

REVIEW ARTICLE

Prosthodontics in Healthy Ageing and Longevity Medicine: A Critical Narrative Review and Proposed Clinical Framework

Arpit Sikri¹, Jyotsana Sikri², Vaishali Kalra³, Rimple Gupta⁴

HOW TO CITE THIS ARTICLE:

Arpit Sikri, Jyotsana Sikri, Vaishali Kalra et. al, Prosthodontics in Healthy Ageing and Longevity Medicine: A Critical Narrative Review and Proposed Clinical Framework. Ind J Dent Educ. 2026; 19(2): 75-82.

ABSTRACT

Healthy ageing is increasingly defined by preservation of functional ability, independence, participation, and quality of life rather than by lifespan extension alone. Oral function is a potentially modifiable component of this trajectory, yet prosthodontic care is rarely discussed within broader longevity-oriented healthcare models. This critical narrative review examines the evidence linking oral functional impairment with nutrition, frailty, cognition, psychosocial participation, and quality of life, while distinguishing observational associations from evidence generated by prosthodontic interventions. A structured literature search was undertaken using PubMed/MEDLINE and supplementary searches of major biomedical databases and authoritative health-agency sources, with emphasis on systematic reviews, meta-analyses, longitudinal studies, clinical intervention studies, and policy documents published from 2000 to July 2026. The literature was thematically synthesized rather than quantitatively pooled because of substantial heterogeneity in populations, definitions of oral function, prosthetic interventions, and outcome measures. Contemporary evidence supports consistent associations between tooth loss/oral frailty and adverse nutritional and functional outcomes, while evidence that prosthodontic rehabilitation directly modifies cognition, frailty, or longevity remains limited and predominantly observational. Importantly, recent systematic reviews indicate that prosthetic rehabilitation may improve nutritional status and oral-health-related quality of life, but effects on dietary intake and systemic outcomes are less consistent. Based on this evidence,

AUTHOR'S AFFILIATION:

¹Assistant Professor, Department of Prosthodontics and Crown & Bridge, Punjab Government Dental College & Hospital, Amritsar, Punjab, India.

²Associate Professor & Post Graduate Teacher, Department of Prosthodontics, Crown & Bridge and Oral Implantology, Bhojia Dental College & Hospital, Solan, Himachal Pradesh, India.

³Consultant Prosthodontist, Indus Hospital, Chandigarh, Punjab, India.

⁴Reader, Department of Conservative Dentistry & Endodontics, Mahatma Gandhi Dental College & Hospital, Jaipur, Rajasthan, India.

CORRESPONDING AUTHOR:

Arpit Sikri, Assistant Professor, Department of Prosthodontics and Crown & Bridge, Punjab Government Dental College & Hospital, Amritsar, Punjab, India.

E-mail: arpitsikri@gmail.com

➤ Received: 12-08-2026 ➤ Accepted: 04-09-2026



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution NonCommercial 4.0 License (<http://www.creativecommons.org/licenses/by-nc/4.0/>) which permits non-Commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the Red Flower Publication and Open Access pages (<https://www.rfppl.co.in>)

a proposed Prosthodontic Healthspan Framework is introduced, positioning restoration of oral functional reserve as a potential upstream component of healthy-ageing care. The framework emphasizes risk identification, restoration of mastication and swallowing-related function, nutritional co-management, longitudinal maintenance, and patient-centred outcomes. Prosthodontics should therefore be viewed not as a proven longevity therapy, but as a potentially important component of multidisciplinary healthspan preservation requiring prospective interventional evaluation.

KEYWORDS

• Prosthodontics • Healthy Ageing • Longevity Medicine • Healthspan • Oral Frailty • Nutrition • Cognition • Frailty • Quality of Life

INTRODUCTION

Population ageing has shifted healthcare priorities from survival alone toward preservation of functional ability, independence, participation, and quality of life. The healthy-ageing agenda promoted by the World Health Organization (WHO) similarly emphasizes intrinsic capacity and functional ability across the life course. In parallel, longevity medicine has emerged as an evolving multidisciplinary approach concerned with delaying functional decline and optimizing healthspan. Although terminology and clinical models vary, common components include physical activity, nutrition, cardiometabolic risk reduction, preventive care, sleep, mental health, and social participation.

