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WATER FLOSSER VERSUS TRADITIONAL FLOSSER: WHICH IS MORE EFFECTIVE AT REMOVING FOOD DEBRIS AND PLAQUE?

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LITERATURE REVIEW

ABSTRACT

Objective: To discuss which is more effective in removing food debris and bacterial plaque: Water Flosser or Dental Floss. Methodology: During the construction of this narrative review article, it was necessary to create a methodological strategy that would meet the article's need to have the maximum amount of current and relevant information on the topic, which would be scientifically proven and rich in support. Thus, searches were carried out in the following databases: DeCs, BVS/BIREME, PROSPERO, Scielo, PUBMED Central, Science Direct, Web of Science, The Cochrane Library in conjunction with Google Academy. Results: Studies that seek to analyze the effectiveness of Water Flosser and Dental Floss show that both can remove food and bacterial plaque effectively, with Water Flosser being more suitable for people who use orthodontic appliances, complete dentures or who have motor difficulties, while Dental Floss would be suitable for people who are not part of these three groups. Conclusion: Scientific evidence confirms that both Water Flosser and Dental Floss are effective in cleaning the mouth, however, certain studies show that Water Flosser is slightly more effective in removing plaque and food debris. Therefore, it is essential that the dentist analyzes the difficulties and needs of each patient individually to determine which option is more viable and beneficial for each respective case.

Keywords: Dental Floss, Water Jet, Home Oral Care Devices, Oral Health.

WATER FLOSSER VERSUS FIO DENTAL TRADICIONAL: QUAL É MAIS EFICAZ NA REMOÇÃO DE RESTOS DE ALIMENTOS E PLACAS BACTERIANAS?

RESUMO

Objetivo: Discutir sobre o que é mais eficaz na remoção de restos alimentares e placas bacterianas: Water Flosser ou Fio Dental. Metodologia: Durante a construção deste artigo de revisão narrativa, foi necessário criar uma estratégia metodológica que atendesse a necessidade do artigo de ter o máximo de informações atuais e relevantes sobre o tema, onde fossem cientificamente comprovadas e ricas em suporte. Assim, foram feitas buscas nas seguintes bases de dados: DeCs, BVS/BIREME, PROSPERO, Scielo, PUBMED Central, Science Direct, Web of Science, The Cochrane Library em conjunto com o Google Academy. Resultados: Estudos que buscam analisar a eficácia do Water Flosser e do Fio Dental mostram que ambos conseguem remover alimentos e placa bacteriana de forma eficaz, sendo o Water Flosser mais indicado para pessoas que usam aparelhos ortodônticos, próteses completas ou que têm dificuldades motoras, já o Fio Dental seria indicado para pessoas que não fazem parte de três grupos. Conclusão: Evidências científicas confirmam que tanto o Water Flosser quanto o Fio Dental são eficazes na limpeza bucal, porém, certos estudos mostram que o Water Flosser é um pouco mais eficaz na remoção de placa bacteriana e restos de alimentos. Dessa forma, é essencial que o dentista analise as dificuldades e necessidades de cada paciente individualmente para verificar qual opção é mais viável e benéfica para cada respectivo caso.

Palavras-chave: Fio dental, Jato de Água, Dispositivos de cuidados orais em casa, Saúde bucal.

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INTRODUCTION

Dental plaque is a biofilm composed of a set of bacteria that attach themselves to the tooth and live closely attached to each other. Oral biofilm is composed of oral bacteria that are responsible for triggering periodontal diseases, gingivitis and cavities, which are problems caused by the lack of good oral hygiene associated with other factors, highlighting the need for daily hygiene in order to remove bacterial plaque dispersed throughout the oral cavity in addition to avoiding possible diseases and oral health problems (Löe et al., 1965). Therefore, it is necessary for each individual to perform correct daily mechanical hygiene using a toothbrush with toothpaste, so that the removal of bacterial plaque and food debris retained in the structures of the mouth are removed effectively (Haffajee et al., 2005; Moeintaghavi et al., 2017). However, studies show that brushing only removes about 60% of the bacterial plaque adhered to the tooth surfaces, leaving a large amount of plaque in the interproximal regions, which in the long term can trigger carious lesions or even inflammation of the gums near the region (Lamont et al., 2010). This percentage of bacterial plaque that the toothbrush cannot normally remove is the portion of plaque located in the subgingival and interdental area of the teeth, regions that the toothbrush bristles cannot access and remove easily, a place where most periodontal problems begin due to this lack of cleaning (Van der Weijden & Slot, 2011)

