Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.

**Corresponding Author:**
Dr. Laxman Khanal,
Junior Resident, Human Anatomy, BPKIHS, BPKIHS,dharan, 00977 - Nepal

**Submitting Author:**
Dr. Laxman Khanal,
Junior Resident, Human Anatomy, BPKIHS, BPKIHS,dharan, 00977 - Nepal

**Other Authors:**
Dr. Jamal Giri,
Junior Resident, Institute of Medicine(IOM), Department of Orthodontics - Nepal
Dr. Hemraj Gaire,
Dentist, BPKIHS, Arghakhanchi, Nepal - Nepal

**Article ID:** WMC003602
**Article Type:** Research articles
**Submitted on:** 30-Jul-2012, 12:06:11 PM GMT  **Published on:** 31-Jul-2012, 06:25:14 PM GMT
**Article URL:** [http://www.webmedcentral.com/article_view/3602](http://www.webmedcentral.com/article_view/3602)
**Subject Categories:** DENTISTRY
**Keywords:** Aesthetic component, Dental health component, Index of orthodontic treatment need, WHO/FDI 1979

**How to cite the article:** Khanal L, Giri J, Gaire H. Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.. WebmedCentral DENTISTRY 2012;3(7):WMC003602

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**Source(s) of Funding:**
We got the fund for this research from the department of community dentistry, CODS, Dharan, Nepal.

**Competing Interests:**
None

**WebmedCentral Peer Reviewed:** No
Introduction

Malocclusion is one of the common problems seen in all parts of the world and varies according to genetic, environment and race and we dental students are no exceptions. It causes the impairment of oral health, functions, aesthetics and also affects the psychology of an individual according to their perception. Since the classification of malocclusion by Edward Angle about 110 years back, people have tried to study about the incidence, prevalence and treatment needs of malocclusion among different groups of people around the world, this study is another brick in the wall. This study is the first of its kind done among the dental students of College of Dental Surgery, B P Koirala Institute of Health Sciences, which apparently represents the entire country (Nepal); geographically, socio-economically and racially. This study is an attempt to measure the level of awareness among the dental students about malocclusion. Various indices have been used to assess the treatment needs in different studies like treatment priority index, Handicapped Labiolingual Deviation index (HLD), Summer’s occlusal index, etc; this study makes use of IOTN index which has been gaining national and international recognition as a method of objectively assessing the treatment needs. This index ranks malocclusion in terms of significance of various occlusal traits for the persons’ dental health and perceive aesthetic impairment with the intention of identifying those persons who would be most likely to benefit from orthodontic treatment.

IOTN has 2 components:
1. DHC (Dental Health Component): Where the examiner examines the patient’s occlusion according to the parameters given by IOTN and determines the patient’s orthodontic treatment needs. 2. AC (Aesthetic Component): Where the patient is asked to rate his/her occlusion or appearance against 10 standard photographs and decide on the need for orthodontic treatment. Hence IOTN assesses the orthodontic treatment need from the dentist’s and patient’s point of view. WHO/FDI index is another index used for the assessment of malocclusion. It assesses the malocclusion based on 3 headings: 1. Gross anomalies – cleft lip, cleft palate and syndromes 2. Teeth – absent teeth, supernumerary teeth, malformation, ectopic eruption, diastema, crowding and spacing. 3. Occlusion – overjet, overbite, openbite, crossbite, midline shift, molar relation, and any other important findings.

Methods

A cross-sectional study was conducted among 134 students (53 females and 81 males) of BPKIHS, Dharan, Nepal, from 18th January to 18th February 2010. Informed consent (in written form) was obtained from each student prior to study. Each student was asked a close ended question regarding the influence of malocclusion (“Has malocclusion affected your personal and social life?”) after recording their demographic data. All examinations were conducted by 4 examiners who were accompanied by 4 alert and co-operative recording clerks using a mouth mirror and WHO probe in good illumination within 5 minutes. On completion of clinical examination a frontal view intra-oral photograph of each student was taken and student was asked to rate his/her photograph against 10 standard photographs showing different level of dental attractiveness. Students’ assessments were recorded according to the grading of standard photograph they thought ‘best look like’.

Result

During the study, when the students were asked a closed ended question regarding malocclusion (“Has malocclusion affected your personal and social life?”), 29(21.64%) of them replied in affirmative (Illustration 1).

Only, 8 Students who had replied in negative were actually in “definite need” category according to DHC of IOTN and 1 student was in “definite need” category according to AC of IOTN (Illustration 2).

The survey revealed that 103(76.86%) students had “no need” for orthodontic treatment according to DHC,
15(11.19%) students had a “borderline need” for orthodontic treatment and the number of students with the “definite need” for orthodontic treatment was 16(11.94%) (illustration 3).

