



The history of systematic reviews in dentistry

What have we learned from systematic reviews of dental topics?

Asbjørn Jokstad
University of Oslo, Norway

Medline reviews – medicine & dentistry

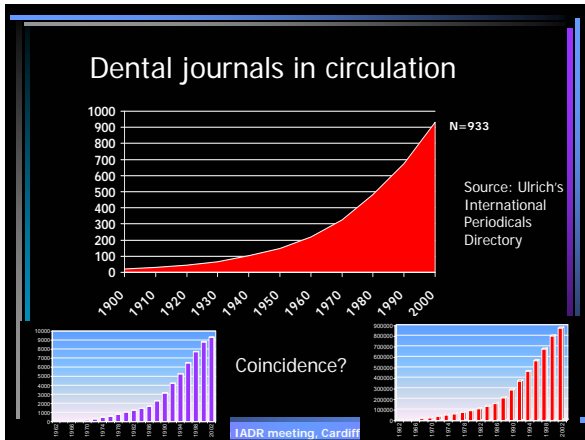


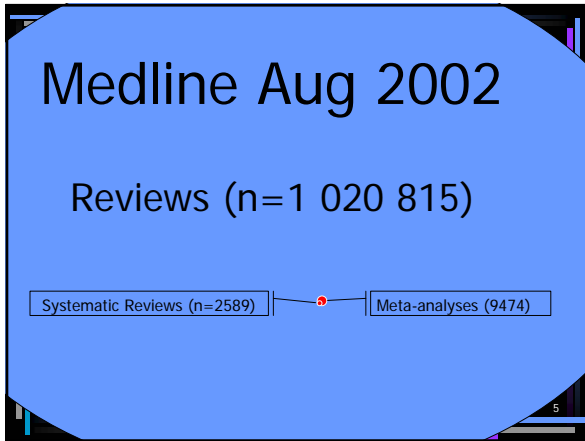
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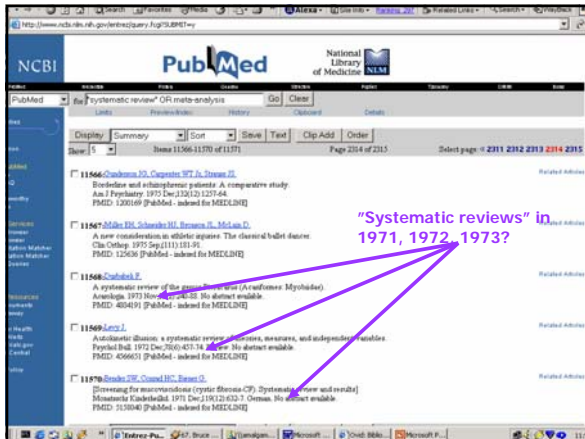
Medline reviews - dentistry

