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A Comprehensive Literature Review of Measures for Enhancing Oral Hygiene

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ABSTRACT

Dental health play vital role in overall well-being of the individual, and effective oral hygiene is fundamental to prevention and control of dental problems. Mechanical plaque control remains the foundation of home-based oral hygiene, while adjunctive measures may improve plaque control in specific clinical and anatomical situations. This narrative review summarizes evidence concerning various measures or aids for oral hygiene maintenance such as manual and powered toothbrushes, brushing-related factors, interdental cleaning aids, and mouthwashes.

Keywords: mouthwashes, tooth brush, brushing technique, chlorhexidine, oral hygiene

Introduction

Periodontal diseases have found among the most prevalent chronic health condition worldwide, affecting almost every individual in a life span and alternatively affecting the quality of the life of the individual.[1] Neglecting dental health can lead to pain, discomfort and in some patients may interfere with sleep, depending upon the period of illness of the person. One should maintain a proper oral hygiene by ensuring the overall cleanliness by removal of the microbial plaque and inhibiting its growth as well as adherence over the tooth surface. [2-4] Dental plaque is found to be the primary etiological factor for most of the dental problems, or in other words, plaque is the initiating factor in most of dental conditions. [5-7] Mouthwashes are used as an adjunct to mechanical aids to maintain oral hygiene. Various types of mouthwashes are available in the market, broadly including chemical and herbal formulations. Mouthwashes are the liquid solutions that helps in cutting down bacteria, manage accumulation of plaque, combats halitosis, helps in preventing tooth decay, and supports the overall health of the gingiva. [4-9]

Historical evidence suggests that the toothbrush with bristles were introduced into dentistry during as early as the 16th century. Subsequent modifications in the shape and size of the shank and handle of the tooth brushes facilitated effective removal of plaque over the tooth surface and oral hygiene maintenance.[2-3] With advancement in the toothbrushes, electronic toothbrushes have been introduced in to the field of the dentistry, these toothbrushes operate on oscillating, rotating and sonic technologies which shows promising superior efficacy in the removal of the plaque.[9] In addition, the use of interdental brushes and water flossers has further enhanced oral hygiene by facilitating effective cleaning of interdental and other hard-to-reach areas.[10-11]

Various clinical studies have shown that, use of these advance aids in daily life contributes maintaining the overall health of the person. [3-5] Apart from use of these aids, oral health also depends on how frequently an individual uses a toothbrush and whether the brushing technique is appropriate. These factors play an important role in maintaining oral health and achieving favourable outcomes. [1-5]

Various oral hygiene measures, which can be used in maintain the oral hygiene are as:

Manual tooth brushes:

There are various factors, which can affect the efficacy of the plaque removal, including duration of the brushing, technique of brushing, the specific brushing technique adopted by the individual, pressure exerted over the tooth surface while brushing, and design of tooth brush. Excessive force or pressure might affect the overall structure of the healthy tooth, contributing to dental abrasion.[2-4] A study conducted by Xu et al (2019), stated that manual toothbrushes with crisscross and tapered bristle technology shows significantly reducing the gingivitis and as well as helps in improved removal of plaque when compared to traditional flat tooth brushes.[7] Another study by Farook et al (2023) revealed that, those patients with fixed orthodontic appliances, flat trim tooth brushes play a significant role in the efficient removal of the plaque.[8]

Powered tooth brushes:

These toothbrushes operate electrically using the various mechanism like oscillating, rotating and sonic technologies, and have demonstrated greater efficacy in plaque removal when compared to the manual tooth brushes. These brushes

have specific designs to reach out the specific areas of the oral cavity and helps in removing the plaque. These electronic brushes also have inbuilt feature of timing and pressure to be generated over the tooth; this is one of the major beneficial points of using these types of tooth brushes. These electronic tooth brushes are good in removing plaque from the oral cavity and reducing the incidence of gingivitis in the individual and thus improving the overall oral health of the individual.[9] Study by Yılmaz et al (2021) compared the efficacy of powered tooth brushes with the conventional tooth brushes among patients undergoing orthodontic treatment and revealed that electronically driven powered tooth brushes show good results in removing the plaque and maintain the good gingival health.[9]