Oral health is increasingly recognized as part of this broader health agenda. WHO policy documents explicitly position oral health within universal health coverage and the noncommunicable-disease agenda, reflecting the fact that oral diseases affect eating, speaking, comfort, social participation, and general well-being.^{1,2} Nevertheless, the role of prosthodontics within healthy-ageing and longevity-oriented care remains insufficiently articulated.

The conventional prosthodontic endpoint is often described in terms of replacement of missing teeth, restoration of mastication, aesthetics, phonetics, implant survival, or prosthesis longevity. These outcomes remain essential, but they may not fully capture the consequences of restored oral function in older adults. Tooth loss and oral functional impairment can coexist with restricted dietary diversity, malnutrition, oral frailty, physical frailty, social withdrawal, and cognitive vulnerability.³⁻⁸ Conversely, the presence of a prosthesis does not automatically normalize

chewing performance, dietary intake, cognition, or systemic health. The clinically important question is therefore not whether oral health is 'associated' with healthy ageing, but under what circumstances restoration of oral function produces meaningful downstream benefits and how such benefits can be incorporated into multidisciplinary care.

The purpose of this review is consequently threefold: (1) to critically synthesize contemporary evidence connecting oral functional impairment with domains relevant to healthy ageing; (2) to distinguish evidence for association from evidence supporting an effect of prosthodontic rehabilitation; and (3) to propose a clinically testable framework through which prosthodontics could be incorporated into healthspan-oriented care. This approach addresses an important gap in the existing literature: the field has accumulated substantial evidence on oral frailty, nutrition, cognition, and quality of life, but these domains are seldom integrated into a single prosthodontic model of functional ageing.

METHODS

Review design and rationale

A critical narrative review design was selected because the objective was to integrate evidence across multiple related constructs—oral function, nutrition, frailty, cognition, psychosocial participation, quality of life, and healthy ageing—rather than to estimate a single pooled treatment effect. The review was structured to improve methodological transparency by prespecifying the principal concepts, evidence hierarchy, and thematic synthesis used to interpret the literature.

Literature search

Literature was identified through structured searches of PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar, supplemented by reference-list screening and searches of authoritative sources including WHO publications. Searches focused on publications from January 2000 to July 2026, while older landmark studies were retained when necessary to establish foundational concepts. Search terms were combined around four domains: (i) prosthodontics/oral rehabilitation (prosthodontic rehabilitation, complete denture, removable denture, implant-supported prosthesis, tooth replacement); (ii) oral function (mastication, chewing, swallowing, oral frailty, tooth loss, edentulism); (iii) healthy ageing outcomes (nutrition, malnutrition, frailty, sarcopenia, cognition, dementia, social participation, quality of life); and (iv) longevity concepts (healthy ageing, healthspan, longevity medicine, functional independence). Priority was given to systematic reviews, meta-analyses, longitudinal cohort studies, clinical trials, and major consensus or policy documents.

Eligibility and evidence prioritization

Studies involving adults, particularly older adults, were considered when they examined an oral-health or oral-function exposure, a prosthodontic intervention, or an outcome directly relevant to healthy ageing. Studies were excluded from the principal synthesis when they addressed purely technical prosthodontic outcomes without relevance to function, nutrition, cognition, psychosocial participation, or patient-reported health. Evidence was prioritized according to study design and directness: systematic reviews/meta-analyses and prospective studies were considered more informative than cross-sectional studies; intervention studies were considered more informative for causal inference than observational associations.

