Evidence-Based Dentistry

The Cochrane Oral Health Group Trials Register: Electronic Searching and Beyond


Ms. Bickley is Trials Search Coordinator, Cochrane Oral Health Group, University Dental Hospital of Manchester; and Ms. Glenny is Lecturer in Evidence-Based Oral Healthcare, University Dental Hospital of Manchester. Direct correspondence to Ms. Sylvia R. Bickley, Cochrane Oral Health Group, University Dental Hospital of Manchester, Higher Cambridge Street, Manchester, M15 6FH, United Kingdom; +44 (0) 161 2757814 phone; +44 (0) 161 2757815 fax; Sylvia.R.Bickley@man.ac.uk.

Submitted for publication 4/28/03; accepted 5/14/03

Well-conducted randomized controlled trials (RCT) provide the highest level of clinical evidence for the evaluation of healthcare interventions. For clinicians wanting to base their practice on the best evidence, the RCT (or, ideally, systematic reviews of such trials) should be the first consideration for the evaluation of the most effective interventions. Much work has been published on the development of search strategies for the identification of RCTs in dentistry, using databases such as MEDLINE.1-6 However, it is acknowledged that these searches are unlikely to identify all RCTs in any given specialty. It has been suggested that a “computer-based clinical knowledge system” would be beneficial,4 registering all trials within dentistry and providing clinicians with a quicker, more efficient way of accessing results from RCTs.

A register of trials within dentistry exists in the form of the Cochrane Oral Health Group’s Trials Register. This article describes the process by which the register is compiled and maintained. The benefits of specialist registers over bibliographic databases such as MEDLINE for the identification of RCTs will be illustrated.

The Cochrane Oral Health Group Trials Register

The Cochrane Oral Health Group’s (OHG) Trials Register was established in 1997. The purpose of the register is to provide an electronic resource to assist reviewers undertaking Cochrane systematic reviews on dental and oral health topics and to contribute to the Cochrane Central Database of Controlled Trials for the benefit of the increasing number of people across the world with access to The Cochrane Library.

Essentially the register is a database of reports of Randomized Controlled Trials (RCTs) and Controlled Clinical Trials (CCTs) and associated articles such as published correspondence, conference proceedings, and research abstracts. The basis of the register’s foundation is the Cochrane Central Register of Controlled Trials (CENTRAL)* in the Cochrane Library.** CENTRAL (formerly known as the Cochrane Controlled Trials Register or CCTR) is probably the best single source of randomized con-

---

* Trials within CENTRAL (formerly the Cochrane Controlled Trials Register or CCTR) are the result of electronic searches (chiefly of MEDLINE and EMBASE) conducted by information specialists of the Cochrane Collaboration applying a highly sensitive search strategy to identify Randomized Controlled Clinical Trials (RCTs) and Controlled Clinical Trials (CCTs) and the results from other electronic searches and handsearching journals by Cochrane entities around the world.

** The Cochrane Library is an electronic resource available on a subscription basis. Some countries have arranged national provisions, providing free access to all residents. See www.update-software.com/Cochrane/default.HTM.
trolled trials. The CENTRAL database is updated quarterly, chiefly from downloads from MEDLINE and EMBASE and from records submitted by Cochrane entities around the world covering all medical healthcare specialties (Figure 1).

With each new quarterly issue of the Cochrane Library, new records relating to oral health (reflecting searches of multiple sources including MEDLINE and EMBASE) are identified and downloaded from CENTRAL into the Oral Health Register. Beyond this infrastructure, the OHG trials register has a continuous program of development as trials are added on an almost daily basis as a result of searches carried out by the group for reviewers and from the identification of trials picked up by other means than electronic searching such as handsearching oral health journals. As a resource of trials within the specialty, the OHG’s Trials Register provides a rich starting point for those researching evidence-based oral healthcare. The Oral Health Group Trials Register is maintained and managed by the Oral Health Group’s editorial base at the University of Manchester.

