

# Psychosocial impact of dental aesthetics among sudanese high school students

Impacto psicossocial da estética dental entre estudantes de ensino médio sudaneses

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## ABSTRACT

**Objective:** Dental aesthetics – essential part of facial attractiveness, plays a vital role in the social as well as the psychological well being of individuals. This study aimed to assess the level of dental aesthetics by the self-rated Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) and the psychosocial impact of dental aesthetics using the ‘Psychosocial Impact of Dental Aesthetics Questionnaire’ (PIDAQ). **Material and methods:** A total of 192 high school students (13-16 years old), genders equally participated in the study and completed a modified version of the ‘Psychosocial Impact of Dental Aesthetics Questionnaire’ (PIDAQ). Dental aesthetics were assessed by the IOTN Aesthetic Component (self-rated IOTN-AC). The data was processed and analyzed using computer software program “SPSS” (Statistical Package for Social Sciences) version 17. T-test has been used, P-value of less than 0.05 was considered as significance. **Results:** All the variables of the PIDAQ showed a significant difference with the groups of the IOTN-AC (P-value < 0.05). Inter-gender significant difference was found among the students. **Conclusion:** Self-perceived dental aesthetics has a strong influence on the psychological as well as the social wellbeing of individuals. Therefore self-perception of dental aesthetics maybe an important key in deciding the orthodontic treatment need.

## KEYWORDS

Esthetics, Dental; psychosocial aspects; Malocclusion; Index of Orthodontic Treatment Need; Students.

## RESUMO

**Objetivo:** a estética dental é parte essencial da atratividade facial e desempenha um papel vital na vida social, bem como no bem-estar psicológico dos indivíduos. Este estudo teve como objetivo avaliar o nível de estética dental pela auto-avaliação do Componente Estético (CE) do Índice de Necessidade de Tratamento Ortodôntico (INTO) e o impacto psicossocial da estética dental utilizando o Questionário de Impacto Psicossocial da Estética Dental. **Material e Métodos:** um total de 192 estudantes do ensino médio (13-16 anos), distribuídos igualmente entre os sexos, participaram do estudo. Os estudantes responderam uma versão modificada do Questionário de Impacto Psicossocial da Estética Dental. A estética dental foi avaliada pelo Componente Estético do Índice de Necessidade de Tratamento Ortodôntico (auto-avaliação). Os dados foram processados e analisados utilizando software “SPSS” (Statistical Package for Social Sciences) versão 17. O Teste t foi utilizado, com nível de significância de 5%. **Resultados:** todas as variáveis do questionário de impacto psicossocial mostraram uma diferença significativa com os grupos da avaliação do Componente estético ( $p < 0,05$ ). Também foi encontrada uma diferença significativa entre os sexos. **Conclusão:** a auto-percepção da estética dental tem uma forte influência sobre a percepção psicológica, bem como com o bem-estar social dos indivíduos. Portanto a auto-percepção da estética dental talvez seja uma chave importante na decisão sobre a necessidade de tratamento ortodôntico.

## PALAVRAS-CHAVE

Estética dentária; Impacto psicossocial; Má oclusão; Índice de Necessidade de Tratamento Ortodôntico; Estudantes.

## INTRODUCTION

Humans are aware of facial and body aesthetics as there is plenty of evidence the appreciation of beauty or physical attractiveness in pre-historical archaeological artefact. Aesthetics is defined as the branch of philosophy dealing with beauty. In dentistry, a philosophy concerned especially with the appearance, function and symmetry of the face, oral cavity and the teeth [1].

Malocclusion is defined as an anomaly which causes disfigurement or which impedes function, and requires treatment, if the disfigurement or functional defect was likely to be an obstacle to the patient's physical or emotional wellbeing."Malocclusion might be associated with; malalignment of individual teeth in each arch, mal-relationship of the dental arches relative to the normal occlusion (in antero-posterior, vertical or transverse planes) [2].

For the most time, orthodontists have considered dental health, function as well as the health of the supporting structures as the main goals of orthodontic treatment, however social and psychological wellbeing are now being included in the outcomes for the treatment of malocclusion [3,4].

It is believed that patient's expectations for orthodontic treatment are the improvement of social contact and dental self-confidence, this is supported by studies that focused on certain aspects of oral health related quality of life as it was found that individuals with malocclusion suffered from its negative impacts in relation to the oral health related quality of life and its domains, the reported impacts were greatest in younger people and those with a university education [5]. Khan and Fida, stated that: "Being part of a social network, there is an inherent need for one to feel accepted" [6].