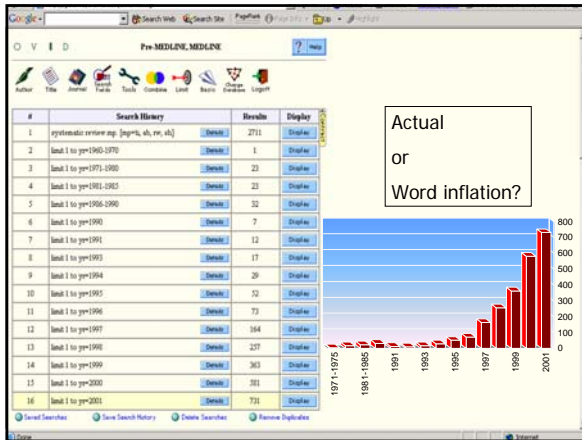


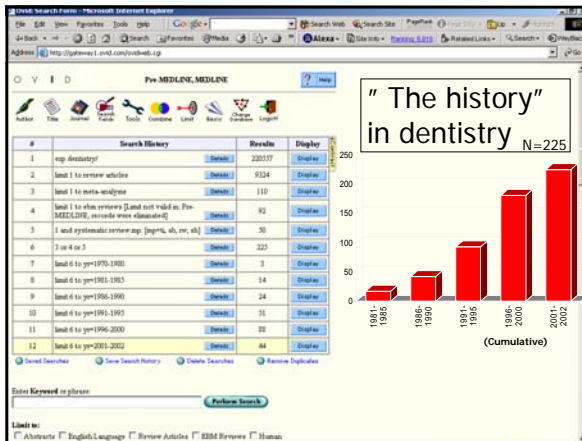
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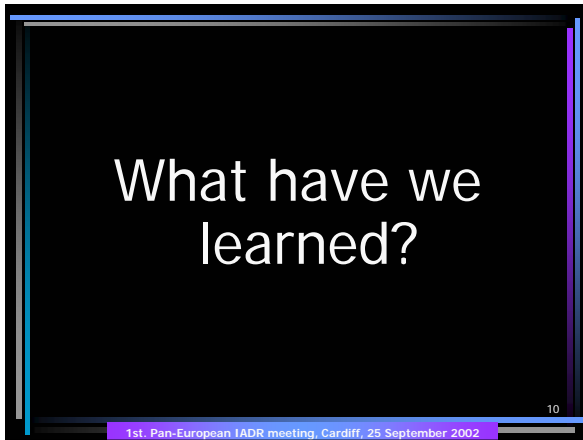


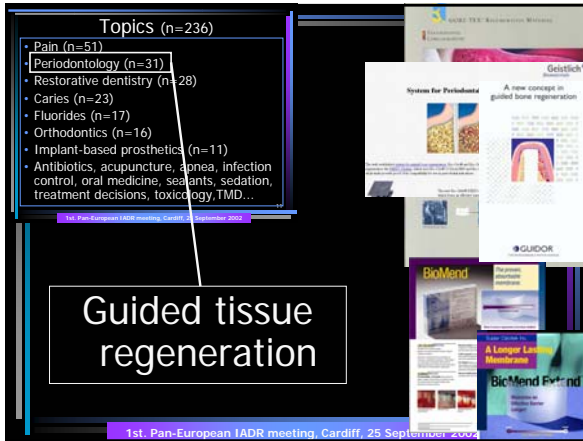


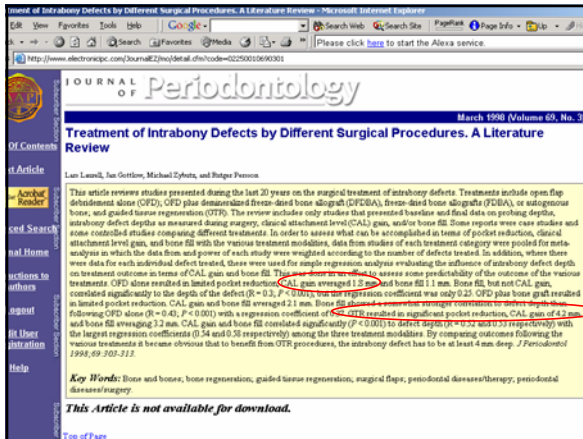
Topics (n=236)

- Pain & pharmacotherapy (n=51)
- Periodontology (n=31)
- Restorative dentistry (n=28)
- Caries (n=23)
- Fluoride issues (n=17)
- Orthodontics (n=16)
- Implant-related (n=11)
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Focus on intrabony defects: guided tissue regeneration

Table 2. Controlled clinical trials comparing guided tissue regeneration procedure with access flap procedures

