

Will the Action I Take, Inspire My Patients and Family to Dry Brush?

Joyce Lew, RDH, BS

O'Hehir University Class 3B-15

September 3, 2015

Key Words: Biofim, Quorom Sensing, Microbes, Dry Brushing

Abstract

Introduction: The mechanism with which bacteria bond together to form biofilm to cause bad breath, periodontal disease, tooth decay, and contribute to the formation of calculus in the mouth, is called quorum sensing. Bacteria adhere to surfaces in an aqueous environment such as teeth in saliva and gingiva. This allows them to bond together for the purpose of producing biofilm in which they thrive.

Teaching this information with the help of the book, The Toothpaste Secret, to my patients and family will be an exciting and rewarding experience.

My Action Research Question is: Will the actions I take, motivate my patients and family to try a two-step, dry brushing method?

Methodology: The process I took in teaching my patients and my family the two-step dry brushing method was as follows. I started out by having them fill out a brief questionnaire, read the book The Toothpaste Secret, and followed up by another questionnaire.

Findings: Some participants were already dry brushing where others had a hard time making the switch. Because of the information I supplied some participants found it interesting.

Conclusion: A clinician needs to take into account many behavioral factors when trying to teach a new concept such as two-step dry brushing method.

Introduction

The reason I went into the dental hygiene profession was to help people.

As far back as I can remember I was exposed to doctors and hospitals. My grandfather was a physician and later became a psychiatrist. I looked up to him. He is the reason I went into health care and why I wanted to make a difference. Have I really made a difference, I ask myself? Have I really helped and motivated my patients to have better oral hygiene and home care?

When I enrolled into O'Hehir University (OHU) I was burnt out. I had lost my enthusiasm and motivation for the hygiene profession, which I needed if I was going to make a difference in my patients' lives. After a few weeks of classes at OHU I could tell my interest had been reawakened in my profession. My motivation and enthusiasm were coming back. I was learning new and current information of what was going on in the dental field, which in turn would help my patients.

When I first read the book, The Toothpaste Secret (1) I was in awe of how simple and direct the message was. It inspired me to try the two-step dry brushing the next day. I was sure that this was the magic bullet to convince my family and patients to try a new brushing technique, with some education from me of what biofilm is and why they should care.

Background

After forty three years in the dental hygiene profession and countless numbers of patients, I would like to feel I made a difference in motivating my patients to have cleaner teeth, better oral hygiene, and better overall general health. With the two-step brushing method I believe I can achieve my goal even better. I am reaching out to as many patients as I can to motivate and teach them about biofilm and how fast it grows within twelve hours. As soon as the surface of a tooth is brushed, the bacteria immediately begin growing. (2)

Plaque was studied by Dr. G.V. Black 100 years ago and focused on dental decay. In 1943, Dr. Charles C. Bass, Dean of the School of Medicine at Tulane University, published papers stressing the importance of brushing and flossing to help prevent periodontal disease by removing plaque from teeth. From Dr. Bass's work came the Bass Tooth Brushing Technique. (3) No one at that time studied the white sticky film on the teeth. In 1965 the experimental studies published by Dr. Harold Loe on "Experimental Gingivitis in Man," allowed plaque to accumulate on patients with healthy teeth teeth and gums for ten to twenty one days. His findings showed that it produced gingivitis. Dr. Loe recommended that his subjects start brushing and flossing again which reversed the gingivitis within seven days, in less time than it took the disease to develop. (4)

Those early plaque studies became the documentation needed to show plaque was very different from food debris or material alba. Dr. J. William Costerton, who is known for coining the term "biofilm", did much research in this field and found biofilm is responsible for many chronic diseases such as heart valve endocarditis and cystic

fibrosis. By testing the sputum of patients who had cystic fibrosis he found colonies of biofilm growing that were resistant to antibiotics, antimicrobial agents and the body's own immune system. Because of his research we are able to build on the knowledge we have today in the field of "biofilmology". Dr. Costerton died on May 12, 2012. His legacy lives on through the Costerton Biofilm Center, where experimentations and studies go on today. (5)