When the students were asked to assess their dental appearance according to the AC of IOTN, 124(92.53%) found themselves in “no need” category as 4(2.98%) and 6(4.47%) thought they best fit in “border line” or “definite need” categories respectively (illustration 4).

When the results were analyzed according to gender, boys were found to be in more need of orthodontic treatment compared to girls.

According to AC of IOTN for boys; 88.8% were in no need category, 4.93% were in borderline category and 6.17% were in definite need category. For girls it was 98.1%, 1.9% and 0% respectively (illustration 5).

According to DHC of IOTN for boys; 72.83% were in no need category, 13.58% were in borderline category and 13.58% were in definite need category. For girls it was 83.01%, 7.54% and 9.43% respectively (illustration 6).

Common malocclusion among dental students (according to WHO/FDI, 1979) was crowding in 82 students (crowding of lower anteriors being most common) followed by spacing, missing, malformation etc as shown in following bar diagram (illustration 7).

The interarch molar relationship of the students was found to be Angle’s class I in 72.38 % (97), class II in 19.40 % (26) and class III in 5.97 % (8). Also, 2.23 % (3) students either had class IV relation or had missing first molars (illustration 8).

**Discussion**

In our study 11.94% students were in definite need of orthodontic treatment according to DHC of IOTN which is quite less than the number of students who were in definite orthodontic need category in a Maltese[2] schoolchildren study (42.08%) and an Iranian[3] schoolchildren study (45.7%). But, the result of our study was similar to the Iranian[3] school children study according to AC of IOTN where 4.47% students of our study and 3.3% students of Iranian[3] study thought they belonged to definite need category contrary to the Maltese[2] schoolchildren study where 26% students thought so. In the Iranian[3] schoolchildren study female students had a greater demand of treatment according to AC of IOTN(35.2% for females vs. 20.9% for males ) unlike our study where male students found themselves in more need of treatment compared to their female counterparts(11.1% for males vs. 1.92% for females).

92.53% students of our study didn’t feel the need of orthodontic treatment according to AC of IOTN which was similar to a study in Turkey[4] where 90.4% students felt the same. The most common malocclusion recorded in the Maltese[2] study was crowding (35%) like our study where 61.19% students had crowding.

The difference in need for orthodontic treatment may be because of the following reasons.

1. **Sample selection:** In our case, study samples were graduating dental students who were aware of malocclusion and most of them who had malocclusion were undergoing orthodontic treatment and hence were excluded from the study unlike the Maltese[2] and Iranian[3] study where the samples were schoolchildren.

2. **Age factor:** Maltese[2] study was done among 12 year old school children who were more likely to have transient malocclusion due to mixed dentition hence were more likely to have higher scores according to AC of IOTN. In our study all the students were above 19 years.

3. **Socioeconomic status:** Iranian[3] study was done among the indigenous residents who were both socially as well as economically not developed and large number of people didn’t believe in restoring primary teeth. In our study, the samples were mostly from middle class family and mostly aware of malocclusion.

4. **Level of awareness:** The dental students, samples of our study, were found more aware of their malocclusion compared to school children as observed in other studies[2,3,4] because aesthetic component and dental health component of IOTN were found closely matching in our study.

**Conclusion**

The prevalence of malocclusion was less common among the dental students of BPKIHS, Dharan, Nepal compared to students of other parts of the world under similar study[2,3,4]. The dental students were found to be more aware of their malocclusion. This study clarified that in spite of great need for orthodontic treatment according to the DHC of IOTN, orthodontic demand is highly related to the AC and the latter index
should be considered in governmental dental health programs.

Acknowledgement

We acknowledge the constant guidance, support and endeavour of Dr. Ashish Shrestha, Head of Department, Department of Community Dentistry, B.P.Koirala Institute of Health Sciences (BPKIHS), Dharan for carrying out this study. We highly appreciate Dr J.N.Sharma, Head of Department, Department of Orthodontics, BPKIHS, for his expert opinions and valuable advices for making this study a success. We are thankful to Dr. Arjun Bhandari, Dental surgeon of BPKIHS for his co-operation and suggestion during our study. We also thank Mr. Prakash Subedi and Mr. Ek Bahadur Tamang in providing, sterilizing and arranging instruments. We are grateful to all the students who participated in our study.

References

Illustrations

Illustration 1

figure 1

[Bar chart showing the impact of malocclusion on personal and social life. The chart shows the number of participants who answered 'yes' or 'no' to the question 'Has malocclusion affected your personal and social life?'.]

