ORIGINAL ARTICLE

# The value of the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN) in the Assessment of Subjective Orthodontic Treatment Need

HAIDER ZAHID[1], AIMAN NIAZ[2], SOFIA SHEHZAD[3], SUNNIYA SAEED[4], KAINAT KHAN[5], PALWASHA KHAN[6]
[1]Registrar, Department of Orthodontics, Sardar Begum Dental Hospital, Gandhara University, Peshawar, Pakistan.
[2]House Officer, Department of Peadodontics, Sardar Begum Dental Hospital, Gandhara University, Peshawar, Pakistan.
[3]Professor, Department of Preventive and Community Dentistry, Sardar Begum Dental Hospital, Gandhara University, Peshawar, Pakistan
[4]Post-Graduate Trainee, Department of Orthodontics, Islamic International Dental Hospital, Riphah University, Islamabad, Pakistan
[5]House officer, Department of Peadodontics, Sardar Begum Dental Hospital, Gandhara University, Peshawar, Pakistan.
[6]House officer, Department of Peadodontics, Sardar Begum Dental Hospital, Gandhara University, Peshawar, Pakistan.
Correspondence to: Dr. Haider Zahid (BDS, MDS), Email: d.haiderzahid1991@gmail.com, Phone: 0345 5777790

## ABSTRACT

**Background:** Malocclusion is the most common dental problem. Its correction needs assessment before planning Orthodontic treatment. The index of orthodontic treatment need (IOTN) is one of the most valuable method of grading and evaluating malocclusion. A number of studies stated; using the IOTN have reported that there is limited use of aesthetic component in school going children.

**Objectives:** To estimate whether dental concern expressed by the grade of the AC chosen by subjects is reliable and whether it may be predictive for potential co-operation.

**Materials and Methods:** This study was carried out in school going children of 12 year of age in kpk Pakistan. This study was based on a questionnaire and clinical examination. The questionnaire consists of various items. On the basis of these item questionnaire was filled. Clinical examination was done at the schools each time by the same orthodontist. Statistical analysis was done.

**Results:** Out of total children, 29 were female and 58 were male. Most of the children were satisfied with dental aesthetics. Most of them wanted to change colour of the teeth. Most of the enrolled students were classified in "no treatment need' category" followed by "need borderline treatment" category. Satisfaction with aesthetic were also evaluated (P-value <0.090).

**Conclusion:** It was concluded that large number of people were in need of the orthodontic therapy as per the aesthetic component of IOTN.

**Key words:** Index of Orthodontic Treatment Need, Aesthetic Component, Scan scale

## INTRODUCTION

Malocclusion or "bad bites" is one of the most common oral health problem (1). Patients with malocclusion are in need for orthodontic treatment. If such patients are not treated in time then malocclusion will lead to a number of oral health issue. The lethal effects of malocclusions on the oral health are still blurred. Different methods are used to assess the malocclusion in order to stop further complication.

There are a number of indices that have been used to classify the malocclusion into different groups according to malocclusion severity. These indices are the Treatment Priority Index (TPI), Summers' Occlusal index , the Need for Orthodontic Index, the Handicapping Malocclusion Assessment Record, and the Index of Orthodontic Treatment Need (IOTN) (2, 3). Out of these the best and reliable tool for assessment of orthodontic treatment need is the Index of Orthodontic Treatment Need (IOTN) (4). In routine clinical practice, most treatment decisions are based on orthodontic treatment need index. The IOTN is an internationally recognized method for objectively evaluating treatment need (5). In 1989, the Index of Orthodontic Treatment Need was introduced by Brook & Shaw in UK and later renamed as 'IOTN' (2, 6). It is a modified form of index used by the Swedish Dental Health Board (2, 7). It is a clinical index which categorizes malocclusion on the basis of treatment needs ultimately to compare populations.

The main reasons for orthodontic treatment are usually an improvement in facial or dental aesthetic.

The IOTN index consists of two parts: (1) Dental Health Component (DHC) and (2) Aesthetic Component (AC) (8, 9). Both DHC & AC are recorded separately. In this study the Aesthetic Component of the IOTN is used, which comprises of a 10-grade scale illustrated by different colors in intra-oral photographs. The series of photographs shows 3 categories in regard to treatment: (10)

Grades 1-4: need no treatment.
Grades 5-7: need borderline treatment.
Grades 8-10: need severe treatment.

