Effect of anterior crowding or spacing on oral health-related quality of life: a cross-sectional study

Introduction: Oral health-related quality of life (OHRQoL) involves many aspects such as chewing ability, sleeping, social interactions, self-esteem, and satisfaction with life and oral health. The increasing research interest in OHRQoL began only after the shortcomings of previous approaches of treating symptoms only and neglecting the patient’s self-perception were revealed.

Patients and methods: The current study design is a cross-sectional study of patients who attended King Abdulaziz University Dental Hospital (Jeddah, Saudi Arabia) and King Saud University Dental Hospital (Riyadh, Saudi Arabia). After obtaining their verbal consent, young adult and adult patients (mean age 25.19±7.29 years old) with anterior spacing or crowding were recruited to participate in the study. They filled the Arabic short version of the oral-health impact profile-14 questionnaire after a clinical evaluation of the severity of their spacing or crowding. Parameters of spacing/crowding severity assessment were as follows: <4, mild; 4–8, moderate; and >8, severe. Data were analyzed using the chi-square test in SPSS statistical package. The level of significance was set to <0.05.

Results: The sample size of this study was 308 subjects. Findings indicated a statistically significant (p=0.001) association between anterior spacing malocclusion (ASM) with Q5 “self-consciousness”, since 64.2% of patients with ASM reported being self-conscious. Results indicated a statistically significant association between educational level with anterior crowding malocclusion (ACM; p=0.02) and ASM (p=0.01) with Q3 “painful aching”. Moreover, findings indicated a statistically significant association (p=0.04) between income and ACM with Q5 “self-consciousness”. On the other hand, results showed no significant association between gender with either ACM or ASM.

Conclusion: This study sheds light on how anterior malocclusion (crowding or spacing) impacts OHRQoL negatively, especially heightening self-consciousness about their appearance. These effects should be addressed by the orthodontist during the course of treatment.

Keywords: OHRQoL, malocclusion, OHIP-14, patient preference

Introduction

Oral health-related quality of life (OHRQoL) is defined as “The subjective experience of symptoms related to oral conditions that have an impact on well-being.” There are abundant articles discussing the effect of malocclusion generally or a specific type of malocclusion on the quality of life or self-esteem of patients. The increasing research interest in OHRQoL began only after the shortcomings of previous approaches of treating symptoms only and neglecting the patient’s self-perception were revealed. Some patients with mild malocclusion may report greater concerns than those with severe forms and a different self-perception. OHRQoL involves many aspects such as chewing ability, sleeping, social interactions, self-esteem, and satisfaction with life.
Patients and methods

The current study design is a cross-sectional study of patients who attended King Abdulaziz University Dental Hospital (Jeddah, Saudi Arabia) and King Saud University Dental Hospital (Riyadh, Saudi Arabia). Ethical approval (number #0010117) was obtained from King Abdulaziz University Dental Hospital. After obtaining their verbal consent, young adult and adult patients (mean age 25.19±7.29 years old) with anterior spacing or crowding were recruited to participate in the study. Verbal consent was obtained from the parent or legal guardian of any participants who were under the age of 18. Verbal consent was approved by ethical approval committee of King Abdulaziz University Dental Hospital. The patients filled the Arabic short version of the OHIP-14 questionnaire after a clinical evaluation of the severity of their spacing or crowding. Parameters of spacing/crowding severity assessment were as follows: <4, mild; 4–8, moderate; and >8, severe. Exclusion criteria included the following:

- Patients <15 years old
- Current or history of orthodontic treatment
- Severe dentofacial anomalies, including cleft lip and palate or obvious malocclusions, such as severe unilateral or bilateral crossbite
- Patients with extraction spaces
- Patients with or in need of extensive dental treatment
- Patients with extensive anterior dental treatment
- Patients with systemic diseases

Statistical analysis

Data were analyzed using the chi-square test in SPSS statistical package (version 21; SPSS, Chicago, IL, USA). The level of significance was set to <0.05. The scores of OHIP-14 were dichotomized to absence (if the answer is “never” or
“hardly ever”) and presence (if the answer is “occasionally,” “fairly often,” and “very often”) of impact on OHRRQoL.

