

## Original Article



# Gingival Bleeding Index Status Among Orthodontic Patients Treated with Fixed Orthodontic Appliances in a Tertiary Level Hospital

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### Abstract

**Background:** Oral hygiene maintenance becomes difficult during fixed orthodontic treatment. **Objective:** The aim of this study was to assess Gingival Bleeding Index among patients treated with fixed orthodontic appliances in a tertiary level hospital. **Metanilit and Methody:** This study was conducted on 100 patients treated with fixed orthodontic appliances for more than six months in the OPD of Orthodontics Department at Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2013 to July 2014. All the information related to oral hygiene maintenance like brushing, dental floss use, use of mout hwash during treatment in the OPD were recorded. The Gingival Bleeding Index (GBI) was calculated and recorded. Apart from this, frequency of brushing, type of tooth brush, technique of brushing and inter dental brush were also considered. **Result:** Over all mean value of GBI was  $23.44 \pm 17.00$ . Mean value of GBI was  $26.44 \pm 15.23$  among patients who brushed their teeth once a day but it was decreased gradually as the patients increased frequency of toot hbrush use per day and became  $11.55 \pm 4.71$  among the patients who brushed their teeth thrice a day. Mean value of GBI was  $23.46 \pm 17.18$  who did not use dental floss and  $22.85 (12.64)$  who used dental floss once a day. Mean value of GBI was  $25.30 \pm 17.73$  who used inter dental brush irregularly but  $2.75 \pm 0.35$  who used it thrice a day. Mean value of GBI was  $25.17 \pm 17.69$  who did not use mouth wash whereas it reduced to  $8.00 \pm 0.00$  among them who used mouth wash thrice a day.

**Conclusion:** The Gingival Bleeding Index (GBI) is increased in patients treated with fixed orthodontic appliances.

**Keywords:** A Gingival Bleeding Index (GBI) and Fixed orthodontic appliance.

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### Introduction

Orthodontic therapy often involves the use of fixed appliances in the management of malocclusion and mal relationship of the dental arches. The placement of fixed orthodontic appliances can affect the oral hygiene procedures. So standard oral hygiene maintenance is essential for all patients undergoing orthodontic treatment. Inadequate oral care and dental hygiene practices can increase chance of development of gingivitis.

There are complications frequently encountered in orthodontic treatment like any treatment modality.<sup>1</sup> Dental decay usually occurs on smooth surfaces and is a common complication in orthodontics, affecting 2% to 96% of all orthodontic patients.<sup>2</sup> It has been also reported that there is an increase in stimulated salivary flow rate, pH, buffer capacity, Plaque Index (PI)

scores, and the levels of lactobacilli after three months of active orthodontic treatment.<sup>3</sup> During the first six months of treatment, a significant modification of oral microbial is found in subjects with fixed appliances. These outcomes suggest that the risk of gingivitis during their months of therapy was high.<sup>4</sup>

The margins of orthodontic bands usually run along proximal to the sub gingival area. Plaque accumulation in the sub gingival band margins can be a factor in the development of periodontal diseases.<sup>5</sup> This periodontal condition may persist even after the orthodontic treatment has concluded.<sup>6</sup> Orthodontists and dental hygienists are familiar with the oral hygiene problems that may be initiated by fixed appliances massive initial lesions and even more-advanced enamel loss following removal of the wires and brackets.<sup>7</sup> Therefore, a high standard of oral hygiene is essential for patients

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undergoing orthodontic treatment.<sup>8</sup> Effective oral hygiene programs are needed to help preventing periodontal diseases in orthodontic patients. The carious lesions are difficult to locate the lowering of resting pH, increased volume of dental plaque and rapid shift in bacterial flora are the factors of increased risks of dental decay.<sup>9</sup>

A combination of proper diet, optimal self-care such as tooth brushing & interdental cleaning and regular checkups can prevent decay.<sup>10</sup> Oral hygiene instruction is essential in all cases of orthodontic treatment, and the use of adjuncts such as power or electric tooth brushes, interproximal brushes, chlorhexidine mouthwashes, fluoride mouthwashes, and regular professional cleaning must be reinforced.<sup>11</sup>

In order to reduce these clinical problems, the effects of an oral hygiene instruction & intervention program for orthodontic patients are necessary to investigate. The aim of the present study was to assess Gingival Bleeding Index among patients treated with fixed orthodontic appliances in the Orthodontic Department of BSMMU.

## Material and Methods

This observational study was carried out in the Department of Orthodontics at Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2013 to June 2014 for a period of one year. Patients of any sex taking treatment with full mouth fixed orthodontic appliance for more than 6 months were selected for this study. Patients who were treated with removable appliance or under single arch treatment or had history of taking antibiotics in last 3 months or periodontal treatment within 1 month excluded from the study. During taking treatment in the OPD all the information of the patients like frequency of brushing, type of tooth brush used, use of inter dental brush, dental floss use, mouthwash were recorded. The Gingival Bleeding Index was calculated and recorded.

## Result

In our study female were predominant and male female ratio was 1:3.16. Mean age of the patients was  $20.49 \pm 4.74$  within the range of 12 - 30 years (Table I).

Mean value of GBI was  $29.77 \pm 19.07$  among the patients who used medium soft and  $19.37 \pm 14.27$  who used soft tooth brush. Difference was statistically significant. Mean value of GBI was  $26.44 \pm 15.23$  among patients who brushed their teeth once a day followed by  $25.89 \pm 19.14$  and  $11.55 \pm 4.71$  who brushed their teeth twice and thrice a day respectively. The difference between the frequencies of toothbrush use per day in GBI was statistically significant (Table II).

