

If I ask my patients with gingival bleeding to use a ToothShower[®] on a daily basis, what differences will they notice?

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November 1, 2020

SUMMARY

In the pursuit to find an attainable and convenient oral hygiene regimen for patients, led to the action research question of: **"If I ask my patients with gingival bleeding to use a ToothShower on a daily basis, what differences will they notice?"**

The goal was to find participants with inflammation that were open to evaluating the ToothShower[®] in whether or not they would increase the use of their home care devices, as well as what changes they may notice in their oral health. Each participant was supplied with a unit, and double the accessories if they were sharing the unit.

The results overwhelmingly revealed that there was in fact an increase in oral home care and all participants no longer saw bleeding. As well as participants found having the unit located in the shower was more convenient. Seeking first to understand by having an open dialog with patients created synergy, making it a win-win for all involved when it came to finding a more convenient way to obtain oral health goals:

- Why do we need to clean between our teeth?
- How to understand the value of disease prevention education?
- How do you know if you have gingivitis?
- How many people understand the link between oral and systemic health?

KEY TAKEAWAYS:

- Encourage patients to participate in their own oral health choices
- Make the oral health task more convenient
- Dental Hygienists are on the frontline

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INTRODUCTION

Oral hygiene habits are introduced during childhood regardless of socioeconomic status. The most accepted method for oral hygiene maintenance in the United States is a mechanical toothbrush. To remove biofilm interproximally, dental floss is the most recommended, however this application has shown low compliance. ¹

HOW BIOFILM STICKS TO TEETH

Bacterial biofilm, also known as microbial plaque, is a colorless substance made up of food particles, saliva, and a complex mass of microorganisms that occur primarily in a sticky polysaccharide matrix which firmly attaches to the acquired pellicle, teeth, calculus, and restorations. ²

The human host cohabitates with these microorganisms that are primarily bacteria, fungi, viruses, yeast, and protozoa. The sensation of dental plaque often is described by patients as a “fuzzy” feeling on their teeth, or as a sensation of having “sweaters” on their teeth. Plaque formation was first identified by the Dutchman Antonie Van Leeuwenhoek in 1674 when he used a microscope to observe his dental plaque. He reported his observation as seeing “little living animalcules prettily moving.” ³

- **The human body harbors 10 to one hundred trillion microbes** (mainly in our gut, which greatly outnumbers our human cells) ⁴
- **The mouth is second in line to the gut** (with a diverse microorganism community harboring at least six billion bacteria, which are represented by 700 species that colonize the soft tissue of the oral mucosa and the hard surfaces of teeth) ⁵

Out of the 700 species, only a limited number take part in dental caries or periodontal disease. Most species of bacteria are harmless and even beneficial, however, some are pathogenic bacteria that can cause disease. The focal infection theory postulated that oral disease was the source for the spread of systemic disease was first documented in the 1900s by two dentists, Dr. W.D. Miller and W. Hunter. ⁶

HUMAN HOST AND MICROBE

ECOSYSTEM:

The human host and microbiome can be thought of as an ecosystem. When the ecosystem is within balance, the oral environment and host will be healthy; however, when the microbiome changes to a dysbiotic state, or unhealthy balance, diseases such as periodontal disease, dental caries, skin disorders, neurological complications, and GI disorders may occur. ⁷

CONTRIBUTING FACTORS:

Several factors can contribute to the oral microbiome ecosystem to become unbalanced and to allow for the pathogenetic bacteria to increase in population. These factors range from an unhealthy diet high in sugar, poor oral hygiene, use of tobacco, harmful use of alcohol, low pH in the mouth, medications, and stress to list a few. ^{2,7,8}

- **When the oral microbiome’s ecosystem is an unhealthy balance, gingival inflammation becomes a concern; this is the first stage of periodontal disease. This stage of gingival inflammation is a vital inflammatory response that alerts the host’s immune system to fight against infections, injuries, and toxins; basically, anything that is present to cause harm. Gingival inflammation appears within four to five days in an undisturbed bacterial plaque environment. However, gingival inflammation can be reversed with consistent oral care within five to ten days.** ²

- If gingival inflammation, also known as gingivitis persists, it can convert to periodontitis. The definition of “itis” means “forming names of inflammatory disease.”⁹ Periodontitis is an aggressive disease of the periodontium that causes resorption of alveolar bone, detachment of collagen fibers, accompanied by apical migration of the junctional epithelium onto the root surfaces.¹⁰