Therefore, it is necessary to use something that complements brushing, which helps control dental biofilm so that there is less bacterial plaque than when using only a toothbrush. Dental floss and Water Flosser are complementary options for removing bacterial plaque, being able to access areas that the toothbrush has difficulty reaching. Dental floss is the most traditional and commonly used option in society, where the person makes gentle sawing movements between the teeth using the floss (Chapple & Van der Weijden, 2019). The Water Flosser, on the other hand, is a more recent form and is little used by society because it is a more expensive option when compared to dental floss or because it is not very widespread. It is an oral irrigator with a pulsating jet, with a reservoir, pressure control and a nozzle where the jet comes out, being directed at the height of the gingival margin free of the interproximal regions and other

surfaces of the teeth (Goyal et al., 2012).

In recent years, more researchers have been conducting research where they have analyzed the removal of bacterial plaque performed by Dental Floss and Water Flosser, so that it can later be identified which is more effective. Based on this, the objective of this narrative literature review article is to discuss which is the most effective option for removing bacterial plaque: Dental Floss or Water Flosser, through randomized clinical trials, systematic, integrative reviews and other works that address the topic of this article.

METHODOLOGY

During the construction of this narrative review article, it was necessary to create a methodological strategy that would meet the article's need to have the maximum amount of current and relevant information on the topic, where they were scientifically proven and rich in support. Thus, searches were made in the following databases: DeCs, BVS/BIREME, PROSPERO, Scielo, PUBMED Central, Science Direct, Web of Science, The Cochrane Library in conjunction with Google Academy. In addition to using the aforementioned databases, gray literature was also used during the development of the work, providing relevant information on the topic and which was essential. In order to acquire only information related to the topic, the following descriptors were used during the data searches: Dental Floss, Water Jet, Home Oral Care Devices, Oral Health. As this is a narrative literature review, it was necessary to use a work that addresses what the methodology used in this type of review should be, what its structure is, what it is necessary to have in this type of work and what should not be included in it, thus, the work of Rother (2007) was the study used as a guide from the beginning to the end of this article.

RESULTS

A randomized clinical trial conducted by Abdellatif et al. (2021) aimed to compare the effectiveness of Water Flosser and Dental Floss in removing plaque in just

one use. This RCT found that both dental floss and Water Flosser were effective in removing plaque after a single use. However, Water Flosser is the best option when it comes to patients who use fixed prostheses, orthodontic appliances or who have a problem that affects the motor skills of their hands, as it is an easier option to use than dental floss, which requires more precise and firm handling. However, as much as Water Flosser is effective in removing plaque, this study analyzed the presence of plaque before and after the use of both options and the percentage of plaque reduction where dental floss was used was slightly higher: Water Flosser with 87.23% and Dental floss with 89.09%.

Another study carried out by Ferraz & Carvalho (2022) carried out an integrative review that sought to analyze the use of Water Flosser and Dental Floss in removing bacterial plaque in children. This work, after analyzing 18 studies related to the topic, concluded that both Water Flosser and Dental Floss are highly effective in removing bacterial plaque, with Water Flosser being more suitable for people with: neuropsychomotor limitations, bedridden, with some disability or for children who wish to perform their hygiene alone. In addition, this study emphasized the fact that the most important thing in reality is that the person performs oral hygiene, using soft-bristled brushes, fluoridated toothpaste and using dental floss correctly or with Water Flosser depending on whether the patient fits into one of the groups that have indication.

