**“Tooth brushing for college students”**

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March, 31 2022

**Introduction**

Microbial biofilms are complex communities of bacteria and are common in the human body. The nature of the biofilm enhances bacteria's resistance to both the host's defense system and antimicrobials. If not removed regularly, the biofilm undergoes maturation, and pathogenic bacterial complex can cause dental caries, gingivitis, and periodontitis. In addition, dental biofilm, especially subgingival plaque in patients with periodontitis, has been associated with various systemic diseases and disorders, including cardiovascular disease, diabetes mellitus, respiratory disease, and adverse pregnancy outcomes. It is important for oral health professionals to communicate to their patients that both dental caries and periodontal disease are infectious diseases resulting from dental plaque biofilm accumulation [5].

An understanding of biofilm nature helps implement proper management strategies. As biofilm cannot be eliminated it should be reduced and controlled through daily oral care. Daily regiment of scrubbing oral hygiene procedures, including toothbrushing and interdental cleaning, is key to controlling biofilm accumulation. There is a number of toothbrushing techniques that are used for removing dental plaque. Some of the more effective some less, but all of them are doing the most important thing - maintain our oral health, if used in a regular basis. Modified Bass technique was recognized as the most effective technique for now-days. The meaning of technique in placing of toothbrush bristles in 45 angle degree apical to the tooth surface. Pressing bristles slightly to allow them go into the sulcus, vibrate the brush back and forth with 10-15 strokes, and roll the brush towards the occlusal surface of the teeth[3]. This helps not only clean the surface of the tooth from the pathogenic bacteria, but also remove bacteria from under the gum line, where the most worst microorganisms are grow.

Effectiveness of toothbrushing is measured by application of plaque disclosing agents and counting plaque index (PI). The main goal of counting PI is to reduce the number to as low as possible and maintain it at the lowest level as long as possible. Disclosing agents include dye of erythrosine, fluorescein, and iodine, and are available in solution, swab, and tablet forms [6]. Disclosing agents allows clinician to visualize all biofilm accumulation areas in the patients teeth. It helps motivate patients for more comprehensive oral hygiene routine at home to maintain healthy state of their gums.

The purpose of the present public oral health project is to teach NYCCT students to brush their teeth with the Modified Bass technique which should reduce number of biofilm in their mouth, decrease plaque index, and will help maintain oral hygiene in appropriate level.

**Assessment**

The target population are the college students from New York City College of Technology (NYCCT). Students are diverse group of population including different age, gender, race, ethnicity, socioeconomic status, access to medical and dental care etc. The population of NYCCT consists of 46 % woman and 54 % man. 34 % of population are Hispanic, 28 % are Black, 21 % are Asian, 11 % are White [4]. Students from NYCCT are multicultural community with different cultural background, oral health believes and oral hygiene rituals. 31 % of student were born outside the United States (143 countries involved). Around 73 % reports speaking another language than English at home [4]. A lot of college student start their separate life without parents, some of them are combine studying together with work. 27 % report working more than 20 hours per week [4]. College students may demonstrate risky health behavior, alcohol and tobacco consumption, and not adequate oral hygiene [1]. Overall, many college students experience phycological stress [7]. All those factors affecting oral health of college students.

30 college students agreed to participate in our Service Learning Project (20 females and 10 males). The questionnaire was developed and used for gathering the information about college student toothbrushing routine. The results indicated that college students do not have steady toothbrushing routine. 26% of participants reported using toothbrush once a day, 10% noted they might skip brushing for several days, 11% of participants use toothbrush several times per day (more than 2 times per day). Bleeding upon toothbrushing was indicated in 65% of participants, and 58% of the student consider occasional bleeding during toothbrushing to be normal. Other findings are improper toothbrushing techniques, insufficient toothbrushing time, aggressive toothbrushing, using of hard toothbrush and not following of changing toothbrush time frame. Woman are more aware about oral hygiene than man [3]. Plague Index were used for detection and distribution of dental biofilm among the participants. The results among participants showed the range 1.16 (fair) – 2.3 (poor) and generalized distribution of biofilm on the middle and cervical third of the teeth in both arches. Poor oral hygiene routine may be the cause developing of dental diseases. Education of proper toothbrushing technique and routine are one of the ways of enhancing oral health among college students.