The mechanism with which bacteria communicate to bond together forming biofilm, that causes bad breath, periodontal disease, tooth decay and contributes to the formation of calculus in the mouth, is called quorum sensing. Bacteria adhere to a hard surface in an aqueous environment, such as teeth and gingiva in saliva. This allows them to bond together for the purpose of producing biofilm in which they thrive. If the biofilm leaves the oral cavity it can cause systemic inflammation, infection and death. (6)

Bacteria work best in an acid pH in the mouth. The more sugary products ingested, the longer the pH level stays acidic. It takes 20 minutes for the mouth to resume its neutral pH level after each sugary exposure. (7) According to Dr. Ellie Phillips, stress, hormone changes, sleep deprivation and poor nutrition can contribute to acidic saliva. (8)

In contrast, having several exposures to xylitol during the day restores the oral cavity to its neutral pH. Our class discussed this in detail since one of the students did her paper on aphthous ulcers and how xylitol can help. (9)

The toothpaste industry would have us believe the way to rid ourselves of the bacteria in our mouths is to kill them with anti-bacterial agents. Colgate came out with a

toothpaste with Triclosan, Crest came out with Crest ProHealth with Cetylpyridinium Chloride. Both bacterial agents are designed to kill bacteria and these agents can be absorbed through the mucous membrane. A simpler and more effective way of ridding ourselves of biofilm would simply be to dry brush and floss. After discussing the anti-bacterial agents in class and the harm they can do, I am convinced they cannot be good for the general public. A student in my class wrote a wonderful paper on this subject and inspired me to rethink my position on anti-bacterial agents. (10) I am convinced that killing bacteria in our oral cavity should not be our first line of defense. Brushing with toothpaste which delivers fluoride without the potentially harmful anti-bacterial agents after dry brushing would be healthier by far.

Methodology

I was very disappointed the first week I tried introducing a two-step dry brushing method to my patients. No one was interested in me contacting them in one week to see how their brushing was going. Most patients didn't like the concept. Others were in a hurry. I would reflect on my mistakes and try again in two weeks.

The process I took in teaching my patients and my family the two-step dry brush method was as follows.

I started out by having them fill out a brief questionnaire:

1. How many times a day do you brush and floss?
2. Have you ever heard of plaque and /or biofilm and how it causes cavities, gingivitis and bad breath in your mouth?
3. Did you know that bacteria flourish in an acid environment in your mouth?
4. Would you be willing for one week to try a two-step dry brushing method? At the end of the week would you have time to answer a few short questions?

I made sure I told them this time there was no right or wrong answers to the questions I asked.

After my participants signed the consent form and read my ethic's decree, I gave them the book The Toothpaste Secret (1) to read. After reading the book, I asked if anyone had any questions or comments. Most people liked the book and thought it was cute. I would not say it inspired them. Most questions were, "what if I don't like the dry brushing do I have to still do it even during the study?" My answer was, "no you will not have to continue if you don't want to." "Will you get a bad grade if I choose not to do it?" Again, my answer was, "no I just want you to be honest in your answers."

Trying to relieve their fears, I assured them they will not get in trouble if they stop dry brushing, but I said I would like to know why they stopped just to be able to put it into the study. After their questions were answered I started cleaning their teeth and began explaining the process of how often bacteria form in one's mouth. Once the bacteria multiply, they seek out each other so they may bond together. Once bonded, the bacteria produce a biofilm that releases acids that dissolve the tooth surface to cause cavities. The bacteria work best in an acidic pH level in your mouth producing more biofilm. The more sugary products one ingests, the longer the pH level stays acidic. It takes 20 minutes for the mouth to resume its basic pH level after each sugary substances are eaten.

