



Second Semester-Plaque Biofilm Control for the Periodontal Patient Lec.19 (part1)

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Plaque Biofilm Control for the Periodontal Patient

Microbial plaque biofilm control, also referred to as periodontal self-care, is an effective way of treating and preventing gingivitis and is an essential part of all procedures involved in the treatment and prevention of periodontal diseases.

* Subjects in the study stopped brushing and other plaque biofilm control procedures, **thus resulting in the development of gingivitis in every person within 7 to 21 days**

* Microbial biofilm growth occurs within hours, and it must be completely removed at least once every 48 hours in the experimental setting with periodontally healthy subjects to prevent inflammation.

The Toothbrush

- * Toothbrushes vary in size and design, as well as in length, hardness, and arrangement of the bristles.
- * In fact, at least one study compared four commercially available toothbrushes for total plaque biofilm removal at a single brushing.
- * All four toothbrushes removed biofilm equally, and the investigators concluded that no one design was superior to the others.
- * **When recommending a particular toothbrush, ease of use by the patient and the perception that the brush is effective are the important considerations.**



Data from in vitro studies of abrasion by different manual toothbrushes suggest that brush designs that permit the bristles to carry a greater amount of toothpaste while brushing contribute to abrasion more than the bristles themselves.

However, it has been shown that several factors contribute to the problem of abrasion:

- (1) The use of hard toothbrushes.
- (2) vigorous horizontal brushing.
- (3) The use of extremely abrasive dentifrices.

All these factors may contribute to and lead to cervical abrasions of teeth and recession of the gingiva.

Toothbrush Design

Toothbrush bristles are grouped in tufts that are usually arranged in three or four rows. **Rounded bristle ends cause fewer scratches on the gingiva than flat-cut bristles with sharp ends .**

* Two types of bristle material are used in toothbrushes: **natural bristles from hogs** and **artificial filaments made of nylon**. Both remove microbial plaque biofilm, but nylon bristle brushes predominate in the market.

Handle design characteristics are entirely a matter of personal preference. **Softer bristles are more flexible**, clean slightly below the gingival margin when used with a **sulcular** brushing technique, and reach farther apically to the proximal surfaces .

* The amount of **force** used to brush is not critical for effective **plaque biofilm removal**. Vigorous brushing is not necessary and **can lead to gingival recession, wedge-shaped defects in the cervical area of root surfaces, and painful ulceration of the gingiva.**

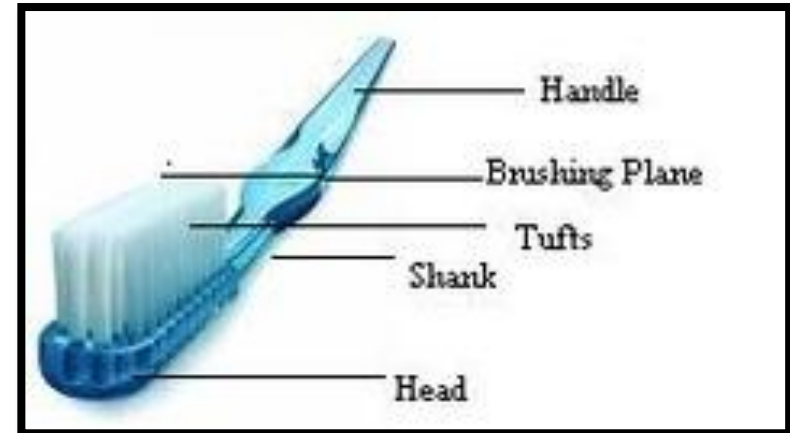
When recommending toothbrushes, keep these general recommendations in mind:

- Soft nylon bristle toothbrushes clean effectively when used properly and tend not to traumatize the gingiva or root surfaces.
- Toothbrushes become worn due to wear and should be replaced about every 3 to 4 months.
- If patients perceive a benefit from a particular design of toothbrush, they should use it as long as it is not too stiff and hard.

□ specification of toothbrushes.

American dental association (ADA)

- Length : 1 to 1.25 inches
- Width : 5/16 to 3/8 inches = 8-9.5 mm
- No. of rows : 2 to 4 rows of brushes
- No. of tufts : 5 to 12 per row
- No. of bristles : 80 to 85 per tuft



Powered Toothbrushes

* Electrically powered toothbrushes designed to mimic back-and-forth brushing techniques were invented in 1939.

