

The Half-a-Day flossing method: A new approach

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Abstract

Objective: The objective of this article is to propose an easier regimen of dental hygiene that could lead to improved gingival health for people who at present do not floss regularly.

Methods: The Half-a-Day flossing method consists of flossing only half one's teeth every day, along with twice-daily brushing. Personal experience led to the development of the Half-a-Day flossing method. A literature review was conducted to assess the potential usefulness of the Half-a-Day method for the general population.

Results: Five prospective, randomized clinical trials have compared different frequencies of oral hygiene in order to determine the minimum frequency of oral hygiene needed to prevent or cure gingivitis. One human and one animal study support an every-other-day flossing frequency. Three other studies, one human and two animal, are not directly relevant due to design issues.

Conclusions: The Half-a-Day method combines frequent brushing with an effective, but less onerous flossing regimen. It should be recommended to patients with gingivitis who have been unable to comply with current recommendations to floss all one's teeth every day.

Keywords: oral hygiene, gingivitis, prevention, dental floss

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Introduction

The purpose of this article is to propose a new, alternative approach to the current recommendation to floss all one's teeth every day. First, this article reviews prospective clinical studies of the minimal necessary frequency of oral hygiene. Second, it describes and critiques current recommendations for brushing and flossing. Third, it explains why the following strategy, the Half-a-Day method, may be a more effective approach for many people:

Floss half the teeth each day:

Floss the lower teeth on Mondays, Wednesdays and Fridays.

Floss the upper teeth on Tuesdays, Thursdays and Saturdays (or Sundays).

Background

Interdental cleaning is most commonly done by flossing one's teeth, but may also be done with other types of interdental cleaners. In this article, I will use the term "flossing" to denote interdental cleaning with either dental floss, toothpicks, triangular balsa wood sticks or interdental brushes.

Dental professionals agree that regular flossing prevents gingivitis by reducing the buildup of plaque on the interproximal surfaces of the teeth (1). In adults, Graves et al (2) reported that brushing plus daily flossing was clearly more effective than brushing alone in preventing gingivitis. On the other hand, children do not seem to benefit from flossing in addition to brushing (3). The lack of significant benefit in children is presumably due to the wider spaces between children's teeth, which generally permit a toothbrush to reach the interdental spaces.

In adults, preventing gingivitis prevents the development of periodontitis, the most common cause of tooth loss among adults (4). However only a small proportion of people with gingivitis develop periodontitis. A number of research strategies are being pursued to better understand and prevent the progression of gingivitis to more serious periodontal disease (5). While it is to be hoped that improved toothpastes or other inexpensive approaches may eventually control gingivitis without the need for flossing, a recent study by Caton et al suggests that flossing remains necessary (6).

Review of the Literature: Minimum Frequency for Oral Hygiene

There are five prospective, randomized clinical trials which have compared different frequencies of oral hygiene in order to determine the minimum frequency of oral hygiene needed to prevent or cure gingivitis. Two studies have been done in humans (7,8); one in primates (9); and two in beagle dogs (10,11). Each of these studies will be briefly summarized.

A larger number of cross-sectional, observational studies have compared the oral health status of individuals using different frequencies of oral hygiene. Those studies have not been systematically reviewed, but several of them will be cited as appropriate.

Lang (7)

In a study of 32 dental students, Lang (7) compared four frequencies of plaque removal: twice daily (every 12 hours), once every other day (every 48 hours), once every third day (every 72 hours), and once every fourth day (every 96 hours). The dental students in the study used toothbrushes, supplemented by floss and interdental woodsticks. Study participants began the study with healthy gingivae. Plaque removal was supervised by a dental hygienist, who used a disclosing solution to ensure that no plaque remained. The details of the remedial measures used after the use of the disclosing solution were not specified.

Lang's study showed that supervised cleaning of the teeth every other day was just as satisfactory as cleaning the teeth twice a day for the prevention of gingivitis.

Kelner (8)

In a study of 10 dental students and faculty, Kelner (8) compared two frequencies of plaque removal: once daily versus once every third day (every 72 hours). Study participants began the study with healthy gingivae. The study participants used a disclosing solution before brushing and flossing. Kelner found that cleaning of the teeth every third day was not sufficient to maintain a healthy gingiva. After two weeks of the 30-day study, the every-third-day group showed a significant increase in the gingival index.

Kelner concluded that brushing and flossing every third day was not an acceptable regimen.

