

Efficacy of using dental floss to improve oral hygiene and gingival status

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Summary

Aim. Dental floss is the most effective means for the removal of bacterial plaque from proximal tooth areas. The efficacy of the use of dental floss was evaluated, regardless of its commercial form, in individual oral hygiene practice.

Material and methods. A parallel clinical study of 58 subjects was performed over a period of four weeks. In order to assess the oral hygiene and gingival status, the proximal plaque index modified according to Lange (API) and the papillary bleeding index of Muhlemann (PBI) were determined. Subjects were distributed into two equal groups of treatment. The subjects in the first group were trained in the correct use of dental floss, once per day before tooth brushing, and in brushing their teeth two times daily, in the morning and evening, using the tooth brush and paste. The subjects in the second group were trained to brush their teeth two times per day, in the morning and evening, with the tooth brush and paste. After four weeks, subjects were reevaluated regarding their oral hygiene and gingival status. Treatment effects across time within each group were examined using a paired t-test. A p value = 0.001 was considered as statistically significant.

Results. After four weeks, subjects who used tooth brushing associated with dental floss demonstrated significant decreases ($p=0.0001$) in papillary bleeding, of 56.75%, with an initial mean PBI value of $0.74(\pm 0.15)$ and a final mean PBI value of $0.31(\pm 0.25)$. In this treatment group, a significant decrease in proximal plaque deposits, of 58.1%, was also found.

Conclusion. These results support the clinical efficacy of dental floss for the removal of bacterial plaque from proximal tooth areas.

Keywords: dental floss, efficacy, bacterial plaque, hygiene of proximal tooth surfaces.

Introduction

The use of dental floss represents a means for the control of proximal bacterial plaque and is an important component of efficient oral hygiene programs [1]. The removal of bacterial plaque from proximal surfaces is necessary for the maintenance of

the health of gingival tissues and the prevention of chronic marginal gingivitis. In addition to efficacy, the easy introduction into interdental spaces and the resistance to tearing and fraying are essential properties of dental floss. The aim of this study is to evaluate the efficacy against gingival inflammation of dental flossing as an ancillary means of oral hygiene.

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Material and method

A longitudinal study was carried out, which recorded the gingival and oral hygiene status of 58 subjects with chronic marginal gingivitis, over a period of four weeks. For the clinical evaluation of the oral hygiene status, the API index (proximal plaque index modified according to Lange) was used initially (day 0) and finally (days 28-30). On the clinical examination of marginal periodontium for the evaluation of gingival status, the papillary bleeding index of Muhlemann (PBI) was recorded, initially (day 0) and finally (days 28-30) [2,3].

The probing of the mesial and distal papillary gingival areas was performed with a periodontal probe, (0.5 mm), for each hemiarch alternatively from the vestibular and oral aspects, and observed for 30 seconds. The evaluation was carried out in a dichotomous fashion (by estimations of "yes" or "no" type). The subjects included in the study presented at least 20% proximal sites with bleeding on probing and were distributed in two equal treatment groups. The subjects from the first group were trained in the correct use of dental floss, once daily, preferably in the evening, before dental brushing, as well as to brush their teeth twice daily, in the morning and evening, with the tooth brush and paste [4]. The subjects in the second group were trained to brush their teeth twice daily, in the morning and evening, with the tooth brush and paste. After four weeks, subjects were reevaluated

regarding their oral hygiene and gingival status. The subjects were asked to abstain from any other form of oral hygiene, such as the use of mouthwashes, over the duration of the study. The efficacy against chronic marginal gingivitis was evaluated using the mean values of PBI and API indices, at the level of the whole oral cavity. The changes in mean values of PBI and API indices, from baseline to final, were compared by ANOVA. Treatment effects across time within each group were examined using a paired t-test.

A p value = 0.001 was considered as statistically significant.

Results

As it is shown in *Table 1*, the treatment groups were well matched for age and sex.

The subjects who used tooth brushing associated with dental flossing demonstrated a significant decrease ($p=0.0001$) of bleeding on probing from the proximal aspect, of 56.75% after four weeks of use (*Table 2*). For this treatment group, the mean value of the PBI index recorded on the first clinical examination of marginal periodontium was $0.74(\pm 0.15)$ and $0.31(\pm 0.25)$ on the final examination (*Table 2*).

In the group of subjects who performed tooth brushing alone, the decrease of bleeding on probing from the proximal aspect was not significant, the initial and final mean PBI values being $0.72(\pm 0.16)$ and $0.70(\pm 0.24)$, respectively (*Table 2*).