A various number of indices and investigations were developed to measure the

degree of malocclusion and dental aesthetics [7-10]. The Index of Orthodontic Treatment Need (IOTN) was developed by Brook and Shaw, it is a scoring system that ranks malocclusion based on occlusal traits for oral health and aesthetic impairment, Aesthetic Component (AC) of the IOTN has commonly been used to evaluate treatment need on aesthetic grounds assessed by dentists (operator-rated) or patients (self-rated) [7].

Ulrich Klages et al. developed a psychometric instrument for assessment of orthodontic specific aspects of quality of life, using a pool of 23 items dealing with the psychosocial impact of dental aesthetics and concluded that the proposed instrument, termed the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ), meets the criteria of factorial stability across samples and criterion-related validity and reliability, and might be a promising tool for further research and clinical application in orthodontics [9].

Worldwide several studies were carried out to identify the treatment needs of patients, their preferences and what is best for their outcomes of treatment. Other studies were conducted to discuss the prevalence and severity of malocclusion among different genders, age groups and even racial or ethnic groups [3, 11, 12].

Recently efforts were made to investigate and describe the problem of malocclusion in a more aesthetic point of view as well as its relationship with the self-confidence of individuals and also their social interactions in a community [13-14].

Several researches and studies were conducted to review the self-awareness of individuals on malocclusion to determine their treatment needs, rate their satisfaction with the treatment outcomes, however little remains said about the outcome of not treating malocclusions and poor dental aesthetics. Therefore this study aimed to assess the level of the dental aesthetics and its psychosocial impact among a sample of high school students in Khartoum, Sudan.

## MATERIAL AND METHOD

First the study was proved by the research committee at the faculty of Dentistry, University of Medical Sciences and Technology and the Ministry of Education as well as from the selected high schools. From November 2014 to March 2015 the fieldwork was carried out by the main researcher.

The study population consists of 192 high school students aged 13 to 16 years old in 14 schools selected randomly from all the boys and girls high schools in Khartoum area, Sudan.

Students who have met the inclusion criteria; Sudanese nationality, students with no current or previous history of orthodontic treatment, no facial deformities or syndromes, no clear lesion in the anterior segment due to caries, filled or traumatic injuries or hypoplasia or fluorosis and the ones who agree to participate in the study, were selected randomly and all students were first informed about the aims of the study and all the steps which were required to collect the data.

Once consent had been obtained from the selected students, firstly, they were assessed for the severity of the dental aesthetics using the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN-AC). [7] They were presented with 10 colour photographs of anterior teeth showing varying degrees of malocclusion and asked to indicate which grade of photograph (1 to 10) they thought most closely resembled their own dentition (Appendix 1).

There was no time limit given to the participants for the self-rating of AC. The IOTN-AC self-rating was then used in grouping the subjects according to the grades that they had chosen, namely; IOTN- AC grade 1, IOTN-AC grade 2, IOTN-AC grade 3 and IOTN-AC grade 4 and above.

For assessing the impacts of the IOTN-AC grades chosen by the respondents, a modified version of the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ) was used. [9] the questionnaire was self-administered by the subjects. A total of four variables including 'Dental Self-confidence', 'Social impact', 'Psychological impact' and 'Aesthetic concern' were assessed by a series of relevant statements (Appendix 2).

The data was processed and analyzed using computer software program "SPSS" (Statistical Package for Social Sciences) version 17. The results were then analyzed and correlated with those of the Aesthetic Component of the Index of Orthodontic Treatment Needs (IOTN-AC) and the final results obtained were presented in the form of tables and figures. T-test has been used, P-value of less than 0.05 was considered as significance.

## RESULTS

The study sample consisted of 192 students (13-16 years old) of whom 96 were selected from each gender.

In Figure 1, the majority of the students was found to have IOTN-AC grade 2 and very few reported to have IOTN-AC grade 4 and above.

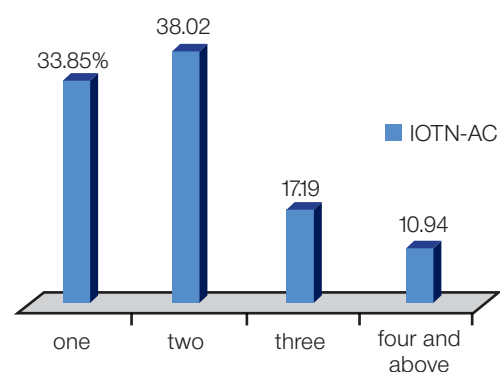


Figure 1 - Distribution of IOTN-AC scores among the students.