Caton (9)

Caton (1979) did a study in six Rhesus monkeys comparing three frequencies of brushing and flossing: once per week, twice per week and three times per week. The monkeys all started with "gross amounts of plaque and moderate to severe gingivitis." Caton noted that plaque removal three times a week rather than daily would be advantageous for dental studies of non-human primates because it would lessen the frequency of sedation. Non-human primates have to be

sedated before toothbrushing or flossing can be done.

Caton's description of remedial measures after use of the disclosing solution was precise:

“Plaque removal was assessed by topical application of a disclosing solution. Any plaque so disclosed was removed with the toothbrush.”

It should be noted that flossing was done only once. Any extra cleaning was done with a toothbrush.

Tromp (I) (10)

Tromp and others at the Department of Periodontology, Univ. of Groningen, The Netherlands, conducted a series of studies in beagle dogs. Two of those studies examined the frequency of tooth brushing in relation to gingivitis (10,11). Plaque disclosing agents were not used in either study. Nor was dental floss used, because dogs' teeth are generally widely spaced and floss is not needed to reach the interdental spaces. In both studies, the beagle dogs were fed a soft, plaque promoting diet. Colleagues of Tromp (12,13) also published two very similar studies of artificial periodontal effects. These studies showed similar results to those described in Tromp II (11), and will not be discussed in detail.

In the first study (10), 12 beagle dogs began the study with healthy gingivae. They were then randomly divided into three groups of four dogs each using a different brushing frequency: once a week, three times a week and every day. There was no significant difference in gingivitis between brushing every day versus brushing three times a week.

The researchers concluded that brushing three times per week was adequate to maintain healthy gingivae.

Tromp (II) (11)

In the second study (11), an experimental gingivitis was induced before the comparison of toothbrushing frequencies. The dogs' teeth were not brushed at all for 4 weeks, leading to development of plaque accumulations and gingivitis. As in the first study, 12 dogs were then randomly divided into three groups with different brushing frequencies: once a week, three times a week and every day. In this study, the researchers reported that brushing three times per week was not adequate to obtain healthy gingivae.

They concluded that brushing seven times per week was needed to obtain healthy gingivae, when one begins with diseased gingivae.

Current Oral Hygiene Recommendations

The American Dental Association (ADA) recommends daily flossing, and specifies a minimum of twice daily brushing (14). The American Dental Hygienists' Association (ADHA)

recommends once daily flossing and brushing after every meal whenever possible (15). ADHA also recommends talking with your dental hygienist to design a personalized preventive program.

Despite a large number of studies, there has been relatively little explicit discussion of brushing recommendations in the dental journals. In 1971, the Journal of Periodontology invited four experts to answer the question, "How frequently must patients carry out oral hygiene procedures in order to maintain gingival health?" (16) Dr. Loe, a pioneer in modern research on periodontal disease, was one of the invited experts. He is a co-author of the Lang study, and was undoubtedly aware of the preliminary results of the Lang study and/or similar earlier studies. The recommendations of the experts were complex because the researchers recognized the variations between individuals, and the fact that a single precise recommendation would not be realistic for all patients. Nonetheless, I will attempt to summarize them as follows,

- 1) "at least 25 minutes a day... divided ... [into] at least two segments of time" (Arnold A. Ariaudo)
- 2) "at least once a day," (Sumter S. Arnim)
- 3) "once every 24 hours," and (John C. Greene)
- 4) "once daily or [if done properly] every second day." (Harald Loe)

While three of the controlled studies described above have shown that complete plaque removal every second day, or three times per week, is effective in maintaining gingival health (7,9,10), the quality of the plaque removal during these studies was exceptional. The studies either used supervised brushing with disclosing solution, and/or the brushing was carried out by dental clinicians.

Many patients are not as good at plaque removal as are dental clinicians or dental students. In fact a cross-sectional study (17) comparing brushing patterns and gingival health in two groups - dental students and clinic attenders documented this difference. The study showed that for dental students, there was no difference between once-a-day versus twice-a-day brushing. However, among clinic attenders, twice-a-day brushing was associated with significantly better gingival health than once-a-day brushing.

The current consensus on oral hygiene is well expressed by Griffen and Goepford (18; pp 1221-1222):

"Complete plaque removal every 48 hours by brushing and flossing has been shown to prevent gingivitis and periodontitis, but in actual practice complete removal of plaque is not usually achieved at any one session. For this reason, daily flossing and a minimum of twice-daily brushing is usually recommended."

