

Using the Best Evidence to Enhance Dental Hygiene Decision Making

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Introduction

An evidence-based approach to healthcare officially started in the early 1990s with leaders such as Dr. David Sackett and Archie Cochrane, although roots of this movement can be traced to earlier times. This approach has continually been implemented in all areas of healthcare, including dentistry. The American Dental Association (ADA) definition of Evidence-based Dentistry can be adapted as “an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient’s oral and medical condition and history, with the dental care professional’s clinical expertise and the patient’s treatment needs and preferences.”¹ This definition includes the three critical realms: the science, the clinician’s judgment, and the individual patient’s needs and preferences.

Using evidence-based decision making (EBD) provides specific and individualized health care that is based on the most robust scientific evidence. Much debate has occurred around the role of each of these realms, but Dr. Sackett described it best when he said, “External clinical evidence can inform, but can never replace, individual clinical expertise.” Dr. Victor Montori, another leader in the evidence-based healthcare movement, gave a clear assessment of the role of research when he stated that, “The better the research, the more confident the decision,” but he also stated that “Evidence alone is never sufficient to make a clinical decision.” The key take-home message is that evidence and science informs, but never replaces, clinical decisions.

Learning how to use evidence in making healthcare decisions is a skill learned which is perfected over time. As describe in Figure 1, there are 5 steps in applying EBD. This presentation and manuscript will review these 5 steps and will give the reader insights as to how to obtain the skills necessary to successfully implement each step.

Figure 1



Figure 2: Sample PICO Question

For patients with an orthodontic appliance, would the addition of professional fluoride varnish, when compared to home fluoride toothpaste use alone, reduce caries incidence?

P: orthodontic patients

I: professional fluoride varnish plus home fluoride toothpaste

C: home fluoride toothpaste

O: caries incidence

Step 1. Make the question

This may seem like an easy thing to do, and we have much experience in asking all types of questions. However, developing a strategic clinical question does take skill and practice. The advantages of framing a clinical question is that it helps define exactly what information you are seeking and helps you know when you’ve found the answer. It also helps to define search terms and develop a successful search strategy.

Table I: Sources of Pre-Appraised Evidence: Guidelines and Critical Summaries

Organization	Website	Evidence Type
American Dental Association's Center for Evidence-Based Dentistry (Free)	http://ebd.ada.org	Evidence-based Guidelines Summaries of systematic reviews
Translating Research Into Practice (Free)	http://www.tripdatabase.com/	Evidence-based Guidelines Summaries of clinical studies and systematic reviews
Scottish Dental Clinical Effectiveness Programme (Free)	http://SDCEP.org	Evidence Based Guidelines
Database of Abstracts of Reviews of Effects (DARE) (Free)	http://www.crd.york.ac.uk/CRD-Web/	Summaries of clinical studies and systematic reviews
National Guideline Clearinghouse (Free)	http://www.guideline.gov	Evidence-based Guidelines
Journal of Evidence-based Dental Practice (subscription)	http://www.journals.elsevier.com/journal-of-evidence-based-dental-practice/	Summaries of clinical studies and systematic reviews
Evidence-Based Dentistry Journal (subscription)	http://www.nature.com/ebd/index.html	Summaries of clinical studies and systematic reviews

A PICO question format is typically used, where P refers to the population, I refers to the Intervention about which we are seeking scientific information, C is the comparison group – usually a placebo or current standard practice, and O is the outcome being evaluated. Figure 2 provides an example of a PICO question. In this example, lack of a defined question might lead one to consider a much larger patient population or use a wider pool of outcome measures. However, using the PICO question helps us to narrow our search to those patient populations with orthodontics and narrow our outcome measure to caries incidence. This provides framing and focus for our clinical question. More recently, an S has been added to PICO, creating PICOS, in order to focus the question even more. It can be used for the type of study or for the setting for which the question is needed.

Step 2. Access the Evidence

This part of EBD would undoubtedly be quite a challenge without the capacity to do electronic searches of multiple databases. There are different approaches to search online for evidence, and this is another skill that is acquired over time. One approach is to seek pre-appraised evidence first. This refers to evidence where an individual or organization has evaluated and summarized evidence. The advantage of this approach is that it is typically quicker and provides concise information in a user-friendly format. Examples include evidence-based guidelines and critical

summaries of research. Some resources for pre-appraised evidence are free others require a subscription examples are found in Table I.

A second strategy typically employed if an answer to the PICO(S) question is not identified through searching for pre-appraised evidence is to search databases for systematic reviews (Figure 3) and clinical studies. PubMed is an open access database with handy multiple online tutorials. One very useful PubMed feature is the Clinical Queries Search that will enable the user to quickly identify both systematic reviews and clinical studies.