Subsequent models featured circular or elliptical motions, and some had combinations of motions. Currently, powered toothbrushes have oscillating and rotating motions , and *some brushes use low-frequency acoustic energy to enhance cleaning ability.

Typically, comparison studies of powered toothbrushes, manual toothbrushes, and other powered devices demonstrate slightly improved plaque biofilm removal for the device of interest in short-term clinical trials.



Powered toothbrushes have been shown to improve oral health for the following:

- (1) children and adolescents;
- (2) people with physical or mental disabilities;
- (3) hospitalized patients, including older adults who require the assistance of caregivers for hygiene.
- (4) patients with fixed orthodontic appliances



Toothpaste(Dentifrices)

-Dentifrices aid in cleaning and polishing tooth surfaces. They are used mostly in the form of pastes, although powders and gels are also available.

Composition

***Detergent:** sodium lauryl sulfate

***Cleaning and polishing agent:** Calcium carbonate, Calcium pyrophosphate and bicalcium phosphate.

***Blinder:** Organic hydrophobic colloids, alginate, magnesium aluminum silicate.

***Humectant:** 20-40% Glycerin: Sorbitol.

***Preservatives:** Alcohol, formaldehyde.



***Sweetener:** 2-3% Sorbitol, Xylitol.

***Flavoring agent:** 1-15% peppermints: cinnamon.

***Therapeutic agent:** 1-2% Fluoride.

***Coloring agent:** 2-3%- added for all activeness.

***Water:** 20-40% main transport medium.

-**Calculus control” toothpastes**, also referred to as “tartar control” toothpastes, contain **pyrophosphates** and have been shown to reduce the deposition of new calculus on teeth as it forms.

Toothbrushing methods

-There is no single oral hygiene method that is correct for every patient. The morphology of the dentition (crowding, spacing, gingival phenotype, etc)

-**Methods of tooth brushing can be classified based on the position and motion of the brush.**

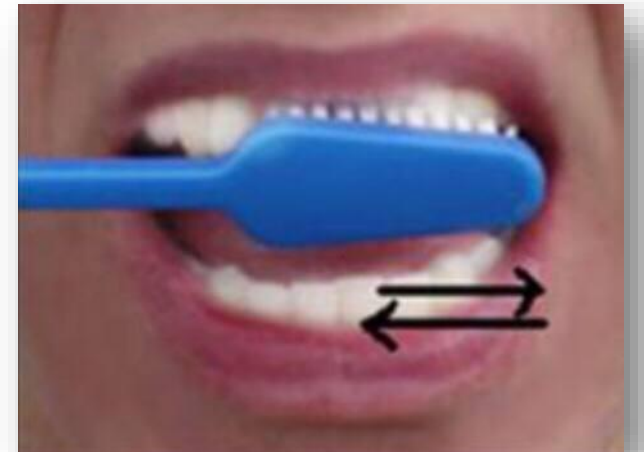
***Horizontal brushing**

-The most commonly used tooth brushing method.

-Most individuals use horizontal brushing because it is simple.

-The head of the brush is positioned perpendicular to the tooth surface, and then a horizontal back-and forth scrubbing movement is applied (Loe 2000).

-Unfortunately, gingival and enamel damage can occur with aggressive stroke and too firm of bristle.



***Vertical brushing [Leonard (1939) technique]**

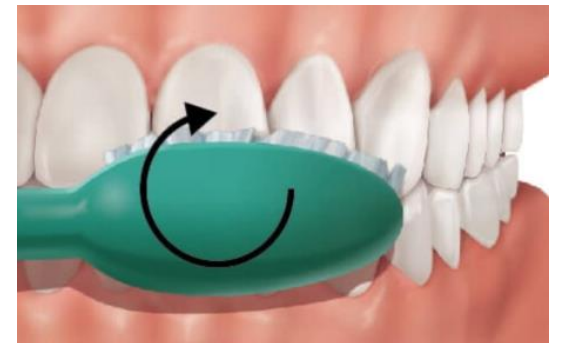
-is similar to the horizontal brushing technique, but the movement is applied in the vertical direction, using up-and-down strokes.



