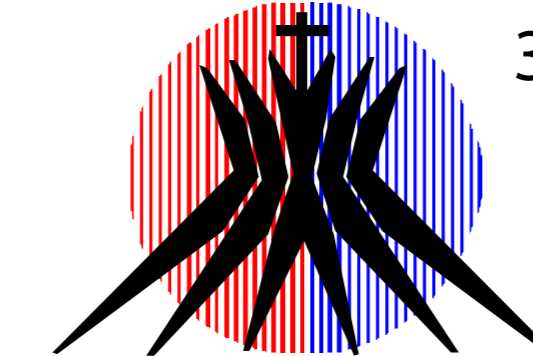


# SALIVARY FLOW AND CARIES — A SYSTEMATIC REVIEW

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## Introduction

Saliva composition can vary according to different factors, such as the type of a particular gland as well as duration and nature of the gland stimulus. However, saliva flow rate is considered the most important factor to be analyzed. In addition, the literature has shown that pathologically diminished flow rate is a significant risk factor for caries development, but the cut-off values of saliva needed to cause tooth decay has not been yet established.

## Material and Methods

The methodology followed the format of a systematic literature review. The review objective was to appraise existing evidence in regard to an inversed relationship between saliva flow and dental caries. Literature search (22 March 2006) extended to nine English (BioMed Central, Cochrane Library, Directory of Open Access Journals, mRCT/ISRCTN Register, PubMed, ReFeR and Cochrane Oral Health Review Register) and two Portuguese databases (BBO, LILACS), accessible over the Internet.

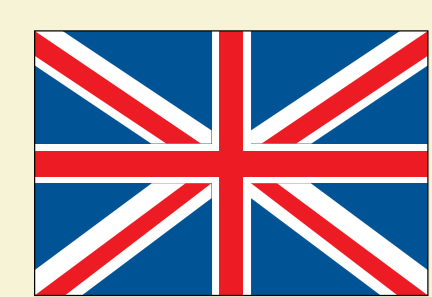
## Search keywords

English	Portuguese
Saliva flow AND (caries OR tooth decay)	Fluxo AND saliva\$ AND cari\$

## Inclusion criteria:

Two reviewers assessed articles (Trials and Reviews) independently. Articles were included according to the criteria:

- Listing in above databases;
- Relevant to review objectives of the particular MI topic;
- Language of publication comprehensible by reviewers:



ENGLISH



GERMAN



SPANISH



PORTUGUESE

## Exclusion criteria:

Included articles were reviewed in-depth and excluded according to the criteria:

### A. for Trials:

- No control group exists;
- The study and control group compared are not similar;
- The exposure and outcomes are not measured the same way in the compared groups;
- The study shows no clear dosage-response relationship.

### B. for Reviews:

- Focus on population or intervention not clearly stated in title and abstract
- No clear inclusion and exclusion criteria
- No clear search strategy, key words and used databases
- No study-by-study critique table or discussion of study qualities

In-vitro laboratory studies or with animal tissues were excluded on basis of uncertainty of extrapolating in-vitro results to physiological effects in humans.

## Evidence values

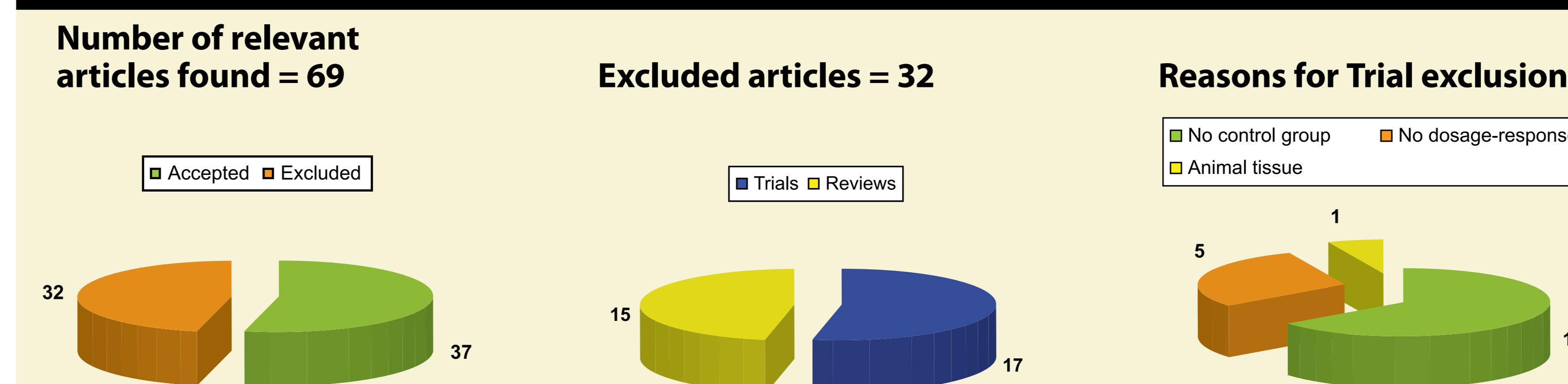
Articles, which passed exclusion criteria, were rated according to following scoring system:

