

Relationship of Dental Aesthetic Index to the Self-perception about desire for orthodontic correction in Bagalkot District

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Introduction

Aesthetics is one of the important reasons why people seek dental treatment. Increased concern over dental appearance has been observed during childhood and adolescence to early adulthood.¹ The decision to start orthodontic treatment is primarily influenced by such concerns and psychological well-being.² Malocclusions are third in the ranking of priorities among the problems of dental public health worldwide, surpassed only by dental cavity and periodontal diseases.³ However with the reduction of caries in children and adolescent in recent decades, this condition has received more attention.³ Malocclusion has proved to be a difficult entity to define, since individual perceptions of what constitutes a malocclusion problem differs widely.⁴ Orthodontic treatment is often carried out for aesthetic rather than functional considerations, since it is assumed that failure to meet social norms for dental aesthetics will have negative psychosocial affects and these affects may well exceed the biological problems.⁵ Thus, Orthodontic treatment is

A B S T R A C T

Purpose: To determine the relationship of the dental aesthetic index with desire for correction by orthodontic therapy in Bagalkot district.

Methods: 100 school children of age group 13-16yrs from Bagalkot district were selected and divided into 50 boys and 50 girls. The subjects were interviewed using- Questionnaire having questions concerning smile, dental appearance and desire for orthodontic treatment. A cross-cultural index, "Dental Aesthetic Index (DAI)" was also assessed. The relationship between Dental aesthetic index and the self-assessment of relative appearance of teeth was determined.

Results: Statistically significant correlations were observed between subjective assessments of dental appearance and DAI ($p = 0.0007$) and need for orthodontic treatment and DAI ($p = 0.0006$). The strongest correlations were found between DAI and comparative evaluations of dental appearance ($p < 0.005$).

Conclusion: This study has shown significant correlations between DAI and subjective perceptions of dental appearance.

Keywords: Dental aesthetic index, Dental appearance, Desire for orthodontic correction

primarily affected by patient's demand and needs.⁶ Dentists predict that psychosocial component of malocclusion will continue to be one of the strongest motivator for orthodontic treatment.⁷ This has also been accepted that parents or patients perception does not match with professional evaluation in terms of orthodontic treatment need.⁸ Due to an increase in global demands for orthodontic care; there is a need to develop methods to assess and grade malocclusion in order to prioritize treatment.⁹ Various indices are available to determine the extent of malocclusion like IOTN¹⁰, SALZMANS handicapping malocclusion assessment record (HAMAR)¹¹ and Dental Aesthetic Index (DAI)⁷. This study is an attempt to assess whether or not DAI provides reliable information regarding the subjects psychosocial desire for orthodontic treatment.

METHODS

100 school children of age group 13-16 years were selected for the study and divided into 50 boys and 50 girls from Bagalkot District. Exclusion criteria: 1.Children with mental or physical impairment 2.Previous history of or currently undergoing orthodontic treatment Prior to examination, Informed Consent from school authorities and participants were obtained. The subjects were interviewed using questionnaire having questions concerning smile, dental appearance and desire for orthodontic treatment in both English and Kannada.¹² A cross structural index "Dental

Aesthetic Index (DAI)" was assessed.(Table 1)

DAI component	Rounded weight
1. Number of missing visible teeth (incisors, canines, and premolars in maxillary and mandibular arch)	6
2. Crowding in incisal segment (0=no segments crowded, 1=1 segment crowded, 2=2 segments crowded)	1
3. Spacing in incisal segment (0=no spacing, 1=1 segment spaced, 2=2 segments spaced)	1
4. Midline diastema, in millimetres	3
5. Largest anterior maxillary irregularity, in millimetres	1
6. Largest anterior mandibular irregularity, in millimetres	1
7. Anterior maxillary overjet, in millimetres	2
8. Anterior mandibular overjet, in millimetres	4
9. Vertical anterior openbite, in millimetres	4
10. Anteroposterior molar relationship, largest deviation from normal either left or right (0=normal, 1=½ cusp mesial or distal, 2=1 full cusp or more mesial or distal)	3
11. Constant	13
Total	DAI score

Table 1. Assessment of DAI

Measured individual components was added followed by the addition of constant number 13 to get final DAI score.⁶ From the final DAI score Treatment need is divided into following categories¹³:

Malocclusion severity	Treatment Need	DAI score
Without abnormality or mild malocclusion	Little or no need	≤ 25
Defined Malocclusion	Elective	26 to 30
Severely Malocclusion	Highly desirable	31 to 35
Very severe or disabling malocclusion	Indispensable	≥ 35

The relationship between Dental Aesthetic Index and the questions concerning the self-assessment were determined.

STATISTICAL ANALYSIS

The SPSS computer based software was used for descriptive data analysis. Comparison of boys and girls with DAI scores was done using t-test. Questionnaire results and DAI scores were compared by Chi-square test.

