



Clinical Update

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Evidence-based Care in Dentistry

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Traditionally, clinical decisions in dentistry have been based on the experience of the clinical dentist. If a given treatment seemed to work, it was utilized again; if the results were disappointing, the procedure was deserted. Evaluating clinical treatment in this fashion is difficult because it is hard to know which factors are important for success and which ones contribute to failure. The purpose of this clinical update is to introduce a new model in dentistry called evidence-based care. This model facilitates conclusions for clinical practice based on sound research studies. This concept augments knowledge derived from clinical training and experience, continuing education courses and dental school with the results of clinical research adhering to the highest standards of scientific proof. Empirical evidence from treating patients in the past, listening to different lecturers describe certain clinical modes of treatment for different clinical situations, and utilizing just what you were exposed to in dental school is no longer enough to provide quality dental treatment to our patients. Bacteriological sampling and gingival crevicular fluid sampling are just two examples of tests that can help us to predict differing risk levels for future disease with regards to caries or periodontal disease. Tests like these and newer ones developed in the future may better predict future disease and will focus our planning based on the evidence of these tests. We can develop treatment plans based on degree of risk for disease. This evidence-based care approach should have a positive effect on predictable care and may help to reduce health care costs in the long-term (1).

In an evidence-based approach, all evidence is not given the same weight. The stronger the evidence, the stronger the recommendation it will support (1,2). See Table 1.

Table 1. - Study designs, ranked by strength of inference about effectiveness of treatment(3)

Strength	Study Design
Strongest	Randomized, controlled clinical trials: two or more groups of patients are assigned to different treatment conditions according to random assignment or by chance, maximizing the probability that groups are similar in signs and symptoms before treatment is begun.
Intermediate	Uncontrolled (nonrandomized) clinical trials or comparative treatment outcome studies: two or more groups of patients are assigned to different treatment conditions according to any method other than random assignment.
Weakest	Case series or case studies: one or more patients are followed up prospectively after treatment is begun and examined for improvement.

The evidence-based approach puts the most weight on research that has clearly defined goals. It acknowledges potential sources of bias within the study design, and uses analytical methods to determine both statistical and clinical significance. Every new technique, material and diagnostic test should ideally be subject to rigorous long-term randomized clinical trials. If this were not available, clinicians would use other types of studies or expert-based opinions. Double blind, placebo-controlled, randomized clinical trials are considered the gold standard for evidence-based care, however due to costs and difficulties performing these studies, many times they aren't readily available in the literature. Advantages of randomized clinical trials include reduction in bias since the groups are randomly assigned to various treatments or placebo. Neither patient nor the investigator knows who received which therapy. Utilizing longitudinal studies, which follow large groups, can provide information about the long-term effects of treatment or the natural history of a disease. Cross-sectional studies look at patients treated with different modes of therapy at a single point of time. A disadvantage of cross-sectional studies is that long-term evaluation of the treatment isn't done. Case reports provide information about new clinical techniques, often with detailed methods. They aren't designed to provide an unbiased estimate of the efficacy of the treatment. Animal and laboratory studies provide important information that can be used to improve the design of human clinical trials. Meta-analysis of the literature can be used also as well as anecdotal clinical observations but only as a last resort if other information isn't available. As dentists, we must be able to recognize the different levels of evidence because they allow us to assess the value of large-scale data warehouses with longitudinal tracking of patients and their services (1,2,4).

In evaluating controlled clinical trials about treatment efficacy we need to ask several questions about the trials prior to taking the evidence to heart and utilizing it in clinical practice (5):

- Can the results be applied to my patient's care?
- Were the patients assigned to study groups randomly?
- Were all patients followed up completely, or did many drop out of the study?
- Were the patients analyzed in the groups to which they were randomly assigned?
- Were the patients, health workers, and study personnel blind to the treatment?
- Were all clinically important outcomes considered?
- Are the likely treatment benefits worth the potential harms and costs?