In Table 1 it clear that the 'Dental self-confidence' was found to be greatest in respondents with IOTN-AC grade 1 (mean value = 15.17) and least for IOTN-AC grades 4 and above (mean value = 3.33). 'Social impact' was found to be highest with IOTN-AC grades 4 and above (mean value = 14.90) and lowest with IOTN-AC grade 1 (mean value= 4.80). 'Psychological impact' was found to be greatest in greatest in respondents with IOTN-AC grades 4 and above (mean value = 15.33) and least for IOTN-AC grade 1 (mean value = 4.45). 'Aesthetic concern' was found to be highest with IOTN-AC grades 4 and above (mean value = 9.00) and lowest with IOTN-AC grade 1 (mean value = 1.48).

For the male high school students, 'Dental self-confidence' was found to be greatest in respondents with IOTN-AC grade 1 (mean value = 18.60) and least with IOTN-AC grades 4 and above (mean value = 1.89). 'Social Impact' was found to be greatest with IOTN-AC grades 4 and above (mean value = 9.63) and least with IOTN-AC grade 1 (mean value = 3.91). 'Psychological Impact' was found to be highest with IOTN-AC grades 4 and above (mean value

= 10.13) and lowest with IOTN-AC grades 1 (mean value = 3.26). 'Aesthetic Concern' was found to be greatest with IOTN-AC grades 4 and above (mean value = 7.75) and least with IOTN-AC grade 1 (mean value = 1.31).

For the female high school students, 'Dental Self-Confidence' was found to be highest with IOTN-AC grade 1 (mean value = 11.17) and lowest with IOTN-AC grades 4 and above (mean value = 4.23). 'Social Impact' was found to be greatest with IOTN-AC grades 4 and above (mean value = 18.15) and least for IOTN-AC grade 1 (mean value = 5.83). 'Psychological Impact' was found to be greatest with IOTN-AC grades 4 and above (mean value = 18.54) and least with IOTN-AC grade 1 (mean value=5.83). 'Aesthetic Concern' was found to be greatest with IOTN-AC grades 4 and above (mean value = 9.77) and least with IOTN-AC grade 1 (mean value = 1.67) Table 3.

An inter-gender significant difference among the high school students in relation to the 'Psychosocial Impact of Dental Aesthetics Questionnaire' scores (P-value < 0.05) was found as shown in table 4.

**Table 1 -** The Psychosocial Impact of Dental Aesthetics Questionnaire scores in comparison to the IOTN-AC groups for the students

IOTN-AC	PIDAQ variables	N	Minimum	Maximum	Mean	Std.Deviation	P - value
One	Dental Self- Confidence	65	7	24	15.1692	4.79443	0.00
	Social Impact	65	0	10	4.8	3.00624	0.00
	Psychological Impact	65	0	10	4.4462	2.64002	0.00
	Aesthetic Concern	65	0	5	14.769	1.30033	0.00
Two	Dental Self- Confidence	73	0	18	9.1233	3.38274	0.00
	Social Impact	73	0	12	5.589	3.34097	0.00
	Psychological Impact	73	0	10	5	2.23607	0.00
	Aesthetic Concern	73	0	8	1.9863	1.99648	0.00
Three	Dental Self- Confidence	33	0	12	5	2.66927	0.00
	Social Impact	33	0	15	8.3333	3.47011	0.00
	Psychological Impact	33	4	14	8.2121	2.40777	0.00
	Aesthetic Concern	33	4	11	6.6667	1.88193	0.00
Four and above	Dental Self- Confidence	21	0	10	3.3333	3.07137	0.00
	Social Impact	21	8	20	14.9048	4.70005	0.00
	Psychological Impact	21	8	22	15.3333	4.75745	0.00
	Aesthetic Concern	21	6	12	9	1.84391	0.00

**Table 2** - The 'Psychosocial Impact of Dental Aesthetics Questionnaire' scores in comparison to the IOTN grades for the males

