

REMOVABLE DENTURE USE, POSTERIOR OCCLUSION, AND HEALTH-RELATED QUALITY OF LIFE: A COHORT STUDY FROM THE LIFE STUDY

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Objectives

- Tooth loss reduces occlusal support and masticatory function, which can impair health-related quality of life (HRQoL)¹.
- Although the use of removable denture (RD) may mitigate these adverse effects, evidence on the association between RD use and HRQoL remains limited and inconsistent²⁻⁹.
- Because posterior occlusion (PO) may moderate the association between RD use and HRQoL, **this study examined the association between RD use and HRQoL, while accounting for PO.**

Methods

Study design	•Retrospective observational study using data from the Longevity Improvement & Fair Evidence (LIFE) Study ¹⁰
Study Population	•Older adults aged ≥60 years residing in two municipalities participating in the LIFE Study who completed the questionnaire during the FY 2024 health checkups
Outcome	• HRQoL, measured using the EuroQol 5-dimension, 5-level instrument (EQ-5D-5L) ¹¹
Exposure	• RD use in the year prior to the survey , defined using denture-related diagnosis and procedure codes validated in a previous study ¹²)
Covariates	•Age, sex, municipality, PO , number of teeth, number of dental visits, RD use 2 years prior, Charlson Comorbidity Index, depression, anxiety disorder, sleep disorder
Posterior occlusion (PO)	•PO was defined by the number of functional support zones ¹³) •Each participant was classified according to the Eichner classification •Participants were grouped as with PO (A1–A3, B1–B3) or without PO (B4, C1–C3) (Fig. 1)

