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DEN1100(OL10)

12/10/2021

**PART** **1**

Gingivitis is defined as an early-stage gum disease which is caused by the buildup of plaque on the gingival margin. These bacteria, when left undisturbed, causes inflammation which eventually results in swelling and redness of the gum tissue. Toxins produced by this plaque causes this inflammation. This condition is easily reversible, if the patient recognizes the symptoms and start to focus on oral hygiene. Furthermore, if left untreated will lead to development of a critical condition called periodontitis. Periodontitis causes the gum tissue to be pulled away from the teeth, leading to formation of pockets.

Gingivitis can present as red, sore, and bleeding gums, tooth pain or sensitivity, bad breath, or loose teeth. Patients tend to ignore these symptoms and fail to seek any professional help, making conditions worse. Even in initial stage this disease is reversible if patient maintains oral hygiene and seeks professional help, if needed. Moreover, gingivitis could be easily prevented if patient is brushing and flossing regularly. Secondly, patient who smoke or use tobacco are at a higher risk for the development of a gum disease. Crest mentions on their official website that a smoker has seven times more chance of suffering from a gum disease. Poor nutrition is another contributing factor to gum diseases. When we are unable to provide the body with essential nutrients for the defense system to function properly, it eventually leads to diseases. Stress is another important risk factor which weakens our immune system, leading to gingivitis. Hormonal changes in the body during pregnancy, menopause, or the monthly cycle increases the reactivity of our gums, leading to inflammation. Improper toothing brushing technique, where patient ignore the gum, causes the bacteria in the plaque to proliferate further. In some cases, certain medication or chronic diseases like cancer, HIV, diabetes, impedes the body to fight infection.

Generally, people have a concept that they do not need to see a dentist until and unless they their gums bleed. As a dental hygienist our role is critical here, we need to guide them that regular dental checkups are necessary, and they should check the gums often in the mirror to see any deviation in color or texture from the normal. We need to guide our patient about the appropriate brushing technique and interdental care. The most common mistake people make is that they ignore their gingiva during toothbrushing. Toothbrushing techniques such as Bass Method and Stillman`s Method, actively involve our gingiva and pocket during toothbrushing. Secondly, if any gingivitis symptoms arise, they tend to ignore those symptoms due to unawareness. Therefore, it is important to make your patient understand the need of a routine dental checkup. During these checkups a professional clinician can identify any symptom that is deviating from the normal and then formulate plan for the patient accordingly. While formulating the plan the most important component that a hygienist should take in account is the patients’ needs and comfort. In case the patient is unable to exert the mechanical force required during manual toothbrushing, ask your patient to switch to an electric toothbrush for the removal of the bacterial plaque from their teeth. Guide the patient about the significance of a soft bristle toothbrush and their toothpaste containing fluoride. Similarly make your patient aware of the significance of brushing their teeth and gums for at least two minutes twice a day. Generally, most of the people fail to realize the significance of flossing in our oral hygiene. As a dental health care professional, we need to guide people that flossing once a day is vital because a floss slide easily between our teeth as well as below the gum line which is significant for the removal of gingivitis causing plaque. Most of the people believe that we do not need to replace our toothbrushes until and unless the bristles are not worn out. So, it is important to advocate that a toothbrush should be replaced every three months because damaged bristles will not be efficient enough to remove the plaque. As we have discussed earlier that nutritional deficiency can be a triggering factor for the plaque formation similarly out of proportion and increased consumption of sugars can promote the growth of gingivitis causing plaque.

**PART 2**

1. **TOOTHBRUSH METHODS**

Brushing our teeth is an art which is as adequate as showering and shaving our body for personal hygiene. To attain the maximum efficacy while toothbrushing it is important to keep certain approaches which will reap us maximum benefits. Most of the people ignore oral health and take it for granted. As a professional we should remind our patients that any medical condition showing in our mouth is just like other medical conditions in our body and demand similar attention.