SYNTHESIS STRATEGY

Because the included literature differs substantially in definitions of oral frailty, masticatory function, nutritional status, cognitive outcomes, prosthetic modalities, follow-up duration, and outcome instruments, formal quantitative pooling was not attempted. Instead, evidence was synthesized thematically

and classified as: (A) relatively consistent association; (B) probable but heterogeneous association; (C) limited or conflicting evidence for an intervention effect; or (D) evidence gap requiring prospective research. Particular attention was given to residual confounding, reverse causality, measurement heterogeneity, and the distinction between tooth loss/oral dysfunction and the effects of prosthodontic treatment itself.

DISCUSSION

ORAL FUNCTION AS A COMPONENT OF HEALTHSPAN

The central conceptual premise of this review is that oral function can be considered part of the functional reserve required for healthy ageing. Mastication, swallowing, speech, facial expression, and oral comfort contribute to everyday activities that influence food choice, social interaction, and self-management. Loss of teeth is therefore not simply an anatomical endpoint; in susceptible individuals it may become a functional limitation that interacts with other age-related deficits.

The distinction between oral disease burden and oral functional reserve is important. Two individuals with a similar number of missing teeth may have very different functional capacity depending on residual ridge anatomy, periodontal status, neuromuscular control, occlusal stability, denture quality, implant support, saliva, cognition, and adaptive behaviour. Consequently, tooth count alone is an incomplete surrogate for the contribution of prosthodontics to healthy ageing.

Nutrition: association is stronger than proof of systemic benefit

Tooth loss and impaired chewing are consistently associated with altered dietary patterns and nutritional vulnerability. Older adults with impaired oral function may preferentially avoid hard or fibrous foods and select softer, more processed foods, potentially reducing dietary diversity. Contemporary systematic evidence supports an association between nutritional status and oral-health-related quality of life in older adults.⁹ A systematic review of denture use found that dentures generally improved nutritional status compared with no dentures, although

the direction of effect on measured dietary intake was inconsistent and objective eating function often remained inferior to that of dentate adults.¹⁰

Evidence concerning prosthodontic rehabilitation is therefore more nuanced than the statement that dentures ‘improve nutrition.’ A recent systematic review of prosthetic rehabilitation, with or without dietary advice, reported variable nutritional effects, emphasizing the importance of multidisciplinary dietary support rather than prosthesis provision alone.¹¹ Emerging evidence also suggests that prosthetic design may matter: a 2026 systematic review comparing overdentures with conventional complete dentures reported differences in nutritional outcomes, supporting the need to consider prosthetic modality when evaluating systemic consequences.¹²

The clinically relevant implication is that prosthodontic treatment should be coupled with nutritional assessment and, where appropriate, dietary counselling. Restoring chewing capacity may create the opportunity for dietary improvement, but the behavioural and nutritional response is not automatic. Thus, nutrition should be treated as a co-managed outcome rather than an assumed consequence of denture insertion.

Oral frailty, physical frailty, and sarcopenia

The relationship between oral dysfunction and frailty has become substantially better characterized. Recent systematic reviews and meta-analyses consistently report associations between poor oral health/oral frailty and physical frailty.^{4,5} A 2025 meta-analysis of 35 studies involving more than 200,000 participants estimated an overall oral-frailty prevalence of approximately one-third, although substantial heterogeneity was observed between assessment tools and populations.⁵ An umbrella review published in 2026 similarly concluded that oral-health indicators are associated with physical frailty, while emphasizing limitations in the quality and heterogeneity of the underlying evidence.⁴

Importantly, these findings do not establish that prosthodontic rehabilitation prevents physical frailty. Reverse causality is plausible: frailty can reduce the ability to maintain oral

hygiene, attend dental appointments, afford treatment, adapt to dentures, or prepare food. Shared determinants such as socioeconomic status, multimorbidity, disability, smoking, and diet may also confound the relationship. The strongest defensible interpretation is therefore that oral functional impairment is a clinically relevant marker and potentially modifiable contributor within a broader frailty pathway, rather than an independently proven cause of frailty.

Cognitive health: biologically plausible, clinically promising, but not yet causal

The association between tooth loss and cognitive impairment has been reported in epidemiological studies and systematic reviews, and several biological mechanisms have been proposed, including reduced sensory stimulation during mastication, altered cerebral activation, nutritional pathways, inflammation, and social isolation.^{6,7} However, association should not be equated with prevention of dementia through prosthodontic treatment.

