Original Article

Assessment of the Correlationship of Self-perception of Dental Appearance, Smile, and Willingness to Undergo Treatment among School Children with Dental Esthetic Index at Thiruchengode

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Abstract

Aim: The aim of the survey was to assess the correlation of DAI with self-perception of smile, self-assessment of dental appearance and desire to uptake treatment. **Methods:** 400 school children aged 12-15 years from Thiruchengode were clinically examined using DAI. Subjective assessment of their smile and dental appearance and desire of treatment uptake were elicited by 10-point questionnaire. Correlation of clinical assessment and variables of subjective assessment were analyzed using Chi square test and Kappa statistics. **Results:** A statistically significant correlation was present between DAI and self-perception of dental appearance and also between DAI and their dental appearance when compared with the peer group. DAI score presented only 4.8% of children needed mandatory treatment. Distribution of children dissatisfaction of dental appearance was significant and no significant relation on willingness to uptake treatment. **Conclusion:** A wide range of school children perceived dissatisfaction of their appearance but their desire to uptake the orthodontic treatment was not significant.

Keywords: *Dental esthetic index score, orthodontic treatment need, school children, self perception*

Introduction

Esthetics is the most common reason for children to seek orthodontic treatment. A "good dental appearance" has been shown to be related to a person's social and intellectual competence, peer group acceptance and hence related to successful life outcomes than people with lower attractiveness.[1] There is a greater chance of malocclusion having an impact on quality of living among schoolchildren who have negative self-perceptions regarding their dental esthetics, smile, and such children more frequently perceive the need for orthodontic treatment. The World Health Organization (WHO) has recommended Dental Esthetic Index (DAI) for assessing dentofacial anomalies in their oral health survey. DAI is a cross-cultural index focused on socially defined dental aesthetics.[2]

The DAI looks into the esthetic aspects of occlusion. The DAI links clinical and esthetic components, mathematically, to produce a single score. This score reflects the malocclusion severity. DAI effectively recognizes the conditions that cause potential psychosocial problems.[3]

The psychosocial component of malocclusion will continue to be one of the strongest motivators for orthodontic treatment. The benefits of taking orthodontic treatment are for prevention of tissue damage, correction of the esthetic component and to improve the physical function.

During adolescence, there is an increased concern for dental appearance. The desire to look good, self-esteem awareness and willing to undergo orthodontic treatment

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Figure 1: Pre- structured questionnaire

1. Do you have a pleasant smile? Yes/No
2. How much do you like the appearance of your smile?
   - Very much
   - Quite a bit
   - Not much
   - Not at all
3. Do you like the way your teeth look? Yes/No
4. How much do you like the way your teeth look?
   - Very much
   - Quite a bit
   - Not much
   - Not at all
5. Are your front teeth straight? Yes/No
6. How would you consider your teeth as compared to your entire face?
   - One of the nicest features of your face
   - Better than average feature of your face
   - Below average feature of your face
   - One of the poorest features of your face
7. Are your teeth good looking? Yes/No
8. Compared to your classmates and friends how do you think your teeth look?
   - Among the nicest
   - Better than average
   - Below average
   - Among the worst
9. Do your teeth need straightening? Yes/No
10. If it were possible would you want to wear braces to straighten your teeth?
    - Definitely No
    - Probably No
    - Probably Yes
    - Definitely Yes

influence the uptake of orthodontic treatment. The benefit the individual receives from orthodontic treatment will depend on the severity of the malocclusion as well as the patient's own perception of the problem. Not all patients with malocclusion, even though with severe malocclusion seek orthodontic correction. Some do not recognize that they have a problem and some may not be unhappy about their dental appearance. There may be others who are aware of the problem but are not willing for the treatment. Therefore, the study is designed to understand and motivate the children requiring orthodontic correction and enable them to become confident healthy individuals. Self-perception of the individual's appearance has an influential impact on their social and psychological adjustments and builds in confidence.[4]

The aim of this study was to assess the correlations between DAI and self-perception of their appearance among school children of 12–15 years of age.

The objectives of the study were:

1. To evaluate the relationship between DAI and perception of smile
2. To evaluate the relationship between DAI and perception of dental appearance
3. To evaluate the correlation between DAI and self-appraisal of the dental appearance on comparison with their face
4. To evaluate the correlation between DAI and appearance of their own teeth when compared with their classmate
5. To evaluate the relationship between DAI and willingness to uptake orthodontic treatment.

