

Aesthetic Perceptions: Can we really rely on the Aesthetic Component of the Index of Orthodontic Treatment Needs?

Sanjeev Datana,
Saugat Ray¹, Sanjay Londhe,
M. P. Prasanna

Department of Orthodontics and
Dentofacial Orthopaedics, R and
R, Delhi Cantonment, New Delhi,
¹Department of Dental Surgery, FDC,
Fort, Mumbai, Maharashtra, India

Abstract

Objectives: The aim of this study is to evaluate the esthetic perception of own dentition among young adolescents and evaluate the reliability of esthetic component (AC) of index of orthodontic treatment need (IOTN). **Materials and Methods:** A sample of 228 subjects was recruited for the study. The subjects were shown their own photographs and were asked to score them using AC of IOTN. The photographs of subjects were divided into three Groups: Group 1 (little or no need), Group 2 (borderline need), and Group 3 (severe or definite need). The same photographs were shown to five dental surgeons who also evaluated and scored the photographs using AC of IOTN. Finally, the essential records of the subjects were shown to five orthodontists who also scored them using dental health component of IOTN. Both the dental surgeons and orthodontists were kept blind about the entire methodology. **Results:** The Cohen's kappa analysis shows the moderate level of agreement between the opinions of subjects with that of dental surgeons and orthodontists, but there is a substantial level of agreement between the opinion of dental surgeons and orthodontists. **Conclusion:** The AC of IOTN may be utilized for preliminary assessment for orthodontic treatment need both by dental surgeons and patient themselves.

Key words: Esthetics perceptions, index of orthodontic treatment need, malocclusion

INTRODUCTION

The expectations of children and their parents toward overall facial esthetics are increasing day by day. What appeared to be insignificant earlier, is taking priority among children to overcome routine barriers, including psychosocial aspects. This has led to increased awareness among people about the various modalities available to rectify the problem of malocclusion at a very early age.

The primary hurdle for any orthodontist is to determine whether the patient requires active intervention or

not. Although various indices are available for scoring the degree of malocclusion, the index of orthodontic treatment need (IOTN) is one of the most widely used occlusal indices, which is not only a method for defining the severity of malocclusion, but also suggests the need for any orthodontic treatment. Occlusal indices define the treatment need from a clinician point of view; however, patient's own perception of need for orthodontic treatment cannot be under estimated. The dental surgeons who are usually the first in the channel of referral diagnose the malocclusion and hence their perception about various occlusal traits also plays a key role in the management of a patient.

Aims and objectives

The aim and objectives of this study are:

1. To evaluate the esthetic perception of own dentition among young adolescents and opinion of dental surgeons about orthodontic treatment needs for commonly existing malocclusions.

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Address for Correspondence:

Dr. Saugat Ray, FDC, Fort, Mumbai - 400 023, Maharashtra, India. E-mail: drdatana@rediffmail.com

- To evaluate the reliability of esthetic component (AC) of IOTN for initial screening of patients seeking orthodontic treatment.

MATERIALS AND METHODS

This is a cross-sectional study conducted on a mixed Indian population with children from different geographical areas and cultural dissimilarity. Few government schools in New Delhi were selected for the collection of sample. A prevalence rate of 42.5% (range: 33.6-51.4) was taken for calculation of sample size. Taking the margin of error to be 6% with 95% confidence interval and 80% power, the sample size was calculated to be 254. Hence, keeping various exclusion criteria in picture a convenient sample of 300 was taken. The sample consisted of equal number of males and females (150 each) with age group between 12 and 15 years. The exclusion and inclusion criteria for sample selection were as follows.

Exclusion criteria

- Severe skeletal dysplasia.
- Mentally challenged children requiring special attention/schooling.
- Subjects who or any of their sibling or either of the parents had already undergone orthodontic treatment.

Inclusion criteria

- Children belonging to same socioeconomic background with parental income ranging between 20-25 thousand INR per month.
- Children entitled free orthodontic treatment being wards of central government employee (to rule out cost factor involved in the orthodontic treatment).
- Children with either of their parents having educational qualification of at least graduation.

