Survey amongst Orthodontist to validate reliability of IOTN in assessing severity of malocclusion

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Abstract-
The purpose of this study is to estimate whether grades given by IOTN index for assessing malocclusion is reliable and whether it may be predictive for potential cooperation.
Methodology- study cast and dental photographs of 50 patients with different malocclusion were given to 10 experienced (more than 5 year experience) orthodontists and requested to score them on the basis of DHC and AC components of IOTN.
Result- the outcome of the study shows that both DHC and AC reflects subjective perception of dental health and need for orthodontic treatment.
Conclusion- IOTN can be reliably used to assess severity of malocclusion. However, further study using large sample size is needed.
Key words- *IOTN, dental health component (DHC), aesthetic component (AC), malocclusion.*

I.   Introduction

Malocclusion is second most common oral health problem first being dental caries[1]. Presence of malocclusion leads to various oral health problems by affecting the functional needs. It also compromises dentofacial esthetics, speech, mandibular function and psychological wellbeing of an individual[2].

Various epidemiological indices has been developed in literature to assess patients dental appearance, treatment needs[3-6]. One such index i.e. Index of Orthodontic treatment needs (IOTN) described by Brook and Shaw[7] and Shaw et al[8] has gained widespread recognition for objectively assessing treatment needs.

IOTN comprises of two separate components i.e. dental health index (DHC) and aesthetic index (AC). DHC is an adaptation of an index used by Sweedish Medical Health Board (SMBI)[9]. Later on, Linder-Aronson & Co-workers in 1976 revised the index and added a fifth category as grade zero which describes subject with no need of treatment[10]. DHC represents biological or anatomical aspect of IOTN that record treatment need on the basis of dental health and function. One the other hand, the Aesthetic component consists of a 10-grade scale illustrated by numbered colour intra-oral photographs. The photographs represent three treatment categories: 'no treatment need' (grades 1-4), 'borderline treatment need' (grades 5-7), and 'great treatment need' (grades 8-10). Aesthetic component measures aesthetic impairment and justifies treatment on social- psychological ground[11].

The demand for orthodontic treatment is increasing in India mainly due to awareness and desire to improve esthetics. However, with large geographic area and population of around 130 crores, it becomes necessary to treat the patient according to orthodontic triage. At the institutional level, where large waiting times are present after the patient applies for orthodontic treatment, it becomes necessary to determine the patients who are in great and immediate need of treatment and give a high priority so as to achieve high standard of orthodontic treatment. Hence, it becomes crucial to assess reliability of an index.

Therefore, aim of the present study was a)to assess reliability of DHC by comparing index values examined by experienced Orthodontists. b)to assess reliability of AI by comparing index values examined by experienced Orthodontists.

II.   Materials and methods

A hospital based study was conducted among 10 experienced orthodontist. Sample size was calculated as 44 with the confidence level of 90% so that the real value should be within +/- 10%of the measured/surveyed value. Total of 50 samples were taken as round figure. Pre treatment records of 50 patients were collected with different orthodontic malocclusion. Pre treatment study cast and photographs were selected. No radiographic

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data was provided. Age distribution was not considered while selecting sample. 10 experienced orthodontists with more than 5 year experience are requested to examine the malocclusion and give score according to IOTN. To assess DHI, heirarchial scale was used as follows-

1. **M**issing teeth (including aplasia, displaced & impacted teeth)
2. **O**verjets (including reverse sagittal overjets)
3. **C**rossbites
4. **D**isplacements
5. **O**verbites
6. Pneumonic acronym: **MOCDO**