**Limitations of Electronic Searching**

Searching electronic databases has become increasingly accessible and may at first appear to be a perfect and reliable means of tracking down literature. However, even the most experienced searchers will miss some relevant literature. Approximately half of the relevant controlled trials on a topic, for example, may be missed in an electronic search, even though most of the missed citations are actually in the databases. Recent studies continue to highlight these limitations, emphasizing that where comprehensive searching is paramount no one database or resource is adequate. Specifically, in oral health, Bickley and Harrison searched four leading orthodontic journals on MEDLINE using the indexing terms Randomized Controlled Trial or Controlled Clinical Trial in the Publication Type field and compared the results to handsearching these four journals.

From Table 1 it can be seen that a total of 143 (105+38) out of a total of 304 trials were identified...
through MEDLINE. Initially, this would suggest that if reviewers were to rely on electronic searching of MEDLINE alone, they could potentially retrieve 47 percent of the relevant studies. On closer examination of the thirty-eight studies identified through MEDLINE alone, it was found that only six of them were in fact clinical trials (Table 2). This reduces the sensitivity of the MEDLINE search to 41 percent (111/272).

**Table 1. Identification of clinical trials through handsearching and MEDLINE**

<table>
<thead>
<tr>
<th>Method of identification</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handsearching and Medline</td>
<td>105</td>
<td>34.5</td>
</tr>
<tr>
<td>Handsearching only</td>
<td>161</td>
<td>53.0</td>
</tr>
<tr>
<td>Medline only</td>
<td>38</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>304</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Shortcomings of Searching Medline**

The reasons for missed articles on searching MEDLINE are manifold. To understand the reasons for these limited returns, we should consider first how much information is actually available in the electronic record on which the search can be conducted. In the electronic record the fields relating to the subject matter of the paper are the title, authors, abstract, and indexing terms assigned by professional indexers (in MEDLINE these are Medical Subject Headings or MeSH). Essentially, for the researcher, electronic searches chiefly rely on two things:

- the controlled vocabulary (in MEDLINE MeSH) terms assigned to the article by professional indexers; and
- descriptors (text words) used by author/s in the title and abstract.

Where the detail of the study design is “lost” in the main body of the paper, this information will not be available in the electronic record and, further, is more likely to be missed by the indexers. Lack of detail in the title and abstract of the paper will influence the results of a search, and as by no means all articles have abstracts, this limits the search potential even further. Increasingly, journals are insisting on structured abstracts, where the author systematically discloses the methodology of the study in the abstract. This is one of the recommendations of the CONSORT guidelines and should improve the yield and quality of electronic searches in the future. But for those records with no abstracts and already indexed in MEDLINE, for example, handsearching the relevant journal may be the only sure way of identifying them.

Another source of trials that slip through the electronic search net are conference abstracts that are published in journals but are not indexed in the main bibliographic databases such as MEDLINE. Some of the abstracts will, in due course, appear as fully published papers. It has been estimated that between approximately 30 and 60 percent of abstracts presented at scientific meetings eventually get published as full journal articles, depending upon the clinical specialty. The percentage of oral health conference abstracts reaching full publication is as yet unclear. Unpublished trials are an essential component of systematic reviewing if the effect of publication bias (defined as “the tendency on the parts of investigators, reviewers, and editors to submit or accept manuscripts for publication based on the direction or strength of the study findings”) is to be minimized. Conference abstracts provide an important tracking system to identify both published and unpublished trials that are paramount to unbiased reviews. Several electronic resources are now available to search for conference abstracts. Two of these are the British Library’s Inside Web service (www.bl.uk/services/current/inside.html) and the CSA Internet Database Service, which is located in Bethesda, Maryland, with offices in Hong Kong, France, and the UK (www.csa1.co.uk).