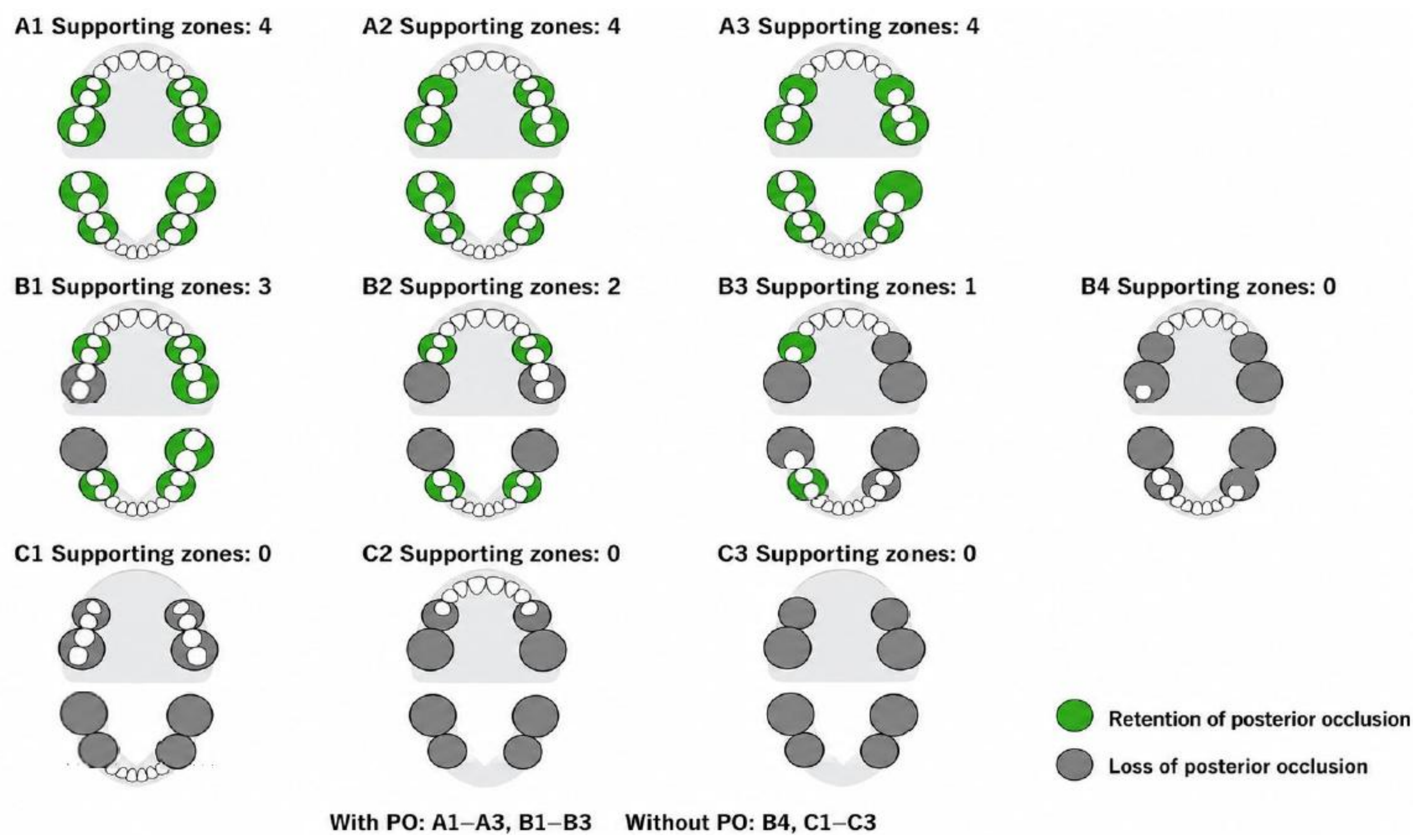


Fig. 1. Patterns of PO based on the Eichner classification (modified from Miyano et al., 2025¹³)

Statistical analysis	•Generalized linear models (GLMs) ➢ Predicted mean EQ-5D-5L scores ➢ Average marginal effects (AMEs) ➢ Interaction between RD use and PO
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Results

- 562 participants were included (mean age: 71.1 [standard deviation = 5.8] years; 39.0% male), of whom 26.3% used RD.
- After accounting for the interaction, **RD users without PO had significantly higher HRQoL than nonusers, exceeding the minimal important difference (0.044)¹⁴.**

Table 1. Predicted mean EQ-5D-5L scores and AMEs of RD use from GLMs (n = 562)

Multiplicative scale ^a				Additive scale ^b		
		Model 1	Model 2	Model 3	Model 1	Model 2
Predicted mean EQ-5D-5L (95% CI)						
RD nonuse	Overall	0.922 (0.913, 0.931)	0.914 (0.901, 0.927)	0.911 (0.899, 0.923)	0.922 (0.913, 0.931)	0.914 (0.900, 0.928)
	Without PO			0.831 (0.793, 0.870)		0.831 (0.788, 0.874)
RD use	Overall	0.916 (0.900, 0.933)	0.939 (0.912, 0.965)	0.937 (0.910, 0.964)	0.916 (0.900, 0.933)	0.938 (0.912, 0.965)
	Without PO			0.938 (0.881, 0.995)		0.936 (0.878, 0.993)
RD use	Overall			0.937 (0.910, 0.964)		0.937 (0.910, 0.964)
	With PO					
Average marginal effect (95% CI) (RD use vs RD nonuse)						
Overall		-0.006 (-0.025, 0.013)	0.025 (-0.011, 0.061)	0.026 (-0.010, 0.061)	-0.006 (-0.025, 0.013)	0.024 (-0.012, 0.061)
Without PO				0.105 (0.062, 0.148)***		0.105 (0.060, 0.150)***
With PO				0.022 (-0.015, 0.059)		0.022 (-0.016, 0.059)

Model 1: Crude; Model 2: Model 1 + all covariates; Model 3: Model 2 + interaction term between RD use and PO.
^aMultiplicative scale estimates were obtained from GLMs with Gaussian family and log links.
^bAdditive scale estimates were obtained from generalized linear models with Gaussian family and identity links.
*** *P* < 0.001.