- Total: 105 (29 yes, 76 no)
- Male: 58 (23 yes, 35 no)
- Female: 47 (6 yes, 41 no)
Illustration 2

table 3

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>No need</th>
<th>Borderline</th>
<th>Definite need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>81</td>
<td>72 (88.8%)</td>
<td>4 (4.93%)</td>
<td>5 (6.17%)</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>52 (98.1%)</td>
<td>1 (1.9%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Table 3
Illustration 3

figure 2

![Pie chart showing treatment need according to DHC]

Illustration 4

figure 3

![Pie chart showing treatment need according to AC]
Illustration 5

Table 1- According to DHC of IOTN

<table>
<thead>
<tr>
<th>Student’s reply</th>
<th>Total</th>
<th>No need</th>
<th>Borderline</th>
<th>Definite need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>29(21.64%)</td>
<td>23(17.2%)</td>
<td>1(0.74%)</td>
<td>5(3.7%)</td>
</tr>
<tr>
<td>No</td>
<td>105(78.36%)</td>
<td>101(75.3%)</td>
<td>3(2.2%)</td>
<td>1(0.74%)</td>
</tr>
</tbody>
</table>

Table 2- According to AC of IOTN

<table>
<thead>
<tr>
<th>Student’s reply</th>
<th>Total</th>
<th>No need</th>
<th>Borderline</th>
<th>Definite need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>29(21.64%)</td>
<td>17(12.6%)</td>
<td>4(2.9%)</td>
<td>8(5.9%)</td>
</tr>
<tr>
<td>No</td>
<td>105(78.36%)</td>
<td>86(64.2%)</td>
<td>11(8.2%)</td>
<td>8(5.9%)</td>
</tr>
</tbody>
</table>
Table 5

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>No need</th>
<th>Borderline</th>
<th>Definite need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>81</td>
<td>59(72.83%)</td>
<td>11(13.58%)</td>
<td>11(13.58%)</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>44(83.01%)</td>
<td>4(7.54%)</td>
<td>5(9.43%)</td>
</tr>
</tbody>
</table>

Table 5
Illustration 7

figure 4

Illustration 8

figure 5
Reviews

Review 1

Review Title: Epidemiology of Malocclusion
Posted by Dr. William J Maloney on 15 Sep 2012 09:11:06 PM GMT

What are the main claims of the paper and how important are they?:
The main purpose of this article is to review the epidemiology of malocclusion and to assess the orthodontic needs of a certain group of individuals.

Yes
Yes
Yes

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
Yes
Yes
No
No

Rating: 5

Comment:
Malocclusion is one of the common problems seen in all parts of the world. The studies analyzed 134 students from Dharan, Nepal. 76.86% of the students were determined to have 'no need' for orthodontic treatment.

Competing interests: No

Invited by the author to make a review on this article?: No

Have you previously published on this or a similar topic?: No

References:

Experience and credentials in the specific area of science:
Clinical associate professor

How to cite: Maloney W. Epidemiology of Malocclusion[Review of the article 'Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.' by ].WebmedCentral 1970;3(9):WMCRW002236
Review 2

Review Title: Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.

Posted by Dr. Constantino Ledesma-Montes on 01 Sep 2012 05:47:34 AM GMT

What are the main claims of the paper and how important are they?:
This manuscript deals with the frequency of malocclusions and orthodontic needs in a student population.

No. There are numerous studies with the same aim in the literature.

Yes

No. The statistical methods is not adequate.

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
NA

Yes. But it is not convenient that future studies follow this methodology.

The results re not enough to consider it is a good study.

The results re not enough to consider it is a good study.

Rating: 3

Comment:
NA

Competing interests: No.

Invited by the author to make a review on this article?: No

Have you previously published on this or a similar topic?: No

Experience and credentials in the specific area of science:
I am in a Dental Diagnosis clinic.

How to cite: Ledesma-Montes C. Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.[Review of the article 'Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.' by ].WebmedCentral 1970;3(9):WMCRW002217
Review 3

Review Title: Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS Dharan, Nepal

Posted by Dr. Varghese Chacko on 01 Sep 2012 04:57:37 AM GMT

What are the main claims of the paper and how important are they:

Study claims to be the first of its kind done on dental students in Nepal, BUT THE IMPORTANCE OF SELECTION OF THIS STUDY GROUP IS NOT EXPLAINED.(WHY WERE ONLY DENTAL STUDENTS CHOSEN?)

IT MIGHT BE THE FIRST STUDY ON EPIDEMIOLOGY OF MALOCCLUSION AMONG DENTAL STUDENTS, BUT THE REASONING THAT THIS STUDY GROUP REPRESENTS THE ENTIRE COUNTRY IS FLAWED. SIMILAR STUDY DONE IN SAME REGION " Epidemiology Of Malocclusions And Assessment Of Orthodontic Treatment Need For The Population Of Eastern Nepal ". AUTHORS: SHARMA & JAGAN NATH

CLAIMS TO BE THE FIRST STUDY OF ORTHODONTIC TREATMENT NEEDS & EPIDEMIOLOGY OF MALOCCLUSION AMONG DENTAL STUDENTS IN NEPAL WHICH IS TRUE

RESULTS ARE POORLY WRITTEN

AIM OF THE STUDY NOT PROPERLY MENTIONED.IS IT TO STUDY EPIDEMIOLOGY OF MALOCCLUSION (AS IN TITLE ) / AWARENESS OF MALOCCLUSION (AS MENTIONED IN INTRODUCTION)

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?

