Toothbrushes

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Dental Plaque

• Biofilm or mass of bacteria that grows on surfaces
• Commonly found between the teeth, on the front of teeth, behind teeth, on chewing surfaces, along the gumline, or below the gumline cervical margin
• Progression and build-up of dental plaque can give rise to tooth decay – the localised destruction of the tissues of the tooth by acid produced from the bacterial degradation of fermentable sugar
  – and periodontal problems such as gingivitis and periodontitis
Plaque control

- removal can be achieved with correct daily or twice-daily tooth brushing and use of interdental aids such as dental floss and interdental brushes.
- Prevention of its accumulation on the tooth and the adjacent gingival tissues
- Prevents calculus formation
- Includes mechanical procedures and chemical agents that are able to prevent plaque formation
The toothbrush is an oral hygiene instrument used to clean the teeth and gums that consists of a head of tightly clustered bristles mounted on a handle, which facilitate the cleansing of hard to reach areas of the mouth.
History of the Toothbrush

World’s first toothbrush was a just a stick about the size of a pencil. One end was chewed into thus becoming softened and brush-like while the opposite end was pointed and used as a toothpick to clean food and debris from between the teeth. The twigs used were carefully chosen from aromatic trees such as neem, meswak, babool etc. that had the ability to clean and freshen the mouth.
Promoting tooth brushing at the beginning of the 20-th century
History of the Toothbrush

The earliest literature showing the use of these twigs is found in Chinese literature at around 1600 BC.

The first toothbrush of a more modern design was made by William Addis in England around 1780 – the handle was carved from cattle bone and the brush portion was still made from swine bristles.

In 1844, the first 3-row bristle brush was designed.
In 1770, Addis had been jailed for causing a riot in Spitalfields.

While in prison, and observing the use of a broom to sweep the floor, he decided that the prevalent method used to clean teeth at the time – crushed shell or soot – with a cloth was ineffective and could be improved.

To that end, he saved a small animal bone left over from the meal he had eaten the previous night, into which he drilled small holes. He then obtained some bristles from one of his guards, which he tied in tufts that he then passed through the holes in the bone, and which he finally sealed with glue.

After his release, he started a business to manufacture the toothbrushes he had built, in 1780, and he soon became very rich. He died in 1808, and left the business to his eldest son, also called William, and it stayed in family ownership until 1996.

Under the name Wisdom Toothbrushes, the company now manufactures 70 million toothbrushes per year in the UK.

By 1840 toothbrushes were being mass-produced in England, France, Germany, and Japan.
Early toothbrushes
courtesy of the Addis website.
The horsehair toothbrush was said to have been used by Napoleon Bonaparte (1769–1821)
Natural bristles were the only source of bristles until Du Pont invented nylon. The invention of nylon started the development of the truly modern toothbrush in 1938, and by the 1950s softer nylon bristles were being made, as people preferred these.
OBJECTIVES OF TOOTHBRUSHING:

1. To clean teeth and interdental spaces of food remnants, debris, and stains.
2. To prevent plaque formation.
3. To disturb and remove plaque.
4. To stimulate and massage gingival tissues.
5. To clean the tongue.
TYPES OF TOOTHBRUSHES

On the basis of manipulation
  a. Manual toothbrushes
  b. Powered toothbrushes
  c. Sonic and ultrasonic toothbrushes
  d. Ionic toothbrushes

On the basis of sizes
  a. Large
  b. Medium
  c. Small

On the basis of bristle diameter
  a. Soft bristle- 0.2mm (0.007 inch)
  b. Medium bristle- 0.3mm (0.012 inch)
  c. Hard bristle- 0.4mm (0.014 inch)
Requirements of a Manual Toothbrush

1. It should confirm to individual patient requirement in size, shape and texture.
2. It should be easily and effectively manipulated.
3. It should be readily cleaned and areated and should be impervious to moisture.
4. It should be durable and inexpensive.
5. It should be designed for utility, efficiently and cleanliness.
"Reach" toothbrush

In 1976 – DuPont enters toothbrush market after four years of research conducted by "bio-dental team" from Tufts University first ergonomically designed toothbrush, that proved significantly better in clinical trials and spawned a whole new field of "toothbrush design"

it had an angled head, similar to dental instruments, to reach back teeth;

the bristles were concentrated more closely than usual to clean each tooth of potentially cariogenic materials;

outer bristles were longer and softer than the inner bristles
End-tuft brush

The small round brush head comprises seven tufts of tightly packed soft nylon bristles, trimmed so the bristles in the center can reach deeper into small spaces.

The brush handle is ergonomically designed for a firm grip, giving the control and precision necessary to clean where most other cleaning aids cannot reach.
1. **Handle** - The part grasped in the hand during tooth brushing.

2. **Head** - The working end of a tooth brush that holds the bristle or filaments.

3. **Tufts** - Clusters of bristles or filaments secured into the head.

4. **Brushing plane** - The surface formed by the free ends of the bristles or filaments.

5. **Shank** - The section that connects head and handle.
TOOTHBRUSH DESIGN:

# Two types of bristles material are used-

1. Natural bristles from hogs
2. Artificial filaments made of nylon

# Bristle hardness is proportional to square of the diameter and inversely proportional to the square of bristle length.

# Amount of force used to brush is not critical for effective plaque removal.
Tooth brush must also be replaced periodically, although the amount of visible bristle wear does not appear to affect plaque removal for up to 9 weeks.

