

Interdental Cleansing

By **Jacquelyn L. Fried, RDH, MS**

In March 2008, the Standards for Clinical Dental Hygiene Practice were adopted by the Board of Trustees of the American Dental Hygienists' Association. The two stated purposes for this document are (1) "to assist dental hygiene clinicians in the provider-patient relationship" and (2) "to educate other health care providers, policy makers and the public about the clinical practice of dental hygiene." To access the full standards document, go to www.adha.org/downloads/adha_standards08.pdf. The following article on interdental cleansing contains references that link back to the standards document. Readers who would like greater understanding of the standards are encouraged to read it alongside a copy of the standards document and make their own links to the information in the article. Readers who do so are encouraged to share their insights with Access.

Interdental cleansing is necessary for the attainment of optimal oral health. Since most toothbrushes have limited access to proximal surfaces of teeth, measures for interdental cleansing must be included in dental hygiene care plans. Interdental spaces are areas where bacteria can accumulate, multiply and remain undisturbed. Undisturbed plaque biofilm can cause gingival inflammation and bleeding and increase the risk for and progression of periodontal disease.

p4 Definition of Dental Hygiene Practice

Accessing interdental areas can be challenging for patients. A myriad of devices designed to access interdental spaces are available for consumer purchase. Examples of interdental aides on the market include dental floss and tape, water jets, interdental brushes and tips, and plastic or wooden picks. Products can vary according to comfort, cost, ease of use, consumer acceptance and effectiveness in reducing bleeding, gingival inflammation and the composition and quantity of biofilm accumulations. With so many options available, patients need a professional's guidance to determine what choices to make. Dental hygienists can assist by offering recommendations that are individualized and based on patients' needs and abilities.

p6 Dental Hygiene Process of Care

This article will address why the Water Flosser (also known as an oral irrigator or dental water jet) is a viable and useful adjunct for interdental cleansing. Research examining the effectiveness of the Water Flosser when compared to toothbrushing alone, to string (dental) floss in conjunction with toothbrushing, and with another powered interproximal type device will be explored. The Water Flosser's mechanisms of action, benefits, versatility and suitability for specific target groups and the general public also will be discussed.

Research Studies

Water Flosser and Dental Floss

For almost five decades, oral irrigation and its effects on interdental cleansing, tissue health and the potential for bacteremia, as well as in reducing calculus, plaque, gingival inflammation and bleeding have been studied assiduously.¹⁻⁶ Reductions in bleeding, gingivitis and plaque accumulations have been the key dependent variables for oral irrigation clinical trials. Repeatedly, in studies that have compared the adjunctive use of dental flossing or irrigation with toothbrushing,

oral irrigation has shown significantly greater reductions in bleeding and gingivitis levels. The following three studies compared the Water Flosser to string floss when each was used as an adjunct to toothbrushing.⁴⁻⁶ All studies demonstrated that the Water Flosser provided superior results over string floss for reducing gingival bleeding. Barnes et al.⁴ found that the combined use of a Water Flosser with toothbrushing was as effective in removing plaque and significantly better at reducing bleeding and gingivitis when compared to flossing and toothbrushing. With orthodontic patients, Sharma et al.⁵ found that when comparing the use of manual toothbrushing and a dental water jet using an orthodontic tip to manual toothbrushing with flossing or floss threaders, or to just brushing alone, the Water Flosser was more effective in reducing plaque and bleeding scores. Rosema et al.⁶ compared three study groups, two of which used a manual toothbrush and a Water Flosser with two different tips and a third group that used flossing with manual toothbrushing. Both water flossing groups experienced a significantly greater reduction in gingival bleeding scores when compared to the flossing group.

Plaque Removal

Although two dated reports, one involving a case study and another that compared toothbrushing to a Water Flosser alone, questioned the plaque removal capabilities of water flossing, subsequent studies refute those results.⁴⁻⁹ In recent studies where the Water Flosser was used alone or as an adjunct to toothbrushing, superior or equivalent reductions in plaque accumulations were found.⁴⁻⁶ Another study found that the Water Flosser with the Classic Jet Tip removed 99.9 percent of plaque biofilm.⁷

p5 Professional Responsibilities and Considerations

Host Response

Another body of research examines the effects of oral irrigation on plaque disruption, bacterial virulence and host response indicators.