INFLAMMATION HAS BECOME ONE OF THE MOST SERIOUS AND HOTTEST TOPICS IN MEDICAL RESEARCH TODAY

Inflammation has become one of the most serious and hottest topics in medical research today as it is proven that periodontal disease, diabetes, heart disease, cancer, Alzheimer’s, and asthma, are all forms of inflammation. The recommendations to decrease inflammation in the body have remained consistent despite new research. This advice generally is to floss daily, brush daily, lose weight, exercise 30 minutes a day, include leafy greens and consume fish to disable free radicals.¹¹

CENTER FOR DISEASE CONTROL AND PREVENTION

Despite the information on systemic inflammation, and more specifically gingival inflammation being readily available through television commercials, journals, and healthcare providers; periodontal disease continues to be a widespread health concern among our population. The Center for Disease Control and Prevention in 2012, data reflects 47.2 percent of adults aged 30 and older have some form of periodontal disease. This percentage increases to 70.1 percent in adults 65 years and older.¹²

WORLD HEALTH ORGANIZATION:

The World Health Organization reported in 2017, that it is estimated oral disease affects nearly 3.5 billion people globally, with almost 10 percent of the global population affected by severe periodontal disease.¹³ For Comparison, the global World Population Clock for 2020 documented that there are 7.8 billion people in the world. Therefore, 10 percent are said to have severe periodontal disease which amounts to 780 million people. To assist with this visual, the total population for the United States is 331 million people in 2020, thus over two times the United States population has severe periodontal disease worldwide.

THE IMPORTANCE OF CREATING AN EASY ROUTINE

TO ASSIST PATIENTS ORAL HYGIENE REGIME TO MINIMIZE BACTERIAL BIOFILM TO DECREASE GINGIVAL BLEEDING, IS FAR MORE IMPORTANT THAN JUST A PRETTY SMILE

Seeing that most patients have the scientific knowledge available at some level, maybe we need to look at changing their behavior; as well as ours. At times providers speak to their patients as if they are biology majors. Providers have little time to offer an overwhelming amount of information prior to the end of the appointment. People need to hear something 5 to 14 times before action is taken. As providers selecting what is most important and making a quick slogan would be more productive than the patient hearing multiple pieces of information. For example, think of the quick slogans that companies use such as “A diamond is forever” De Beers, “Just do it” Nike, and “The breakfast of champions” Wheaties.¹⁴ People tend to change when they feel inspired, and they change when they are ready. When a person feels their freedom of choice has been removed or they feel pressured, they will disagree.¹⁵

BEGIN WITH THE END IN MIND

CALL TO ACTION

Begin with the end in mind by asking the patient what results they want when they return. Seek first to see the problem from their point of view, identify the key concerns, determine the desired results and discuss possible new solutions to achieve those results. Open communication such as “let’s look at our alternatives”, “what will happen if you don’t”, or “how would you like that consequence”, will allow a patient to visualize and participate in their personal end results.¹⁶ Often, I hear patients being directed to “floss more” as if it is the only choice they have. The research reports that floss is challenging for most patients to maneuver and 70 percent do not use floss.

A similar study for a water flosser was conducted by the University of Nebraska in 2004 to determine whether gingival health had greater improvement with a water flosser compared to string floss. The compelling evidence demonstrated that the water flosser showed up to 52 percent superior improvement in gingival health than conventional floss. Additionally, orthodontic and implant patients were three times more effective with a water flosser over traditional floss. **17**

In reviewing clinical studies of the successful results of the use of a water flosser, I came across the history of the first two inventions of the water flosser. In 1958, Dr. C. D. Matteson acquired the first patent for a “dental syringe” that performed similarly as the water flosser. Then in 1962, Aqua-Tec invented what we know today as the Waterpik. **18**

The positive studies on water flossers are compelling, yet they have been around for over sixty years with less focus than dental floss. The answer may be in creating an easy and convenient environment to decrease dental plaque to ward off gingival inflammation more consistently. I chose the apparatus called the ToothShower® to evaluate whether or not there will be an improvement in the patient’s total hygiene regimen. My main focus will be whether there is a decrease in gingival inflammation, and whether the patients become more consistent with their oral hygiene regimen.

