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Edentulism, Prosthodontic Rehabilitation, and Nutritional Health in Older Americans: Addressing the Oral Rehabilitation Coverage Gap — A Narrative Review

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Abstract
Background: *Complete and extensive tooth loss remains a concentrated burden among older, low-income and rural Americans. Beyond its dental meaning, losing the dentition alters what people can chew, what they choose to eat and how they present themselves socially, while the principal public insurer of older adults, traditional Medicare, has excluded routine dental care since 1965.*
Materials and Methods: *A narrative review was conducted of PubMed-indexed literature published between 1998 and 2026, complemented by federal public-health sources. Priority was given to systematic reviews, meta-analyses, randomized controlled trials and nationally representative U.S. analyses addressing three domains: the*

functional, nutritional and psychosocial consequences of tooth loss; the outcomes of prosthodontic rehabilitation; and coverage of rehabilitation in Medicare, Medicare Advantage and Medicaid.

Results: *Forty-three sources were synthesized. Tooth loss is consistently associated with fewer functional tooth units, poorer diet quality, higher malnutrition risk, impaired oral health-related quality of life and, in longitudinal data, higher risk of cognitive impairment and mortality. Prosthodontic rehabilitation reliably restores chewing ability and satisfaction, and denture use appears to attenuate the cognitive risk associated with tooth loss; however, prostheses alone rarely change nutrient intake, whereas prostheses delivered together with brief dietary counselling improved intake and nutritional screening scores in several randomized trials. Coverage is fragmented: traditional Medicare excludes routine dentures, comprehensive Medicare Advantage dental plans were available in only 39.9% of U.S. counties in 2023, and adults who lose Medicaid at age 65 experience a measurable drop in dental coverage. The national objective for complete tooth loss shows no progress toward its 2030 target.*

Conclusion: *Oral rehabilitation for older Americans should be treated as a nutrition-sensitive health service rather than an elective dental benefit. A bundled "prosthesis-plus-nutrition" pathway, covered across public programs and evaluated with nutritional and functional outcomes, would align prosthodontics with national healthy-aging, nutrition and health-equity goals.*

Key Word: *Edentulism; Tooth loss; Complete denture; Implant overdenture; Nutrition; Older adults; Medicare; Medicaid; Health equity.*

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I. Introduction

The 2021 National Institutes of Health report Oral Health in America concluded that, two decades after the first Surgeon General's report on oral health, public dental coverage remains limited for many low-income, minority and older adult populations, and that additional resources are needed to reduce out-of-pocket costs for lower-income adults [1]. Complete tooth loss (edentulism) is the most visible end-point of that gap. Although the prevalence of edentulism in the United States fell dramatically during the second half of the twentieth century, the decline has been uneven: by 2010 edentulism had become rare in high-income households and had contracted geographically toward states with disproportionately high poverty [2]. Healthy People 2030 retains complete tooth loss among adults aged 45 years and older as a national objective (OH-05), yet the most recent estimate, 8.9% for 2017–2020, remains above the 2030 target [3].

For an older adult, losing the dentition is not merely a dental event. It reduces the number of opposing posterior tooth pairs available for chewing, shifts food choice toward softer and more processed items, alters facial appearance and speech, and can carry a sense of bereavement and premature ageing. These consequences intersect with nutrition, frailty, cognition and social participation, which are central concerns of an ageing society. At the same time, the federal program that insures most Americans aged 65 years and older was enacted in 1965 without comprehensive dental coverage [4], leaving the costs of dentures, relines and implant-supported prostheses largely to patients, to a patchwork of Medicare Advantage supplemental benefits, and to state Medicaid programs whose adult dental benefits vary widely.

This narrative review addresses three questions. First, what are the functional, nutritional, systemic and psychosocial consequences of tooth loss in older adults? Second, what does the evidence show about the outcomes of prosthodontic rehabilitation, particularly with respect to nutrition? Third, how do the principal U.S. public programs cover oral rehabilitation, and what policy and clinical models could close the resulting coverage gap? The review argues that oral rehabilitation should be understood and financed as a nutrition-sensitive health service, and it proposes a bundled care pathway consistent with national nutrition, healthy-ageing and health-equity goals.