**Results**

The sample size of this study was 308 subjects. Descriptive analysis illustrated the sample characteristics with 53.2% males with the mean age of 25.2 years. In terms of educational level, almost 58% of the studied population held bachelor’s degrees. An income of <3,000 SR represents the majority of the studied population (40%) followed by those with >9,000 SR (23%; Table 1). The distribution of anterior crowding malocclusion (ACM) and anterior spacing malocclusion (ASM) were divided into mild, moderate, and severe based on the severity of the cases. A trend was observed for both ACM and ASM where those with a mild form of malocclusion were more prevalent followed by moderate and severe forms. Upon comparison between crowding and spacing malocclusions, it was found that crowding was a more prevalent malocclusion with 56.5% than spacing, which represents 43.5%.

Bivariate analyses (chi-square test) were performed to test potential association between ACM and ASM with each of the OHRRQoL questions. Findings indicated a statistically significant (p=0.001) association between ASM with Q5 “self-consciousness,” since 64.2% of patients with ASM reported being self-conscious (Table 2). The potential associations between ACM and ASM with descriptive data (gender, educational level, and income) were tested using the chi-square test. Results indicated a statistically significant association between educational level with ACM (p=0.02) and ASM (p=0.01) with Q3 “painful aching”. Moreover, findings indicated a statistically significant association (p=0.04) between income and ACM with Q5 “self-consciousness”.

**Table 1** Sample characteristics and demographic distribution

| Sample characteristics          | Number (%) |
|--------------------------------|------------|
| Gender                         |            |
| Male                           | 164 (53.2) |
| Female                         | 144 (46.8) |
| Total                          | 308        |
| Mean age ± SD, years           | 25.19±7.29 |
| Educational level              |            |
| Below bachelor’s degree        | 113 (36.7) |
| Bachelor’s degree              | 178 (57.8) |
| Post-graduate degrees          | 17 (5.5)   |
| Income, SR                     |            |
| <3,000                         | 123 (39.9) |
| 3,000–6,000                    | 56 (18.2)  |
| >6,000–9,000                   | 58 (18.8)  |
| >9,000                         | 71 (23.1)  |

| Presence of impact             | n (%)      |
|--------------------------------|------------|
| p-value                        |            |

**Table 2 The potential association between anterior malocclusion and OHRRQoL**

| OHRRQoL daily activity | Crowding (N=174) | Spacing (N=134) |
|------------------------|------------------|-----------------|
| Q1-Had problems pronouncing words | Presence of impact | 36 (20.6) | 47 (35.1) |
| p-value                | 0.001*           | 0.001*         |
| Q2-Felt that the sense of taste worsened | Presence of impact | 21 (12.1) | 26 (19.4) |
| p-value                | 0.001*           | 0.001*         |
| Q3-Had painful aching in the mouth | Presence of impact | 98 (56.3) | 78 (58.2) |
| p-value                | 0.09             | 0.05            |
| Q4-Found it uncomfortable to eat any food | Presence of impact | 78 (45.8) | 63 (47) |
| p-value                | 0.17             | 0.49            |
| Q5-Had been self-conscious | Presence of impact | 79 (45.4) | 86 (64.2) |
| p-value                | 0.22             | 0.001*          |
| Q6-Felt tense | Presence of impact | 66 (38) | 67 (50) |
| p-value                | 0.001*           | 1               |
| Q7-Had an unsatisfactory diet | Presence of impact | 39 (22.4) | 32 (23.9) |
| p-value                | 0.001*           | 0.001*          |
| Q8-Had to interrupt meals | Presence of impact | 38 (21.8) | 33 (24.6) |
| p-value                | 0.001*           | 0.001*          |
| Q9-Found it difficult to relax | Presence of impact | 41 (23.6) | 37 (27.6) |
| p-value                | 0.001*           | 0.001*          |
| Q10-Had been a bit embarrassed | Presence of impact | 74 (42.5) | 71 (53) |
| p-value                | 0.04*            | 0.49            |
| Q11-Had been irritable with other people | Presence of impact | 59 (33.9) | 60 (44.8) |
| p-value                | 0.001*           | 0.22            |
| Q12-Had difficulty doing usual jobs | Presence of impact | 35 (20.1) | 29 (21.6) |
| p-value                | 0.001*           | 0.001*          |
| Q13-Felt that life in general was less satisfactory | Presence of impact | 37 (21.3) | 39 (29.1) |
| p-value                | 0.001*           | 0.001*          |
| Q14-Had been totally unable to function | Presence of impact | 20 (11.5) | 16 (11.9) |
| p-value                | 0.001*           | 0.001*          |

