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# Original Research

## Comparison of Manual Orthodontic, Powered and Sonic Toothbrushes in patients undergoing Fixed Orthodontics

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***ABSTRACT:***

**Background:** Good plaque control is an important factor in the maintenance of dental health during fixed appliance therapy. The present study was conducted to compare manual orthodontic, powered and sonic toothbrushes in patients undergoing fixed orthodontics. **Materials & Methods:** The present study was conducted on 60 patients undergoing fixed orthodontics of both genders. Patients were divided into 3 groups of 20. Group I patients were given manual orthodontic brushes, group II patients were given powered brushes and group III patients were given sonic powered brushes. Parameters such as plaque index (PI), gingival index (GI) and interdental bleeding index were recorded at baseline, 4 weeks and 8 weeks recall visits after fixed appliance bonding. **Results:** The mean plaque index at baseline in group I was 1.18, in group II was 1.14 and in group III was 1.12, at 4 weeks was 1.06, 1.05 and 1.04 in group I, II and III respectively, at 8 weeks was 1.05, 1.04 and 1.04 in group I, II and III respectively. Difference within the group was significant (P< 0.05). The mean gingival index at baseline in group I was 1.10, in group II was 1.08 and in group III was 1.09, at 4 weeks was 1.06, 1.06 and 1.05 in group I, II and III respectively, at 8 weeks was 1.06, 1.05 and 1.05 in group I, II and III respectively. Difference within the group was significant (P< 0.05). The mean bleeding index at baseline in group I was 1.22, in group II was 1.19 and in group III was 1.20, at 4 weeks was 1.14, 1.08 and 1.11 in group I, II and III respectively, at 8 weeks was 0.12, 0.08 and 0.07 in group I, II and III respectively. Difference within the group was significant (P< 0.05). **Conclusion:** Authors found that sonic tooth brushes were effective in reducing all parameters followed by powered and manual brushes.

**Key words:** Brushes, manual, powered, tooth brushes.

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### INTRODUCTION

Regular tooth brushing is advised routinely to patients undergoing fixed orthodontic therapy as a means of preventing gingival and dental disease. Since, various types of toothbrushes are available in the market with attractive appeal, there is a need for sound clinical research to evaluate their effectiveness in order to guide professional recommendations for orthodontic patients.

Good plaque control is an important factor in the maintenance of dental health during fixed appliance therapy. Brackets, arch wires and other appliance components are both a focus for plaque accumulation and an obstruction to plaque removal, thereby promoting gingivitis. Plaque also harbors cariogenic bacteria potentially capable of hard tissue damage, especially at the bracket margins. While mouth rinses may aid to reduce plaque formation and mechanical cleaning of tooth surfaces can be accomplished in many forms, regular tooth brushing is advised routinely as the means of preventing gingival and dental disease during orthodontic appliance therapy. Different type of manual toothbrushes in orthodontic patients has been tried. Electric toothbrushes using a normal brush head or a brush designed specifically for use by orthodontic patients has also been shown to be as effective as a manual brush in removing plaque. Despite reduced

plaque scores in such power brush trials, concomitant improvements in the gingival health of fixed appliance patients are not as convincing. The present study was conducted to compare manual orthodontic, powered and sonic toothbrushes in patients undergoing fixed orthodontics.

## MATERIALS & METHODS

The present study comprised of 60 patients undergoing fixed orthodontics of both genders. They were informed regarding the study and written consent was obtained. Ethical clearance from ethical committee was taken prior to the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 3 groups of 20. Group I patients were given manual orthodontic brushes, group II patients were given powered brushes and group III patients were given sonic powered brushes. All the patients were instructed to brush twice a day for a 2-minute time period, in the morning, and at night.

Parameters such as plaque index (PI), gingival index (GI) and interdental bleeding index were recorded at baseline, 4 weeks and 8 weeks recall visits after fixed appliance bonding. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

| Groups | Group I | Group II | Group III |
|---|---|---|---|
| Method | Manual brushes | Powered brushes | Sonic brushes |
| Number | 20 | 20 | 20 |

Table I shows distribution of patients in different groups based on type of brushes used.

**Table II Assessment of Plaque index**

| Duration | Group I | Group II | Group III | P value |
|---|---|---|---|---|
| Baseline | 1.18 | 1.14 | 1.12 | 0.91 |
| 4 weeks | 1.06 | 1.05 | 1.04 | 0.94 |
| 8 weeks | 1.05 | 1.04 | 1.04 | 0.93 |
| P value | 0.01 | 0.02 | 0.04 | |

Table II, graph I shows that mean plaque index at baseline in group I was 1.18, in group II was 1.14 and in group III was 1.12, at 4 weeks was 1.06, 1.05 and 1.04 in group I, II and III respectively, at 8 weeks was 1.05, 1.04 and 1.04 in group I, II and III respectively. Difference within the group was significant (P< 0.05).