***Circular brushing [Fones (1934) method]**

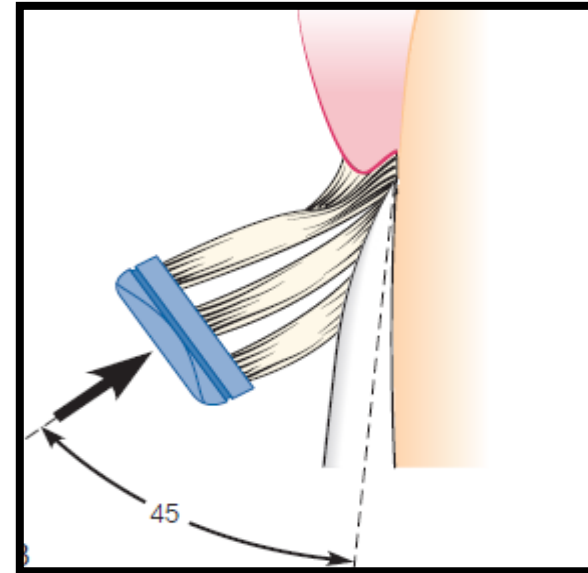
-Is performed with the teeth closed, the brush placed inside the cheek, and a fast circular motion applied that extends from the maxillary gingiva to the mandibular gingiva, using light pressure.

-Back-and-forth strokes are used on the lingual and palatal tooth surfaces.



*Sulcular brushing [Bass (1948) method]

- The head of the brush is positioned in an oblique direction toward the apex. so that the bristles are angled approximately 45° to the long axis of the tooth.
- The brush is moved in a back-and-forth direction using short strokes.
- The Bass method is widely accepted as an effective method for removing plaque, not only at the gingival margin but also subgingivally.

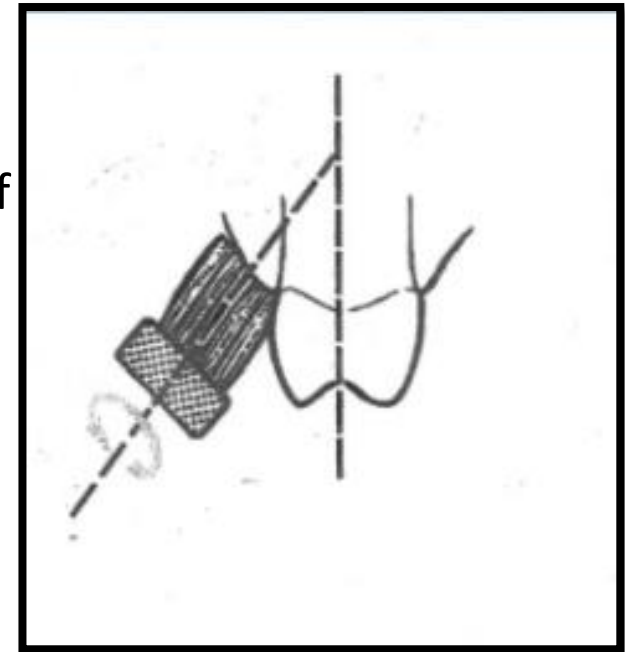


*The vibratory technique [Stillman (1932) method]

-The head of the brush is positioned in an oblique direction toward the apex, with the filaments placed partly in the gingival margin and partly on the tooth surface.

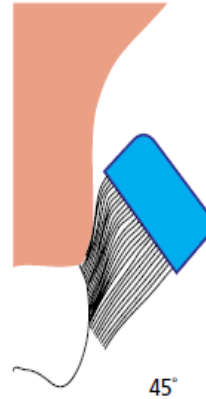
-Light pressure, together with a vibratory movement, is then applied to the handle, while the filament tips are maintained in position on the tooth surface

- Stillman method was designed for the massage and stimulation of the gingiva and for cleaning the cervical areas of the teeth.



*The vibratory technique [Charters (1948) method]

-Compared to the Stillman technique, the position of the brush head is reversed. The head of the brush is positioned in an oblique direction, with the filament tips directed toward the occlusal or incisal surfaces. short back and forth vibratory strokes.



~This method is particularly effective in cases with:

1\Receded interdental papillae because the filament tips can easily penetrate the interdental space.