Quality aspect	Criteria	Points
Study setting	In situ	1
	In vivo	2
Article provides information on:	How Samples were collected	1
	How examiners/patients were blinded	1
	How operators were trained or calibrated	1
	Examiner reliability	1
Sample drop out rate	30 – 20%	0
	10 – 19%	2
	< 10%	3
Follow up period	< 1 year	0
	1 year	1
	> 1 year	2

Strong evidence (S) = 10 - 11 | Good evidence (G) = 6 - 9 | Reasonable evidence (R) = 0 - 5

Systematic reviews were rated as 'Strong'.

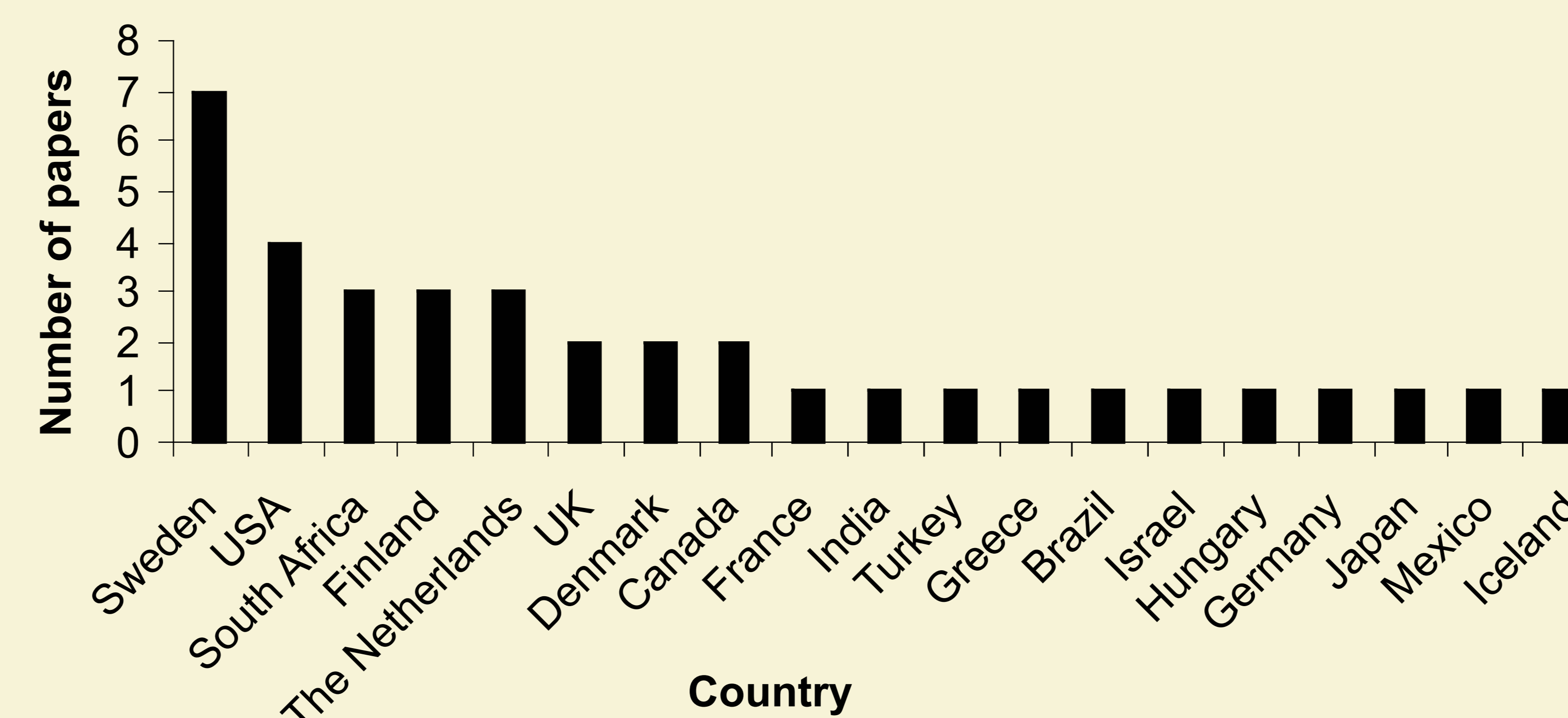
## Results



## Reasons for Review exclusion

No clear exclusion and/or inclusion criteria stated; Lack of information on clear search strategy, key words and databases used; study-by-study critique table missing.