**Graph I Assessment of Plaque index**

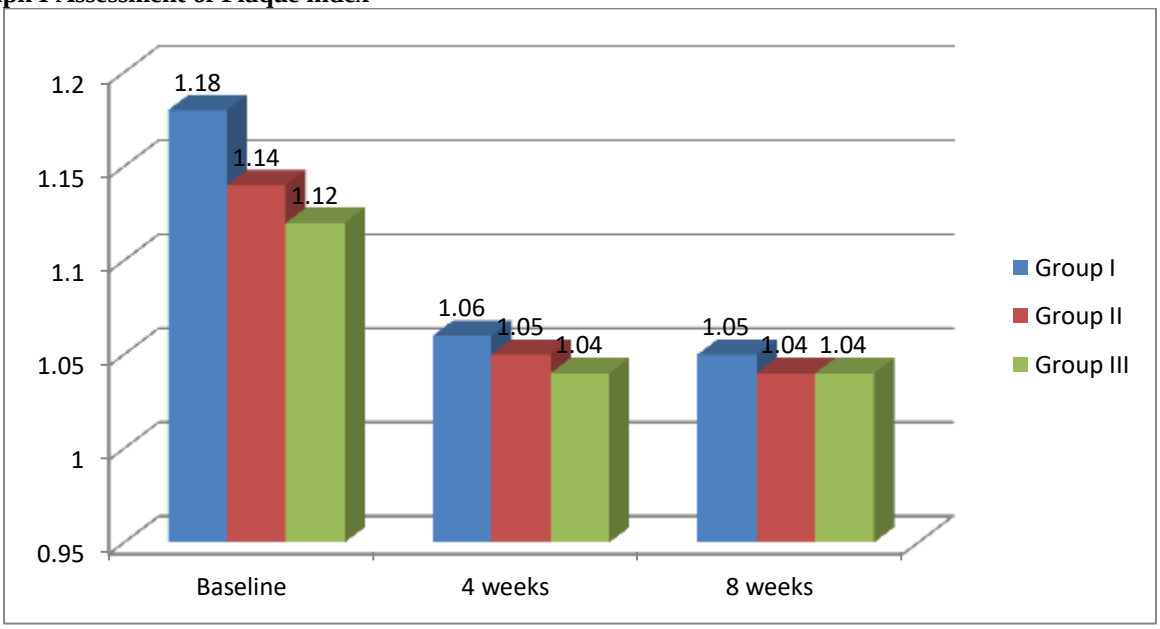

**Table III Assessment of gingival index**

| Duration | Group I | Group II | Group III | P value |
|---|---|---|---|---|
| Baseline | 1.10 | 1.08 | 1.09 | 0.93 |
| 4 weeks | 1.06 | 1.06 | 1.05 | 0.97 |
| 8 weeks | 1.06 | 1.05 | 1.05 | 0.94 |
| P value | 0.05 | 0.12 | 0.02 | |

Table III, graph II shows that mean gingival index at baseline in group I was 1.10, in group II was 1.08 and in group III was 1.09, at 4 weeks was 1.06, 1.06 and 1.05 in group I, II and III respectively, at 8 weeks was 1.06, 1.05 and 1.05 in group I, II and III respectively. Difference within the group was significant (P< 0.05).

