



Role of Text Message Reminder on Oral Hygiene Maintenance of Orthodontic Patients

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ABSTRACT

Introduction: Fixed orthodontic treatment is frequently associated with increased plaque accumulation leading to gingivitis and white spot lesions (WSLs).

Aim: This study evaluated the role of text message reminder on oral hygiene of orthodontic patients.

Materials and methods: A total of 60 patients under fixed orthodontic treatment were randomly divided into two equal groups as control group and study (text message) group. Text message group received reminders about oral hygiene, while the control group did not receive any messages. Oral hygiene of both the groups was evaluated at baseline, 2, and 3 months using plaque indices (PIs) along with WSL status. Data were statistically analyzed using Statistical Package for the Social Sciences (SPSS) statistical software, version 19, with chi-square test and t-test.

Results: At the baseline, plaque score was higher in the study group over control group ($p > 0.038$), whereas it was decreased after 3 months in the test group ($p > 0.001$). For WSL, there was no significant difference at baseline, but it was significantly lower in study group ($p > 0.003$).

Conclusion: Oral hygiene status improved with text message reminder.

Keywords: Orthodontic treatment, Plaque control, Text message.

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INTRODUCTION

Complaint of oral hygiene is one of the most common factors in fixed orthodontic treatment. Previous studies have shown that there is an initial decline in oral hygiene after bonding followed by increase in oral hygiene after 5th month of orthodontic treatment.¹ There are increased chances of WSLs around orthodontic brackets with excessive plaque accumulation. Inadequate plaque controls either pretreatment or during orthodontic treatment is associated with increased chances of WSL.² Increased plaque accumulation can lead to gingival inflammation, recession, and periodontal problem.³ This can lead unsatisfactory orthodontic outcome and possibility of discontinuation of the procedure.²

Earlier studies have shown that oral hygiene can be improved with reward system or active reminder therapy.¹ A systematic review in 2009 demonstrated the influence of text messages on behavioral changes in 13 out of 14 studies.⁴ Nowadays, mobile usage has increased dramatically. During the late 1980s, short message service (SMS) was created with digital technology, i.e., global system for mobile communication.⁵ Later on, mobile phones were used for different services in medical field, such as appointment reminder, reminder for medicine by SMS alert, or phone calls.² Previous studies have shown that the text message follow-up from orthodontic clinic helped in reducing the patient's self-reported pain.⁶ Automated text messages even help to keep in contact

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with patients during longer appointment intervals.³ Rinchuse et al⁷ found no effect in their study on the influence of instruction on oral hygiene in orthodontic patients. Very few studies have been reported regarding the influence of text messaging on the oral hygiene of orthodontic patients. Hence, the present study aimed to evaluate the role of text message reminders on plaque control and WSL in orthodontic patients.

MATERIALS AND METHODS

In this randomized clinical study, the patients receiving fixed orthodontic treatment were selected from the Department of Orthodontics in the age group of 13 to 19 years. Inclusion criteria were orthodontic patients without any medical or dental complications, who are having mobile phones and able to read SMS alert in English, who are voluntarily willing to participate, who are already under fixed orthodontic treatment which is due for minimum period of 6 months. Patients with periodontal problem or early carious lesions were excluded from the study.

Sixty patients under fixed orthodontic treatment who met the inclusion criteria were randomly divided into two equal groups as control group and study (text message) group. Written informed consent was obtained from all the participants. Standardized oral hygiene instruction was given to all the participants before start of the study. Text message group received reminders about oral hygiene, while the control group did not receive any messages. During the entire study period, the patient or their parents in the study group received one text message reminder every week regarding the oral hygiene (Table 1).

Plaque index scoring criteria were used as mentioned in Table 2. Oral hygiene of both the groups was

Table 1: Samples of text messages

Reminder: It is important to keep your teeth clean. Brush and keep them healthy.
Oral hygiene alert: Brush for 2 minutes, put these bristles to work.
Reminder to brush after meal to avoid cavities.
Use fluoride toothpaste and mouth rinse.
Your smile is the first thing people can see, so keep them clean and orthodontist will straighten them.

