Vol. 14, No.4 October-December 2022

A SYSTEMATIC REVIEW OF ORAL FRAILTY

Dana Gabriela Budală[1], Zinovia Surlari [2*], Roxana Ionela Vasluianu[1†], Monica Mihaela Scutariu[1†], Dragoș Ioan Virvescu[2*], Carina Balcoș[3], Mihaela Scurtu[2]

[1]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Implantology, Removable Dentures, Dental Technology
[2]"Gr.T.Popa"U.M.Ph. -Iași, Romania, Faculty of Dentistry, Department of Odontology-Periodontology, Fixed Prostheses
[3]"Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Implantology, Removable Dentures, Dental Technology

[*] Corresponding author; Surlari zinovia : zinaamaseluta@yahoo.com
Dragoș Virvescu :dragosvirvescu@yahoo.com
† contribution equal with first author

ABSTRACT

Introduction. These complex physiological age-related changes are not yet fully understood but are thought to be related to the lifelong accumulation of impairments at molecular, tissue, and organ level and over the next decade, the gerodontologist might have a greater effect on the prevention and maintenance of oral and general health status, and need to expend less effort on treatment

Key words: *oral frailty, gerondontology, oral health, elderly, etc.*

INTRODUCTION.

The number of old people living in industrialized nations has seen a significant rise over the course of the past few decades, and it is anticipated that this trend will continue into the next few decades as well. This shift in population will have significant repercussions for the services provided by health care providers. There will be an increase in the number of senior individuals who are feeble, and as a result, there will be an increase in the number of elderly persons who require a greater share of medical services [1].

Those who are unable to carry out their daily activities without assistance typically require the assistance of domiciliary care services or are placed in residential care facilities [2,3].

The number of people who are edentulous has decreased over the past few decades as a direct result of improvements in oral health care and treatment [4]. Additionally, the percentage of adults who keep their natural teeth until late in life has significantly increased as a direct result of these advancements. In addition, an ever-increasing percentage of older adults who are dentate have tooth wear, oral implants, and highly developed restorations and prostheses that are supported by their teeth or implants. As a result, individuals have an ongoing requirement for dental treatment that is both preventative and therapeutic in nature.

The complexity of oral health status, systemic disorders, and the use of various drugs make (frail) elderly persons more prone to oral difficulties than younger age groups, and this vulnerability is amplified in those who have cognitive impairment [5,6].

Concerns about the health of the elderly population have recently come to the forefront of discussions within both the government and the medical community. This is due to the fact that older people are more likely to experience a greater number of adverse health effects than people of other

age groups[7,8].

In most cases, becoming older is accompanied by a decline in both the body's physiological strength and its overall health. Chronic illnesses, musculoskeletal disorders, impairment and functioning, mental illness, comorbidities, and accidental injuries are the categories that may be used to classify the health problems that are experienced by the aged [9-11].

LITERATURE REVIEW

11% of older people suffer significant morbidity, whereas 8% of senior people have short-term morbidity [12].Research has shown that older women are more likely to suffer from both acute and chronic forms of morbidity.

According to the findings of another survey that was carried out in India [5], 62.1% of senior citizens did not receive healthcare services.

As a result, there is an immediate requirement to gain an understanding of the process of health care utilization as well as the barriers related to the accessibility and affordability of health care services in order to meet the growing demands of the elderly population and to encourage healthy aging.

Given what has been discussed above, it is clear that concerns over the health of the elderly population have been a source of worry for some time now. Aging itself is associated with a number of different health difficulties [13,14].

The process of aging is a natural one. Alterations in the tissues and functions of the mouth cavity are some of the physiological effects of becoming older. As a consequence of this, the bone density of the jaws is diminished as a result of the loss of calcified tissue and the variations in the structure of the collagen. The dental pulp gets progressively calcified, and as a result, its size decreases[15,16].

Along with it, the blood and nerve supply network in the pulp also decreases in size. Alterations in taste perception take place, which may be related to changes in taste buds, their receptors, the central nervous system, or dietary habits. Oral sensory function decreases as a result of these changes in taste perception [17,18].

This narrative review reports on the consequences of having poor oral health and its impact on the general health of frail elderly people. It also provides an overview of the important enabling and disabling factors regarding the provision of adequate oral health care to this target group [23].

