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Utilizing Dental Hygienists to Improve Health Outcomes in Long-Term Care

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Abstract: Poor oral health practices contribute to negative health outcomes for residents of long-term care facilities. The abundance of current information on the oral-systemic connection underscores the need for improved oral hygiene among all citizens but specifically for older adults, who face challenges for self-care due to sensory, mobility, endurance and cognitive deficits. Dental hygienists are oral disease prevention specialists and are trained to perform dental procedures that significantly improve a person's oral health. Dental hygienists are legally permitted to provide many oral healthcare services to residents of long-term care facilities independent of dentist supervision or in collaborative agreements with dentists. Models of collaboration between long-term care facilities and dental hygienists have proven efficacious in enhancing overall health outcomes for residents.

Key words: oral health, dental hygiene, dentistry, teeth, periodontitis

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In 2010, 40 million people aged 65 years and older accounted for 13% of the US population. That number is expected to jump to 72 million people (19%) by 2030.¹ Furthermore, the number of people aged 85 years and older—who are most likely to need long-term care (LTC)—is projected to grow from 5.5 million in 2010 to 8.7 million in 2030, and 19 million by 2050.

The prevalence of poor oral health in residents of LTC facilities in North America is startling. A recent study published in the *Journal of the Canadian Dental Association* found that 51% of residents had untreated dental decay and 67% had moderate to severe periodontal disease.² According to a report issued by the Kansas Bureau of Oral Health, 29% of LTC residents had substantial oral debris on at least two-thirds of their teeth, and 15% had natural teeth that were loose.³ One-fourth of US adults aged 65 or older have lost all of their teeth.⁴ According to a recent study, 61% of participants scored “fair” or “poor” in the Comprehensive Measure of Oral Health Knowledge questionnaire.⁵ Oral health literacy among people over the age of 65 contributes significantly to the prevalence of oral disease in this patient population, having grown up in a time when little was known about the pathology of oral diseases.

The mouth is a window into the overall health of a person. The association between poor oral health and several systemic diseases has received much attention.⁶ In 2010, the Department of Health and Human Services launched its 10-year agenda for improving the health of Americans, Healthy People 2020. While the agenda contains 42 topic areas with more than 1200 objectives, a condensed set of 26 objectives, called the Leading Health Indicators, have been selected to represent those topics that were deemed high-priority health issues. Of these health issues, 17 relate directly to oral health, and a number of others reflect the connection between oral disease and other chronic illnesses

such as diabetes, stroke, cancer, and heart disease.⁷ Additionally—for the first time in three decades—Oral Health was added as a Leading Health Indicator. This designation was met with great appreciation by oral healthcare providers, who have long realized the importance of oral hygiene. Research has shown direct causation between poor oral hygiene and negative health outcomes such as pneumonia or respiratory tract infection among elderly people in nursing homes or hospitals.^{8,9}

Another benefit of maintaining proper oral hygiene among residents in LCT facilities is that signs of systemic infection or disease are visible in the oral cavity before they are visible elsewhere in the body. For example, gingivitis (edematous, bleeding “gums”) signals the body’s launch of an inflammatory response. Striations in the buccal mucosa (the tissue lining the inside of the mouth) signal lichen planus, an autoimmune disorder also classified as an inflammatory disease; anemia is often manifested through density changes and redness in the tongue.

In assisted living and LTC facilities, the contributions that the dental hygienist can make toward reducing the incidence of oral disease have been well documented.

Daily oral hygiene practices can easily be supervised and/or performed by nurses and other caregivers. In fact, the practice of effective plaque removal via the use of a toothbrush (manual or power) and interdental aid (ie, floss, toothpicks, waterpicks) is of utmost importance in the prevention of disease and easy to do. However, facility administrators’ perceptions of the adequacy of oral health policy and practice are not consistent with dental professional standards.¹⁰ Additionally, both nurses and caregivers have been found to be lacking in the formal training required to provide adequate oral hygiene practices for clients in LTC facilities.¹¹ Programs to provide training to these personnel so that they may meet the oral health needs of clients has not been helpful. In their systematic review, Wang and associates reported that there is “limited evidence that oral health education for caregivers may be effective for improving the oral health of the elderly.”¹² Skilled, educated oral health professionals are needed.

