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Cross-bite and oral health related quality of life in young people

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ABSTRACT

Objectives: This study sought to assess the impact of posterior cross-bite on OHRQoL in young people aged 15–25 and to determine whether the impact on higher domains of Oral Health Impact Profile-14 (physical disability, psychological disability, social disability and handicap) is a direct function of the cross-bite or mediated through the lower domains of OHIP-14 (functional limitation, pain and discomfort).

Methods: One hundred and forty-five young adults [72 cross-bite cases and 73 controls] aged 15–25 years, attending orthodontic clinics at the Faculty of Dentistry, Universiti Teknologi MARA participated in this study. Participants completed the OHIP-14 and had a clinical examination for cross-bite. Data analyses included descriptive statistics, *t*-test and bivariate and multivariate regression modelling.

Results: There was no significant difference between the case and control groups in gender, age and education level. The mean scores (±SD) for OHIP-14 total and all domains were significantly higher in cross-bite patients as compared to controls. The bivariate and multivariate regression analyses showed functional limitation was significantly associated with all the higher domains in all four models, whereas pain was only significantly associated with the psychological domain and discomfort was only significantly associated with the physical disability domain.

Conclusion: The possession of a posterior cross bite has a significant association with OHRQoL especially on the functional limitation and psychological disability domains, among 15–25 years old young people. The relationship of cross-bite and lower domains of OHIP-14 with higher domains of OHIP-14 was in agreement with the relationships proposed by Locker's conceptual model of oral health.

Clinical significance: Patients with a cross bite were more limited in their oral functions and experienced greater psychological discomfort than did controls. It is possible that part of patients' rationale for seeking treatment would be to alleviate such impacts on their oral health related quality of life.

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1. Introduction

Posterior cross-bite has been defined as, ''a transversal arch discrepancy in which the palatal cusps of one or more of the upper posterior teeth do not occlude in the central fossae of the opposing lower teeth. A posterior cross-bite may be unilateral or bilateral when the patient bites into maximum intercuspation''.[1,2] Studies have suggested that the prevalence of a posterior cross-bite ranges between 8% and 16% of the population.[1] The aetiology of cross-bites is complex and may include prolonged retention or premature loss of deciduous teeth, crowding, palatal cleft, arch deficiencies, oral digit habits, oral respiration during growth periods, and malfunctioning temporomandibular joints. Posterior cross-bite may have long-term effects on the growth and development of the teeth and jaws.[1] The abnormal movement of the lower jaw may place strain on the orofacial structures, causing adverse effects on the temporomandibular joints and masticatory system. Also, the asymmetrical function and activity of the jaws in patients with a posterior cross-bite have been reported to cause different development of the right and left sides of the mandible.[2] Studies of adolescents and adults have revealed that patients with posterior cross-bite have an increased risk of developing craniomandibular disorders, and show more signs and symptoms of these problems. In most cases, the cross-bite is accompanied by a mandibular shift, a so-called forced cross-bite, which causes midline deviation. A forced bite may cause alterations in the activity of the jaw muscles and may lead to skeletal changes with asymmetry of the face in the course of facial growth.[2]

Conditions affecting oral health such as dental caries and periodontitis,[3,4] including cross-bite, have consequences not only for physical well-being as mentioned above, but can also impair quality of life by affecting function, appearance, interpersonal relationships, socializing, self-esteem and psychological well-being.[5,6] The concept of oral health-related quality of life (OHRQoL) corresponds to the impact of oral health or diseases on the individual's daily functioning, well-being or the conduct of valued activities.[7–9] To date, much OHRQoL research has been based implicitly on Locker's (1988) conceptual model of oral health.[10] This model states that there are five consequences of oral disease: impairment, functional limitation, pain/discomfort, disability, and handicap. Further the model proposes that these domains are sequentially related. Impairment (structural abnormality e.g. cross-bite) leads to functional limitation (restrictions in body functions, e.g., difficulty chewing) and pain/discomfort (self-reported physical and psychological symptoms), which, in turn, lead to disability (limitations in performing daily activities, such as an unsatisfactory diet) and then to handicap (social disadvantage, such as social isolation).[11] Functional limitation may also lead directly to handicap. The model can be conceptualized as comprising lower order impacts (impairment, functional limitation, pain/discomfort), which may cause higher order impacts manifest as handicap and disability (physical disability, psychological disability, social disability, and handicap). The Oral Health Impact Profile (OHIP) is one of the most frequently used OHRQoL measures which is based on Locker's conceptual model of oral health.[10] The OHIP measures the impact of oral disease in the seven domains of Locker's model. The disability domain of Locker's conceptual model is further divided into physical, psychological and social disability domains.[10] Research is required to understand the physical, social, and psychological impact of cross-bite on OHRQoL and its individual domains, since it sheds light on the effects of cross-bite on people's lives and provides more understanding of the demand for orthodontic treatment. In addition, since social and psychological effects are the key motives for seeking treatment in general, OHRQoL in conjunction with objective measures (e.g. IOTN) of malocclusion can be considered a good reflection of treatment need and outcome.[5] Such research may be of great value to researchers, health planners, and oral health care providers.[12]

Previous research exploring the relationship between malocclusion and OHRQoL, as well as the impact of orthodontic treatment on OHRQOL has, in some instances, found a strong relationship between malocclusion or orthodontic treatment need and OHRQoL,[13–16] but other research has found no clear relationship.[17,18] However to date the impact of cross-bite on OHRQoL has not been explored. Therefore, this study was conducted to assess the impact of posterior cross-bite on OHRQoL in young people aged 15–25, who sought orthodontic treatment in the Department of Orthodontics at Universiti Teknologi MARA Malaysia and to determine the impact of cross-bite and lower domains of OHIP-14 (functional limitation, pain and discomfort) on higher domains of OHIP-14 (physical disability, psychological disability, social disability and handicap).

2. Methods

2.1. Study design

One hundred and forty-five young adults, aged 15–25 years, attending orthodontic clinics at the Faculty of Dentistry, Universiti Teknologi MARA, in Malaysia participated in this study. Most participants were motivated by their parents to seek an orthodontic consultation. A convenience consecutive sampling approach was used. The participants were recruited at their first visit for orthodontic screening before starting any orthodontic treatment. The parents, or wherever possible the participants, signed an informed consent form, and agreed to participate in the study. To be eligible, the participant had to be in good general health. Participants who required a surgical intervention or who had chronic medical conditions, severe dentofacial anomalies such as cleft lip and palate, untreated dental caries, and poor periodontal health status as indicated by a community periodontal index score of 3 or more were excluded, as were those who had undergone previous orthodontic treatment. This was to prevent possible confounding effects of these conditions on the participants' quality of life and to achieve a homogeneous group population. The Universiti Teknologi MARA (UiTM) Research Ethics Board approved all study procedures.

2.2. Outcome variable (OHIP-14)

OHRQoL was measured using a Malay language translated version of the 14-item Oral Health Impact Profile (OHIP-14).