Generally, people have a concept that using a hard bristle brush will produce maximum results but, an ADA approved soft bristle brush is the best option (Wilkins, pg 435). This is because softer bristles can bend and reach all places in your mouth due to flexibility. Additionally, an appropriate size of the head is essential so that you can reach all surfaces of each tooth including the occlusal surface and interproximal spaces. It is also essential that the handle of the toothbrush fits comfortably in the patient’s hand so that he can have maximum control of the brush’s movement during each stroke (nidcr.nih.gov, 2018). The Wilkins textbook states that an individual should brush a minimum of two times per day for 120 seconds or two minutes to reduce the caries incidents and severity of periodontal disease. Dentist Dr. Jon Marashi states in an interview to nbcnews.com that one of the most common mistakes that people make in maintaining oral hygiene is to only brush in the morning. He says, “By the end of the day, you have the most amount of food debris stuck in an on between your teeth. Additionally, when you sleep your mouth is the least active for saliva production, which functions to help bathe the teeth clean. As a result, the bacterium in your mouth now has a festive food supply in which they consume. The byproduct is an acid secretion that leads to tooth decay. Brushing your teeth at night is non-negotiable.”

Most of the patients will have different anatomical features in the oral cavity, which can be dealt with an appropriate toothbrushing technique for that specific feature. Sometimes the patient may be efficient to choose any method but a lack of interest in toothbrushing can make a hygienist think of another method which can be easily adopted by such a patient. As a hygienist our aim should be to target the maximum areas of the mouth to be cleaned by the patient. It is our duty to not only teach the patient about the advantages of toothbrushing but also guide him with an appropriate technique according to his needs. The most widely used technique is the *Bass method* also called as sulcus cleaning method. This method is sufficient to go under the gingival margin, open interproximal areas, and exposed root surfaces. Bristles at an angle of 45 degree and then activating it. Clean the occlusal surfaces too by pressing the bristles firmly against the pit and fissures. Secondly *Modified Stillman’s* technique is used to remove the dental plaque from cervical areas and exposed proximal surfaces. This method also requires the bristles to be placed at an angle of 45 degrees, pointed apically and partly on the cervical aspect of tooth and partly on the adjacent gingiva. This technique not only cleans the tooth surfaces but also provides gingival massage and is recommended for areas with progressing gingival recession and root exposure.

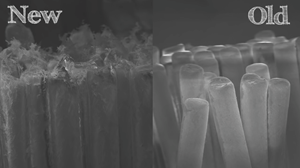
For young children, physically or emotionally handicapped individuals or those patients who lack the dexterity the *Fones method* is recommended. This circular method is easy to learn and require shorter time. Recommend though *Vertical method/Leonard’s* method for small children with deciduous teeth. This method requires the toothbrush to be placed at a 90-degree angle do the facial surface of the tooth. However, if the patient is wearing fixed partial dentures or orthodontic appliances, or the patient have had a periorbital surgery, or the patient has moderate interproximal recession recommend him the *Charter’s method.* The multi tufted toothbrush is recommended to be placed at an angle of 45 degrees to the gingiva with the bristles directed coronally. The bristles when activated by mild vibratory strokes reach interproximal. However, if your patient is an adult with limited dexterity then the *Rolling Stroke method* will be recommended. Do teach your patient the Smiths method which is recommended for occlusal surfaces. This method duplicates natural self-cleansing gingival mechanism during mastication our food. It is a natural self-cleansing mechanism which also helps in supra gingival cleaning.

Make tooth brushing and flossing task of fun for your patient and ease them into this task. If even after explaining all the possible techniques to your patient, you still feel that the patient is not interested or did not understand manual toothbrushing then recommend an electric toothbrush. An electric toothbrush can reduce the chore-like feeling of toothbrushing and add an element of fun while accomplishing its task. As a hygienist your target should be to achieve the maximum efficacy and explain to brush properly all their teeth.

To produce maximum results our approach should not only be confined to the type, features and technique of the toothbrush but also how to take care of it. Toothbrush acts as the first line of defense against the bacteria that tends to harm our gingiva and teeth, causing halitosis. Our oral cavity nurtures millions of germs so it is essential to rinse our toothbrush thoroughly with the tap water after every brushing session. Rinse it thoroughly to get rid of any visible debris, dentifrice, and bacteria from between the filaments (Wilkins, pg450). American Dental Association states on their official website, “Toothbrushes have shown to harbor bacteria (including fecal coliform bacteria) that is released into the air when toilet is flushed or can spread to the toothbrush when owner touch a contaminated surfaces before handling the brush.” Centers for Disease Control and Prevention states on their official website that it is recommended to not share our toothbrushes with anyone to prevent the risk of cross-contamination specially for an immunosuppressed patient.

