

Relationship between aesthetic concern and self-esteem in adolescents with severe malocclusion

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ABSTRACT

Objective: This study aimed to evaluate the relationship between aesthetic concern and self-esteem in adolescents with severe malocclusion.

Methods: A cross-sectional study developed with 543 adolescents from 11 to 13 years of age and severe malocclusion was selected. Dental aesthetic index (DAI) diagnosed the malocclusion and selected the groups with greater severity (DAI 3 and 4). Aesthetic concern was assessed using the oral aesthetic subjective impact scale (OASIS) and considered an outcome variable. The global negative self-evaluation (GSE) evaluated self-esteem. The variables were analysed using Poisson multiple regression and the model adjustment determined by the Akaike information criterion (AICC). The effect of each variable on OASIS was expressed as a prevalence ratio (PR) with 95% confidence intervals. The analyses were performed using the R program with a significance level of 5%.

Results: A significant association was observed between aesthetic concern scores and self-esteem ($p < .05$). Individuals with low self-esteem had OASIS scores 14% higher (PR: 1.14; 95% CI: 1.08–1.21). There was no significant association between OASIS and gender and age ($p > .05$).

Conclusions: Self-esteem modulates how the individual perceives malocclusion. Adolescents with severe and very malocclusion and low self-esteem have greater aesthetic concerns.

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Introduction

Individuals generally seek orthodontic treatment motivated by aesthetic concerns [1–4] and not necessarily to correct malocclusion [2,5]. In this context, dental aesthetics is related to patients' concerns about the psychosocial impact of their dental appearance [1–3], which justifies the search for treatment orthodontics is related to physical appearance and psychosocial factors. Correction of malocclusion positively impacts the individual's self-confidence and self-esteem [4,6–8].

Self-esteem is a relatively stable trait [9] with few differences from adolescence to adulthood [2,10]. Individuals with high self-esteem are more likely to be mentally balanced and safely face the different challenges of life [11,12]. Therefore, dental appearance has an impact on self-esteem. The literature shows a significant relationship between the need for orthodontic treatment, quality of life related to oral health and self-esteem [9,13]. However, there is still a lack of clear evidence that proves the modulating factor of self-esteem in this relationship.

Specifically, in oral health, it is suggested that severe malocclusion can strongly predict low self-esteem [6,8,13–15]. A previous study [16] pointed out that malocclusion affected the self-esteem level. In contrast, others [3,17] have reported no significant malocclusion effects on self-esteem. A possible

justification is that the studies do not use samples from individuals with established malocclusion. Therefore, the influence of psychosocial factors, including self-esteem, on oral health needs has not yet been fully elucidated.

The severity of malocclusion measures how much an occlusion deviates from normality and is related to the need for orthodontic treatment [18,19]. The severity of malocclusion and the need for treatment can be assessed using the dental aesthetic index (DAI) [20] or the Orthodontic Treatment Need Index (IOTN) [21]. In this sense, orthodontic indices play a fundamental role in classifying the severity of malocclusion and the need for orthodontic treatment. It is essential to highlight that the self-perception of the need for orthodontic treatment becomes more latent in adolescence, as physical and dentofacial appearance becomes very important at this stage. Additionally, social life becomes more intense during adolescence, and facial appearance influences self-acceptance.

Considering the importance of this stage of life and the lack of studies that evaluate self-esteem as a modular factor of aesthetic concern in adolescents with highly desirable treatment needs, this study aimed to assess the relationship between aesthetic concern and self-esteem in adolescents with severe and very severe malocclusion. The study hypothesis was that aesthetic concern is modulated by self-esteem.

Materials and methods

The ethical approval for this study was obtained from the Research Ethics Committee of Herminio Ometto Foundation-FHO (Brazil) (#18096619.9.0000.5385). The study was conducted following the ethical guidelines of the Helsinki Declaration and written and verbal informed consents were obtained from both the volunteers and their parents or legal guardians.

A cross-sectional population-based study was carried out involving adolescents in public schools in Araras (São Paulo, Brazil). The sample was calculated using the EpiInfo version 7.2 (Centers for Disease Control and Prevention, Atlanta, USA), considering a test power of 80%, a significance level of 5%, and a minimum detectable odds ratio of 1.5 [3]. Based on the information provided by the Municipal Department of Education, the distribution of 12-year-old adolescents in each administrative district was obtained. The sample was stratified according to the administrative district. In the first phase, schools were selected using a simple randomization procedure. In the second phase, adolescents were selected for the sample through a simple randomization procedure. Only adolescents with severe and very malocclusion were included in the study. The adolescents with current or previous orthodontic treatment and systemic diseases such as Down syndrome were excluded. To compensate for the possible non-participation of volunteers, the sample was increased by 20%, and the final size was 543 individuals.