Materials and Methods

The cross-sectional study was conducted among school children of 12–15 years of age. The sample size included 500 school children, both age and gender matched. The school children were selected from Thiruchengode, rural area in Namakkal Dist. List of schools in Thiruchengode was obtained from the Directorate of education at Namakkal District. Eight schools were randomly selected. Informed consent was obtained. The study included children of 12–15-year-old, who were willing to participate. The children who had or who were undergoing orthodontic treatment, including interceptive orthodontics were excluded from the study. Children who already decided to uptake orthodontic treatment and those who were physically and mentally challenged were also excluded from the study.

The school children were interviewed with following ten questions privately, the questions were verbally explained. The perception of smile, the perception of dental appearance, self-assessment of dental appearance when compared to face, self-assessment of dental appearance on comparing with classmates and friends and willingness to undergo orthodontic treatment were assessed using prestructured questionnaire with ten questions, [Figure 1] given in both English and Tamil (vernacular language). Oral examination was done by two well-trained examiners. The instruments used were autoclaved community periodontal index probe, plain mouth mirror, and a light source. Five to six minutes were taken for the questionnaire and oral examination for each child. Children were assessed clinically with DAI for determining their level of malocclusion [Figures 2 and 3]. It contains ten components which include:

1. Number of missing visible teeth (incisors, canines, and premolars in the maxillary and mandibular arches)

Figure 2: Components of Dental Aesthetic Index regression equation and their actal and rounded regression coefficients (weights)

DAI components	Regression coefficients	
	Actual weighs	Rounded weighs
1. Number of missing visible teeth (incisor, canine and premolars in the maxillary and mandibular arches)	5-76	6
2. Crowding in incisal segments 0=no segments crowded, 1=1 segment crowed, 2=2 segment crowded	1-15	1
3. Spacing in the incisal segment 0=no spacing, 1=1 segment spaced, 2=2 segments spaced	1-31	1
4. Midline diastema (mm)	3-13	3
5. Largest anterior irregularity on the maxilla (mm)	1-34	1
6. Largest anterior irregularity on the mandible (mm)	0-75	1
7. Anterior maxillary overjet (mm)	1-62	2
8. Anterior mandibular overjet (mm)	3-68	4
9. Vertical anterior openbite (mm)	3-69	4
10. Antero-posterior molar relation, largest deviation from normal either left or right: 0=normal, 1=½ cusp or more either mesial or distal, 2=one full cusp or more either mesial or distal	2-69	3
11. Constant (total)	13-36 (actual score)	13 (rounded score)

DAI: Dental Aesthetic Index

Figure 3: Dental Aesthetic Index Score (DAI Score)

Severity of malocclusion	DAI score
Minor or no anomaly: No or slight need	≤25
Definite malocclusion; elective treatment	26-30
Severe malocclusion: Treatment is highly desirable	31-35
Handicapping malocclusion; treatment mandatory	>36

DAI: Dental Aesthetic Index

Table 1: The frequency distribution of the questions

	Q1 (%)	Q3 (%)	Q5 (%)	Q7 (%)	Q9 (%)
Yes	78.3	57.5	46	47.8	53.5
No	21.8	42.5	54	52.3	46.5

Q1: Do you have a pleasant smile?, Q3: Do you like the way your teeth look?, Q5: Are your front teeth straight? Q7: Are your teeth good looking?, Q9: Do your teeth need straightening?

2. Crowding in the incisal segments: 0 = No segment crowded 1 = 1 segment crowded, 2 = 2 segment crowded
3. Spacing in incisal segments: 0 = no spaced; 1 = 1 segment spaced, 2 = 2 segment space
4. Midline diastema in mm
5. Largest anterior irregularity on the maxilla in mm
6. Largest anterior irregularity on the mandible in mm
7. Anterior maxillary overjet in mm
8. Anterior mandibular overjet in mm
9. Vertical anterior open bite in mm
10. Antero-posterior molar relation: largest deviation from Normal either left or right: 0 = normal, 1 = half cusp either mesial or distal, 2 = one full cusp or more either mesial or distal.

Statistical analysis

The data collected was analyzed using IBM SPSS software for windows version 16 (SPSS Inc., Chicago). Frequency tables were computed. Chi-square test and Kappa statistics were used to test the association between DAI score and esthetic perception and willingness to undergo orthodontic treatment.

Results

Of the total 400 patients, 78.3% were satisfied with their smile, but only 44.3% liked the appearance of the smile very much. Nearly 57.5% liked the way their teeth look, and when asked how much they liked the look of the teeth, 49.5% liked it quite a bit.

Nearly 54% of children felt they did not have straight teeth and when compared to their face, 22% felt it as a below average feature of their face and 9% as the poorest feature of their face. 47.8% of children felt their teeth were looking good, but only 22.5% felt their teeth to be nicest among classmates and friends. About 53.5% of participants felt the teeth needed straightening but only 28% desired to wear braces to correct it shown in Table 1.

