

Self-Perception of Malocclusion Among Nigerian Adolescents Using The Aesthetic Component of The IOTN

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Abstract: *Introduction:* The practice of orthodontics is very young in South-South Nigeria and there is need for base line data for informed planning. This study was carried out to investigate the self-perception of malocclusion among Nigerian school children aged 12 to 18 years in order to compare their perception with that of an orthodontist and also to determine the influence of gender and age on self-perception.

Materials and Methodology: A total of 612 randomly selected schoolchildren comprising 299 (48.9%) males and 313 (51.1%) females with a mean age of 15 ± 2.0 years were included in the study, the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) was the instrument used to measure the perception of malocclusion by both the school children and the orthodontist.

Results: Majority of the students (82.5%) rated their teeth towards the more attractive end of the scale (Grades 1-4). Although self - perception was not found to be related to gender, older children (16-18 years) had an increased level of perception of need. Males and older children were found to be more in need of treatment by the orthodontist.

Conclusions: A significant difference was found between the orthodontist's rating and the students' ratings of the attractiveness of their occlusions. Age and gender were not found to influence self- perceived orthodontic treatment need. Therefore, for effective orthodontic care, self- perception and not only professional assessment must be taken into consideration when formulating treatment plans to ensure patient satisfaction.

Keywords: Children, Malocclusion, Orthodontist's perception, Self-perception.

INTRODUCTION

Human self-esteem and self-confidence depend to a large degree on an acceptable physical appearance, well proportioned facial features, properly aligned teeth and a pleasing attractive smile [1]. However, the cosmetic impairment of a particular malocclusion is not readily measured because perceptions of malocclusions are highly subjective and perceived by individuals more qualitatively than quantitatively [2]. Most occlusal indices define aesthetics and ultimately orthodontic treatment need from a clinicians point of view only (normative need) without considering patients' social needs. But, perception of dental aesthetics by patients cannot be under estimated because they are the ones receiving treatment and need to gain satisfaction from improved aesthetics [3, 4]. In most people, the demand for orthodontic treatment is related to their desire to improve their appearance and their degree of attractiveness [3, 5-12].

The Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) (Fig. 1), which is a scale of ten photographs of the occlusion of anterior teeth is a standardized method of assessing dental aesthetics [2,13]. Data concerning self-perception of malocclusion based on this index, are available for many populations with figures ranging from 8% to 38% [3, 6,14-24]. However, no such data are available for Nigerian adolescents residing in Rivers State; a place where the practice of orthodontics is relatively new.

Therefore, this study aimed at investigating the self-perception of malocclusion among Nigerian school children aged 12 to 18 years using the Aesthetic Component of IOTN, and to compare their perception with that of an orthodontist as well as to determine the influence of gender and age on self-perception.

MATERIALS AND METHODOLOGY

A total of 612 students aged 12 to 18 years were randomly selected from six (6) public schools in six (6) different Local Government Areas (Port Harcourt, Ikwerre, Omuma, Tai, Okrika and Asari – Toru) located across Rivers State, Nigeria. Ethical approval was sought and obtained from the Ethics Committee of the University of Port Har-

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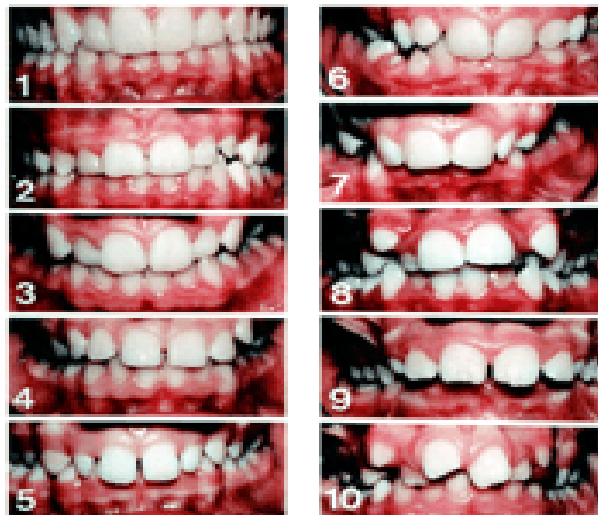


Fig (1). The AC of the IOTN (Brook and Shaw, 1989)

1-4 indicates no need.

