The Saudi Dental Journal (2014) **26**, 156–165

King Saud University

The Saudi Dental Journal

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ORIGINAL ARTICLE

Agreement between orthodontist and patient perception using Index of Orthodontic Treatment Need

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Received 6 February 2013; revised 12 December 2013; accepted 31 March 2014
Available online 5 May 2014

KEYWORDS

Self perception;
Orthodontist perception;
Perception;
IOTN;
IOTN-AC;
IOTN-DHC

Abstract *Objectives:* The primary objective of the study was to assess the agreement between orthodontist and patient perception regarding the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN-AC) at pre-orthodontic treatment levels. The secondary objective was to determine how well the subjective assessment of malocclusion (IOTN-AC) correlated with the normative Dental Health Component of the IOTN (IOTN-DC).

Materials and methods: A cross-sectional analytical study was conducted on patients between the ages of 16 and 25, presenting for initiation of orthodontic treatment with no history of prior orthodontic treatment. The mean age of the total sample population was 19.50 ± 3.15 years. The mean age of the males was 19.05 ± 3.09 years and for females it was 19.75 ± 3.18 years. The sample consisted of 41 males and 80 females. Patients were shown their pretreatment monochrome intraoral frontal photographs to rate according to the IOTN-AC. Simultaneously, the orthodontist reviewed the photographs with each patient. The IOTN-DHC of pretreatment casts was also recorded by the orthodontist. The frequency of specific traits that had led to increased severity of malocclusion was also identified. All readings were recorded manually on a data collection form. The data were assessed using the chi-square test, Spearman's correlation and Cohen's kappa test. Intra- and inter-examiner reliability was assessed using Spearman's correlation.

Results: A significant positive relationship ($p < 0.05$) was observed between orthodontist and patient perception ($r = 0.516$), orthodontist perception and the normative need ($r = 0.430$), and between the patient perception and the normative need ($r = 0.252$). A statistically significant level of agreement was observed between orthodontist and patient perception (kappa = 0.339,

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Peer review under responsibility of King Saud University.

Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.sdentj.2014.03.004

$p \leqslant 0.001$, 95% CI, 0.207–0.470) and between orthodontist perception and the normative need (kappa = 0.331, $p \leqslant 0.001$, 95% CI, 0.197–0.424). A weak and insignificant level of agreement was observed between patient perception and normative treatment need (kappa = 0.107, 95% CI, 0.02–0.187).

Conclusions: Patient understanding of their treatment need or aesthetic classification may not always be as accurate as that of orthodontists. This may be a cause for concern when an orthodontist finds a certain condition to be severe, and a patient who does not agree may limit their treatment needs.

1. Introduction

As a prerequisite to orthodontic treatment, patient functional and aesthetic needs are taken into consideration. Several indices have been developed over the years to quantify these needs (Borzabadi-Farahani, 2011); however, each method has its limitations. The Handicapping Labio-lingual Deviation Index (HLD) (Draker, 1960) is unable to record missing and impacted teeth, or spacing and transverse discrepancies. The Dental Aesthetic Index (DAI) (Cons et al., 1986) reflects malocclusion severity as per the North American culture, aesthetic and psychosocial value, but does not assess occlusal anomalies such as buccal cross-bite, impacted teeth, deep overbite, mesio-distal discrepancy, and severity of arch length discrepancy. The Index of Complexity, Outcome and Need (ICON) (Daniel and Richmond, 2000) is highly weighted towards aesthetics; hence, it is more subjective than objective in its assessment.

The Index of Orthodontic Treatment Need (IOTN) was introduced by Brook and Shaw (1989) to form a valid and reproducible index of orthodontic treatment priority. The index consists of two components, the Aesthetic Component and the Dental Health Component. The IOTN-AC is the subjective component of the index, and comprises a set of 10 intra-oral frontal photographs to be rated from 1 to 10, with 1 being the most attractive to 10 being the least attractive. The IOTN-AC provides a measurable, visual assessment regarding the patient perception of their presenting malocclusion and their treatment needs. The IOTN-DHC was derived from the index of treatment priority used by the Swedish Dental Board (Linder-Aronson, 1974). The IOTN-DHC is the objective component of the IOTN index. It consists of 5 grades of treatment need, ranging from 1 (none) to 5 (very great) (Shaw et al., 1995). It records the severity of the malocclusion using specific traits: missing or unerupted teeth, overjet, crossbites, displaced contact points, or overbite. Correction of these traits contributes towards more stable occlusions (Brook and Shaw, 1989). A study conducted by Fida (2000) using IOTN found that 40% of children in Pakistan between 12 and 14 years of age were in need of orthodontic treatment. Similarly, Bashir and Waheed (2002) determined that IOTN recorded orthodontic treatment need priority in 60% of Pakistani population, thus establishing its effectiveness.

The properties of the IOTN have been extensively compared with other treatment need indices. Beglin et al. (2001) compared the reliability and the validity of the IOTN with those of the DAI and the Handicapping Labiolingual Deviation with the California Modification (HLD Cal Mod). They found the IOTN to be the most accurate index (98%) in comparison to DAI (95%) or the HLD Cal Mod (94%) (Draker, 1960). According to a study conducted by Mandall et al. (2005), the sensitivity of the IOTN-AC was 40.7% and its specificity 90.9%, whereas the sensitivity of the IOTN-DHC was found to be 38.4% and its specificity to be 90.4%. Cardoso et al. (2011) assessed the validity and reproducibility of the IOTN-DHC as compared to the DAI, and concluded that although both the indices had good reproducibility and validity [Intra class coefficient (ICC), DAI (0.89)], the IOTN-DHC required less time for assessment ($p \leqslant 0.001$). Kerosuo et al. (2004) found that the self-perception of Arab high school students demonstrated 77% agreement with the IOTN-AC and 53% agreement with the IOTN-DHC, thus indicating that the IOTN-AC can be used to reflect a patient self-perceived treatment need. However, most treatment need indices are unable to assess the prognosis of untreated malocclusions and associated symptoms (Borzabadi-Farahani, 2012a,b).

Esthetic treatment requires that the clinician and patient mutually agree upon the severity of the presenting condition or complaint. Such harmony of perception enhances patient understanding and aids communication between clinicians and patients, improving compliance levels from these patients. The influence of self-esteem on self-perception cannot be denied.

Several studies have indicated that patients overestimate their pretreatment conditions more than clinicians (Hamdan, 2004; Hassan, 2006). Although Albarakati (2007) found no significant difference between the opinions of the patient and the orthodontist ($p < 0.05$), a study conducted by Dogan et al. (2010) showed that an orthodontist may overestimate the severity of conditions to a greater extent (11.5%) than patients (6.7%). A significant correlation between the DHC and the orthodontist-rated AC of IOTN was also observed, ($r = 0.625$, $p < 0.001$) indicating that the orthodontist's ability to perceive the patient's presenting conditions is much more accurate and comprehensive than that of the patient (Dogan et al., 2010) in view of the orthodontist's clinical skills. A discrepancy in perception between orthodontist and patient increases expectations and demands from each side, which may eventually deter individuals from seeking treatment.

This study of dental aesthetics therefore aims to compare patient self-perception with orthodontic assessment. Perception, being a subjective phenomenon, will be correlated with the objective IOTN-DHC to assess which group is better able to perceive the severity of the patient condition. Understanding the aesthetic needs of patients enables orthodontists to meet patients' expectations and eventually improves clinical practice.