Another integrative review conducted by Campos et al. (2024) sought to analyze 13 articles that compared the use of dental floss and water flosser in removing bacterial plaque. After the analysis, this study concluded that Water Flosser is indeed highly effective in removing bacterial plaque, but more randomized clinical trials are needed to provide more tested and proven clinical evidence. This study also stated that Water Flosser is more suitable for people with implants, orthodontic appliances and motor limitations.

In the study by Lai et al. (2016) conventional dental floss was replaced by Water Flosser, where it was seen that the use of Water Flosser did not leave traces of bacterial plaque, in addition, even in one of the groups in which Water Flosser was replaced by brushing, positive results were obtained in plaque reduction, however, it is not recommended that brushing be replaced by Water Flosser, but that the ideal is to

perform brushing combined with the correct use of dental floss or water flosser depending on the patient's health condition or limitation.

Nasiloski et al. (2015) conducted a study with children with neuropsychomotor disabilities, which makes them need medications such as: antidepressants, neuro epileptics and anticonvulsants, medications that use sucrose in their composition, which is not positive for oral health. In addition, after a study carried out with these children, the author concluded that 90% of them do not use dental floss, causing them to have a plaque index of 85%. In this case, because these are children exposed to these limitations and conditions, the authors of this research recommend the use of Water Flosser, as it is an easier option to introduce and use in the oral health care of these children with neuro psychomotor problems.

Goyal et al. (2013) was a clinical study that aimed to analyze the removal of bacterial plaque, where two groups were separated: one group that would use manual brushing combined with Water Flosser and the other that would use manual brushing combined with dental floss. After analyzing the results, the authors reached the final conclusion that the group that performed manual brushing combined with Water Flosser had a greater removal of bacterial plaque than the manual brushing combined with dental floss. In addition, the group that used Water Flosser was able to remove bacterial plaque located in areas that are more difficult to remove and that are most often not removed by brushing.

Goyal et al. (2018) conducted a clinical trial with the aim of comparing the use of manual brushing in conjunction with Water Flosser with manual brushing without the use of dental floss or Water Flosser on gums with clinical signs of inflammation, where two groups were randomly divided: the first group where the Water Flosser was used once a day and manual brushing was performed twice a day, the second group performed only manual brushing twice a day. After analyzing the results, this study concluded that both groups were effective in reducing bacterial plaque and bleeding on probing, however, the group that used Water Flosser was more effective in bringing health to the gums than the group that only had manual brushing.

The study by Altalhi et al. (2023) aimed to analyze the effectiveness of Water Flosser in irrigating interdental and subgingival areas, comparing it with other methods,

aiming to see which is better in managing gums with periodontitis. In this study, they concluded that it is effective in reducing bacterial plaque and in managing gums with periodontal disease, triggering an improvement in inflammation and that it would reduce it even further if the patient with periodontal disease creates a routine of using Water Flosser within their oral hygiene.

Swan et al. (2022) in this randomized clinical trial, the objective is to compare the use of Water Flosser and Super Flosser in removing bacterial plaque from orthodontic appliances, where it was done with single-blind, which concluded that both were effective in reducing bacterial plaque, effectively removing plaque from orthodontic appliances.

Bertl et al. (2021) conducted a study that aimed to analyze whether the Water Flosser device, after being used regularly, could accumulate bacteria in the equipment, which could cause the water jets to come out contaminated after a few uses. This research had results that showed that the Water Flosser device, after regular use for 3 weeks, presented a bacterial colony on the tip of the device, with anaerobic species, not just oral ones. Thus, this research leads us to understand that in addition to the bacteria from the bacterial plaque having colonized the tip, bacteria from the external environment also settled in the region, emphasizing the need for cleaning before and after using the Water Flosser device to remove bacterial plaque.