II. Materials and Methods

A narrative review design was chosen because the research questions span clinical prosthodontics, nutritional epidemiology and health policy, domains in which the relevant evidence is heterogeneous in design and outcome measures and therefore not amenable to a single pooled analysis. PubMed was searched between October and November 2026 using combinations of the terms edentulism, tooth loss, functional tooth units, complete denture, implant overdenture, nutrition, diet quality, malnutrition, Mini Nutritional Assessment, cognitive impairment, quality of life, Medicare, Medicare Advantage and Medicaid. Reference lists of key reviews were hand-searched.

Priority was given to (a) systematic reviews and meta-analyses; (b) randomized controlled trials of prosthodontic rehabilitation with or without dietary counselling; (c) nationally representative U.S. analyses, particularly those based on the National Health and Nutrition Examination Survey (NHANES), the Medicare Current Beneficiary Survey and the Health and Retirement Study; and (d) peer-reviewed policy analyses of

Medicare and Medicaid dental coverage. Federal sources were used for national objectives. Every bibliographic record was verified against its PubMed entry or the issuing agency's website, and quantitative findings are reported as presented in the original sources. Because this is a narrative rather than a systematic review, no formal risk-of-bias scoring was applied; the strength and limitations of the evidence are discussed qualitatively in Sections VI and X.

III. Edentulism in the United States: Burden, Trends and Inequities

Using time-series data from five national surveys spanning 1957 to 2012, Slade and colleagues showed that the prevalence of edentulism among U.S. adults declined from 18.9% in 1957–1958 to 4.9% in 2009–2012 [2]. The decline was driven mainly by the passing of generations born before the 1940s, whose incidence of complete tooth loss far exceeded that of later cohorts. The authors projected a slower decline thereafter, reaching 2.6% by 2050, but population growth and ageing mean that an estimated 8.6 million Americans will still be edentulous in 2050 [2]. Edentulism is therefore a shrinking proportion but a persistent absolute burden, and one increasingly concentrated among the poor.

National surveillance confirms that progress has stalled. Healthy People 2030 measures complete tooth loss among adults aged 45 years and older from clinical examinations in NHANES; the latest estimate of 8.9% (2017–2020) shows no improvement toward the 2030 target, and the objective explicitly notes that disparities by age, race and ethnicity, education and income persist [3]. Partial tooth loss, which is far more prevalent than edentulism, carries many of the same functional consequences when the number of functional tooth units falls below the threshold needed for efficient chewing.

The economic dimension is substantial. An updated estimate of the burden of periodontitis attributed approximately US$150 billion in indirect costs in the United States in 2018 to productivity losses, the majority of which were related to edentulism caused by periodontal disease and to periodontal disease itself [5]. These indirect costs dwarf direct treatment expenditures and indicate that tooth loss is a macro-economic as well as a clinical problem.

IV. Functional, Nutritional and Systemic Consequences of Tooth Loss

A. Masticatory function and diet quality

Chewing capacity depends less on the total number of teeth than on functional tooth units (FTUs), that is, pairs of opposing natural or artificial posterior teeth. In 6,291 adults from NHANES 2011–2014, impaired FTUs were associated with lower Healthy Eating Index-2020 (HEI-2020) scores and a more inflammatory dietary profile, although sociodemographic factors explained a larger share of overall dietary variation [6]. Among 2,606 adults aged 60 years and older in four NHANES cycles (2011–2018), a modified-treatment-policy analysis emulated hypothetical interventions: if all participants had retained 25 or more teeth, the likelihood of better diet quality would increase by 51% (odds ratio [OR] 1.51), whereas prosthetic rehabilitation of individuals with fewer than 25 teeth increased that likelihood by only 8% (OR 1.08) [7]. A causal-mediation analysis of 2,600 adults aged 60–80 years found that severe tooth loss was associated with an HEI-2020 score 2.8 points lower, and that dietary quality accounted for a small (8.9%) and statistically fragile share of the association between tooth loss and cognitive performance [8].

Two implications follow. First, prevention of tooth loss has a larger population-level nutritional benefit than replacement, which reinforces the case for periodontal and caries prevention across the life course. Second, for people who have already lost their teeth, restoring occlusal contacts is necessary but, on its own, may not be sufficient to restore a healthy diet, a point developed in Section VI.