Let your toothbrush air dry only and it does not need to be soaked in disinfecting solutions or mouthwash nor to be given a rinse in dishwashers, this will only damage the toothbrush. In case of immuno-comprised patients, Wilkins recommends, a rinse with an antimicrobial mouth rinse prior to brushing reduces the bacterial load. It also says to soak the toothbrush in an antimicrobial rinse such as essential oil mouthwash, cetylpyridinium chloride or chlorhexidine after brushing. However, some companies have launched their toothbrush sanitizer devices, but American Dental Association asks general public to only look for a device that has been cleared by the U.S Food and Drug Administration (FDA).

Once the brushing is finish and we have air dried our toothbrush, then store it in upright position. The brushes should be placed in such a manner in the holder that they do not touch each other. A study in August 2015 was done to assess the bacterial contamination on those toothbrushes which were stored along with other family members and those which were stored alone. The study concluded that toothbrush should be kept in a separate box. The results clearly indicated that total mean value of bacterial counts isolated from twice toothbrush those kept with family members were more than those stored separately (Raiyani, et al.,2015). American Dental Association states on their official website that avoid covering the toothbrushes and do not store them in closed container because it will let the bacteria proliferate. Their research showed that storing a moist toothbrush in a closed container promotes microbial growth more than leaving it exposed to open air. Wilkins also recommend that our toothbrush needs to be dried completely between brushings. For this purpose, it is recommended to have at least two toothbrushes so that one of them is thoroughly dried before usage

 Toothbrushes being an over-the-counter product are available to the user without any special instruction. One misconception in general public is that toothbrush needs not to be replaced until and unless the bristles are worn out. However, American Dental Association (ADA) on their official website states that toothbrushes should be approximately every three or four month or more often if the bristles become matted or wear off. Ancient toothbrushes are declared to be a hotbed of bacteria. An August 2015 study in the Journal of Natural Science, Biology and Medicine determined that a three-month-old brush are heavily contaminated by bacteria. Heavy bacterial counts of S. mutans, Pseudonomas, lactobacilli, E. coli and Candida were found in the toothbrush head (Raiyani, et al.,2015). Moreover, the effectiveness of the brush decreases as the bristles become frayed, as they leave behind plaque and can further harm the gums. Clinical research shows that a new toothbrush can remove more plaque than one that has worn out, this ensures that we need to replace our toothbrush before it is worn out (Watson, 2019). A 2013 study showed that after 40 days of continuous use of toothbrush, it flared out the bristles and decreased their plaque removal efficacy. This study was aimed to verify the impact of the Progressive Toothbrush Bristle Flaring on plaque control efficacy of toothbrush. The results clearly show that as the toothbrush flaring increases, the plaque scores also increased. The study concluded that progressive increase in the plaque scores was directly proportional to the increase in toothbrush bristles flaring (Tangade et al., 2013). Figure 1 shows a comparison between old and new toothbrush bristles. Image taken from [Toothbrushes | American Dental Association (ada.org)](https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/toothbrushes)

**B)** **TOOTHBRUSH TYPES**

ELECTRIC TOOTHBRUSH vs MANUAL TOOTHBRUSH

Brushing our teeth is the foundation of oral hygiene. 80% of Americans use the manual toothbrush. American Dental Association (ADA) states that both toothbrushing methods are a secure and efficient way of dental biofilm removal. ADA puts a seal on all toothbrushes that are proven to be safe and efficient.

Electric toothbrush bristles vibrate or rotate to help remove the plaque buildup from our teeth and gingiva. Whereas in manual toothbrush we must adapt it according to the location of the tooth and surface to maximize its efficacy.

Electric toothbrush is an expensive option and not everybody can afford them. On the other hand, manual toothbrush is much cheaper and generally everybody can afford them. Manual toothbrush does not need batteries, making them a much feasible option. They do not need head replacement as in an electric toothbrush. Finding the right replacement head is not always easy and convenient for individuals.