The study by Maslamani et al. (2023) carried out an analysis through a review article, which sought to identify the effectiveness of the Water Flosser in removing oral bacterial plaque from people with orthodontic appliances, with the result that the Water Flosser helps in removing interdental dendrites, bacterial plaque, reducing bleeding, being a great ally for people who are undergoing orthodontic treatments.

The work of Mohapatra et al. (2023) is a systematic review that, after a large analysis, came to the conclusion that the Water Flosser is more effective than dental floss in removing bacterial plaque, especially in the inaccessible interproximal regions of the tooth surfaces. In addition, the article states that because Water Flossers are expensive, most people who do not have a financial condition end up not buying them, even though they are good. However, for people with orthodontic appliances or who use dentures, the investment is more worthwhile because it is a piece of equipment that

will facilitate hygiene for people in these situations.

Batool et al. (2021) was a randomized study that aimed to analyze whether the Water Flosser works in removing bacterial plaque and whether it is the best option, where two groups were separated, group A where dental floss was used and group B that used the Water Flosser, with 28 men and 42 women who were divided equally into the two groups. At the end of the trial, the result obtained was that the Water Flosser together with manual brushing is superior to Dental Floss in removing bacterial plaque, plaque removal was 20-30% greater in the group that used the Water Flosser.

Kuru et al. (2018) conducted a study whose objective was to evaluate the cleaning efficacy of different interdental cleaning devices regarding in vitro and in vivo aspects together with patient preference and acceptance, obtaining as a result: the use of Water Flosser or not, should be applied depending on the profile of each patient individually, it is the role of the dentist to analyze whether the patient has any specific need or limitation, to later indicate whether he or she should use conventional dental floss or the Water Flosser device, always giving priority first to the patient's ability and condition so that the choice fits ideally with what the patient needs and is able to use. In addition, the study made it clear that it is necessary to conduct more randomized clinical trials that analyze how hygiene should be performed in people with implants, since peri-implant tissues differ from periodontal tissues, to see if these people need more differentiated hygiene in addition to checking the effectiveness of the Water Flosser, making it clear the need for more research on the subject.

Behera et al. (2023) conducted a study where he sought to evaluate the removal of bacterial plaque with dental floss and with Water Flosser, seeking to analyze which removes more plaque, a study with 30 participants divided into two groups: group 1 would use conventional dental floss and group 2 would use the Water Flosser. In this study, the amount of bacterial plaque was collected and analyzed before and after the use of each type of flosser depending on the group, where the plaque chosen for analysis was from the canine and premolar teeth. After the procedures and analysis of the samples, the study concluded that both dental floss and Water Flosser were effective in removing bacterial plaque, leaving it up to the person to decide which one they want to choose, but that Water Flosser would be more suitable for people who have manual

problems. In addition, the authors highlighted the need for a study that analyzes the use of both types of flosser in the long term, in order to analyze which of the options the research participants liked and adapted to the most.

Al Sughaier et al. (2023) conducted a study that aimed to see if Water Flosser would have an effect on marginal microleakage at crown edges sealed with resin-modified glass ionomers (RMGI) and self-adhesive resin cement. The study concluded that using Water Flosser on crowns cemented with Rely-X and GIC triggered marginal microleakage, where there was accumulation of bacterial plaque subsequently causing cavities and periodontal disease, making it necessary to use Water Flosser with caution in cases like this. Therefore, we can conclude that in certain cases, dental floss would be recommended instead of a Water Flosser to avoid infiltration, plaque build-up, cavities and periodontal diseases.

The work of Rohra et al. (2019) carried out a review on the types of interdentals that aid oral brushing, concluding that Water Flosser is by far the most effective interdental aid for the removal of supragingival and sub gingival plaque when combined with manual tooth brushing, in addition to being expensive.

Gänzer et al. (2024) conducted a randomized clinical trial that compared the use of conventional dental floss and Water Flosser in removing plaque in adolescents with orthodontic appliances, within a 4-week period of use at home, with a total of 20 individuals. This study concluded that neither option was statistically superior to the other in removing plaque. In fact, what is extremely important is for the adolescent to know how to clean the appliance by following precise and correct instructions. The Water Flosser would be recommended for patients who have difficulty using interdental brushes, in addition to being an option that can access hard-to-reach areas, helping to remove plaque in difficult places.

