評価対象論文リスト(要因:歯の本数、アウトカム:フレイル・サルコペニア)

評価判定日:2024/11/29

(フレイル)

①既存の系統的レビュー・メタ解析・統合解析

1	Hakeem FF, Bernabé E, Sabbah W. Association between oral health and frailty: A systematic review of longitudinal studies. Gerodontology. 2019;36(3):205-215. doi:10.1111/ger.12406
2	Slashcheva LD, Karjalahti E, Hassett LC, Smith B, Chamberlain AM. A systematic review and gap analysis of frailty and oral health characteristics in older adults: A call for clinical translation. Gerodontology. 2021;38(4):338-350. doi:10.1111/ger.12577
3	Dibello V, Lobbezoo F, Lozupone M, et al. Oral frailty indicators to target major adverse health-related outcomes in older age: a systematic review. Geroscience. 2023;45(2):663-706. doi:10.1007/s11357-022-00663-8

②日本人集団の個別研究

4	Satake A, Kobayashi W, Tamura Y, et al. Effects of oral environment on frailty: particular relevance of tongue pressure. Clin Interv Aging. 2019;14:1643-1648. Published 2019 Sep 12. doi:10.2147/CIA.S212980
5	Albani V, Nishio K, Ito T, et al. Associations of poor oral health with frailty and physical functioning in the oldest old: results from two studies in England and Japan. BMC Geriatr. 2021;21(1):187. Published 2021 Mar 18. doi:10.1186/s12877-021-02081-5
6	Suthutvoravut U, Tanaka T, Takahashi K, Akishita M, Iijima K. Living with Family yet Eating Alone is Associated with Frailty in Community-Dwelling Older Adults: The Kashiwa Study. J Frailty Aging. 2019;8(4):198-204. doi:10.14283/jfa.2019.22
7	佐藤 美寿々, 岩﨑 正則, 皆川 久美子, 小川 祐司, 山賀 孝之, 葭原 明弘, 宮﨑 秀夫, 地域在住高齢者における現在歯数および義歯の使用状況・主観的評価とフレイルとの関連についての横断研究, 口腔衛生学会雑誌, 2018, 68 巻, 2 号, p. 68-75, 公開日 2018/05/18, Online ISSN 2189-7379, Print ISSN 0023-2831, https://doi.org/10.5834/jdh.68.2_68, https://www.jstage.jst.go.jp/article/jdh/68/2/68_68/_article/-
8	Miyano T, Kaneko R, Kimura T, et al. Dietary Problems Are Associated with Frailty Status in Older People with Fewer Teeth in Japan. Int J Environ Res Public Health. 2022;19(23):16260. Published 2022 Dec 5. doi:10.3390/ijerph192316260
9	Murotani Y, Hatta K, Takahashi T, et al. Oral Functions Are Associated with Muscle Strength and Physical Performance in Old-Old Japanese. Int J Environ Res Public Health. 2021;18(24):13199. Published 2021 Dec 15. doi:10.3390/ijerph182413199
10	Takeuchi N, Sawada N, Ekuni D, Morita M. Oral Factors as Predictors of Frailty in Community-Dwelling Older People: A Prospective Cohort Study. Int J Environ Res Public Health. 2022;19(3):1145. Published 2022 Jan 20. doi:10.3390/ijerph19031145
11	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(12):1661-1667. doi:10.1093/gerona/glx225
12	Iwasaki M, Yoshihara A, Sato M, et al. Dentition status and frailty in community-dwelling older adults: A 5-year prospective cohort study. Geriatr Gerontol Int. 2018;18(2):256-262. doi:10.1111/ggi.13170
13	Horibe Y, Ueda T, Watanabe Y, et al. A 2-year longitudinal study of the relationship between masticatory function and progression to frailty or pre-frailty among community-dwelling Japanese aged 65 and older. J Oral Rehabil. 2018;45(11):864-870. doi:10.1111/joor.12700

-	(総説)Watanabe Y, Okada K, Kondo M, Matsushita T, Nakazawa S, Yamazaki Y. Oral health for achieving longevity. Geriatr Gerontol Int. 2020;20(6):526-538. doi:10.1111/ggi.13921

（サルコペニア）

①既存の系統的レビュー・メタ解析・統合解析

1	Moynihan PJ, Teo JL. Exploring oral function, protein intake, and risk of sarcopenia: a scoping review. JDR Clinical & Translational Research. 2024;9(1):4-20. doi:10.1177/23800844231157259