Recent evidence strengthens the rationale for investigation but also illustrates the uncertainty. A 2024 systematic review of clinical studies found insufficient evidence to conclude that oral care or oral rehabilitation reliably improves cognitive function.¹³ In contrast, a 2025 systematic review and meta-analysis of observational studies reported an association between denture restoration and cognitive impairment, while a 10-year prospective cohort study found that denture use was associated with a slower rate of cognitive decline among older adults with partial tooth loss.^{14,15} These findings are encouraging but remain vulnerable to healthy-user effects, socioeconomic confounding, baseline health differences, and indication bias.

Accordingly, prosthodontics should not currently be presented as a dementia-prevention intervention. A more scientifically defensible position is that preservation of masticatory function may represent one potentially modifiable component of a multidomain strategy for maintaining cognitive and functional reserve. Randomized or carefully designed prospective studies with standardized cognitive endpoints are needed.

Quality of life, social participation, and functional independence

The most direct patient-centred evidence concerns oral-health-related quality of life. Edentulism can affect speech, appearance, chewing, confidence, and social interaction, and contemporary systematic evidence confirms that different full-arch rehabilitation approaches can improve oral-health-related quality of life in older edentulous patients.¹⁶ These outcomes are clinically important because healthspan is not synonymous with the absence of disease; it also includes the ability to participate in valued activities and maintain autonomy.

Nevertheless, quality-of-life outcomes are influenced by expectations, adaptation, socioeconomic context, pain, general health, and social support. Prosthodontic success should therefore be evaluated using patient-

reported outcomes alongside objective measures of masticatory performance and prosthesis function. This multidimensional assessment is more consistent with healthy-ageing principles than reliance on prosthesis survival or technical adequacy alone.

PROSTHODONTICS WITHIN LONGEVITY MEDICINE: FROM ASSOCIATION TO A TESTABLE MODEL

The concept of integrating prosthodontics into longevity medicine is attractive, but it requires careful definition. Longevity medicine should not be interpreted as a justification for attributing systemic benefits to dental treatment without direct evidence. Rather, the proposed role of prosthodontics is as a component of function-preserving healthcare that may influence several modifiable pathways relevant to healthspan.

Table 1: Prosthodontic Healthspan Framework

Domain	Prosthodontic target	Potential healthspan pathway	Current evidence
Oral functional reserve	Mastication, occlusal stability, denture/implant function	Eating efficiency, oral comfort, daily function	Moderate/consistent association; intervention evidence heterogeneous
Nutritional resilience	Restoration of functional dentition/prosthetic support	Dietary diversity and nutritional status	Probable benefit, but intake effects inconsistent
Physical reserve	Management of oral frailty and functional tooth loss	Reduced oral limitation; possible support of frailty prevention	Association strong; causal intervention evidence limited
Cognitive/social reserve	Mastication, speech, facial support, social confidence	Sensory stimulation, participation, reduced isolation	Biologically plausible; observational evidence; causality unproven
Patient-centred healthspan	Comfort, participation, satisfaction, maintenance	Independence and quality of life	Quality-of-life benefit better established than systemic outcomes

The proposed Prosthodontic Healthspan Framework (Table 1) contains five linked domains: (1) oral functional reserve; (2) nutritional resilience; (3) physical reserve and frailty risk; (4) cognitive and social participation; and (5) longitudinal patient-centred outcomes. The framework is conceptual and should be regarded as a hypothesis-generating model rather than a validated clinical tool.

Clinical implications

A healthspan-oriented prosthodontic pathway could begin with identification of older patients at risk of oral functional decline, followed by assessment of masticatory ability, denture performance, nutritional risk, swallowing-related complaints, frailty indicators, cognitive status where clinically indicated, and patient-defined goals.

Treatment planning would then prioritize the least burdensome intervention capable of restoring useful function, with maintenance and reassessment treated as part of the intervention rather than as post-treatment aftercare.

