Evidence based dentistry*

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We live in an age of information, innovation and change. Clinical descision making based on good quality evidence should lead to more effective and efficient treatments. Each practitioner has a role in assesing this information. this paper outlines this role, together with the advantages and problems of introducing an evidence based approach to dentistry.

There is world-wide interest in making health services more effective, and containing health care costs without compromising quality of care , in the face of technological advances, demographic change and increasing public expectation.

However, comparatively few decisions made in the health services are made as a result of good evidence. Shaw[1] pointed out in his recent leader on the Cochrane Collaboration that even when we do have good evidence for a particular intervention or therapy it is often many years before it comes into general use . He quotes the use of corticosteroids to reduce neonatal mortality in premature birth.[2] Cumulative systematic review could have shown 20 years ago that the use of intravenous streptokinase in acute myocardial infarction was a life saving measure.[3]

The aim of evidence-based 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 clinical problems.

What are the problems?

Amount of evidence

Currently over 2 million biomedical articles are published annually in some 20,000 journals. There are about 500 journals related to dentistry. Clearly not all of these articles are relevant to all areas of dental practice nor can one hope to read any more than a small minority.

Quality of evidence

Much of the ever increasing volume of evidence is produced to enhance career prospects than necessarily to increase knowledge. This can compromise quality. A number of publications that are widely read in dentistry are not subject to peer review and even where they are there is the tendency for publication bias. This bias may not be explicit but there is a tendency both by the researchers and editors to publish positive reviews. Negative trials can be equally valuable, and concerns have been raised that increasing sponsorship of medical trials by commercial concerns could result in non- publication of negative or unhelpful findings. Sir Robert Boyles[4] in 1661 pointed out that 'Many excellent notions or experiments are, by sober and modest men suppressed' and there seems to have been little change!

Dissemination of evidence

Unless good methods of dissemination are available even where there is good evidence it can take many years for a particular treatments to become the norm.

Practice based on authority rather than evidence

The use of techniques or therapies based on the views of authority rather than evidence may lead to the wrong treatment being performed, Iain Chalmers and Brian Haynes in their paper[5] give the example of the *Oxford Textbook of Clinical Medicine*[6] which stated 'the clinical benefits of thrombolysis (in treating patients with myocardial infarcts) . . . remains to be established'. This was several years after the publication of the study noted above.[3]

The problems of introducing evidence-based dentistry

- amount of evidence
- quality of evidence
- dissemination of evidence
- practice based on authority rather than evidence

Advantages of evidence-based dentistry

- it improves the effective use of research evidence in clinical practice
- it uses resources more effectively
- it relies on evidence rather than authority for clinical decision making
- it enables the practitioner to monitor and develop clinical performance

What is evidence-based dentistry?

Evidence-based dentistry (EBD) is a process that restructures the way in which we think about clinical problems.

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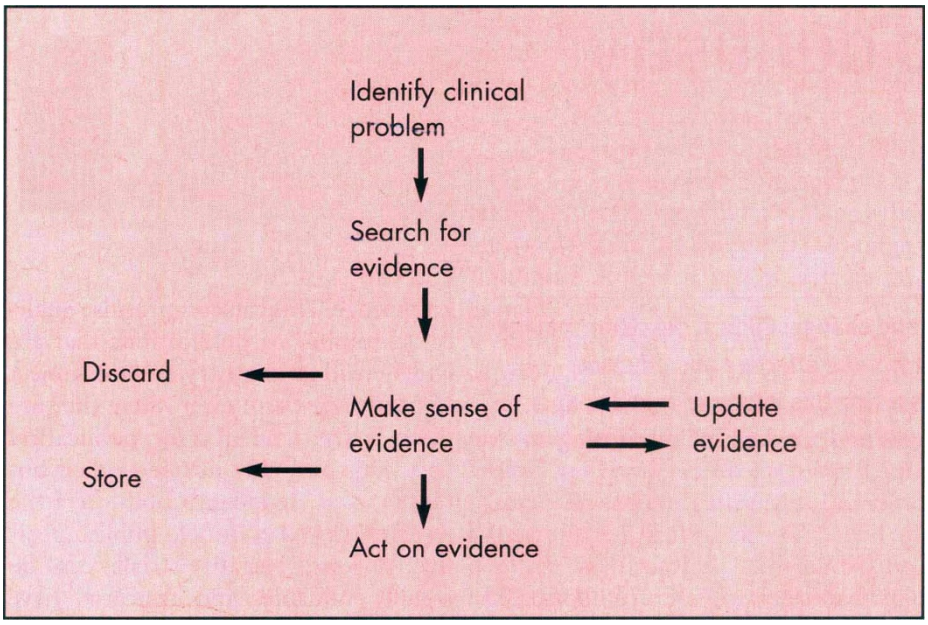