②日本人集団の個別研究

-	（総説） Watanabe Y, Okada K, Kondo M, Matsushita T, Nakazawa S, Yamazaki Y. Oral health for achieving longevity. Geriatrics Gerontology Int. 2020;20(6):526-538. doi:10.1111/ggi.13921
2	Hatta K, Ikebe K. Association between oral health and sarcopenia: A literature review. J Prosthodont Res. 2021;65(2):131-136. doi:10.2186/jpr.JPOR_2019_567
3	Abe T, Tominaga K, Ando Y, et al. Number of teeth and masticatory function are associated with sarcopenia and diabetes mellitus status among community-dwelling older adults: A Shimane CoHRE study. Fürnsinn C, ed. PLoS ONE. 2021;16(6):e0252625.
4	Inui A, Takahashi I, Sawada K, et al. Teeth and physical fitness in a community-dwelling 40 to 79-year-old Japanese population. Clin Interv Aging. 2016;11:873-878. doi:10.2147/CIA.S108498
5	稲田さくら. 口腔状態とサルコペニアとの関連についての横断研究. Published online 2024. doi:10.5834/jdh.74.1_21
6	Iwasaki M, Kimura Y, Ogawa H, et al. The association between dentition status and sarcopenia in J apanese adults aged ≥75 years. J of Oral Rehabilitation. 2017;44(1):51-58. doi:10.1111/joor.12460
7	Tanaka T, Takahashi K, Hirano H, et al. Oral frailty as a risk factor for physical frailty and mortality in community-dwelling elderly. The Journals of Gerontology: Series A. 2018;73(12):1661-1667. doi:10.1093/gerona/glx225
8	Murakami M, Hirano H, Watanabe Y, Sakai K, Kim H, Katakura A. Relationship between chewing ability and sarcopenia in J apanese community‐dwelling older adults. Geriatrics Gerontology Int. 2015;15(8):1007-1012. doi:10.1111/ggi.12399
9	Takata Y, Ansai T, Awano S, et al. Relationship of physical fitness to chewing in an 80‐year‐old population. Oral Diseases. 2004;10(1):44-49. doi:10.1046/j.1354-523X.2003.00972.x
10	Murotani Y, Hatta K, Takahashi T, et al. Oral functions are associated with muscle strength and physical performance in old-old japanese. IJERPH. 2021;18(24):13199. doi:10.3390/ijerph182413199

（フレイル）

■コホート研究

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**
Tanaka T, et al.	Oral Frailty as a Risk Factor for Physical Frailty and Mortality in Community-Dwelling Elderly	2018	2012-2016	n=2011	community-dwelling elderly individuals (65 years old and over)	Physical frailty	83/1151	japanese	Number of remaining teeth (<20)		Cox proportional hazard model		age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly income, and smoking behavior; participants having baseline outcomes were excluded from	
									Physical frailty not onset	31%		p＝0.052		
									Physical frailty onset	38%				
									Number of functioning teeth (<Q1/5 : 26)				age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly	
									Physical frailty not onset	14%		p＝0.619		
									Physical frailty onset	15%				
									oral frailty status				age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly income, and smoking behavior;	
									Non- oral frail (0/6)		Ref			
									Pre- oral frail (1–2/6)		HR = 1.85 (1.06–3.23)	p = .031		
									oral Frail (≥3/6)		HR = 2.41 (1.27–4.55)	p = .007	oral frail (i) the number of natural teeth, (ii) chewing ability, (iii) articulatory oral motor skill for “ta,”	
Iwasaki M, et al	Dentition status and frailty in community-dwelling older adults: A 5-year prospective cohort study	2018	2003-2008	n=322	community-dwelling Japanese adults aged 75 years	frailty	48/322	japanese	Functional dentition status(-)	37/204	Ref		sex, income, education, smoking status, body mass index, low albumin, high C-reactive protein, diabetes and cardiovascular disease.	↓ ↓
									Functional dentition status(+) 20本以上の歯と9対以上の閉塞性歯がある場合	11/118	HR 0.50 (0.25–0.98)	N/A		
Takeuchi N, et al.	Oral Factors as Predictors of Frailty in Community-Dwelling Older People: A Prospective Cohort Study	2022	2017-2021	n=97	Participants who visited the Preventive Dentistry Clinic at Okayama University Hospital		34/97	japanese	Number of teeth present (n)		Mann–WhitneyUtest,			NS
									Robust Group		21.8 ± 6.7	p=0.062		
									Frailty Group		19.1 ± 7.2			
									Number of functional teeth (n)					
									Robust Group		27.0 ± 2.0	p=0.142		
									Frailty Group		25.3 ± 5.3			

