The Impact of Malocclusion/Orthodontic Treatment Need on the Quality of Life

A Systematic Review

Zhijian Liu; Colman McGrath; Urban Hägg

ABSTRACT

Objective: To assess the current evidence of the relationship between malocclusion/orthodontic treatment need and quality of life (QoL).

Materials and Methods: Four electronic databases were searched for articles concerning the impact of malocclusion/orthodontic treatment need on QoL published between January 1960 and December 2007. Electronic searches were supplemented by manual searches and reference linkages. Eligible literature was reviewed and assessed by methodologic quality as well as by analytic results.

Results: From 143 reviewed articles, 23 met the inclusion criteria and used standardized health-related QoL (HRQoL) and orthodontic assessment measures. The majority of studies (18/23) were conducted among child/adolescent populations. Seventeen of the papers were categorized as level 1 or 2 evidence based on the criteria of the Oxford Centre for Evidence-Based Medicine. An observed association between HRQoL and malocclusion/orthodontic treatment need was generally detected irrespective of how they were assessed. However, the strength of the association could be described as modest at best. Key findings and future research considerations are described in the review.

Conclusions: Findings of this review suggest that there is an association (albeit modest) between malocclusion/orthodontic treatment need and QoL. There is a need for further studies of their relationship, particularly studies that employ standardized assessment methods so that outcomes are uniform and thus amenable to meta-analysis. (Angle Orthod. 2009;79:585–591.)

KEY WORDS: Malocclusion; Orthodontic treatment need; Quality of life, Oral health–related quality of life

INTRODUCTION

Although malocclusion in itself is neither a disease nor a life-threatening condition, there has long been a marked demand for orthodontic care. Moreover, the treatment of malocclusion places a considerable burden on health care resources globally, particularly when funded by public means. In an attempt to prioritize the treatment of malocclusion, various occlusal indices have been developed based on the severity of malocclusion and/or the conceivable destruction it may cause to oral health if left untreated. However, it has long been recognized that perhaps people seek and undergo orthodontic treatment not because of the anatomic irregularities per se or to prevent the destruction of tissue within the oral cavity, but because of the consequences of the esthetic impairment caused by malocclusion. Thus, malocclusion and orthodontic care have become a quality-of-life (QoL) issue.

QoL is a vague and abstract concept with usages across many disciplines and in essence reflects an individual’s experiences that influence one’s satisfaction with life. The term health-related quality of life...
(HRQoL) has been used to describe an individual's assessment of how the following factors affect his or her well-being: experience of pain/discomfort, physical function, psychology (ie, concerning the person's appearance and self-esteem), and social function (such as interactions with others). When these considerations focus on orofacial concerns, oral health–related quality of life (OHRQoL) is assessed.11

The physical, social, and psychologic consequences of malocclusion and its influence on QoL have long been topics of research. Moreover, over the past two decades a number of specific OHRQoL measures have been developed to assess the impact of oral health status on QoL and to assess the outcomes of oral health care intervention in terms of contribution to QoL. However, there is a paucity of systematic appraisal of the consequences of malocclusion on QoL. This is important to provide an understanding of the importance of, and priority for, orthodontic care within the health care spectrum. Thus, the aim of this review was to assess the literature related to the impact of malocclusion, orthodontic treatment need, and orthodontic care on QoL, HRQoL, and OHRQoL.

**MATERIALS AND METHODS**

Four electronic databases (MEDLINE via PubMed, EMBASE, CENTRAL, and CINAHL) were searched for...
Table 1. Extended

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articles published between January 1960 and December 2007 in English, French, German, Spanish, Chinese, or Japanese. In MEDLINE via PubMed, the following search syntax was used: (‘quality of life’ [MeSH term] OR life quality [text word] OR well being [text word] OR daily living [text word] OR physical impact [text word] OR social impact [text word] OR psychological impact [text word]) AND (‘malocclusion’ [MeSH term] OR ‘orthodontics’ [MeSH term] OR ‘orthodontics’ [MeSH term]). In the other three databases, similar search strategies were used.

In addition, the following specific orthodontic periodicals from 1990 onward were hand-searched at a university library for articles relating to QoL, malocclusion, and orthodontics: American Journal of Orthodontics and Dentofacial Orthopedics, European Journal of Orthodontics, Angle Orthodontist, Journal of Orthodontics and World Journal of Orthodontics.

Abstracts from the electronic and manual searches formed a list of potentially relevant studies. Three independent researchers reviewed the titles and abstracts of all potentially relevant studies independently. Where it was apparent from the abstract that the study subjects were inappropriate for the focus of the review (in terms of exclusion criteria), full-text articles of these studies were not obtained. The reference lists of articles deemed eligible for the review were checked, and where relevant, referenced papers were added to the list of potentially relevant studies through reference linkage.

Next, the full text of all potentially relevant papers was obtained and reviewed for (1) method of assessing OHRQoL, (2) use of standardized measures of malocclusion and/or orthodontic treatment need, and (3) methods of statistical analyses. This identified eligible papers relevant to this review. Exclusion criteria were lack of standardized measures in assessing QoL, HRQoL, or OHRQoL; lack of effective statistical analyses; and case reports and review papers (Figure 1).