The ToothShower was invented by a 25-year practicing dental hygienist who saw the need for convenience and consistency with her patients. I met the inventor of the ToothShower when I attended the RDH Under One Roof Conference in 2018. In the booth I was able to experience how the ToothShower worked, I have since tried it myself. The ToothShower recently launched to market in 2019. The ToothShower is free of electricity, batteries, noise, and does not take up counter space. It is an all in one unit that attaches to the shower wall, which consists of a water flosser tip, irrigating dual-head toothbrush, tongue cleaner (the small rubber bristles on the backside of one of the toothbrush heads was used as a tongue cleaner), and a seven-stream gum massager. Additionally, there are four more accessories available for purchase, which are a periodontal pocket tip, single head toothbrush, orthodontic brush, and a sensitive gum tip. **19** For this evaluation, no additional accessories have been purchased.

Introducing:

ToothShower®

ORAL
HOME
CARE
SUITE IN
YOUR
SHOWER



IMPLEMENTATION:

FOR THE IMPLEMENTATION OF THIS ACTION RESEARCH PAPER, TOOTHSHOWER, UNITS WERE PROVIDED TO EACH PARTICIPANT. EACH UNIT WAS SUPPLIED WITH DOUBLE ACCESSORIES TO ALLOW FOR TWO PEOPLE TO UTILIZE THE DEVICE. A TOTAL OF TWELVE PARTICIPANTS AGREED TO PARTICIPATE IN THIS ACTION RESEARCH PAPER. ALL PARTICIPANTS SIGNED A CONSENT FORM.

Each participant was shown how to utilize the product and instructed to view the information within the website www.toothshower.com. The website consists of instructional videos on the use of each accessory the ToothShower offers. Three accessories were provided to the participants for this research. The accessories provided are the irrigating double-sided brush, irrigating tip, and 7-stream gum massager (the back side of the brush cleans the occlusal surfaces). Each person was instructed how to attach the ToothShower to the shower wall, as well as to the shower head. Each participant was instructed to complete a baseline intake questionnaire. Next, participants were instructed to use a disclosing tablet in the evening on the first day prior to using the ToothShower, as well as after using the ToothShower on the same day. The disclosing tablet is for educational purposes for the participant to visually see plaque on their teeth, and to also demonstrate the angles needed for each accessory.

COMPLETION:

After the completion of the above steps, and using motivational interviewing, the participants were to execute what comes natural for their oral hygiene habits for the next ten days. The participants were asked to note each time they utilized the product. After 10 days, they were to email, or text that they have completed the 10 days. At that time, they received a questionnaire to complete and email back.

CONCLUSION:

The study was originally to be performed on twelve individuals, however it turned out nine were able to follow through. A senior participant had a difficult time with attaching the ToothShower, however states she will use it daily once attached. The two youngest participants did not use it, however stated they see the benefit of having it in the shower, and will use it in the future. Overwhelmingly out of those nine that did participate, it is apparent that having a convenient oral hygiene regimen does in fact increase the use of oral hygiene regimens.

The response of not needing counter space, no dripping water on the floor and not having to plug in the ToothShower was a perk to all. The water flosser was utilized at least once a day with all nine, and a couple used it up to three times a day. Participants reported feeling longer lasting smoothness on their teeth, fresher breath, and no longer saw bleeding. Some participants preferred the double-sided brush with the water pressure, and some preferred using their Oral B or Sonicare toothbrushes in the shower. The introduction of the gum massager was new to all, and the feedback was positive in use.

The back of the double-sided toothbrush has a raised rough area that was used to brush the occlusal surfaces of the teeth. Surprisingly though, disclosing tablets became a large focus for the participants. Almost all requested more disclosing tablets, and reported that they were surprised that their floss did not remove all plaque from in between. Many of the participants asked what they could use to remove the rest of the plaque, to which interproximal brushes were recommended. A possible idea for the ToothShower company would be to make an interproximal brush attachment to capture this part of the market, and to assist in these hard to reach places making it a win-win.

WHAT'S NEXT:

Current circumstances in understanding COVID-19 has increased awareness of the presence of bacteria, viruses and fungal interactions in overall health. By seeking first to understand, dental providers can utilize this opportunity to appeal to patient's current concerns as well as provide convenient solutions in supporting a balanced oral ecosystem. Dental hygienists are on the front lines when it comes to understanding our patient's medical history, oral health, and other factors that compromise their health. Even with the challenges of time constraints, dental hygienists have the opportunity to create long-term relationships. Many patients are seen quarterly for their appointments, as well as current technology allows for better access to communication. Encouraging patients to participate in their own oral health choices while making the task more convenient, will create synergy. Synergy takes place when we respect our patients, value their differences, and build upon their strengths.