However, for many years it has been clear that most people do not floss on a daily basis. Ronis et al found that about 96% of adults brush their teeth at least once a day, but only about 32% of

adults floss their teeth on a daily basis (19). Previous surveys have provided even lower estimates of flossing (20). While there appears to have been a modest increase in the frequency of flossing, Ronis concluded that “there is little need to increase the frequency of brushing, but more substantial need for interventions to increase frequency of flossing...”

The major weakness of the current recommendations for oral hygiene is their failure to more effectively address the frequency of flossing.

The Half-a-Day Method

Greene (16) recognized the frequent difficulties in getting patients to floss every day, and that a discouraged patient might not floss at all. He suggested a practical, intermediate regimen of flossing at least twice weekly, combined of course with twice a day brushing. However, Kelner’s study (8) showed that performing dental hygiene every three days was not sufficient. This suggests that twice a week flossing should not be recommended.

The Half-a-Day method is an improvement on Greene’s suggestion. The Half-a-Day method consists in flossing three times a week, and adds a “divide and conquer” approach. The basic method is defined as follows:

On Monday, Wednesday and Friday, floss your lower teeth.

On Tuesday, Thursday and Saturday (or Sunday), floss your upper teeth.

Broken floss, the boring aspect of flossing, finger pain and/or finger injuries due to tightly wound floss, and difficulties due to arthritic limitations, are all likely to be less serious problems when the duration of a flossing session is cut in half. Personal observations by the author suggest that many flossing difficulties occur more commonly during the second half of a standard flossing session. On a daily basis, the Half-a-Day method reduces the time and effort needed for flossing by 50%; and on a weekly basis, by 4/7 or 57%, compared to daily flossing of all teeth.

The Half-a-Day method should of course be accompanied by a strong emphasis on twice a day brushing. Brushing should be done in the morning (preferably after breakfast), and in the evening (preferably after dinner or any late-night snacks).

To facilitate the use of the Half-a-Day method by people who have not flossed regularly before, or who have never learned to floss properly, it is suggested that a patient should try flossing the lower teeth first. This suggestion is made because one can see the lower teeth in a mirror much more easily than the upper teeth. Seeing what you are doing makes it easier to learn to floss.

There are a few other caveats which should be included regarding the use of the Half-a-Day method.

- 1) If a person sees or feels food particles between two teeth, that interdental space should be cleaned as soon as is possible or convenient.
- 2) If a person has difficulties with floss shredding or getting stuck between his teeth, he or she should be encouraged to try one of the newer types of non-shredding floss, such as Glide[®]. If that does not solve the problem, the person should consult his or her dentist.
- 3) If a person has difficulties handling floss, other mechanical devices should be suggested on a trial basis, such as various types of interdental cleaners or floss holders. These include toothpicks held with the Peri-Aid[®] holder, balsa wood sticks (J&J Stim-U-Dent[®]), or interdental brushes. All of the above-described devices could be used according to the Half-a-Day method.
- 4) The clinical response of the gingivitis should of course be followed by the person themselves and by a clinician. If a person continues to have gingivitis with the Half-a-Day method, the person should be encouraged to try a modified Half-a-Day method, flossing the upper teeth in the morning and the lower teeth in the evening or vice versa.

Discussion

The question, “How often should I clean my teeth?” is an old one. In London in 1568 Thomas Raynalde, advised cleaning by a professional, followed by once daily brushing and flossing. He said that “[if the teeth] be very yellow and filthie, or blackish, let a Barber scour, rub and pick them cleane; it shall be very good to rub them every day with the root of a mallow, and to pick them cleane that no meate remayne and putrifie between the teeth.” (25) However, it wasn’t until the 1960’s that dental researchers demonstrated the causal relationship between a lack of proper oral hygiene and gingivitis (26) and began serious studies to answer the question, “How often should I clean my teeth?” Since the 1971 editorial, “In our opinion...,” in the Journal of Periodontology (16), the Half-a-Day method is the first new and practical approach to flossing that is based on the modern understanding of gingivitis.

Evidence for effectiveness of the Half-a-Day method

Of the prospective clinical trials reviewed above, the results of Caton’s primate study provide the best evidence that the Half-a-Day method would be effective for most people. In that study, the animals had moderate to severe gingivitis at baseline. Flossing was only done three times per week. Any additional plaque shown by disclosing solution was taken care of by additional brushing. This suggests that if brushing is done properly, then flossing three times per week is adequate.

