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Review

The risk factors related to bruxism in children: A systematic review and meta-analysis

Huaqi Guo[a,b,c], Tongxia Wang[b,d], Xiaohong Niu[a,b,c], Hui Wang[a,b,c], Weihan Yang[e], Jie Qiu[a,b,*], Lan Yang[a,b]

[a] Department of Maternal, Child and Adolescent Health, School of Public Health, Lanzhou University, No. 199 Dong Gang West Road, Gansu, China
[b] Gansu Provincial Maternity and Child Care Hospital, No. 143 North Road, Gansu, China
[c] Center for Evidence-Based Medicine, Lanzhou University, No. 199 Dong Gang West Road, Gansu, China
[d] School of Health Care Management, Shandong University, No. 44 Cultural West Road, Jinan, China
[e] School of Public Health, Gansu University of Chinese Medicine, No.10 Ding Xi East Road, Gansu, China

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ABSTRACT

Objective: This systematic review was performed to determine the risk factors related to bruxism in children.
Design: This systematic review was conducted with reporting in agreement to the PRISMA statement and according to guidelines from the Cochrane Handbook for Systematic Reviews of Interventions. We conducted a systematic search of seven online databases, with the last search updated on 1st October 2016. The seven databases were Pubmed, Embase, Cochrane Library database, Web of Science, CNKI, CBM, and WF. The included trial type were RCT, cohort studies, and case-control studies, and bruxism symptoms were assessed by questionnaires and examinations. Eighteen out of the 5637 initially identified studies met the inclusion and exclusion criteria.
Results: gender, age, gene, mixed position, anxiety, the nervous, secondhand smoke, high psychological reactions, responsibility, move a lot during sleep, sleeps with mouth open, snores loudly, restless sleep, sleep hours, sleep with light on, noise in room, headache, biting, cheeks tonus, perioral musculature participation, conduct problems, peer problems, emotional symptoms, mental health problems, birth weight, occupation of family head, maternal marital status, hyperactivity, family income seemed to have statistical significance from the present systematic review and meta-analysis.
Conclusions: The risk factors related to bruxism were as follows: Male, gene, mixed position, moves a lot, anxiety, the nervous, psychological reactions, responsibility, secondhand smoke, snore loudly, restless sleep, sleep with light on, noise in room, "sleep hours, ≤8 h", headache, objects biting, conduct problems, peer problems, emotional symptoms and mental health problems.

1. Introduction

Bruxism is a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible, and it has two distinct circadian manifestation: it can occur during sleep (indicated as sleep bruxism) or during wakefulness (indicates as awake bruxism) (Lobbezoo et al., 2013). And it is a source of many dental and neuromuscular problem, including tooth wear, periodontal disease, hypertrophy of the masticatory muscles, headaches, and temporomandibular disorders (Glaros and Rao, 1977aGlaros and Rao, 1977a; (Glaros and Rao, 1977b; Thompson, Blount, & Krumholz, 1994; Xhonga, 1977). Moreover, the quality of life in bruxers, especially those with pain, is also affected. A recent review reported a variability of prevalence between 3.5% and 40.6% with a commonly described decrease with age and no gender differences (Manfredini, Winocur, Guarda-Nardini, Paesani, & Lobbezoo, 2013). Variations in definition and diagnostic method of bruxism, population characteristics and research methodologies among different studies might partially contribute to the inconsistent results. In addition, children are the most critical period for human growth and development. So bruxism in children is an important public health problem.

Bruxism is associated with multiple risk factors, and hitherto there

Abbreviations: Embase, Excerpta Medica Database; CNKI, Chinese National Knowledge Infrastructure; CBM, Chinese Biomedical Literature Database; WF, Wan fang Data; OR, odd ratio; CI, confidence interval; ref, reference; NOS, Newcastle Ottawa scale; PRISMA, preferred reporting items for systematic reviews and meta-analyses; CRD, Centre for Reviews and Dissemination, University of York; RCT, randomized controlled trial

* Corresponding author at: Department of Maternal, Child and Adolescent Health, Gansu Provincial and Child Care Hospital, No. 143 North Road, Lanzhou, Gansu, China.
E-mail address: Qioujie814102@163.com (J. Qiu).

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Table 1
Characteristics of included studies: the relationship between outcome and bruxism.