RESULTS

The present study was carried out on 100 subjects (50 boys and 50 girls) of Bagalkot district. Among the subjects examined 8% definitely needed orthodontic treatment according to the DAI. In response to the questions put forth in questionnaire (Table 2), 66% of subjects reported to be satisfied with the appearance of their smile. Almost the similar number of subject's ie.65% stated that they liked the way their teeth looked. In comparison of the teeth to other features of their face 80% felt their teeth to be better than average. 76% were convinced of having better than average or having the nicest dentitions than their classmates and friends. In order to improve their smile, whether they would undergo orthodontic treatment by wearing, 37% were willing to wear braces. There was no statistical difference between answers of boys and girls except one where girls considered themselves to be less good looking ($p<0.0002$). Comparison of Dental aesthetic Index with questionnaire were highly significant $p<0.05$. Statistical results of DAI in comparison to individual questions (Q-2,4,6,8,10) obtained were as follows (Table 3)- with smile ($p<0.00001$), way there teeth looked ($p<0.0007$), teeth to other features of

their face ($p<0.00001$), compared to their classmates and friends ($p<0.0002$), want to wear braces for orthodontic correction ($p<0.0006$). Correlation found between DAI and the questions concerning the self-perception of individual were found highly significant.

Table 2 Statistical Analysis of Questionnaire

Question	Boys	%	Girls	%	Total	Chi-square	p-value
Do you have a pleasant smile?							
Yes	31	62	35	70	66	0.713	0.3985
No	19	38	15	30	34		
How much do you like the appearance of your smile?							
Very much	17	34	21	42	39	1.1685	0.7606
Quite a bit	20	40	19	38	38		
Not much	10	20	8	16	18		
Not at all	3	6	2	4	5		
Do you like the way your teeth look?							
Yes	34	68	31	62	65	0.3956	0.5294
No	16	32	19	38	35		
How much do you like the way your teeth look?							
Very much	17	34	22	44	40	1.1619	0.7622
Quite a bit	19	38	18	36	36		
Not much	12	24	9	18	21		
Not at all	2	4	1	2	3		
Are your front teeth straight?							
Yes	32	64	27	54	59	1.0335	0.3094
No	18	36	23	46	41		
How would you consider your teeth as compared to your entire face?							
One of the nicest feature of your face	12	24	16	32	28	1.1458	0.766
Better than average feature of your face	28	56	24	48	52		
Below average features of your face	7	14	8	16	15		
One of the poorest features of your face	3	6	2	4	5		
Are your teeth good looking							
Yes	38	76	37	74	88	13.6364	0.0002*
No	12	24	13	26	12		
Compared to your classmates and friends how do you think your teeth look?							
Among the nicest	11	22	16	32	27	2.6878	0.4423
Better than average	28	56	21	42	49		
Below average	9	18	12	24	21		
Among the worst	2	4	1	2	3		
Do your teeth need straightening							
Yes	31	62	26	52	57	1.02	0.3125
No	19	38	24	48	43		
If it were possible would you want to wear braces to straighten your teeth?							
Definitely no	12	24	15	30	27	0.4746	0.9244
Probably no	8	16	7	14	15		
Probably yes	11	22	10	20	21		
Definitely yes	19	38	18	36	37		
Total	50	100	50	100	100		

DISCUSSION

The desire for treatment by individuals who are dissatisfied with their appearance underlies most orthodontic treatments. For this reason, the orthodontist objective is to improve the function and appearance and to ensure patient satisfaction at the end of treatment. This study was conducted to find out the agreement

between DAI score and self-perception of appearance of teeth and smile. The DAI was developed by Cons, Jenny and Kohout in

Questions	No treatment need	Elective treatment	Treatment desire	Treatment mandatory	Total	Chi-square	p-value
How much do you like the appearance of your smile?							
Very much	26	10	3	0	39	42.3	0.00001*
Quite a bit	19	7	8	4	38		
Not much	0	11	5	2	18		
Not at all	0	0	3	2	5		
How much do you like the way your teeth look?							
Very much	26	8	5	1	40	28.72	0.0007*
Quite a bit	15	14	6	1	36		
Not much	4	6	6	5	21		
Not at all	0	0	2	1	3		
How would you consider your teeth as compared to your entire face?							
One of the nicest feature of your face	13	12	3	0	28	40.23	0.00001*
Better than average feature of your face	29	13	9	1	52		
Below average features of your face	2	3	4	6	15		
one of the poorest features of your face	1	0	3	1	5		
Compared to your classmates and friends how do you think your teeth look?							
Among the nicest	15	5	7	0	27	32.75	0.0002*
Better than average	27	15	4	3	49		
Below average	3	8	7	3	21		
Among the worst	0	0	1	2	3		
If it were possible would you want to wear braces to straighten your teeth?							
Definitely no	21	3	3	0	27	29.1	0.0006*
Probably no	6	7	1	1	15		
Probably yes	5	11	3	2	21		
Definitely yes	13	7	12	5	37		
Total	45	28	19	8	100		