Authors	Type of membrane	n (guided tissue regeneration)	Guided tissue regeneration probing attachment gain±SD (mm)	n (flap)	Flap probing attachment gain±SD (mm)
Chang et al. (18)	Collagen	10	0.6±0.6	10	-0.7±0.9
Opavsky & Taylor (7)	Collagen	26	3.0±1.5	26	1.0±0.9
Prosser et al. (24)	Expanded polytetrafluoroethylene	9	1.2±2.0	9	0.6±1.0
Al-Arzed et al. (1)	Collagen	14	3.9	14	2.7
Mathson et al. (26)	Collagen	9	2.4±2.1	9	0.4±2.1
Cortellini et al. (22)*	Expanded polytetrafluoroethylene	13	4.1±1.9	15	2.5±0.9
Cortellini et al. (22)*	Thiazium-modified expanded polytetrafluoroethylene	15	3.3±2.2	-	-
Cortellini et al. (22)*	Expanded polytetrafluoroethylene	12	5.2±1.4	12	2.3±0.9
Cortellini et al. (28)	Polymer	12	1.6±2.1	-	-
Ahn (31)	Expanded polytetrafluoroethylene	19	4.0±2.1	18	2.0±1.2
Khan (32)	Expanded polytetrafluoroethylene	10	3.7±2.0	10	2.1±2.0
Tonetti (40)	Polymer	60	3.0±1.6	67	2.2±1.5
Cortellini (19)	Polymer	31	3.0±2.1	27	1.0±1.4
Weighted mean		243	3.4±1.8	213	1.6±1.4

* These are studies. Comparisons were made among two different laser treatments

Cortellini P, Tonetti M. Focus on intrabony defects: guided tissue regeneration. *Periodontology* 2000;22:104-132.

GUIDED TISSUE REGENERATION FOR PERIODONTAL INFRABONY DEFECTS

HL Guido-Lopez E, Tucker KJ, Worthington HW

Date of most recent update: 6 August 2001
Date of most recent substantive update: 20 May 1999

This review should be cited as: Needleman JS, Guido-Lopez E, Tucker KJ, Worthington HW. Guided tissue regeneration for periodontal infra-bony defects (Cochrane Review). In: The Cochrane Library, Issue 2, 2000. Oxford: Update Software.

ABSTRACT

Background
Conventional treatment of destructive periodontal (par) disease aims to reduce the disease but does not reorganize bone support or connective tissue loss in the disease process. Guided tissue regeneration (GTR) is a surgical procedure that aims to regenerate the periodontal tissues when the disease is advanced and could overcome some of the limitations of conventional therapy.

Objectives
To assess the efficacy of GTR in the treatment of periodontal infra-bony defects measured against the current standard of surgical periodontal treatment, open flap debridement.

Search Strategy
We conducted an electronic search of the Cochrane Central Register of Controlled Trials register and MEDLINE up to October 2000. Hand searching included *Journal of Periodontology*, *Journal of Clinical Periodontology*, *Journal of Periodontal Research* and bibliographies of all relevant papers and review articles up to October 2000. In addition, we conducted expert opinion enquiries (mailing in surgical research to find other trials or unpublished material) or to clarify ambiguous or missing data and printed requests for data on two periodontal electronic discussion groups.

Inclusion/Exclusion Criteria
Randomised controlled trials of at least 12 months duration comparing guided tissue regeneration (with or without graft material) with open flap debridement for the treatment of periodontal infra-bony defects. Furcation involvements and studies specifically treating early onset diseases were excluded.

Data collection and analysis
Screening of possible studies was conducted independently by two reviewers (DT & HW) and data abstraction by three reviewers (DT, IN & HW). The methodological quality of studies was assessed in duplicate (DT & HW) using both individual components and a quality score (Dard 1995) and agreement determined by kappa scores. Methodological quality was used to investigate analyses to test the robustness of the conclusions. The Cochrane Oral Health Group statistical guidelines were followed (Dard) and the results expressed as weighted mean difference (WMD) and 95% CI for continuous outcomes and relative risk (RR) and 95% CI for dichotomous outcomes calculated using random effects models where significant heterogeneity was detected (P < 0.1). The final analysis was conducted using ITA&A in order to combine both parallel group studies and some individual (single mouth) studies. The primary outcome measure was gain in clinical attachment. Any heterogeneity was investigated.