Another limitation of electronic searching is that not all journals are indexed in MEDLINE and, in particular, non-English language references are underrepresented. There is good evidence that research findings showing statistically significant results are more likely to be published in English language journals. By excluding non-English language articles, the results of a systematic review are again susceptible to publication biases. The study by Suarez-Almazor et al. to compare the performance of MEDLINE and EMBASE in identifying English language controlled clinical trials found that even using these two databases, with dedicated compre-
Handsearching to Identify Trials

Given the limitations of electronic searching, where comprehensive searching is paramount, then electronic searching must be supplemented by handsearching of key journals. Handsearching involves searching a journal page by page to identify all reports of controlled clinical trials, whether as full papers, abstracts, or correspondence.

The Cochrane Collaboration is dedicated to producing and disseminating systematic reviews of the effects of healthcare interventions to help people make well-informed decisions about healthcare. A comprehensive search for all relevant trials combining electronic searching with handsearching of key journals is essential to the validity of systematic reviews. In recognizing the need for the potentially huge and tedious task of handsearching journals, the Cochrane Collaboration organized a worldwide handsearching program. The program is coordinated and managed by the New England Cochrane Center in the United States and operates a strict protocol for registering searches to ensure that each journal is handsearched only once and the results shared across the world via CENTRAL, thereby avoiding duplication of effort and maximizing resources.

Collaborators from all around the world are handsearching health care journals and conference proceedings to contribute to the Cochrane worldwide handsearching program. At the present time, nearly 2,200 journals have been or are being systematically handsearched for this program. Trials not previously found by electronic searches are entered into CENTRAL. Searches of the master list of journals being searched may be conducted online, or the list of the journals and status of the searches registered can be accessed and/or downloaded in Microsoft Excel format from www.cochrane/us/cochrane/mainpage.asp.

Cochrane Collaborative Review Groups are responsible for coordinating handsearching of journals related to the scope of their group, and the Oral Health Group coordinates and manages searches of the dental/oral health literature. Handsearching requires the searcher to read/scan a journal page by page to identify published and unpublished controlled clinical trials or information on trials such as abstracts and correspondence. The searcher then submits the information to the OHG Trials Search Coordinator. Any trials not previously identified are downloaded into the OHG Trials Register, which is in turn uploaded into the CENTRAL database in The Cochrane Library, thus enabling the results of the handsearcher’s efforts to be accessible to anyone with access to the Cochrane Library across the world.

Training is provided remotely from the Oral Health Group’s editorial office in Manchester, UK, by the group’s Trials Search Coordinator. Those wishing to become handsearchers are provided with a copy of the OHG Handsearchers’ Manual, which gives a comprehensive overview and guidance on what is required. To regulate the quality of search results, the manual also identifies a test set of journals that must be searched. The test results are then submitted to the editorial office for checking. Once the search trainee has demonstrated competency in identifying controlled trials, matched against a gold standard test search, the searcher can be registered to contribute to the handsearch program.

Anyone may volunteer to undertake handsearching and contribute to the Cochrane Collaboration’s worldwide program. The commitment of time is entirely in the control of the handsearcher, and searching is carried out at the most convenient library facility for the searcher. Searching can also be carried out online as more and more journals are published electronically.

Searchers are usually asked to search a specific journal in the oral health literature subject to the journal’s availability to the searcher. Journals that have been or are in the process of being searched are listed in Table 3.

Those interested in contributing to the handsearching program are encouraged to contact the OHG’s Trials Search Coordinator at Sylvia.R.Bickley@man.ac.uk.

Acknowledgments

We would like to take this opportunity to thank all of those who have undertaken, or are registered to undertake, handsearching on behalf of the Cochrane Oral Health Group to contribute to the Cochrane worldwide handsearching program.
REFERENCES

New Cochrane Systematic Reviews: Cochrane Oral Health Group

The following Cochrane systematic reviews were published in Issue 2, April 2003 of The Cochrane Library. Reproduced with permission from John Wiley and Sons Ltd. For a full list of reviews/protocols published by the Cochrane Oral Health Group, please visit www.cochrane-oral.man.ac.uk.


Background
Bonding of orthodontic brackets to teeth is important to enable effective and efficient treatment with fixed appliances. The problem is bracket failure during treatment, which increases operator chairside time and lengthens treatment time. A prolonged treatment is likely to increase the oral health risks of orthodontic treatment with fixed appliances, one of which is irreversible enamel decalcification.