**Graph II Assessment of gingival index**

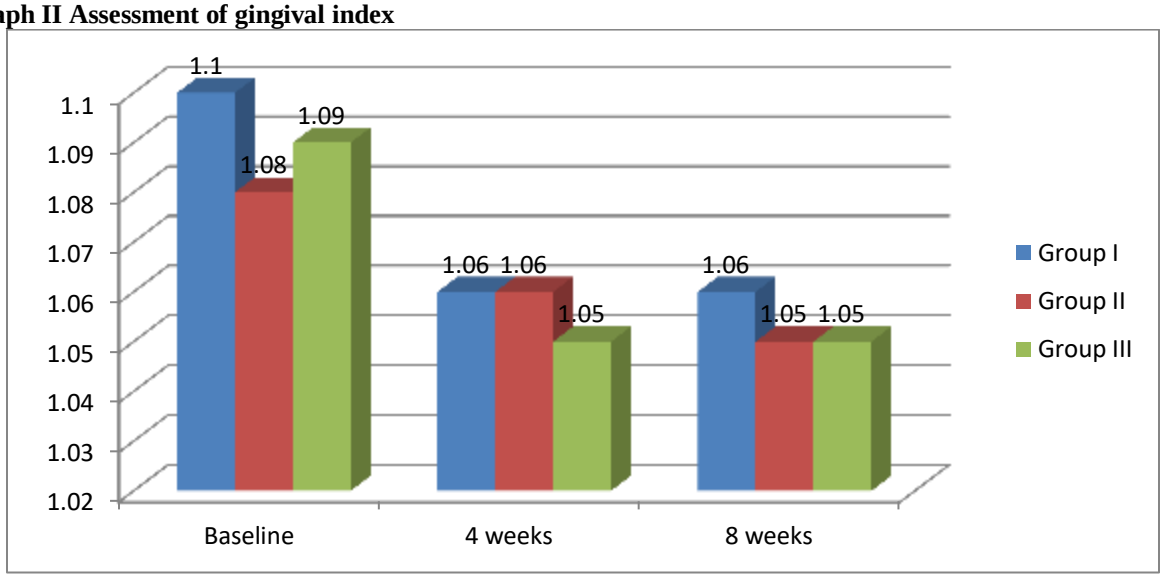


**Table IV Assessment of bleeding index**

| Duration | Group I | Group II | Group III | P value |
|---|---|---|---|---|
| Baseline | 1.22 | 1.19 | 1.20 | 0.91 |
| 4 weeks | 1.14 | 1.08 | 1.11 | 0.92 |
| 8 weeks | 0.12 | 0.08 | 0.07 | 0.05 |
| P value | 0.05 | 0.05 | 0.01 | |

Table IV shows that mean bleeding index at baseline in group I was 1.22, in group II was 1.19 and in group III was 1.20, at 4 weeks was 1.14, 1.08 and 1.11 in group I, II and III respectively, at 8 weeks was 0.12, 0.08 and 0.07 in group I, II and III respectively. Difference within the group was significant (P< 0.05).

## DISCUSSION

Dental plaque is a structurally and functionally organized biofilm. It is the community of microorganisms found on a tooth surface as a biofilm, embedded in a matrix of polymers of host and bacterial origin. Plaque has been described as the soft, tenacious material found on the tooth surfaces, which is not readily removable on rinsing with water. Dental plaque is the primary cause of gingivitis (gum inflammation), which is recognized by redness of the gums at the junction with the teeth, together with slight swelling and bleeding from the gingival margin. Personal oral hygiene is the maintenance of oral cleanliness for the preservation of oral health, whereby microbial plaque is removed and prevented from accumulating on teeth and gingiva. The present study was conducted to compare manual orthodontic, powered and sonic toothbrushes in patients undergoing fixed orthodontics.

In this study, patients were divided into 3 groups of 20. Group I patients were given manual orthodontic brushes, group II patients were given powered brushes and group III patients were given sonic powered brushes. Sharma et al included 60 subjects who received orthodontic treatment with both upper and lower fixed appliances, were randomly divided into three study groups, with 20 patients in each group. Groups I to III were given manual orthodontic, powered and sonic toothbrushes, respectively. This study showed that a significant reduction in all the three indices scores was found from baseline to 4 and 8 weeks in group III.

On intergroup comparison, no statistically significant differences were detected between the three groups for any of the parameters assessed.

We found that mean plaque index at baseline in group I was 1.18, in group II was 1.14 and in group III was 1.12, at 4 weeks was 1.06, 1.05 and 1.04 in group I, II and III respectively, at 8 weeks was 1.05, 1.04 and 1.04 in group I, II and III respectively. Shipla et al included a total of 111 subjects who were randomly allocated into each of the intervention groups, i.e., group A (manual tooth brush), group B (powered tooth brush), and group C (manual tooth brush combined with mouthwash) by lottery method. It was seen that there was a highly statistically significant difference between the three groups, with the manual tooth brush combined with chlorhexidine mouthwash group recording the lowest mean PI score of 0.5 ± 0.39. A comparison of the mean GI scores among the groups at the end of 2 months shows a highly statistically significant difference. The mean MPBI scores at the end of 2 months were highly statistically significant among the three groups, with the group C recording the lowest mean MPBI score of 0.3 ± 0.3.

We found that mean gingival index at baseline in group I was 1.10, in group II was 1.08 and in group III was 1.09, at 4 weeks was 1.06, 1.06 and 1.05 in group I, II and III respectively, at 8 weeks was 1.06, 1.05 and 1.05 in group I, II and III respectively. The mean bleeding index at baseline in group I was 1.22, in group II was 1.19 and in group III was 1.20, at 4 weeks was 1.14, 1.08 and 1.11 in group I, II and III respectively, at 8 weeks was 0.12, 0.08 and 0.07 in group I, II and III respectively. Hickman et al included 63 orthodontic patients wearing upper and lower fixed appliances were randomly assigned to use either a powered toothbrush fitted with a modified orthodontic brush head or a manual toothbrush. Patients using the powered toothbrush showed a significant reduction in percentage interdental bleeding scores from baseline to four weeks and this was still apparent at eight weeks, although there were no statistically significant changes in either plaque or gingivitis scores for this group. Those patients using a manual toothbrush showed a significant reduction in mean plaque score from baseline eight weeks, but gingivitis scores were only reduced significantly at four weeks. In this group, interdental bleeding scores reduced significantly at four weeks, but were not significantly different from baseline at eight weeks. When the two patient groups were compared using two sample *t*-tests, there were no significant differences in any of the parameters measured at any time point in the study.

The limitation of study is small sample size.

## CONCLUSION

Authors found that sonic tooth brushes were effective in reducing all parameters followed by powered and manual brushes.

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