Finally, I asked if my participants would like to know how to control the bacteria in their mouths? Three of my patients this week were very excited to learn new methods in home care. One went as far as saying she would like to learn better habits. I began teaching them the two-step dry brushing technique along with flossing in order to reach into the sulcus of the gums. I warned them against any toothpaste or mouthwash that said it will kill germs and what the repercussions could be. Again I asked for feedback, thoughts and questions. No one seemed to have any more. I could tell they were inspired and excited to try a new brushing technique.

The next weekend my husband, two sisters-in-law, brother-in-law, along with my mother and father-in-law were all going to Cape Cod for a nice respite. I thought it would be a good idea to try my two-step dry brushing method on them. With The

Toothpaste Secret (1) book securely in hand, along with some free toothbrushes, we started out to Cape Cod.

I waited until the early evening when everyone was fed and tired from the day. Then I took the book The Toothpaste Secret (1) and we all read it together. After my little presentation one of my sisters-in-law announced she has been dry brushing for years. I was totally shocked. I knew in the past she had periodontal problems and was worried about her teeth, but I never knew that she dry brushed. I demonstrated the brushing technique but I could tell she was not interested. I asked her how she learned to do this. She didn't remember. At this point in time her gums were fine and her teeth always feel clean. She did still get build up on the lower anterior teeth but made it be known she wasn't interested in learning anything that night.

My husband had already heard my little spiel at home about the dry brushing and announced proudly he is doing it and his teeth never felt better. Now I have my father-in-law's attention. Last year he spent a small fortune on his mouth by taking out his upper centrals, laterals, and canines since he ground them down to pegs. He had implants with crowns inserted. His smile looks amazing. "So how am I supposed to brush," he asks? I am very excited now so I go into my dissertation of what exactly he will be brushing off of his teeth, and I show him the two-step dry brushing method. Then he wanted me to demonstrate to him what he was doing wrong with his flossing. The floss would get caught or shred when he would floss the upper right teeth. So there I am with no gloves going into my father-in-law's mouth. I am back in 1974 private practice where the standard was not using gloves. I realized that floss does shred between tooth number 2 and 3. Luckily my sister-in-law uses Glide floss so I was able

to demonstrate to him the difference, and he is now sold on the floss and the new way of brushing. Let's hope when I check back with him in a week he will still be so excited about it.

The next morning my other sister-in-law and brother-in-law arrived to join us at the Cape. I waited for the most ideal time to spring the book on them to get their thoughts. Again I was surprised to find my second sister-in-law also dry brushes. However, after telling us how clean her teeth are she announced she also has build up on the lower anterior. My first sister-in-law said she uses the little dental picks you can buy in CVS to get out tartar on her lower teeth. I ask if I can demonstrate the technique again to her and she declined stating "she is perfectly fine and does not need to be taught". I told her that wasn't a problem. The next person to speak was my brother-in-law who was standing on the side lines. He seemed very interested in what I had to say. He brushes with an sonic tooth brush so hand position was very important if he was going to get his teeth clean. His hygienist recommended the brush to him. I spent about a half hour going over how to hold the brush telling him to "let the brush do the brushing for you. No need to brush on top of the Sonicare brushing." He had a home Sonicare and a travel size Sonicare; everything he needs to have clean teeth if he uses them properly.

My last question to my family was what could I say or do to make them want to dry brush, since I was having a difficult time getting patients to buy into this technique. Everyone thought for a few minutes and one of my sisters-in-law said proudly, "tell them it feels good after you brush." I do wish it was that easy. I will try to reinforce that concept and see if that makes a difference.

Business Aspect

In doing research for this paper I googled pH related to gingivitis. It was amazing how many dental products tout they can restore tooth enamel from the cause of acid erosion plus help gingivitis. The public is at the mercy of the toothpaste industry as to which product to buy. Now more than ever the consumer needs a dental hygienist professional to help decipher one product from another.