5-7 indicates moderate need.

8-10 indicates definite need

court Teaching Hospital. Informed verbal consent was obtained from each of the participants. The data was collected in the school compound during school hours under standardised lighting conditions, with the student seated and the teeth in centric occlusion.

A full intraoral examination was carried out using a wooden spatula and each student's anterior teeth were assessed using the AC of the IOTN with grade 1 as the most attractive and grade 10 as the least attractive (Fig. 1). The grades of the AC which correspond to the numbers on the respective photographs, depicting the levels of treatment need are as follows:

AC Grades 1- 4: No need for orthodontic treatment.

AC Grade 5-7: Borderline / Moderate need for orthodontic treatment.

AC Grade 8-10: Definite need for orthodontic treatment.

The examination was carried out by one author (EAA) who had been previously calibrated in the use of the AC of the IOTN by a senior colleague (COO). None of the students had undergone any form of orthodontic treatment.

The students also assessed their own occlusions using the same scale (AC of the IOTN) and rated their occlusions according to the photograph which most closely matched the attractiveness of their own teeth.

INTRA EXAMINER RELIABILITY

Intra-examiner reliability was tested using Spearman Rank Correlation Coefficient. Sixty-two students were re-examined a month after their initial examination. A result of 0.94 was obtained, indicating excellent agreement.

STATISTICAL ANALYSES

The data was analyzed statistically using the SPSS statistical package (Statistical Package for the Social Sciences Version 17.0 for Windows 2009, SPSS, Inc., Chicago, Illinois). Descriptive statistics were used to describe the subjects' perception of their dental aesthetics as compared to the normative assessment. T-test and chi-square statistics were used to analyse the data with statistical significance set at $P < 0.05$. A matrix of Spearman Rank Order Correlation Coefficients was constructed for comparison of self-perceived dental aesthetics of the subjects with normative assessment. Logistic regression analysis was used to determine the influence of sex, age and self assessment of need by participants on professional assessment of need. Preliminary analyses were performed by using univariable models. Next, a multiple logistic regression analysis was then performed to remove the effects of age, sex and self-assessment of need which serve as the confounding factors to produce the adjusted odd's ratios.

RESULTS

Table 1 shows the gender and age distribution of the sample comprising 299 (48.9%) males and 313 (51.1%) females with a mean age of 15 ± 2.0 years. The mean age for the males was 14.9 ± 1.9 years, whilst that for females was 15.0 ± 2.0 .

Table 1. Distribution of the Participants According to Age and Gender

Age (years)	Frequency (%)		
	Male	Female	Total
12	42 (14.0)	51 (16.3)	93 (15.2)
13	44 (14.7)	36 (11.5)	80 (13.1)
14	50 (16.7)	43 (13.7)	93 (15.2)
15	42 (14.0)	33 (10.5)	75 (12.3)
16	44 (14.7)	55 (17.6)	99 (16.2)
17	43 (14.4)	65 (20.8)	108 (17.6)
18	34 (11.4)	30 (9.6)	64 (10.5)
Total	299 (48.9)	313 (51.1)	612 (100)
Mean	14.9 ± 1.9	15.0 ± 2.0	15.0 ± 2.0
Median	15	15	15

Student's t test (independent) = 0.82, $p = 0.42$

Table 2. Gender Distribution of Self-Assessment and Professional (Orthodontist) Assessment of Dental Aesthetics of the Studied Population According to the Aesthetic Component of the Index of Orthodontic Treatment Need