B. Malnutrition risk

A systematic review and meta-analysis restricted to adults aged 60 years and older in developed countries, using validated nutrition screening or assessment tools, concluded that older adults with tooth loss are at greater risk of malnutrition than those with a functionally adequate dentition, and recommended nutrition screening by dentists and dietitians with cross-referral [9]. An earlier meta-analysis of 26 studies using the Subjective Global Assessment or the Mini Nutritional Assessment (MNA) found that well-nourished older adults had significantly more FTUs and more teeth present, but that edentulism per se and prosthesis use were not significantly associated with nutritional status [10]. An overview of seven systematic reviews confirmed that tooth loss increases the likelihood of poor nutritional status, especially in older people, while rating the overall confidence in the evidence as low because of methodological heterogeneity [11]. Taken together, these findings suggest that the relevant exposure is loss of functional occlusion, and that dentures, as currently provided, do not consistently neutralize nutritional risk.

C. Metabolic and mortality associations

Analyses linking NHANES to the National Death Index extend these associations to hard outcomes. In 5,780 adults aged 60 years and older (NHANES 2009–2018), those with zero to three FTUs had a higher risk of all-cause mortality than those with 10–12 FTUs (hazard ratio [HR] 2.4), and the association persisted after propensity-score matching (HR 1.8) [12]. Using NHANES 1999–2018, FTUs were inversely associated with metabolic syndrome and, among people with metabolic syndrome, with all-cause, cardiovascular and cancer mortality; diet quality mediated roughly 15% of the FTU–metabolic syndrome relationship [13]. These are observational associations subject to residual confounding by socioeconomic position and comorbidity, but their consistency across cohorts and their partial mediation through diet support a plausible pathway from loss of chewing function to poorer systemic health.

D. Cognitive outcomes

A dose-response meta-analysis of 14 longitudinal studies (34,074 participants) found that greater tooth loss was associated with a 1.48-fold higher risk of cognitive impairment and a 1.28-fold higher risk of dementia, with edentulous participants facing relative risks of 1.54 and 1.40, respectively; notably, the association was not significant among denture users [14]. A 2026 meta-analysis of 21 longitudinal studies reported similar pooled estimates for dementia (OR 1.26) and mild cognitive impairment (OR 1.40), and again found no significantly increased dementia risk among denture wearers (OR 1.03) [15]. A separate meta-analysis of six observational studies (24,252 participants) estimated a 1.27-fold higher risk of cognitive impairment among people with tooth loss who did not use dentures, compared with a 1.01-fold risk among those who did [16]. Causality cannot be inferred from these observational designs, and reverse causation (cognitive decline leading to neglect of oral care) is plausible; nevertheless, the repeated finding that prosthodontic rehabilitation attenuates the association makes timely rehabilitation a reasonable, low-risk component of strategies for healthy cognitive ageing.

Table 1. Selected evidence syntheses on the consequences of tooth loss and the effects of prosthodontic rehabilitation

Source	Design / population	Principal finding
Zelig et al. [9]	SR/MA; adults ≥60 y, developed countries	Tooth loss associated with greater malnutrition risk on validated tools
Toniazzo et al. [10]	SR/MA; 26 studies, older adults	More FTUs/teeth in well-nourished; edentulism and prosthesis use not significant
Qi et al. [14]	Dose-response MA; 14 longitudinal studies	Edentulism: RR 1.54 cognitive impairment, 1.40 dementia; not significant in denture users
Chen et al. [15]	MA; 21 longitudinal studies	Dementia OR 1.26, MCI OR 1.40; denture users OR 1.03 for dementia
Gerritsen et al. [17]	SR/MA; 35 studies	Tooth loss consistently linked to poorer OHRQoL; anterior loss most impactful
Emami et al. [18]	MA of RCTs; implant vs conventional mandibular dentures	Greater satisfaction with implant overdentures; OHRQoL difference not significant
Brígido et al. [19]	SR; 12 RCTs, adults ≥60 y	Prosthesis alone did not consistently improve nutrition; prosthesis + dietary advice improved intake
McGowan et al. [20]	SR/MA; 9 studies, 526 participants	Narrative support for rehabilitation + dietary advice; pooled F/V effect not significant

SR, systematic review; MA, meta-analysis; RCT, randomized controlled trial; FTU, functional tooth unit; MCI, mild cognitive impairment; OHRQoL, oral health-related quality of life; F/V, fruit and vegetable intake; RR, relative risk; OR, odds ratio.