To get the message out to the public that dental hygienists are sincere in their efforts to improve oral health in all ages, prevention is the key. I would like to see a *Dental Hygiene Minute* on television. If people hear and see information in any form in the media they are more likely to listen and hear the message of how to have better oral health. I propose small snippets of information teaching the public how to brush, floss, take care of their dentures, cold sores, answering questions to new mothers of when deciduous teeth erupt, also at what age they should bring their child for her first dental appointment. The *Dental Hygiene Minute* could take place in between cartoons, soap operas, afternoon talk shows and late night TV to target all ages. Those are a few of the many informational bites we are capable of answering.

The general public was living in a bubble before Dr. Oz and other medical shows started to spread the word of the importance of better health, exercise and eating right. So why couldn't the dental hygiene profession copy their lead and see where it takes us? My vision would be that the toothpaste and toothbrush industry would sponsor us to help get our messages out. I think it is worth a shot.

Findings

After one week of using the new brushing technique, I asked my participants the following questions:

1. Now that you know how bacteria form in your mouth and the role they play in causing bad breath and cavities, how has it inspired you to brush using the two-step dry brush method?
2. Explain why you did or did not like the two-step brushing method?
3. How did your teeth feel as the day went on?
4. Has flossing become part of your night routine?
5. Do you plan on continuing brushing using the two-step method of brushing? Please explain why or why not?

I contacted my participants by email. The three patients whom I felt were motivated to be successful at dry brushing turned out not as well. I am naming them A, B and C in order of sign up. A and B gave me great reviews for explaining how bacteria form in their mouths, what biofilm was and how to brush their teeth. C never wrote anything except to have her sign the authorization form saying she will participate in the study. A sent back her answer telling me she did not enjoy dry brushing, her teeth did not feel any cleaner as the day went on, she quit half way through the week and does not plan on doing it again. B and C never answered. I reached out to them again through email and still did not get a response.

Next I contacted my family starting with my sisters-in-law and brother-in-law. My sisters-in-law said nothing different had changed for them as far as brushing but thanked me for the information because it was interesting. My brother-in-law said he is brushing better as far as positioning the brush. However he is not dry brushing, only brushing with toothpaste. I asked him why he is not dry brushing and his answer was he forgot that part and he felt it would be too long of process to do both.

Lastly, I asked my husband how the dry brushing was going. He said he dry brushes before breakfast, brushes again with toothpaste after breakfast and with toothpaste before bed. Why don't you dry brush at night I asked? He replied he didn't think about it; he just did it.

Conclusions

Reflecting on my mistakes I kept in mind the advice I received in the Health Behavior Change in the Dental Practice book. (11) In chapter three the authors write stay away from the directing style of information, try to use a more guiding method so the clinician and patient can work this out together, ask open ended questions, never force the patient to change and never give the impression that you will be mad if they don't comply. Maybe I was too anxious or too excited that first week when I taught this type of two-step brushing method.

The "Theory of Planned Behavior" regarding change in one's own habits, such as two-step dry brushing, are based on three psychological factors:

1. "Attitude: A person's positive or negative feeling about the activity
2. Subjective Norm: The perceived social pressures to perform or not perform the behavior, such as two-step dry brushing.
3. Perceived: Behavior Control or self-efficacy: One's perception of their capabilities to perform a behavior." (12)

With all my participants, none of them were under any social pressure to perform the two-step dry brushing method. The only preconceived idea that my patients had was brushing without toothpaste seemed odd to them. I made it clear they were under no obligation to continue dry brushing if they chose not to. None of my participants voiced any concern of not being able to perform this task.

Behavioral change takes time to happen and it only happens when the subject is ready to change. I don't feel I failed in not inspiring my participants to dry brush. I feel I

did the best I could to inspire them. Ultimately the choice is theirs. I will not give up in the dental office in trying to make a difference in my patients' oral and overall health.