Variable	Frequency (%)		
	Male	Female	Total
Self assessment of need by participants			
1 – 4 No Need	244 (81.6)	261 (83.4)	505 (82.5)
5 – 7 Moderate need	32 (10.7)	35 (11.2)	67 (10.9)
8 – 10 Definite need	23 (7.7)	17 (5.4)	40 (6.5)
Total	299 (100)	313 (100)	612 (100)
Mean	3.3 ± 2.1	3.4 ± 2.0	3.3 ± 2.1
Median	3	3	3
Student's t statistic = 0.06, p = 0.95			
Professional assessment of need			
1 – 4 No need	175 (58.5)	222 (70.9)	397 (64.9)
5 – 7 Moderate need	56 (18.7)	51 (16.3)	107 (17.5)
8 – 10 Definite need	68 (22.7)	40 (12.8)	108 (17.6)
Total	299 (100)	313 (100)	612 (100)
Mean	4.6 ± 2.8	3.8 ± 2.5	4.2 ± 2.7
Median	4	3	4
Student's t statistic = 3.65, p = 0.0003			

Note: Need >4, No need ≤4

ORTHODONTIST PERCEPTION OF DENTAL AESTHETICS

Orthodontist rating revealed that 64.9% (397 students) had no need for treatment (grades 1–4), 17.5% (107 students) had a moderate need (grades 5–7) and 17.6% (108 students) had a definite aesthetic need (grades 8–10) for orthodontic treatment (Table 2).

ORTHODONTIST PERCEPTION COMPARED BY AGE AND GENDER

There were significant statistical differences between age, gender and the normative orthodontic need as assessed by the AC. Thirteen year-olds had the least orthodontic treatment need of 25% whilst 17 year-olds had the greatest need for treatment of 43.5%. Male students were statistically ($p=0.00$) found to have a greater need for treatment (41.5%) than female students (29.1%) (Table 3). A multivariate analysis revealed that as age increased by one unit, participants were 1.1 times more likely to have a professional need for treatment. Males were 1.76 times more likely to have professional need than females (Table 4).

SELF PERCEPTION OF DENTAL AESTHETICS

However, when the students were asked to rate their own dental attractiveness, 505 (82.5%) scored their teeth as aesthetically acceptable (grades 1–4), 67 (10.9%) as moderate (grades 5–7) and 40 (6.5%) rated their teeth from grades 8 to 10 (Table 2).

SELF PERCEPTION COMPARED BY AGE AND GENDER

As depicted in Table 5, majority of the students in each age group rated their teeth towards the more attractive end of the scale. Though there was an increase in the proportion of

older children (16 -18 years) rating their teeth in need of orthodontic treatment as compared with the younger school-children, the difference was not statistically significant ($p >0.05$). There were almost equal numbers of male 55(18.4%) and female 52(16.7%) students rating themselves to be in need of orthodontic treatment. Hence, self perception is not statistically different between genders.

ASSOCIATIONS BETWEEN ORTHODONTIST PERCEPTION AND SELF-PERCEPTION

Using Pearson Correlation Coefficient, a weak but significant correlation was found between the orthodontist rating and the students' self-perception ($r = 0.24$, $P= 0.00$). One hundred and eight students were rated by the orthodontist to have a definite aesthetic need for orthodontic treatment, out of which 22 also rated themselves likewise. Whilst 107 of the students were rated by the orthodontist as having a moderate need, only 16 were in agreement with this rating. Meanwhile, out of the 397 students assessed not to have a need, 351 of them rated themselves similarly (Table 6). The students who perceived themselves to have a need for treatment were 2.91 times more likely to have a professional need than those without a self-perceived need (Table 4).

DISCUSSION

The perception that potential patients have of the need for orthodontic treatment cannot be ignored because it is these patients that gain satisfaction from improved aesthetics and even function [3, 4, 10]. Thus, the knowledge of self-perception of malocclusion, assessment of orthodontic treatment need, (self-perceived as well as professional) and their comparisons for any given population are vital issues in modern orthodontic practice.