The availability of oral healthcare to the LTC population is limited, partially because administrators are under the misguided notion that only a dentist can provide oral

healthcare services to their residents.¹⁰ Although the topics of poor oral healthcare in LTC facilities and its deleterious consequences for residents have been explored, interventions to address these problems have been few. This is partly due to facility administrators’ and caregivers’ lack of knowledge of oral healthcare provider models, such as a dental hygienist and other midlevel service providers. Additionally, some healthcare practitioners report a disconnect between feeling responsible, yet somewhat incapable and/or ill-prepared, to provide adequate oral care for their patients.¹³

Alternatively, many options for utilizing dental hygienists in LTC facilities are available. In assisted living and LTC facilities, the contributions that the dental hygienist can make toward reducing the incidence of oral disease and, consequently, the incidence of systemic disease have been well documented.¹⁰ Dental hygienists are trained to identify unhealthy oral tissue and make proper referrals to healthcare professionals when necessary.

Oral Disease

The two major oral diseases affecting the oral cavity involve the teeth (dental) and the supporting structures (periodontium, which includes the bone). A third, oral and pharyngeal cancer, is rising in prevalence and currently affecting over 40,000 Americans.¹⁴ Oral and pharyngeal cancers require treatment by medical physicians and cannot be treated by dentists or dental hygienists. However, dentists and dental hygienists are trained to identify lesions that are abnormal and require further observation.

Dental Disease

Although the prevalence of dental caries (cavities) has significantly decreased for most Americans over the past four decades, the National Institute of Dental and Craniofacial Research reports that 48% of adults (over 20 years of age) have untreated decay.¹⁵ In older patient populations, this is partially due to an inability to perform oral hygiene activities as a result of physical/mental limitations. Dental caries is an infectious and transmissible disease that is multifactorial, involving primary and secondary modifying factors. Caries is caused by the metabolism of fermentable carbohydrates by bacteria. Normal salivary pH ranges from 6.2 to 7.0. Acids produced during the metabolism of fermentable carbohydrates lower the pH of saliva. Enamel dissolves (decays) at pH levels in the range of 4.5 to 5.5. Other tooth structures, the dentin and cementum, dissolve at pH levels of ~6.0 or higher due to a decreased number of hydroxyapatite crystals.

Once caries spreads throughout the dentition, it can cause pain and requires restorative services that only a dentist and dental therapist can provide. However, in the early stages, the demineralization process (caries process) can be reversed by incorporating topical fluoride applications

that facilitate the remineralization of enamel by supplying calcium and phosphate minerals.¹⁶ The most recent scientific research supports a paradigm shift from the traditional surgical-restorative approach to one of risk assessment for the prevention of decay. Caries Management by Risk Assessment (CAMBRA) represents an evidence-based, best practices approach that supports the dental hygiene model of oral care.¹⁷

Periodontal Disease

The periodontium consists of the hard and soft tissues that help to anchor, support, and protect the teeth. These tissues include the gingiva (the “gums”), alveolar bone (“jawbone”), cementum (material which covers the root surface of a tooth), and periodontal ligament (connective tissue attached to the cementum). The periodontium responds to biofilm formation (formed by the metabolism of food bacteria in dental plaque) by the process of inflammation. When biofilm is not removed properly (and daily), byproducts and toxins such as lipopolysaccharides (LPS) are released which cause the immune system to respond by sending in B and T lymphocytes, macrophages, and plasma cells. These interact with LPS to produce cytokines and inflammatory mediators such as IL-1, prostaglandin E2, tumor necrosis factor, and matrix metalloproteinases. It is this inflammatory response that is responsible for the tissue destruction seen in periodontal disease. Often, this destruction is thought to be directly related to the aging process actually results from disease or lifestyle influences. Thus, the prevalence and severity of periodontal disease is multifactorial, with poor oral hygiene being one of the most significant risk factors.¹⁸

Shammari and associates¹⁹ report that more teeth are lost due to periodontal disease than for any other reason. Additionally, it is the inflammatory response initiated by pathogens in plaque that contribute to adverse systemic effects. Daily mechanical removal of pathogenic bacteria that accumulate on the teeth and periodontal structures is the only effective means of preventing periodontal disease. This is because pathogenic bacteria can create biofilms within minutes following a professional prophylaxis. Oral biofilms are resistant to antimicrobial agents, antibiotic therapies, and host defense mechanisms.²⁰ Although many over-the-counter and prescription antimicrobial products are useful as adjuncts, without mechanically removing the biofilm (for example, with tooth floss or toothbrush), they are ineffective regardless of their potency.