References

1. O'Hehir T. The Toothpaste Secret. Perio Reports Press, 2003, Flagstaff, AZ.
2. O'Hehir T. How Subgingival Plaque Biofilm Gets Started. Hygienetown; 2011, August.
3. O'Hehir T. Battling Bacterial Biofilm Inflammation and Latest Research. Hygienetown; 2010, March.
4. Loe, H. et al. Experimental Gingivitis in Man. J. Perio; 1965, 36:177 May-June.
5. Costerton J.W. Costerton Biofilm Center, University of Copenhagen, Denmark
6. Socransky S.S, Haffajee A.D, Periodontal Microbial Ecology. Periodontology 2000, 2005, Vol 38: 135-187.
7. Proal A. Understanding Chronic Disease and Biofilm. 2008 <http://bacteriality.com/2008/05/biofilm/>
8. Phillips E. Acidity. 2012 <https://ultimateoralhealthguide.com/2012/05/08/your-biggest-oral-health-enemy-acidity/>
9. Delgado W. Class 3B-15 OHU
10. Parkhurst L. Class 3B-15 OHU
11. Ramseir A. Suvan J. Health Behavior Change in the Dental Practice. 2010, Wiley-Blackwell, Ames, Iowa.
12. Ajzen I. The perceived Social Pressure to Perform or not Perform A Behavior. Organizational Behavior and Human Decision Processes. 1991, Academic Press, Inc. p. 188

Appendix

- A. Employer Authorization for Patient Participation
- B. Permission and Ethics Form
- C. Participant Questionnaire

Employer Authorization for Patient Participation

Dear Dr. Lakis,

I am conducting an Action Research Project to see if I can inspire people to change their brushing habits to improve their oral health. I am seeking your permission to share my project with select patients in the hope of including their experience in my research. I am providing you with my Permission and Ethics form I will present to them before they proceed with participation and will follow up with a small questionnaire at the end of the 1 week project period they will complete. All Participants will remain anonymous.

Please sign below for consideration of my request.

Gratefully, Joyce Lew

Signature and Date

PERMISSION AND ETHICS FORM FOR MY ACTION RESEARCH PROJECT

Dear Project Participate:

I am undertaking an Action Research project to see if I can inspire people to change their brushing habits. I would be appreciate it if you choose to participate:

Anything you share with me about your participation will be kept anonymous in my report.

You are free to withdraw from the research project at any time, whereupon I will destroy all data relating to you.

I will ask you to answer a few brief questions; there is no right or wrong answers.

In conducting this research, I hope to inspire people to change their brushing habits so they may have a better oral hygiene and a healthier oral cavity and body. I expect some candidates to decline participation and will include this in my findings.

My project depends upon your response. I will provide you with a copy of this Permission and Ethics form. I will share my knowledge of why it is important to change your brushing habits. After 1 week I will follow up with another brief questionnaire about your experience.

Thank you for your consideration! Please sign below with your signature and date, along with your email address and cell number to contact you.

Your contact information will be destroyed after my Action Research paper.

Thank You,

Joyce Lew

Participant Questionnaire

I started out by having my participants fill out a brief questionnaire:

1. How many times a day do you brush and floss?
2. Have you ever heard of plaque and /or biofilm and how it causes cavities, gingivitis and bad breath in your mouth?
3. Did you know that bacteria flourish in an acid environment in your mouth?
4. Would you be willing for one week to try a two-step dry brushing method? At the end of the week would you have time to answer a few short questions?

After one week of using the new brushing technique, I asked my participants the following questions:

1. Now that you know how bacteria form in your mouth and the role they play in causing bad breath and cavities, how has it inspired you to brush using the two-step dry brush method?
2. Explain why you did or did not like the two-step brushing method?
3. How did your teeth feel as the day went on?
4. Has flossing become part of your night routine?
5. Do you plan on continuing brushing using the two-step method of brushing? Please explain why or why not?