Papers included in the final review were assessed using the following parameters: (1) study design; (2) sample (source, sampling technique, sample size, and age characteristics); (3) assessment method of OHRQoL; (4) assessment method of malocclusion and/or orthodontic treatment need; (5) key findings and statistical inference(s); and (6) level of scientific evidence based on the criteria of the Oxford Centre for Evidence-based Medicine14 (Table 115–37).

RESULTS

A list of 134 articles was obtained from the searches of electronic databases (Figure 1). A manual search
of the orthodontic periodicals added one more article for this review. Following review of the abstract details of the 135 articles, 28 articles were excluded from the list of potentially eligible papers based on the study sample characteristics: obstructive sleep apnea patients, temporomandibular disorder patients, and dentofacial injury patients.

Full texts of the remaining 107 papers were obtained; from their references, eight more articles were reference linked as potentially relevant articles and their full texts obtained. One hundred fifteen articles were reviewed for assessment methods used in assessing HRQoL and malocclusion/orthodontic treatment need and statistical analyses. Agreement between reviewers occurred for 86% (99/115) of the papers, and disagreements were resolved through dis-

Figure 1. Flow diagram of literature search strategy.
cussion prior to further assessment of the papers. Of the 115 selected papers, 92 were excluded based on the use of nonstandardized assessment methods of OHRQoL (measures whose reliability and validity had not been reported in the literature), malocclusion, and/or orthodontic treatment need. Twenty-three papers were identified as “included” papers to form the basis of the review. The 23 included papers \(^{15–37}\) were identified from 20 studies. Among the 23 included papers, four offered level 1b evidence (cohort studies with good follow-up), 13 offered level 2c evidence (large community/ecologic studies), and six were level 3b evidence (cross-sectional studies among convenient samples) according to the Oxford Centre for Evidence-based Medicine criteria.\(^{14}\) Sixteen articles used community samples (sample size ranged from 148 to 1675) and seven used convenient clinical samples (sample size ranged from 89 to 193). Eighteen of the articles described findings in child/adolescent study populations, and five described findings in adult populations.

Both generic and oral health–specific QoL measures were employed in assessing the effects of malocclusion/orthodontic treatment need on life quality. Among children and adolescents, the Child Perception Questionnaire (CPQ) was the most frequently employed measure (9 of 18 papers). Among adults the Oral Impact on Daily Performance (OIDP) measure was most frequently used in the assessment of OHRQoL (two of five papers).

Subjects in most studies were classified according to their orthodontic treatment need rather than by occlusal traits. The Index of Orthodontic Treatment Need (IOTN) was most frequently employed in classifying the study population clinically (10 of 23 papers).

Because of the heterogeneity of different methods of assessing malocclusion/orthodontic treatment need and OHRQoL, it was not feasible to combine the statistical results to form a meta-analysis. However, the majority of the findings from cross-sectional studies indicated an association between QoL (irrespective of how it was assessed) and malocclusion/orthodontic treatment need (irrespective of how it was assessed) \((P < .05)\). The strength of the correlation \((r\) value\) between malocclusion/orthodontic treatment need status and QoL, where reported, ranged from 0.15 to 0.45. The regression analyses (linear and logistic) showed that the strength of the association between malocclusion/orthodontic treatment need status and QoL was above 4.0 for some studies (adjusted odds ratio/regression coefficient) (Table 1).

DISCUSSION

QoL is a somewhat intangible entity and there has been much debate as to how to define it. However, since there is general consensus that QoL reflects physical, social, and psychologic functioning, these terms formed the basis of the literature search methodology.\(^3\) The literature search yielded more than 100 potentially relevant articles, demonstrating the paradigm shift from the biophysical focus of malocclusion to a more patient-centered focus of malocclusion and its management. Moreover, it was apparent that QoL has been a particularly common topic of research in the past decade among all dental disciplines.\(^{38}\)

In this review a rather stringent approach was taken to the selection of included papers; this approach was based on the requirement of standardized assessment methods for malocclusion/orthodontic treatment need and for HRQoL. This process was used since assessment methods (for both malocclusion/orthodontic treatment need and HRQoL) have been available for more than two decades and because the use of nonstandardized assessment methods makes it difficult to draw conclusions about QoL, itself already an elusive concept.\(^{13,38}\) For the most part, OHRQoL measures have been employed, rather than generic HRQoL measures, in the assessment of the impact of malocclusion on QoL, which would seem appropriate given the greater sensitivity of condition-specific measures.\(^{12}\)

Perhaps not too surprisingly, the majority of the research in this area has focused on the impact of malocclusion on the QoL in children rather adults. This relates in part to the fact that children make up the majority of orthodontic patients, although it is increasingly recognized that more and more adults are seeking correction of their malocclusion.\(^{39}\)

The level or strength of evidence that can be gleaned from the included papers was relatively low. Most were cross-sectional studies, since the research questions were concerned primarily with identifying an association between malocclusion and QoL rather than outcomes of treatment. It is uncertain as to whether a higher level of evidence will emerge in the future, since orthodontics frequently does not lend itself to randomized controlled trials very well because of ethical issues, particularly when children are involved.\(^{40}\) Of note, studies generally observed an association between malocclusion/orthodontic treatment need and HRQoL, irrespective of how the parameters were assessed. However, the inferences from the correlation statistics and regression findings would indicate that, at best, the strength of the association could be interpreted as moderate.

CONCLUSIONS

- There is a growing interest in the relationship between malocclusion/orthodontic treatment need and HRQoL.
REFERENCES


