

Self-Perceived Dental Esthetics and Orthodontic Treatment Need

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ABSTRACT

Introduction: Individual's concerns dental esthetics is an essential factor influencing the psychosocial orthodontic treatment.

Objectives: To explore the self-perceived dental esthetics of adult individuals and to evaluate their subjective orthodontic treatment needs on esthetic grounds.

Materials and Methods: This descriptive, cross-sectional study utilized a self-administered questionnaire distributed among a random sample of the general population. A total of 1014 participants (737 female, 277 male) completed the questionnaire, which included Aesthetic Component of Index of Orthodontic Treatment Need (AC-IOTN) and Oral Aesthetics Subjective Impact Score (OASIS).

Results: Spearman correlation test revealed a statistically significant relationship between the OASIS and the AC-IOTN ($r=0.37$, $P=0.005$). The positive association indicated that as the individual's OASIS score increased, suggesting a greater concern about dental esthetics, his or her orthodontic treatment needs also increased on the AC-IOTN. Furthermore, the demand for orthodontic treatment was significantly influenced by gender.

Conclusion: There was a weak association that indicating when the patient's esthetic self-satisfaction decreased, the subjective need for orthodontic treatment increased. For this reason, we suggest that it is important to consider patients' perceptions of their own dental esthetics in orthodontic treatment planning. Gender differences should likewise be considered.

Key words: Malocclusion, Dentistry, Orthodontic treatment, Dental esthetics, Teeth

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INTRODUCTION

Malocclusion is a prevalent condition affecting oral health; it is ranked third among international dental public health priorities, following dental decay and periodontal diseases [1]. The prevalence of malocclusion varies across the world. Western European studies revealed that 60%–75% of adults manifest some form of malocclusion [2].

Recent studies also reported a high prevalence of malocclusion in Arab population, with crowding and spacing being the most frequent conditions [1-3].

Kerosuo et al. suggested that 40% of adolescent males require orthodontic treatment [4]. Therefore, it is not surprising that the demand for orthodontic treatment is increasing dramatically these days, and the reasons for this increase should be investigated.

There are multiple factors related to self-perception of the need for orthodontic treatment, and this perception is often influenced by demand more than by need. Individual variables such as age, gender, socioeconomic status, and educational background could affect the demand for treatment [5].

In general, the motives for seeking orthodontic treatment include esthetic, functional, social, and psychological concerns [2]. However, esthetic dissatisfaction is a key motivational factor in seeking treatment [5-7].

There is general agreement among modern societies that pleasant physical esthetics benefit self-confidence and interpersonal interactions [8]. A meta-analysis conducted in the United States found a positive correlation between facial attractiveness and peer popularity, where well-aligned teeth are considered an important component of facial attractiveness [5].

Those who are dissatisfied with their dental alignment seem to experience a level of psychological distress, low self-esteem, and impaired quality of life—all of which affect their social behaviours and interactions [5].

Malocclusion affecting the anterior teeth, in particular, is significantly associated with esthetic self-satisfaction and the subjective need for orthodontic treatment [25,5,8,9]. The presence of midline diastema appears to have a strong association with esthetic satisfaction and the perception of treatment needs, whereas malocclusion of the posterior teeth has no impact at all [8].

Esthetic factors are of great importance in patients' decision-making: 50% of adult patients, 48% of children, and 54% of parents select esthetics as their main motivating factor in seeking treatment [6]. The eventual uptake of orthodontic treatment is substantially influenced by the patient's desire to improve facial appearance and boost self-confidence. Amaral et al. confirmed that patients who have received orthodontic treatment have greater self-esteem than those who have not [8].

For a long time, dental professionals depended on occlusal indices (normative criteria) to evaluate the severity of malocclusion and recommend orthodontic treatments, and the patients' opinions about their orthodontic conditions were not taken into account [8]. Several studies found both that professionally-assessed treatment need is higher than the self-perceived need estimated by patients and vice versa [4-8].

Since the range of dental variations that are considered normal or acceptable often varies among individuals and societies, self-perceived need for treatment should not be underestimated [4].

The initiative for treatment is mostly taken by patients themselves, and rarely by professionals [4]. For these reasons, combining esthetic satisfaction and the subjective need for treatment with normative criteria will benefit the prioritization of orthodontic treatment.

The Aesthetic Component of the Index of Orthodontic Treatment Need (AC-IOTN) has frequently been used to estimate actual or perceived treatment needs based on esthetics, and self-evaluated Aesthetic Component (AC) assessments have commonly been more favorable than professional assessments [10].

Meanwhile, self-perceived dental esthetics can be assessed by using an independent self-evaluation tool such as the Oral Aesthetic Subjective Impact Score (OASIS) questionnaire [11].

Information regarding the self-perception of dental appearance and the subjective need for orthodontic

treatment of populations in the Middle East is insufficient. Such information is necessary for an in-depth understanding of patients and their attitudes, and for the successful planning of public orthodontic treatment services.

