Index of Orthodontic Treatment Need in a referred Nepalese population

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ABSTRACT

Objective: The study aims to assess the need for orthodontic treatment in a group of referred Nepalese population of Kathmandu valley.

Materials and method: Dental Health Component (DHC) and Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) was evaluated on a group of 412 Nepalese orthodontic patients including 142 male and 270 female subjects aged 11-30 years with the mean age 17.12 years by a single examiner.

Result: Dental Health Component showed 16 % no/little treatment need, 19.9 % showed borderline need, and 64.1 % showed great/severe treatment need. Aesthetic Component showed 26.5 % no/little treatment need, 32 % showed borderline need, and 41.5 % showed great/severe treatment need.

INTRODUCTION:

Over the past decades, the impact of oral health, oral disease, malocclusion, dental appearance, facial aesthetics, and their management on psychological and functional well-being has drawn increasing attention for clinicians and researchers. The oral-facial region is usually an area of significant concern for the individual because it draws the attention from other people in interpersonal interactions and is the primary source of vocal, physical, and emotional communication. Facial and dental attractiveness represents an important element on quality of life. An attractive smile and well-aligned teeth are important to laypersons, perhaps more valued than the improved oral function. According to some studies in social-psychology, it has been shown that physical appearance of an individual play an important role in his/her social relations and facilitate in obtaining social skills. Thus it is necessary to determine the patient who is in need of orthodontic treatment and prioritize those with higher treatment needs.

Malocclusion is a public health concern in population; however due lack of orthodontic awareness on treatment need and lack of availability of population data; epidemiological study is required for evaluation and planning of orthodontic services. Several indices have been developed to categorize malocclusion into groups according to the level of treatment need. Some of the examples are Grainger’s Treatment Priority Index (1967), Salzmann’s Handicapping Malocclusion Assessment Record (1968), Summer’s Occlusal Index (1971). In recent years; the Index of Orthodontic Treatment Need (IOTN) and the Peer Assessment Rating (PAR) are being used more commonly to assess orthodontic treatment need, priority, and evaluation of treatment success.

Index of Orthodontic Treatment Need (IOTN) was first developed in Britain by Brook and Shaw in 1989 as a system for grading malocclusions. The aesthetic component of IOTN was developed originally by Evan & Shaw in 1987. The British Orthodontic Society states that; if the treatment has to be rationalized the IOTN is an objective and reliable way for specialists to select the patients who will benefit most from the treatment and is a fair way to prioritize the limited health service resources.

Various studies on determination of orthodontic treatment needs were carried out on the basis of IOTN by different authors: Brook and Shaw (1989), Burden and Holmes (1994), Mandall et al. (1999), Kok et al. (2004), Holmes and Willmot (1996), and in different countries: England (Brook & Shaw 1989, Richmond et al 1994), Norway (Birkeland et al., 2000), Switzerland (Firestone et al, 1999), Turkey (Ucuncu and Ertugay, 2001), Iran (Hedayati et al. 2007, Padisar et al 2009) and Pakistan (Zahid et al. 2012). Thus the study aims to assess the need for orthodontic treatment in a group of referred Nepalese population of Kathmandu valley.

MATERIALS AND METHOD:

A study on Index of Orthodontic Treatment Need (IOTN) was done to assess the orthodontic treatment need in a referred Nepalese population. A total of 412 patients with
Conclusion: Increasing trend of treatment need for more severe forms of orthodontic problems seen in Nepalese orthodontic patients according to DHC and AC scores in age groups 11-25 years and for both male and female gender groups.

Key words: index, malocclusion, orthodontic treatment, referred population
142 male and 270 female of the age ranging from 11-30 were included in the study. The study was conducted among the patients of Department of Orthodontics, Kantipur Dental College Teaching Hospital & Research Center (KDCCH), Kathmandu who were seeking orthodontic treatment during the year 2008-2012. The subjects were evaluated using dental cast and intra-oral photograph.

