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American Dental Association's Resources to support Evidence-Based Dentistry

K Aravamudhan, BDS, MS and J Frantsve-Hawley, RDH, PhD

American Dental Association Center for Evidence-Based Dentistry

Keywords

dental informatics; clinical recommendations; decision support; systematic reviews

Background or Purpose

According to the National Library of Medicine, which maintains a database of research papers published in peer-reviewed journals, there are about 17,350,434 citations indexed between 1966 and 2009. Despite this volume of scientific information, before research discovery can make a real impact on patients' health, published information needs to be easily accessible and accessed by practitioners when planning treatment for their patients.

However, several significant barriers to using evidence in clinical practice exist including lack of effective strategies to disseminate scientific information, limited access to evidence, and practitioner's limited skills in searching for evidence and time constraints.[1], [2], [3,4], [5] The time required to search for articles, obtain the articles and appraise their content is impractical for most clinicians, especially at the point of care.[6]. Furthermore, clinicians may find that the literature is presented in a research-oriented format that is not easy to comprehend. Thus, there has been a call for the presentation of evidence in a clear and concise format.[7] Richard G. Stevenson III, DDS, of the UCLA School of Dentistry, indicated that two major barriers to the implementation of EBD "include the dissemination of best evidence in research formats and placing the responsibility of obtaining, implementing, and evaluating the outcomes of best evidence on the clinician alone." [8]

This well-documented need formed the basis for the ADA's initiative to develop dental informatics resources that provide practitioners with access to the most current scientific information that is easy to comprehend and presented in a format that can be quickly reviewed at the point of care. Dental informatics is "the application of computer and information science to improve dental practice, research, education and management." [9] More dentists are using computers in their offices and in their operatories. Information technology is emerging as a resource in the dissemination of scientific information to practicing dentists [10], [11] and a tool for enhancing dentist-patient communication.[12]

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Leckie and colleagues derived a conceptual framework of information seeking of professionals and found seven variables to be important factors affecting a professionals awareness of information [13]. These include:

1. Accessibility – ease of use and availability of source
2. Cost – how much effort and expense are involved with a source
3. Familiarity – previous success using the source
4. Packaging – convenience and usefulness of a source
5. Quality – accuracy and level of detail of the source
6. Timeliness – source’s capacity to provide information when needed
7. Trustworthiness – reliability and helpfulness of a source

The internet offers unparalleled access to information in conjunction with more efficient mode of dissemination and acquisition especially considering the insular environment often encountered in dentistry. [14]

To take advantage of this emerging information source, the ADA Center for Evidence-Based Dentistry was awarded a grant by the National Library of Medicine and the National Institutes of Dental and Craniofacial Research (G08 LM008956) to implement this project (Figure 1).

Description of the tool

The Web site at <http://ebd.ada.org> offers four key features.

1. Database of Systematic Reviews and Critical Summaries
2. Clinical recommendations
3. Resources: Links to external sources of EB information
4. Suggest Clinical Ideas

Database of Systematic Reviews and Critical Summaries

Systematic reviews methodically locate, appraise and synthesize evidence from published scientific studies to answer specific clinical questions. The authors of a systematic review perform an exhaustive search for studies (the evidence), have elaborate procedures to maximize objectivity and minimize bias, assess the quality of each study using standard criteria and, when possible, use statistically combined available evidence for a single estimate of effect. Such a “study of studies” can be used by practitioners as a secondary source of evidence when planning treatments. Systematic reviews are different from traditional narrative review articles. While systematic reviews are conducted to answer specific clinical questions through a systematic search and an assessment of evidence quality, review articles provide a broad overview on a topic. Additionally, systematic reviews can be used to identify areas where research is weak or lacking. [15] This allows researchers to focus their efforts by targeting research to close the gaps in current knowledge.

The ADA’s EBD Web site offers a database of over 1100 systematic reviews in dentistry categorized by topic index. The list is developed and updated through a quarterly search of MEDLINE. A panel of experts called the Critical Review Panel (Table 1) oversees the development of the Web site and screens the titles and abstracts of the search results to select all systematic reviews related to dentistry for indexing on the Web site. Indexed by topic, the reviews are easily located on the “Systematic Reviews” Web page. This pre-screened list will save the practitioner time when searching for relevant systematic reviews on a topic of interest.

Practitioners who are new to the Web site can also use the search feature to locate systematic reviews using simple key words. Such a search requires no additional skills (such as knowledge of search filters or designing effective search strategies) and generates very specific results that are not cluttered with other types of publications.

While systematic reviews are a great resource, their use by practitioners is limited because they generally do not subscribe to journals or have access to databases through academic institutions to access the manuscripts. Further, the reviews themselves are typically long manuscripts written in research formats.