Horibe Y., etal	A 2-year longitudinal study of the relationship between masticatory function and progression to frailty or pre-frailty among community-dwelling Japanese aged 65 and older	2018	2013-2015	n=418	community-dwelling Japanese adults aged 65-86 years	frail, pre-frail	japanese	Number of remaining teeth	OR 1.26 (0.71-2.25)	p= 0.43	Age, Sex , Hand grip, Walking speed , Mini-Mental State Examination , Self-Rating Depression Scale, Skeletal mass index, Number of medications taken, **Mixing ability**	
									OR 0.94 (0.54- 1.64)	p= 0.83	Age, Sex , Hand grip, Walking speed , Mini-Mental State Examination , Self-Rating Depression Scale, Skeletal mass index, Number of medications taken, Occlusal force	
									OR 0.98 (0.57-1.66)	p=0.93	Age, Sex , Hand grip, Walking speed , Mini-Mental State Examination , Self-Rating Depression Scale, Skeletal mass index, Number of medications taken, **Self-reported chewing ability**	NS

■横断研究

Reference			Study subjects											
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or	Participant's race	Category		Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	**Magnitude of association**
Satake A., et al	Effects of oral environment on frailty: particular relevance of tongue pressure	2019	–	n=467	community-dwelling volunteers	frailty		japanese	Number of teeth			OR 0.963(0.930–0.997)	p = 0.032	?	↓
Albani V., et al	Associations of poor oral health with frailty and physical functioning in the oldest old: results from two studies in England and Japan	2021	–	n=542	randomly recruited people resident in	Frailty	120 (22%)	japanese	Complete tooth loss			OR (95% CI)□		age, sex, BMI, alcohol intake, smoking status, education level, cardiovascular disease, diabetes, and hypertension	
										1 or more teeth	69 (19%)	Ref			
										No teeth	46	OR 1.67 (1.05, 2.67)	N/A		↑ ↑
Suthutvoravut U., et al	Living with Family yet Eating Alone is Associated with Frailty in Community-Dwelling Older Adults: The Kashiwa Study	2019	–	n=1914		Frailty		japanese	Number of functional teeth			Binary Logistic Regression		age, years of education, chronic diseases, MMSE, and number of functional	
											men	OR 0.96(0.89-1.0)	p=0.311		
											women	OR N/A(0.86-1.0)	p= 0.069		
佐藤 美寿々, 他	地域在住高齢者における現在歯数および義歯の使用状況・主観的評価とフレイルとの関連についての横断研究	2018	–	n=344	地域在住高齢者	Frailty		日本人	現在歯数（1本増加ごと）			OR 0.94（0.90–0.99）	N/A	性別，体格，精神健康状態	
									現在歯数	20本未満		Ref		性別，体格，精神健康状態	
										20本以上		OR 0.39（0.15–0.97）	N/A		
									現在歯数20本未満のみで						
										義歯使用		Ref		性別，体格，精神健康状態	
										義歯不使用		OR 17.89（5.00–64.32）			
Miyano T., et al	Dietary Problems Are Associated with Frailty Status in Older People with Fewer Teeth in Japan	2022	_	n=160	community-dwelling older people who aged 75 and older	Frailty		japanese	Number of remaining teeth		Frailty	chi-square test			
										<20 Teeth	34%		p＝0.011		
										≧20 Teeth	15.9%				

（サルコペニア）

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	**Magnitude of association**
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or	Participant's race						
Tanaka T., et al	Oral Frailty as a Risk Factor for Physical Frailty and Mortality in Community-Dwelling Elderly（※提言記載）	2018	2012-2016	n=2011	community-dwelling elderly individuals (65 years old and over)	Sarcopenia	63/1216	japanese	Number of remaining teeth (<20) Sarcopenia not onset Sarcopenia onset	31% 41%	Cox proportional hazard model	p＝0.041	age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly income, and smoking behavior	
									Number of functioning teeth Sarcopenia not onset Sarcopenia onset	14% 14%		p＝0.843	age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly income, and smoking behavior	
						Sarcopenia			oral frailty status Non- oral frail (0/6) Pre- oral frail (1–2/6) **oral Frail (≥3/6)**	N/A N/A N/A	Ref HR = 1.85 (0.95–3.58) p = .070 HR = 2.13 (1.05–4.58) p = .032		age, sex, BMI, chronic conditions, depressive symptoms, cognitive function, living arrangement, yearly income, and smoking behavior: oral frail (i) the number of natural teeth, (ii) chewing ability, (iii) articulatory oral motor skill for “ta,” (iv) tongue pressure, (v) subjective difficulty in eating tough foods, and (vi) subjective difficulty in swallowing.oral	