The study by Jolkovsky et al. (2015) is a study that reports the introduction of the Water Flosser 50 years ago, showing that this innovation was subjected to several studies that analyzed its efficacy, safety, administration of antimicrobial agents and mainly its clinical functionality against bacterial plaque, gingivitis, depth of the periodontal pocket, bleeding and calculus, in addition to refuting possible ideas that the Water Flosser may harm the depth of the periodontal pocket or the fixation of the

junctional epithelium.

DISCUSSION

Based on the results obtained by the studies analyzed, both dental floss and Water Flosser have demonstrated effectiveness in removing bacterial biofilm. However, each one presents specific advantages depending on two variables: patient conditions and use. Dental floss is a consolidated option in daily oral hygiene practice and recommended by professionals because its effectiveness in cleaning interdental areas has been proven. However, it requires manual skill and precision, which may limit its use in patients with motor difficulties or in children.

Water Flosser emerges as a complementary and efficient alternative, especially for children with motor limitations, those with orthodontic appliances or in cases of patients rehabilitated with implants and fixed prostheses. Studies such as those by Goyal et al. (2013) and Batool et al. (2021) highlight that Water Flosser presented superior results in removing biofilm in hard-to-reach areas, in addition to promoting greater comfort and adherence to use. Despite this, the need for proper maintenance of the equipment is emphasized, since the accumulation of bacteria on the tips can pose a risk to the user (Bertl et al., 2021).

Although studies such as those by Behera et al. (2023) and Gänzer et al. (2024) did not find statistically significant differences between the two options, it is valid that the choice between dental floss and Water Flosser should be personalized, considering the needs, abilities, and limitations of the patient. The introduction of devices such as the Water Flosser may be more beneficial in patients with periodontitis or conditions that make flossing difficult.

On the other hand, caution is required when using the Water Flosser in patients with cemented crowns, whether with resin-modified glass ionomer or self-adhesive cement, due to the possibility of marginal infiltration, as demonstrated by Al Sughaier et al. (2023). This shows that the use of the Water Flosser may not be ideal in all clinical situations. Thus, the study reinforces the importance of an individualized oral hygiene plan, where the dentist must evaluate the oral conditions and limitations of each patient to guide the best choice. The need for more randomized and long-term studies is

highlighted to provide additional evidence that strengthens the scientific basis for the indication and use of these oral hygiene tools.

CONCLUSION

Over the years, dentistry has advanced and improved, seeking to develop new technologies, innovative procedures, sophisticated medicines and more effective instruments in daily clinical practice. The Water Flosser is an innovation in dentistry, a new alternative option that can replace the use of classic dental floss that has been used since its creation to this day. However, the Water Flosser has grown in recent years, being the subject of videos on social media, discussions between dentists and within society in general, for being something innovative, aesthetically beautiful and something different from the common dental floss, making it even more attractive, which has made this oral irrigator become the object of study all over the planet. Recent studies such as randomized clinical trials together with systematic and integrative reviews have compared dental floss and water flosser, aiming to identify which is better for removing dental plaque, with water flosser as the great differentiator and being the result of the vast majority of studies.

Thus, the conclusion of this literature review after analyzing several studies is that both dental floss and water flosser are extremely effective in removing food debris and bacterial plaque, and the water flosser still appears to be a slightly more effective option than traditional dental floss. However, it is important that each dentist, before recommending a water flosser to a patient, seeks to analyze the patient's profile and talk to them to see if a water flosser would be the right choice for them. Patients with dentures, orthodontic appliances, manual difficulties, and children are the most suitable to use a water flosser. Furthermore, it is seen that because it is something that can have a great impact on society, it is clear that there is a need for more clinical trials that seek to understand more about Water Flosser and compare it with Dental Floss, so that the world has more certainty and security regarding the product.

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