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SUPPLEMENTARY MATERIAL **OPEN ACCESS**

Effectiveness of Oral Hygiene Aids for Children with Special Healthcare Needs: A Systematic Review and Meta-Analysis

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PRISMA CHECKLIST

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 3
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 3,4
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 4,5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 6
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7

Section and Topic	Item #	Checklist item	Location where item is reported
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (*e.g.* for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 5,7
	10b	List and define all other variables for which data were sought (*e.g.* participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7,8
Effect measures	12	Specify for each outcome the effect measure(s) (*e.g.* risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (*e.g.* tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Page 8
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 8
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 8
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 8
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (*e.g.* subgroup analysis, meta-regression).	Page 9
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Page 9
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Page 9
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 9
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 10
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 10
Study characteristics	17	Cite each included study and present its characteristics.	Page 11, 12
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Page 14, 15
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (*e.g.* confidence/credible interval), ideally using structured tables or plots.	Page 15,16,17,18
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 19
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (*e.g.* confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Page 19
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Page 19
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Page 20
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Page

Section and Topic	Item #	Checklist item	Location where item is reported
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 21
	23b	Discuss any limitations of the evidence included in the review.	Page 25
	23c	Discuss any limitations of the review processes used.	Page 25
	23d	Discuss implications of the results for practice, policy, and future research.	Page 25
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 4
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 4
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Page 4
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 26
Competing interests	26	Declare any competing interests of review authors.	Page 26
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 26+27

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, *et al*. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. This work is licensed under CC BY 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/

SUPPLEMENTARY MATERIAL

Supplementary Table 1. The search string for databases.

Database	Search String	Result
PubMed /MEDLINE	#1 (“special needs” OR “special healthcare needs” OR “special health care needs” OR disabil* OR “intellectual disability” OR “intellectual disabilities” OR autism OR autistic OR “autism spectrum disorder” OR “cerebral palsy” OR “Down syndrome” OR ADHD OR “attention deficit hyperactivity disorder” OR “visual impairment” OR “visually impaired” OR blindness OR “hearing impairment” OR “hearing impaired” OR deafness) AND (child* OR children OR pediatric OR paediatric OR adolescent* OR adolescen* OR teenager* OR youth* OR infant* OR preschool* OR “school age” OR “school aged” OR “school-aged”) #2 (toothbrush* OR “manual toothbrush” OR “powered toothbrush” OR “power toothbrush” OR “electric toothbrush” OR “sonic toothbrush” OR “triple headed toothbrush” OR “three headed toothbrush” OR “modified toothbrush” OR (customised AND toothbrush*) OR (customised AND toothbrush*) OR “special needs toothbrush” OR “interdental brush” OR “dental floss” OR floss* OR “floss holder” OR “oral irrigator” OR “oral irrigation” OR “water flosser”) #3 (plaque OR “dental plaque” OR “plaque accumulation” OR “plaque control” OR “plaque removal” OR “plaque index” OR “Quigley Hein” OR “Quigley-Hein” OR TQHPI OR Turesky OR “oral hygiene” OR “oral hygiene index” OR gingivitis OR “gingival health” OR “gingival index” OR “Loe and Silness” OR “Löe and Silness” OR “Silness and Loe” OR “Silness and Löe”) #1 AND #2 AND #3 Filters: 1/1/2006 – 31/1/2026	147
Google Scholar	(intitle: “special needs” OR intitle: autism OR intitle: “cerebral palsy” OR intitle: “Down syndrome” OR intitle: disabled OR blind OR deaf OR intitle: “visual impairment” OR intitle: “hearing impairment”) AND (“oral hygiene aid” OR “oral hygiene device” OR “oral hygiene”) Filters: 2006 – 2026	397

