The history of systematic reviews in dentistry

What have we learned from systematic reviews of dental topics?

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1st Pan-European IADR meeting, Cardiff, 25 September 2002

**Medline reviews - medicine & dentistry**

(OVID strategy: review.pt)

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**Medline reviews - dentistry**

(OVID strategy: review.pt + exp dentistry)

1st Pan-European IADR meeting, Cardiff, 25 September 2002
Dental journals in circulation

Source: Ulrich's International Periodicals Directory

N=933

Medline Aug 2002

Reviews (n=1 020 815)

Systematic Reviews (n=2589) — Meta-analyses (9474)

"Systematic reviews" in 1971, 1972, 1973?
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)
- Antibiotics, acupuncture, apnea, infection control, oral medicine, sealants, sedation, treatment decisions, toxicology, TMD...
What have we learned?

Guided tissue regeneration

Topics (n=236)
- Pain (n=51)
- Periodontology (n=111)
- Restorative dentistry (n=23)
- Fluorides (n=15)
- Orthodontics (n=16)
- Implant-based prosthetics (n=11)
- Antibiotics, acupuncture, apnea, infection control, oral medicine, sedation, treatment decisions, toxicology, TMD.
Focus on intrabony defects: guided tissue regeneration.

Cortellini P, Tonetti M.

Table 1: randomized clinical trials comparing guided tissue regeneration procedure with open flap debridement.

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>No. of Sites</th>
<th>GTR Mean Gain (mm)</th>
<th>Open Flap Mean Gain (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laurell et al. 1998</td>
<td>Open flap debridement</td>
<td>20</td>
<td>2.7</td>
<td>-</td>
</tr>
<tr>
<td>Cortellini et al. 2000</td>
<td>Open flap debridement</td>
<td>20</td>
<td>1.6</td>
<td>-</td>
</tr>
<tr>
<td>Needleman et al. 2001</td>
<td>Open flap debridement</td>
<td>20</td>
<td>1.1</td>
<td>-</td>
</tr>
</tbody>
</table>

GTR attachment gain compared to open flap debridement

Laurell et al. / Periodontol 1998: 2.7 mm
Uncontrolled and unblinded studies

Cortellini et al. / Periodontology 2000 2000: 1.6 mm
Unclear selection criteria for studies
Inclusion of studies of short duration

Needleman et al. / Cochrane Review 2001: 1.1 mm
Randomised, controlled trials
Trials only comparing GTR vs open flap debridement
Trials > 12 months
Furcation involvements excluded

Studies specifically treating early onset diseases excluded
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

Topics (n=236)

- Pain (n=56)
- Periodontology (n=31)
- Restorative dentistry (n=35)
- Caries (n=23)
- Fluorides (n=12)
- Orthodontics (n=16)
- Implant-based prosthetics (n=11)
- Antibiotics, acupuncture, apnea, infection control, oral medicine, sedation, sleep medicine, treatment decisions, TMD
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

Perceived/self reported:
- Adaptation to prosthesis (satisfaction)
- Appearance
- Function (chewing, speech)
- Dietary significance (intake, selection)
- Health
- Quality of life (psyche, well-being, self esteem)
- Social activity

Observed:
- Appearance
- Function (bite force, tracking)
- Diet survey
- Health indices
- HRQL indices
- Social activity

We have learned:

Need to define the most relevant criteria for treatment outcomes when implant based prostheses are compared to alternative treatments.
Topics (n=236)

- Pain (n=51)
- Periodontology (n=31)
- Restorative dentistry (n=28)
- Caries (n=23)
- Paedodentistry (n=27)
- Orthodontics (n=16)
- Implant-based prosthetics (n=11)
- Statistics, pharmacology, genes, infection control, oral medicine, sedation, treatment decisions, TMD, antibiotics, acupuncture, genomics, infection control, oral medicine, sealants, sedation, treatment decisions, TMD...

Impacted third molars

Dentists' decisions on prophylactic removal of mandibular third molars: a 10-year follow-up study

Conclusion. Contrary to the decisions on prophylactic removal of mandibular third molars, there has been no change over the last 10 years towards a more non-interventional attitude. Thus, the dentists seem not to have been influenced by the evidence that this intervention is not cost-effective.
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?

www.fdiworldental.org

Temporomandibular dysfunction
TMD - not a new affliction
1840, Evens, articulator
1895, 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

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?

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
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
We have learned:

A review being published in a highly reputable journal does not necessarily mean it is not biased.
Systematic reviews are not necessarily true or of relevance, but they may be repeatable.

Systematic Reviews & Meta-analyses - in sum:
SHIT IN SHIT OUT

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”
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