After applying the above criteria, 72 subjects were excluded. The final sample consisted of 228 subjects including 106 males and 116 females.

Each subject was shown his/her own intra-oral photograph on a multimedia projector (XD 520U Mitsubishi, Japan) with 4 ft × 6 ft screen. They were asked to rank their dental attractiveness taking as reference the 10 representative photographs of the AC component of the IOTN as suggested by Evans and Shaw.^[1]

The assessments of the subjects were broadly divided into three groups using classification as suggested by Richmond *et al.*^[2] Grades 1-4 represent no or little esthetic need (Group 1), Grades 5-7 borderline esthetic need (Group 2),

and Grades 8-10 definite esthetic need for orthodontic treatment (Group 3).

Thereafter five renowned dental surgeons were selected who had at least 15 years of clinical experience. The purpose of selecting lesser number of dental surgeons was to get a common consensus without much of conflict to grade the photographs of subjects. The photographs of subjects were shown group wise to these five dental surgeons. The dental surgeons were not told about the photographs being already evaluated by subjects themselves and the groups being made based on the assessments of the subjects. The dental surgeons were made to sit together in one room and intra-oral photographs of the subjects were flashed on the same projector. They were asked to evaluate the photographs as per 10 point scale of AC and grade them accordingly with a common consensus.

At last all the relevant data of these 228 subjects, required for dental health component (DHC) of IOTN were taken for further evaluation by orthodontists. The photographs along with the study models of all the subjects were sent to five experienced orthodontists who were told to assess and grade these subjects as per DHC of IOTN with common consensus. The DHC records were recorded as per guidelines suggested by Brook and Shaw^[3] into five grades according to severity and the need for orthodontic treatment. Grades 1 and 2 represent no/little need for treatment, Grade 3 borderline, and Grades 4 and 5 a definite need for orthodontic treatment. The orthodontists were also kept blind about the evaluation being already done by subjects themselves and dental surgeons.

RESULTS

In total 228 subjects were evaluated. Table 1 shows the observations by the subjects. About 47.36% subjects graded themselves as mild requiring little or no treatment. About 35.52% subjects considered themselves borderline and 17.10% subjects graded themselves as severe requiring definite treatment.

The comparison of opinion of subjects with dental surgeons and orthodontists has been shown in Tables 2 and 3, respectively.

When the scorings of subjects using AC of IOTN were evaluated in comparison with orthodontists' scoring using

Table 1: Observations by subjects

Groups	Subjects
Group 1	108
Group 2	81
Group 3	39

DHC of IOTN, it was observed that 14.03% subjects over rated and 16.66% subjects under rated themselves for orthodontic treatment need. About 69.29% subjects evaluated themselves correctly for orthodontic treatment requirement. The scorings of the dental surgeons' using AC of IOTN revealed that 7.45% subjects were over rated by dental surgeons and 10.45% subjects were under rated by the dental surgeons for orthodontic treatment need in comparison to the evaluations of orthodontists. The bulk, 81.57% subjects were evaluated correctly by the dental surgeons for orthodontic treatment need in comparison to the orthodontists' opinion. The statistical evaluation was carried out using Statistical Package for Social Sciences version 20. Cohen's kappa analysis was carried out to check the level of agreement between the opinions of subjects, dental surgeons and orthodontists.

The comparison of scorings of dental surgeons and subjects shows moderate strength of agreement with kappa coefficient values 0.526. The comparison of the scorings of subjects and orthodontists reveals the moderate strength of agreement with kappa coefficient values of 0.509. The comparison of scorings of dental surgeons and orthodontists has substantial strength of agreement with kappa coefficient values of 0.705.