The aims of this study were to explore the self-perceived dental esthetics of adult and to evaluate their subjective orthodontic treatment needs on esthetic grounds. We hypothesized that a patient's desire for orthodontic treatment does not always correlate with his or her self-perception of dental esthetics.

MATERIALS AND METHODS

This descriptive, cross-sectional study utilized a self-administered questionnaire distributed among a random sample of the general population in Makkah region, Saudi Arabia. The inclusion criteria for this study were that they be residents of Makkah region, male or female, aged between 18 and 60 years. Individuals with craniofacial deformities or psychiatric diseases were excluded.

Sample size

The sample size was calculated using Open Epi version 2. A minimum sample size of 385 participants was required for this study, based on Makkah region's population of 8,000,000.

An estimated orthodontic treatment need of 50% was used, with a precision level of 5% and a confidence interval of 95%. One thousand and fourteen invitations were sent out to compensate for the expected 40% dropout rate.

Data collection tools

The Arabic versions of AC-IOTN and OASIS were sent via Google Forms. Demographic questions were added, including age, gender, marital status, and city of residence in the region.

The survey was sent through social media platforms, and recipients were asked to share the survey with their networks. All participants signed an informed consent form before completing the questionnaire, and participation was voluntary and anonymous.

The AC-IOTN (Brook and Shaw, 1989) contains 10 monochrome photographs showing advanced degrees of esthetic problems and varying degrees of malocclusion.

The scoring range was 1 to 10, from the most attractive to the least attractive. Each participant was asked to indicate which photograph most closely resembles his or her real smile.

Values of 1–4 represent little or no need for orthodontic treatment, 5–7 represent a borderline need, and 8–10 infer a definite need for treatment.

The OASIS questionnaire is an independent self-evaluation tool that contains five questions on the perception of and satisfaction with one's own dental esthetics.

The participants had to answer these five questions. Each question was scored on a seven-point Likert scale, where 1 expresses the best perception of oral esthetics and 7 expresses the poorest perception.

The OASIS scores were dichotomized into 0=positive perception (OASIS<14) and 1=negative self-perception (OASIS>14).

Data analysis

Data were analyzed using Stata v.23 (Stata Corp LP, College Station, TX, USA). We used descriptive statistics and Chi-square tests.

One-way analysis of variance (ANOVA) was used to

compare OASIS mean scores according to the perceived orthodontic treatment need on the AC-IOTN. The relationship between OASIS and AC-IOTN was examined using Spearman's correlation test. The significance level was set at $P < 0.05$.

RESULTS

A total of 1014 participants completed the questionnaire. The results showed that 543 [53.6%] of the respondents were from Makkah city, 293 [28.9%] from Jeddah, 144 [14.2%] from Taif, and only 34 [3.4%] from other cities of the region. Table 1 represents the response percentage for other demographic variables.

Table 1: Participant demographic variables (n=1014).

	N	(%)
Gender		
Female	737	72.7
Male	277	27.3
Age		
18–29 years	405	39.3
30–49 years	445	43.9
50–60 years	164	16.2
Marital status		
Single	361	35.6
Married	610	60.2
Divorced	28	2.8
Widowed	15	1.5

The mean OASIS scores were 12.53 ± 7.34 , ranging from 5 to 35. The results revealed that more than half the participants [66.5%] had positive self-perceived dental esthetics.

According to the participants' self-evaluation of orthodontic treatment need using the AC-IOTN, 914 participants [90.1%] were in the "no need for

orthodontic treatment" category, 52 [5.1%] in the "borderline treatment need", and 48 (4.7%) in the "definite treatment need" category. The mean AC score was 2.27 ± 1.97 .

A significant gender difference was observed in the mean AC-IOTN scores (Table 2).

Table 2: Gender distribution of AC-IOTN scores.

Treatment Category	Female n (%)	Male n (%)	Total n (%)
No need for treatment	676 (73.9)	238 (26)	914 (90.1)
Borderline need for treatment	27 (51.9)	25 (48.1)	52 (5.1)
Definite need for treatment	33 (73.9)	15 (31.3)	48 (4.7)
Total	736 (72.6)	278 (27.4)	1014 (100)

$\chi^2: 12.38; p=0.002$

There was a gradient increase in mean OASIS scores across the AC-IOTN's different categories of malocclusion.

The mean OASIS scores increased because there was a greater need for treatment on the AC-IOTN (Table 3).

Table 3: Distribution of OASIS scores according to AC-IOTN categories.

AC categories	Mean	SD
No need for treatment	11.79	6.82
Borderline need for treatment	19.17	7.58
Definite need for treatment	19.37	9.31

A comparison of the mean OASIS scores using one-way ANOVA showed significant differences between the OASIS scores in the different treatment categories with an F value of 51 [$p=0.000$]. Post hoc tests revealed that the differences were significant between the no treatment need and borderline treatment need groups as well as the no treatment need and definite treatment need groups ($p<0.005$).