Like other countries, the demand for orthodontic treatment is increasing day by day in Pakistan. In Pakistan a number of dental colleges provide such services.
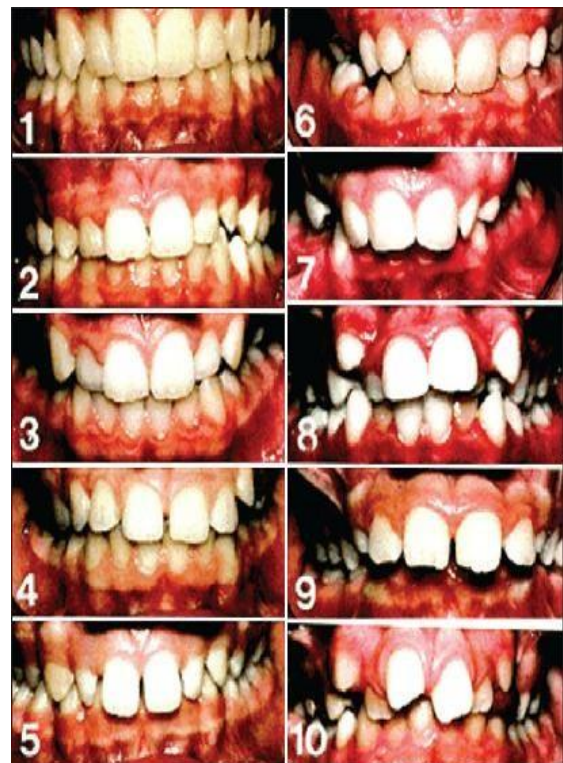

Fig: IOTN AC Scale

**Objective:**
1. To estimate whether dental concern expressed by the grade of the AC chosen by subjects is reliable and
2. Whether it may be predictive for potential co-operation.

## MATERIALS AND METHODS

**Sample Size:** The sample size was 87 keeping the 58.3% proportion [11], 95% confidence interval and power of 80% using WHO sample size calculator.

This school-based study was conducted from 14th to 16th March 2022. Patients were recruited by multistage cluster sampling technique.

**Inclusion Criteria:**
- Children of 12 year of Age.
- Children of three primary school in kpk Pakistan.
- Both gender.

**Exclusion Criteria:**
- Patients who are currently undergoing or previously undergone orthodontic treatment.
- Nonconsenting patients.

**Methods:** According to inclusion criteria totally 87 individuals were enrolled in our study. All the individuals were clinically examined in a classroom in the presence of natural light. Approval was obtained from hospitals ethical committee before starting the study.

The individuals assessed their own occlusion and then graded themselves according to the 10 colored photographs of the Aesthetic Component (AC) provided during a clinical examination at school. Where Photograph #1 represented the most attractive dental arrangement and photograph #10 represented the least attractive dental arrangement.

For easy and best assessment, a lip retractor and a mirror were also provided.

A questionnaire form was given to the individuals followed by a presentation explaining how to fill the form.

During examination the dentist and the orthodontist also graded each individuals occlusion using the AC scale.

**Statistical Analysis:** By using the SPSS version 23.0, all the collected data were analyzed. Frequency and percentages were presented for the different questions asked according to questionnaire i.e. subjective assessment of aesthetics, perceived functional disorders, Attitude to orthodontic treatment, Evaluation of aesthetics in the AC scale of IOTN, Satisfaction with dental appearance in relation to the AC grade. A chi-square test was used to evaluate any significant differences between two independent samples. Comparisons of the two aggregated samples were made using the chi-square test, keeping the significance level as P value ≤ 0.05.

## RESULTS

Table 1:

| Health and well-arranged teeth are important for appearance | Boys (n) | Girls (n) | Total |
|---|---|---|---|
| Yes | 54 (93.1%) | 29 (100%) | 83 |
| No | 2 (3.4%) | - | 2 |
| Do not know | 2 (3.4%) | - | 2 |
| Are you satisfied with your dental aesthetics? | | | |
| Yes | 40 (69.0%) | 23 (79.3%) | 63 |
| No | 15 (25.9%) | 2 (6.9%) | 17 |
| Do not know | 3 (5.2%) | 4 (13.8%) | 7 |
| Anything you would like to change about your Teeth. | | | |
| Yes | 33 (56.9%) | 17 (58.6%) | 50 |
| No | 22 (37.9%) | 10 (34.5%) | 32 |
| Do not know | 3 (5.2%) | 2 (6.9%) | 5 |
| If yes then | | | |

| | | | |
|---|---|---|---|
| Color | 16 (27.6%) | 11 (37.9%) | 27 |
| arrangement | 12 (20.7%) | 2 (6.9%) | 14 |
| size | 2 (3.4%) | 2 (6.9%) | 4 |
| CS | 2 (3.4%) | 1 (3.4%) | 3 |
| AS | 2 (3.4%) | 0 | 2 |
| CAS | 1 (1.7%) | 3 (10.3%) | 4 |

Table 2

| Trouble chewing or speaking due to current teeth condition | Boys (n) | Girls (n) | Total |
|---|---|---|---|
| Yes | 14 (24.1%) 42 | 4 (13.8%) | 18 |
| No | (72.4%) | 25 (86.2%) | 67 |
| Do not know | 2 (3.4 %) | - | 2 |