Objectives
To evaluate the effectiveness of different orthodontic adhesives for bonding.

Search strategy
Electronic databases: the Cochrane Oral Health Group’s Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, and EMBASE. Date of most recent searches: August 2002 (CENTRAL) (The Cochrane Library Issue 2, 2002).

Selection criteria
Trials were selected if they met the following criteria: randomized controlled trials (RCTs) and controlled clinical trials (CCTs) comparing two different adhesive groups. Participants were patients with fixed orthodontic appliances. The interventions were adhesives that bonded stainless steel brackets to all teeth except the molars. The primary outcome was debond or bracket failure.

Data collection and analysis
Data were recorded on decalcification as a secondary outcome, if present. Information regarding methods, participants, interventions, outcome measures, and results was extracted in duplicate by pairs of reviewers (Nicky Mandall [NM] and Rye Mattick [CRM]; Declan Millett [DTM] and Joy Hickman [JH2]). Since the data were not presented in a form that was amenable to meta-analysis, the results of the review are presented in narrative form only.

Main results
Three trials satisfied the inclusion criteria. A chemical cured composite was compared with a light cure composite (one trial), a conventional glass ionomer cement (one trial), and a polyacid-modified resin composite (compomer) (one trial). The quality of the trial reports was generally poor.

Reviewers’ conclusions
It is difficult to draw any conclusions from this review; however, suggestions are made for methods of improving future research involving orthodontic adhesives.

Background
Periodontitis is a chronic infective disease of the gums caused by bacteria present in dental plaque. This condition induces the breakdown of the tooth-supporting apparatus until teeth are lost. Surgery may be indicated to arrest disease progression and regenerate lost tissues. Several surgical techniques have been developed to regenerate periodontal tissues including guided tissue regeneration (GTR), bone grafting (BG), and the use of enamel matrix derivative (EMD). EMD is an extract of enamel matrix and contains amelogenins of various molecular weights. There is evidence to show that amelogenins are involved not only in enamel formation, but also in the formation of the periodontal attachment during tooth formation.

Objectives
To test the efficacy of EMD in comparison with open flap debridement, GTR, and various BG procedures for the treatment of intrabony defects.

Search strategy
We searched the Cochrane Oral Health Group’s Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, and EMBASE. Several journals were handsearched. No language restrictions were applied. Authors of randomized controlled trials (RCTs) identified, personal contacts, and the manufacturer were contacted to identify unpublished trials. Most recent search: January 2003.

Selection criteria
RCTs on patients affected by periodontitis having intrabony defects treated with EMD compared with open flap debridement, GTR, and various BG procedures with at least one year followup. The outcome measures considered were: tooth loss, changes in probing attachment levels (PAL), pocket depths (PPD), gingival recessions (REC), marginal bone levels on intraoral radiographs, and postoperative infections.

Data collection and analysis
Screening of eligible studies, assessment of the methodological quality of the trials, and data extraction were conducted in duplicate and independently by two reviewers. Results were expressed as random effect models using weighted mean differences for continuous outcomes and relative risk for dichotomous outcomes with 95 percent confidence interval (CI). Heterogeneity was investigated including both clinical and methodological factors.

Main results
No difference in tooth loss was observed. A meta-analysis including eight trials showed that Emdogain-treated sites displayed statistically significant PAL improvements (mean difference 1.3 mm, 95%CI: 0.8 to 1.8) and PPD reduction (1 mm, 95%CI: 0.5 to 1.4) when compared to flap surgery. Comparing Emdogain with GTR (six trials), GTR showed a statistically significant reduction of PPD (0.6 mm) and increase of REC (0.5 mm). No difference in postoperative infections was observed.

Reviewers’ conclusions
Emdogain is able to significantly improve PAL levels (1.3 mm) and PPD reduction (1 mm) when compared to flap surgery; however, these results may not have a great clinical impact since it has not been shown that more periodontally compromised teeth could be saved. There was no evidence of clinically important differences between GTR and Emdogain.