評価対象論文リスト（要因：歯の本数、アウトカム：死亡）

評価判定日：2024/11/29

①既存の系統的レビュー・メタ解析・統合解析

1	Polzer I, Schwahn C, Völzke H, Mundt T, Biffar R. The association of tooth loss with all-cause and circulatory mortality. Is there a benefit of replaced teeth? A systematic review and meta-analysis. Clin Oral Invest. 2012;16(2):333-351. doi:10.1007/s00784-011-0625-9
2	Aminoshariae A, Nosrat A, Jakovljevic A, Jaćimović J, Narasimhan S, Nagendrababu V. Tooth loss is a risk factor for cardiovascular disease mortality: a systematic review with meta-analyses. Journal of Endodontics. 2024;50(10):1370-1380. doi:10.1016/j.joen.2024.06.012
3	Peng J, Song J, Han J, et al. The relationship between tooth loss and mortality from all causes, cardiovascular diseases, and coronary heart disease in the general population: systematic review and dose–response meta-analysis of prospective cohort studies. Bioscience Reports. 2019;39(1):BSR20181773. doi:10.1042/BSR20181773

②日本人集団の個別疫学研究

4	Ando A, Tanno K, Ohsawa M, et al. Associations of number of teeth with risks for all-cause mortality and cause-specific mortality in middle-aged and elderly men in the northern part of Japan: the Iwate-KENCO study. Comm Dent Oral Epid. 2014;42(4):358-365. doi:10.1111/cdoe.12095
5	Kusama T, Takeuchi K, Kiuchi S, Aida J, Kondo K, Osaka K. Weight loss mediated the relationship between tooth loss and mortality risk. J Dent Res. 2023;102(1):45-52. doi:10.1177/00220345221120642
6	Suma S, Naito M, Wakai K, et al. Tooth loss and pneumonia mortality: A cohort study of Japanese dentists. Amar S, ed. PLoS ONE. 2018;13(4):e0195813. doi:10.1371/journal.pone.0195813
7	Goto Y, Wada K, Uji T, et al. Number of teeth and all-cause and cancer mortality in a japanese community: the takayama study. Journal of Epidemiology. 2020;30(5):213-218. doi:10.2188/jea.JE20180243
8	Furuta M, Takeuchi K, Adachi M, et al. Tooth loss, swallowing dysfunction and mortality in Japanese older adults receiving home care services. Geriatrics Gerontology Int. 2018;18(6):873-880. doi:10.1111/ggi.13271
9	Tani Y, Yamamoto T, Kusama T, et al. Cooking skills modify the association between oral health and mortality. Age and Ageing. 2023;52(9):afad180. doi:10.1093/ageing/afad180
10	Nakazawa N, Kusama T, Cooray U, et al. Large contribution of oral status for death among modifiable risk factors in older adults: the japan gerontological evaluation study (Jages) prospective cohort study. Fielding R, ed. The Journals of Gerontology: Series A. 2023;78(1):167-173.
11	Matsuyama Y, Aida J, Watt RG, et al. Dental status and compression of life expectancy with disability. J Dent Res. 2017;96(9):1006-1013. doi:10.1177/0022034517713166
12	Saito M, Shimazaki Y, Nonoyama T, Tadokoro Y. Association of oral health factors related to oral function with mortality in older Japanese. Gerodontology. 2021;38(2):166-173. doi:10.1111/ger.12508
13	Ishikawa S, Konta T, Susa S, et al. Association between presence of 20 or more natural teeth and all-cause, cancer-related, and cardiovascular disease-related mortality: Yamagata (Takahata) prospective observational study. BMC Oral Health. 2020;20(1):353. doi:10.1186/s12903-020-01346-6
14	Koyama E, Kimura-Ono A, Mino T, et al. Does maintaining the number of present and functional teeth benefit the longevity of life in older people requiring nursing care?: A prospective cohort study. J Prosthodont Res. 2024;68(4):599-605. doi:10.2186/jpr.JPR_D_23_00221