And study cast were assessed using criteria given in table 1

IOTN Dental Health Component	5	4	3	2	1
Missing teeth	5h □ extensive hypodontia □ restorative implications >1 tooth missing per quadrant requiring pre-restorative orthodontic treatment 5s = submerging primary teeth 5i = impeded eruption/ impaction	4h = less extensive hypodontia requiring orthodontic treatment for pre-restorative or space closure.			
Overjet	5a = OJ>9 mm 5m = ROJ >3.5 mm + masticatory and speech difficulties	4a = OJ 6.1-9 mm 4b = ROJ > 3.5 mm with no masticatory and speech difficulties	3a = OJ 3.6-6 mm + incompetent lips 3b = ROJ 1.1-3.5 mm	2a = OJ 3.6-6 mm + competent lips 2b = ROJ 0.1-1 mm	
Crossbite		4c = x-bites + >2 mm discrepancy between RCP and ICP 4l = posterior lingual x-bite	3c = x-bite + 1.1 – 2 mm discrepancy between RCP and ICP	2c = x-bite with up to 1 mm discrepancy between ICP and RCP	
Displacement of contact point		4d = contact point displacement >4 mm 4t = partially erupted teeth, tipped and impacted against teeth 4x = supplemental teeth	3d = contact point displacement 2.1- 4 mm	2d = contact point displacement 1.1 – 2 mm	Minor irregularity
Overbite (including open bite)		4e = lateral or anterior open bite >4 mm 4f = increased + complete OB + Gingival or palatal trauma	3e = lateral or anterior open bite 2.1- 4 mm 3f = increased + complete OB with no gingival trauma	2e = lateral or anterior open bite 1.1 – 2 mm 2f = increased OB >3.5 mm and no gingival contact.	

Table 1-DHC component using MOCDO acronym

For AC, Orthodontists were asked to rate the photographs on the basis of overall dental attractiveness as per the specific similarities given by IOTN index. (fig 1)
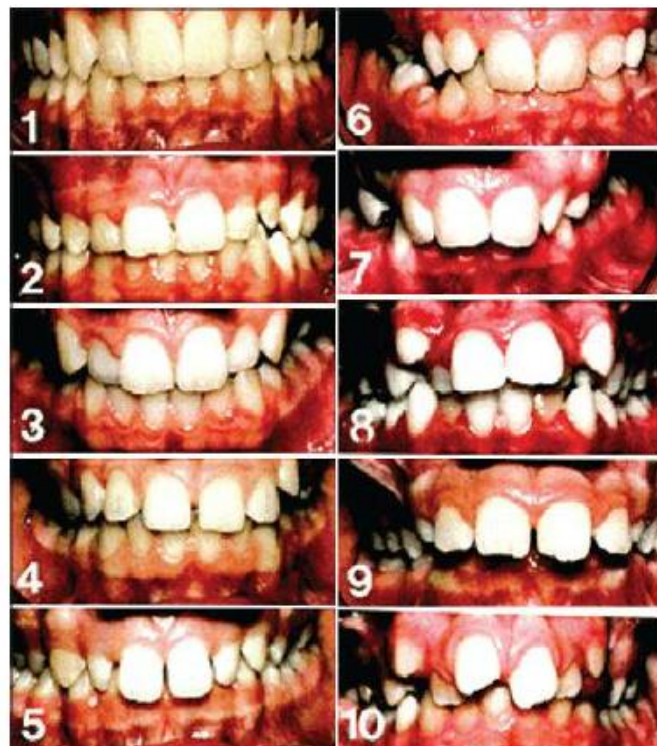

Fig1- IOTN AC scale

Statistical analysis-

The reliability between the findings of Clinical examination and IOTN index were measured using cronbach Alfa coefficient test which shows that the reliability value of 0.812, which is good.

Cases	Valid	50
	Excluded	0
	Total	50

Table 2- validity of sample.

Cronbach's Alfa	No of items
0.821	2

Table 3- Cronbach test carried out to assess correlation

III.   Discussion

Total of 50 study samples were selected. Age and gender distribution was not considered while selecting sample. Result of this survey study showed most of the Orthodontist scored within range for given specific study sample. Total scores for DHC and AI were similar upto 98%.

Orthodontic treatment is an integral part of oral health program. Hence, it becomes necessary to treat patients on the basis of orthodontic triage and treat the patients according to priority. IOTN provides sufficient information about treatment need for an individual. However, it becomes necessary to assess its reliability for specific population. Sample population in the present study was study cast and photographs of the patient who visited our institution for treatment purpose. Some of them were already undergoing treatment. However, only pre treatment records were considered to eliminate bias

Result of our study suggested that most of the orthodontist scored same for specific malocclusion. Hence IOTN can be used efficiently to assess treatment needs. However, study design with large sample size should be carried out in near future to validate present result.

IV.   Conclusion

IOTN was found quick, reliable and easy to use. Hence, IOTN may be adequate for public health planning and epidemiological survey. In areas where there is high demand for orthodontic treatment need it is necessary to establish need for the orthodontic treatment as fundamental so that individuals with greatest treatment need can be assigned priority.

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