Interdental measures:

The interdental cleaning involves use of various tools to remove plaque and debris from hard to access interdental areas. Interdental aids include a range of products from dental floss and interdental brushes to water flosser devices, which are commonly used in case dental implants[14]. The choice of the measure depends on the personal choice and sometime according to specific anatomical area or specific oral condition.[6,12-17] A study done by Mirza et al (2024) revealed that, when a cordless power flosser used along with the manual tooth brush, demonstrated promising results in maintaining the oral hygiene and improving the gingival health of the individuals.[18] Similarly, Li et al (2024) revealed that sonic power flosser shows efficient good results in the removal of the plaque and maintain the periodontal health.[19]

Mouthwashes:

Mouthwashes in adjunct to regular tooth brushing and appropriate tooth brushing technique play an important role in maintaining the periodontal and gingival health, and overall oral health. There are various types of mouthwashes available in the market. Some are chemical based mouthwashes and other are herbal mouthwashes. Both have their own distinct properties and potential benefits.[10,11] Among chemical mouthwashes, chlorhexidine mouthwash stands at top. The chemical mouthwashes are cationic polybiguanides or bisbiguanides, which primarily kill bacteria and used to maintain bacterial load. These are classified in three generations based on their mechanism of action. The first generation includes phenols and compounds of ammonium, the second generation includes bisbiguanides like chlorhexidine and the third generation includes delmopinol. The primary attribution of chlorhexidine mouthwash is its property of persistence. It has a property of remaining active for more than 12 hours following absorption to the oral surface.[10,11]

Therapeutic mouthwashes include active mouthwashes, which contain chlorhexidine mouthwash, cetylpyridinium chloride (CPC), essential oils (thymol, eucalyptol, menthol), or povidone-iodine. It helps in controlling plaque, helps in controlling gingivitis and periodontitis.[10,11,20,21] Other group of mouthwashes are fluoride mouthwashes, it mostly contains sodium fluoride, stannous fluoride, which helps in preventing dental caries by helps in remineralizing the enamel and inhibiting the process of demineralization. In contrast, cosmetic mouthwashes primarily used for reducing the bad breath, provides short term of freshness, but does not cure the underlying cause. Whitening mouthwashes, which includes hydrogen peroxide, it helps in providing mild bleaching effect over the teeth, and helps in whitening the teeth a bit.[21]

Other category of mouthwashes such as Analgesic and anti-inflammatory mouthwashes contains benzydamine hydrochloride, salicylates, or herbal anti-inflammatories (chamomile, aloe vera, turmeric).[22] Whereas antifungal mouthwashes contain nystatin, amphotericin B and clotrimazole, used in the treatment of oral thrush.[23] These formulations differ in their mechanisms and clinical indications. Lastly herbal mouthwashes mostly contain plant extracts like green tea, neem tulsi, aloe vera in it, oil of clove, chamomile and propolis, demonstrates anti-inflammatory, antimicrobial and anti-oxidant properties.[20,24-27]

Integrated approach to oral hygiene

No single oral hygiene measure or product can compensate for inadequate preventive behaviour. Effective oral hygiene combines regular mechanical plaque disruption, appropriate interdental cleaning, professional preventive care and selective use of chemical adjuncts. The appropriate combination varies across the life course. Children may require parental supervision, while older adults or individuals with impaired dexterity may benefit from powered toothbrushes or simplified interdental methods. Orthodontic and periodontal patients may require additional site-specific measures.

Conclusion

Natural teeth are often regarded as the best dentition; therefore, preserving them through effective oral hygiene and preventive care is essential for achieving favourable long-term oral health outcomes. In addition to toothbrushing, adjunctive oral hygiene measures can contribute to maintain the good oral health. The discussed techniques and products have common aim of preventing caries, controlling plaque, and maintain the oral hygiene. Therefore, adequate knowledge of preventive aids and advancements in oral health can help reduces the burden of dental diseases and contribute to improved overall quality of life.

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