This model also supports closer collaboration with geriatricians, dietitians, speech and swallowing specialists, physiotherapists, primary-care clinicians, and caregivers. Such integration is consistent with the WHO direction toward embedding oral health within broader health systems rather than treating dental care as an isolated service.^{1,2} Importantly, the model does not imply that every older adult requires complex prosthodontic treatment; prevention, preservation of natural dentition, simple rehabilitation, and appropriate referral may be equally important.

The interrelationship of Prosthodontics and healthy ageing is outlined in Figure 1.

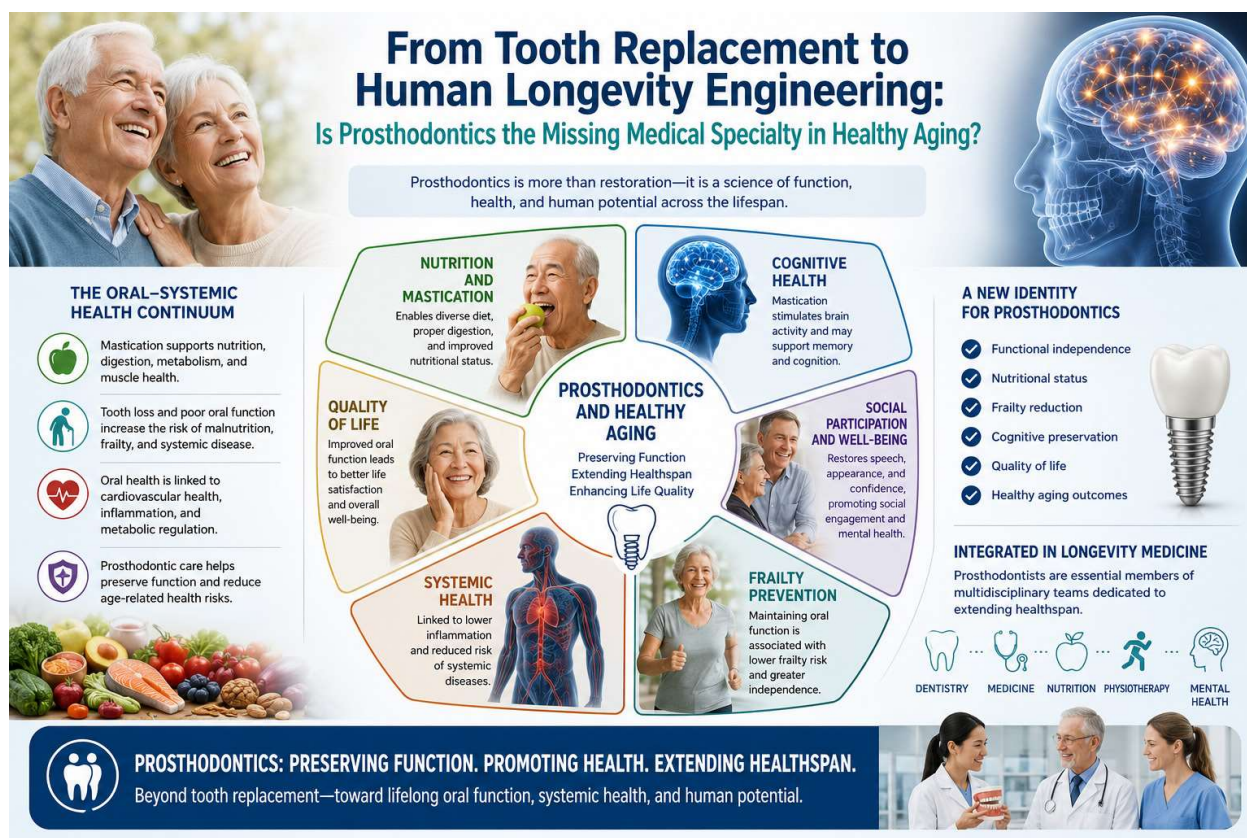


Figure 1: Prosthodontics and healthy ageing

CRITICAL APPRAISAL OF THE EVIDENCE

The literature supports a graded interpretation rather than a single causal narrative. Evidence is strongest for associations between oral functional impairment and oral-health-related quality of life, nutritional vulnerability, and frailty. Evidence linking tooth loss with cognitive impairment is substantial but primarily observational. Evidence that prosthodontic treatment itself changes systemic outcomes is considerably less mature. Recent reviews also demonstrate substantial heterogeneity in definitions of oral frailty, outcome instruments, prosthesis types, dietary endpoints, and follow-up periods.^{4,5,10–15}

Several methodological limitations recur. First, cross-sectional studies cannot distinguish whether oral dysfunction precedes frailty or results from it. Second, denture users differ from non-users in socioeconomic status, healthcare utilization, health literacy, and general health, creating confounding. Third, restoration of teeth does not necessarily restore normal masticatory performance, particularly with conventional complete dentures. Fourth,

many studies measure surrogate outcomes rather than healthspan itself. Finally, ‘longevity’ is often used conceptually without measuring survival, disability-free life expectancy, or validated healthy-ageing outcomes. These limitations should temper claims and define the research agenda.

KNOWLEDGE GAPS AND RESEARCH AGENDA

Prospective studies should examine whether baseline oral functional impairment predicts subsequent frailty, sarcopenia, hospitalization, disability, and loss of independence after adjustment for major confounders.

Randomized or pragmatic comparative trials should test whether specific prosthodontic interventions, alone or combined with dietary counselling, improve nutritional status, physical function, and patient-reported healthspan outcomes.

Cognitive studies should use standardized longitudinal outcomes and distinguish denture provision from broader oral-health interventions.