## Place of origin of accepted trials



Articles Results	Value of evidence		
	Strong	Good	Reasonable
No relationship between caries and saliva flow rates within healthy limits*	-	8	16
Observed relationship between caries and saliva flow rates outside healthy limits*	1	6	7

\* Cut-off rates for Unstimulated Whole Saliva < 0.5 mL/min and Stimulated Whole Saliva < 1.0 mL/min

## Main characteristics of the accepted articles

Reference*	Sample	Association with caries		Evidence Strength
		Yes	No	
Wöltegens - J Biol Buccale 1992; 20: 145-149	Healthy; 4-16	X		R
Leone - J Dent Edu; 2001 65: 1054-1062	Review	X		S
Johansson - Caries Res 1992; 26: 38-43	Malnutrition; 8-12	X		R
Guivante - Int Dent J 1998; 48: 111-122	Healthy; ~ 83	X		R
Santos - Spec Care Dentist 2002; 22: 103-107	Cerebral palsy; 6-16	X		R
Koseki - Oral Diseases 2004; 10: 75-80	Dry eyes; ~ 56	X		R
Pedersen - BMC Clinical Pathology 2005; 5: 04	Sjögren; ~ 60	X		R
Sgan-Cohen - Community Dent Oral Epidemiol 1992; 20: 328-342	Healthy; 5-12 / 35-45	X		R
Wöltegens - J Biol Buccale 1992; 20: 235-240	Healthy; 4-15	X		G
Jentsch - Clin Oral Invest 2004; 8: 156-160	Healthy; 23	X		G
Vehkalahti - Caries Res 1996; 30: 22-28	Healthy; ~15	X		G
Bardow - Arch Oral Biol 2001; 46: 413-423	Dry mouth; ~ 66	X		G
Holbrook - Caries Res 1993; 27: 431-437	Healthy; 4	X		G
Spak - Caries Res 1994; 28: 388-393	Irradiated patients; ~ 59	X		G
Pérez - Revista ADM 1997; LIV: 41-45	Healthy; 7-12		X	R
Russell - Community Dent Oral Epidemiol 1990; 18: 120-125	Healthy; Adolescents		X	G
Twetman - Pediatr Dent 1992; 14: 184-188	Diabetes; 3 - 17	X		G
Klock - Scand J Dent Res 1979; 87: 129-139	Healthy; 9-12	X		G
Sundh - Oral Surg Oral Med Oral Path 1989; 67: 286-290	Crohn's disease; 30-59		X	G
Lundgren - Acta Odontol Scand 1997; 55: 282-291	Frail; 88-92	X		G
Ratio - Acta Odontol Scand 1996; 54: 113-117	Healthy; 11-14	X		G
Närhi - J Dent Res 1999; 78: 1640-1646	Healthy; ~ 78	X		G
Hyde - J Canad Assoc 1972; 5: 186-189	Healthy; 5-6	X		R
Botha - SADJ 2001; 56: 348-351	Healthy; 3-9	X		R
Granath - Community Dent Oral Epidemiol 1991; 19: 257-260	Healthy; 4-5	X		R
Shannon - J Dent Res 1964; 43: 1029-1038	Healthy; 17-22	X		R
Siamopoulou-Mavridou - Int J Padiatr Dent 1992; 2: 93-97	Thalassaemia major; ~12	X		R
Wöltegens - J Biol Buccale 1984; 12: 247-252	Healthy; 2-14	X		G
Twetman - Caries Res 2002; 36: 31-35	Diabetes; 8-16	X		G
Saunders - Spec Care Dentist 1992; 12: 116-121	Frail; > 65	X		R
O'Sullivan - Caries Res 2000; 34: 82-87	Dental erosion; 3-16	X		R
Bayraktar - Clin Nephrol 2004; 62: 380-384	Hemodialysis; 18-68	X		R
Englander - J Dent Res 1958; 37: 906-911	Healthy; 18	X		R
Gárbis - Caries Res 1999; 33: 191-195	Healthy; 14-16	X		R
Crossner - Acta Odontol Scand 1976; 35: 135-139	Healthy; 5-8	X		R
MacEntee - Gerodontology 1993; 10: 90-97	Frail; 65	X		G
Coogan - J DASA 1996; 51: 823-827	Healthy; 12-20	X		R

\* Just the first author is cited

## Conclusion

• There is evidence that low saliva flow rate is inversed related to dental caries<sup>1</sup>.

1. Minimum Intervention (MI): A New Approach In Dentistry - Evidence-Based Compendium. S Mickenautsch, V Yengopal, M Bönecker, SC Leal, ACB Bezerra, LB Oliveira. 1st Edition, Midentistry cc - Johannesburg, 2006. ISBN: 0-620-34080-0. <http://www.midentistry.com/academia.html>

## Acknowledgements

GC Asia and Midentistry.com  
 Ministério da Saúde – Brasília, DF