On considering DAI score 65.5% did not need orthodontic correction, 21.8% needed elective treatment, 8% needed desirable treatment and 4.8% required mandatory treatment.

Chi-squared test and kappa statistics was used to evaluate the significant relationship between DA1 scores and

Table 2: Relationship of Dental Aesthetic Index with Q2 (How much do you like the appearance of your smile?)

Q2	DAI score	Very much	Quite a bit	Not much	Not at all	*P*	κ
How much do you like the appearance of your smile?	No need treatment	30.8% (123)	26.3% (105)	7.0% (28)	1.5% (6)	0.002*	0.284
	Elective treatment	9.3% (37)	7.8% (31)	2.8% (11)	2.0% (8)		
	Treatment desirable	2.8% (11)	2.8% (11)	2.3% (9)	3% (1)		
	Treatment mandatory	1.5% (6)	1.5% (6)	1.8% (7)	0% (0)		

*Statistically significant. DAI: Dental Aesthetic Index

Table 3: Correlation of Dental Aesthetic Index and Q4 (How much do you like the way your teeth look?)

Q4	DAI score	Very much	Quite a bit	Not much	Not at all	*P*	κ
How much do you like the way your teeth look?	No need treatment	13.3% (53)	33.3% (133)	16.8% (67)	2.3% (9)	0.001*	0.029*
	Elective treatment	2.8% (11)	12% (48)	6.3% (25)	8% (3)		
	Treatment desirable	5% (2)	3.8% (15)	3.3% (13)	5% (2)		
	Treatment mandatory	8% (3)	2% (5)	3.5% (14)	0% (0)		

*Statistically significant. DAI: Dental Aesthetic Index

Table 4: Relationship between Dental Aesthetic Index and Q6 (How would you consider your teeth as compared to your entire face?)

Q6	DAI score	Very much	Quite a bit	Not much	Not at all	*P*	κ
How would you consider your teeth as compared to?	No need treatment	23.3% (93)	27% (108)	12% (48)	3.3% (13)	0.000	0.086
	Elective treatment	3.8% (15)	8.3% (33)	6% (24)	3.8% (15)		
	Treatment desirable	2% (8)	3% (12)	1.5% (6)	1.5% (6)		
	Treatment mandatory	8% (3)	8% (3)	2.8% (11)	5% (2)		

DAI: Dental Aesthetic Index

Table 5: Relationship between Dental Aesthetic Index and Q8 (Compared to their classmate how their teeth look?)

Q8	DAI score	Among the nicest	Better than average	Below average	Among the worst	*P*	κ
Compared to your classmates and friends, how do you?	No need treatment	17.5% (70)	31.3% (125)	13.8% (55)	3% (12)	0.000*	0.028*
	Elective treatment	2.5% (10)	10% (40)	6.3% (25)	3% (12)		
	Treatment desirable	1.5% (6)	1.8% (7)	3% (12)	1.8% (7)		
	Treatment mandatory	1% (4)	5% (2)	3% (12)	3% (1)		

*Statistically significant. DAI: Dental Aesthetic Index

Table 6: Relationship between Dental Aesthetic Index and Q10 (if it were possible would you want to wear your braces?)

Q10	DAI score	Definitely no	Probably no	Probably yes	Definitely yes	*P*	κ
If it were possible would you want to wear braces to?	No need treatment	31.8% (127)	6.8% (27)	9.5% (38)	17.5% (70)	0.354	0.174
	Elective treatment	8.8% (35)	3% (12)	4.3% (17)	5.8% (23)		
	Treatment desirable	2.5% (10)	5% (2)	1.3% (5)	3.8% (15)		
	Treatment mandatory	2.3% (9)	8% (3)	8% (3)	1% (4)		

DAI: Dental Aesthetic Index

their esthetic perceptions. Table 2 shows that there was no statistically significant correlation between the DA1 score and self-satisfaction.

A strong statistical significant correlation was seen between DA1 score and the way their teeth look [Table 3].

The correlation of DAI score with how straight their teeth are and how they considered these features when they compared to their entire face was not significant. The frequency distribution showed less variation [Table 4].

When comparing the scores of how good looking their teeth are with their friends and classmates and their

DA1 scores, Kappa statistics showed a strong significant correlation in Table 5.

Statistically, no significance was observed between DA1 scores and their assessment of treatment need and willingness to undergo treatment using braces among the participants [Table 6].

