

Oral Impacts on Daily Performances Related to Wearing Orthodontic Appliances among the Patients Reporting to the Department of Orthodontics and Dentofacial Orthopaedics, Dhaka Dental College and Hospital

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ABSTRACT

Introduction: Patients may have some oral impacts on their day to day activities during the course of treatment with orthodontic appliances. Often the impacts may lead the patient to interrupt or terminate the treatment. Proper information on frequency, intensity and extent of the oral impacts on daily performances related to wearing orthodontic appliances during orthodontic treatment will help the patients and orthodontists to increase the treatment compliance.

Objectives: To assess the frequency, severity and extent of oral impact on daily performances (OIDP) in the patients wearing orthodontic appliances in relation to type of orthodontic appliances and sex of patients.

Materials and method: The study was a descriptive cross sectional study with 300 participants by convenient sampling aged 10-25 years, undergoing orthodontic treatment at the department of Orthodontics & Dentofacial Orthopedics of Dhaka Dental College & Hospital. Face-to-face structured interviews and clinical examination were done to collect information about OIDP.

Results: Three hundred patients (31% male and 69% female) undergoing orthodontic treatment participated in the study. The prevalence of condition-specific impacts related to wearing orthodontic appliances was 31.7%. Among adolescents with impacts related to wearing orthodontic appliances, 17.8% reported impacts of severe or very severe intensity and 90.5% reported impacts on only one daily performance, commonly eating or speaking or cleaning mouth. The prevalence and the extent, but not the intensity of condition-specific impacts differed by type of orthodontic appliance ($P = .002^*$ and $.004^*$ respectively).

Conclusion: Almost one in three participants undergoing orthodontic treatment reported side effects, specific impacts on daily living related to wearing orthodontic appliances. Such impacts were higher among patients wearing fixed and combination of both fixed and removable type of orthodontic appliances rather than removable type. This information could help to inform patients about the frequency and intensity of sociodental impacts during the course of their treatment.

Key words: Orthodontic appliance, Oral impact.

INTRODUCTION

The prevalence of malocclusion among 12 to 14 years old Bangladeshi school children of Dhaka city is 65.5%.¹ Another study showed 68.4% of 17 to 25 years old young adults have no or little malocclusion requiring no or little orthodontic treatment and 31.4% have specific malocclusion requiring varying grade of orthodontic treatment from elective orthodontic treatment to mandatory orthodontic treatment.² Hossain et al. reported in 1994, patients with malocclusion attending to the department of orthodontics at Dhaka Dental College and Hospital fall into class I case 55.22%, class II case 33.33%, class III case 8.46%, nonspecific case 2.00% and open bite case 0.99%.³ An Indian study among 8-12 years old school children in Bangalore reported normal occlusion in 29% and malocclusion in 71% of subjects.⁴

Malocclusions are usually treated with orthodontic appliances and the patients may have some impacts on their day to day activities during the course of treatment with orthodontic appliances. There may be some difficulties in swallowing and speech with removable orthodontic appliance and these problems persist to some degree.⁵ However, while most previous studies have only assessed the experiences of pain and discomfort among orthodontic patients immediately after insertion of appliances or during the progression of treatment, evaluation of the results showed that an adaptation to pain and discomfort occurred during the first one week after placement of the appliance.⁵⁻¹¹ Pain and discomfort during orthodontic treatment may have a negative influence on cooperation and some patients may even stop brushing their teeth. Furthermore, it has been shown that patients often choose to interrupt or terminate their treatment.

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In a study in Pakistan, aesthetics during treatment, gender bias, poor socio-economic status, discomfort and pain were found to be very important among all other barriers towards orthodontic treatment.¹² It is widely known that orthodontic treatment with appliances occasionally causes social discomfort and functional limitations. Patients self confidence level may be affected by visibility of the appliance and by speech impairment, especially during social interaction.¹³ That they are being worn is often obvious to others and it is possible that susceptible individuals may be self-conscious about wearing such devices in public. There may be tension, sensitivity and pain as well.⁵ Patient feels a mild aching sensation, and the teeth are quite sensitive to pressure, so that biting a hard object hurts. The pain typically lasts for 2 to 4 days, then disappears until the orthodontic appliance is reactivated.¹⁰ If light forces are used, the amount of pain experienced by patients can be decreased by having them engaged in repeated chewing during the first 8 hours after the orthodontic appliance is activated.¹¹ Few patients may have experience of small wound and very few suffer badly from ulceration caused by fixed appliance with the more incidence in female than male.¹⁴