Future studies should report prosthesis type, retention/stability, masticatory performance, adaptation, maintenance requirements, and adherence rather than classifying participants simply as ‘denture users’.

A core outcome set for healthspan-oriented prosthodontics should include oral function, nutritional status, frailty/physical function, quality of life, treatment burden, and patient-defined goals.

Health-economic studies are needed to determine whether incorporating oral rehabilitation into integrated healthy-ageing pathways reduces downstream healthcare utilization or disability.

Implementation research should evaluate feasible models for referral between dental, primary-care, geriatric, nutrition, and rehabilitation services, particularly in resource-constrained settings.

LIMITATIONS OF THIS REVIEW

This review has limitations inherent to a critical narrative design. It does not provide a formal meta-analysis, and the heterogeneity of the literature limits direct comparison across interventions and outcomes. Although structured searches and evidence prioritization were used, the review was not designed as a systematic review with protocol registration, duplicate independent screening, or formal risk-of-bias assessment of every included study. Consequently, the conclusions should be interpreted as a critical synthesis and conceptual framework rather than as estimates of treatment efficacy. The proposed Prosthodontic Healthspan Framework also requires empirical validation before clinical adoption.

CONCLUSION

The emerging evidence supports a broader view of prosthodontics within healthy ageing, but the strongest scientific position is not that prosthodontics has already been proven to extend lifespan. Rather, oral functional impairment represents a potentially modifiable component of the multidimensional functional decline that accompanies ageing. Current evidence is relatively consistent for associations with nutritional vulnerability, frailty, and oral-health-related quality of life, whereas evidence for direct effects of prosthodontic rehabilitation

on cognition, systemic health, or longevity remains limited and largely observational.

The principal contribution of this review is therefore a shift from an association-based narrative to a testable healthspan model. By assessing oral functional reserve and linking prosthodontic treatment to nutritional, physical, cognitive-social, and patient-centred outcomes, prosthodontics can be positioned as a potential component of multidisciplinary healthy-ageing care without overstating the current evidence. Future longitudinal and interventional research should determine whether restoring oral function produces measurable gains in healthspan, independence, and healthcare value.