Notes: Absence of impact = never or hardly ever; presence of impact = occasionally, fairly often, or very often. *p-value is significant.

Abbreviation: OHRRQoL-14, oral-health impact profile-14.

On the other hand, results showed no significant association between gender with either ACM or ASM.

**Discussion**

This study used the Arabic version of OHRRQoL, which was validated in a convenient sample of the Saudi population.10,13,15–18 This questionnaire was used in several cross-sectional and
longitudinal studies to assess the impact of several oral-health diseases and disorders, including malocclusion.19,20

Individuals seeking dental treatment with either ACM or ASM were recruited from King Abdulaziz University Dental Hospital in Jeddah and King Saud University Dental Hospital in Riyadh. The sample size consisted of 308 subjects, 53.2% males and 46.8% females with the mean age of 25.2 years. In terms of educational level, almost 58% of the studied population held a bachelor’s degree. An income of <3,000 SR represented the majority of the studied population (40%). Patients with ACM constituted 56.5% of the sample compared to 43.5% of patients with ASM.

In the current study, “painful aching”, “chewing efficiency”, “diet choices”, and “meal interruption” were not significant, supporting Daniels and Richmond findings stating that functional aspects have minimal effect on the OHRQoL among adolescents.21 On the other hand, de Oliveira and Sheiham, and Hassan and Amin reported that functional parameters were significantly affected.10,22 This may be attributed to the fact that this study assessed anterior malocclusion (crowding and spacing), which may have no or minimal impact on functional abilities. Moreover, in the present study, “self-consciousness” was significantly affected by ASM. This finding supports the results of de Oliveira, who reported that self-consciousness increased for patients with malocclusion.22

This study assessed the association between anterior malocclusion with descriptive data (gender, educational level, and income), and we found no statistically significant association with gender. This finding agrees with Hassan and Amin and disagrees with de Oliveira and Sheiham, Cicciu et al, and Ulinski et al who found that gender affected OHRQoL perception significantly; under similar conditions, females reported more discontent with their appearance than males.10,23–25 Furthermore, Tsakos et al reported that educational level affected OHRQoL negatively in elderly people.26 The current study found educational level to be a significant factor for patients with ACM and ASM only regarding one question, which was Q5 “self-consciousness”.

The present study’s findings agree with those of other studies that use OHIP-14, which concluded that malocclusion affects OHRQoL negatively.1,6,27–28 A limitation of the current study must be considered. Subjects were recruited from hospitals; thus, this sample might not represent the characteristics of the rest of the population who did not seek dental treatment, thereby causing an unequal distribution of malocclusion severity and age.

Conclusion
This study shed light on how anterior malocclusion (crowding or spacing) impacts OHRQoL negatively, especially heightening self-consciousness about their appearance. These effects should be addressed by the orthodontist during the course of treatment.

Disclosure
The authors report no conflicts of interest in this work.

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