In case of electric toothbrushes, wide range of head designs are available in electric toothbrushes which can make them a very good option for different individuals according to their needs. However, electric toothbrush is more productive at removing dental plaque but the whole debate narrows down at an individual`s need. Secondly electric toothbrush is very befitting for certain patients. Those individuals who show lack of interest of toothbrush can be encouraged to go for electric toothbrushing. Similarly, individuals with limited dexterity can avail this option, as it can benefit them without much exertion. New trends in markets have introduced electric toothbrushes that can limit the pressure exertion. If user exceed the normal pressure, this toothbrush indicates the amount of pressure used. Lately, app and trackers connecting to electric toothbrush which provide user with feedback and guidance. Smaller head in case of an electric toothbrush makes it easier to reach difficult areas.

If patient is recommended electric toothbrush, we must guide them how to use them properly. Let the electric toothbrush do its work and do not exert any extra pressure nor scrub it. Bristles are programmed to rotate or vibrate. Electric toothbrushes need head replacement every 3 month or when the bristles wear out. Like a manual toothbrush, they should also be stored carefully. Bristles should be allowed to air dry in an upright position. Wipe its base too with a clean cloth after few days. It is also important to charge it fully before use.

**Part 3: Flossing Methods**

History of dental floss is linked to prehistoric times. Adequate archaeological evidence is found on the teeth of ancient people, which was significant in making this connection. Mostly pointed sticks were used for interdental cleaning in those times (Dental Floss, 2021). However, in modern times the reinvention of dental floss is attributed to Levi Spear Parmly, a dentist from New Orleans. This staple for the dental hygiene was invented in 1815 and he propagated it to be beneficial for oral cavity and its hygiene. Dr. Levi Spear Parmly encouraged patients to floss with a waxed silk thread after each visit. His book “A Practical Guide to the Management of Teeth”, which encouraged people to brush twice a day and floss at least once a day (Young, 2016).

The first human usable non waxed floss was produced by the Codman and Shurtleft Company in 1882 and that is when it entered the consumer market. In 1989, Johnsons & Johnson patented dental flosses and production of various types of waxed and unwaxed dental floss started (Horse Hair, 2016). However, during the World War II price of silk increased manifolds and companies began to look for a less expensive option (Weller, 2017). It was then that Dr. Charles Bass replaced silk with nylon is also referred as “father of preventative dentistry”. He adopted Dr. Levi Parmly advice and preached it further to masses (Emrich, 2015). Johnsons & Johnsons mention on their official website that it was the first affordable floss, that costed a fraction of a worker`s hourly pay.

Brushing and Flossing are both important for the hygiene of our oral cavity. Both should be made a part of our daily routine. The goal of brushing and flossing is the removal of biofilm, which consists of active colonies of destructive bacteria. These microorganisms cause localized destruction of the tooth by acid production, which leads to demineralization of our teeth or lead to the formation of calculus. Brushing helps us remove the biofilm from facial and lingual surface of the tooth but is unable to access the interdental area. Interproximal surface is the most prone to the invasion of these bacteria and unfortunately most neglected too. Anatomy of our oral cavity allows bacteria in this non-keratinized ‘col’ area to propagate undisturbed. Food particles and debris accumulate interproximal, allowing bacteria to feed on our food. Flossing is the most recommended method to remove these hidden bacteria and halt its progression. It’s the best way clean those areas where toothbrush cannot reach. Floss prevents these bacteria from causing gingivitis, periodontal disease, halitosis, sore and bleeding gum or in worse cases tooth loss. Studies now link gingival diseases to an increased risk in systemic diseases too.

Daily flossing not only improve our oral hygiene but also reduce the risk of other serious health conditions (Chang, 2020). A 2019 study showed the link between oral hygiene and atrial fibrillation and heart failure. It concluded that healthier oral hygiene by frequent brushing as well as interdental cleaning may reduce the risk of atrial fibrillation and heart failure. According to American Dental Association (ADA), interdental cleaners such as floss play a significant role in disrupting bacterial growth in areas that toothbrush cannot reach. ADA recommends that along with brushing twice a day, at least floss once a day too. It is recommended the flossing should be done before brushing them because will loosen up the food particle and easier for toothbrush to dislodge them (Wilkins, pg460).