Overwhelmingly out of those nine that did participate, it is apparent that having a convenient oral hygiene regimen does in fact increase the use of oral hygiene regimens. .

Karyn Hill BS CRDH

RESEARCH RESULTS

Participant A: Male, age 48

Bleeding Before: Yes

Bleeding After: No

Water floss Before: 0 days

Water floss After: 10 days

Clean Tongue Before: Daily

Clean Tongue After: 2x

Brush Before: 2x a day

Brush After: 2x a day Sonicare

Use of Gum Massager: 4 out of 10 days

Any changes in oral health: Made me more aware of my oral health. My teeth felt smoother.

Why would you or would you not recommend this product: Yes, I would recommend the ToothShower. It is staring you in the face and I do not have to plug it in.

Participant B: Female, age 47

Bleeding Before: Yes

Bleeding After: No

Water floss Before: limited

Water floss After: 2-3x a day

Clean Tongue Before: Yes daily

Clean Tongue After: Yes, daily not with ToothShower

Brush Before: 2-3x a day

Brush After: 2-3x a day not with ToothShower, Sonicare

Use of Gum Massager: 2-3x a day

Any changes in oral health: Bleeding at first, then zero bleeding after about 3 days use

Why would you or would you not recommend this product: Yes, for the water flosser and gum massager. Convenient and increased my daily use.

Participant C: Male, age 45

Bleeding Before: Yes

Bleeding After: No

Water floss Before: 0

Water floss After: 10 days out of 10

Clean Tongue Before: 0

Clean Tongue After: 0

Brush Before: 2 x a day

Brush After: 2 x a day

Use of Gum Massager: 10 out of 10 days

Any changes in oral health: Felt like my mouth was clean after use

Why would you or would you not recommend this product: I love the convenience of having everything in one place, and would recommend for that reason

Participant D: Male, age 48

Bleeding Before: Yes

Bleeding After: No

Water floss Before: No

Water floss After: 10 days, 2x a day

Clean Tongue Before: No

Clean Tongue After: 1x out of 10 days

Brush Before: 2x a day

Brush After: 2x a day with the double sided brush and Sonicare

Use of Gum Massager: 10 days

Any changes in oral health: Feel like my breath is more fresh and my gums are not sore

Why would you or would you not recommend this product: I would for the water flosser alone.

Having it in the shower made it easier to use.

Participant E: Female, age 40

Bleeding Before: Yes

Bleeding After: No

Water floss Before: 0

Water floss After: 10 out of 10 days

Clean Tongue Before: 0

Clean Tongue After: 10 out of 10 days

Brush Before: 2-3x a day

Brush After: 2-3x a day

Use of Gum Massager: 10 out of 10 days

Any changes in oral health: I feel like my breath and my husband's breath has improved. No bleeding for the both of us.

Why would you or would you not recommend this product: Yes. As a Mom I felt it was relaxing to have everything in the shower with the warm water. I used it longer than I ever have. Not having to hook everything up first makes it easy to use. I wish it was a regular brush though. I like brushing the tops of my teeth.

Participant F: Male, age 48

Bleeding Before: Yes when I brush

Bleeding After: No

Water floss Before: No but I use a toothpick 3x daily

Water floss After: 10x out of 10 days

Clean Tongue Before: No

Clean Tongue After: 10x out of 10 days

Brush Before: 2x a day

Brush After: 2x a day

Use of Gum Massager: 10x out of 10 days

Any changes in oral health: No bleeding

Why would you or would you not recommend this product: Definitely. I love the pressure and not having to deal with the mess.

Participant G: Male, age 54

Bleeding Before: Sometimes

Bleeding After: Not that I could see

Water floss Before: No

Water floss After: 10 out of 10 days

Clean Tongue Before: Yes daily

Clean Tongue After: Yes daily with a separate tongue scraper

Brush Before: 2x a day

Brush After: 2x a day with my Oral B still

Use of Gum Massager: 6 out of 10 days (I felt like the water flosser got everything out)

Any changes in oral health: I just felt clean and fresh

Why would you or would you not recommend this product: Absolutely. It is easy to use

Participant H: Female, age 38

Bleeding Before: Yes

Bleeding After: No

Water floss Before: 3x a week

Water floss After: 10 days, 2x a day

Clean Tongue Before: No

Clean Tongue After: Yes

Brush Before: 2x a day

Brush After: 2x a day

Use of Gum Massager: daily

Any changes in oral health: I do not see blood when I water pick any more. I did not like the way the toothbrush felt. I do feel my breath is fresher for some reason. My husband agrees.