IOTN-AC	PIDAQ variables	N	Minimum	Maximum	Mean	Std.Deviation	P - value
One	Dental Self- Confidence	35	12.00	24.00	18.6000	2.79916	.000
	Social Impact	35	.00	8.00	3.9143	1.88448	
	Psychological Impact	35	.00	6.00	3.2571	1.52128	
	Aesthetic Concern	35	.00	5.00	1.3143	1.20712	
Two	Dental Self- Confidence	38	.00	18.00	10.9474	3.44805	.000
	Social Impact	38	.00	9.00	4.4211	2.24970	
	Psychological Impact	38	1.00	10.00	3.8421	1.76339	
	Aesthetic Concern	38	.00	4.00	1.8158	.92577	
Three	Dental Self- Confidence	15	2.00	8.00	4.5333	1.68466	.000
	Social Impact	15	4.00	15.00	7.4000	3.06594	
	Psychological Impact	15	4.00	11.00	7.4667	2.47463	
	Aesthetic Concern	15	4.00	8.00	5.3333	1.17514	
four and above	Dental Self- Confidence	8	.00	3.00	1.8750	.99103	.000
	Social Impact	8	8.00	13.00	9.6250	1.59799	
	Psychological Impact	8	8.00	16.00	10.1250	2.79987	
	Aesthetic Concern	8	6.00	9.00	7.7500	1.03510	

**Table 3** - The 'Psychosocial Impact of Dental Aesthetics Questionnaire' score in comparison to the IOTN grades for the females

IOTN-AC	PIDAQ variables	N	Minimum	Maximum	Mean	Std. deviation	P-value
One	Dental Self- Confidence	30	7.00	19.00	11.1667	3.28091	.000
	Social Impact	30	.00	10.00	5.8333	3.70539	
	Psychological Impact	30	.00	10.00	5.8333	2.99521	
	Aesthetic Concern	30	.00	5.00	1.6667	1.39786	
Two	Dental Self- Confidence	35	4.00	11.00	7.1429	1.88091	.000
	Social Impact	35	.00	12.00	6.8571	3.86647	
	Psychological Impact	35	.00	10.00	6.2571	2.01965	
	Aesthetic Concern	35	.00	8.00	2.1714	2.72770	
Three	Dental Self- Confidence	18	.00	12.00	5.3889	3.27448	.000
	Social Impact	18	.00	14.00	9.1111	3.67646	
	Psychological Impact	18	5.00	14.00	8.8333	2.22948	
	Aesthetic Concern	18	5.00	11.00	7.7778	1.62899	
four and above	Dental Self- Confidence	13	.00	10.00	4.2308	3.58594	.000
	Social Impact	13	12.00	20.00	18.1538	2.30384	
	Psychological Impact	13	15.00	22.00	18.5385	1.98391	
	Aesthetic Concern	13	7.00	12.00	9.7692	1.83275	

**Table 4** - The 'Psychosocial Impact of Dental Aesthetics Questionnaire' scores among gender

PIDAQ variables	Gender	N	Mean	Std.Deviation	Std.Error Mean	P-value
Dental Self-Confidence	Male	96	11.9792	6.46933	.66027	.000
	Female	96	7.6771	3.82924	.39082	
Social Impact	Male	96	5.1354	2.84187	.29005	.000
	Female	96	8.4896	5.35674	.54672	
Psychological Impact	Male	96	4.7188	2.87531	.29346	.001
	Female	96	8.2708	4.84166	.49415	
Aesthetic Concern	Male	96	2.6771	2.32377	.23717	.000
	Female	96	4.0938	3.78940	.38675	

## DISCUSSION

This is a cross section study carried out among high school Sudanese students to assess the level of dental aesthetics by the self-rated Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) and the psychosocial impact of dental aesthetics using the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ). The results revealed that Self-perceived dental aesthetics has a strong influence on the psychological as well as the social wellbeing of individuals

The majority of the Sudanese students rated themselves as IOTN-AC grade 2 which corresponds to the values obtained by Munizeh Khan Et al. in a study among 120 Pakistani adults of more than 18 years old in which the majority of respondents rated themselves as IOTN-AC grade 2 [6]. However it is in contrast with Klages et al. findings which reported that the majority of respondents had IOTN-AC grade 1. [9] IOTN-AC grade 4 was the least to be found among the Sudanese students which was in line with the results recorded by Bellot-Arcísina study among 627 Spanish adolescents (age group: 12-15) and with another study among 194 Dutch university students (age group: 18- 30 years ) by Klages et al. [13,17]

When the two genders were compared, the majority of the students reported to have IOTN-AC grade 2 and the least number reported to have IOTN-AC grade 4 and above. Although the IOTN-AC findings were almost similar for the two genders, it is in the way each was affected

that the significant difference was noted. 'Dental Self-Confidence' entity of the questionnaire aims to assess the level of acceptance of individuals' dental appearance and it was observed that in the present study the level of 'Dental Self-Confidence' follows an inversely proportional relationship with the grades of the IOTN-AC where in higher IOTN-AC grades the level of 'Dental Self-Confidence' was noted to decrease. Similar findings were observed by Khan and Fida, Klages et al. and Klages et al. [6,9,13]

The study showed the strong association between the higher grades of the 'Aesthetic Component' of the 'Index of Orthodontic Treatment Need' (indicating poor dental aesthetics) and the increase in the scores of the 'Social Impact', 'psychological Impact', and 'Aesthetic Concern' entities of the 'Psychosocial Impact of Dental Aesthetics Questionnaire' which concluded the strong influence of disturbed dental aesthetics on the psychosocial wellbeing of individuals which corresponds to the findings obtained by de Paula et al., among 301 Brazilian adolescents (age group: 13-20) [14].