We used Spearman's correlation test to examine the relationship between OASIS and AC-IOTN scores. The results were statistically significant ($r=0.37$, $p=0.000$). The positive correlation indicated that as the OASIS score increased, suggesting a greater concern about dental esthetics, the individual's orthodontic treatment needs also increased on the AC-IOTN.

DISCUSSION

In this study, we aimed to investigate the relationship between the self-perception of dental esthetics and orthodontic treatment need by assessing the relationship between OASIS and AC-IOTN scores. The majority of adults participating in our study expressed positive self-perceived dental esthetics regardless of their age, gender, culture, or socioeconomic status, a result that aligned with some previous studies [10].

However, other studies have shown that men are happier than women with the appearance of their dentition and that, as age increases, self-satisfaction decreases, especially in women. Moreover, the self-satisfaction of Caucasians with their dental esthetics is much higher than that of Asians; the majority of Chinese, for example, are dissatisfied with their teeth [5].

With respect to treatment need, our results reveal that only 5.1% of the participants expressed a moderate/borderline need and 4.7% expressed a definite treatment need, while the majority [90.1%] thought they did not need orthodontic treatment. These findings are also corroborated by several studies conducted in the Middle east.

A study in Jeddah city reported that 60.6% demonstrated no or slight need for treatment, 23.3% demonstrated a borderline need, and only 16.1% were in extreme need.

A comparison of these estimates to professional assessment indicates that only 15.2% have little or no need for treatment, 13.2% have a moderate/borderline need, and 71.6% have a definite need for treatment.

Another study confirmed high treatment needs among middle eastern as assessed by professionals, where 9.7% did not need treatment, 13.3% had a borderline need, and 77% were assessed in severe need [1]. Overall, the

results suggest that the objective criteria identified more orthodontic needs than those perceived by individuals.

Our findings correspond with the results of previous studies in which the demand for orthodontic treatment is affected by gender [12]. This finding can be explained in part by the fact that most participants who answered the survey were female, and women are more likely to have concerns about their appearance and to look for cosmetic enhancement [5].

A study reported a gendered difference in apprehensions about dental appearance, with the percentage of males having such apprehensions being lower than that of females [13].

On the contrary, other authors have found that gender does not influence seeking orthodontic treatment and is not the main factor affecting the subjective need for such treatment [4,5,14]. Nonetheless, orthodontists should be aware of the gender difference when communicating with their patients.

The relationship between the self-perceived need for orthodontic treatment and satisfaction with dental esthetics has been evaluated in this study. Note that a high OASIS score indicates an individual's greater concern about dental esthetics and stronger perception of orthodontic treatment needs according to the AC-IOTN.

Other studies have reported similar results, whereby satisfied individuals selected grade 1 or 2 on the AC scale more frequently than did dissatisfied individuals, and females expressed dissatisfaction with their teeth and demonstrated subjective needs for treatment more often than did males [4,6,5,10]. Thus, the concern for dental esthetics is an essential factor influencing the psychosocial need for orthodontic treatment [15].

Additionally, ethnic minorities in various countries have shown less demand for treatment than have native inhabitants, with the former's prominent reason for seeking orthodontic treatment being a masticatory function, not esthetics [7,5]. This finding may be attributed to differences in educational and cultural backgrounds, as well as limited access to government treatment services [4,5].

This study has some limitations with regards to its sample population, which was taken from a single region. Therefore, different regions should be studied to strengthen the scientific findings. Furthermore, the majority of responses were received through Google forms, so some individuals may have been neglected due to a lack of access to the internet or similar reasons.

Moreover, the evaluation of self-perceived dental esthetics based on a self-reported questionnaire designed by dental professionals does not necessarily reflect the patient's opinions, as it restricts the patient to a pre-determined set of responses. Therefore, more robust methodological tools such as in-depth interviews may be necessary to determine patients' genuine perceptions.

CONCLUSION

- The present study suggests that the majority of adult individuals have positive self-perceived dental esthetics, and that the demand for orthodontic treatment is significantly influenced by gender.
- There was an association that indicates when the patient's esthetic self-satisfaction decreases, the subjective need for orthodontic treatment increases.
- It is important to consider the patient's perception of his or her own dental esthetics along with gender differences in orthodontic treatment planning.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Institutional Reviewing Board (IRB) of Umm Al-Qura University, Faculty of Dentistry [IRB number 186-20]. All participants signed a consent form before completing the questionnaire.

CONSENT FOR PUBLICATION

All authors approved this manuscript and publication.

AUTHORS CONTRIBUTION

AA, SA were responsible for the literature search, questionnaire construction, data collection, discussion, and drafting of the manuscript. MR was responsible for the data analysis, data interpretation, and writing the results. MB, MK, MR conceived the idea for the study, corrected the manuscript, participated in its design and coordination, provided the feedback on the revisions to the manuscript, and read and approved the final manuscript.

AVAILABILITY OF SUPPORTING DATA

Not applicable.

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