

Oral health-related quality of life changes in patients with severe Class III malocclusion treated with the 2-jaw surgery-first approach

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Introduction: In this nonrandomized prospective study, we compared the effects of the surgery-first approach with conventional 2-jaw orthognathic surgery on skeletal Class III patients' oral health-related quality of life (OHRQoL), quality of the orthodontic outcome, and average treatment duration. **Methods:** The sample consisted of 16 patients with severe skeletal Class III malocclusion, who needed 2-jaw orthognathic surgery: 8 were treated with the surgery-first approach, and 8 were treated with the traditional orthodontic-surgical approach. OHRQoL was assessed by using the Orthognathic Quality of Life Questionnaire (OQLQ) and the Oral Health Impact Profile-short version (OHIP-14). Malocclusion severity and esthetic self-perception were assessed with the Index of Orthodontic Treatment Need. Dental health status was determined using the Decayed, Missing and Filled Teeth Index. Tests were repeated at 7 times: baseline, 1 month after appliance placement, and 3 months, 6 months, 1 year, and 2 years after the beginning of the treatment; and for both groups, there was an also evaluation stage after the orthognathic surgery. **Results:** After 2 years, the surgery-first group showed a significant decrease in malocclusion severity ($P < 0.001$) and had significant reductions in OQLQ ($P < 0.001$) and OHIP-14 scores ($P < 0.001$). These changes began after the orthognathic surgery and were progressive throughout the evaluation periods. In the traditional orthodontic-surgical approach group, after 2 years of monitoring, all patients were still in the preoperative orthodontic preparation phase, and their malocclusion severity increased significantly, thereby resulting in a not statistically significant worsening of their OHRQoL (OHIP-14, $P = 0.89$; OQLQ, $P = 0.11$). **Conclusions:** OHRQoL improved significantly in a linear trend of progressive improvements in all severe Class III patients who had the surgery-first approach after the surgical procedure through 2 years of follow-up, as their malocclusion and esthetic self-perception also improved. (Am J Orthod Dentofacial Orthop 2017;151:1048-57)

Orthognathic surgery combines orthodontic and surgical treatment to provide a more harmonious facial profile and improved occlusal function to persons with skeletal discrepancies beyond the scope of

conventional orthodontic treatment.¹ These discrepancies affect one's quality of life immensely,^{2,3} and it is now recognized that quality of life assessment is a key outcome measure in the management of dentofacial deformities.⁴⁻⁷ Three systematic reviews have shown that conventional orthognathic surgery (3-stage treatment consisting of preoperative orthodontic treatment, surgery, and postoperative orthodontic treatment) yields measurable benefits to patients affected by dentofacial deformities unrelated to syndromes or cleft lip and palate.^{1,8,9} The reported greater positive effects of orthognathic surgery were in the esthetics, psychological, and social domains.⁸ Nevertheless, most studies included in those reviews had a short follow-up period.

The major complaints of patients who had conventional orthognathic surgery are the long duration of treatment, masticatory discomfort, and worsening of

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the facial profile during preoperative orthodontic treatment.¹⁰⁻¹² Moreover, recent studies have demonstrated that oral health-related quality of life (OHRQoL) is worse in patients in the presurgical phase of treatment than in patients in the postsurgical treatment phase.^{11,13}

In 2009, a new modality of surgical-orthodontic treatment without presurgical orthodontic intervention was described in the dental literature^{10,14-22}: the surgery-first approach (SFA). This concept involves the prediction and simulation of dental alignment, incisor decompensation, and arch coordination using setup models. Based on this approach, a plan for the surgical movement of the maxilla and the mandible to correct the skeletal discrepancy is made using miniplate anchorage. After the orthognathic surgery, a carefully preplanned orthodontic treatment is performed.¹⁵ The SFA can provide good clinical results with a substantial reduction in total treatment time and has been considered a cost-effective method to manage skeletal malocclusion in selected patients.^{14,22} Because all dental correction must be performed after surgery, such as decompensating dentoalveolar inclinations, performing en-masse movement, dental intrusion, or any other dental movement, the use of miniplate anchorage is an essential step and is a great advantage to the SFA approach because it allows greater predictability of the orthodontic movement. The main limitations for performing surgery before orthodontic treatment are a severe curve of Spee and vertical asymmetries.¹⁵ A severe curve of Spee hinders the establishment of a predictable mandible position, and asymmetries hamper the proper evaluation of the ideal occlusal plane. In both cases, a presurgical orthodontic aligning and leveling stage is highly recommended.

Based mainly on case reports, the SFA treatments are assumed to be well accepted by patients and to have positive functional and psychosocial results, similar to those obtained with conventional treatment.^{14,15,19,20} The most recent systematic review suggested that the SFA has been acknowledged to reduce the full treatment time significantly (most patients lasted under a year) and to achieve high levels of patient and professional satisfaction.²² In a more detailed assessment, the extent of the improvement on the OHRQoL provided by SFA was investigated in a retrospective study using the Dental Impact on Daily Living assessment and the Oral Health Impact Profile (OHIP-14) in patients who had 1-jaw surgery. The scores in this study were relatively lower in the surgery-first group than in the orthodontics-first group, although this difference did not reach a significant level in any stage.¹⁷ Nevertheless, the most specific OHRQoL tool to evaluate orthognathic patients, the Orthognathic

Quality of Life Questionnaire (OQLQ), has not been used to evaluate the SFA.

In this nonrandomized prospective study, we compared the effects of the SFA with conventional 2-jaw orthognathic surgery for skeletal Class III patients over 2 years, measured by 2 OHRQoL scales and clinical orthodontic outcomes.

MATERIAL AND METHODS

This 2-year follow-up nonrandomized experimental study involved 16 patients with skeletal Class III malocclusion who were recruited for surgical-orthodontic treatment between September 2009 and September 2011. Ethical approval was obtained from the ethics research committee of Pedro Ernesto Hospital, Rio de Janeiro State University, Rio de Janeiro, Brazil (2807 CEP/HUPE).

To be eligible for the study, subjects had to be diagnosed as having a skeletal Class III malocclusion with an A-point-nasion-B-point angle smaller than 0°, a concave profile, a negative overjet, and the necessity of bimaxillary surgery (2-jaw). The criterion to select 2-jaw surgery patients was whether the degree of setback exceeded 10 mm at pogonion parallel to the occlusal plane in the preoperative simulation. Maxillary advancement supplemented the amount of setback if the isolated mandibular setback exceeded 10 mm. The position of maxillary Point A was determined with reference to the McNamara line. The Coben analysis was used to determine the vertical position of pogonion. Subjects were excluded if they had received any orthodontic treatment before the first examination or had any craniofacial anomalies, previous facial bone fractures, total edentulism, or any abnormal oral or medical condition contraindicating the surgical-orthodontic treatment. Written informed consent was obtained from the patients or their parents if they were adolescents before entering the study.

Eight patients were treated using the traditional surgical-orthodontic treatment protocol^{13,15} (OF group), and 8 patients were treated using the SFA protocol (SF group). Sample size was calculated to allow for a detectable difference of 4 points (SD, 2.5; power, 0.8; significance level, 0.05) in OHRQoL measurements (primary outcome) between the 2 groups after a follow-up period of 2 years. Subjects were assigned to the OF or the SF group based on their malocclusion characteristics. Patients who had a flat to moderate curve of Spee, no vertical asymmetries, and at least 3 stable points of contact between their arches when the models were mounted on the semiadjustable articulator for orthognathic surgery planning were

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