Insignificance P-value < 0.290

Table 3:

| Think you should have orthodontic treatment. | Boys (n) | Girls (n) | Total |
|---|---|---|---|
| Yes | 5 (8.6%) | 4 (13.8%) | 9 |
| No | 50 (86.2 %) | 22 (75.9%) | 72 |
| Do not know | 3 (5.2%) | 3 (10.3 %) | 6 |
| Would you agree for orthodontic therapy if parent or dentist suggested it | | | |
| Yes | 26 (44.8 %) | 16 (55.2%) | 40 |
| No | 22 (37.9 %) | 9 (31.0 %) | 31 |
| Do not know | 10 (17.2 %) | 4 (13.8%) | 14 |
| | | | |

Insignificance P-value <0.472
Insignificance P-value < 0.661

Table 4:

| AC Grade | Student's evaluation | | |
|---|---|---|---|
| | Boys (n) | Girls (n) | Total |
| 1 to 4 | 53 (91.4%) | 26 (89.7%) | 79 |
| 5 to 7 | 3 (5.2%) | 3 (10.3%) | 6 |
| 8 to 9 | 2 (3.4) | 0 | 2 |
| | | | |
| | Orthodontics' evaluation | | |
| | Boys (n) | Girls (n) | Total |
| 1 to 4 | 48 (82.8%) | 26 (89.7%) | 74 |
| 5 to 7 | 6 (10.3%) | 1 (3.4%) | 7 |
| 8 to 9 | 4 (6.9%) | 9 (6.9%) | 13 |

Insignificance P-value< 0.416
Insignificance P-value<0.535

Table 5:

| Satisfaction with Aesthetics | AC grade (Children's evaluation) | | | Total | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | >4 | |
| Yes | 36 | 12 | 9 | 6 | 63 |
| No | 6 | 1 | 4 | 6 | 17 |
| Do not know | 2 | 1 | 2 | 2 | 7 |

Insignificance P-value <0.090

## DISCUSSION

Currently oral health and in particular the treatment of malocclusion, is not a high priority in Pakistan. However, for future, valid and reliable information regarding treatment needs will be needed. The current school-based study was conducted with an aim to estimate whether dental concern expressed by the grade of the AC chosen by the subjects is reliable and whether it may be predictive for potential co-operation in Pakistani population.

The SCAN scale (Standardized Continuum of Aesthetic Need) was applied using frontal intraoral photographs of a 12-year old school going children. In our study 87 school going children were enrolled. Because a number of studies stated that IOTN have shown that assigning 'own' dentition to the AC scale is a tough task. It was recognized about three decades ago that any

significant assessment of the need for orthodontic treatment must comprise of an assessment of the aesthetic impairment of a malocclusion (12).

IOTN is a scoring system that ranks malocclusion based on occlusal traits for oral health and aesthetic impairment.

AC of the IOTN has been used to assess treatment need on aesthetic grounds assessed by patients or dentists.

In our study 29 individuals were female and 58 were male, selected from three primary school in kpk Pakistan.

From our study it was concluded that teenager give great importance to teeth for attractive and well-arranged appearance. Dental appearance is an important contributor of the facial appearance of an individual (13). Dental appearance is a key factor in social interaction, career desire and getting of individuals (14). Psychologically it is indicated that facial attractiveness specially eyes and oral attractiveness is the most significant feature for overall look (15, 16). Dental appearance has a potential impact on the whole face (17). In a study conducted in Finland stated that dental arrangement in a good way had a high influence on the beauty and success of individuals (18). The dental appearance is an essential and fundamental component of facial beauty (19). Aesthetics is an important aspect that defines one´s personality (20).

Our study revealed that the level of satisfaction with dental aesthetics among the participants was 69.0% and 79.3% in boys and girls respectively. Our study were resembled by the finding of Izabela (11) but higher than the observation of Nabil M et al.(21).

In our study 56.9% boys and 58.6% girls wanted change, most of them wanted to change their colour followed by teeth arrangement. In our study most of the children do not want to undergo treatment (P-value <0.472).

Aesthetic Component of the IOTN comprises of a 10-grade scale illustrated by different colored intra-oral photographs. The series of photographs shows 3 categories in regard to treatment: (10) Grades 1-4: need no treatment. Grades 5-7: need borderline treatment. Grades 8-10: need severe treatment. In our study most of the individuals fell in Grade 1-4 category. Optimum oral health is impossible to attain without treatment. Globally, Most of the people undergo orthodontic treatment to improve aesthetics and to look attractive (22). Most of the individuals treated were satisfied with their dental aesthetics (69.0%). Same results were also reported by other studies (11, 23). However, this percentage is significantly lower than the percentage of children who classified themselves in the 'no treatment need' category. Children dissatisfied with their dental appearance selected grade 3 or higher three times more frequently than grade 1 or 2 (P < 0.09). In our study most of the patients were satisfied with Aesthetics.

## CONCLUSION

It was concluded that IOTN is reliable and reproducible due to its simplicity and objective nature of application. Large number of people were in need of the orthodontic therapy as per the aesthetic component of IOTN.

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