p3 Introduction

Drisko et al.¹⁰ and Chaves et al.,¹¹ respectively, found subgingival disruption of bacteria and a reduction of pathogens when an oral irrigator was used. Drisko noted that spirochetes were disrupted in pockets of up to 6 millimeters, while Chaves found a reduction of pathogens when the irrigator was used with either chlorhexidine 0.04 percent or water. Rinsing with chlorhexidine 0.12 percent or toothbrushing alone did not reduce pathogens. Cobb and colleagues also noted a qualitative difference in the bacteria up to 6 mm when water irrigation was used.¹² Cytokine profiles have been studied to determine how oral irrigation impacts the host inflammatory response. While reducing the traditional clinical measures of plaque biofilm, bleeding and gingivitis, the oral irrigation also increased anti-inflammatory mediators while simultaneously decreasing pro-inflammatory cytokines.¹³ Only in the irrigation group did reductions in bleeding on probing correlate with reductions in IL-1 β . Another randomized controlled trial (RCT) measured the serum cytokine profile of diabetic subjects. Following scaling and root planing, subjects performed routine hygiene either alone or with oral irrigation twice daily. The results similarly showed that Water Flosser users had greater reductions in bleeding, gingivitis and plaque biofilm plus significant

reductions in IL-1 β and PGE $_2$.¹⁴ Given the symbiotic relationship between diabetes and periodontal disease, oral self-care measures that curb the inflammatory process are critical to a diabetic patient's oral and systemic well-being. Research suggests that water flossing may decrease the toxic products generated by plaque biofilm and that a change in the host response could be the mechanism by which the Water Flosser achieves improvements in gingival health.¹¹⁻¹⁵

p4 Definition of Dental Hygiene Practice
p7 Standard 1. III. d.

Comparing Power Interdental Cleaners

A recent randomized controlled trial compared the effectiveness of two power interdental devices, the Water Flosser and the Air Floss, when used as adjuncts to manual toothbrushing. Both groups showed significant reductions in gingivitis, bleeding on probing, and plaque from baseline for all regions and time points measured ($p < 0.001$). Between groups, the Water Flosser group showed significantly higher plaque reductions for whole-mouth, marginal, approximal, facial and lingual areas. For bleeding on probing, the Water Flosser group was numerically better than the Air Floss group for all areas and time points, with statistically significant findings for whole-mouth and facial areas, at week 2 and for the facial area at week 4. The Water Flosser group was significantly more effective at reducing plaque and gingivitis at weeks 2 and 4 for all areas measured ($p < 0.001$).¹⁶

Systematic and Literature Reviews

Two comprehensive literature reviews and one systematic review conducted between 2005 to 2008 address the Water Flosser.¹⁷⁻¹⁹ In its published report, the American Academy of Periodontology emphasizes the value of the oral irrigation for use in periodontal maintenance and for the treatment of gingivitis. A key advantage cited was the Water Flosser's ability to attenuate bacterial reductions obtained during scaling and root planing. The Water Flosser was recommended for patients who display inadequate interdental cleansing skills.¹⁷ Hussein et al. found that in the majority of studies cited in their systematic review, the addition of oral irrigation to toothbrushing significantly reduced bleeding and gingivitis levels when compared to toothbrushing alone. No differences in plaque accumulations were found.¹⁸ The Canadian Dental Hygienists' Association's 2006 position paper on flossing recommends the 'home irrigator' (Water Flosser) as a viable alternative to 'finger flossing'.¹⁸ The paper cites the fact that patients often have difficulty removing interproximal plaque with traditional string dental floss.¹⁹ Although dental floss is routinely suggested as the option of choice for interdental cleansing, low compliance with flossing has been reported.^{20,21} Therefore, other evidence-based options must be prescribed to patients who have been unable to achieve effectiveness with dental flossing and/or are noncompliant with its usage.

p6 Standard 1. I. a.

p9 Standard 5. III.



The Waterpik® Ultra Water Flosser™ is clinically proven up to twice as effective as string floss to reduce bleeding and improve gingival health.

