

Clinical Paper  
 Orthognathic Surgery

# Impact of orthognathic surgery on oral health-related quality of life in patients with jaw deformities

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*K. Kurabe, T. Kojima, Y. Kato, I. Saito, T. Kobayashi: Impact of orthognathic surgery on oral health-related quality of life in patients with jaw deformities. Int. J. Oral Maxillofac. Surg.* 2016; xxx: xxx–xxx. © 2016 Published by Elsevier Ltd on behalf of International Association of Oral and Maxillofacial Surgeons.

**Abstract.** The purpose of this study was to clarify the impact of orthognathic surgery on oral health-related quality of life (OHRQOL) in patients with jaw deformities. The subjects were 65 patients (21 males and 44 females) who underwent orthognathic surgery. The mean age of the patients was 23.6 years. Forty-seven patients had skeletal class III malocclusions, eight patients had skeletal class II, and 10 patients had skeletal class I with facial asymmetry and/or open bite. OHRQOL was assessed using the Japanese version of the Oral Health Impact Profile (OHIP-J54) before and 6 months after surgery. While OHIP-J54 scores in the patients before surgery were significantly higher than those in the control subjects, OHIP-J54 scores after surgery were significantly lower than those before surgery. OHIP-J54 scores in older patients were significantly higher than those in younger patients. In conclusion, most patients with jaw deformities have lower OHRQOL than individuals with normal occlusion, and orthognathic surgery has a positive impact on OHRQOL. The determination of OHRQOL in patients with jaw deformities seems to be very useful for understanding the patients' problems and for assessing the extent of changes in terms of patient well-being.

**Key words:** oral health-related quality of life; orthognathic surgery; jaw deformities.

Accepted for publication 7 July 2016

Orthognathic surgery is now an established treatment for patients with jaw deformities. The purpose of this treatment is to correct the functional and aesthetic problems resulting from the underlying jaw deformities. This treatment might also contribute to improvements in the patient's psychological and social problems, because they often experience difficulties in, for

example, social interactions and interpersonal relationships.<sup>1</sup> Therefore, it is important to understand the patient's problems and offer an appropriate treatment for each individual patient.

There have been many reports on psychological status and satisfaction following orthognathic surgery determined using qualitative and quantitative methods.<sup>1–22</sup>

It has become clear that orthognathic surgery has various effects on patients with jaw deformities. However, there have been few investigations in Japanese subjects on the patient's subjective evaluation, including mental disability, psychological responses, social aspects, and functionality.

In recent years, assessments of quality of life (QOL) have been used throughout

healthcare, and QOL has become one of the important outcomes in medical evaluation research. Patients can now compare various treatments and select a treatment for themselves. Information on the effects of treatments on QOL would be helpful for patients when choosing an appropriate treatment and would also help to close the gap between patients and medical practitioners regarding recognition of the treatment for better health care. The increasing use of condition-specific QOL measures in orthognathic surgery highlights the importance of a patient-centred approach<sup>3</sup> and a shared decision-making process.<sup>4</sup>

The purpose of this study was to clarify the impacts of orthognathic surgery on oral health-related quality of life (OHRQOL) in patients with jaw deformities by conducting investigations before and after surgery.

## Materials and methods

### Subjects

The subjects were 65 orthognathic surgery patients (21 males and 44 females) for whom jaw deformities were corrected surgically in a clinic of oral and maxillofacial surgery in Niigata, Japan, between December 2013 and June 2015 (Table 1). The mean age of the patients ( $\pm$  SD) at surgery was  $23.6 \pm 8.1$  years (range 15–43 years). Exclusion criteria were the presence of a congenital disease or syndrome with maxillofacial deformities such as cleft lip and palate, a mental disease, and maxillofacial transformation caused by an injury.