Fig. 1 The process of evidence-based dentistry in order to make clinical decisions

It is an approach to clinical problem solving that has evolved from self-directed and problem based approach to learning rather than the more traditional didactic form.

This problem based method of learning has been extensively developed at McMaster University Medical School in Hamilton, Canada. The Department of Community Dental Health at the Faculty of Dentistry, University of Toronto is also using these methods. They are also being adopted in many other medical schools throughout the world. A useful introduction to the methods employed is in the textbook by Sackett *et al.*,[7] *Clinical Epidemiology. A Basic Science for Clinical Medicine.*

EBD is the process of making decisions based on known evidence. Figure 1 outlines the main stages in the process. The first stage is to identify the clinical problem, following this evidence to help solve the problem must be located.

What constitutes evidence?

Our own clinical examination including specific findings from history and results from tests constitutes evidence. Research evidence will usually be based on a much larger number and variety of clinical interventions and thus becomes an important aid for clinical decision making, since it extends beyond our individual experience.

Research evidence helps us as Clinicians decide which interventions are most effective. It should not replace our clinical findings from the history and examination, but harness our clinical intuition from years of experience. What research should do is to enable us as clinicians maximise our experience by recognising gaps and uncertainties in our knowledge rather than waiting for the next patient to expose our inadequacies.

What is good evidence?

The gold standard for evidence is strong evidence from at least one published systematic review of multiple well designed randomised controlled trials (RCTs). However, this is not the only evidence and a list of levels of evidence is shown in figure 2 (level one being the best). Systematic reviews efficiently integrate existing information and provide data to establish whether scientific findings are consistent and can be generalised across populations, settings and treatment variations. Meta-analysis is a form of systemic review looking at all the relevant literature whether good bad or indifferent. The next stage is to work out a grading and a conclusion for each trial. The results are then combined with more weight being given to larger studies. This produces a single estimate of the clinical effectiveness . The advantage of a meta-analysis is that it summarises the available evidence and because of its systematic nature it can be appraised rapidly and the results applied to patient care. Some recent examples of dental systemic reviews are DePola *et al.*[8] on the relative anti-caries effectiveness of sodium monofluorophosphate and sodium fluoride as contained in currently available dentifrice formulations, and a meta-analysis by Hayes *et al.*[9] of systemic tetracycline use in chronic adult periodontitis.

Finding the evidence

Having identified a clinical problem where do you find good evidence? There are four basic routes:

1 Ask someone.
2 Consult a textbook.
3 Find a relevant article in your own reprint file.
4 Use a bibliographical database such as MEDLINE.

Asking a consultant or a colleague is an efficient way of getting an answer to a problem particularly if you are unlikely to encounter it again. There are however a number of drawbacks to this approach. Experts often disagree, they may not be up to date in that particular area of the subject, or they may not agree with the latest evidence. The best method of using an expert is to ask them for a specific reference so that you can appraise the evidence for yourself. In this way you do not abdicate your role in assessing whether your patient would benefit from the approach suggested by the expert.