The study by Lang et al (7) is also supportive, especially if one assumes that any residual plaque was removed by brushing as was done in Caton’s study. Kelner’s study suggests that a flossing frequency of less than three times per week would not be sufficient to establish or maintain gingival health. The studies in beagles are not directly relevant, because flossing is not needed for dental hygiene in beagles.

A prospective randomized clinical trial comparing once a day flossing versus the Half-a-Day method would be the best approach to test the effectiveness of the Half-a-Day method. For such a trial, the commonly used study population of dental students might be of limited usefulness. A study in dental students might show both methods to be equivalent, because their dental hygiene practices are quite good, and compliance would be expected to be high. A more representative group of adults who have gingivitis and who do not floss daily might provide more useful and generalizable results, but might be more difficult to recruit.

It should be emphasized that the Half-a-Day method should be accompanied by toothbrushing at least twice a day. This could entail an increase in toothbrushing for some people. However it is likely that this regimen of brushing and flossing will achieve better compliance and better oral health for most people than the currently recommended regimen of twice daily brushing and once daily flossing.

While a prospective, randomized clinical trial of the Half-a-Day method would be ideal, it may be unlikely in the near future. Resources for research in this area appear to be sparse, aside from studies sponsored by commercial entities to demonstrate the efficacy of a new flossing aid or a new mouthwash. After devising the Half-a-Day method, this author contacted several private companies who manufacture dental products, as well as using a licensing agent working on commission, as well as contacting the National Institute for Dental Research. None of those contacted were interested in research on the Half-a-Day method.

Advantages of the Half-a-Day method

The major advantage of the Half-a-Day method is that it reduces the difficulty of the most difficult part of oral hygiene. In terms of the human needs conceptual model of dental hygiene proposed by Darby and Walsh (21), the Half-a-Day method interacts at several levels. Walsh & Darby (22) identified 11 specific areas in the human needs model that were relevant to dental hygiene. Of those 11, the Half-a-Day method is most relevant to three, numbers 4, 8 and 9. The numbers used here are those assigned by Walsh & Darby (22).

- * Number four is the need for “skin and mucous membrane integrity.” By improving a patient’s ability to care for his/her gingivae, gingivitis may be cured or ameliorated.
- * Number eight is the need for “appreciation and respect.” By improving a patient’s ability to improve his/her gingival health, the patient may be more respected by others.
- * Number nine is the need for “self-determination and responsibility.” Many people are unable to follow dental professionals’ standard recommendation to floss all their teeth every day. Many such people may become discouraged. Such discouragement can lead to cognitive dissonance and the rationalization that flossing really isn’t needed. Thus patients who are unable to comply with the recommendation to floss all their teeth every day may not floss at all or may floss very infrequently. By making it easier to follow a clinician's instructions about flossing, the Half-a-Day method may reduce a patient's

feelings of incompetence and frustration. The Half-a-Day method could help many people become regular flossers. A person who successfully uses the Half-a-Day method is likely to have increased feelings of competence, responsibility and self-determination.

The Half-a-Day method and Caries

One concern that might be raised about the Half-a-Day method is that it might increase the risk of approximal caries. This could be a concern if people who currently floss every day were to switch to the Half-a-Day method and actually decrease their flossing.

However, a recent review of caries prevention (23) stated that “there is no evidence that [toothbrushing and flossing] as ordinarily practiced, lead to reductions in the incidence of caries. Daily personal oral hygiene is recommended ... because of its effect on ... gingival disease, and as a vehicle for the application of fluoride dentifrice, a proven caries preventative.”

A three-year clinical trial (24) comparing different fluoride toothpastes among adolescents found three preventive factors that influenced the incidence of new caries: the frequency of brushing (twice a day is better than once a day); method of rinsing after brushing (less rinsing is better); and the fluoride concentration (higher fluoride concentration is better). With respect to rinsing, those adolescents who rinsed with a glass of water were much more likely to develop caries than those who rinsed their mouth with other methods, e.g. a wet toothbrush, handful of water, etc. No data on flossing habits were reported, and the locations of the new caries were not specified.

Patients using the Half-a-Day method should be strongly urged to brush at least twice daily with a fluoride containing toothpaste in order to prevent caries. After brushing, adults should rinse minimally, in order to allow a longer duration of fluoride contact. An adult with caries should be advised to add a fluoride gel or fluoride mouth rinse to his daily routine.

Recommendation

Patients who have been unable to floss all their teeth every day should be encouraged to try the Half-a-Day method.

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