The chief complaint was classified into three categories. Forty-two patients

complained of a facial deformity, 20 patients complained of occlusal disharmony, and three patients complained of functional disturbances. The anteroposterior relationships between the facial skeletal structures were assessed on lateral cephalograms, and the patients were divided into three groups according to the type of anteroposterior skeletal pattern. Forty-seven patients had skeletal class III malocclusions, eight patients had skeletal class II malocclusions, and 10 patients had skeletal class I malocclusions with facial asymmetry and/or open bite. A bilateral sagittal split osteotomy (BSSO) was performed in 19 patients, and a combination of Le Fort I osteotomy (LFI) and BSSO was used in 46 patients. All of the patients received pre- and postoperative orthodontic treatment, and osteosynthesis was achieved using titanium miniplates and/or resorbable fixation devices. Maxillomandibular fixation was performed 1 day after surgery and was maintained for 14 days. Postoperative symptoms were assessed clinically at 6 months after surgery, including paresthesia of the lip or chin, temporomandibular joint (TMJ) symptoms, and limitations in mouth opening. In this study, limited mouth opening was defined as a maximum inter-incisal distance of less than 35 mm. Postoperatively, paresthesia of the lip or chin was identified in 17 patients (26.2%), TMJ symptoms in 24 patients (36.9%), and limited mouth opening in seven patients (10.8%).

Control subjects were 14 young female students at the university who had a normal occlusion, no TMJ symptoms, and little knowledge of dentistry.

### Assessment of oral health-related quality of life (OHRQOL)

OHRQOL was assessed using the Japanese version of the Oral Health Impact Profile (OHIP-J54) (Table 2)<sup>23</sup> before surgery and at 6 months after surgery. The original OHIP was developed by Slade and Spencer in 1994 to assess geriatric OHRQOL<sup>24</sup> and consists of 49 items organized into seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. These domains were based on Locker's model of oral health.<sup>25</sup> The OHIP-J54 is the Japanese version of the OHIP with an additional domain consisting of five items on TMJ symptoms.<sup>23</sup> The questions are rated using a five-point Likert scale: never 0, hardly ever 1, occasionally 2, fairly often 3, very often 4. The total OHIP-J54 score ranges from 0 to 216, and the subscale scores of the eight domains are 0–36 for functional limitation, 0–36 for physical pain, 0–20 for psychological discomfort, 0–36 for physical disability, 0–24 for psychological disability, 0–20 for social disability, 0–24 for handicap, and 0–20 for the additional items in the Japanese version. OHRQOL is estimated using the eight subscale scores and the total score; a high score means a low OHRQOL level.

### Ethical considerations

The study protocol was approved by the necessary ethics committee and informed consent was obtained from the subjects.

### Statistical analyses

The Wilcoxon signed-rank sum test was used to compare scores before and after surgery. The Mann–Whitney *U*-test was used to compare scores in the patient group and control group. The Mann–Whitney *U*-test, Kruskal–Wallis one-way analysis of variance, and pairwise comparison were used to assess the relationships between OHIP-J54 scores and contributing factors. Probabilities of less than 0.05 were accepted as significant. Data were analyzed using IBM SPSS Statistics 20 for Windows (IBM Japan, Ltd, Tokyo, Japan).

## Results

All of the subscale scores of the patients before surgery were significantly higher than those of the control subjects, and all of the subscale scores after surgery were significantly lower than those before

Table 1. Characteristics of the subjects.

	n (%)
Chief complaint	
Facial deformity	42 (64.6)
Occlusal disharmony	20 (30.8)
Functional disturbance	3 (4.6)
Anteroposterior skeletal pattern	
Class III	47 (72.3)
Class II	8 (12.3)
Class I	10 (15.4)
Operative procedures	
BSSO	19 (29.2)
LFI + BSSO	46 (70.8)
Postoperative symptoms	
Paresthesia of the lip or chin	17 (26.2)
Temporomandibular joint symptoms	24 (36.9)
Limited mouth opening (MMO <35 mm)	7 (10.8)

BSSO, bilateral sagittal split osteotomy; LFI, Le Fort I osteotomy; MMO, maximum mouth opening.

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