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IOT BASED SMART TOOTHBRUSH FOR PLAQUE REMOVAL

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Abstract

Regular mechanical removal of bacterial plaque is essential to prevent the onset of dental diseases such as dental caries, gingivitis and periodontal disease. Oral hygiene practices involve the thorough daily removal of dental plaque and debris using intra oral cleaning devices. Tooth brushes are the most commonly used oral hygiene aids. As technology advanced, powered toothbrushes came into being as an alternative to manual tooth brushing. The driven toothbrush was designed to assist individuals with difficulties with manual dexterity or other physical disabilities. In many styles and modes of operation, they are available. The early models had a basic back and forth motion and plaque control was ineffective. The popularity of powered toothbrushes increased with the advent of newer models that integrated the rotation oscillation action (ROA) and optional characteristics such as timer, pressure sensor and blue tooth. The use of a powered toothbrush is now indicated not only for individuals with various skills, but also for the general public.

Keywords: *Toothbrush, Plaque, Bacteria, Tooth, Dental, Oral, Hygiene, Health care.*

I. INTRODUCTION

Dental caries and periodontal diseases exert tremendous social, economic, and financial burden on a global scale. Despite a plethora of preventive measures available, dental plaque, the precursor of dental caries and periodontal disease remains an enigma. Dental plaque is a sticky layer of bacteria that can harden into tartar, irritate the gums, resulting in gingivitis, a swollen tissue of the gum bleeding. If successfully carried away, dental plaque can be the most effective way to maintain good oral hygiene, minimize tooth decay, and encourage improved gingival health With the different methods used to maintain oral hygiene, tooth brushing is the most common way to eliminate plaque, prevent gingivitis, and even control dental caries as considered an effective way to remove plaque [1]. The importance of unregulated tooth brushing has often been challenged in the prevention of dental caries, however. Manual

dexterity and an individual's motivation are of vital importance in preserving oral hygiene, and successful plaque removal often depends on the type of toothbrush in addition to proper brushing technique. Craft and materials from Toothbrush have come a long way. In order to preserve good oral hygiene, several factors interact. The important role of dental plaque in the aetiology of gingivitis was shown, and that plaque removal can reverse this process. The nature of the toothbrush, the ability of the user to use the brush, the frequency of tooth brushing, the length of use are key factors in regulating the accumulation of plaques, thereby preventing gingivitis and/or periodontitis and decay [2].

The last two variables reflect the action of individual tooth brushing and are influenced by learning experience, motivation and manual skill and can, of course, be strengthened with good communication between dentists and patients. The first factor, however, represents technology enhancement and is influenced by the physical and mechanical properties of the heads and handles of the toothbrush bristles, shape, scale and morphometric. Manufacturers of toothbrushes strive to innovate in the production of brush heads. That will help to compensate for the process and time of non-ideal tooth brushing [3]. Tooth brushes with regular (straight) bristles and more advanced versions with angled bristles are the more basic designs, particularly aimed at helping to remove plaque from the teeth and along the gum line. The advanced toothbrushes, particularly from the gum lines and approximate surfaces, have the potential to remove larger amounts of plaque than traditional toothbrushes incorporating straight bristles.

On the other hand, if the design is more capable of successful plaque control has had contradictory findings. To remove plaque effectively, first toothbrushes were only produced and they had hard and then medium bristle softness. Soft bristles have recently been used in straight and criss-cross brushes, as hard and medium bristle hardness can have the ability to cause damage to soft tissue. Higher tooth brushes minimize plaque more effectively but are more stressful for teeth and gum, while the best balance between cleaning outcome and gum and tooth health was scored by using a medium to soft tooth brush with a longer cleaning time. Many dentists suggest using a soft toothbrush because tooth enamel can be damaged and gums can be irritated by rough bristled toothbrushes. No evidence-based guidelines for their use or renewal at a time when toothbrushes are over-the-counter items, nor the advantages of one form, the texture of the bristle over the others is available. There is so little scientific research published comparing the impact of soft, medium and hard bristle toothbrushes on oral hygiene. More research is required on this topic. In this parallel group, there therefore, the cross-sectional comparative analysis aims to bridge the gap by comparing the effectiveness of plaque control and the possible effects of the different toothbrush bristle textures on gingival damage.