Main Results
We initially included 23 trial reports. Twelve were subsequently excluded. Of those, seven presented zero-month data only, four were not fully randomised controlled trials, one used a non-vascularised autogenous fibroblast. Eleven studies were finally included in the review. Six testing GTR alone and five testing GTR with bone substitute (one study had both but

For attachment level changes, the weighted mean difference between GTR alone and open flap debridement was 1.1 mm (95% CI: 0.63 to 1.57), chi-square for heterogeneity: 21.4 (P < 0.0001) and for GTR alone and bone substitute was 1.25 mm (95% CI: 0.87 to 1.63), chi-square for heterogeneity: 0.01 (P = 1), with 95% CI for GTR alone and bone substitute. The results showed a significant benefit with GTR compared to open flap debridement with relative risk 0.58 (95% CI: 0.39 to 0.88) chi-square for heterogeneity: 0.01 (P = 1) and 95% CI for GTR alone and bone substitute. The results showed a significant benefit with GTR compared to open flap debridement with relative risk 0.58 (95% CI: 0.39 to 0.88) chi-square for heterogeneity: 0.01 (P = 1) and 95% CI for GTR alone and bone substitute. The results showed a significant benefit with GTR compared to open flap debridement with relative risk 0.58 (95% CI: 0.39 to 0.88) chi-square for heterogeneity: 0.01 (P = 1) and 95% CI for GTR alone and bone substitute.

GTR attachment gain compared to open flap debridement

Laurell et al. <i>J Periodontol</i> 1998:	<u>2.7 mm</u>
Uncontrolled and unblinded studies	
Cortellini et al. <i>Periodontology</i> 2000 2000:	<u>1.6 mm</u>
Unclear selection criteria for studies	
Inclusion of studies of short duration	
Needleman et al. <i>Cochrane Review</i> 2001:	<u>1.1 mm</u>
Randomised, controlled trials	
Trials only comparing GTR vs flap debridement	
Trials > 12 months	
Furcation involvements excluded	
Studies specifically treating early onset diseases excluded	

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We have learned:

- Selection of studies to include in reviews will reflect conclusions
- Study methodology aspects will reflect conclusions
- Need to focus on better methodological design of studies

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- Antibiotics, acupuncture, apnea, infection control, oral medicine, sealants, sedation, treatment decisions, toxicology, TMD...

The Longevity of Dental Restorations
A Systematic Review

REPORT 19

Restorative Dentistry

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Diagnosis and Management
of Dental Caries Throughout
Life

March 20, 2001
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Dental caries

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Fluorides

NHS CRD Report 18
Synopsis: Br Med J 2000; 321: 855-9

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Implant based prosthetics

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Quality Assessment of Randomized Controlled Trials of Oral Implants

Marco Esposito, DDS, PhD; Paul Coulthard, BDS, MFGDP MDS, FDSRCS, PhD; Helen V. Worthington, BSc, MSc, PhD, FDS; Aakjsem Jolkstad, DDS, PhD

The aim of this study was to assess the quality of randomized controlled trials (RCTs) concerned with the effectiveness of oral implants and to create a trial register. A multilayered search strategy was used to identify all RCTs published by the end of 1999 in any language. The Cochrane Oral Health Group specialist register, PubMed, and personal libraries were searched. Seventy-four RCTs were identified. Forty-three articles, not presenting the same patient material, were independently assessed by 3 researchers using a specially designed form. A statistician assessed all trials for the appropriateness of statistics. The quality of each study was assessed on 7 items, including 3 key domains. Randomization and concealment/allocation procedures were not described in 30 articles (70%). Reasons for withdrawals were not given in 10 reports (23%). No attempt at blinding was reported in 31 studies (72%). The quality of RCTs of oral implants is generally poor and needs to be improved.

Key words: dental implants, randomized controlled trial, register, research design, review literature

The quality of RCTs of oral implants is generally poor and needs to be improved

The most relevant outcome criteria?

- Plaque, marginal bleeding, probing pocket depth, probing attachment level, radiographic marginal bone level, bone changes on standardised intra-oral radiographs....
- Implant mobility and implant removal of stable implants dictated by progressive marginal bone loss
- Implant fracture and other mechanical complications

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The most relevant outcome criteria?