*p<0.05

Table 3 Comparison of levels of DAI with questionnaire

1987.⁷ The DAI attempts to incorporate patients perceptions into the index. It is a relatively simple index, which can be obtained intraorally, without the use of radiographs in few minutes. It has been accepted by the WHO as a cross-cultural index.⁸ It identifies occlusal traits and mathematically derives a single score. The DAI appears to be easy to use, although the lack of assessment of traits such as buccal cross bite, open bite, centreline discrepancy and deep overbite is a limitation of this index.¹³ In addition, DAI measurements are carried out using a millimetre gauge, and small errors in accuracy can have an exaggerated effect due to the index weightings.¹⁴ A malocclusion index has to distinguish subjects with the highest scores and priority for treatment, from those with

lower scores and a less urgent need. Thus, cut off point needs to be established which will serve as lowest score at which the orthodontic treatment will be offered. The recommended treatment cut off point for Dental Aesthetic Index is 31.¹³ The reliability and validity of DAI has been well documented in various studies.^{5,13,15} Adolescence is the age when increase in awareness and facial aesthetics takes priority and adolescent children have a tendency to compare themselves with peers, models etc. The age group of subjects in the present study was 13 to 16 years.¹² Hence, the questionnaire used in this study was aimed at children in the adolescent age group to assess their awareness of dental appearance and to evaluate their relationship with an objective measure of aesthetics (DAI). In present study, dissatisfaction with smile was about 34 percent which is inbetween the values obtained from prevalence studies conducted in Turkey (42.7 per cent; Akarslan et al., 2009)¹⁶, Nigeria (57.4 per cent; Onyeaso and Sanu, 2005)¹⁷ and Tanzania (23.3 per cent; Mtaya et al., 2008)¹⁸. Therefore, the self-perception of smile should be analysed using a multidimensional approach that takes into consideration the different individual understandings about health in face of the existing cultural and psychosocial contexts. The present study revealed that the association between DAI and self-satisfaction with smile was significant. This is in agreement to the result of Cons. et al.⁷ There was a significant correlation between DAI and self-satisfaction with dental appearance, which is in agreement with the study by Nayak et al.¹², Onyeaso et al.⁸, but is in

contrast to the study by Yeh et al.¹⁴, which showed no significant relationship. Hamdan AM (2004)¹⁹ reported that twice as many females presented for orthodontic consultation than males. In present study, girls reported more dissatisfied the way their teeth looked as compared to boys which shows higher concern of aesthetics among girls. Results are in accordance with study by Birkeland et al., (1996)²⁰ where about 75% of subjects who seek orthodontic treatment do so for aesthetic reasons and girls are more likely to recognize dental irregularities and place more importance on this than boys. Similarly, (Hamamci et al., 2009²¹, Jung, 2010²²) concluded that female adolescents had the greatest dissatisfaction regarding smile. Equal number of boys and girls stated that they would be willing to wear braces if it would improve their dental appearance. Desire for treatment has been noted to be more frequent than dissatisfaction with appearance. In the present study, the need for orthodontic treatment as assessed by DAI was 26% whereas the demand was 37%. Similarly, Alhajja (2004)²³ found 49% demand for orthodontic treatment among school children in North Jordan. In another study²⁴, negative self-perception of dental appearance in adolescence increased considerably with the severity of occlusal abnormalities. Their findings reinforced the importance of taking into consideration subjective measures when the purpose is to identify occlusal problems that negatively affect the life of adolescents. High number of patients having a desire for the treatment shows the trust of the patient

toward dentist.^{20,25} Such an attitude to the dental service makes it possible that the child and the parent will follow advice from dentist.²⁰ DAI is based on socially defined aesthetic standards which bridge the gap between the aesthetics and clinical diagnosis. Prevalence can be assessed in terms of the number of individual who are believed to require treatment. In the present study, significant correlations were observed between subjective assessments of dental appearance and objective assessment of dental aesthetics using DAI. Therefore, standard criteria should be used in conjunction with either DAI or other indices that better express orthodontic treatment needs. Subjective self-perception criteria are an epidemiological tool for oral health to be applied in population surveys and, above all, to contribute to the allocation of resources and definition of criteria in the orthodontic services offered by public health care systems.

CONCLUSIONS

1. There is a significant correlation between DAI and self-perception of desire for orthodontic correction.
2. Statistically significant association was found between the subjective parameters and the DAI scores.
3. DAI can be used as a very significant tool to assess and motivate people to undergo orthodontic treatment.

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