

Effect of malocclusion severity on oral health-related quality of life and food intake ability in a Korean population

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Introduction: The aim of this study was to evaluate the effect of malocclusion severity on oral health-related quality of life and food intake ability in adult patients, controlling for sex, age, and the type of dental clinic visited.

Methods: The sample consisted of 472 Korean patients (156 male, 316 female) with a mean age of 21.1 (SD, 8.6) years in a dental hospital and a private clinic. The correlations between the Korean version of the Oral Health Impact Profile-14 (OHIP-14K), subjective food intake ability (FIA) for 5 key foods, and Index of Orthodontic Treatment Need-Dental Health Component (IOTN-DHC) were investigated. **Results:** The mean IOTN-DHC and OHIP-14K scores were significantly higher for the dental hospital patients than for the private clinic patients (IOTN-DHC, $P < 0.001$; OHIP-14K, $P < 0.05$). Malocclusion severity was significantly higher in male than in female subjects ($P < 0.001$). Older patients perceived their oral health-related quality of life more negatively than did the teens ($P < 0.001$). As the severity of the malocclusion increased, oral health-related quality of life and masticatory function worsened (OHIP-14K, $P < 0.001$; FIA, $P < 0.05$). **Conclusions:** As the severity of the malocclusion and the age of the patients increased, oral health-related quality of life and masticatory function relatively deteriorated. This finding provides evidence that severe malocclusions are associated with lower quality of life and less masticatory efficiency in older patients. (Am J Orthod Dentofacial Orthop 2016;149:384-90)

People with a severe malocclusion can be less self-confident in social relationships because of their dentition and facial morphology, since a severe malocclusion can affect how a person is perceived in a negative manner throughout his or her entire life. von Wezel et al¹ reported that facial satisfaction is a significant predictor for all expectations of orthodontic treatment in subjects 17 years and older. Thus, patients with a severe malocclusion expect psychological comfort

by esthetic improvement after orthodontic treatment as well as improvement in oral function.^{1,2}

Previous epidemiologic investigations on oral health have depended on clinical indexes, such as the Community Periodontal Index of Treatment Needs or the Decayed, Missing, and Filled teeth index.³ Consequently, these studies have limitations because of the emphasis only on the presence or absence of oral disease. To overcome these limitations, the oral health-related quality of life (OHRQoL) index was introduced and has recently gained more attention. OHRQoL is defined as the "absence of physical and psychological negative effects by oral health status in daily life and self-confidence about the maxillofacial region."⁴ Patients desire orthodontic treatment to gain psychological stability by functional and esthetic improvements instead of merely treating oral disease.⁵ Thus, OHRQoL may be the most appropriate method to measure the necessity for and the results of orthodontic treatment.⁶⁻⁹

A person's self-perceived masticatory function has a great effect on his or her daily life.¹⁰ An improvement in masticatory function by orthodontic treatment can maintain the healthy status of patients via the intake of various foods and improvement in their quality of

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life.¹¹ Masticatory function can be evaluated by subjective and objective methods. Subjective methods measure masticatory function using a questionnaire or an interview to determine food intake ability (FIA) of various types of foods. Clinically, the FIA questionnaire was developed as a simple and easy method to assess subjective masticatory function.¹²

The aim of this study was to investigate the effects of malocclusion severity on OHRQoL and chewing ability. The Korean version of the Oral Health Impact Profile-14 (OHIP-14K) survey was used to evaluate OHRQoL, and the FIA questionnaire was used to evaluate chewing ability in patients who came for orthodontic treatment. The null hypothesis was that malocclusion severity was not correlated with OHRQoL and FIA in patients, controlling for sex, age, and type of dental clinic visited.

MATERIAL AND METHODS

This study was a cross-sectional evaluation of 472 patients aged 21.1 ± 8.6 years who visited the Department of Orthodontics at Yonsei University Dental Hospital in Seoul, Korea, and private clinics in Gyeonggi province from April 2012 to January 2014. In this study, 228 patients were from the dental hospital, and 244 patients were from the private practices (316 female, 156 male) (Table I).

Patients with the following conditions were excluded from this study: (1) severe dentofacial anomalies, including cleft lip and palate; (2) current or past history of orthodontic treatment and orthognathic surgery; and (3) serious medical conditions for which they had been hospitalized in the past 3 months, or patients taking medications. These criteria were used to form a homogeneous group by excluding factors affecting the participants' quality of life. This study was performed with the understanding of each participant, and written informed consent was obtained from each subject. This study followed the guidelines of the Declaration of Helsinki and was approved (2-2013-0052) by the institutional review board of Yonsei University Dental Hospital.

Data were collected in face-to-face interviews. During the interviews, the patients provided information on their sex and age. OHRQoL was assessed using the OHIP-14K questionnaire, which was previously translated and validated.¹³ All 14 OHIP-14K questions asked how frequently the patient had experienced an adverse effect from oral conditions during the preceding 3 months.¹⁴ The 14 questions covered these 7 domains of oral health: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The responses were recorded with a Likert-type scale coded as follows:

Table I. Characteristics of the subjects

	Private	Hospital	Total	P value
Total	244 (51.7)	228 (48.3)	472 (100)	
Sex				<0.001
Female	188 (59.5)	128 (40.5)	316 (66.9)	
Male	56 (35.9)	100 (64.1)	156 (33.1)	
Age (y)				0.057
Teens	97 (45.3)	117 (54.7)	214 (45.3)	
20-29	111 (57.2)	83 (42.8)	194 (41.1)	
30-39	28 (60.9)	18 (39.1)	46 (9.7)	
Over 40	8 (44.4)	10 (55.6)	18 (3.8)	

Values are presented as number (%). P values were calculated with the chi-square test.

0, never; 1, hardly ever; 2, occasionally; 3, fairly often; and 4, very often. The OHIP-14K total score was calculated as the sum of the 14 scores, generating scores from 0 to 56, with higher scores indicating poor OHRQoL.

To evaluate subjective masticatory ability, the FIA self-assessed questionnaire requested the patients' masticatory abilities for 5 key foods (dried cuttlefish, raw carrots, peanuts, cubed white radish kimchi, and caramel) according to previous studies.^{15,16} The subjects answered the FIA questionnaires using a 5-point Likert scale: cannot chew at all (1 point), difficult to chew (2 points), cannot say either way (3 points), can chew some (4 points), and can chew well (5 points). The total FIA score was calculated as the average of the 5 key foods, which generated scores from 5 to 25, with higher scores indicating good chewing ability. A lower score indicated poor chewing ability.

The Dental Health Component of the Index of Orthodontic Treatment Need (IOTN-DHC) involves an assessment of the following 10 malocclusion traits: overjet, reverse overjet, overbite, open bite, crossbite, crowding, impeded eruption, cleft lip and palate defects or other craniofacial anomalies, Class II and Class III buccal occlusions, and hypodontia.¹⁷ The IOTN-DHC consists of 5 grades. Grades 1 and 2 describe conditions that do not require treatment or require minimal treatment. Grade 3 describes a moderate or borderline need for treatment. Grades 4 and 5 describe conditions that require treatment.

For the OHIP-14K and the FIA questionnaire, the reliability of internal consistency was verified by measuring the Cronbach α coefficient. Forty people who did not participate in this study were randomly selected and reexamined 2 weeks after their initial examination. The Cronbach α values were 0.860 for the OHIP-14K and 0.886 for the FIA questionnaire. The IOTN-DHC was measured by 2 trained and calibrated orthodontists (J-S.K., J-Y.C.). To assess interexaminer and intraexaminer reliability,

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