15	Hiratsuka T, Komiyama T, Ohi T, et al. Contribution of systemic inflammation and nutritional status to the relationship between tooth loss and mortality in a community-dwelling older Japanese population: a mediation analysis of data from the Tsurugaya project. Clin Oral Invest. 2020;24(6):2071-2077. doi:10.1007/s00784-019-03072-y
16	Kino S, Tamada Y, Takeuchi K, et al. Exploring the relationship between oral health and multiple health conditions: An outcome-wide approach. J Prosthodont Res. 2023;68(3):415-424. doi:10.2186/jpr.JPR_D_23_00091

■コホート研究（コホートのプール解析含む）

Reference													
				Study subjects									
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
Ayumi Ando, et al.	Associations of number of teeth with risks for all-cause mortality and cause-specific mortality in middle-aged and elderly men in the northern part of Japan: the Iwate-KENCO study	2014	From 2002-2005 to 2009	7779 men 40-79 years	Iwate-KENCO study	All-cause mortality and cause-specific mortality (cancer, CVD, and noncancer, non-CVD)	A total of 455 deaths (including 175 deaths from cancer, 98 deaths from CVD, and 130 deaths from noncancer, non-CVD)	Japanese	**ALL (40–79 years)** All-cause mortality No teeth — 161 — 1.28 (0.97–1.68) 1-9 teeth — 120 — 1.24 (0.94–1.63) 10-19 teeth — 78 — 1.04 (0.77–1.41) ≥20 teeth — 96 — Ref. — (P for trend 0.049) — Magnitude: - **40–64 years** No teeth — 15 — 2.75 (1.37–5.49) 1-9 teeth — 16 — 1.89 (0.99–3.63) 10-19 teeth — 24 — 1.94 (1.09–3.43) ≥20 teeth — 24 — Ref. — (P for trend 0.004) — Magnitude: ↑↑ **65–79 years** No teeth — 146 — 1.06 (0.79–1.43) 1-9 teeth — 104 — 1.08 (0.79–1.47) 10-19 teeth — 54 — 0.82 (0.57–1.17) ≥20 teeth — 72 — Ref. — (P for trend 0.359) — Magnitude: -				age, body mass index, systolic blood pressure, total- and HDL-cholesterol, HbA1c, current smoking, current alcohol drinking, and low level of education	
Kusama T, et al.	Weight Loss Mediated the Relationship between Tooth Loss and Mortality Risk	2023	2013-2019	34,510	Japan Gerontological Evaluation Study (JAGES)	Death	4825	Japanese	**Mediator: >5% Weight Loss** — Death 20 or more teeth — Ref. (Total effect) 0–19 Teeth — N/A — 1.28 [1.16, 1.40] 10–19 Teeth — 1.11 [1.00, 1.22] 1–9 Teeth — 1.36 [1.12, 1.53] Edentulous — 1.60 [1.34, 1.87] — (P for trend N/A) — Magnitude: ↑↑ **>5% Weight Gain** 20 or more teeth — Ref. (Total effect) 0–19 Teeth — N/A — 1.29 [1.16, 1.42] 10–19 Teeth — 1.14 [1.01, 1.27] 1–9 Teeth — 1.34 [1.15, 1.53] Edentulous — 1.64 [1.34, 1.94] — (P for trend N/A) — Magnitude: ↑↑				sex, age, equivalent income, education, comorbidities (stroke, diabetes, and cancer) marital status, walking time as physical activity, smoking status, drinking habits, depressive symptoms, use of dental prosthesis, and body mass index at baseline.	
Goto Y, et al.	Number of Teeth and All-Cause and Cancer Mortality in a Japanese Community: The Takayama Study.	2020	2002 to 2013	11,273 (aged 45 to 79 y) (4,968 men and 6,305	Takayama Study	All-cause mortality and cause-specific mortality (cancer, and	1,098 (435 cancer-related and 235 cardiovascular-related)	Japanese	All-cause mortality 20 or more teeth — 367 — Ref. 10–19 — 274 — 1.18 (1.01–1.39) 0–9 — 457 — 1.19 (1.03–1.39) Per 1 tooth lost — - — 1.01 (1.00–1.01) — (P for trend 0.01)				Age, sex, education level, body mass index in quartile, physical activity score (METs-h=week), alcohol consumption in quartile, smoking status marital status (married or not married), and	↑
Tani Y, et al.	Cooking skills modify the association between oral health and mortality.	2023	2016–2019	10,121	Japan Gerontological Evaluation Study	Mortality	488	Japanese	All-cause mortality 20 or more teeth — N/A — Ref. 10–19 — 1.32(0.97–1.80) 0–9 — 1.65(1.26–2.16) — (P for trend N/A)				Age, sex, education, income, marital status, and employment status, instrumental activities of daily living and health status (BMI, depressive	↑↑
Nakazawa N, et al.	Large Contribution of Oral Status for Death Among Modifiable Risk Factors in Older Adults: The Japan Gerontological Evaluation Study (JAGES) Prospective Cohort Study.	2023	2010-2017	Men (n = 24 175) Women (n = 27 888)	Japan Gerontological Evaluation Study (JAGES)	All-cause mortality	6104	Japanese	**Men** — All-cause mortality 20 or more teeth — 805 — Ref. 10–19 — 857 — 1.15 (1.04–1.27) 1–9 — 1208 — 1.35 (1.22–1.48) 0 — 1018 — 1.67 (1.51–1.86) PAF(%) (number of teeth) — 20.1 — (P for trend N/A) — Magnitude: ↑↑ **Women** 20 or more teeth — 452 — Ref. 10–19 — 468 — 1.08 (0.94–1.23) 1–9 — 656 — 1.08 (0.94–1.22) 0 — 640 — 1.37 (1.19–1.56) PAF(%) (number of teeth) — 7.2 — (P for trend N/A) — Magnitude: ↑				age, marital status (married, bereavement, divorce, and never), and socioeconomic status (education status, equivalent household income), and other modifiable risk factors (masticatory disability, dry mouth, cough reflex, hypertension, diabetes, heart disease, stroke, depression, alcohol drinking, smoking status, physical activity)	
Matsushima Y, et al.	Dental Status and Compression of Life Expectancy with Disability.	2017	1,374 days from 2010 (3.8 years)	Men (n = 36,074) Women (n = 41,323) 65 y or more	Japan Gerontological Evaluation Study (JAGES)	Onset of functional disability and all-cause mortality	Dead without disability (n=2550), dead after being disabled states (n=968)	Japanese	Healthy to dead **Men** — 1665 20 or more teeth — 0.58 (0.50-0.68) 10–19 — 0.71 (0.62-0.82) 1–9 — 0.80 (0.70-0.91) 0 — Ref. — (P for trend N/A) — Magnitude: ↓↓ **Women** — 885 20 or more teeth — 0.70 (0.57-0.85) 10–19 — 0.81 (0.67-0.98) 1–9 — 0.77 (0.64-0.92) 0 — Ref. — (P for trend N/A) — Magnitude: ↓					