Mechanism of Action

The Water Flosser's mechanisms of action are central to its effectiveness. The two main physical features of water flossing action include pulsation and pressure. Pulsation essentially regulates pressure. A combination of these two actions allows for disruption of bacterial activity, the expulsion of subgingival bacteria and the removal of loosely lodged debris and food particles. Research has determined the appropriate levels of pressure that should be applied during usage. Clinical effectiveness has been demonstrated in the 50-90 psi (pounds of pressure per square inch) range. These levels reflect what both healthy and inflamed tissues can comfortably handle without tissue damage.^{22,23}

p5 Professional Responsibilities and Considerations

Versatility/Benefits

Those with diminished dexterity can easily use the Water Flosser. It requires the user to simply hold the handle at a 90-degree angle to the tooth and irrigate the tissues at an appropriate pressure setting. With shifting demographics and a growing elderly population, concerns related to dexterity and other physical limitations will grow. The elderly who suffer from arthritis or other conditions that compromise the use of their hands may find the Water Flosser easy to manage and control. Manufacturer's instructions clearly state the

desired power settings, and instructions are printed in readable type with accompanying graphics.

The versatility of the Water Flosser also merits attention. In addition to subgingival lavage with water, the Water Flosser can hold, deliver and direct antimicrobial solutions into the sulcus and interproximal regions. Thus, when patients are advised to use antimicrobial agents for home care, the Water Flosser is an appropriate choice. Six different water-flossing tips can attach to the unit. These inserts are designed to address patient needs specific to general and tongue cleansing, orthodontic appliances, fixed restorative appliances, deeper periodontal pocket areas and toothbrushing.

The Water Flosser also is a safe and effective approach for cleansing between implants.²⁴

p7 Standard 1. II. d. 8.

Orthodontic patients, in particular, can benefit from water lavage.⁵ Food debris and plaque cling to orthodontic wires, brackets and plastic orthodontic appliances. Although people of all ages may require orthodontic care, the majority of orthodontic patients typically are adolescents and young adults who tend to be less amenable to the time commitment and labor intensity of flossing. Further, younger orthodontic patients may not have the dexterity to be skillful and effective when flossing. The Water Flosser is ideal for thorough cleansing of orthodontic fixtures.

Conclusion

The Water Flosser offers convenience and ease of usage to a broad consumer group. With today's technology and a world of "quick and easy," a large segment of the market is attracted to power-driven devices and oral hygiene practices that require minimal time and energy. The Water Flosser is adaptable, easy to use, versatile and suitable for

diverse populations. Research studies demonstrating its effectiveness, patient acceptance and provider validation place it among the evidence-based choices for effective interdental cleansing. When dental hygienists make recommendations to their patients, they should include the Water Flosser, a well-researched, effective and reliable approach to interdental cleansing,

p10 Key Terms

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■ Your Feedback Is Welcome!

In 2008, the ADHA Board of Trustees approved the current *Standards for Clinical Dental Hygiene Practice*. In her annual report, then President Jean Connor, RDH, wrote, "These standards reflect the dental hygiene process of care and will be instrumental in assisting clinicians in their daily delivery of patient care and educating the public, other care providers and policy makers on dental hygiene practice." Links to the standards document appear throughout this article on professional tooth whitening and are expanded on the opposite page.

The *Standards* are intentionally general so that they apply to all aspects of clinical dental hygiene care. If you have comments about or additions to the links made in this article, please write and let us know. ADHA intends for the *Standards* to be a living document, and we welcome your participation in the process. Send comments and comments to

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HOW THIS ARTICLE REFLECTS THE STANDARDS FOR CLINICAL DENTAL HYGIENE PRACTICE

- **Interdental cleansing is necessary for the attainment of optimal oral health.**

The Definition of Dental Hygiene Practice (p4) includes removal of biofilm plaque and calculus from teeth. Interdental cleansing is integral to this aspect of dental hygiene care.

- **Dental hygienists can assist by offering recommendations that are individualized and based on patients' needs and abilities.**

The Standards' Dental Hygiene Process of Care section (p6) states that the purpose of the dental hygiene process of care is to provide a framework where the individualized needs of the patient can be met; and to identify the causative or influencing factors of a condition that can be reduced, eliminated, or prevented by the dental hygienist.

- **Although two dated reports, one involving a case study and another that compared toothbrushing to a Water Flosser alone, questioned the plaque removal capabilities of water flossing, subsequent studies refute those results.**

The Standards' Professional Responsibilities and Considerations (p5) require the dental hygienist to access and utilize current, valid, and reliable evidence in clinical decision making through analyzing and interpreting the literature and other resources; and to commit to lifelong learning to maintain competence in an evolving health care system. As illustrated here, new research can change the best evidence on which to base clinical decisions.