V. Psychosocial and Economic Consequences

A systematic review of 35 studies provided fairly strong evidence that tooth loss is associated with impaired oral health-related quality of life (OHRQoL) regardless of the instrument used, that the number of occluding pairs correlates with OHRQoL, and that anterior tooth loss has the greatest impact [17]. Qualitative work with edentulous people undergoing routine prosthetic care identified reactions akin to bereavement, lowered self-confidence, dislike of appearance, secrecy about tooth loss, altered socializing and a sense of premature ageing, even among patients who appeared to be coping well with dentures [21].

These consequences have labour-market correlates. Using NHANES 2013–2014, Halasa-Rappel and colleagues found that each one-point increase in a dental problem index that incorporated missing anterior teeth decreased the odds of employment by 7.7%, and estimated that improved access to routine dental care would increase employment among working-age adults [22]. For the growing number of Americans who continue

working beyond conventional retirement age, or who care for grandchildren and spouses, oral rehabilitation is therefore linked to economic and social participation, not only to comfort.

VI. Prosthodontic Rehabilitation: What the Evidence Shows

A. Conventional complete dentures and implant-supported overdentures

Conventional complete dentures remain the most accessible rehabilitation for edentulous older adults. In 2002, the McGill consensus statement proposed that a mandibular overdenture retained by two implants should become the first-choice standard of care for the edentulous mandible [23]. Subsequent evidence supports the patient-centred advantages of implant support: a meta-analysis of randomized trials found clinically relevant greater satisfaction with mandibular implant overdentures than with new conventional dentures, although the difference in OHRQoL was not statistically significant and the authors called for cost-effectiveness analyses [18]. The long-term value of implant support in older adults also depends on preventing peri-implant infection and preserving osseointegration, an area in which antimicrobial and osteoinductive implant surface coatings are under active development [24]. A systematic review of 53 studies concluded that implant overdentures improve chewing efficiency, bite force and satisfaction, but found no changes in dietary intake, body mass index or blood nutritional markers [25]. Similarly, a meta-analysis found that implant-supported prostheses improve mastication compared with conventional prostheses while the bioavailability of most nutrients remains stable, especially in completely edentulous patients [26], and a 2026 review of older adults reached the same conclusion: consistent gains in mastication, satisfaction and OHRQoL but inconsistent nutritional effects [27]. Clinical reports of interdisciplinary oral rehabilitation further illustrate that restoring function in extensively compromised dentitions usually requires staged, multi-specialty planning rather than the delivery of a single appliance [28].

B. The missing ingredient: dietary counselling delivered with the prosthesis

The most policy-relevant finding of this review is that the nutritional benefit of rehabilitation appears to depend on pairing the prosthesis with dietary guidance. In a randomized controlled trial of edentulous patients receiving replacement complete dentures, two tailored dietary counselling sessions increased fruit and vegetable intake by 209 g/day, compared with 26 g/day in the standard-care group, even though perceived chewing ability improved in both groups [29]. In Japan, a trial in which dentists provided a simple dietary advice pamphlet alongside new complete dentures produced greater intake of several foods at three months [30], and a related trial found significantly higher Mini Nutritional Assessment–Short Form scores at six months in the advice group than in the control group [31]. In India, a tailored dietary intervention delivered with new complete dentures significantly improved body mass index and MNA scores at three months [32].

Systematic reviews converge on the same conclusion. A review of 12 randomized trials in adults aged 60 years and older found that prosthetic treatment significantly improved chewing ability but did not produce a consistent improvement in nutritional status unless dietary advice was also provided [19]. A review of nine studies (526 participants) found improvements in at least one oral and one dietary outcome in every study combining rehabilitation with dietary intervention, although a pooled analysis of three studies did not reach statistical significance and the interventions were poorly described and rarely theory-based [20]. The practical message is that a denture restores the capacity to eat a healthier diet, while counselling helps translate that capacity into behaviour. Coverage policies that pay for the appliance but not for the nutritional component are therefore likely to under-deliver on the health benefit that justifies rehabilitation in the first place.