Author	Title	Year	Period	N	Study	Outcome	Events	Population	Category	n	HR (95% CI)	p	Adjustments	
									Healthy to disabled					
									Men	1514			age, denture use, education, self-reported comorbidity, self-rated health, smoking status, alcohol drinking status, walking time, BMI, depression assessed by the Geriatric Depression Scale	
									20 or more teeth		0.52 (0.44-0.61)			
									10–19		0.65 (0.56-0.76)			
									1–9		0.77 (0.67-0.88)	N/A		
									0		Ref.			
									Women	1557				
									20 or more teeth		0.58 (0.49-0.68)			
									10–19		0.75 (0.65-0.86)			
									1–9		0.73 (0.64-0.83)	N/A		
									0		Ref.			
									Disabled to dead					
									Men	629				↑
									20 or more teeth		1.26 (0.99-1.60)			
									10–19		1.20 (0.94-1.53)			
									1–9		1.14 (0.93-1.40)	N/A		
									0		Ref.			
									Women	339				↑ ↑ ↑
									20 or more teeth		2.42 (1.72-3.38)			
									10–19		2.42 (1.76-3.34)			
									1–9		1.41 (1.04-1.90)	N/A		
									0		Ref.			
Saito M, et al.	Association of oral health factors related to oral function with mortality in older Japanese.	2021	2014-2018	4765 (75y : 2773, 80 y: 1992)		Death	283	Japanese		Death			age, sex, smoking habit, body mass index and medical history (stroke, cardiovascular disease, cancer and pulmonary disease)	-
									20 or more teeth	125	Ref.			
									19-0	158	1.24 (0.97-1.58)	0.086		
									Number of poor oral health factors (number of teeth, swallowing difficulty, oral dryness, and oral hygiene status)					
									0		Ref			
									1		1.28 (0.97-1.69)			
									2		1.49 (1.04-2.13)			
									3 or 4		4.37 (2.65-7.20)			
Ishikawa S, et al.	Association between presence of 20 or more natural teeth and all-cause, cancer-related, and cardiovascular disease-related mortality: Yamagata (Takahata) prospective observational study.	2020	2005-2016	2208 participants aged 40 or more years	Takahata Study	All-cause, cancer-related, and cardiovascular disease-related mortalities	219 (82: cancer deeath, 55: CVD death)	Japanese	**All**	All-cause mortality			age, sex, body mass index, smoking habit, alcohol consumption, educational status, hypertension, diabetes mellitus, and perceived mental stress	↑ ↑
									20 or more teeth	90	Ref.			
									< 20	129	1.604 (1.007–2.555)	0.047		
									Men					↑ ↑
									20 or more teeth		Ref.			
									< 20	153	1.775 (1.012–3.114)	0.045		
									Women					-
									20 or more teeth		Ref.			
									< 20	66	1.382 (0.565–3.380)	0.479		
									< 65 years					-
									20 or more teeth		Ref.			
									< 20	48	1.031 (0.411–2.583)	0.948		
									65 or more years					↑ ↑ ↑
									20 or more teeth		Ref.			
									< 20	170	3.126 (1.651–5.922)	< 0.001		
Hiratsuka T, et al.	Contribution of systemic inflammation and nutritional status to the relationship between tooth loss and mortality in a community-dwelling older Japanese population: a mediation analysis of data from the Tsurugaya project.	2020	2003-2016	891 participants aged 70 or more years	Tsurugaya project	All-cause mortality	31	Japanese		All-cause mortality			age, sex, smoking status, alcohol consumption, medical history, educational level, depressive symptoms, cognitive function, and physical function	↑ ↑
									20 or more teeth		Ref.			
									10–19 teeth		1.11 (0.80–1.54)			
									1–9 teeth	N/A	1.75 (1.28–2.40)	N/A		
									Edentulous		1.84 (1.30–2.59)			
Kino S, et al.	Exploring the relationship between oral health and multiple health conditions: An outcome-wide approach.	2024	2013-2019	32827 people aged 65 or more years	Japan Gerontological Evaluation Study (JAGES)	Death, dementia, and functional disability	N/A	Japanese		Death			age, sex, marital status, whether living alone, educational level, employment status, and equivalent household income. Additionally adjusted for smoking and drinking habits reported in the pre-baseline	↑
									20 or more teeth		Ref.			
									10-19 teeth with prosthesis		1.10 (1.01, 1.21)			
									0-9 teeth with prosthesis	N/A	1.26 (1.17, 1.35)	N/A		