**Planning**

        Our goal for this project is to decrease the plaque score in college students who are not properly implementing oral hygiene techniques. Our plan is to create a questionnaire to assess the oral hygiene habits of the students. From the questionnaire we will gather a list of participants, male and female, to demonstrate proper oral hygiene techniques(specifically the modified bass technique). A key component of this project is disclosing the students. This will be the measurable objective of the project. The students will be instructed to swish around with 2-3 drops of disclosing agent, rinse with water and expectorate. We will examine each of the 6 surfaces needed to collect the plaque index. The criteria  to collect PI is as follows:

0 = No soft debris or stain present

1 = Stainable soft material covering up to one-third of the tooth surface

2 = Stainable soft material covering half of the tooth surface

3 = Stainable soft debris covering more than three-quarters of the tooth surface.

PI = Sum of scores from 6 surfaces/6.

Score results

0 = Excellent

0.1-0.6 = Good

0.7-1.8 Fair

1.9-3.0 = Poor

After collecting the initial PI, we will then demonstrate the modified bass technique and have students repeat the demonstration. The students will be instructed to implement this technique for a certain time frame. After this time frame students will return to collect a final plaque score. It is expected that students who scored in the fair and poor range will have significant improvement and a lower score.

**Implementation**

We wanted our project to be as cost effective and time efficient as possible.

To achieve our goal, we need the students to want to make a change. Most people brush very quickly and don’t have a proper brushing strategy, which leads to a buildup of plaque.

We had to inform and educate the students on why that’s a problem. Therefore, we held a presentation about what plaque is, how and where it forms and why it’s important to brush properly and effectively.

After the presentation, a few typodonts and toothbrushes were handed out between the students to practice the Modified Bass technique. Throughout the lesson, all students were observed practicing on the typodonts and were helped to improve their techniques. Some errors that the students made included improper angulation where the bristles were not directed towards the gumline resulting in inadequate sulcus cleaning. Another common error was poor vibratory motion, thus resulting in poor gingival stimulation.

Everyone got a take home handout that included pictures and descriptions of how to properly use the modified bass technique.

**Evaluation**

Evaluation is one of the most important parts of our search field project because it will indicate whether or not students have been compliant with tooth brushing technique, specifically Modified Bass technique.

We have asked 30 students of NYCCT to come back 3 weeks later after the assessment, to evaluate their oral health. We used a disclosing solution on every student to assess and measure the new plaque scores.

Our goal was to reach at least 20% of students with a reduced PI score, which would indicate that students have been using the tooth brushing technique correctly.

The new plaque scores have shown a reduction in plaque biofilm in 50% of the students. Fifty percent of students have been using Modified Bass tooth brushing technique correctly and therefore we have reached our target goal.

We explained to the students that a toothbrush with medium or hard bristles could do more damage to the teeth and gums and instead go for a toothbrush with soft bristles.

Students were also educated on importance of disrupting plaque biofilm through the tooth brushing at least twice a day to prevent diseases such as gingivitis and periodontitis which can eventually lead to the tooth loss. Moreover, we explained how maintaining a good oral health affects the general health overall.

We distributed goody bags to the students containing toothbrush with soft bristles, dental floss and oral rinse in hopes, that it will motivate them to change their oral hygiene behavior and stay compliant and consistent with it.

**Conclusion**

The main goal of the present project was decrease plaque index at least on 20% among students population who are not properly implementing toothbrushing technique. 30 students of NYCCT was selected to participate - 20 females and 10 males. On the assessment stage information regarding present conditions of oral health and oral hygiene routine at home was gathered with questionnaire. According to collected data 26% of students was using toothbrush once a day, 10% were skipping brushing for several days, 11% of participants were brushing their teeth several times per day (more than 2 times per day). 65% of respondents had bleeding during brushing every time and 58% had occasional bleeding. Also participants reported using improper toothbrushing techniques, insufficient toothbrushing time, aggressive toothbrushing, using of toothbrush with hard bristles and not following of changing toothbrush time frame.

To detect the amount of biofilm in the participants mouth disclosing solution was used and plaque index was calculated. Results showed the range from 1.16 (fair) to 2.3 (poor) with average 1.67 (fair). Students were taught about what biofilm is, why it is dangerous to have high PI, were demonstrated Modified Bass technique, and were asked to use it at home 2 times a day every day.

In a 3 weeks all 30 students show up for final evaluation. After disclosing we admit that average PI decreased in 50% and now average was 0.83, which is still fair but much close to good numbers. Our goal was achieved. Modified Bass technique was shown as effective tools to decrease PI.

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