Clinical evaluation of malocclusion was performed using the DAI [20]. The score is obtained by evaluating ten aesthetic and occlusal features (the number of visible missing teeth, incisor crowding, interdental incisor space, midline diastema width, maxillary and mandibular tooth irregularity, incisive projection, mandibular projection, anterior open bite and oral segment ratio) multiplied by a predetermined weight obtained by multiple linear regression [20]. In addition, a constant of 13 points is added to the total DAI score, which can range from a minimum of 13 to an indefinite upper limit. Four levels of malocclusion severity are established: (1) no malocclusion or mild change (score less than or equal to 25); (2) established malocclusion (score between 26 and 30); (3) severe malocclusion (score between 31 and 35); and (4) debilitating malocclusion (score greater than or equal to 36) [22]. For this study, only adolescents with DAI 3 and 4 were selected, with severe and very severe malocclusion.

A trained examiner performed the examinations under artificial light in schools. The calibration process was performed before the start of the study to obtain acceptable consistency for all clinical conditions. The training stage included a theoretical discussion and an experimental stage. During training and calibration, and inter-examiner and an intra-examiner agreement were estimated by Kappa analysis for the DAI components, with an acceptable limit value greater than 0.92 [23].

The oral aesthetic subjective impact scale (OASIS) [1] assessed adolescents' aesthetic concerns. The OASIS presents five questions related to the perception of oral aesthetics, with answers on a 7-point Likert scale. The score ranges between 5 and 35 points and includes the IOTN-AC score [21]. The IOTN-

AC assesses adolescents' psychosocial needs through a dental attractiveness scale illustrated by ten colour photographs that show a decreasing and continuing degree of attractiveness. Photo 1 represents the most attractive dental arrangement, and image ten is the least attractive. The evaluations identified the degree of aesthetic compromise of the images on the scale considered similar to the smile. Photos 1–4 were related to individuals with little or no need for orthodontic treatment (Grades 1 and 2); photos 5, 6 and 7 with a moderate need for orthodontic treatment (Grade 3) and photos 8, 9 and 10 with a severe need for orthodontic treatment (Grade 4 and 5). The IOTN-AC value is added to get the final OASIS summation. The median dichotomized the OASIS variable. Higher scores indicate greater aesthetic concern [1].

The global negative self-evaluation (GSE) determined adolescents' self-esteem [24]. The GSE scale has six questions with six answer options each, scored from 1 to 6: (1) is not applicable at all; (2) does not apply well; (3) applies somewhat well; (4) applies reasonably well; (5) applies well; and (6) applies precisely. The scores are added to obtain the average self-esteem of each participant. Adolescents were classified as either high (mean <2.69) or low self-esteem (mean >2.7) [24].

Statistical analyses

After the descriptive analysis of the data, Poisson multiple regression analysis evaluated the variables associated with aesthetic concern (OASIS), which was considered an outcome in the model. The effect of each variable on OASIS was expressed as a prevalence ratio (PR) with 95% confidence intervals. The model fit was verified by the Akaike information criterion (AICC). The analyses were performed using the R program (R Foundation for Statistical Computing, Vienna, Austria) with a significance level of 5%.

Results

The study included 543 adolescents with severe or very severe malocclusion (DAI 3 and 4), 266 females and 277 males. The sample's mean age was 12.7 years, the standard deviation of 1.4 years, a minimum of 11, and a maximum of 13 years. Figure 1 shows the score of OASIS (ranging from 6 to 21) and GSE (from 5 to 18).

Table 1 presents the results of the Poisson model's adjustment, with OASIS as the response variable. The GSE variable was significantly associated with OASIS ($p < .05$). OASIS scores were 14% higher in individuals with higher GSE scores (PR: 1.14; 95% CI: 1.08–1.21).

Discussion

This study evaluated the relationship between aesthetic concern and self-esteem in adolescents with malocclusion. A homogeneous sample of adolescents with severe and very severe malocclusions was selected because the need for orthodontic treatment has adverse emotional and psychosocial side effects on the individual's life, especially in