Answering some of these important questions will help to develop the critical skills necessary to evaluate the research literature and better determine if a direct application to our clinical practice may be made. If some of these questions don't provide the appropriate answers, there may be crucial faults to the study, which may render it inadequate for clinical application.

Requirements for practice of evidence-based health care (6):

- Define the patient's problem.
- Identify the information required to resolve the problem.
- Conduct an efficient search of the literature.
- Select the best of the relevant studies.
- Apply the rules of evidence to determine validity.
- Extract clinical messages and present to colleagues.
- Apply to the patient's problem.
- Evaluate outcomes.

The movement toward evidence-based care in dentistry is based on similar mechanisms used in general medical practice as well as the demand from consumers of dental health care for quality care. Purchasers of health care are asking for accountability or "evidence" that the care being provided is of quality care and the use of evidence-based care is expressing this accountability. It would seem that insurance companies may be driving this focus towards evidence-based care but the dental community seems ready to embrace it and change its focus toward improving the quality of care. In 1996, the American Academy of Periodontology convened a World Workshop in Periodontology, which used an evidence-based care approach to assess the efficacy of a wide range of diagnostic and treatment options. The group discussed epidemiology and diagnosis of periodontal disease, periodontal regeneration around natural teeth, surgical and non-surgical pocket therapy, and implant therapy (2).

Delta's Dr. David Sackett gave one definition for evidence-based care: "the conscientious and judicious use of current best evidence in the management of individual patients."(1) According to Dr. Max Anderson, evidence-based care would not be a set of prescriptive rules or clinical guidelines that restrict practitioners from making an informed judgment about their patients. The "external body of knowledge" is information from published studies, and practitioners must utilize their clinical experiences and this body of knowledge and integrate both into their clinical practices. One problem is that a database of "external body of knowledge" accessible to all dentists who practice dentistry may be hard to import into dental society to allow equal access to integrate this material into daily practice with the time constraints put into daily scheduling. Possibly ranking studies based on their perceived value and providing possible clearer means to utilize this volume of information may make it more amenable to daily dental practice (1).

With evidence-based care patients can be treated differently based on degree of risk. For example, patients at higher risk for dental caries may be placed on a more aggressive prevention track with multi-fluoride regimens, chlorhexidine, fluoride varnishes, remineralization therapy and nutrition counseling (1). Using Evidence-based care, dentistry is changing its focus toward remineralization as a therapy for early carious lesions and moving away from the traditional surgical model toward

the preventive medical model and dealing with dental caries as a preventable and manageable bacterial infection (1).

Profound external forces are reshaping dental education and clinical practice. Changes in disease prevalence, technological advances, and the increasing demands of consumers of dental health care for accountability are inducing change within the dental profession. Medicine and dentistry share several barriers in the teaching and practice of evidence-based health care. Insufficient evidence, underdeveloped critical appraisal skills, inadequate time, and poor accessibility to the literature are important impediments and are equally likely to affect both the medical and dental professions. Dental educators can help to overcome these barriers by incorporating more critical appraisal programs into curricula and by promoting continuing dental education courses that adopt the philosophy of critical literature evaluation. The dental research community can help by conducting more randomized controlled clinical trials of new diagnostic and treatment modalities (6).

If dental educators are willing to incorporate evidence-based health care approaches within their practices and facilities, they will be contributing to clinical practice guidelines. Students will follow these role models and will be motivated to use evidence-based care in their practice. Evidence-based care will contribute to improved quality of dental health care with accountability, force practitioners to critically review the dental literature, and influence the dental health care delivery system into the 21st century (6).

The evidence-based approach offers a bridge between science and clinical practice. The dentist must integrate the evidence in the literature with patient preferences, scientific knowledge, clinical judgment and personal experience. This approach empowers the dentist by allowing informed clinical decision making based on research facts rather than opinions. The best part is that it will allow us to better treat our patients with predictable outcomes.

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