2\Orthodontic patients.



*Roll technique (modified stillman technique)

-With the modified stillman technique ,the head of the brush is positioned in an oblique direction toward the apex of the teeth, with the filaments placed partly in the gingival margin and partly on the tooth surface.

-Next, the head of the brush is rolled over the gingiva and teeth in an occlusal direction.



*The modified Bass technique

-The term modified bass technique indicate a final sweep with a tooth brush toward the occlusal surfaces.

-After activation of the brush head in a back-and-forth direction, the head of the brush is rolled from the gingiva line toward occlusal direction, making it possible for some of the filaments to penetrate interdentally.



Interdental Cleaning Aids

- ✓ Any toothbrush, regardless of the brushing method used, does not completely remove interdental plaque biofilms. This is true for all patients, even for periodontal patients with wide-open embrasures.
- ✓ The majority of dental and periodontal diseases originate in interproximal area.
- ✓ Common aids for interdental hygiene are **dental floss, interdental brushes, rubber tips, and wooden or plastic tips.**

Dental Floss

*Dental floss is the most widely recommended tool **for removing biofilm from proximal tooth surfaces**. Floss is made **from nylon filaments or plastic monofilaments**, and it comes in **waxed, unwaxed**, thick, thin, and flavored varieties.

*Some prefer monofilament floss made of nonstick material because they are slick and do not fray.

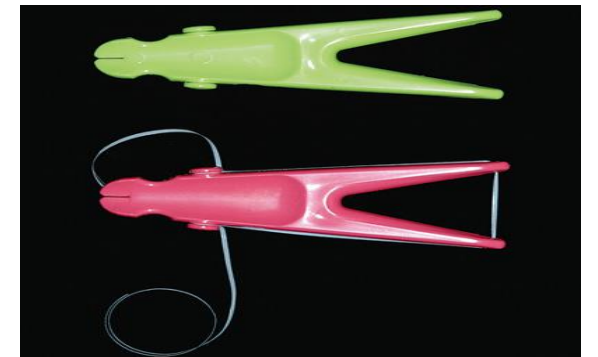
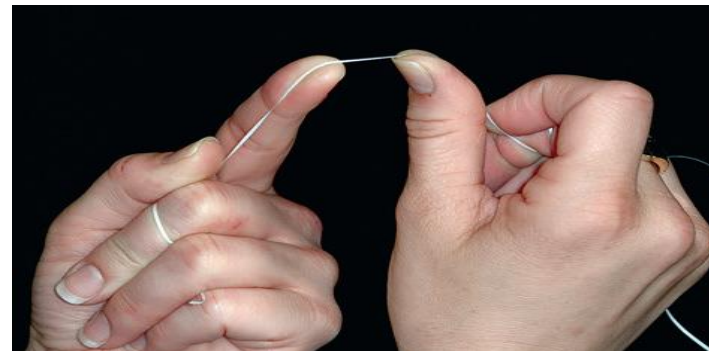
*Waxed dental floss was thought to leave a waxy film on proximal surfaces, thus contributing to **biofilm accumulation and gingivitis**.

***Factors influencing the choice of dental floss** include the tightness of tooth contacts, the roughness of proximal surfaces, and the patient's manual dexterity, not the superiority of any one product

Technique for the Use of Dental Floss

Flossing technique requires the following:

1. Start with a piece of floss long enough to grasp securely; 12 to 18 inches is usually sufficient. It may be wrapped around the fingers, or the ends may be tied together in a loop.
2. Stretch the floss tightly between the thumb and forefinger or between both forefingers, and pass it gently through each contact area with a firm back-and-forth motion. Do not snap the floss past the contact area, because this may injure the interdental gingiva. In fact, zealous snapping of floss through contact areas creates proximal grooves in the gingiva.