DISCUSSION

The perception of esthetics among adolescents varies depending primarily upon the socioeconomic status of the families, the educational status of their parents, knowledge about the treatment and its availability and treatment costs.^[4-7] In this study, most of these confounding factors were eliminated by selectively including the subjects all from almost same socioeconomic background and parental educations with marginal differences. Further, parental influences, their desires and their enforced opinion on their children grossly affect the children's own opinion about their orthodontic treatment needs.^[8-11] Hence in this study, an attempt has been made to focus exclusively on an individual's perception toward his/her attractiveness and requirement of any orthodontic treatment because this affects the level of cooperation of the children, especially when they undergo any sort of orthodontic treatment in future. Daniels *et al.* also demonstrated that although parents reported greater motivation levels than their children, the patients' levels of motivation to receive orthodontic treatment were found to determine their reported cooperation with their orthodontists' treatment recommendations.^[12]

The judgment of dental unattractiveness of an individual and requirement of any correction with orthodontic treatment is highly variable, especially when using the 10

point rating scale using photographs (AC of IOTN).^[13-15] Despite this fact the evaluation and further scoring for orthodontic treatment need in this study has been done using AC of the IOTN because it is simple to understand by the subjects and dental surgeons and does not require any technical expertise or additional training. The evaluation of subjects themselves is shown in Table 1.

The distribution of number of subjects in various groups with different orthodontic treatment needs as assessed by dental surgeons and orthodontists is shown in Tables 2 and 3. The comparison of scorings of dental surgeons and subjects shows moderate strength of agreement with kappa coefficient values 0.526.

The level of agreement between the scorings of subjects and orthodontists although lesser than that between dental surgeons and subjects with kappa coefficient values of 0.509, but the inference still shows the moderate strength of agreement.

The comparison of opinions of dental surgeons and orthodontists is shown in Table 4. Further, the strength of agreement between the opinions of dental surgeons and orthodontists shows kappa coefficient values of 0.705. This shows there was substantial agreement between their opinions.

Table 2: Subjects (AC) versus dental surgeons (AC)

Groups	Dentists' opinion		
	Little or no need	Borderline need	Definite need
Group 1	92	13	3
Group 2	22	44	15
Group 3	1	13	25

AC – Aesthetic component

Table 3: Subjects (AC) versus orthodontists (DHC)

Groups	Orthodontists' opinion		
	Little or no need	Borderline need	Definite need
Group 1	87	18	3
Group 2	18	46	17
Group 3	2	12	25

AC – Esthetic component; DHC – Dental health component

Table 4: Dental surgeons (AC) versus orthodontists (DHC)

Dentists' rating	Orthodontists rating		
	Little or no need	Borderline need	Definite need
Little or no need	93	15	0
Borderline need	9	62	10
Definite need	0	8	31

AC – Esthetic component; DHC – Dental health component

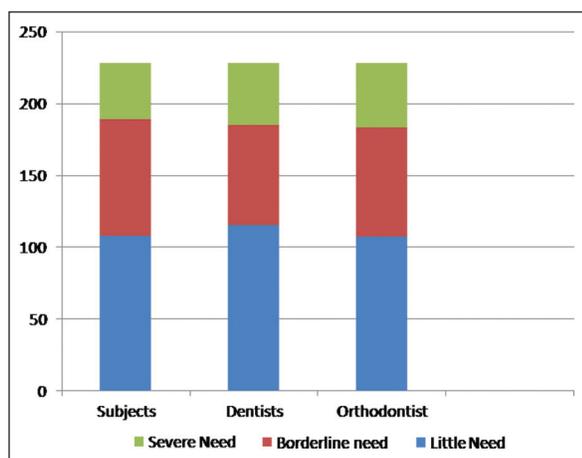


Figure 1: Complete distribution of data collected from subjects, dental surgeons, and orthodontists

