Lecture 6

Mechanical & Chemical Plaque Control

Dr. Aljoharah AL-Sinaidi, BDS, MSc

Reference
Ch.50 /Glickman’s Clinical Periodontology, 10th edition
Dental Plaque

- Structured, resilient, yellow-grayish substance that adheres to the intraoral hard surfaces.
- Primary etiologic factor for dental and periodontal diseases (sub-gingival plaque).
- Grows within hours.
Plaque Control

Means:
Regular removal of dental plaque & prevention of its accumulation on the teeth and adjacent gingiva.

Importance:
Critical in:
• Prevention of dental & periodontal diseases.
• Treatment of dental & periodontal diseases.
• Maintenance of oral health*
Maintenance of Oral Health

Responsibility of:
- Dentist
- Hygienist
- Patient *
Frequency of Plaque Removal

- Daily job.
- Once every 24 - 48 hours for well trained individuals in controlled, supervised environment (researches).
- Twice per day for most patients. Why?:
  - Average daily plaque control lasts less than 1 minute.
  - Plaque removed is only 40%.
- Recommendations: Reading*
Plaque Control

Mechanical

Most dependable way to achieve oral health for all dental patients

Chemical

Adjunctive agents to mechanical plaque control
Mechanical Plaque Control
Mechanical Plaque Control

Means:
**Daily** cleaning with a toothbrush and other oral hygiene aids.
Manual Toothbrush
Manual Toothbrush

Parts

- Bristles
- Head
- Handle
Manual Toothbrush

Head Design & Size

Design:
- Conventional
- Diamond
- Superbrush
- Ozone

Size:
Bristles

Pattern:

- Block
- Wavy or V-shape

Hardness:

- Soft: 0.2 mm in diameter.
- Medium: 0.3 mm in diameter.
- Hard: 0.4 mm in diameter.
## Bristles

<table>
<thead>
<tr>
<th>Material:</th>
<th>Nylon</th>
<th>Natural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaque removal</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Predominates in market</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Uniformity of bristle size</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Elasticity</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Resistance to fracture</td>
<td>✔ ✔</td>
<td>✔ ✔</td>
</tr>
<tr>
<td>Debris &amp; water repulsion</td>
<td>✔ ✔</td>
<td>✔ ✔</td>
</tr>
<tr>
<td>Fraying, breaking, contamination, softening</td>
<td>✔ ✔</td>
<td>✔ ✔</td>
</tr>
</tbody>
</table>

- **Natural**: from hogs.
- **Artificial**: made of nylon.
Toothbrush Replacement

Wear pattern:

With regular use, brushes show wear within few months.
It is recommended to replace the toothbrush every 3 months.
Manual Toothbrush

Handle

- **Straight handle**
  - conventional brushes
  - Easier to control

- **Flexible handle**
  - for less gum injury

- **Contra-angle handle**
  - to access difficult areas.

- **Slip prevention grip handle**
  - prevent brush slipping during brushing.
Selection

No specific toothbrush is superior in terms of plaque removal.

Recommendations:
- Soft, nylon bristles toothbrush.
- Brush replacement every 3 months.
- Beneficial brush design (patient dependent).

Consider:
- Patient interest.
- Morphology of the dentition.
- Periodontal health.
- Manual dexterity.
Manual Toothbrush

Acceptable Manual Toothbrushes

Brushing surface (ADA):
- Length: 1-1.25 inches (25.4-31.8 mm).
- Width: 5/16-3/8 inch (7.9-9.5 mm).
- Rows: 2-4.
- Tufts: 5-12 tufts/row.

Bass toothbrush:
- Straight Handle 6 inches long, 7/16 inches wide.
- Nylon soft bristles 10.3 mm long with rounded ends.
- 3 rows of tufts with 6 evenly spaced tufts per row.
- 80-86 bristles/tuft.