The two flossing methods used are *scooping* and *loop* method. In the scooping method, the individual needs to hold a 12 to 15 inch of floss between the index finger and thumb of each hand and keep only half into the floss between the fingertips. Tuck and hold tightly the ends of the floss or wrap around middle finger. While working on the maxilla keep the floss is directed upwards by holding it over two thumbs. At the same time fulcrum on the tooth of the opposite side of the maxillary arch to balance. While working on the mandible direct the floss downwards by holding it with two fingers. One index finger holds the floss from this and the other on the official aspect add the same time on the opposite side of the mouth. Now hold the floss in a diagonal position and gently guide the floss into the contact areas with a gentle back and forth motion. Keep a control of the floss to prevent any kind of snapping through the contact area into the gingival tissue. The most important thing while flossing is that we will clean the proximal surface of each tooth separately while working on the distal aspect curve the floss mesially add vice versa. Curve the floss around the tooth in a C shape. One of the main objectives of flossing is that it should be moved gently beneath the gingiva.

Second method is called as the loop method or floss loop. In this method the floss is died from both ends in a circular form. This circle will be rotated as the floss is used, every time bringing a new area forward for flossing. It is beneficial because of an increased user compliance and easy handling. Moreover, it is concluded to have a lower string wastage and increased level of efficiency in plaque removal.

**Part 4: Patient Care**

1. How would you approach a 13-year-old teenager who has orthodontic appliances and tells you he brushes once a day and never flossed before getting braces?

Firstly, it is important to teach the teenager about dental hygiene with orthodontic appliances. Teenagers needs to be addressed in non-medical terms so that it is easy for him to understand and retain the information. These appliances can attract food and plaque, which can stain teeth if not brushed away. It is important to brush after every meal and snack with a fluoride toothpaste and carefully remove any food particle which get stuck in the retainers or braces. It is equally important to use an appropriate soft bristle ADA approved toothbrush that does not harm the appliance or tooth surface. Explain Charter`s method the patients so that maximum areas could be accessed with the toothbrush bristles. Use gentle pressure and angle the brush along the gum margin to remove food that can be stuck in that area. Tips of bristle should reach the gingival margin as well upper margins of his braces. Then he should brush gently on the top of his braces and then below his braces. Clarify that brush all back teeth and chewing surfaces too. Keeping in mind that this procedure should take at least 2 minutes.

A floss pick or floss threader is essential to be used so that we can reach those areas where a toothbrush could not access. Floss needs to go beneath wire where the bristles of the toothbrush did not reach. Take 18 inch of floss and pull 3-5 inches of floss through the loop at the end of the threader. Now thread the floss threader under the arch wire and gently go between the teeth, hugging the sides of each tooth by making a C shape with the floss. Keeping doing this until you are done with all teeth. Similarly, interdental brush should also be recommended. It can be used between the arch wire and the braces to help loosen the food particles, remove plaque and to stimulate the gums.

Similarly, an oral irrigator can be helpful to flush out the food stuck interproximal. They are commonly known as waterpiks or oral flossers. A wand of water emits from the water irrigator with moderate pressure, that will dislodge any food or bacteria from those areas where a toothbrush of floss could not reach. This can also be recommended for those areas which inaccessible with brushing or flossing. A fluoride mouthwash can also be recommended, which can get into difficult to reach area.

1. How would you approach a 28-year-old patient who has localized gingival recession on the buccal surfaces of all posterior teeth, and indicates that they have been scrubbing their teeth using a medium TB bristle their entire life, and only flosses when food gets stuck in-between?

Most important thing is that patient needs to be understand that gingiva protects our teeth but when it’s pulled away, it exposes roots to bacteria and injury. These pockets become excellent homes to bacteria and our ignorance of oral care let them proliferate further, causing serious damage.

