

Evidence - Based Dentistry: Do We Know What It Means?

Robert Čelić¹
Susan E. Sutherland²

¹Department of
Prosthodontics
School of Dental Medicine
University of Zagreb
²Department of Dentistry
University of Toronto
Sunnybrook and Women's
College Health Science
Centre, Toronto, Canada

Summary

To practice in an evidence-based dentistry manner, practitioners must be able to formulate a clear question, find the best available evidence efficiently, evaluate the evidence systematically and, if it is relevant and credible, apply the results of the appraisal to their practice. Materials, instruments, techniques, and therapies change so fast that most of us have difficulty keeping up with their names, much less the details of their use. As electronic technology (Internet, CD-ROM, and DVD) expands, information retrieval is increasingly easy. Patients have access to the same data that doctors do in many cases, and as their knowledge levels increase, so do their expectations and demands. Evidence-based dentistry closes the gap between clinical research and real world dental practice and provides dentists with powerful tools to interpret and apply research findings. Evidence-based dentistry process is not a rigid methodological evaluation of scientific evidence that dictates what practitioners should or should not do. Rather, the evidence-based dentistry process is based on integrating the scientific basis for clinical care, using thorough, unbiased reviews and the best available scientific evidence at any one time, with clinical and patient factors to make the best possible decision(s) about appropriate health care for specific clinical circumstances. Evidence-based dentistry relies on the role of individual professional judgment in this process.

Key words: *dentistry, evidence-based medicine.*

Acta Stomat Croat
2003; 195-198

REVIEW

Received: December 3, 2002

Address for correspondence:

Robert Čelić DDS, MS
Department of Prosthodontics
School of Dental Medicine
Gundulićeva 5, 10000 Zagreb
Croatia
Email: robert.celic@zg.tel.hr

Introduction

The term “*evidence-based dentistry*” has been widely used in recent years, sometimes erroneously. It has been employed to justify a variety of practices, to promote new technologies and products, and

to select evidence to support particular standpoints. However, the very definition of evidence-based practice, “*the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients*” (1), suggests that the primary aim and the most valuable appli-

cation of the evidence-based approach to the practice of dentistry is “to encourage the ordinary dental practitioner in primary dental care to look for and make sense of the evidence available in order to apply it to every day problems” (2). To do this successfully, many practicing dentists need to acquire certain skills not previously taught in most undergraduate dental curricula (3).

Discussions about the “evidence-based approach” are not new. Medical and dental speciality boards and up-to-date practitioners have always emphasized the importance of quality data. The evidence-based approach has spread from university and epidemiology origins into virtually every aspect of dental research and the delivery of care. Governments, professional organizations, and managed care organizations are using the evidence-based approach in planning research, purchasing, authorizing procedures, and developing guidelines. A major push to integrate the principles of the evidence-based approach into the mainstream of clinical practice has come from the fact that there is great variation on both clinical decision-making and results of therapy (4).

This paper will explain the concept of evidence-based dentistry (EBD) and will demonstrate how to integrate and summarize existing scientific and professional evidence for the use of practicing dentists.

Evidence-based paradigm

In the early years of dentistry, virtually all clinical decisions were based on whim, or at best, on case reports. But as we moved into our position as a learned profession, scientific investigation began to underpin these clinical decisions. As a profession, we have taken pride in our forward-thinking approach to the provision of health care services (5).

Evidence-based care is a global movement in all the health science disciplines. It represents a philosophical shift in the approach to practice - a shift that emphasizes evidence over opinion and, at the same time, judgment over blind adherence to rules. Evidence-based health care recognizes the complex environment in which clinical decisions are made and the importance of individual patient circumstances, beliefs, attitudes and values (3, 6). Evidence-

based practice is a practical approach to clinical problems. It involves tracking down the best available evidence, assessing its validity and using “rules of evidence” to grade the evidence according to its strength (3, 7).

There is an increasing body of literature to assist practicing clinicians in the acquisition of the skills needed to use evidence to guide practice. It has been shown that evidence-based methods can be learned by clinicians of varying backgrounds, at any stage in their careers (3, 8). The fact that scientific research evidence has built the knowledge base and has always provided the foundation for sound practice of the profession of dentistry is not in dispute. However, the context for change, and what has made the practice of evidence-based dentistry possible, is the electronic revolution. The research evidence can now be readily accessed at the “user” level by dentists or patients. Because the quality of research reports and, therefore, the accuracy of the conclusions drawn, vary tremendously, tools are needed to help dentists to properly interpret and apply the evidence. The “information explosion” and the limited amount of time for keeping up with the literature has made the evidence-based approach valuable and effective for efficiently filtering what is truly important for clinical decision making from what is not (3, 9).