Most commonly recommended toothbrush:
- Short-headed.
- Straight-cut, round-ended soft Nylon bristles.
- 3-4 rows of tufts.
Powered Toothbrush
Powered Toothbrush

- Different acceptance by patients.
- Proper use results in good plaque control.
- Different designs (straight/round head, reciprocating tufts, tips).
- Additional features (sonic technology, timers).

Recommended for:
- Children and adolescents.
- Children with physical or mental disabilities.
- Hospitalized patients (older adults).
- Patients with fixed orthodontic appliance.
Dentifrices
**Dentifrices**

- Aid in cleaning & polishing.
- Increase brushing effectiveness.
- Available as paste*, powder & gel.
- Contain:
  - 20%-40% abrasives (insoluble inorganic salts)
  - 1000-1100 ppm therapeutic agents (caries control)
  - Pyrophosphates (anti-tartar agent against new supragingival calculus*)
Brushing Techniques
Many accepted techniques.

It is a personal choice.

Solely depends on the person's dexterity, motivation and individual needs.

No clear superiority for any technique.
# Brushing Techniques

<table>
<thead>
<tr>
<th>Roll</th>
<th>Vibratory</th>
<th>Circular</th>
<th>Vertical</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll Mod Stillman</td>
<td>Stillman</td>
<td>Fones</td>
<td>Leorand</td>
<td>Scrub'</td>
</tr>
<tr>
<td></td>
<td>Charters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Simplest, oldest & most common**
- For inflamed gums
- For gingival recession
- For braces/ periosurgery
- For sulcular cleaning
Brushing Techniques

Bass Technique
Bass Technique

- Buccal surfaces
- Posterior palatal/lingual surfaces
- Anterior palatal/lingual surfaces
- Occlusal surfaces
Modified Stillman Technique

Brushing Techniques

A

B
Charter’s Technique

- Bristle ends are pointing away from the gingiva, toward proximal surfaces of the teeth.
- Bristles rest on the gum.
Brushing Techniques

**Scrub:**
- Back & forth with bristles \( \perp \) tooth surfaces.
- Every one, including children can adapt at it.

**Roll:**
- In the way of tooth growing.
- Needs concentration & slow performance.

**Mod. Stillman & Mod. Bass:**
Back & forth + rolling
Brushing Techniques
Interdental Cleaning
**Importance:**

Most of dental & periodontal disease originate in the interproximal areas. **Why?**

Interproximal areas are not accessible to the toothbrush & retain the highest amounts of plaque.

**Main purpose:** To remove plaque, not just food particles!

**Frequency:** Daily.

**Recommended cleaning aids:**

Dental floss - Wooden or plastic tips - Interdental brushes.
Dental Floss

Most widely recommended.

Types:
1. Multifilament nylon (twisted/ nontwisted, waxed/ unwaxed, thick/thin, flat/round).
2. Monofilament teflon.

Floss choice:
1. Tightness of tooth contacts.
2. Roughness of proximal surfaces.
3. Patient’s manual dexterity.
1. Flattened floss is designed to increase the contact surface with the tooth.

2. Ultra floss is spongy and soft

3. Round floss is relatively thinner
Flossing

Step 1:
Take about 12-18 inches of floss and wrap around the middle fingers, leaving a short distance between them.

Step 2:
Stretch the floss tightly between the thumb and forefinger and pass it gently through each contact area with a firm back-and-forth motion. Note: the floss up to the contact area and down into the sulcus again (not in a sawing motion).
Superfloss

Dental floss

Stiff-end threader

Spongy floss

Regular floss
Superfloss

Slide the stiff-end threader through the gap in between teeth with spaces on orthodontic appliances.

Regular floss removes plaque from adjacent tooth surfaces.
Flossing Devices

- Dental Floss
- Floss holder
- Powered flossing device
- Threaders
Advantages:
It can clean interproximal surfaces, extending to the junctional epithelium, where the toothbrush can’t reach.