Handle of toothbrush—slightly bent brush handles improve posterior access for plaque removal.

TOOTHBRUSH MODIFICATIONS

(To achieve enhanced plaque removal)

1. Long and contoured handle
2. Double angulation of head and neck
3. Concave surface of the brushing plane
4. Special indicator bands
RECOMMENDATIONS

# Soft bristle toothbrushes clean effectively, remain effective for a reasonable time and tend not to traumatize the gingiva or root surfaces.

# Toothbrushes need to be replaced about every 3 months.

# If patients perceive a benefit from a particular brush design, then they should use it.
5,460 CUREN® filaments.

Ultra soft toothbrush offers exceptional gentleness and efficiency.

5,460 CUREN® filaments, 0.1 mm in diameter.
Toothbrushing Techniques

- Bass Technique
- Modified Bass Technique
- Stillmans Technique
- Modified Stillmans Technique
- Charters Technique
- Roll Technique
Bass technique

Toothbrush head parallel to occlusal surface of the teeth
Bristles are directed apically into the gingival sulcus 45 degree angle to the long axis of the teeth
Applying gentle press in an apical direction by making short vibratory stroke
Modified Bass technique

The modification consists of sweeping the bristles downward over the tooth surface occlusally after the vibratory motion in the gingival sulcus.
Stillmanns Method

Bristles directed apically and compressed laterally against the gingiva (45 degree angle)

A vibratory rotary motion is applied to the brush with the bristles remaining the same positioning
Modified Stillmans Method Technique

The modification consists in the brush moved occlusally in a rolling stroke after the vibratory motion.
Charters Method

The bristles are directed occlusally and the sides of the bristles are firmly flexed against the gingiva with a vibratory motion.
Roll Method

Bristles are directed apically – Swept in an occlusal direction with a rolling motion
COLGATE® 360° CHARCOAL TOOTHBRUSH SOFT

Charcoal-infused tapered bristles

Cleans 2x deeper along the gum line (vs an ordinary flat trim toothbrush)

Cleans your teeth, tongue, cheeks, and gums

https://www.youtube.com/watch?v=Pnb016HIUBc
That makes rapid automatic bristle motions

- back-and-forth oscillation
- or rotation-oscillation (where the brush head alternates clockwise and counterclockwise rotation),
- Motions at sonic speeds or below are made by a motor.

Recent types usually powered by a rechargeable battery charged through inductive charging when the brush sits in the charging base between uses.
POWERED TOOTHBRUSH
(AUTOMATIC OR MECHANICAL OR ELECTRIC TOOTHBRUSH)

The heads of these toothbrushes oscillate in a side to side motion or in rotary motion. The frequency of the oscillations is around 40Hz in an ordinary powered toothbrush.

- **ADVANTAGES**
  1. It increases patient motivation resulting in better patient compliance.
  2. Increased accessibility in interproximal and lingual tooth surface
  3. No specific brushing technique required
  4. Uses less brushing force than manual toothbrushes
  5. Brushing timer is incorporated in some brushes to help the patient in brushing for the required duration.
ORAL-B GENIUS 8000

• 6 modes: Daily Clean, Gum Care, Sensitive, Whitening, Pro-Clean, Tongue Cleaning
• Position Detection technology so you never miss a zone while brushing
• Bluetooth Connectivity with the Oral-B app
• Visible Pressure Sensor
• Smart Travel Case that charges your brush and smartphone
• LED SmartRing with 12 colors for a personalized look
Advanced electric tooth brush heads

**PRO GUMCARE**
FOR A GENTLE CLEAN
- Removes up to 100% more plaque* for healthier gums
- Round head with ultrathin bristles for a gentle clean
- Helps prevent gum problems

**CROSSACTION**
Modeled after the round shape of professional dental cleaning tools

**FLOSSACTION**

**3D WHITE**
- Polishing cup gently removes stains to whiten teeth

https://www.youtube.com/watch?v=UUXAivWbnOw
Philips Sonicare Electric Toothbrushes

unique technology drives fluid deep between the teeth and along the gum line

Sonic technology means that the oval brush head of the sonicare toothbrush pulses at high speed to remove plaque.

You can use a massage setting to brush inflamed gums and an intense brushing setting if you want to thoroughly clean your teeth, for example.

**DiamondClean**
- Whitens teeth
- Removes up to 7x more plaque than a manual toothbrush
- 5 modes: Clean, Gum Care, Polish, Sensitive, White
- Dual Charging System: Charging glass and USB charging case
Ultrasonic toothbrush

- is an electric toothbrush that operates by generating ultrasound in order to aid in removing plaque and rendering plaque bacteria.

- work by generating an ultrasonic wave usually from an implanted piezo crystal, the frequency of which technically could begin at 20,000 Hz (2,400,000 movements per minute).

- typically operates on a frequency of 1.6 MHz, which translates to 96,000,000 pulses or 192,000,000 movements per minute
Disadvantages of excessive toothbrushing

• Abrasion
  • At the area of the cemento-enamel junction
  • At areas of eroded surfaces
    • After drinking of acidic liquids (30 minutes!)
      • Ice tea, coke, citrus foods or liquids (especially if carbonated!)
    • GERD disease

• Do not push the brush!
Thank you for your attention