From the viewpoint of a single item, the mouth cavity is responsible for a number of important tasks, including chewing, swallowing, and communicating with others. Therefore, maintaining good dental health is a crucial component of one's overall health, as well as one's level of life satisfaction, quality of life, and perspective of oneself.

It is highly frequent for older persons to have problems with their oral functions, and this negative aspect of aging can interact in a roundabout way with various frailty domains according to the multiple paths it uses.

An obvious manifestation of this connection is the functional oral deterioration that comes with advancing age. This condition is characterized by improper dental hygiene, inadequate dental prostheses, and dietary deficiencies, all of which contribute to an increased likelihood of nutritional frailty. [24-27].

There have been a number of studies that have discussed the correlation between oral health and frailty. The findings of these studies have led researchers to the conclusion that oral health issues in later age might be potential exposure risk factors for a frailty syndrome.

Additionally, a decreased capacity to chew or swallow,[13] oral motor skills,[14] degeneration of hard and soft oral tissues[15,16]and pain[17] may combine with the state of oral frailty. It has also been hypothesized that there is a link between frailty and poor oral health, namely having a limited number of teeth that are still present and having a reduced oral function.

There are a few different avenues that have been explored in order to understand the connection between dental health and frailty. The first hypothesis that makes sense is that there is some sort of interaction between poor dental health and progression to frailty. Because of this, nutritional status may act as a mediator between the link between oral health and frailty, which may result in difficulty eating. It has been previously observed that there is a cross-sectional connection between oral fragility and malnutrition among older persons who live in community settings.

Oral fragility, which may be described as the accumulation of oral health impairments, has started to develop as a concept over the course of the past five years [8,10].

Oral frailty was defined by the Japan Dental Association in 2020 as a series of processes that lead to age-associated changes in various oral conditions (such as the number of remaining teeth, oral hygiene, and oral dysfunction), along with a decreased interest in oral health and reduced physical and cognitive functions. This definition was published in the year 2020.

The inflammatory pathway is another another potential connection between good dental health and reduced physical strength. It has been hypothesized that there is a connection between inflammation and frailty, and periodontal disease has been linked to an increase in the incidence of inflammatory markers. On the other hand, Hakeem and colleagues came to an equivocal conclusion on the connection between periodontal health and frailty in their research.

When compared to the total number of teeth, periodontal disease appears to have a less significant correlation with frailty, according to the findings of the National Health and Nutrition Examination Surveys. However, a study that looked at persons with complete or partial dentition (meaning they had between 1 and 32 teeth) found that those with severe periodontitis had a 2.1-times greater chance of developing frailty over the course of three years than people who did not have severe periodontitis.

nutrition, food intake, and the selection of food intakes based on mouth health (eg, remaining teeth).

According to the researchers dietary status may be a significant risk factor in the

It's possible that periodontal disease might have a role in preventing frailty. It is possible that the relationship between oral health and degree of frailty is mediated by tooth loss brought on by periodontal disease, as well as the impact this loss has on dietary choices and nutritional status [28-30].

In addition, periodontal disease is usually caused by bacteria in the mouth invading the gum tissue that surrounds the teeth. In the past five years, there has been a growing interest in the research community in the potential function that oral microbiota could have in the microbiota–gut–brain axis. There is a dynamic equilibrium that exists between the bacteria that are found in dental plaque and the innate defense system of the host; any disruption of this equilibrium can result in dental caries (also known as tooth decay) and periodontal disease [31].

It is recommended that bigger longitudinal population-based studies be conducted in order to investigate the possible role that severe periodontal disease plays in the onset of frailty.

The connection between having poor dental health and being feeble may be mediated by a number of different psychological and intermediary variables, all of which need to be investigated[32].

For instance, the social repercussions of dental health degradation and its influence on quality of life, given that loneliness might potentially contribute to the development of frailty as a contributing factor.

In addition, late-life depression might have an impact not only on frailty but also on dental health condition. A decrease in salivary flow, rampant dental decay, advanced periodontal disease, and oral dysesthesias have all been linked to

depression in people over the age of 67 and in late-life [33-35].

This depression has also been linked to a lack of interest in practicing good oral hygiene and eating a cariogenic diet.

Another possible connection between oral health and frailty involves the impact that socioeconomic variables have in both frailty and dental health. [Cause and effect] When compared to older persons with a higher level of education, those with a lower level of education were more frail, and persistent socioeconomic inequalities have been observed for a variety of oral health variables.