Disadvantages:
It is likely to miss plaque in root grooves and furcations.
Interdental Cleaning

Toothpicks
Interdental Cleaning

Interdental Brushes

Indications:

- Gingival recession
- Fixed orthodontic appliance
- Fixed bridge
Single Tufted Brush

**Design:**
It is a toothbrush with a very small head.

**Indications:**
To clean wisdom and tilted teeth.

**Method of use:**
Hold the brush in a pen grip, and place the bristles over the tilted tooth area (at the gingival margin of the wisdom tooth) and brush gently.
Interdental Cleaning

Interdental Space Size & Hygiene Aids

Note:

In areas where an interproximal brush can be used, it is not necessary to floss.
Disclosing Agents

- Available as solutions or wafers.
- Used for education and motivation
- For clinic and home use.
Gingival Massage

**Material:**
Strong elegant polycarbonate plastic.

**Design:**
Two angled heads to easily stimulate interior and anterior gums.

**Indication:**
for firming and strengthening gums.
Oral Irrigation Devices

Supragingival irrigator

Subgingival irrigator
Brushing Injuries

- Cervical abrasion.
- Gingival recession.
- Gingival ulceration.

Causes:

- Vigorous brushing.
- Hard toothbrush.
Chemical Plaque Control
Chemical Plaque Control

Effective for:
- Plaque reduction
- Gingivitis reduction.
- Improved healing following periodontal surgery

Chemical agents (ADA):
- Are two:
  - Chlorhexidine digluconate oral rinse
  - Essential oil rinse.
- Used as dilute solutions with oral irrigators or as oral rinse
- Available with and without alcohol.
Any Chemical plaque agent should possess several properties including:

1. **Anti-plaque action**: bactericidal/ bacteriostatic.

2. **Substantivity**: ability to adhere to oral surfaces & released slowly over time, enhancing effectiveness duration (eg. Chlorhexidine (+ve) adhere to oral tissues (-ve) for several hours).

3. **Low permeability**: to allow for more retention in the oral cavity.

4. **Low toxicity & non-irritating.**
Chlorhexidine
Chlorhexidine Oral Rinse

- It is recommended by 99% of dentists for the front line prevention & treatment of gingivitis & other oral disorders.
- It is available in original or mint flavor in 300ml or 600ml bottles & also for localized use as a 50g gel or 60ml dental spray.
Advantages:

- Most effective antibacterial agent.

Clinical human studies:

- Rinsing with 10 ml of 0.2% twice daily completely inhibits plaque, calculus & gingivitis.
- 45%-61% reduction in plaque.
- 27%-67% gingivitis reduction.

- Highly substantive
**Chlorhexidine Oral Rinse**

- CORSODYL
- Curasept
- Denti-Care 0.2%
- Periplus 0.12%
- PeriOx 0.12%
Chlorhexidine Oral Rinse

Indications:

- Phase I therapy.
- Recurrent infections.
- Ineffective plaque control.
- Some oral mucosal diseases (oral ulceration and oral candidal infections).
- Following periodontal/ oral surgery.

Side effects (disadvantages):

- **Local**: Brown staining* & transient impairment of taste perception, calculus formation.
- **Systemic**: toxicity (very low) & increased risk of oropharyngeal cancer(? ? ?).
Modes of use:

- **Mouth rinse**: full strength of 15 ml / tid / 30 sec.

- **Supragingival irrigation**: 1:1 with water (0.06%) once /day.
Essential Oil
Essential Oil Rinse

**Features:**
- Very old rinse (19th century).
- Plaque reduction: 20%-35%.
- Gingivitis reduction: 25%-35%.
- Contains up to 24% alcohol.
- Less effective than CHX.
- Minimal side effects (staining)
Important to know:

- Oral rinses should not replace mechanical plaque control.

- Patient motivation:
  - is a critical and important for long-term success of periodontal therapy.
  - Requires patient commitment and regular return visits

- Important points: Read.
Ideal for the patient to use at home
Thank You

Any Question?