Mean value of GBI was  $23.46 \pm 17.18$  who did not use dental floss and  $22.85 \pm 12.64$  who used dental floss once a day. Difference was not statistically significant (Table II).

Mean value of GBI was  $25.30 \pm 17.73$  among patients who used inter dental brush irregularly followed by  $18.22 \pm 9.83$ ,  $13.94 \pm 2.41$  and  $2.75 \pm 0.35$  who used inter dental brush once, twice and thrice a day respectively. The difference was

statistically significant ( $p < 0.05$ ) (Table II).

Mean value of GBI was  $25.17 \pm 17.69$  among patients who did not use mouthwash followed by  $14.64 \pm 1.96$ ,  $10.13 \pm 10.09$  and  $8.00 \pm 0.00$  who used mouthwash once, twice and thrice a day respectively. The difference was not statistically significant ( $p > 0.05$ ) (Table II).

**Table I:** Demographic profile of the patients (n=100)

| Variable                    | Frequency                  | Percent |
|-----------------------------|----------------------------|---------|
| Gender                      |                            |         |
| • Male                      | 24                         | 24.0    |
| • Female                    | 76                         | 76.0    |
| Age                         |                            |         |
| • <20                       | 48                         | 48      |
| • >20                       | 52                         | 52      |
| • Mean $\pm$ SD (Min – Max) | $20.49 \pm 4.74$ (12 - 30) |         |

**Table II:** GBI score of the patients

|                                  | GBI               | p value |
|----------------------------------|-------------------|---------|
| <b>Type of brush used</b>        |                   |         |
| Medium soft (n=42)               | $29.77 \pm 19.07$ | 0.004   |
| Soft (n=58)                      | $19.37 \pm 14.27$ |         |
| <b>Toothbrushing</b>             |                   |         |
| Once a day (n=17)                | $26.44 \pm 15.23$ | 0.001   |
| Twice a day (n=54)               | $25.89 \pm 19.14$ |         |
| Thrice a day (n=23)              | $11.55 \pm 4.71$  |         |
| <b>Use of dental floss</b>       |                   |         |
| Never (n=97)                     | $23.46 \pm 17.18$ | 0.952   |
| Once a day (n=3)                 | $22.85 \pm 12.64$ |         |
| <b>Use of inter dental brush</b> |                   |         |
| Irregular (n=82)                 | $25.30 \pm 17.73$ | 0.008   |
| Once a day (n=7)                 | $18.22 \pm 9.83$  |         |
| Twice a day (n=9)                | $13.94 \pm 2.41$  |         |
| Thrice a day (n=2)               | $2.75 \pm 0.35$   |         |
| <b>Use of mouthwash</b>          |                   |         |
| Irregular (n=85)                 | $25.17 \pm 17.69$ | 0.185   |
| Once a day (n=9)                 | $14.64 \pm 1.96$  |         |
| Twice a day (n=4)                | $10.13 \pm 10.09$ |         |
| Thrice a day (n=2)               | $8.00 \pm 0.00$   |         |

## Discussion

Brushing procedure become more difficult with fixed appliances and Complete removal of dental plaque is not possible which favours the development of gingivitis.<sup>12</sup> An important factor which contributes to periodontal disease is plaque formation.

In our study mean value of GBI was  $23.44 \pm 17.00$  where as it was  $19.14 \pm 7.95$  in the study of Atassi and Awartani.<sup>13</sup> In This study GBI was higher considering their results; this may be due to the variation of socioeconomic status of two countries. In This study majority of the patients' were in the age group of more than 20 years. Since abnormal bites, or mal occlusion, are first noticed between the ages of 6-12 years as the permanent teeth erupt, most orthodontic treatments occur between 8 and 14 years old.<sup>14</sup> However, it is possible for orthodontic treatment to be carried out at any age if the mouth

and teeth are healthy.<sup>15</sup> In this study female were predominant which indicates that female are more commonly treated with orthodontics appliances. The reason may be due to the cosmetic purposes which have been more adopted by the female.

Mean GBI was decreased gradually as the patients increased frequency of tooth brushing per day. The difference between the frequencies of tooth brushing per day in GBI was statistically significant. Similar result has been reported by Atassi and Awartani.<sup>13</sup> A systematic review on non-orthodontic individuals showed that a single brushing produced an average of 43% plaque removal.<sup>16</sup>

GBI was less among the patients who used soft tooth brush comparing among the patients who used medium soft tooth brush. Gradual decrease of GBI values indicates that the use of soft tooth brush is better than the medium soft brush among the orthodontic patients.<sup>13,17</sup>

Mean GBI was found higher among dental floss non user comparing them who used dental floss once a day. Similar to the present study result Cutler et al.<sup>18</sup> have reported that GBI value was decreased due to use of dental floss which is consistent with the present study result.

Mean GBI was decreased gradually as the patients increased frequency of inter dental brush use per day. Slot DE et al.<sup>19</sup> have reported that inter dental brushes are often recommended to clean around orthodontic appliances and open inter dental spaces which gives the removal of dental plaques among the orthodontic patients.

Mean GBI was decreased gradually as the patients increased frequency of mouthwash per day. Similar to the present study result Atassi and Awartani have reported that regular use of mouth wash decrease the GBI values.<sup>13</sup>

## Conclusion

The Gingival Bleeding Index (GBI) is increased in patients treated with fixed orthodontic appliances. GBI index is significantly reduced due to use of soft tooth brush, dental floss, inter dental brush and frequent use of mouth wash.

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