocols, such as OQLQ, when it comes to the assessment of QoL of ortho-surgical patients, are more accurate.

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