Why would you or would you not recommend this product: I would for the water flosser and gum massager, but I rather use my Sonicare tooth brush.

Participant I: Male, age 44

Bleeding Before: A little

Bleeding After: No

Water floss Before: 2x a week

Water floss After: 10x out of 10 days

Clean Tongue Before: No

Clean Tongue After: 10 out of 10 days

Brush Before: 2x a day Sonicare

Brush After: 2x a day Sonicare

Use of Gum Massager: 10 out of 10 days

Any changes in oral health: I definitely have water picked more with it in the shower. I have not noticed any bleeding like I did. My teeth feel cleaner than before.

Why would you or would you not recommend this product: I would recommend. It was much more convenient, and seeing it hanging in the shower reminded me to use it daily

REFERENCES

1. Tilliss, T., Reduce Oral Disease With Interdental Biofilm Control. *Dimensions of Dental Hygiene*. Volume 18, (7): 26-27, 2020.
2. Wilkins, E., *Clinical Practice Of The Dental Hygienist*. Seventh Edition. Williams & Wilkins. Malvern. Malvern, Pennsylvania, US; 1994.
3. Patil, S., Rao, R. S., Sanketh, D. S., Amrutha, N., Microbial Flora in Oral Diseases. *The Journal of Contemporary Dental Practice*. Volume 14(6): 1202-1208. 2013.
4. Turnbaugh, P., Ley, R., Hamady, M. et al. The Human Microbiome Project. *Nature*. <https://www.nature.com/articles/nature06244>. 2007. <https://doi.org/10.1038/nature06244>.
5. Theilade, E., *Factors Controlling the Microflora of the Healthy Human Mouth*. CRC Press Inc. Boca Raton, FL, US; 1990.
6. Barnett, M., The Oral-Systemic Disease Connection. *Journal of The American Dental Association*. Vol. 137: 64-65. 2006.
7. Sanders, J., The Human Microbiome New Understanding of The Complex Human Bacterial Ecosystem Has Great Implications For Both Oral and Systemic Health. *Dimensions of Dental Hygiene*, Vol 13(1): 38-41, 2015.
8. Hill, M., Marsh, P., *Human Microbial Ecology*. CRC Press Inc. Boca Raton, Fl. US; 1990.
9. Merriam-Webster.com Dictionary. Merriam-Webster, <https://www.merriam-webster.com/dictionary/-itis>. Accessed 16 Oct. 2020.
10. Narayanan, S., Page, R., Connective Tissues of the Periodontium. *ScienceDirect*. <https://www.sciencedirect.com/science/article/abs/pii/S0174173X83800478>. 2012. [https://doi.org/10.1016/S0174-173X\(83\)80047-8](https://doi.org/10.1016/S0174-173X(83)80047-8).
11. Gorman, C., Park, A., Dell, K., Cellular Inflammation The Secret Killer. *Time*, Vol 163 (8): 39-46. 2004.
12. Centers for Disease Control and Prevention. Oral Health. Department of Health and Human Services. <https://www.who.int/news-room/fact-sheets/detail/oral-health>. March 2020.
13. World Health Organization. Oral Health. <https://www.who.int/news-room/fact-sheets/detail/oral-health>. March 2020.
14. O'Hehir, T., Communicating with Sound Bites. *Hygienetown*, June: 114-166, 2012.

15. Ramseier, C., Suvan, J. Health Behavior Change in the Dental Practice. Wiley-Blackwell. Ames, Iowa, USA; 2010.
16. Covey, S., The 7 Habits of Highly Effective People. A Division Of Simon & Schuster Inc. New York, NY, USA; 1989, 2004.
17. International Waterpik., Forget String Floss Use Water. British Dental Journal. Nature. <https://www.nature.com/articles/sj.bdj.2016.653#cities>. 2016. <https://doi.org/10.1038/sj.bdj.2016.653>.
18. Wilson, M., National Inventors' Day. Fort Collins Museum of Discovery. <https://fcmof.org/blog/2020/02/10/national-inventors-day/>. February 2020.
19. ToothShower, LLC 2020 V.1. <https://toothshower.com/> Copyright © 2019 ToothShower