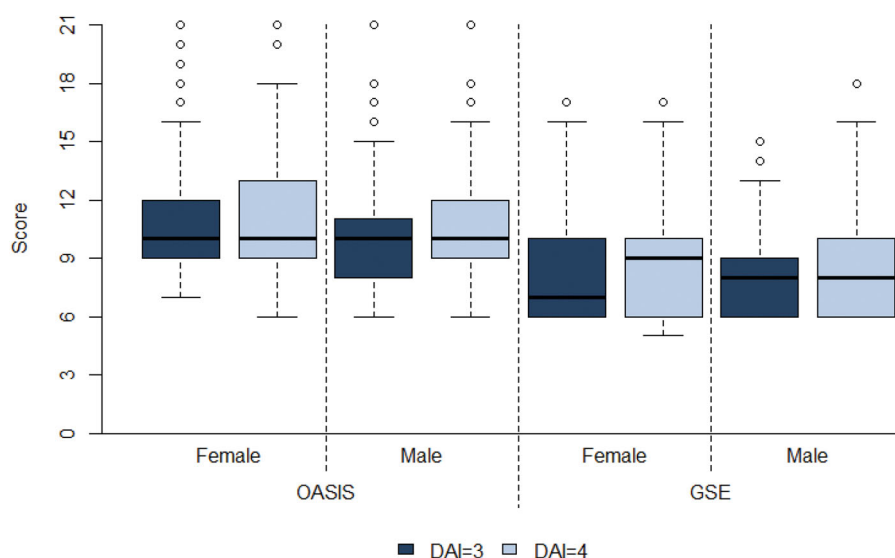


Figure 1. Boxplot of oral aesthetic subjective impact scale (OASIS) and global negative self-evaluation (GSE) according to sex and dental aesthetic index (DAI).

Table 1. Results of the Poisson model's adjustment, with oral aesthetic subjective impact scale (OASIS) as the outcome variable.

Parameters	Estimated	Standard error	Wald 95% confidence limits		Wald Chi-square	^c RP (IC95%)	<i>p</i> Value
Intercept	0.2502	0.0338	0.1839	0.3165	54.70		<.0001
Gender (Ref = M)	0.0352	0.0290	-0.0217	0.0920	1.47	1.04 (0.98–1.10)	.2253
Age (Ref= ^a major)	0.0362	0.0291	-0.0208	0.0932	1.55	1.04 (0.98–1.10)	.2128
GSE (Ref= ^b minor)	0.1351	0.0291	0.0781	0.1921	21.61	1.14 (1.08–1.21)	<.0001

^a> 12 years (median); ^b≤11 (median). ^cPrevalence ratio (95% confidence interval); AICC (empty model) = 1323.55; AICC (final model) = 1327.42. GSE: global negative self-evaluation.

adolescence, a crucial moment when the individual considers his appearance of great importance. According to the literature, no studies assess the association between aesthetic concern and self-esteem in a sample exclusively of individuals with severe and very malocclusion.

Our study used the OASIS to identify the aesthetic impact [1] and to determine the influence of the perception of the aesthetic impact of malocclusion on the desire for orthodontic treatment [1]. It is interesting to highlight that OASIS measures external influences by asking questions about the individual's perceptions of the dental appearance [25–27]. Thus, our results suggest that adolescents with higher OASIS scores are more concerned with aesthetics [1].

According to our findings, there was a significant association between aesthetic concern and self-esteem. OASIS scores were 14% higher in adolescents with low self-esteem. Thus, we can assume that low self-esteem has a significant psychological effect on the self-perception of malocclusion that the orthodontist cannot ignore. Considering that self-perceived oral health is a multidimensional concept with aesthetic and psychosocial aspects involved in the individual's well-being [3,28] is an important finding. There may be other factors that significantly influence an adolescent's self-esteem, but considering that we studied only individuals with severe malocclusion, the role of self-esteem is quite evident.

A similar association was observed between self-esteem and normative malocclusion without considering the individual's perception [6,9,15,28]. In this context, our findings reinforce that self-esteem modulates how malocclusion is perceived by the individual more than the assessment of self-perception of isolated malocclusion. The results indicate

that professionals should consider self-perception and self-esteem when planning orthodontic treatments [10,13,29].

We also aimed to evaluate the influence of gender and age groups on the aesthetic concern. Gender plays an important role in assessing aesthetic variables but, according to our findings, did not influence malocclusion's self-perception. The sample characteristic can justify the results. Some studies show that women are more sensitive to criticism [15] but feel more satisfied with their appearance when compared to men [6,29], but beauty is a subjective concept, which changes with culture and age [7,29–33]. Perhaps there were no differences between sex and age because the entire sample had the same occlusal conditions.

Our study had a cross-sectional design, which prevents the hypothesis of causality. However, the design allowed the identification of risk indicators to be included in further longitudinal assessments. Future longitudinal studies should be carried out to monitor the influence of these factors from childhood to adulthood. Finally, this is the first study, as far as we know, that investigates the relationship between aesthetic concern and self-esteem only in adolescents with severe and very malocclusion from an epidemiological point of view. This study indicates that clinical measures are insufficient to assess the impacts of malocclusions and the need for orthodontic treatment. Still, subjective measures such as self-perception and self-esteem need to be included.

Conclusion

Adolescents with severe and very severe malocclusions and low self-esteem report greater aesthetic concerns.

Self-esteem modulated how the adolescent perceived malocclusion and should be included in the broad assessment of the need for orthodontic treatment.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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