There are very few studies on oral impacts on daily activities related to wearing orthodontic appliances. Few studies have assessed the socio-dental impacts of wearing orthodontic appliances.^{7,13,15,16} A condition-specific oral health related quality of life (OHRQoL) measure to assess the impact on daily performances of wearing orthodontic appliances would identify the problems patients experienced during the progression of orthodontic treatment and those were less in relation to their pretreatment expectation.¹⁶

Oral impacts on daily performances (OIDP) assessed the serious oral impacts on eight daily performances, namely, eating, speaking, cleaning the mouth, relaxing, smiling, studying or working, emotion, and social contact. Only those impacts related to wearing orthodontic appliances, hereafter referred as condition-specific impacts (CSI), are considered for the analysis. According to almost similar study among Brazilian adolescent, prevalence of the CSI related to orthodontic appliances by performances and type of orthodontic appliances were statistically significant but no statistically significant difference in the prevalence of CSI by gender.¹⁷

MATERIALS AND METHODS

The study was a descriptive cross sectional study and conducted in the Department of orthodontics and Dentofacial orthopedics, Dhaka Dental College and Hospital, Dhaka from May' 2013 to November' 2013. A total of 300 patients were selected by convenience sampling method.

Selection criteria

- 1 Bangladeshi origin.
- 2 Age ranging from 10-25 years.
- 3 At least 6 months experience of wearing orthodontic appliance.
- 4 Free from any other serious oral disease.

Exclusion criteria

1. Non-cooperative patient.
2. Patient of less than 10 years age.
3. Patient discontinuing orthodontic treatment.

Procedures of data collection

Data was collected with

1. Clinical examination which requires dental unit and dental mirror
2. Questionnaire data sheet

METHOD

After clinical examination information was collected through questionnaire data sheet on the following variables: frequency and severity of CSI, type of orthodontic appliances and sex of patients. The patients were given instructions on how to fill up the data sheet. They provided information on eight daily activities during the past six months. The data sheet consisted of 2 simple questions: one for frequency & another for severity of oral impact on each performance of 8 daily performances.

3-point score (scale) were applied for every question. If patients report an impact on any performance, its frequency (scale from 1, for "1 to 7 days" or "once or twice a month" to 3 for "15 days or more" or "3 or more times a week") and severity of its effect on their daily life (scale from 1, for "little effect" to 3 for "severe effect") were scored. If no impact was reported, then a zero score was assigned. The performance score was calculated by multiplying the corresponding frequency and severity scores. Since only six numbers could be obtained by multiplying 3-point frequency and severity scales (1, 2, 3, 4, 6, and 9), the intensity of the impacts was classified into very little (1), little (2), moderate (3-4), severe (6), and very severe (9).¹⁷⁻¹⁹ Required portion of questionnaire data sheet was translated in Bengali to be filled it up by the participant.

- The performance score (of each performances)
= Frequency score x severity score
- Classification of intensity of impact on each performance is done on the basis of performance score
- Overall OIDP score: (0 - 78)
= $\frac{\text{Sum of 8 performances score} \times 100}{72}$
- Overall intensity of CSI = The most severe impact on any of 8 performances
- Extent of CSI = Number of performances affected (1-8)

Data analysis

All data analyzed through Statistical Package for Social Science Software (SPSS) / STATA version 10.

RESULT

Three hundred patients, 93 (31%) male and 207 (69%) female, undergoing orthodontic treatment participated in this study (Fig. 1). Their mean age was 17.7±4.6 years. Out of 300 patients, 209 (69.67%) patients used fixed, 78 (26%) patients used removable and 13 (4.33%) patients used both type of appliances (Table 1).

Eating (16%), speaking (6%) and cleaning mouth (5.7%) were the most commonly affected daily performances (Fig. 2). Though the prevalence of the CSI related to orthodontic appliances was 31.7%, studying or working and emotion were not impacted at all by wearing appliances (Table 2). There was no statistically significant difference in the prevalence of CSI by gender. However, the prevalence of CSI was significantly higher in patients wearing fixed appliances and both types of appliances compared to those wearing only removable appliances (P = .002) (Table 3).