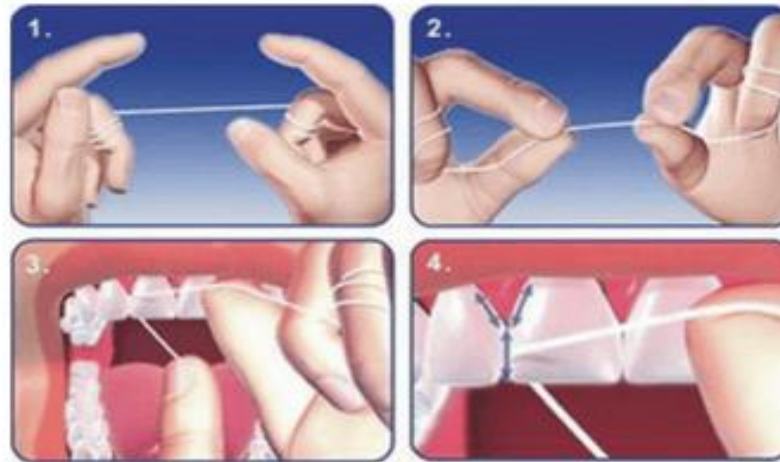


3. Once the floss is apical to the contact area between the teeth, wrap the floss around the proximal surface of one tooth and slip it under the marginal gingiva. Move the floss firmly along the tooth up to the contact area and gently down into the sulcus again, repeating this up-and-down stroke two or three times.

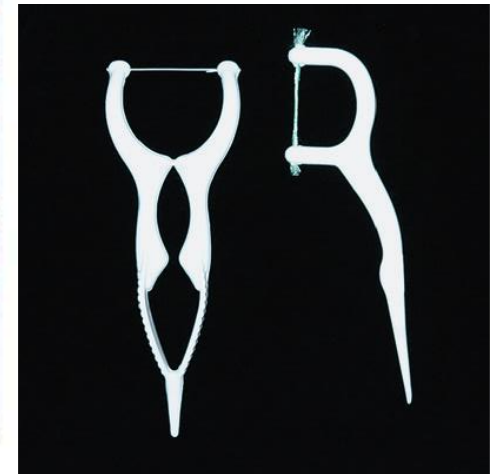
Then move the floss across the interdental gingiva, and repeat the procedure on the proximal surface of the adjacent tooth.

4. Continue through the whole dentition, including the distal surface of the last tooth in each quadrant. When the working portion of the floss shreds or becomes contaminated, move the floss to a fresh portion.

Flossing can be facilitated by using a floss holder

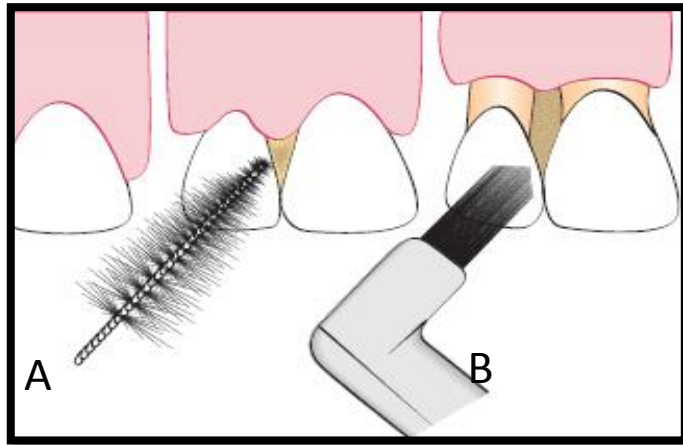


Correct Flossing Technique

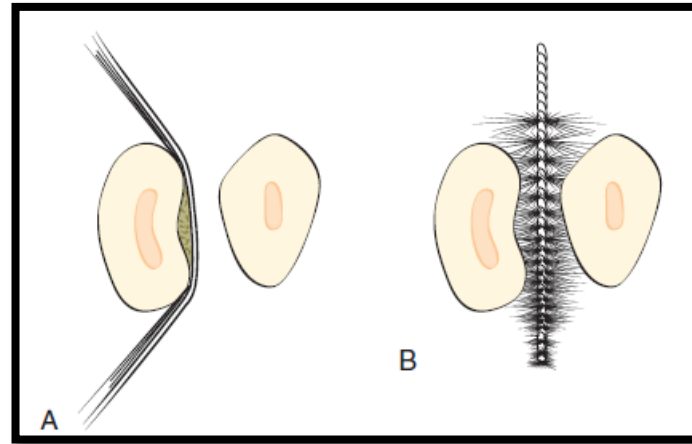


■ Interdental Brushes

- The most effective plaque biofilm removal method for interdental areas, where the papilla does not completely fill the space, is the use of interdental brushes, also Cleaning of concave or irregular proximal tooth surfaces.