Discussion

In the past decade, there has been an increase in awareness regarding esthetic appearance, and many are motivated to seek orthodontic treatment. For public health and epidemiological survey purpose, various indices such as Summers' Occlusal Index,[5] Salzmann's Handicapping Malocclusion Assessment Record,[6] and Grainger's Treatment Priority Index,[7] The DAI[2] and Index of Orthodontic Treatment Need (IOTN)[8] had been developed, which assist the dental professionals to categorize the severity of malocclusion and its treatment need. The DAI have an advantage over IOTN, as the esthetic perception by DAI are linked with anatomic trait measurements, which produce a single score by regression analysis. Cons, Jenny, and Kohout developed the DAI in 1987 which is simple and easy to use without the use of radiographs in assessing the severity of malocclusion and need for orthodontic treatment.[2] DAI) was selected as the epidemiological screening tool because of its reliability and validity. This DAI was integrated into items of the International Collaboration Study of Oral Health Outcomes and guidelines by the WHO.[9] DAI was used to assess the severity of malocclusion and treatment requirement in the present study as it focuses on clinical and subjective esthetic factors and malocclusion.[10] DAI scores >31 require mandatory treatment, and it is useful to identify the group of children who definitely need orthodontic treatment. Facial appearance especially dental esthetics had a strong impact on the psychological and social adjustments.[11,12] Expectation and opinion of the patient toward dental esthetics cannot be underestimated, as it is they who benefit from improved esthetics after orthodontic treatment.[13,14] Professional opinion and patient opinion of facial appearance, dental esthetics, and malocclusion may not be coincident, and often orthodontic treatment is influenced by the perception of the patient regarding their appearance.[15,16] To evaluate the patient's perception of malocclusion, a prestructured questionnaire containing ten questions reflects and projects the dental appearance and self perception of smile and willingness to uptake orthodontic treatment was used in this study.[13]

The age of 12–15 years was chosen in this study as all permanent teeth would have erupted, except 3rd molar and malocclusion and dentofacial anomalies will be well expressed.[10] The study was done among school children in rural area of Thiruchengode, Namakkal dist., with same demographic and cultural characteristics. The children were age and gender matched.

In the present study, on comparing the DAI score with their perception of smile, there was no significant correlation. This result was in agreement with Nayak et al. but it was contradicting the results of Jenny et al. which had a strong significant correlation.[13,17]

There was a significantly strong association between perception of dental appearance and DAI, which is in accordance with the results of Nayak et al., Jenny et al. and Onyeso *et al*.,[13,17,18] but this result is, in contrast, to study by Shue Te Yeh *et al*.[19] The study shows that a person's perception of esthetic smile is not just dependent on pleasing dental appearance. Dissatisfied dental appearance may be a good indication for uptake of orthodontic treatment need.

The association between DAI with the children's self assessment of the relative appearance of teeth as compared to their face showed no significant correlation present and this result is not similar with a study by Jenny et al. and Nayak *et al*.[9,13]

The relationship between DAI and self perception of dental appearance when compared to their classmates and friends have strong significant co relation, and the results corroborated the Cons et al. study.[2] DAI scores and their desire to uptake orthodontic treatment showed no significant association. This is not in agreement with studies by Holmes, Espealand, Gosney, and Birkeland[8,20,21,22]

Only 4.8% of the children examined required mandatory treatment as per DAI score. Dissatisfaction with individual's smile and dental appearance is a good motivating factor for uptake of orthodontic treatment.[23] In the study dissatisfaction with their dental appearance is this could be socioeconomic status, parent's knowledge on malocclusion and need of orthodontic treatment, their awareness regarding the available treatment in their locality which needs to be evaluated in further studies. more in distribution, but their willingness to undergo orthodontic treatment was not significant. The reason for this could be socioeconomic status, parent's knowledge on malocclusion and need of orthodontic treatment, their awareness regarding the available treatment in their locality which needs to be evaluated in further studies.

Conclusions

High distribution of school children did not require orthodontic treatment and only 4.8% children needed mandatory treatment. There was a significant correlation

between DAI scoring and the dissatisfaction regarding their dental appearance and also between DAI and their dental appearance when compared with the peer group (classmates and friends). No statistically significant association present between DAI and smile perception, self-assessment of dental appearance on comparison with their face and desire to uptake orthodontic treatment.

Although the dissatisfaction regarding the dental appearance was high, the willingness to uptake treatment was significantly low. Further studies are needed to evaluate the role of socioeconomic status, rural location, high cost, parent awareness regarding malocclusion, and treatment availabilities in influencing their willingness to undertake orthodontic treatment.

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Conflicts of interest

There are no conflicts of interest.

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