Among the 95 patients with CSI, 17.8% reported impacts of severe or very severe intensity (Table 2). Although eating was the very severely impacted daily performance, only one patient (2.1%) reported impacts on eating of very severe intensity. On the other hand, numerous patients with CSI related to wearing orthodontic appliances reported impacts of severe intensity for eating (20.8%), speaking (16.7%) and leaning mouth (17.7%). There was no statistically significant difference for the intensity of CSI by gender (P = .175) and by the type of orthodontic appliance (P = .248) (Table 4). The mean number of performances affected was 1.10±0.34 per patient; 90.5% of the patients with impacts reported one affected performance, 8.6% reported two affected performances and 0.9% (only one patient) reported three affected performances (Fig. 3). There was no statistically significant difference in the extent of CSI by gender (P= .183) but extent of CSI by type of appliance was statistically significant (P= .004) (Table 5).

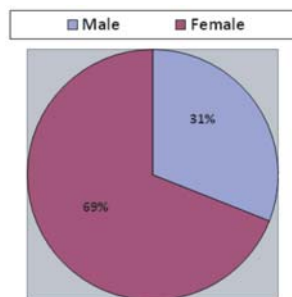


Fig. 1 shows that 69% of the participants were female and 31% of the participants were male

Table 1 Use of appliance by the participants

| Type of appliance | Male | | female | |
|-------------------|--------|------|--------|------|
| | Number | % | Number | % |
| Fixed | 57 | 61.3 | 152 | 73.4 |
| Removable | 32 | 34.4 | 46 | 22.2 |
| Both | 4 | 4.3 | 9 | 4.4 |

Table 1 shows that 61.3% (57) male used fixed, 34.4%(32) male used removable and 4.3% (4) male used both type of appliances where as 73.4% (152) female used fixed, 22.2%(46) female used removable and 4.4% (9) female used both type of appliances

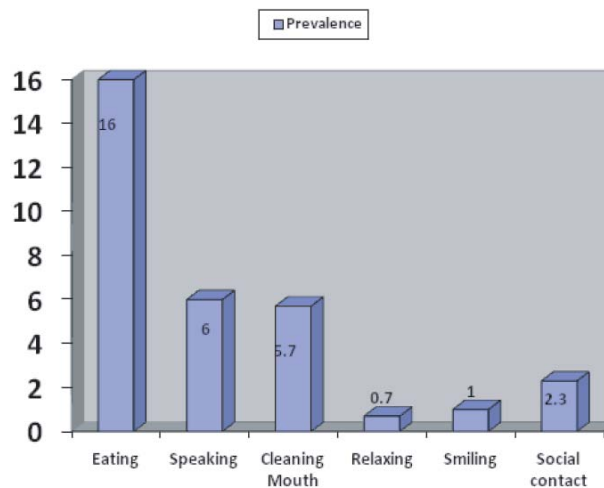


Fig. 2 Prevalence of impacts attributed to orthodontic appliances

Fig. 2 presents, eating (16%), speaking (6%) and cleaning mouth (5.7%) were the most commonly affected daily performances among all (six) affected performances (31.7%)

Table 2 Prevalence of impacts attributed to orthodontic appliance by covariables

| Covariables | With impacts | | Without impacts | | p-value |
|-------------------------------|--------------|------|-----------------|------|---------|
| | Number | % | Number | % | |
| Sex | | | | | |
| Male | 27 | 29.0 | 66 | 71.0 | 0.511 |
| Female | 68 | 32.9 | 139 | 67.1 | |
| Type of orthodontic appliance | | | | | |
| Fixed | 72 | 34.5 | 137 | 65.5 | 0.002* |
| Removable | 16 | 20.5 | 62 | 79.5 | |
| Both | 7 | 53.9 | 6 | 46.1 | |

Table 2 shows There was no statistically significant difference in the prevalence of CSI by gender but the prevalence of CSI was significantly higher in patients wearing fixed appliances (34.5%) and both types of appliances (53.9%) compared to those wearing only removable appliances (20.5%).

Table 3 Prevalence and intensity of impacts attributed to orthodontic appliances

| Indicator | Impacts by Performances | | | | | | | | |
|---|-------------------------|----------|----------------|----------|---------|---------|----------|----------------|-----------------|
| | Eating | Speaking | Cleaning mouth | Relaxing | Smiling | Emotion | Studying | Social contact | Over all impact |
| Prevalence of impacts (n=300) | | | | | | | | | |
| Number | 48 | 18 | 17 | 2 | 3 | 0 | 0 | 7 | 95 |
| % | 16.0 | 6.0 | 5.7 | 0.7 | 1.0 | 0 | 0 | 2.3 | 31.7 |
| Intensity of impacts (% of patients with impacts at each intensity level) | | | | | | | | | |
| Very little | 22.9 | 11.1 | 23.5 | 0 | 33.3 | 0 | 0 | 28.6 | 21.0 |
| Little | 35.4 | 22.2 | 23.5 | 50.0 | 33.3 | 0 | 0 | 28.6 | 30.5 |
| Moderate | 18.8 | 50.0 | 35.3 | 50.0 | 33.3 | 0 | 0 | 42.8 | 30.5 |
| Severe | 20.8 | 16.7 | 17.7 | 0 | 0 | 0 | 0 | 0 | 16.8 |
| Very severe | 2.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 |