IOTN comprise of two components: Dental Health Component (DHC) and Aesthetic Component (AC). The accurate use of IOTN requires specialist training. The objective assessment of Dental Health Component and the subjective assessment of Aesthetic Component should take place in a specialist practice. Thus the qualified specialist orthodontist; co-author of the present research evaluated the samples used in the study. To maintain reproducibility and reliability of the data, all the data were collected and measured by a single examiner. The study was conducted as per the guidelines published by the European Orthodontic Society. The subjects were also assessed for the distribution of malocclusion status according to Angle's classification based on molar relation. Data were analyzed using SPSS 16.0 version.

**DENTAL HEALTH COMPONENT (DHC):**

Dental Health Component can be examined either clinically or on the study model. In the present study, dental stone study model were used to determine the DHC. Study models were examined and graded by the specialist to determine the DHC of the IOTN. The grades of DHC are based on occlusal characteristics: overjet, overbite, crossbite, contact point displacement, missing teeth and other occlusal abnormalities.

Dental Health Component (DHC) comprise of 5 grades: Grade 1- no treatment need, Grade 2- slight/ little treatment need, Grade 3- moderate/borderline treatment need, Grade 4- great treatment need, Grade 5- very great treatment need.

**Dental Health Component (DHC)**

**Grade 1: No treatment need**
1 - Extremely minor malocclusions including displacements less than 1mm

**Grade 2: Little treatment need**
2a - Increased overjet greater than 3.5 mm but less than or equal to 6 mm with competent lips
2b - Reverse overjet greater than 0 mm but less than or equal to 1 mm
2c - Anterior or posterior crossbite with less than or equal to 1mm discrepancy between retruded contact position and intercuspal position
2d - Displacement of teeth greater than 1mm but less than or equal to 2mm
2e - Anterior or posterior open bite greater than 1mm but less than or equal to 2mm
2f - Increased overbite greater than or equal to 3.5mm without gingival contact
2g - Prenormal or postnormal occlusion with no other anomalies. Includes up to half a unit discrepancy

**Grade 3: Moderate or Borderline treatment need**
3a - Increased overjet greater than 3.5 mm but less than or equal to 6 mm with incompetent lips
3b - Reverse overjet greater than 1 mm but less than or equal to 3.5 mm
3c - Anterior or posterior crossbite with greater 1mm but less than or equal to 2mm discrepancy between retruded contact position and intercuspal position
3d - Displacement of teeth greater than 2mm but less than or equal to 4mm
3e - Lateral or anterior open bite greater than 2 mm but less than or equal to 4mm
3f - Increased and complete overbite without gingival or palatal trauma

**Grade 4: Great treatment need**
4a - Increased overjet greater than 6 mm but less than or equal to 9 mm
4b - Reverse overjet greater than 3.5 mm with no masticatory or speech difficulties
4c - Anterior or posterior crossbite with greater than 2 mm discrepancy between retruded contact position and intercuspal position
4d - Severe displacements of teeth greater than 4 mm
4e - Extreme lateral or anterior open bite greater than 4mm
4f - Increased and complete overbite with gingival or palatal trauma
4h - Less extensive hypodontia requiring prerestorative orthodontics or orthodontic space closure to obviate the need for a prosthesis
4l - Posterior lingual crossbite with no functional occlusal contact in one or both buccal segments
4m - Reverse overjet greater than 1mm but less than 3.5 mm with recorded masticatory and speech difficulties
4t - Partially erupted teeth, tipped and impacted against adjacent teeth
4x - Existing supernumerary teeth

Grade 5: Very great treatment need
5a - Increased overjet greater than 9 mm
5h - Extensive hypodontia with restorative implications (more than 1 tooth missing in any quadrant) requiring prerestorative orthodontics
5i - Impeded eruption of teeth (except 3rd molars) due to crowding, displacement, presence of supernumerary teeth, retained deciduous teeth and any pathological cause
5m - Reverse overjet greater than 3.5 mm with reported masticatory and speech difficulties
5p - Defects of cleft lip and palate
5s - Submerged deciduous teeth