- **Research examines the effects of oral irrigation on plaque disruption, bacterial virulence and host response indicators.**

The Introduction to the Standards (p3) states that the purpose of medical and dental science is to enhance the health of individuals as well as populations. The dental hygienist is educated to observe host response to dental hygiene services as part of individualized, patient-centered care that includes interdental cleansing.

- **Given the symbiotic relationship between diabetes and periodontal disease, oral self-care measures that curb the inflammatory process are critical to a diabetic patient's oral and systemic well-being.**

The Definition of Dental Hygiene Practice (p4) requires that the dental hygienist discuss the progress being made toward isolating evidence that notes the potential association between systemic and oral health and disease. Engaging the patient with diabetes in discussion of the oral-systemic link helps enforce compliance with self-care behaviors such as selection and use of the right interdental cleansing regimen. Standard 1. III. d. (p7) specifically cites systemic diseases including diabetes as factors to be evaluated as part of risk assessment prior to dental hygiene treatment planning.

- **The Water Flosser was recommended for patients who display inadequate interdental cleansing skills.**

Standard 1. I. a. (p 6) requires the dental hygienist to record as part of patient history personal information including knowledge, skills and attitude. This aspect of patient assessment will help ensure that patients do not go unidentified who may benefit from selection of and education about aides for interdental cleansing.

- **Other evidence-based options must be prescribed to patients who have been unable to achieve effectiveness with dental flossing and/or are noncompliant with its usage. p9 Standard 5. III.**

Standard 5. III. (p9) states that, throughout the process of care, the dental hygienist evaluates and documents the outcomes of care and is required to collaborate to determine the need for additional care based on treatment outcomes and self-care behaviors. The dental hygienist can identify a patient who cannot or will not successfully use dental floss for interdental cleansing and can intervene by suggesting alternatives such as oral irrigation.

- **[Appropriate levels of pressure for water flossing] reflect what both healthy and inflamed tissues can comfortably handle without tissue damage.**

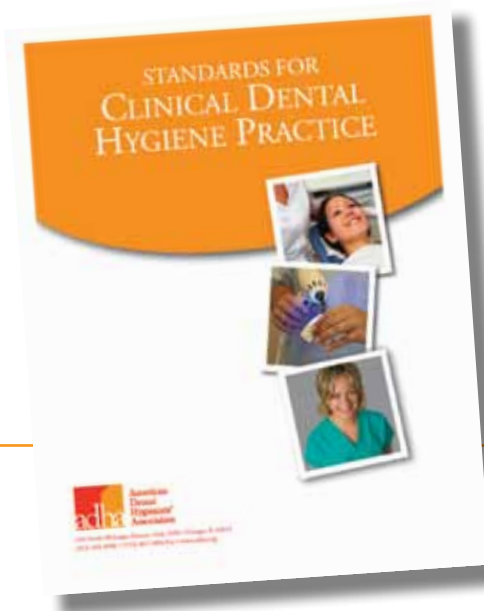
Professional Responsibilities and Considerations (p5) require that the dental hygienist take action to prevent situations where patient safety and well-being could potentially be compromised. Knowing and informing the patient of the manufacturer's recommended settings for use of aides such as the Water Flosser help ensure patient safety as part of the dental hygiene process of care.

- **The Water Flosser also is a safe and effective approach for cleansing between implants.**

Standard 1. II. d. 8. (p7) identifies fixed and removable prostheses among the factors the dental hygienist must include in the clinical phase of patient assessment. Noting the presence of (an) implant(s) in the chart will help ensure that the dental hygienist will have it in mind when recommending the best interdental cleansing regimen for this patient.

- **Research studies demonstrating its effectiveness, patient acceptance and provider validation place [the Water Flosser] among the evidence-based choices for effective interdental cleansing.**

Key Terms (p 10) define Evidence-Based Care as the integration of best research evidence with clinical expertise and patient values. Being current with ongoing research, using clinical judgment to evaluate assessment data and treatment outcomes, and bearing in mind the patient's abilities and willingness to comply with an interdental cleansing home care regimen, the dental hygienist will be able to assist the patient in achieving and maintaining optimal oral health.



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