Table 3 shows that the prevalence of the CSI related to orthodontic appliances was 31.7% (95) where studying or working and emotion were not affected at all by wearing appliances but other performances were affected at different frequency and severity by wearing appliances.

Table 4 Intensity of impacts attributed to orthodontic appliances by sex and type of orthodontic appliances

| Covariables | Very little-little | | Moderate | | Severe | | P-value |
|-------------------------------|--------------------|------|----------|------|--------|------|---------|
| | Number | % | Number | % | Number | % | |
| Sex | | | | | | | |
| Male | 18 | 36.7 | 6 | 20.7 | 3 | 17.6 | 0.175 |
| Female | 31 | 63.3 | 23 | 79.3 | 14 | 82.4 | |
| Type of orthodontic appliance | | | | | | | |
| Fixed | 43 | 87.8 | 22 | 75.9 | 7 | 41.2 | 0.248 |
| Removable | 6 | 12.2 | 7 | 24.1 | 3 | 17.6 | |
| Both | 0 | 0 | 0 | 0 | 7 | 41.2 | |

P < 0.05 is statistically significant

Table 4 shows that there was no statistically significant difference for the intensity of CSI by gender and by the type of orthodontic appliance and thus intensity of CSI was not affected by gender or by the type of orthodontic appliance.

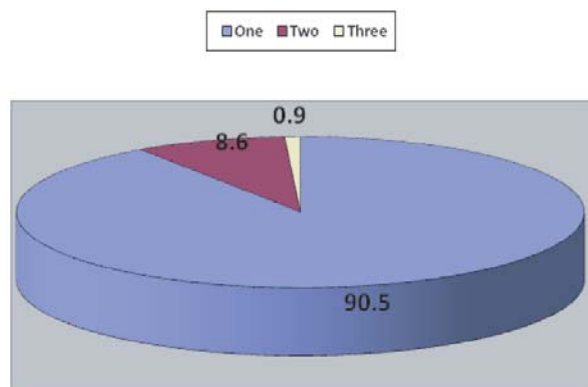


Fig. 3 Distribution of affected participants by number of performance

Fig. 3 presents, 90.5% of the patients with impacts reported one affected performance, 8.6% reported two affected performances and 0.9% reported three affected performances

Table 5 Extent of impacts attributed to orthodontic appliances by sex and by type of orthodontic appliances

| Covariables | Number | Mean±SD | Range | p-value |
|-------------------------------|--------|-----------|-------|---------|
| Sex | | | | |
| Male | 27 | 1.03±0.19 | 1-3 | 0.5247 |
| Female | 68 | 1.13±0.38 | 1-3 | |
| total | 95 | 1.10±0.34 | 1-3 | |
| Type of orthodontic appliance | | | | |
| Fixed | 72 | 1.71±0.75 | 1-3 | 0.004* |
| Removable | 16 | 1.06±0.25 | 1-3 | |
| Both | 7 | 1.00±0.00 | 1-3 | |
| Total | 95 | 1.10±0.34 | 1-3 | |

*P < 0.05 is statistically significant

Table 5 shows that there was no statistically significant difference in the extent of CSI by gender but extent of CSI by type of appliance was statistically significant. Extent of CSI is more in fixed and both types of orthodontic appliance than removable appliance.

DISCUSSION

This study investigated the sociodental impacts experienced by patients wearing different types of orthodontic appliances. The prevalence as well as the intensity and extent of condition-specific impacts caused by wearing orthodontic appliances were assessed in this study. This was done because information about intensity and extent of impacts represent an alternative method of describing or comparing

the impacts in relation to the oral conditions causing them.¹⁷⁻¹⁹ Moreover, using an oral health related quality of life (OHRQoL) measure to associate sociodental impacts to specific oral conditions is useful in planning and for prioritizing oral health care including orthodontics.^{19,20} This study demonstrates that an OHRQoL measure, such as the oral impacts on daily performances (OIDP), can be used to assess not only the outcomes of dental treatments, but also the side effects experienced during dental treatment.

