

Modifying Oral hygiene Techniques to Improve the Oral Health of Alzheimer's/Dementia Patients with Limited Dexterity

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Abstract

The deterioration of cognitive functions, such as executive functioning, working memory, attention, aphasia, and apraxia, complicates the ability to perform oral care in people with dementia. Functional changes in dementia, such as a decline in hand grip strength and manual dexterity, can complicate oral care. This can lead to a higher occurrence of gingivitis and periodontitis. Periodontitis has been associated with multiple systemic health conditions besides AD, such as diabetes mellitus type II and cardiovascular disease. Maintaining good oral hygiene at home plays a quintessential part in reducing systemic health risks and maintaining good oral health. Improvement of oral hygiene and oral health of older people with dementia can be accomplished by administration of oral hygiene instruction (OHI) to formal and informal caregivers to assist and support the patient, the use of oral hygiene screening tools, and regular, consistent professional dental care.

Introduction

In 2022, it has been estimated that 6.5 million Americans age 65 and older have been diagnosed with Alzheimer's Disease/dementia (AD). Almost $\frac{3}{4}$ of this population are over the age of 75. It is also postulated that by 2050 the number of those living with the disease will balloon to possibly over 12 million people without significant medical advancement to cure or curtail the disease's progression in the US, and to 152 million worldwide [1]. The majority of aid provided to older adults living with this condition comes from family, friends, or other caregivers who do not receive payment [2].

Emerging studies also point towards a link between poor oral health and Alzheimer's/dementia. The inflammatory disease periodontitis caused by principal microbes such as *P. Gingivalis* may play a part in AD progression [3]. Although research has begun to show evidence of a possible connection between periodontitis and the presence of dementia, a concise description of the relationship between the two is still unknown [4].

When combined with the direct correlation between poor oral hygiene and tooth decay, infection, and loss, this further highlights the importance of oral hygiene in this patient population. Demonstrating modified oral hygiene techniques and introduction of supplemental oral hygiene tools that can significantly improve the patient's oral health and overall health should be a goal for all dental healthcare providers to achieve while in their care. If the patient living with AD can no longer effectively brush and floss their dentition through traditional means, modifications should be utilized to improve performance and preserve independence. If the patient can no longer execute effective oral hygiene even with modifications, then the caregiver should be given instructions and appropriate modification suggestions to optimize the oral care regimen performed at home. Raising awareness of OHI modifications to dental healthcare practitioners can help in the fight to maintain oral health in patients with AD [5].

Methods

There are a variety of tools available to recommend to patients to improve their oral home care regimen. The recommendation should be based on the specific limitations of the patient. Depending on the physical ability of the patient, the caregiver may need instruction as well to either assist in daily oral hygiene activities, or take them over completely.

Prior to the initiation of any examination or treatment, the patient must have the consent of their legal guardian if guardianship is in place. In this instance, the patient may no longer be able to make decisions about their healthcare, and cannot consent to treatment alone. Documentation should be presented at the initial appointment, and guardian should be present or contacted to give consent to any treatment. Documentation should be kept in the patient's secured chart/record. If there is ever any doubt of whether the patient should be able to make treatment decisions alone, a medical consultation with the patient's physician who can aid in that determination is a key [6].

When the problem is poor grip strength, a number of modifications can be incorporated to improve the patient's ability to perform oral hygiene at home. There are a number of inexpensive modified silicone or rubber-based grips for purchase that serve to increase the diameter of the toothbrush handle, making it easier for patient to grasp and hold during brushing. Alternatively, a small hand towel wrapped around the toothbrush handle and secured with rubber bands can also work. If these solutions are not effective, a 3D printed grip can also be fabricated from a functional impression of the patient's hand.

If the patient is experiencing issues with dexterity, it may be difficult for the patient to execute the fine motor skills needed to properly brush, and the patient may tire and become unable to brush effectively for the prescribed amount of time. Introduction of an electric toothbrush may be the answer to improve home care. Other tools that can be considered are a modified grip that would extend the toothbrush handle so the patient does not need to lift arm into an uncomfortable position for

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a prolonged period of time. A three-sided toothbrush can also be incorporated into the patient's regimen. Since the buccal, occlusal, and lingual surfaces can be cleansed simultaneously, it reduces the amount of motion the patient needs to execute in order achieve proper plaque removal. A more recent entry in the toothbrush market is the u-shaped toothbrush. It requires a very small range of motion to operate, but studies have indicated that they are not effective at removing dental plaque, often citing that the silicone bristles were likely too short to be an effective plaque removal tool [7].

Flossing may also become more difficult to execute as manual dexterity diminishes. It can become very challenging to do consistently, even for the caregiver if using traditional flossing techniques. Without it, we know oral health is difficult to achieve and maintain, increasing the likelihood of caries and periodontal disease progression, especially in the molar areas [8]. Utilization of a flosser with a toothbrush-like handle has advantages. It allows the patient to have a modifiable grip added so that independence in this function can be maintained. Patients may find this flosser easier to use than traditional floss, which may also increase compliance. Water flossers can also be used; it has been shown to be as effective as conventional flossing in plaque removal [9].