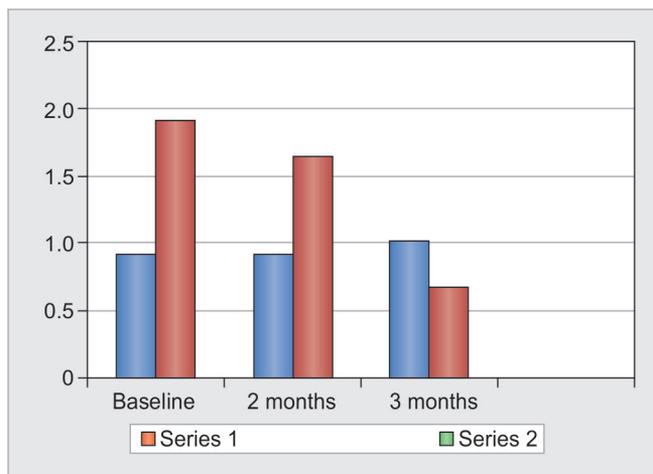
Table 2: Scoring criteria for plaque

Plaque score	Criteria
0	No plaque
1	Discontinuous band of plaque at gingival margin
2	Up to 1 mm continuation band of plaque at gingival margin
3	Band of plaque wider than 1 mm but <one-third of surface
4	Plaque covering between one-third and two-thirds of surface
5	Plaque covering two-thirds or more of surface

Table 3: PI scoring

PI	Control group (n = 30)	Study group (n = 30)	p-value
Baseline mean ± SD	0.92 ± 0.72	1.92 ± 0.74	0.001*
2 months mean ± SD	0.92 ± 0.78	1.65 ± 0.87	0.010*
3 months mean ± SD	1.02 ± 0.61	0.68 ± 0.46	0.038*

*Significant; study group: Text messaging group; test used: t-test; n: Number; SD: Standard deviation



Graph 1: Plaque maintenance in control over study group. Series 1: Control group; Series 2: Study group

Table 4: PI comparison between groups at follow-up visits

WSL	Control group (n = 30)	Study group (n = 30)	p-value
Baseline			
Score 0	10 (3.87)	9 (28)	0.113
Score 1	9 (28.0)	14 (58.0)	
Score 2	5 (18.0)	1 (3.0)	
Score 3	0	0	
2 months			
Score 0	10 (33.0)	12 (42.0)	0.345
Score 1	11 (36.0)	12 (39.0)	
Score 2	3 (15.0)	1 (3.0)	
Score 3	0	0	
3 months			
Score 0	5 (18.0)	16 (46.0)	0.003*
Score 1	11 (39.0)	7 (29.0)	
Score 2	7 (31.0)	1 (3.0)	
Score 3	0	0	

*Significant; n: Number; test used: Chi-square test; p<0.05;

evaluated at baseline, 2, and 3 months using PI (Table 3 and Graph 1) along with WSL status (Table 4). Plaque index was recorded for the buccal surface of each tooth according to Turesky modification on the Quigley–Hein PI scoring (Table 2). Oral hygiene instruction and the study were performed by a trained single examiner.

Statistical Analysis

Data were statistically analyzed using SPSS statistical software, version 19, USA, with chi-square test and t-test; p-value was considered statistically significant at <0.05.

RESULTS

Of 60 participants, 30 were in control group (12 males and 18 females) with mean age of 15.3 years, and 30 were in the study/text message group (16 males and 14 females) with mean age of 16.3 years. Total 12 SMS alerts were sent to text message group over a period of 3 months.

At baseline and 2nd month average PI score was higher in the study group over control group ($p > 0.038$), whereas it decreased after the 3rd month in the test group ($p > 0.001$; Table 3 and Graph 1). For WSL, there was no significant difference at baseline, but it was significantly lower in the study group after 3rd month ($p > 0.003$; Table 4).