Textbooks are only as current as their most recent reference, they can also suffer from the problem identified earlier of the authors not accepting the latest evidence. Personal references files are unlikely to be large or cover the wide variety of problems encountered in every day practice. Using a library is an alternative approach for accessing textbooks and journals but there is little evidence of great use of these facilities by

dental practitioners. The final route is the electronic one, in these days of increasing utilisation of computers this is fast becoming the quickest and simplest way of accessing information. MEDLINE is available in many local and regional medical libraries, and also to members of the BDA through the BDA library. It also features an after hours dial-up service accessible using a modem. Going on-line is a relatively inexpensive option and becoming cheaper every month. Many practices now have computers and the simple addition of a CD-ROM drive would allow personal access to any of the commercial databases currently available on CD-ROM.

Making sense of the evidence

Finding the evidence is just the first stage in the process. The next stage is appraisal; that is making sense of the evidence. This appraisal should be critical, i.e. systematically considering its validity, results and relevance to our own work. For an introduction to the type of skills required for the critical reading of articles the *BDJ* article by Bulman[10] is a useful starting point, while Milne and Chambers[11] provide a number of guidelines for assessing review articles. There are also a series of articles in the *BMJ* on systematic reviews[5,12,13,14,15,16] that give more insight to the process. The Cochrane collaboration and other agencies such as the Centre for Reviews and Dissemination in York also have an important role in reviewing and disseminating evidence. A step in the right direction would be the making of journal abstracts more informative along the line of those adopted by the *British Medical Journal* giving objectives, design, subjects, intervention, main outcome measures, results and conclusions.

Action

Following appraisal of the evidence there are four courses of action. We can act on it, discard it or store it, but we should be aware that new evidence is always emerging so we need to continually update it.

What are the advantages of this approach?

It improves the effective use of research evidence in clinical practice. This clinical problem solving approach to dentistry favours the early uptake of new and better treatments, or results in the early rejection of ineffective treatments.

It uses resources more effectively. Systematic reviews of materials for example may lead to the earlier adoption of the most effective ones. This in turn should lead to a reduction in replacement levels thereby saving resources.

It relies on evidence rather than authority for clinical decision making. Regular reviewing of the currently available evidence should develop us as practitioners so that we have the skills to evaluate evidence for ourselves based on our own clinical practice and assessment of the evidence rather than textbooks or authorities who may not be up to date. This appraisal of evidence is necessary to aid the approach to clinical decision making as described by Kay and Nuttall.[17]

Monitor and develop clinical performance. Use of the skills outlined should enable us to monitor and develop our own clinical performance.

Conclusions

In order to use this approach there is an need for the development of new skills of identifying clinical problems, literature searching, using conventional and electronic means and critical appraisal. Ideally this would involve everyone in the profession but initially we need to develop the skills of a core of enthusiasts who can then encourage its spread through the profession.

This approach needs to take place not only amongst the ranks of the post graduates but equally importantly in the dental schools. The pressure of practice tends to get dentists to switch off the 'learn mode' but there is a need to switch on 'learn mode' again . The experience in Canada that evidence-based doctors are happier doctors and transferring this satisfying effective practice to dentistry can be a market asset in the new world of dentistry. Being able to offer up to date information based on properly evaluated evidence must help with increasing demands of patients. It also helps dentists to test claims of representatives of various dental and drug companies.