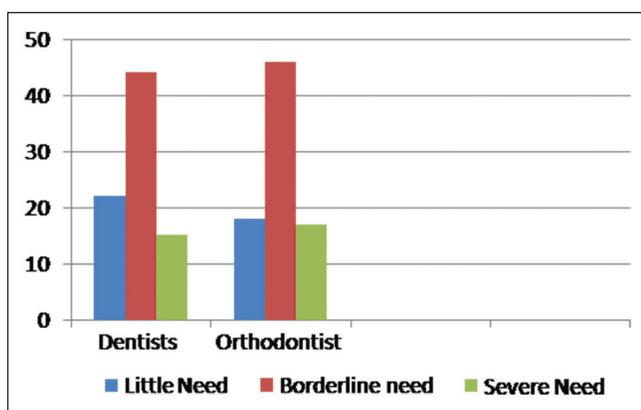


Figure 3: Group 2

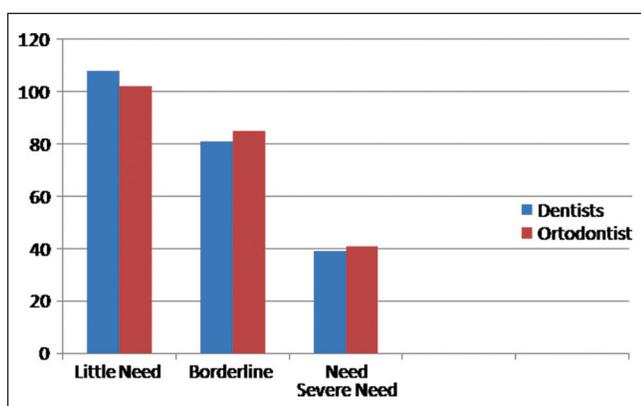


Figure 5: Comparisons between dental surgeons and orthodontists

These results are highly satisfying taking into consideration the increasing demands of orthodontic treatment day by day. This is due to increasing awareness among adolescents and their parents through social media and internet services.^[16] Hence, preliminary screening and necessary referrals by dental surgeons is definitely required for patients seeking orthodontic treatment, so that cases actually requiring orthodontic treatment reach the orthodontists for further treatment.

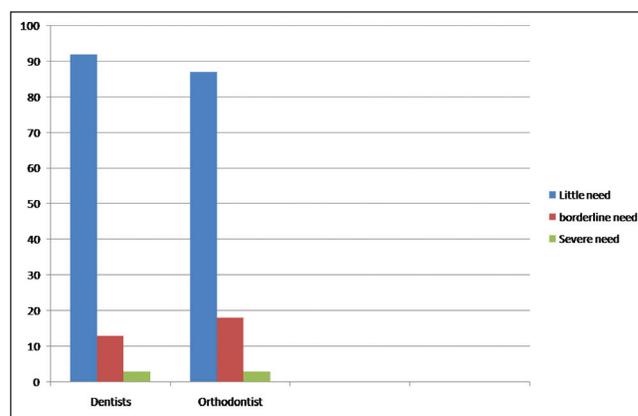


Figure 2: Group 1

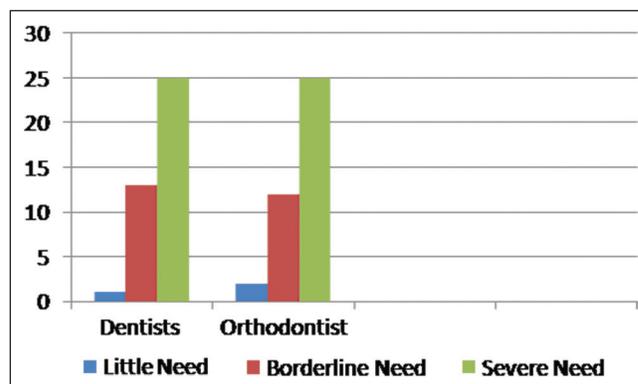


Figure 4: Group 3

The distribution of complete data has been shown in Figure 1. The difference in opinion between dental surgeons and orthodontists has been shown as histograms in Figures 2-5.

The evaluations of treatment need were carried out in different scales by subjects, dental surgeons and orthodontists. Although both the components that is, DHC and AC of IOTN are not comparable, this study is an attempt to evaluate the actual treatment need for the subjects who assessed themselves and further assessed by dental surgeons for their orthodontic treatment entirely on the basis of esthetics. Keeping in view the results of this study, it can be suggested that the AC of the IOTN is reliable for initial screening of the patients seeking orthodontic treatment and dental surgeons may also utilize this for necessary referral of patients to orthodontists for further management.

CONCLUSION

The AC of IOTN may be utilized for preliminary assessment for orthodontic treatment need both by dental surgeons and patient themselves, provided other

factors like socio economic, parental education and over expecting attitude of the parents are ruled out.

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