Table 3. Relationship Between Age, Gender and Professional (Orthodontist) Assessment of Need According to the Aesthetic Component of the Index of Orthodontic Treatment Need

Variable	Professional Assessment of Need (%)		χ^2	Odd ratio	95%CI		p
	Need (n=215)	No Need (n=397)			Lower	Upper	
Age (years)							
12	25 (26.9)	68 (73.1)	3.27	0.64	0.38	1.07	0.07
13	20 (25.0)	60 (75.0)	4.14	0.58	0.33	1.01	0.04*
14	34 (36.6)	59 (63.4)	0.10	1.08	0.66	1.74	0.75
15	32 (42.7)	43 (57.3)	2.13	1.44	0.86	2.42	0.14
16	35 (35.4)	64 (64.6)	0.00	1.10	0.63	1.62	0.96
17	47 (43.5)	61 (56.6)	4.05	1.54	0.99	2.40	0.04*
18	22 (34.4)	42 (65.6)	0.02	0.96	0.54	1.71	0.89
Gender							
Male	124 (41.5)	175 (58.5)	10.31	1.73	1.22	2.45	0.00*
Female	91 (29.1)	222 (70.9)	10.31	0.58	0.41	0.82	0.00*

*Significant

Note: The upper limit of the 95% confidence interval for age 13 years and the lower limit of the interval for age 17 years are approximately equal 1 (i.e. as if the odds ratios did not cross 1). That is why the corresponding p-values appeared to be significant.

Table 4. Multivariable Logistic Regression to Examine the Predictors of Professional Assessment of Need

Variable	Unadjusted Odds ratio	95% CI		p-Value	Adjusted Odds Ratio	95% CI		p-value
		Lower	Upper			Lower	Upper	
Age (year)	1.10*	1.02	1.21	0.02	1.10*	1.00	1.20	0.04
Sex (Male/Female)	1.73*	1.24	2.42	0.001	1.76*	1.25	2.49	0.001
Self need (Yes/No)	3.02*	1.97	4.36	<0.001	2.91*	1.89	4.50	<0.001

*Significant

Note: Unadjusted odds ratio did not remove the effects of confounders, whereas the adjusted odds ratio did.

Table 5. Associations Between Age, Gender and Self-Assessment of Orthodontic Treatment Need According to the Aesthetic Component of the Index of Orthodontic Treatment Need

Variable	Self Assessment of Need (%)		χ^2	Odd Ratio	95%CI		p
	Need (n=107)	No Need (n=505)			Lower	Upper	
Age (years)							
12	12 (12.9)	81 (87.1)	1.59	0.66	0.33	1.31	0.21
13	8 (10.0)	72 (90.0)	3.57	0.49	0.21	1.09	0.06
14	19 (20.4)	74 (79.6)	0.66	1.26	0.70	2.26	0.42
15	11 (14.7)	64 (85.3)	0.47	0.79	0.38	1.61	0.49
16	17 (17.2)	92 (82.8)	0.01	0.97	0.53	1.78	0.93
17	25 (23.1)	83 (76.9)	2.92	1.55	0.55	2.64	0.09
18	15 (23.4)	49 (76.6)	1.76	1.52	0.78	2.93	0.19
Gender							
Male	55 (18.4)	244 (81.6)	0.34	1.13	0.73	1.75	0.56
Female	52 (16.6)	261 (83.4)	0.34	0.88	0.57	1.37	0.56

Table 6. Associations Between Self-Assessment and Professional (Orthodontist) Assessment of Orthodontic Treatment Need According to the Aesthetic Component of the Index of Orthodontic Treatment Need

Self-Perceived Need	Professional Need (%)			
	Definite	Moderate	No Need	Total
Definite need	22 (55.0)	8 (20.0)	10 (25.0)	40
Moderate need	15 (22.4)	16 (23.9)	36 (53.7)	67
No need	71 (14.1)	83 (16.4)	351 (69.5)	505
Total	108	107	397	612

$\chi^2 = 50.95$, $df = 4$, $p = 0.00$

In Rivers State, Nigeria, where this study was carried out, the practice and teaching of orthodontics is relatively new. Thus, this cross-sectional study of self-perception of malocclusion in 612 randomly selected 12 – 18 year-old Nigerian secondary schoolchildren residing in Rivers State will provide valuable data for the adolescents residing in the State and allow for informed planning of orthodontic services.