REFERENCES

1. World Health Organization. Global strategy and action plan on oral health 2023–2030. Geneva: WHO; 2024.
2. World Health Organization. Oral health. Geneva: WHO; 2024.
3. Sheiham A, Steele JG, Marcenes W, Finch S, Walls AWG. The relationship among dental status, nutrient intake, and nutritional status in older people. *J Dent Res*. 2001;80(2):408–13.
4. Oral Health Determinants of Frailty in Older Adults: An Umbrella Review of Systematic Reviews and Meta-Analyses. 2026. PMID: 41380483.
5. Systematic review and meta-analysis on the prevalence and risk factors of oral frailty among older adults. 2025. PMID: 39911869.
6. Shen T, Lv X, Fu H. Tooth loss and dementia: a systematic review and meta-analysis. *Community Dent Oral Epidemiol*. 2021;49(5):401–12.
7. Takeuchi K, Ohara T, Furuta M, Takeshita T, Shibata Y, Hata J, et al. Tooth loss and risk of dementia in the community: the Hisayama Study. *J Am Geriatr Soc*. 2017;65(5):e95–100.
8. Weijenberg RA, Scherder EJA, Lobbezoo F. Mastication for the mind—the relationship between mastication and cognition in ageing and dementia. *Neurosci Biobehav Rev*. 2011;35(3):483–97.
9. Chauhan N, Paul S, Purohit BM, Duggal R, Priya H, Sasidharan S. Nutrition and oral health-related quality of life (OHRQoL) in older adults: a systematic review and meta-analysis. *Int J Prosthodont*? 2024. doi:10.1038/s41432-024-01088-2.

10. Impact of Wearing Dentures on Dietary Intake, Nutritional Status, and Eating: A Systematic Review. 2021. PMID: 34210202.
11. Brígido JA, de Oliveira da Rosa WL, Lund RG. The effect of prosthetic rehabilitation with or without dietary advice on nutritional status in elderly patients: a systematic review. *Aging Clin Exp Res.* 2023;35(11):2399–2411. doi:10.1007/s40520-023-02578-6.
12. Batista DS, Manfron GAW, Bubna DP, Barbosa DM, Stechman-Neto J, Taveira KVM, et al. Nutritional Outcomes of Overdentures vs. Complete Dentures in Older Edentulous Adults: A Systematic Review and Meta-Analysis. *J Oral Rehabil.* 2026;53(2):592–602. doi:10.1111/joor.70111.
13. Inamochi Y, Ogino Y, Harada K, Fueki K, Ayukawa Y, Nishimura M, et al. Do oral care and rehabilitation improve cognitive function? A systematic review of clinical studies. *J Evid Based Dent Pract.* 2024;24(1):101948. doi:10.1016/j.jebdp.2023.101948.
14. Ma X, Zhang Y, Wang J, Hu C, Zhang X, Hong X, et al. Association between denture restoration for tooth loss and cognitive impairment: a systematic review and meta-analysis. *J Prosthodont Res.* 2025;69(3):313–320. doi:10.2186/jpr.JPR_D_24_00060.
15. Denture use and a slower rate of cognitive decline among older adults with partial tooth loss in China: a 10-year prospective cohort study. *Aging Med.* 2024. PMID: 39777091.
16. Linn TT, Khaohoen A, Thu KM, Rungsiyakull P. Oral-Health-Related Quality of Life in Elderly Edentulous Patients with Full-Arch Rehabilitation Treatments: A Systematic Review. *J Clin Med.* 2024;13(12):3391. doi:10.3390/jcm13123391.
17. The prevalence of oral frailty among older adults: a systematic review and meta-analysis. *Eur Geriatr Med.* 2024;15(3):645–655. doi:10.1007/s41999-023-00930-7.
18. Adverse health outcomes of oral frailty in community-dwelling older adults: a systematic review and meta-analysis. 2025. PMID: 40889447.
19. Association between oral health status and frailty in older adults: a systematic review and meta-analysis. 2025. PMID: 40231179.
20. World Health Organization. Tracking progress on the implementation of the Global oral health action plan 2023–2030: baseline report. Geneva: WHO; 2025.