Database	Search String	Result
Cochrance	#1 ((child* OR children OR pediatric OR paediatric OR adolescent* OR teenager* OR youth* OR infant* OR preschool* OR “school age” OR “school aged” OR “school-aged”) AND (“special needs” OR “special healthcare needs” OR “special health care needs” OR “intellectual disability” OR “intellectual disabilities” OR autism OR autistic OR “autism spectrum disorder” OR “cerebral palsy” OR “Down syndrome” OR “visual impairment” OR “visually impaired” OR blindness OR blind* OR “hearing impairment” OR “hearing impaired” OR deafness OR deaf*)) #2 (toothbrush* OR “manual toothbrush” OR “powered toothbrush” OR “power toothbrush” OR “electric toothbrush” OR “sonic toothbrush” OR “triple headed toothbrush” OR “three headed toothbrush” OR “modified toothbrush” OR (customised AND toothbrush*) OR (customised AND toothbrush*) OR “special needs toothbrush” OR “interdental brush” OR “dental floss” OR floss* OR “floss holder” OR “oral irrigator” OR “oral irrigation” OR “water flosser”) #3 (plaque OR “dental plaque” OR “plaque accumulation” OR “plaque control” OR “plaque removal” OR “plaque index” OR “Quigley Hein” OR “Quigley-Hein” OR TQHPI OR Turesky OR “oral hygiene” OR “oral hygiene index” OR gingivitis OR “gingival health” OR “gingival index” OR “Loe and Silness” OR “Löe and Silness” OR “Silness and Loe” OR “Silness and Löe”) #1 AND #2 AND #3 Filters: 1/1/2006 – 31/1/2026	145
Embase	#1 (child* OR 'children'/exp OR children OR 'pediatric'/exp OR pediatric OR 'paediatric'/exp OR paediatric OR adolescent* OR teenager* OR youth* OR infant* OR preschool* OR 'school age'/exp OR 'school age' OR 'school aged' OR 'school-aged') AND ('special needs' OR 'special healthcare needs' OR 'special health care needs' OR 'intellectual disability'/exp OR 'intellectual disability' OR 'intellectual disabilities'/exp OR 'intellectual disabilities' OR 'autism'/exp OR autism OR autistic OR 'autism spectrum disorder'/exp OR 'autism spectrum disorder' OR 'cerebral palsy'/exp OR 'cerebral palsy' OR 'down syndrome'/exp OR 'down syndrome' OR 'visual impairment'/exp OR 'visual impairment' OR 'visually impaired' OR 'blindness'/exp OR blindness OR blind* OR 'hearing impairment'/exp OR 'hearing impairment' OR 'hearing impaired' OR 'deafness'/exp OR deafness OR deaf*) #2 toothbrush* OR 'manual toothbrush' OR 'powered toothbrush' OR 'power toothbrush' OR 'electric toothbrush' OR 'sonic toothbrush' OR 'triple headed toothbrush' OR 'three headed toothbrush' OR 'modified toothbrush' OR (customized AND toothbrush*) OR (customised AND toothbrush*) OR 'special needs toothbrush' OR 'interdental brush' OR 'dental floss' OR floss* OR 'floss holder' OR 'oral irrigator' OR 'oral irrigation' OR 'water flosser' #3 plaque OR 'dental plaque' OR 'plaque accumulation' OR 'plaque control' OR 'plaque removal' OR 'plaque index' OR 'quigley hein' OR 'quigley-hein' OR tqhpi OR turesky OR 'oral hygiene' OR 'oral hygiene index' OR gingivitis OR 'gingival health' OR 'gingival index' OR 'loe and silness' OR 'löe and silness' OR 'silness and loe' OR 'silness and löe' #1 AND #2 AND #3 Filters: 1/1/2006 – 31/1/2026	132
Scopus	TITLE-ABS-KEY(“special needs” OR “special healthcare needs” OR “special health care needs” OR autism OR autistic OR “autism spectrum disorder” OR “cerebral palsy” OR “Down syndrome” OR “visual impairment” OR “visually impaired” OR blind* OR “hearing impairment” OR “hearing impaired” OR deaf* OR “intellectual disability” OR “intellectual disabilities”) AND TITLE-ABS-KEY(toothbrush* OR “manual toothbrush” OR “powered toothbrush” OR “power toothbrush” OR “electric toothbrush” OR “sonic toothbrush” OR “triple headed toothbrush” OR “three headed toothbrush” OR “modified toothbrush” OR “customized toothbrush” OR “customised toothbrush” OR “special needs toothbrush” OR “interdental brush” OR “dental floss” OR floss* OR “floss holder” OR “oral irrigator” OR “oral irrigation” OR “water flosser”) AND TITLE-ABS-KEY(plaque OR “dental plaque” OR “plaque accumulation” OR “plaque control” OR “plaque removal” OR “plaque index” OR “Quigley Hein” OR “Quigley-Hein” OR TQHPI OR Turesky OR “oral hygiene” OR “oral hygiene index” OR gingivitis OR “gingival health” OR “gingival index” OR “Loe and Silness” OR “Löe and Silness”) AND TITLE-ABS-KEY(child* OR pediatric OR paediatric OR adolescent* OR teenager* OR youth* OR infant* OR preschool* OR “school age” OR “school aged” OR “school-aged”) Filters: 1/1/2006 – 31/1/2026	219

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