10-19 teeth without prosthesis	1.16 (1.03, 1.32)	survey. Furthermore, the pre-baseline values of all outcomes in the 2010 survey
0-9 teeth without prosthesis	1.33 (1.19, 1.48)	

■メタ解析、系統的レビュー

Reference			Include study					Design	Category	Relative risk (95% CI or p)	Weight	**Magnitude of association**
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)				
Peng J, et al.	The relationship between tooth loss and mortality from all causes, cardiovascular diseases, and coronary heart disease in the general population: systematic review and dose-response meta-analysis of prospective cohort studies.	2019					Global population (including Japanese)	All-cause mortality	Meta-analysis of prospective studies (cohort, case-cohort, and nested case–control studies)	10 teeth lost	1.15 (1.11–1.19)		↑
										20 teeth lost	1.33 (1.24–1.42)		↑
										32 teeth lost	1.57 (1.41–1.75)		↑ ↑
			15	Hayasaka	2013	2006-2010	Japan (Osaki Cohort 2006)	All-cause mortality		10 teeth lost	1.10 (1.06-1.15)		
										20 teeth lost	1.22 (1.12-1.33)		
										32 teeth lost	1.37 (1.19-1.57)		
			11	Ando	2014	From 2002-2005 to 2009	Japan (Iwate-KENCO Study)	All-cause mortality		10 teeth lost	1.08 (1.00-1.17)		
										20 teeth lost	1.17 (1.00-1.37)		
										32 teeth lost	1.29 (1.00-1.66)		