VII. The Oral Rehabilitation Coverage Gap in U.S. Public Programs

A. Traditional Medicare

When Medicare was enacted in 1965 it excluded coverage of comprehensive dental services; since 2023 it has covered a limited set of dental services inextricably linked to specific medical treatments, but routine care and dentures remain excluded, and in 2019 approximately 24 million beneficiaries (47%) had no dental coverage [4]. Seventy-one percent of traditional Medicare enrollees who did not obtain dental care cited cost as the primary reason [4]. Earlier analysis of 2012 data showed that high-income beneficiaries were almost three times as likely as low-income beneficiaries to have received dental care in the previous year, and that 74% of low-income beneficiaries received none; the same study modelled a Part B dental benefit financed partly by modest premiums [33]. Early evaluation of the recent medically necessary dental reforms found no marked increase in the number of dentists billing Medicare [34], and a claims analysis of 2019–2021 fee-for-service data identified about 2.1 million oral health encounters, mostly billed by non-dental providers [35]. The reforms, while welcome, do not reach the routine prosthodontic needs of edentulous older adults.

B. Medicare Advantage

Medicare Advantage plans frequently advertise dental benefits, but their depth varies. In 2023, beneficiaries could choose from an average of 34.9 plans offering some dental benefit but only 1.7 offering a

comprehensive benefit, and only 39.9% of U.S. counties had at least one comprehensive dental plan; availability was associated with larger populations and higher Medicare Advantage penetration [36], which implies weaker access in the rural, low-density areas where edentulism is concentrated. Among Medicare Advantage enrollees aged 65 and older, dental coverage was associated with higher odds of a dental visit (adjusted OR 1.85) [37], confirming that coverage matters, but annual maximums and frequency limits typical of supplemental benefits are often insufficient for complete dentures, relines and implant-retained prostheses.

C. Medicaid and the age-65 coverage cliff

Medicaid adult dental benefits are optional for states. Between 2016 and 2022 the number of states offering comprehensive adult dental benefits through Medicaid managed care rose from 33 to 36, yet benefit generosity remained inconsistently aligned between managed care and fee-for-service programs, and the authors warned that new federal funding cuts make benefit design decisions increasingly consequential [38]. A recent evidence-based policy analysis covering Florida, New York, Texas, Virginia, Massachusetts and Alaska frames these state-level differences in oral health policy as a matter of national rather than merely local concern [39]. For low-income adults, turning 65 can paradoxically reduce dental coverage: a regression-discontinuity analysis of the Health and Retirement Study found a 13.1-percentage-point decrease in the likelihood of dental coverage at age 65, largely due to loss of Medicaid dental coverage, and a 3.9-point decline in dental visits among Black, Hispanic and other minority adults [40]. Where coverage is absent, unmet needs migrate to hospital emergency departments, as documented in a systematic review of 32 studies of dental-related emergency visits among Medicaid beneficiaries, which concluded that expanding Medicaid dental coverage could reduce such visits [41].

Table 2. Coverage of oral rehabilitation for older adults in U.S. public programs

Program	Current situation	Implication for edentulous older adults
Traditional Medicare (Parts A/B)	Comprehensive dental care excluded since 1965; limited coverage only when dental care is inextricably linked to specified medical treatment [4,34]	Dentures, relines and implant overdentures paid out of pocket; strongest burden on low-income beneficiaries [33]
Medicare Advantage (Part C)	Supplemental benefits common, but comprehensive plans available in 39.9% of counties (2023) [36]	Access depends on county, plan and annual maximum; rural gaps likely
Medicaid (adults)	Optional, state-defined benefits; uneven alignment between managed care and fee-for-service [38]	Coverage may be lost at age 65 when beneficiaries move to Medicare [40]
No coverage / emergency care	Unmet needs shift to emergency departments [41]	Palliative care without rehabilitation; avoidable public expenditure

VIII. Discussion: Toward a Prosthesis-Plus-Nutrition Care Pathway

The evidence reviewed supports three propositions. First, loss of functional occlusion is associated with poorer diet, higher malnutrition risk, and higher risk of cognitive impairment and death, with the strongest and most consistent signals in older adults [9,12,14,15]. Second, prosthodontic rehabilitation reliably restores chewing ability and satisfaction and appears to attenuate the cognitive risk associated with tooth loss [14,16,18], but it improves nutrition consistently only when combined with dietary counselling [19,20,29]. Third, the U.S. financing system treats rehabilitation as an elective dental good, so the people with the highest need, low-income, minority and rural older adults, face the highest barriers [33,36,40].