Table 1. Demographic data of the studied population

Number of subjects	Treatment groups	
	Tooth brushing + dental flossing	Tooth brushing
Women	22 (75.86 %)	20 (68.96 %)
Men	7 (24.13 %)	9 (31.03 %)
Total	29	29
Age (years)		
Mean \pm Standard Deviation	31.9 \pm 9.8	32.6 \pm 11.6
Year range	17 - 47	17 - 49

Table 2. Initial and final mean values of the PBI Index

Treatment groups	Mean PBI value (\pm S.D.)		Decrease in bleeding	(Intragroup) p value
	Initially	Finally		
Tooth brushing + dental flossing	0.74 (\pm 0.15)	0.31 (\pm 0.25)	0.42 (\pm 0.25) (56,75%)	0.0001 *
Tooth brushing	0.72 (\pm 0.17)	0.70 (\pm 0.18)	0.02 (\pm 0.24) (2.77%)	0.604

*p statistically significant

The determination of the oral hygiene status in dynamics, using the API index, showed a significant decrease in proximal plaque deposits, of 58.1% for subjects who performed individual tooth brushing associated with dental flossing, compared to the group of subjects who performed tooth brushing alone (*Figure 1*).

Discussion

The removal of interproximal plaque is considered to be important for the maintenance of gingival health, prevention of periodontal disease and the reduction of caries. Unfortunately, the toothbrush is relatively ineffective at removing interproximal plaque, and therefore patients need to resort

to additional techniques. Results of clinical studies have indicated that the floss, woodsticks, rubber tips and interdental brushes currently represent the primary methods available for interproximal cleaning [5]. Similar results demonstrated that daily flossing significantly reduced the amount of plaque found between the teeth compared to a manual brushing regimen alone. This new method should be useful in future studies on the evaluation of mechanical or chemical means of interproximal plaque control [6]. The results of this study, found that the individual tooth brushing associated with dental flossing, ensured a significant improvement of gingival inflammation after four weeks of unsupervised use.

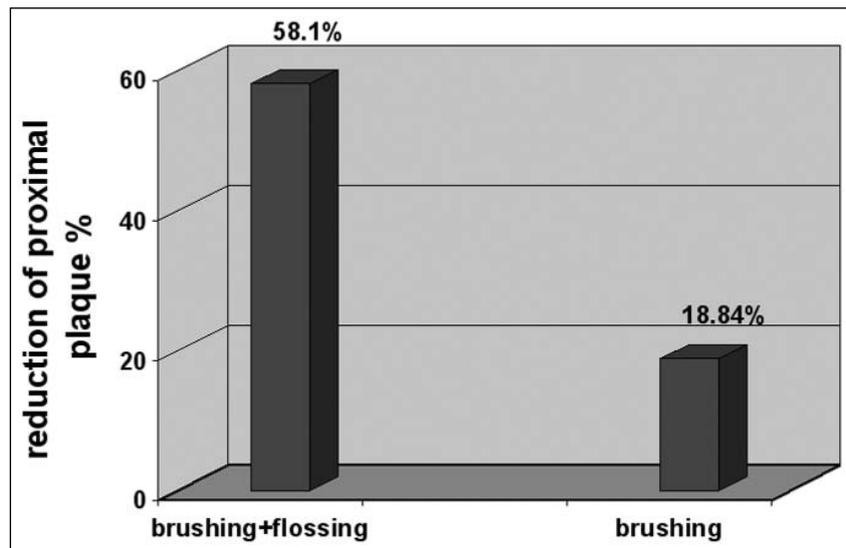


Figure 1. Reduction of proximal plaque deposits following four weeks of flossing

Floss is the most widely used method of interdental cleaning and the American Dental Association reports that up to 80% of interdental plaque may be removed by this method, resulting in a significantly reduced incidence of caries and prevention of periodontal disease [5]. Dental flossing is an efficient means for the removal of bacterial plaque from proximal tooth surfaces and its use is indicated before tooth brushing performed at home. The main problem with all interdental cleaning is, however, patient ability and motivation. Patients are known to find flossing difficult, especially where there are tight contact points, and therefore interdental cleaning does not readily become an established part of daily oral hygiene. More efforts should be made to inform patients on the need for the hygiene

of proximal tooth surfaces and the hygiene means available.

Conclusions

1. Individual tooth brushing associated with dental flossing ensured a significant improvement of gingival inflammation after four weeks of unsupervised use.

2. Dental flossing is efficient means for the removal of bacterial plaque from proximal tooth surfaces and its use is indicated before tooth brushing performed at home.

3. More efforts should be made to inform patients on the need for the hygiene of proximal tooth surfaces and the hygiene means available.

References

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