If the patient is showing signs of forgetfulness as the reason for infrequent brushing, memory aids can be incorporated into the patient's daily routine to improve compliance. Something as simple as a memory board or gentle, consistent reminders from a caregiver can improve compliance.

If the patient no longer has the ability to brush and floss due to advanced disease or severe limitations, the caregiver becomes pivotal in maintaining adequate home oral care. Training the caregiver in how and when to put in and take out any dental appliances such as partials or dentures, as well as instruction on cleaning and storing these appliances when not in use at bedtime. Rinsing with traditional mouthwash can put the patient at risk for aspiration in patients with advanced AD [10]. Use of mouthwash strips enables the patient to utilize this product in a safer way.

Brushing can be a challenge, even with instruction. The caregiver has limited vision and often cannot see how effective their brushing technique is in the posterior region. Use of a three-sided toothbrush can make the job of brushing much easier to execute than using a traditional toothbrush. The head is often smaller and easier to place in the posterior areas for more effective plaque removal [11-16]. Visual confirmation of toothbrush head is not critical, because the toothbrush head can be placed to follow the patient's natural plane of occlusion in order to engage all surfaces with one motion. Training in the utilization of flossers with longer toothbrush like handles eliminates the need for the caregiver to place fingers inside of the patient's mouth, thus preventing any accidental bites during the act of flossing. Caregivers can also be made aware to contact the dental care provider if they see any obvious dental issues. (i.e. broken fillings, sores, swelling, patient report of pain, discomfort, sensitivity, poorly fitting dental appliances) (Figure 1).

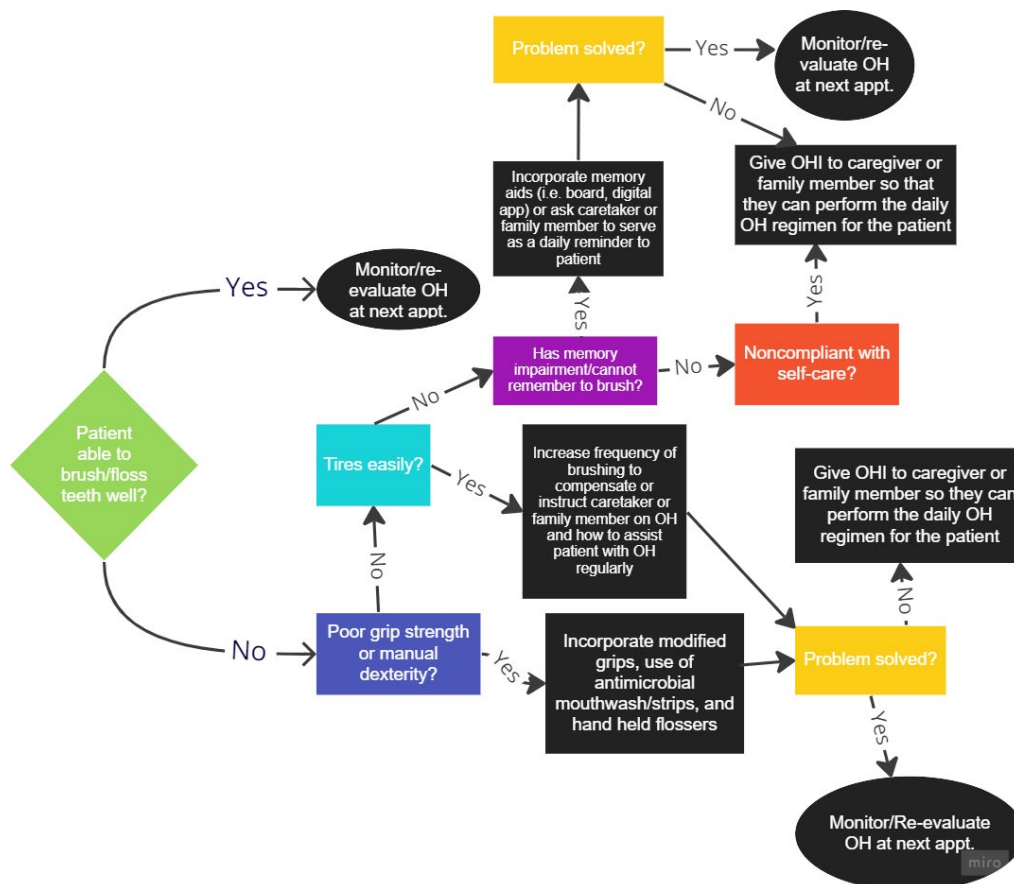


Figure 1: Workflow for determination of OHI modifications.

Conclusion

Devising a systematic system to evaluate the need for OH modifications that fit the scope of the dental practice can be instrumental part of ensuring that the OHI fits the patient's needs. It also allows for consistent review and additional modifications when needed to continually support the patient in their quest to maintain good oral health.

Discussion

In order for it to work at its highest efficacy, oral hygiene instruction must be modified to fit the needs of the patient. When traditional instruction no longer yields oral health, the reason for the change must be identified. When there are multiple reasons for the change, each one should be addressed in order to achieve positive and lasting change. Alzheimer's/dementia are a progressive disease, so a protocol should be in place to address and redress issues in oral hygiene and health as they arise.

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