A significant difference was found between male and female students in terms of the impact of dental aesthetics on the psychosocial wellbeing and similar observations were found by Bellot-Arcís et al. among 627 Spanish adolescents (age group: 12-15) and on the other hand Yaghma Masood et al. has concluded that no significant difference was found between males and females regarding the impact of malocclusion on the quality of life among 323 Malaysian young adults (age group: 15-25) [5,17].

It was also reported that females were affected more negatively by disturbed aesthetics where as positive impact was found to be higher in the male students which could be explained by the long known concept of females having to show beauty and thus are more negatively affected and on the other hand males having to show masculinity therefore are not affected as negatively as females are and so have higher dental self-confidence.

The variation in the results among different study populations may be partially attributed to differences in the sample size, man power, ethnic background as well as the age of the study samples.

Remains strong the relationship between malocclusion and the psychosocial wellbeing of individuals regardless of their age as clarified by the present study, for this reason it is wise and advisable to use self-perception of dental aesthetics in the determination of treatment need along with the dentists' perception of the aesthetic problem for this reason the IOTN-AC is a reliable tool for assessing the severity of malocclusion from the eyes of the patients rather than the dentists' alone.

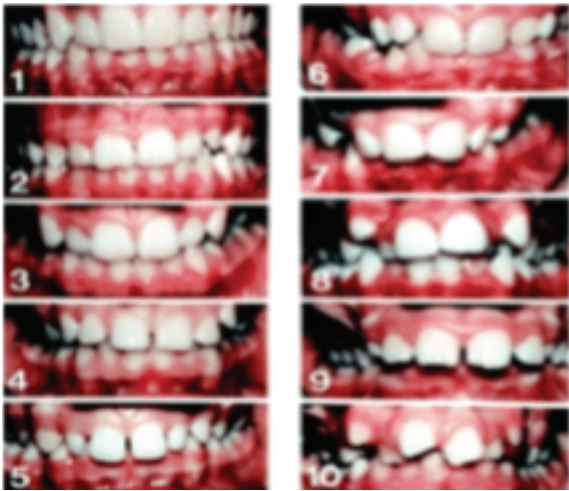
One can conclude that individuals with disturbed dental aesthetics may have a reduced or less than normal performance in the social domain and therefore the education domain which affect ones latter life. Further research with additional tools for assessment of self-perceived dental aesthetics must be set up to provide more knowledge about the psychosocial impacts of dental aesthetics among different populations with larger sample sizes and age groups.

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**APPENDIX 1****The Aesthetic Component:**

The observer is meant to score the severity of the malocclusion in comparison with the image scale below. Trying to match malocclusion to the images is incorrect, these are for guidance only.

**APPENDIX 2****Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) entries:****Dental Self-Confidence**

- I am proud of my teeth.
- I like to show my teeth when I smile.
- I am pleased when I see my teeth in the mirror.
- My teeth are attractive to others.
- I am satisfied with the appearance of my teeth.
- I find my tooth position to be very nice.

**Social Impact**

- I hold myself back when I smile so my teeth don't show so much.
- If I don't know people well I am sometimes concerned what they might think about my teeth.
- I'm afraid other people could make offensive remarks about my teeth.
- I am somewhat inhibited in social contacts because of my teeth.
- I sometimes catch myself holding my hand in front of my mouth to hide my teeth.
- Sometimes I think people are staring at my teeth.
- Remarks about my teeth irritate me even when they are meant jokingly.
- I sometimes worry about what members of the opposite sex think about my teeth.

**Psychological Impact**

- I envy the nice teeth of other people.
- I am somewhat distressed when I see other people's teeth.
- Sometimes I am somewhat unhappy about the appearance of my teeth.
- I think most people I know have nicer teeth than I do.
- I feel bad when I think about what my teeth look like.
- I wish my teeth looked better.

**Aesthetic Concern**

- I don't like to see my teeth in the mirror.
- I don't like to see my teeth in photographs.

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