The evidence based approach has already moved into medicine in this

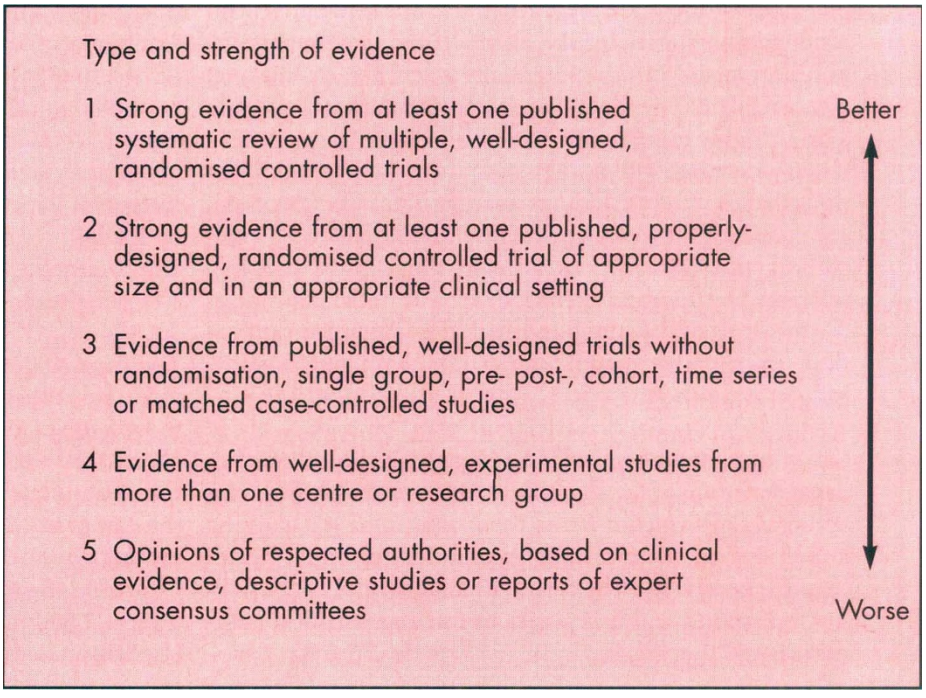

Fig. 2 Levels of evidence

country and there are a number of initiatives in dentistry including the establishment of the Cochrane Oral Health Group in 1993. Recently a Workshop on evidence-based dentistry in Oxford was well received by practitioners. With the ever increasing pressure for efficient and cost effective care there is a need to move the process of evidence-based dentistry into all aspects of dental care. This is particularly important with the increasing role that insurance companies are playing in the provision of dental care. They will feel much happier at buying dental procedures which are supported by evidence and likely to produce a good long-term outcome.

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Call for commentators

We are hoping to recruit a team of commentators for *Evidence-Based Dentistry*. Commentators are experts in various aspects of clinical practice and clinical research who write commentaries for the abstracts that we prepare for publication. If you are potentially interested in the role, please read on. The function of a commentary is to provide a brief, highly expert summary of the context of each article, any key methodological issues, and the clinical applications that the study's findings warrant. The most successful commentaries have been done by individuals with both clinical and research expertise in the clinical problem addressed by the abstracted study, a basic understanding of the methods of the study, and skill in written communication. Informative commentaries can have considerable influence around the world.

Our commentators must (1) be engaged in clinical practice in one or more of the disciplines of relevance to the target audiences of *Evidence-Based Dentistry*; (2) have a working knowledge of basic principles of evidence-based health care; (3) be able to write clearly in English; and (4) be willing to respond within 2 weeks to our request for a commentary.

Commentators' tasks include reading the article to ensure that the abstract prepared by our research staff is accurate, complete, and clear; preparing a 325 word commentary covering (1) the context of the study with respect to other studies on the topic; (2) any important methodological issues in the way the study was conducted, whether good or bad; and (3) the implications of the study findings for clinical practice. Of these three categories the emphasis of the commentary should be on the last point. Commentators must also respond to any comments from the authors of the original study after they have seen the abstract and the commentary.

The commentators for *Evidence-Based Dentistry* provide a valuable service for our readers. If you would like to become a commentator and you meet the criteria above please write to us detailing your field of expertise. Nominations of others are also welcome — send the names and addresses of people you would like to see writing commentaries to: The Editor, Evidence-Based Dentistry, British Dental Association, 64 Wimpole Street, London W1M 8AL, UK (e-mail: CEBD@bhadentph.demon.co.uk) and we will approach them.