The Role of Dental Hygienists in Treatment of Oral Disease

Dental hygienists' training has long focused on the efficacy of plaque removal and dietary control as the means of preventing oral disease. The services that are most effective in

preventing oral disease fall within dental hygienists' normal scope of practice—professional prophylaxis, the application of fluoride, and, most importantly, an in-depth, comprehensive knowledge of plaque removal techniques and aids. As Ettinger states, “...the dental hygienist can meet the periodontal treatment needs of the majority of older adults by carrying out simple scaling and cleaning procedures.”²¹ The traditional method of treating dental caries (surgical-restorative performed by dentists) is currently seen as ineffective in the management of dental decay. Hurlbutt and Young¹⁴ state, “Oral healthcare providers need to acknowledge that the procedure-oriented practice of simply removing and restoring the carious lesion has not resulted in successful resolution of caries disease across a lifetime.” Modern caries management involves the application of evidence-based preventive therapies that are patient-centered and non-invasive.²²

The dental hygiene scope of practice has seen unprecedented expansion in the past 20 years, partly due to efforts to increase access to dental care among vulnerable populations.

The profession of dental hygiene was founded in the early 20th century by Dr. Alfred Fones, who believed that tooth loss, which was very common during that time, could be prevented by controlling the amount of plaque on their teeth. He envisioned dental hygienists working to advance public oral health,²³ and Dental Public Health (also known as Community Health) remains an important part of the curriculum of every dental hygiene program in the United States. The American Dental Hygienists' Association, the representative professional organization of dental hygienists, reminds hygienists in its Code of Ethics to increase public awareness and understanding of oral health practices, promote access to dental hygiene services for all, and recognize and uphold an obligation to provide *pro bono* service. The dental hygiene scope of practice has seen unprecedented expansion in the past 20 years, partly due to efforts to increase access to dental care among vulnerable populations. Organizations such as Pew Charitable Trusts²⁴ and The US Department of Health and Human Services, Health Resources and Services Administration,²⁵ among others, recognize the positive impact dental hygienists can make in closing the gap of these oral health disparities. The Affordable Care Act funds provisions that employ “alternative dental health providers,” such as expanded

function dental hygienists, in order to increase opportunities for dental care in underserved communities.

Effective Collaborations

The autonomy of dental hygienists is governed individually by each state. Each state has a local component of the American Dental Hygienists Association which can assist any facility administrator in identifying the scope of practice for dental hygienists in their state.²⁶ Many local components have created their own programs to assist their members in fostering collaborations with LTC facilities, understanding the great need for oral health instruction and intervention. For example, The Pennsylvania Dental Hygienists' Association has compiled a kit that hygienists can utilize to give a basic oral health presentation to nursing home staff.²⁷ In Colorado, where dental hygienists can practice independently without any supervision by a dentist, entrepreneurial dental hygienists who own their own businesses travel to clients' residences to provide oral healthcare.²⁸ In New York, dental hygienists can provide oral healthcare, under a collaborative agreement with a dentist, to residents in LTC facilities that operate with a certificate granted under Article 28 of the New York State Public Health Law.²⁹ The Maryland State Dental Association Foundation has developed a pilot program to train 15 teams of dentists, hygienists, and dental assistants to provide care for nursing home residents, thanks to a \$25,000 grant from the Maryland Department of Health and Mental Hygiene's Office of Oral Health.³⁰

Conclusion

The high prevalence of oral disease in older adults results from a variety of factors including poor oral hygiene practices, limited oral healthcare services, and low oral health literacy. Poor oral health in the elderly is associated with malnutrition, cognitive decline, higher risk for cardiovascular disease, diabetes, stroke, respiratory diseases, osteoporosis, and cancer. Effective methods that improve the oral health of elders are warranted. Caregivers of clients in LTC facilities have been found to be lacking in knowledge regarding proper oral hygiene practices. Support for interprofessional work of healthcare providers and dental hygienists can open a door for innovative practice that optimizes oral healthcare of LTC facility residents. Dental hygienists, as disease prevention specialists, are the oral health providers who are in the best position to provide oral health instruction and preventive treatment to LTC facility staff and clients. ♦

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