Summaries of published systematic reviews are useful since they provide the practitioner with a short, easy-to-read summary of key findings and conclusions. Further critical summaries or appraisals provide the reader with an objective interpretation of the strengths and weaknesses of the study, the evidence within the study and the clinical implications of the results. The EBD Web site includes critical summaries of selected systematic reviews (Table 2; Figure 2).

Summaries undergo an intensive evaluation process that includes review by the original author of the systematic review before it is posted on the Web site. Authors of the systematic review also have the opportunity to post comments on the summary on the Web site to provide additional comment or insight on the topic. One selected summary is submitted to JADA for publication as a monthly feature [16], [17], [18].

The summaries are written by practitioners (ADA Evidence reviewers) who are selected, trained and mentored by the Critical Review Panel.

Dentists interested in participating as ADA Evidence reviewers can volunteer for this program by completing an application form on the Web site (<http://ebd.ada.org/Volunteer.aspx>).

Clinical Recommendations

Links to the ADA's Clinical Recommendations on Topical Fluoride [19] and Use of Pit and Fissure Sealants [20], published as reports in JADA are also available through the Web site. Clinical Recommendations are developed by a panel of experts after critical assessment of the literature identified through a systematic search. Each recommendation is associated with the panel's assessment of the level of evidence and the strength of the recommendation. Clinical Recommendations are tools that should be used along with a practitioner's clinical expertise and the patient's needs and preferences to make treatment decisions. All future clinical recommendations will be available through this Web site along with chair-side tools that allow practitioners to quickly apply the recommendations when planning treatment and communicate with the patient.

Resources

In addition, the Web site contains links to other sources including links to journals, tutorials, databases, organizations and glossaries, making it a central resource for locating evidence-based information (Figure 3).

Suggest Clinical Ideas

In one direction, the Web site provides practitioners the resources to quickly evaluate the cumulative evidence on specific topics through the systematic review summaries. In the other direction, the dental profession can communicate to the research community the clinical topics that are of particular interest to them using the Web site's "Suggest Clinical Ideas" feature.

This will allow researchers to understand the needs of clinical dentistry and conduct research that will ultimately meet these needs. This self-sustaining loop (Figure 4) is essential to complete the EBD process. The application of EBD in clinical practice is a bi-directional process, whereby the results of scientific research are utilized by the practitioner in providing patient care, and the community of practicing dentists can communicate to the scientific community areas where research is warranted to address the needs of clinical care.

Conclusions

Use of computer-based systems for information retrieval has had an important impact on health care. [6] Whereas the practices of 20th century health care were based largely on paper, there is now a broad consensus that realizing an improved 21st century vision of health care will require intensive use of information technology to acquire, manage, analyze, and disseminate health care information and knowledge. Unlike physicians, the vast majority of dentists are in private practice settings throughout the US and do not have immediate access to medical or dental libraries. The resources provided through the ADA's EBD Web site will address several issues: time constraints that currently prevent dental professionals from conducting literature searches to identify systematic reviews; barriers related to accessibility to medical and dental literature, and barriers related to the format and presentation of scientific literature. The Web site will provide access to a database of systematic reviews and summaries of selected systematic reviews.

Future

The database of systematic reviews, clinical recommendations and links to other resources included in the ADA's EBD Web site (ebd.ada.org) will be updated regularly. New clinical ideas posted by the readers will be available to plan future research. As a future enhancement to the Web site, development of content for dental patients is currently underway. It is anticipated that plain language versions of the critical summaries will be available for the public in 2010.

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ADA. Center for Evidence-Based Dentistry™

Key Words

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HIGHLIGHTS

- First Critical Summary published in JADA, March 2009
- JADA Editorial: Evidence-Based Dentistry finds a new forum
- EBD Conferences

Figure 1.
The ADA's EBD Web site (ebd.ada.org)

Moderately favorable survival rate for implant-supported single crowns

Critical Summary Prepared by: Leonard Shapiro DDS, MS

A Critical Summary of:

A systematic review of the 5-year survival and complication rates of implant-supported single crowns

Jung RE, Pjetursson BE, Glauser R, Zembic A, Zwahlen M, Lang NP. Clin Oral Implants Res. 2008;19(2):119-30

Published Date: 5/13/2009

Clinical Questions:

A) What is the 5-year survival rate of implant-supported single crowns? B) What is the incidence of biological and technical complications?

Review Methods:

The authors conducted a comprehensive search of 1 electronic database (1966 to July 2006), manual searches of the bibliography and hand searches of several journals in both English and German. The search yielded a total of 26 articles, 21 prospective and 5 retrospective, respectively. Two independent reviewers screened the titles and abstracts and included studies that a) had a mean duration of follow-up of at least 5 years b) were published in English or German c) had clinical examination at follow-up d) reported details of the superstructure characteristics and; e) combined findings for implant supported FPD's and single crowns but allowed data extraction for the single crowns group.