Perceived/self reported:	Observed:
<ul style="list-style-type: none"> • Adaptation to prosthesis (satisfaction) • Appearance • Function (chewing, speech) • Dietary significance (intake, selection) • Health • Quality of life (psyche, well-being, self esteem) • Social activity 	<ul style="list-style-type: none"> • Appearance • Function (bite force, tracking) • Diet survey • Health indices • HRQL indices • Social activity

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We have learned:

Need to define the most relevant criteria for treatment outcomes when implant based prostheses are compared to alternative treatments

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Impacted third molars

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27 molars on the first occasion and between 11 and 25 molars on the second occasion. Conclusion: In the decisions on prophylactic removal of mandibular third molars, there has been no change over the last 10 years towards a more non-interventionist attitude. Thus, the dentists seem not to have been influenced by the evidence that this intervention is not cost-effective.

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We have learned:

Systematic reviews and guidelines are not necessarily known to the community of dental practitioners.

Who's responsibility is it to disseminate new research findings and make sure they are implemented?

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FDI World Dental Federation - Dental resources online page - Microsoft Internet Explorer

Address: http://www.fdiworldental.org/online/index.htm

The FDI Organization | FDI World Dental Federation | Global Dental Act & Act Organization | The Dental Industry

FDI Members | FDI Congress, Education & Events Calendar | Global Dental Information | Professional Resources

Site search, profession resources

Search

Professional Resources

Public health issues
Procedures in the dental office
Materials, Techniques & procedures
Specialized procedures
Education & Scientific issues
Dentists' world

www.fdiworldental.org

Patent issues

Endocarditis	[World]	[FDI]	[FDI statement]
Oral cancer	[World]	[FDI]	
Disabled patients	[World]	[FDI]	
Emergency treatment	[World]	[FDI]	
Neuralgia	[World]	[FDI]	
Spont	[World]	[FDI]	
Odontophobia, psychology, fear	[World]	[FDI]	
Oral mucosal problems	[World]	[FDI]	
Saliva and oral health	[World]	[FDI]	
Temporomandibular dysfunction	[World]	[FDI]	
Public health issues	[World]	[FDI]	

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Temporomandibular dysfunction

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TMD – not a new affliction

- 1840, Evens, articulator
 - 1896, Walker, complex articulator--->gnathology
 - 1899, Snow, face bow
 - 1952, Shore, equilibration
- 1877, Kingsley, splint
 - 1881, Goodwillie, pivot appliance
 - 1960, Gelb, MORA splint
- 1887, Annandale, surgical repositioning
 - 1909, Lantz, removal of discus
- 1918, Prentiss, "pressure atrophy"
 - 1934, Costen, "overclosure" --> vertical dimension
- 1959, Schwartz, emotional tension

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TMD - 1996 consensus?

1996: 507 published reviews

- How common and how big is the problem?
- What is the etiology of TMD?
- What is the reliability of different diagnostic tests?
- What is the natural history of TMD?
- Which specific TMD treatment is superior and can be supported?
- Should/can TMD be prevented?

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NIH Technology Assessment Conference on TMD. 29.4 - 1.5.1996

Rationale for addressing the issue:

- Concern about the safety and efficacy of the care provided to patients with TMD(!)
- Absence of clear, valid, and reliable guidelines for diagnosis
- Dearth of proven rationales for a full range of treatment methods
- Many may attempt therapy with approaches that have not been adequately tested in scientifically based research studies

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We have learned:

(NIDCR/NIH 1996:) A need to focus on:

- valid diagnostic criteria
- valid treatment outcomes
- reliable methods to appraise a and b
- better methodological design of studies

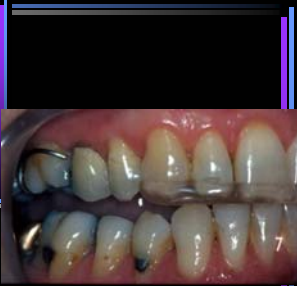
Empirical clinical experience is inadequate evidence of management efficacy in spite of being numerous