It is a common misconception is people that hard or medium toothbrush will do more deep cleaning of the toothbrush, however, ADA recommends a soft bristle toothbrush. Firstly, it is essential to make the patient understand that medium will do worse than good, and he must switch to a soft bristle toothbrush. Secondly, most of the people use horizontal scrubbing brushing, which is traumatizing to the tissue, leading to recession. So, discuss with the patient how they brush their teeth and recommend them an appropriate method like Modified Bass, modified stillman`s or Charter technique. Teach them how and why you have asked them to make these changes.

If patient seems demotivated and think that these things are a lot of burden for him then recommend an electric brush. An electric toothbrush can help him control the amount of pressure required while brushing and control the speed of brush leading to less scrubbing motion. Explain him how it is important to replace toothbrush after every 3-4 month or if needed before that. Old bristles also not only insufficient in plaque removal but also cause abrasion of tooth surface and damage the gingival margin. Similarly storing brushing appropriately after air drying it, can also help prevent microbial growth.

Based on the patient`s understanding, explain to him how these changes occur and how they require proper care. Explain them how essential it is for them to brush at least twice a day for 2 minutes and floss at least once. If patient does not seem interested in flossing, then recommend him interdental brushes or any other interproximal cleaner which can lead to better compliance. Using a daily mouth rinse can also help clean difficult to reach areas.

**Part 5: Reflective writing**

I found this assignment very interesting and advantageous, from learning about history of floss to toothbrushing techniques in different patients. I learned how gingivitis being reversible can progress to a worse irreversible condition periodontitis. As a dental hygiene our role can be very critical. I have observed that many dentists are more concerned about the invasive treatments and thus do not teach patients how can we take care of our oral cavity. A dental hygienist can play a vital role here and teach patients how important it is to learn brushing with an appropriate method. Simple oral care at home can halt a condition. But the problem with masses is that there is no awareness about oral hygiene. People just scrub their teeth once in the morning with hard or medium bristles and think it is sufficient for the oral cavity. Dental hygienist can educate patients that any oral sign and symptoms needs same attention as any other medical conditions. Most people have no concepts about storage of toothbrushes and their replacement. People keep using it until bristle completely get wear off. A dental hygienist needs to explain them that these bristle house microorganisms and are worst for our tooth surface. Its is equally important to avoid keeping moist toothbrushes in closed containers.

These are some of the things that even I had no idea about. Most of my family still just scrub their teeth with maximum force with medium or hard brushes. The research which proves that if a family keeps their brushes in one container, it leads to spread of germ, was most interesting for me. Most of us do it and then think that giving a quick rinse to our brush will do the job. I read it before in the textbook, but it was intriguing that there is so much research done to prove how worse it can if we are not taking care of these aspects. Before joining the program, I never knew flossing was so mandatory for oral hygiene nor I knew that toothbrushes are supposed to be replaced every 3 months. I thought we replace them after 6 months. I felt gross that me and my family were using those toothbrushes that housed so many germs.

Another informative part which I learned was how critically oral hygiene is connected to our systemic conditions. Our mouth is the mirror of our overall health. It acts as an entry point for certain microorganisms which can lead to endocarditis, bacteremia and certain other cardiovascular complications too. Something as simple as a mouth rinse, proper brushing, flossing and visit our dentist for checkups can save us from these complications.

Most importantly this assignment was a quick revision about flossing and toothbrushing technique before the exams and very beneficial for me. Corelating them with scenario based questioned makes my concept clearer about gingival recession, orthodontic appliances and how inappropriate oral hygiene can lead to plaque formation followed by calculus build up. I feel more confident about having a conversation with a patient about these concepts and recommending them an appropriate toothbrush method and tell him about significance of interdental care.

Similarly, history of floss was very fascinating for me. It was enthralling to read that flossing was a concept even in prehistoric era and people used horsehair to floss. Flosses have a whole history of progressing from silk to nylon. Another interesting article that I found was about monkey`s oral hygiene and it claimed that they have better oral hygiene than us. Even the article claimed that monkeys have a habit to floss, and they use improvised flosses like bird feather, coconut fibers or grass blades. They have been seen teaching flossing to their kids. I found it so overwhelming that I got up at that moment and taught my kids about flossing. Yes, my children had no concept of flossing before that, so we had a very delightful experience having a flossing session. They were so thrilled that they wanted me to join them in school some day and teach this to their friends too.

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