CROSS SECTIONAL STUDY. NO DEVIATIONS FROM PROTOCOL

1. POOR SELECTION OF STUDY POPULATION
2. WHAT DOES IOTN STAND FOR
3. WHICH INDICES WERE USED IN STUDY NOT CLEARLY STATED
4. DID ALL TH 4 EXAMINERS EXAMINE ALL THE SUBJECTS
5. WAS THERE ANY NEED FOR CALIBRATION AMONG THE EXAMINERS

STUDY ON GENERAL POPULATION WOULD HAVE HAD MORE IMPORTANCE

STUDY ON GENERAL POPULATION WOULD HAVE HAD MORE IMPORTANCE

Rating: 2

Comment:
OVERALL A POORLY WRITTEN PAPER. important drawbacks

1) AIMS OF PAPER NOT PROPERLY STATED. IS IT TO FIND OUT EPIDEMIOLOGY OF MALOCCLUSION OR AWARENESS OF MALOCCLUSION AMONG DENTAL STUDENTS?
2) WHAT DOES IOTN STAND FOR?
3) VARIOUS INDICES NAMED IN INTRODUCTION BUT METHODOLOGY DOES NOT EXPLAIN WHICH ONE WAS USED.
4) REASONING THAT DENTAL STUDENTS OF BPKIHS REPRESENT ENTIRE POPULATION OF NEPAL IS FLAWED
5) findings of A SIMILAR STUDY DONE IN THE SAME REGION TITLED "Epidemiology Of Malocclusions
And Assessment Of Orthodontic Treatment Need For The Population Of Eastern Nepal * has not been considered by the authors.

6) what is class 4 molar relation?

Competing interests: NIL

Invited by the author to make a review on this article? : No

Have you previously published on this or a similar topic?: No

Experience and credentials in the specific area of science:
I AM INVOLVED IN TEACHING & PRACTISING PEDIATRIC DENTISTRY

How to cite: Anonymous.Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal [Review of the article 'Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.' by ].WebmedCentral 1970;3(9):WMCRW002216
Review 4

Review Title: Epidemiology of Malocclusion and Assessment of Orthodontic

Posted by Prof. Silvia S Sales-Peres on 28 Aug 2012 07:31:36 PM GMT

What are the main claims of the paper and how important are they?:
This study is proposed to measure the level of awareness among the dental students about malocclusion and orthodontic treatment need. According to WHO, the malocclusion can be measure by DAI (dental aesthetic index). The article shows limited information about the topic studied and need improve the statistical analysis

Yes
Yes
Yes

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
NA

The methodology could be change.

NA
NA

Rating: 4

Comment:
In the text were included few references and several times the authors presented previous work without citation.

Competing interests: None

Invited by the author to make a review on this article? : No

Have you previously published on this or a similar topic?: Yes

References:

How to cite: Anonymous.Epidemiology of Malocclusion and Assessment of Orthodontic[Review of the article 'Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.' by J.WebmedCentral 1970;3(8):WMCRW002207
Review 5

Review Title: Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.

Posted by Dr. Sanjay Rastogi on 28 Aug 2012 06:20:55 PM GMT

What are the main claims of the paper and how important are they?:
This is an attempt by the author to specify the treatment needs within the dental students. Moreover, it is the understanding of the awareness of orthodontic treatment among them.

Yes
Yes
Yes

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
NA
NA
NA
NA

Rating: 5

Comment:
NA

Competing interests: None

Invited by the author to make a review on this article? : No
Have you previously published on this or a similar topic?: No
Experience and credentials in the specific area of science:
6 years

Review 6

Review Title: Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Needs Among BDS Students of BPKIHS, Dharan, Nepal.

Posted by Dr. Prabhat Kc on 06 Aug 2012 04:50:45 AM GMT

What are the main claims of the paper and how important are they?:
This study is an attempt to measure the level of awareness among the dental students about malocclusion and orthodontic treatment need. For any community and planning of public health services it is very important.

Yes

Yes

Yes

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
NA

Yes

Yes

Yes

Rating: 6

Comment:
Very few reference are cited also in text many placed author reported previous ork ithout citation.

Competing interests: NA

Invited by the author to make a review on this article?: Yes

Have you previously published on this or a similar topic?: No

References:

Experience and credentials in the specific area of science:
NA

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