Tanaka and colleagues[12] developed the first and only operational definition of oral frailty. This definition was based on the identification of six aspects of oral health, including the number of teeth, masticatory function, difficulty chewing, oral diadochokinesis, tongue pressure, and difficulty swallowing.

Currently, there is only one operational definition of oral frailty. Oral frailty was defined as having a bad status in three or more of these six measures of oral health, while oral pre-frail status was defined as having an oral health status that was poor in two or fewer of these measures.

This new frailty phenotype was found to be significantly linked to an increased risk of physical frailty, sarcopenia, disability, and death from any cause. At least one other independent study that used the same criteria as this one has shown that there is a connection between oral and physical frailty. These findings have been partially confirmed by both of these studies.

Oral fragility can also be defined as difficulties chewing combined with age-related alterations in swallowing, according to another alternative description (presbyphagia) [9] In the area of impairment of oral motor abilities, the masticatory function was the third most impaired predictor of frailty.

The difficulty in swallowing was the final predictor of frailty measures, and it was placed in the group of diseases associated with chewing, swallowing, and saliva. A new term, "eating capability," has been coined by Laguna and colleagues to describe various quantifiable endogenous factors in the human body that are associated with the process of swallowing and eating. This term takes into consideration the social, psychological, and biological factors that are associated with the process..

CONCLUSIONS

The presence of poor oral health may be an indicator of the beginning of frailty. Maintaining or improving oral function, and thereby reducing the impact of oral frailty, can be associated with an improved nutritional and functional status in people who are older. This association may also be implicated in a reduction in the risk of mortality and other adverse health-related outcomes, such as dementia and Alzheimer's disease. In point of fact, the implications for oral health may be broken down into two categories: research outlooks, which would dig into the underlying processes connecting oral health status and frailty, and clinical implications.

REFERENCES:

1. Frailty: implications for clinical practice and public health. Lancet 2019; 394: 1365–75.
2. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001; 56: M146–56

3. Mitnitski AB, Mogilner AJ, Rockwood K. Accumulation of deficits as a proxy measure of aging. ScientificWorldJournal 2001; 1: 323–36.
4. O'Caoimh R, Sezgin D, O'Donovan MR, et al. Prevalence of frailty in 62 countries across the world: a systematic review and metaanalysis of population-level studies. Age Ageing 2021; 50: 96–104.
5. Castellana F, Lampignano L, Bortone I, et al. Physical frailty, multimorbidity, and all-cause mortality in an older population from southern Italy: results from the Salus in Apulia Study. J Am Med Dir Assoc 2021; 22: 598–605.
6. Sardone R, Castellana F, Bortone I, et al. Relationship between central and peripheral age-related hearing loss and different frailty phenotypes in an older population of southern Italy. JAMA Otolaryngol Head Neck Surg 2021; 147: 561–7
7. Terry DA, Snow SR, McLaren EA. Contemporary dental photography: selection and
8. Bolat M,Bosînceanu DG, Sandu IG, Bosînceanu DN, Surlari Z, Balcoș C, Solomon O. Vițalariu A. Comparative Study on the Degree of Bacterial Biofilm Formation of Dental Bridges Made from Three Types of Materials.Mater.Plastice.2019;5(1):144-147.
9. Bosînceanu DN, Bosînceanu DG, Bolat M, Baciu R, Forna N. Flexible acrylate versus classic-viable therapeutical solution. Romanian Journal of Oral Rehab.2016;8(1):7-11
10. Lozupone M, Panza F. A multidimensional frailty approach in predicting and preventing dementia. Lancet Healthy Longev 2020; 1: e49–50.
11. Zupo R, Castellana F, Bortone I, et al. Nutritional domains in frailty tools: working towards an operational definition of nutritional frailty. Ageing Res Rev 2020; 64: 101148.
12. Morley JE. Oral frailty. J Nutr Health Aging 2020; 24: 683–84.
13. Watanabe Y, Okada K, Kondo M, Matsushita T, Nakazawa S, Yamazaki Y. Oral health for achieving longevity. Geriatr Gerontol Int 2020; 20: 526–38.
14. Dibello V, Lozupone M, Manfredini D, et al. Oral frailty and neurodegeneration in Alzheimer's disease. Neural Regen Res 2021; 16: 2149–53.
15. Tanaka T, Takahashi K, Hirano H, et al. Oral frailty as a risk factor for physical frailty and mortality in community-dwelling elderly. J Gerontol A Biol Sci Med Sci 2018; 73: 1661–67.
16. Iwasaki M, Motokawa K, Watanabe Y, et al. Association between oral frailty and nutritional status among community-dwelling older adults: the Takashimadaira study. J Nutr Health Aging 2020; 24: 1003–10.
17. Matsuo K, Kito N, Ogawa K, et al. Improvement of oral hypofunction by a comprehensive oral and physical exercise programme including textured lunch gatherings. J Oral Rehabil 2021; 48: 411–21.
18. Hakeem FF, Bernabé E, Fadel HT, Sabbah W. Association between oral health and frailty among older adults in Madinah, Saudi Arabia: a cross-sectional study. J Nutr Health Aging 2020; 24: 975–80.
19. Hasegawa Y, Sakuramoto A, Sugita H, et al. Relationship between oral environment and frailty among older adults dwelling in a rural Japanese community: a cross-sectional observational study. BMC Oral Health 2019; 19: 23
20. Bakker MH, Vissink A, Spoorenberg SLW, Wynia K, Visser A. Self-reported oral health problems and the ability to organize dental care of community-dwelling elderly aged ≥75years. BMC Oral Health 2020; 20: 185.
21. Tôrres LH, Tellez M, Hilgert JB, Hugo FN, de Sousa MD, Ismail AI. Frailty, frailty components, and oral health: a systematic review. J Am Geriatr Soc 2015; 63: 2555–62.
22. Hakeem FF, Bernabé E, Sabbah W. Association between oral health and frailty: a systematic review of longitudinal studies. Gerodontology 2019; 36: 205–15.
23. Moher D, Liberati A, Tetzlaff J, Altman DG, Group PRISMA. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med 2009; 6: e1000097.