※オーラルフレイルの指標の中に、歯の本数が含まれる

■横断研究　7件

Reference			Study subjects											
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	**Magnitude of association**
Abe T., et al	Number of teeth and masticatory function are associated with sarcopenia and diabetes mellitus status among community-dwelling older adults: A Shimane CoHRE study　※319提言あり	2021	-	n=635	community-dwelling Japanese adults	Handgrip strength, Skeletal muscle mass, Calf circumference		japanese	Number of teeth **Handgrip strength** Skeletal muscle mass Calf circumference **Possible sarcopenia**	 N/A N/A N/A 20(3.2%)	OR(95%CI) 0.961 (0.932–0.992) 0.980 (0.951–1.010) 0.980 (0.957–1.004) 0.949 (0.907–0.992)	N/A	sex, age, body mass index, smoking, alcohol consumption, physical activity, diabetes mellitus status	 ↓ ↓
Inui A., et al	Teeth and physical fitness in a community-dwelling 40 to 79-year-old Japanese population	2016	-	n=552	community-dwelling 40 to 79-year-old Japanese population	time 10 m walk test, Hand grip strength, SMM		japanese	Number of teeth Timed 10 m walk test (s) Hand grip strength (kg) Skeletal muscle mass (kg)	 β (p-value), Males = -0.128 (0.088) β (p-value), Females = -0.157 (0.007) β (p-value), Males = 0.092 (0.198) β (p-value), Females = -0.086 (0.145) β (p-value), Males = 0.111 (0.031) β (p-value), Females = -0.045 (0.400)				
稲田さくら	口腔状態とサルコペニアとの関連についての横断研究	2024	-	n=50	大学病院の歯科・予防歯科を受診した患者	サルコペニア		japanese	 非サルコペニア群（n=33） サルコペニア群（n=17）	現在歯数（本） 24.0（19.0,27.0） 22.0（11.0,24.0）	χ2 p=0.098	N/A		
Iwasaki M., et al	The association between dentition status and sarcopenia in Japanese adults aged ≥75 years	2017	-	n=272	community-dwelling Japanese adults aged ≥75 years	sarcopenia		japanese	number of natural teeth ≥20 10-19 1-9 0 number of occluding pairs of natural teeth ≥10 1-9 0	 	OR（95%CI） Ref OR 1.76 (0.68 to 4.58) 2.47 (0.92 to 6.62) 1.24 (0.49 to 3.19) OR（95%CI） Ref 1.24 (0.49 to 3.19) 3.37 (1.07 to 10.61)	N/A N/A	age, sex, decreased ADL, cognitive impairment, involvement in exercise/sports, and low BMI) age, sex, decreased ADL, cognitive impairment, involvement in exercise/sports, and low BMI)	 ↑ ↑ ↑
Murakami M., et al	Relationship between chewing ability and sarcopenia in Japanese community-dwelling older adults（※提言記載）	2015		n=761	community-dwelling Japanese adults	sarcopenia	116/761	japanese	No.existing teeth(/tooth)		OR（95 %CI） OR1.01 (0.98–1.04)	p＝0.523		
Takata Y., et al	Relationship of physical fitness to chewing in an 80-year-old population	2004		n=697	community-dwelling Japanese adults ≧80 years old			japanese	Number of chewable foods 0-4 5-9 10-14 15 Number of teeth 0 1-9 10-19 >=20	Hand-grip strength [OR (95% CI)] 1.00 0.542 (0.172-1.714) 0.687 (0.234-2.017) 1.001 (0.328-3.052) 1.00 1.236 (0.656-2.329) 1.158 (0.564-2.377) 0.795 (0.355-1.779)	Leg extensor strength [OR (95% CI)] 1.00 0.780 (0.233-2.610) 1.796 (0.584-5.522) 1.093 (0.343-3.488) 1.00 1.100 (0.596-2.030) 1.365 (0.682-2.732) 1.817 (0.842-3.919)	Isokinetic leg extensor power [OR 1.00 3.767 (1.005-14.12 5.396 (1.584-18.38 4.885 (1.391-17.15 1.00 1.219 (0.645-2.303 1.964 (0.475-1.958 1.859 (0.387-1.905	Stepping rate [OR (95% CI)] 1.00 1.189 (0.444-3.184) 1.406 (0.559-3.532)* 1.732 (0.669-4.483) 1.00 1.131 (0.686-1.863) 1.299 (0.747-2.258) 0.833 (0.451-1.538)	One-leg standing time [OR (95% CI)] 1.00 2.333 (0.973-5.591) 2.349 (1.036-5.327)* 2.596 (1.108-6.082)* 1.00 1.341 (0.841-2.140) 1.191 (0.717-1.978) 1.380 (0.774-2.459)
Murotani Y., et al	Oral Functions Are Associated with Muscle Strength and Physical Performance in Old-Old Japanese	2021	-	n=511		grip strength. walking speed.		japanese	Number of remaining teeth Number of remaining teeth	N/A N/A	β（95%CI） β 0.01（-0.06 –0.07） β -0.02（-0.13–0.08）	p =0.86 p＜0.68	sex, heitht, oral wetness, Tongue-lip motor function , Tongue pressure, Swallowing function, Number of remaining teeth	