In this study, almost one-third of patients wearing orthodontic appliances reported condition-specific impacts (CSI) on at least one daily performance during the last 6 months. Eating, speaking, cleaning mouth and social contact were the daily performances most commonly affected (Table 2), supporting previous study findings by Machale et al.²¹ Scheurer et al. in 1996 found that biting and chewing were the most painful everyday activities affected in the week after insertion of appliances.⁷ Sergl et al reported in 2000 that the main short- and long-term impacts of wearing appliances were on speech and swallowing as well as in reduced confidence when in public.¹³ And Mandall et al in 2006 reported that undergoing orthodontic treatment caused impacts related to aesthetic as well as to functional limitations.¹⁵

In our study prevalence of impact with fixed and removable orthodontic appliances were 34.5% and 20.5% respectively which agrees with the Brazilian study findings by Bernabé et al.¹⁷ and overall impact was 31.7% which differs from that study. This might be because of more number of participants with fixed appliance than removable appliance and less number of younger aged participants were included in our study but it correlates with the study of Brown and Moerhout²² and Scheurer et al.¹⁷

In an Indian study eating, social contact, cleaning teeth and speaking were the daily performances most commonly affected that matches with our study but prevalence of impact on daily performances was 86.92%²¹ which is more than our study finding. This might be because of inclusion of all participants with only fixed appliances and maximum participants were included from upper and upper middle class socioeconomic condition in their study who were undergoing orthodontic treatment in three private clinics and one dental college-hospital.¹⁷

Social contact was found to be one of the four most commonly affected performances in this study. This might be because of social and cultural backgrounds in the developing country like Bangladesh that has influence on dental behaviour. Participants in the present study were from young age group, as youngsters tend to be more concerned about their appearance, they might be vulnerable to feeling of shame and negative self-regard of their own physical appearance this might be the another reason why the social contact was in the list of commonly affected performance in this study which is shown by the study of Machale et al.²¹

Less than one-fifth patients with condition-specific impact were noticed to have severe or very severe intensity of impacts. The mean number of performances affected was 1.10 ± 0.34 per patient; 90.5% of the patients with impacts reported only one daily performance affected, 8.6% reported two affected performances which is consistent with the previous study findings¹⁷ and 0.9% (only one patient) reported three affected performances. No patient reported CSI on four or more performances, indicating that activities such as maintaining emotional stability and studying or working were not usually affected. Indeed, in our population activities such as studying or working and emotion were not affected at all by wearing orthodontic appliances.

There was no significant difference by gender in the prevalence, intensity, and extent of impacts caused by wearing orthodontic appliances, supporting the some other previous studies^{15,17} and contradicts few studies.^{7,14} It is likely that the different methodologies used among studies to assess condition-specific impacts may explain these differences.

Pain for orthodontic treatment had a definite influence on daily activities of patients. The pain appear within the first 24 hours is considered to be so disturbing that it causes some of them to wake at nights. Almost all patients from various studies reported moderate to extreme difficulty in chewing and biting foods of a firm and hard consistency, which causes them to take them soft diet.^{22,23}

There was a different pattern of sociodental impacts by type of orthodontic appliance worn by patients. The differences were found for the prevalence and extent, but not for the intensity of condition-specific impact. Patients wearing fixed or both types of appliance had a higher frequency and extent of impacts than those wearing removable appliances in this study. Over the short and long-term courses of treatment, fixed or functional appliances have been previously reported to produce a higher intensity of discomfort than removable appliances.^{5,7,8,13}

CONCLUSION

From the result and discussion, following may be the conclusion of the study:

- Less than one-third of the patients reported impacts on their daily life related to wearing orthodontic appliances, which implies that most patients wearing appliances had no problems.
- Among those patients with CSI related to wearing orthodontic appliances, about one sixth reported impacts of severe or very severe intensity and 90.5% reported impacts on only one daily performance, commonly on eating or speaking or cleaning mouth.
- The prevalence and extent of CSI differed by type of orthodontic appliance, whereas the intensity of CSI did

not differ by co-variables.

- The results of this study highlight that OIDP largely depend on type of orthodontic appliance in situ and patient's capability to accommodate the impacts associated with the appliance.

RECOMMENDATION

Recommendation is put forward for future researcher to do further studies, especially longitudinal studies to assess the change over time of the condition-specific impacts related to wearing orthodontic appliances.

The potential side effects of orthodontic therapy on daily living should be discussed carefully with patients before they give informed consent to treatment to prepare them for encountering discomfort during treatment.

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