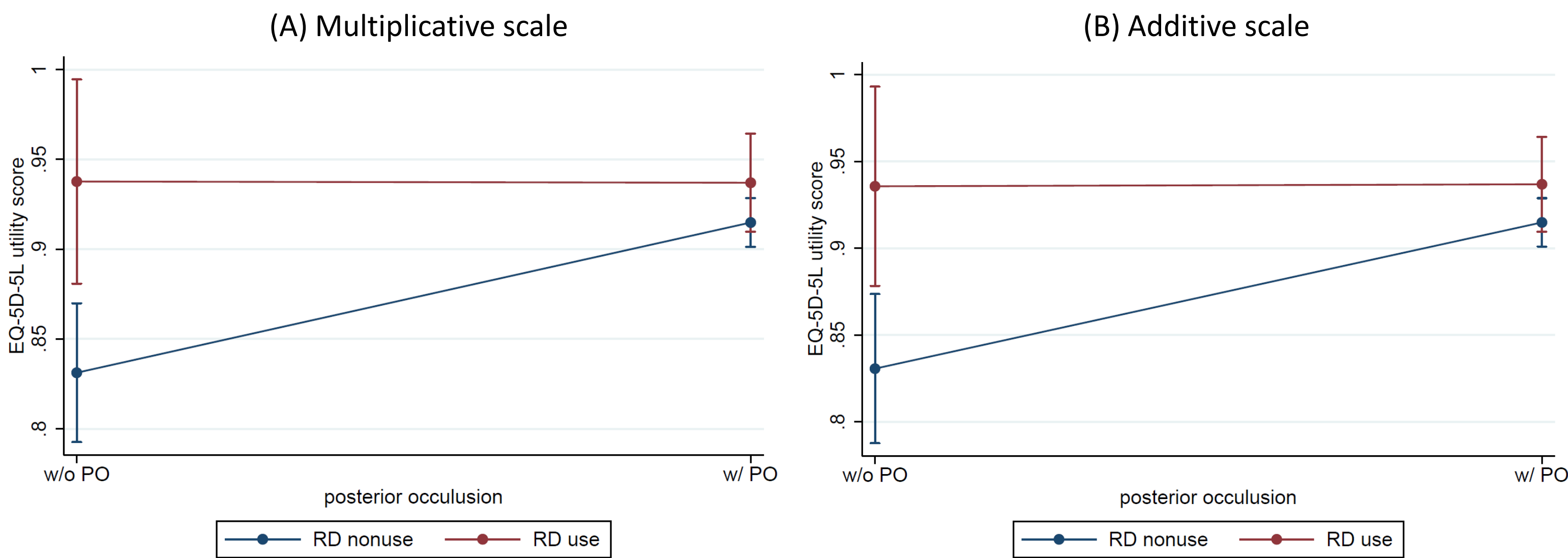


Fig. 2. Interaction between RD use and PO obtained by GLMs after adjusting for all covariates (n = 562)

Discussions

- **RD use was associated with higher HRQoL among individuals without PO**, but not among those with PO.
- Loss of PO may reduce mastication and lead to poorer nutrient intake and lower HRQoL¹⁵), whereas RD can support more varied, higher-quality dietary intake even in those who have lost PO¹⁶).
- Prioritizing timely prosthetic rehabilitation in patients without PO may be associated with higher patient-centered outcomes and inform resource allocation in dental care.
- The subgroup without PO included only 25 participants (4.4%), so these findings should be interpreted with caution.

References: 1) Park et al. *Health Qual Life Outcomes*. 2019, 2) Naito et al. *J Oral Sci*. 2006, 3) Takemae et al. *Environ Health Prev Med*. 2012, 4) Kuo et al. *Qual Life Res*. 2013, 5) Cakir et al. *J Prosthodont*. 2014, 6) Ikeda et al. *Qual Life Res*. 2023, 7) Hoshi-Harada et al. *J Prosthodont Res*. 2026, 8) Wickert et al. *Eur J Oral Sci*. 2014, 9) Tsuda et al. *J Kyushu Dent Soc*. 2017, 10) Fukuda et al. *J Epidemiol*. 2023, 11) Ikeda et al. *Journal of the National Institute of Public Health*. 2015, 12) Kinugawa et al. *JDR Clin Trans Res*. 2026, 13) Miyano et al. *Sci Rep*. 2025, 14) McClure et al. *Value Health*, 2017. 15) Iwasaki et al. *J Oral Rehabil*. 2016, 16) Marshall et al. *J Am Dent Assoc*. 2002