Main Results:

Survival of single crowns was defined as crowns remaining in situ with or without modifications. Biologic

OVERVIEW

Review Conclusion:

Five years after placement, high survival rates can be expected for implants and implant-supported single crowns.

Critical Summary

Assessment:

Based solely on retrospective and prospective studies with a short follow-up, this review provides moderate support for considering implant-supported single crowns as a viable treatment option for single missing teeth.

Evidence Quality Rating:

Limited

Figure 2.
A Critical Summary from the ADA's EBD Web site

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Resources

The following links open in a separate browser window. You may need to disable your pop-up blocker for these links to work properly.

ORGANIZATIONS	CRITICAL APPRAISAL AND EVIDENCE ANALYSIS	CLINICAL RECOMMENDATIONS/GUIDELINES
Association of State and Territorial Dental Directors: Guidelines, Recommendations and Evidence-based Practices Resource Links	Study Designs and Levels of Evidence (Centre for Evidence-Based Medicine, UK)	ADA Evidence-Based Clinical Recommendations
Centre for Evidence-Based Dentistry	Study Designs and Clinical Decision-making (Medical Journal of Australia)	National Guideline Clearinghouse
Cochrane Collaboration	Appraisal Tools--Critical Appraisal Skills Programme (Public Health Resource Unit, UK)	PubMed Clinical Queries (National Library of Medicine)
DSM-Forsyth Center for Evidence-Based Dentistry	AMSTAR (Assessment of Multiple Systematic Reviews)	National Institute for Health and Clinical Excellence (NICE)
Evidence-Based Practice Centers—Agency for Healthcare Research and Quality	Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group Publications	CDC Division of Oral Health
International Centre for Evidence-Based Oral Health (UCL Eastman Dental Institute—London, UK)	QUOROM Statement (Quality of Reporting of Meta-Analyses)	Scottish Intercollegiate Guidelines Network
Oxford Centre for Evidence-Based Medicine	CONSORT Statement (Consolidated Standards of Reporting Trials)	Royal College of Surgeons of England
University of York NHS Centre for Reviews and Dissemination: Database of Abstracts of Reviews of Effects (DARE)	Critical Appraisal Tools (Centre for Evidence-Based Medicine, UK)	TRIP Database, Oral Health page
NIDCR Dental Practice-Based Research Networks (PBRNs)	Meta-analysis of Observational Studies in Epidemiology (MOOSE): A Proposal for Reporting	Agency for Healthcare Research and Quality (AHRQ)
JOURNALS	SYSTEMATIC REVIEWS	TUTORIALS
Bandolier	Cochrane Oral Health Group	Introduction to Evidence-Based Dentistry (Boston University)
Evidence-Based Dentistry	PubMed systematic review search page	Student's Guide to the Medical Literature (University of Colorado Health Sciences Center)
Evidence-Based Medicine Online	EviDents Search Engine for EBD	Evidence-Based Clinical Practice

Figure 3.
Additional Resources available on ebd.ada.org

Figure 4.
The EBD Process

TABLE 1**Critical Review Panel Members**

- Jim Bader (UNC)
- Janet Clarkson (University of Dundee; Cochrane Oral Health Group)
- John Gunsolley (VCU)
- Philippe Hujoel (University of Washington)
- Asbjorn Jokstad (University of Toronto)
- Joseph Matthews (University of New Mexico)
- Robert Weyant (University of Pittsburgh).

TABLE 2

Critical Summary Format

Overview	<i>Systematic Review Conclusion</i>	Statement of the conclusion of the review
	<i>Critical Summary Assessment</i>	The AER's assessment of the review and its clinical implication
	<i>Evidence Quality Rating</i>	Modified from the SORT system (ref): <i>Good, Limited, Poor</i>
Structured Abstract	<i>Clinical questions along with</i>	Incorporates PICO (Population, Intervention, Comparison, Outcome) elements, if they have been identified by the original author
	<i>Review methods</i>	
	<i>Main results</i>	Summarizes the findings of the systematic review
	<i>Systematic Review conclusions</i>	
	<i>Source of funding</i>	
Commentary	<i>Importance and context of the review</i>	Helps dental practitioners interpret the review by putting the question addressed by the review into context within dental practice, by identifying the strengths and weaknesses of both the methods employed and the evidence assembled in the review, and by discussing the implications of the findings for dental practice.
	<i>Strengths and weaknesses of the systematic review</i>	
	<i>Strengths and weaknesses of the evidence</i>	
	<i>Implications for practice</i>	