

Evidence-based dentistry: The clinical connection to innovation

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A lot of clinical questions are answered by combining our intuition, training and clinical experience, which may or may not be based on scientific evidence. This type of learning that relies heavily on clinical experience and information learned in dental schools or from colleagues, can lead to inappropriate treatment outcomes.

Evidence-based dentistry attempts to answer clinical questions based on a critical review of the most sound scientific evidence available combined with one's clinical experience and scientific knowledge.

Key words: Evidence-based dentistry, evidence, scientific

"Education never ends, Watson. It's a series of lessons with the greatest for the last".

SIR ARTHUR CONAN DOYLE^[1]

In keeping abreast with advances in dentistry, we are inundated with information about new techniques, tests, procedures, materials and products. Our desire to keep up to date is often tinged with the dilemma as to whether something new is better than our current clinical strategy.

To further complicate matters, the world in which we learn and practise dentistry is changing at an astonishing rate. Two phenomena-information explosion and consumer movement, both of which are fortified by the extraordinary advancement of the internet, are coming together to change the way all businesses including health care will function in the future.^[2]

Dentistry, as a profession, has developed a store of specialized knowledge that serves as a basis for professional decision-making. This knowledge base has evolved through three phases and currently may be entering the fourth phase.

In the first phase-the age of expertise, knowledge was accumulated through experience, which was nothing more than uncontrolled observation.

The second phase-the age of professionalization, was

characterized largely by changes in how professional knowledge was maintained and disseminated. Reports of individual experience were the most common form of knowledge. Some, but not all these experimental reports were based on careful yet uncontrolled observation spanning a substantial number of patients over a period of time.

We are currently at the end of the third phase-the age of evidence. Whether this phase will continue to develop and emerge as a distinct era in the evolution of dentistry's knowledge base cannot be known at the present time.^[3]

EVIDENCE-BASED DENTISTRY (EBD)

David Sackett, one of the pioneers of the new movement for the practice of EBD, along with his colleagues, emphasizes that EBD (and by analogy, evidence-based medicine) has two components. The practice of EBD means "integrating individual clinical expertise with the best available external clinical evidence from systematic research".^[1]

ROLE OF EVIDENCE-BASED DENTISTRY

Evidence-based dentistry is aimed at general dental practitioners to keep them abreast of the best available evidence on the latest developments in various aspects of clinical dentistry. In addition, it is an invaluable tool for the specialist practitioners needing to maintain an awareness of new approaches outside their branch of dentistry.

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HISTORY

It is claimed that the origin of EBM dates back to ! the mid-19th century. !

1970 - Introduced in MacMaster University ! (CANADA)!

1980 - Harvard University (USA)!

1995 - Oxford University (UK)!

2000 - 1st Fed Dentaire Internationale Workshop ! (PARIS)!

2000 - 1st Center for EBD established in Davangere ! (INDIA)!

STEPS OF EVIDENCE-BASED METHODS

1. Converting information needs into focused ! questions.
2. !Finding evidence to answer questions. !
3. !Critically appraising the evidence for validity and ! clinical usefulness.
4. !Applying results to clinical practice. !
5. Evaluating performance of evidence in clinical ! applications.

QUESTIONS

The !first step in the quest for answers to clinical ! questions is formulating a clear focused question. !

Important clinical questions arise from our daily ! encounters with patients in practice settings. These ! questions are often related to therapy, diagnosis, ! prognosis or causation. Most often the original question ! is too broad, so narrowing it down involves using a ! format (PICO format, see below) to identify the patient ! or population; the problem or condition of interest; ! the exposure to a test, risk factor or intervention; ! the comparison test or intervention, if any, and the ! specific outcome. !

The basics of a well-built question^[2]

P - Patient or problem.... Starting with your patient ! ask, "How would I describe a group of patients similar ! to mine?" Be precise yet brief. !

I - Intervention (treatment, tests, cause, prognostic ! factor).... Ask, "which main intervention am I ! considering?" Be specific. !

C - Comparison.... Ask, "What is the main alternative ! to compare the intervention?" Again be specific. !

O - Outcome... ask, "What can I hope to ! accomplish?" !

E.g. !P - For patients with Osseointegrated ! implant...!

I -who smoke...!

C - ... compared to patients who don't smoke...!

O - what is the proportion of implants lost at 10 ! years?!