Research has proven that most patients seek orthodontic treatment principally for aesthetic improvement [5, 25]. Teenagers, in particular have been found to attach great importance to an attractive dental appearance [3, 7, 8, 10, 16, 26] and have also been shown to have developed an oral perceptual awareness [27, 28]. Adolescence is the time when concern over appearance and facial attractiveness is developing, which translates to an increased awareness of body image [6]. Thus, the self perception of malocclusion is an important parameter in treatment planning for adolescent populations.

In this study, using the AC, 17.5% of the students perceived a need for orthodontic treatment. This result is higher than that of a similar study carried out in South-Western Nigeria by Kolawole *et al.* [22] with treatment need of 8% in 11 – 14 year-olds and that obtained by Ngom *et al.* [29] in 12 to 13 year-olds in Senegal (13.9%). These differences may be as a result of ethnic variation and the wider age range of the adolescents in this present study. Ethnicity does have an effect on self-perceived need due to differences in acceptable facial appearances and what is deemed as acceptable occlusion by different ethnic groups, it would be useful to validate the IOTN in different ethnic groups. This figure (17.5%) is also higher than the subjective need found in the U.K. (6%) [30], Jordan (9%) [19], Saudi Arabia (14.5%) [1], and Peru (12.8%) [31]. It is, however, comparable with 18.7% found in Saudi Arabia among 11-16 year-olds [20] and 5.8% definite need obtained in Malaysia [24] but much lower than 65% and 21.8% subjective need, respectively reported among visually and hearing impaired Saudi Arabian adolescents [20].

In the present study, there were no significant age or gender differences in the participants' self-perceived need for orthodontic treatment, and this is probably due to the subjects' general lack of awareness of the presence of malocclusion. This finding is in agreement with a previous Nigerian study [8], where almost equal numbers of male (79.8%) and female (83.6%) participants respectively perceived a need for treatment ($p > 0.05$) as well as other studies in U.K. [23, 30] Saudi Arabia [1] and U.S.A. [28] However, in other studies carried out in South-Western Nigeria [32] and North

Jordan [19], females and older school children tended to rate their dentition towards the more attractive end of the AC scale whereas in a Latvian study [33], female children felt more in need of treatment than male children.

There were significant gender and age differences in the orthodontist's assessment of treatment need, ($p < 0.05$). The increase of orthodontic treatment need with age seen in this study is probably due to the fact that untreated malocclusion worsens with age as the permanent occlusion becomes established [34]. When assessed professionally, male adolescents had a significantly greater need for treatment than females. This is consistent with the findings of Burden *et al.* [35], but at variance with the findings by Onyeaso [36] where more females were found to be in need of treatment than males. However, it must be noted that the finding by Onyeaso [36] was in a demand population and more females sought orthodontic care in that Nigerian study. It also disagrees with the findings from other studies conducted in Nigeria [8, 10, 32, 37], Tanzania [6], Senegal [29], France [38], Kuwait [18], Latvia [33] and Iran [39] where there were no gender or age differences. Although, our findings corroborate that of Burden *et al.* [35], no adequate explanation can be made for this gender difference.

In this study, a weak but positive correlation between self-perceived and normative orthodontic treatment need according to the AC of the IOTN was obtained. This is comparable to that obtained in a study carried out on schoolchildren by Kolawole *et al.* [22] in Western Nigeria ($r = 0.252$, $p = 0.00$) and Kerosuo *et al.* [18] ($r = 0.209$, $p = 0.05$) in Kuwait but lower than the figure obtained by Otuyemi *et al.* [32] ($r = 0.35$) in a previous study also carried out much earlier in South-Western Nigeria.

CONCLUSIONS

A significant difference was found between the orthodontist's rating and the students' ratings of the attractiveness of their occlusions. Age and gender were not found to influence self-perceived orthodontic treatment need. Therefore, for effective orthodontic care, self-perception and not only professional assessment must be taken into consideration when formulating treatment plans to ensure patient satisfaction.

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CONFLICTS OF INTEREST

None declared.

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