These propositions point toward a bundled model of care that could be piloted within existing programs. Its components would be: (1) routine nutrition risk screening, for example with the MNA-Short Form, at dental visits of adults aged 65 and older with fewer than ten FTUs, with referral pathways to registered dietitians or primary care; (2) coverage of conventional complete dentures and relines as a defined benefit, with implant-retained mandibular overdentures available where clinically indicated and supported by cost-effectiveness evidence [18,23]; (3) structured dietary counselling of one to two brief sessions, delivered by the dental team or a dietitian at denture insertion and early follow-up, reimbursed as part of the episode of care [29,31]; and (4) outcome reporting that includes chewing ability, OHRQoL and nutritional screening scores rather than only procedure counts.

For Medicare, such a bundle could be introduced through the Center for Medicare and Medicaid Innovation as a demonstration among dually eligible beneficiaries, the group most exposed to the age-65 coverage cliff [40], or through quality benchmarks for Medicare Advantage dental supplemental benefits, as recommended by Simon and colleagues [36]. For Medicaid, states that already offer comprehensive adult dental benefits could add nutritional counselling codes to the prosthodontic episode and align managed care and fee-for-service benefit levels [38]. Paying for the full episode of care, rather than for the appliance alone, is consistent with analyses of how fee-for-service and value-based payment designs shape incentives and financial sustainability in U.S. dental

practice [42]. Community health centers, which integrate medical, dental and often nutrition services under one roof, are natural settings for early implementation, and the medical-dental integration emphasized in the national oral health report provides the conceptual basis [1], while contemporary practice-management models built on strategic leadership, economic sustainability and teledentistry offer operational tools for implementation [43].

IX. National Interest and Significance

Closing the oral rehabilitation coverage gap aligns with several explicit national priorities and with recent work framing oral health policy as a component of the U.S. national interest [39]. It contributes to Healthy People 2030 objective OH-05, for which national data show no progress [3], and to the broader federal agenda on nutrition and healthy ageing: an intervention that measurably improves fruit and vegetable intake and nutritional screening scores in edentulous older adults [29,31] addresses the dietary risk factors that underlie the leading chronic diseases of later life. It is relevant to the national effort to reduce the burden of dementia, because denture use is repeatedly associated with attenuation of the cognitive risk linked to tooth loss [14–16]. It advances health equity, since edentulism and the loss of coverage at age 65 are concentrated among low-income and minority Americans [2,40]. Finally, it has fiscal relevance: the indirect costs associated with periodontitis and its downstream edentulism are estimated at about US$150 billion per year in the United States [5], and unmet dental needs generate avoidable emergency department use [41]. With 8.6 million Americans projected to remain edentulous by 2050 [2], a prosthesis-plus-nutrition pathway represents a scalable, nationally relevant strategy whose benefits extend beyond the mouth to nutrition, independence and participation in community life.

X. Limitations

This review has limitations. As a narrative review, it did not apply a pre-registered protocol or formal risk-of-bias assessment, and study selection may reflect the author's judgement. Most evidence on nutrition, cognition and mortality is observational and cross-sectional or cohort-based, so residual confounding by socioeconomic status, frailty and comorbidity cannot be excluded. Randomized trials of prosthesis-plus-counselling are small, short (generally three to six months) and largely conducted outside the United States, and their dietary interventions are heterogeneous [19,20]. Coverage data change rapidly, and the policy landscape described here reflects publications available through November 2026. Large, U.S.-based pragmatic trials with economic evaluation are needed to confirm the clinical and fiscal value of the proposed pathway.

XI. Conclusion

Tooth loss in older Americans is a nutritional, cognitive, social and economic problem, not only a dental one. Prosthodontic rehabilitation restores the capacity to chew and improves satisfaction, and its health value is maximized when combined with brief dietary counselling. Yet traditional Medicare excludes routine dentures, comprehensive Medicare Advantage dental coverage is geographically limited, and low-income adults can lose Medicaid dental coverage precisely when they enter old age. Financing oral rehabilitation as a nutrition-sensitive service, through a bundled prosthesis-plus-nutrition pathway with outcome reporting, offers a coherent route to align prosthodontic care with national nutrition, healthy-ageing and health-equity goals.

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