DISCUSSION

Poor oral hygiene is one of the factors that hinders the successful orthodontic treatment delivery. Increased plaque accumulation not only initiates early carious lesion but also results in compromised gingival health. In orthodontic patients, WSLs are likely to occur in 3 to 4 months after plaque accumulation. Some previous studies have shown that text messages sent to patients or parents have helped in improving the oral hygiene status, which is in association with our results.²

In the present study, there was higher mean PI score at baseline and at the 2nd month in the text message group over control group. Later on, oral hygiene was improved and there was a decreased WSL in the study group due to text message reminders. This study comprised patients who had on an average fixed orthodontic treatment 2 months earlier. One text message was sent to the study group each week on Sunday morning with a total of 12 messages in 3 months' time.

Junod Perron et al⁸ observed that the number of missed appointments was similar between text message and telephonic group, while text message was cost-effective and nondisturbing to patients, and they also concluded that both methods are equally effective reminder methods.

Systematic review has shown that text messaging is more effective than telephonic interaction, while other studies are in contrast to it.^{9,10} Li et al¹⁰ from their study concluded that messaging helps in patient education and management. They found no difference in PI and modified gingivitis index between the two groups' pre- and postorthodontic treatment. Several researchers observed good oral hygiene with lesser plaque surfaces over a time in groups with text message reminders compared with control group, similar to our results. They concluded that text messaging helps in maintaining communication with patients.^{1,3} Jejurikar et al² observed that text messages not only reduce plaque score but also cause positive behavior of an individual in cessation of his smoking habit.

Iqbal et al¹¹ concluded that the text message reminder method is effective for improving oral hygiene of orthodontic patients. They found significantly lower scores for PI, bleeding index, and modified gingival index in text message group compared with control group. Zotti et al¹² compared WhatsApp chat/study group over control group. Study group received instructions to share monthly two self-photographs (selfies) showing their oral hygiene status with others. There was improvement in the oral health caries in the study group over control. Abdaljawwad¹³ observed lower PI, marginal gingival index, and bleeding index in text message group over a period of time. Jadhav et al¹⁴ performed a study to evaluate the role of text messaging by sending SMS to study group at 1st, 2nd, 3rd, and 6th months. After the 3rd month, intervention group did not receive oral health education messages. Even after that intervention group showed lower plaque score compared with control group. Harnacke et al¹⁵ employed computer-based training to teach either using fones brushing technique or modified bass technique. Computer presentation resulted in improvement of oral hygiene skills and gingivitis using fones brushing technique when compared with control groups. Roth et al¹⁶ conducted a randomized longitudinal prospective study to evaluate computer-generated reminder for appointment of 228 orthodontic patients and found lower broken appointment in reminder groups, also this study showed that reminder therapy can be applied even for maintenance of oral hygiene. Cozzani et al¹⁷ evaluated the role of follow-up communication on maintenance of oral hygiene in orthodontic patients after 30 to 40 days and observed higher level of oral hygiene in patients receiving communication reminder over participants in the control group. The PI score was 0.3 [interquartile range (IQR), 0.60] and 0.75 (IQR, 1.30) respectively, with a significant difference ($p = 0.0205$). They concluded that reminder therapy helps in improvement of oral hygiene.

In recent times, e-mail reminder has been used as an adjunct to telephonic calls. However, more number of people have cell phones rather than Internet connection or computer, hence text messaging is more beneficial as it is economical, easy to use mass communication, and not disturbing to patients' working conditions. In our study, there was an improvement in oral health from baseline to the 1st month in both the groups, which was not statistically significant. It may be due to the fact that oral health education provided before the start of the study might have the positive effect on the oral health behavior up till 1 month. After 3rd month, there was significant difference in plaque and WLS in the study group over control group, this is because text message reminders help to improve oral hygiene in the study group. This study has shown

that text message reminders help to improve oral health of patients under fixed orthodontic treatment. Further long-term study on larger population is required to evaluate the role of text message reminders in orthodontics.

CONCLUSION

Oral hygiene status was improved with text message reminder. Hence, text message reminder helps in improvement of oral hygiene of patients under orthodontic treatment.

Clinical Significance

Text message reminder helps in improvement of oral hygiene of patients under orthodontic treatment.

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