Source year	Trial type, Sample size	Age	bruxism diagnostic means	Bruxers n1(n2)	Control n1(n2)	OR	95%CI	P	Outcome
Renner et al. (2012)	Cohort studies, n = 869	9–11 years	evaluated by means of a questionnaire applied to the parents/persons responsible for the children	152(95)	289(333)	1.84	1.37–2.49	< 0.05	Male, Female (ref)
				59(177)	138(453)	1.09	0.77–1.55	> 0.05	Birth weight 1500–2499 g, ≥2500 g (ref)
				18(177)	24(453)	1.92	1.02–3.62	< 0.05	Birth weight 500–1499g, ≥2500 g (ref)
				147(33)	364(129)	1.58	1.03–2.42	< 0.05	Occupation of family head,Skilled and semiskilled manual,Nonmanual(ref)
				53(33)	95(129)	2.18	1.31–3.63	< 0.05	Occupation of family head, Unskilled manual and unemployed, Nonmanual (ref)
				65(132)	115(400)	1.71	1.19–2.46	< 0.05	Maternal marital status, Cohabiting, Married (ref)
				40(132)	80(400)	1.52	0.99–2.32	> 0.05	Maternal marital status, No companion, Married (ref)
				40(197)	80(515)	1.307	0.864–1.977	> 0.05	Maternal marital status, No companion, companion (ref)
				172(74)	309(314)	2.3	1.725–3.235	< 0.05	Emotional symptoms
				116(130)	201(422)	1.87	1.386–2.533	< 0.05	Conduct problems
				93(154)	159(463)	1.759	1.284–2.408	< 0.05	Peer problems
				115(227)	126(401)	1.612	1.194–2.178	< 0.05	Hyperactivity
				137(111)	216(405)	2.314	1.715–3.123	< 0.05	Mental health problems
Renner et al. (2012)	Cohort studies, n = 805	7–9 years	evaluated by means of a questionnaire appliedto the parents/persons responsible for the children	76(56)	173(177)	1.389	0.927–2.079	> 0.05	Family income, Low, Medium (ref)
				76(56)	144(177)	1.668	1.108–2.512	< 0.05	Family income, High, Medium (ref)
				35(56)	68(177)	1.627	0.98–2.70	> 0.05	Family income, Unknown, Medium (ref)
				162(80)	316(247)	1.583	1.155–2.17	< 0.05	Emotional symptoms
				85(157)	135(428)	1.716	1.237–2.381	< 0.05	Peer problems
				142(100)	244(319)	1.856	1.368–2.519	< 0.05	Mental health problems
Serra-Negra, Pavia, Auad et al. (2012); Serra-Negra, Paiva, Flores-Mendoza et al. (2012)	Case control, n = 360	7–11 years	a questionnaire for parents/guardians	92(28)	163(77)			> 0.05	Neuroticism, High, Low (ref)
				74(46)	117(123)	1.6	1.0–2.5	< 0.05	Responsibility, High, Low (ref)
				73(47)	114(126)			> 0.05	CSS total-stress levels, High, Low (ref)
				80(40)	121(119)			> 0.05	CSS–physical reactions, High, Low (ref)
				92(28)	116(79)	1.8	1.1–2.9	< 0.05	CSS–psychological reactions, High, Low (ref)
				46(74)	66(174)			> 0.05	CSS–psychological reactions/ depression component, High, Low (ref)
				67(53)	128(112)			> 0.05	CSS–psychophysiological reactions, High, Low (ref)
Montaldo et al. (2012)	RCT, n = 498	7–11 years	Self-reported questionnaire, interview, clinical examination			RR = 4.50	2.17–9.35	< 0.05	Secondhand smoke(SHS), Heavily exposed children, no exposed children (ref)
						RR = 2.22	1.01–4.91	< 0.05	Secondhand smoke (SHS), Moderately exposed, no exposed children (ref)
						RR = 1.23	0.72–2.1	> 0.05	Secondhand smoke (SHS), Lightly exposed, no exposed children (ref)
						RR = 0.97	0.61–1.55	> 0.05	Secondhand smoke (SHS), Occasionally exposed, no exposed children (ref)
						RR = 3.11	2.24–4.32	< 0.05	Secondhand smoke (SHS), exposed, no exposed children (ref)
Tachibana et al. (2016)	Case control, n = 6023	2–12 years	questionnaires	670(593)	2355(2405)	1.09	0.96–1.24	> 0.05	Male, Female (ref)
				319(163)	1410(778)	1.03	0.81–1.31	> 0.05	Age 2–4, 11–12 (ref)
				395(163)	1046(778)	1.72	1.38–2.15	< 0.05	Age 5–7, 11–12(ref)

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