Plaque is the thin layer, uncolored, contains bacteria, and attached to the teeth surface that can form anytime. If the plaque above combined with sugar which contains in consultation intake, it will form acidity. Within a prolonged period of time, the acidity found in the oral cavity will

kill hard tissue of teeth that will demineralize the email surface and form caries. Oral hygiene is a problem when it comes to orthodontic care. If there is no desire to carefully improve oral hygiene, the harm can also be worse and orthodontic treatment may be futile. Based on study, the plaque index was indicated before use. Prevention of periodontal disease and caries in the teeth must be based on good plaque management [4]. All kinds of plaque control, brushing is the most straightforward process, healthy, even, and efficient. A brand of toothbrush is the most significant factor affecting the brushing efficacy of plaque removal. In mechanical plaque control, the toothbrush is the most prominent instrument. Instruction for dentists to perform procedural oral procedures. Hygiene at home, particularly the type of toothbrush, is crucially necessary. Innovation has now been performed on a daily basis in this department, such as electric toothbrush, orthodontic toothbrush, oral irrigator, dental floss, and interdental toothbrush. Specially made toothbrushes with an inline brush shorter than the top and bottom side of the toothbrush head are recommended for the use of fixed orthodontics to help eliminate plaque round bracket [5].

Choosing suitable toothbrush has to be considered on an individual's need. Various things need to be taken into account in tooth brushing. Several experts have developed different methods of brushing teeth with a manual toothbrush that has been developed to accommodate each condition[6]. Circular bass adjustment is the type of tooth brushing that has made recommendations for set orthodontics. Based on the study that Winatha has done in 2014, the decrease in the plaque index for a user of a specially adapted orthodontic toothbrush is more effective than that used by a non-orthodontic manual toothbrush relative to a fixed orthodontic user. Current fixed orthodontic treatment, not only for orthodontic treatment but also part of a modern lifestyle, is currently used by many. Care of set specimens. Orthodontic is a treatment aimed at correcting malocclusion and raising awareness of dental care, the function of chewing, and aesthetics. There are different types of toothbrush as mentioned below:

1. *Proxabrush*: The interdental brush is slender, so it is only effective over a small surface area per stroke. These deficiencies require a specially designed brush that can easily and effectively remove plaque from the critical surfaces that connect residual ridges in the partially edentulous subject. These are known as proxabrush brushes. Its architecture enables access, even as far back as third molars, to proximal surfaces. The benefit of this brush is that it carries the head of the brush to the handle at right angles, making it convenient to apply to the distal and mesial surfaces of the posterior teeth.

2. *Soladey*: Due to a photo-electrochemical effect with the inclusion of a N-type semiconductor of Titanium dioxide (TiO) at the neck of the brush, a new toothbrush called Soladey has recently been developed and is claimed to have better plaque removal ability than traditional toothbrushes. It is conceivable that the reported photo catalytic property of the semiconductor could be involved in the plaque reduction observed in some way.

3. *Traveler's Toothbrush*: A toothbrush that holds toothpaste in a cylindrical handle contains the new traveler's toothbrush. The redesigned toothbrush still incorporates toothpaste inside its handle, but has an ergonomically formed handle that enables a comfortable grip when brushing. It uses a mechanical system consisting of a twist knob attached to a string and rubber gasket.

4. *HYG ionic toothbrush*: The HyG toothbrush has a 3-V lithium battery mounted on the handle under the metal band. The significant ionic exchange can enhance the removal of plaque along with the usual mechanical action of the bristles on the tooth and gingival surfaces. Teeth are usually charged negatively and plaque is charged positively. Attracting and binding to each other are opposite charges. Therefore, plaque is bound to the surface of the tooth by ionic bonding.

5. *Sulcus toothbrush*: The head is narrow, with just two rows of bristles. This can enable customers to when the back teeth are brushed, the 'gagging' reflex is resolved. It may also be used to clean gums and teeth in places which are difficult or difficult to access. Recently, a double-acting sulcus toothbrush has introduced two double rows of relatively long sulcus bristles that are spaced and mutually divergent at an angle of about 30. The benefit of angled bristles is that the upper and lower gum crevices can be cleaned simultaneously at any place in the mouth, resulting in a reduction of brushing time by about half.

6. *Suction toothbrush*: This was identified by nurse managers as a potential tool for managing. Daily dental plaque buildup and oral secretions during a mouth care training session. Yet, its effectiveness had not been investigated in the research [7].

II. CONCLUSION

Plaque control is one of the key elements of practice of dentistry. Mechanical plaque removal with tooth brushes remains the primary method of maintaining good oral hygiene. To maintain optimum dental health. The best method of controlling plaque accumulation is illustrated by tooth brushing and interproximal oral hygiene aids, though frequent tooth brushing can prevent gingivitis. In their ability to extract plaque from the estimated regions but show equality on the flat or on the flat, driven toothbrushes are superior to their manual counterparts. An oral hygiene training program has to be based on risk analysis and tailored to the individual needs by diagnosis, education and training, and needs-related oral hygiene.

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