Methods of evidence-based dentistry

All improvements require change, but not all change is improvement. Identifying which is which requires measurement and interpretation. The methods of evidence-based health care provide an efficient method for the continual upgrading and renewing of these skills (10-12). We encounter patients with diverse problems, exercise numerous clinical, interpersonal, and technical skills, and make many decisions. The factors that affect these decisions and their outcomes are complex. For instance, each patient has unique sociodemographic characteristics, cultural circumstances, and personal preferences. Each clinician has unique knowledge, experiences, and values. Moreover, practitioners and their patients make decisions within the context of a rapidly changing health care system that influences the availability, accessibility, and cost of diagnostic tests

and therapies (13). We may lack the time, motivation, and basic skills needed to find, critically appraise, and synthesize information, all of which we must do if we are to integrate the results of original studies into our practice. Fortunately, several potent methods are emerging that can greatly enhance our ability to interpret and apply research evidence, foremost among them is the systematic review (14).

Systematic reviews are scientific investigations in themselves, with pre-planned methods and an assembly of original studies as their “*subjects*.” They synthesize the results of multiple primary investigations by using strategies that limit bias and random error. These strategies include a comprehensive search of all potentially relevant articles and the use of explicit, reproducible criteria in the selection of articles for review. Primary research designs and study characteristics are appraised, data are synthesized, and results are interpreted (14-16). When the results of primary studies are summarized but not statistically combined, the review may be called a qualitative systematic review. A quantitative systematic review, or meta-analysis, is a systematic review that uses statistical methods to combine the results of two or more studies. The term “overview” is sometimes used to denote a systematic review, whether quantitative or qualitative. Summaries of research that lack explicit descriptions of systematic methods are often called narrative reviews (3, 14).

The systematic review differs significantly from the narrative review. Narrative reviews (the traditional review article) are usually broad in scope, written by experts and are often informal and subjective, supporting the author’s views. Reviews by different authorities may arrive at different conclusions, leaving the reader wondering what the “*truth*” really is. While narrative reviews are useful for providing a general perspective on a topic and are appropriate for describing the history of a problem or its management, their selection of studies is subject to bias and the overall conclusions may not be accurate (14). The strengths of systematic reviews include a clearly defined question, a comprehensive search strategy, explicit inclusion criteria, assessment of methodological quality of the included studies, synthesis of the data and a summary of the results (3).

The evidence-based dentistry process is time-consuming and thorough. The current approach in medicine and other health care fields is to rely on collaborative networks of experts in systematic review methods, statisticians, clinicians and funding agencies to conduct systematic reviews that can be used by professional associations or organizations. An international initiative called the Cochrane Collaboration has evolved to help prepare, maintain, and disseminate the results of systematic reviews of health care interventions (17). The main product of the Cochrane Collaboration is the Cochrane Library, an electronic library, issued quarterly, which contains databases of controlled trials and systematic reviews. The core work of the collaboration is done by the Collaborative Review Groups, which are formed by individuals who have a common interest in a health care problem and who work together through electronic means to prepare a systematic review on their chosen topic. The Cochrane Oral Health Group is based at the University of Manchester, United Kingdom. The Oral Health Group (OHG) has a growing and enthusiastic international membership (18, 19).

The principles and methods of evidence-based dentistry give dentists the opportunity to apply relevant research findings to the care of their patients. The key to finding evidence is to start with a focused, well-built clinical question. A clear question will help you to identify key words for use in your strategic search. Once evidence has been found, you need to decide if the results are believable and whether the findings can be applied to your patient. Assessing the validity (closeness to the truth) and the relevance (importance and usefulness) of the evidence is called critical appraisal (18, 20, 21). Systematic reviews and randomized controlled trials represent the highest levels of evidence, whereas case reports and expert opinion are the lowest (Table 1). This “*ladder of evidence*” was developed to a large extent for questions related to interventions or therapy. For questions related to diagnosis, prognosis or causation, other study designs such as cohort studies or case-control studies will often be more appropriate. For these types of studies, it is useful to think of the various study designs not as a hierarchy, but as categories of evidence, where the strongest design which is possible, practical and ethical should be

used (21). It is interesting to note that the lowest level of evidence is the one that we have traditionally depended on the most. It is likely the basis of how many of us were taught in dental school (5).

Conclusion

There are many challenges in implementing evidence-based practice, producing high-quality systematic reviews and developing useful evidence-based guidelines. Barriers to using evidence-based methods in everyday practice include lack of appropriate skills for formulating clear questions, executing efficient electronic searches and evaluating the literature. However, these skills can be learned

by anyone, at any stage of practice. What is needed is a desire and a commitment to implement this type of practice and practical, accessible continuing education programs and workshops in this regard. Our dental faculties and professional organizations should be the leaders in these endeavours. Interestingly, patients now have access to the same information sources as clinicians, and consistently use them to evaluate their clinical needs. The key, however, is not merely the capacity to access information. The crucial element is knowledge: knowledge based on the ability to identify significant findings, to critically appraise these findings, to combine these findings with clinical expertise, and then to make patient-centered judgments based on that evaluation (12, 21).