The Cochrane Collaboration is another online source of systematic reviews. The Cochrane Collaboration is an independent, non-profit, non-governmental organization consisting of worldwide volunteers. The collaboration was formed to organize medical research information in a systematic way to facilitate the choices that health professionals, patients, policy makers and others face in health interventions according to the principles of evidence-based medicine. They conduct high quality systematic reviews, and many consider Cochrane systematic reviews to be the gold standard. The Cochrane Oral Health Group (COHG) is one of 53 groups around the world and has responsibility for preparing, maintaining and disseminating systematic reviews of randomized controlled trials in oral health. The COHG has 1,400 members from over 40 countries who contribute in different ways. The COHG

Figure 3: What is a systematic review?

- Systematic reviews have increasingly replaced traditional narrative reviews and expert commentaries as a way of summarizing research evidence.
- High quality systematic reviews seek to:
 - Identify all relevant published and unpublished evidence
 - Select studies or reports for inclusion
 - Assess the quality of each study or report
 - Synthesize the findings from individual studies or reports in an unbiased way
 - Interpret the findings and present a balanced and impartial summary of the findings with due consideration of any flaws in the evidence

Table II: Questions to be asked when applying evidence into practice

Primary Question	Sub-question
1. Are the results valid?	Are the studies well designed and executed? What are the types of studies used?
2. What are the results?	What is the certainty of the effect? What is the magnitude of the effect?
3. Can the results be applied to my patient?	Is the population similar? Is the provider similar? Is the setting similar?

always welcomes new members, and increasing the membership of this group is a priority. Increasingly, reviews are conducted on topics relevant to hygienists and therapists. For more information please email cohg@manchester.ac.uk or visit <http://ohg.cochrane.org>.

Step 3. Appraising the evidence

Knowing that not all research is of equal quality, it is important to critically appraise published research to understand each study's strengths and weaknesses. This entails careful consideration of the study methods, which is typically the least read part of journal articles. It is critical to first understand the study methods and quality before one can begin to consider the significance of the results. This, too, is a skill that is developed over time. Fortunately, there are multiple checklists that can help one consider the important factors to appraise for each study design. Web links to such tools are available through the Resources page of the ADA's EBD Website under the title of "Critical Appraisal and Evidence Analysis."

One of the advantages of seeking pre-appraised evidence, as described in the first search strategy above, is that there is no need to conduct a formal critical appraisal because this is included in the critical summary or guideline development process. Furthermore, these documents are developed by individuals with expertise in EBD and critical appraisal.

Step 4. Applying the Evidence

Guidelines will provide clinical recommendations, and clinical judgment along with patient preference will influence whether they are adopted. For individual studies, there are three primary questions that need to be answered when determining whether evidence should be applied in practice (Table II). Each has sub-questions that will help you to determine if the evidence is sufficient to enable you to apply it in practice. Answering these questions will help determine if the study results are trustworthy (Are the results valid?), the anticipated outcome of implementing the intervention (What are the certainty and magnitude of the results?), and if this outcome can be expected with your patients (Can the results be applied to my patient?).

Step 5: Assessing the Outcome

One of aims of EBD is critical thinking. Step 5 is to evaluate the applied evidence in the specific clinical situation. This includes determining which course of action is best and evaluating how well the whole process worked. Did the product or treatment work for this patient in this situation? Was the intended outcome achieved? Did the evaluation or treatment method help this patient? How much time did the process take, and even more important, was the cost efficient? Is the magnitude of the benefit of the additional treatment substantial, and is it worth the extra cost and time?

Conclusion

An evidence-based approach to healthcare requires incorporating the most current and comprehensive scientific evidence, the clinician's judgment, and the patient's needs and preferences to make individualized healthcare decisions. This will likely require developing new skills, or enhancing existing skills, to effectively and efficiently use evidence in practice. The 5

steps of an evidence-based approach to healthcare will help any practitioner effectively implement science in practice:

1. Ask the question
2. Access the evidence
3. Appraise the evidence
4. Apply in practice
5. Assess the outcome

References

1. American Dental Association. Policy Statement on Evidence-Based Dentistry. August 29, 2013. Available at: <http://www.ada.org/en/about-the-ada/ada-positions-policies-and-statements/policy-on-evidence-based-dentistry> Accessed October 7, 2014.
2. Hemingway P, Brereton N. What is a systematic review? Available at: <http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/syst-review.pdf> Accessed October 7, 2014.