24. National Institutes of Health. Study quality assessment tools: quality assessment tool for observational cohort and cross-sectional studies. 2018. https://www.nhlbi.nih.gov/health-topics/studyquality-assessment-tools (accessed June 7, 2021).
25. Atkins D, Best D, Briss PA, et al. Grading quality of evidence and strength of recommendations. BMJ 2004; 328: 1490.
26. Castrejón-Pérez RC, Borges-Yáñez SA, Gutiérrez-Robledo LM, Avila-Funes JA. Oral health conditions and frailty in Mexican community-dwelling elderly: a cross sectional analysis. BMC Public Health 2012; 12: 773.
27. de Andrade FB, Lebrão ML, Santos JL, Duarte YA. Relationship between oral health and frailty in community-dwelling elderly individuals in Brazil. J Am Geriatr Soc 2013; 61: 809–14.
28. Komulainen K, Ylöstalo P, Syrjälä AM, et al. Determinants for preventive oral health care need among community-dwelling older people: a population-based study. Spec Care Dentist 2014; 34: 19–26.
29. Hoeksema AR, Spoorenberg S, Peters LL, et al. Elderly with remaining teeth report less frailty and better quality of life than edentulous elderly: a cross-sectional study. Oral Dis 2017; 23: 526–36.
30. Kamdem B, Seematter-Bagnoud L, Botrugno F, Santos-Eggimann B. Relationship between oral health and Fried's frailty criteria in community-dwelling older persons. BMC Geriatr 2017; 17: 174.
31. Rapp L, Sourdet S, Vellas B, Lacoste-Ferré MH. Oral health and the frail elderly. J Frailty Aging 2017; 6: 154–60.
32. Watanabe Y, Hirano H, Arai H, et al. Relationship between frailty and oral function in community-dwelling elderly adults. J Am Geriatr Soc 2017; 65: 66–76
33. Castrejón-Pérez RC, Jiménez-Corona A, Bernabé E, et al. Oral disease and 3-year incidence of frailty in Mexican older adults. J Gerontol A Biol Sci Med Sci 2017; 72: 951–57.
34. Okura M, Ogita M, Yamamoto M, Nakai T, Numata T, Arai H. Self-assessed kyphosis and chewing disorders predict disability and mortality in community-dwelling older adults. J Am Med Dir Assoc 2017; 18: 550-e1–e6.
35. Ewan VC, Reid WDK, Shirley M, Simpson AJ, Rushton SP, Wade WG. Oropharyngeal microbiota in frail older patients unaffected by time in hospital. Front Cell Infect Microbiol 2018; 8: 42.