(A) interproximal brush,
(B) Single-tufted brush.



(A) Dental floss may be less effective than (B) an interdental brush on long root surfaces with concavities.

- A comparison study between dental floss and interdental brush in patients with severe to moderate periodontitis, showed that interproximal brushes remove slightly more interproximal plaque and that the patients found them easier to use.

- **Single-tufted brushes** provide access to furcation areas, or isolated areas of deep recession, and are effective on the lingual surfaces of mandibular molars and premolars.



✓ *Technique*

- An interdental brush of any style is inserted through the interproximal spaces and moved back and forth between the teeth with short strokes. The diameter of the brush should be slightly larger than the gingival embrasures to be cleaned.



Other Interdental Cleaning Devices (Rubber Tips, Wooden Toothpicks, and Tufted Brushes)

*Other interdental cleaning devices are available for removing microbial plaque biofilm from between the teeth.

Rubber tips with angled shanks, tapered wooden toothpicks that are round or triangular in cross-section, and single-tufted brushes are all helpful in attaining interdental hygiene.

Many interdental devices have handles and contoured shanks for convenient manipulation around the teeth and in posterior areas.



Technique

*Toothpicks are common devices and readily available in most homes. They can be used around all surfaces of the teeth when attached to commercially available handles .

■ Technique

- Soft triangular wooden picks or plastic picks are placed in the interdental space with the base of the triangle resting on the gingiva and the sides in contact with the proximal tooth surfaces . The pick is then moved in and out of the embrasure several times to remove the biofilm.



Oral Irrigation

Supragingival Irrigation

- *Oral irrigators for daily home use function by directing a pulsating stream of water through a nozzle to the tooth surfaces.
- *They are particularly helpful for removing debris from inaccessible areas around orthodontic appliances and fixed prostheses. When used as adjuncts to toothbrushing and interdental cleaning, these devices can have a beneficial effect on periodontal health by reducing the accumulation of microbial plaque biofilm, as well as by decreasing inflammation and pocket depth.
- *Daily supragingival irrigation with dilute chlorhexidine for 6 months resulted in significant reductions in bleeding and gingivitis compared with water irrigation and chlorhexidine rinse controls.

Gingival irrigation can be a useful adjunct for periodontal patients who have residual pockets and complex dental architecture to clean every day.

- **Subgingival irrigation** with specialized tips or blunt syringes for deep pockets and furcation areas is effective for maintaining residual pockets and furcation areas when it is used as part of the daily home care routine.

Subgingival irrigation with an oral irrigator using chlorhexidine diluted to one-third strength performed regularly at home and after scaling, root planing, and in-office irrigation therapy produced significant gingival improvement compared with control subjects



Transient bacteremia has been reported after water irrigation in patients with periodontitis and patients receiving periodontal maintenance therapy. However, bacteremia has also been found after toothbrushing, and it is known to occur in a significant number of patients after scaling of the teeth by the clinician.

Subgingival irrigation at home is not the recommended oral hygiene procedure for patients requiring antibiotic prophylaxis before dental treatment, especially if extensive inflammation is present. [For these patients, supragingival irrigation in combination with toothbrushing and other interdental cleaning aids is recommended.](#)

Caries Control

*Dental caries, particularly root caries, is a problem for periodontal patients because of attachment loss and exposed root surfaces associated with the disease process and periodontal therapy procedures.

*Root caries develops through a process similar to coronal caries, involving an alternating cycle of demineralization and remineralization of the surfaces and other risk factors associated with diet and salivary flow.

* Fluoride is effective primarily by topical effects to prevent and reverse the caries process, whether in enamel, cementum, or dentin.

*Low concentrations of topical fluoride inhibit demineralization, enhance remineralization, and inhibit the enzyme activity in bacteria by acidifying the cells.

*Adult patients benefit from the prevention and reversal of root caries provided by low-concentration topical fluoride delivered by toothpaste or other topical applications.

* It also has been demonstrated that fluoride dentifrice containing 5000 ppm of fluoride was more effective in reversing active root caries lesions than the fluoride level of 1100 ppm found in conventional toothpastes

Thank You!