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Splints

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Abstracts in Oral Biology & Medicine

critical reviews in ORAL BIOLOGY & MEDICINE

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ARTICLES

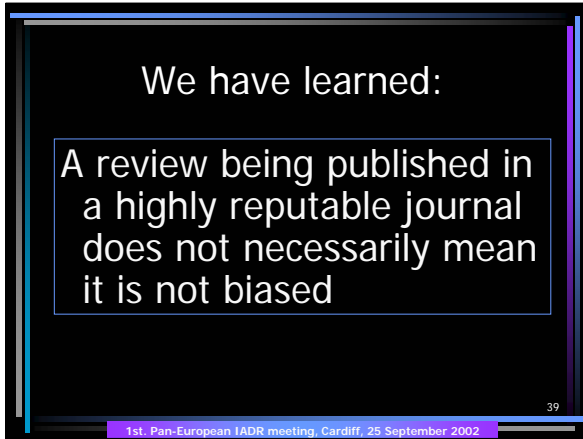
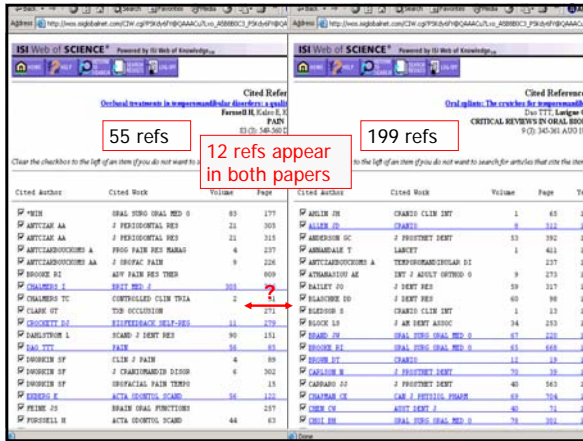
Oral splints: the crutches for temporomandibular disorders and bruxism?

T. T. Dui and G. J. Lorange
Faculty of Dentistry, University of Toronto, Ontario, Canada

Despite the extensive use of oral splints in the treatment of temporomandibular disorders (TMD) and bruxism, their mechanisms of action remain controversial. Various hypotheses have been proposed to explain their apparent efficacy (i.e., low therapeutic value), including the repositioning of condyle and/or the articular disc, reduction in the electromyographic activity of the masticatory muscles, modification of the patient's "habitual" oral behavior, and changes in the patient's occlusion. Following a comprehensive review of the literature, it is concluded that any of these theories is either false or inaccurate, while the issue of low efficacy for oral splints remains unsettled. However, the results of a controlled clinical trial lend support to the effectiveness (i.e., the patient's appreciation of the positive changes which are perceived to have occurred) during the trial of the stabilizing splint in the control of myofascial pain. In light of the data supporting their effectiveness but not their efficacy, oral splints should be used as an adjunct for pain management rather than a definitive treatment. For sleep bruxism, it is prudent to limit their use as a habit management aid and to prevent/limit dental damage potentially induced by the appliance. Future research should study the natural history and etiology of TMD and bruxism, so that specific treatments for these disorders can be developed.

199 refs

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Systematic reviews are not necessarily true or of relevance, but they may be repeatable

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Systematic Reviews & Meta-analyses – in sum:

SHIT IN
SHIT OUT

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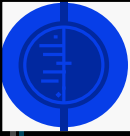
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Dangers of systematic reviews and meta-analysis

- Publication bias
 - Unpublished data
 - Covert duplicate publications
 - Limitation to positive findings
- Language bias
- Funding bias
- Study quality bias
- Retrieval bias – they remain “observational studies”

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Cochrane Oral Health Group

- 250 members from 25 countries
- Specialist trials register ~14,000 entries
- Systematic reviews: near 90
- OHG offers help to complete reviews

Contact: Emma.Tavender@man.ac.uk

<http://www.cochrane-oral.man.ac.uk>



Thank you
for your
kind
attention