FINDING EVIDENCE

Various levels of evidence are (Sackett 1997)

1. !Randomized clinical trials: Randomization refers to ! distributing patients or groups of patients purely by ! chance either into control or experimental groups, ! without the use of age, gender or any method, ! which could prejudice the results. These provide ! the strongest evidence-assuming adherence to ! principles such as eliminating or controlling the ! effects of multiple variables. !
2. !Meta analysis: Is a compilation of statistical analysis ! of several individual studies, which may have been ! inconclusive due to inadequate sample size. From ! statistical perspective, this type of study can provide ! compelling evidence when properly done, because ! it is based on a very large number of subjects. !
3. !Cohort studies: Follow a group of patients over a ! period of time. !
4. !Review articles: Consists of summary of two or ! more scientific papers on a specific topic although ! the quality of these articles may vary because of ! the bias of the author. Review articles provide an ! excellent source of information on a particular ! topic. !
5. !Cross-sectional studies: Examine one or several ! phenomena; such as smoking, disease activity or ! dietary habits, only at one point of time. They ! provide less compelling evidence since they do ! not follow patients over a period of time. !
6. !Case studies: Are quite common and typically ! present a new procedure, technique or clinical ! results which may be unusual or unexpected. These ! again provide less compelling evidence, since they ! typically lack control groups and are of inadequate ! sample size. !
7. !Opinion papers: Represent views of one or more ! authors on a particular topic. It is important to ! remember that these views may or may not be ! based on scientific fact. !

In the past it was rather difficult and time-consuming ! to assess dental literature. It would entail visiting a ! medical library to find and physically retrieve articles. ! Today thanks to computers, that task has been made ! easy. Anyone who is online can quickly and easily ! access medical and scientific literature through highly ! specialized databases. By far the most relevant and ! readily available of these is MEDLINE. !

CRITICALLY APPRAISING THE EVIDENCE

The evidence has to be critically appraised for its ! validity, impact and applicability. This involves ensuring ! that the sources of potential bias have been eliminated ! and appropriate statistical methods have been used. !

Also, the outcomes are appropriately summarized so ! that a decision can be made based on their clinical ! importance. !

APPLYING EBD TO YOUR PATIENTS

! One of the ways that validity of information is ! assessed is the extent to which it can be applied to ! patient care. However, certain specific points must be ! considered while applying certain types of information ! to patient care. These are considered below: !

1. Diagnostic tests: Practitioners must be assured ! that the tests are available, accurate, affordable ! and precise in their settings. Clearly, the patient ! must be a willing participant in the diagnostic ! procedure with the exception of obtaining valuable ! new information that will influence the outcome ! to justify the additional cost or discomfort. !
2. Prognosis: Whether the information in the article ! about the prognosis of the condition should be ! applied by answering questions like, !
...Will the results lead directly to selecting or ! avoiding treatment for an individual patient? !
...Are the results useful for reassuring or counseling ! patients? !
3. Therapy: Certain questions specific to articles ! about therapy will help determine when to apply ! improvements to patients and when not. !
...Are the results reported as outcomes that are ! important to patients? !
...Were all clinically important outcomes reported? !
...Are the likely treatment benefits worth the potential ! harms and costs?^[6] !

TO SUMMARIZE..... WHY DO WE PRACTICE EBD?

EBD is the use of current best evidence in making !

decisions about patient care. It requires us to keep ! abreast of new techniques and developments particularly ! in this era of expectations. !

Information needs to be assessed and its validity ! determined. To properly practise EBD means time must ! be spent searching and assessing the literature and ! information from any source should be questioned. By ! formulating a clinical question, carrying out an efficient ! literature search and evaluating the data, dentists can ! meet the challenges and continue to provide quality ! care in a rapidly changing environment. !

Additional benefits are that it makes it easier to ! justify treatment decisions, especially when there ! is a complaint or a dentolegal issue, along with the ! personal satisfaction that your patients are being ! offered the best treatment. !

REFERENCES

1. Osborn JF, Bulman JS, Petrie A. Further statistics in ! dentistry Part 10: Sherlock Holmes, evidence and evi- ! dence-based dentistry. *Br Dent J* 2003;194:189-95. !
2. Sutherland SE. Evidence based dentistry: Part 1. Getting ! started. *J Can Dent Assoc* 2001;67:204-6. !
3. Bader JD. The fourth phase. *J Evid Base Dent Pract* ! 2004;4:12-5. !
4. Abt E. Evidence-based dentistry: An overview of a new ! approach to dental practice. *Gen Dent* 1999;47:369-73. !
5. Sutherland SE. Evidence based dentistry: Part II. ! Searching for answers to clinical questions: How to ! use MEDLINE. *J Can Dent Assoc* 2001;67:277-80. !
6. Goldstein GR. What is evidence based dentistry? *Dent* ! *Clin North Am* 2002;46:1-9. !

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