Evidence-based dentistry: an overview of the challenges in changing professional practice

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A great deal of effort and resources are currently being directed at developing an evidence-based approach to healthcare delivery. The success of the evidence-based movement will depend upon the provision of necessary support to help GDPs achieve change. This paper aims to give an overview of current knowledge on what types of interventions are most effective at changing health professionals' clinical practices. Barriers to change are highlighted and the implications for the development of evidence-based dentistry are considered. Further research on organisational, social and personal influences affecting the application of evidence-based practice is necessary.

There is an increasing emphasis being placed upon developing an evidence-based approach to clinical care and treatment.[1] This approach offers many potential benefits to the quality of patient care. A core element of evidence-based care is the need for health professionals to change their clinical practices in accordance with the best available scientific evidence. In dentistry, the evidence-based movement is at a relatively early stage of development.[2] Emphasis is currently being placed upon collecting and analysing the available evidence on a range of dental treatments and interventions. In addition to collating guidelines on effective care, it is critically important to understand what factors will influence dentists' ability to change their clinical practices to incorporate the evidence. Without an understanding of how dentists change their clinical practices, evidence-based dentistry will achieve little. This paper aims to explore what interventions are most successful in changing clinical practice. Barriers to change will also be considered and implications for embracing evidence-based dentistry will be examined.

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Interventions to change professional practice

Although considerable resources are spent on clinical research, little attention has been paid to the implementation of research evidence into clinical care. A range of different interventions have been used to change professional clinical practice through the dissemination of research findings. These include the use of opinion leaders, continuing medical/dental education, dissemination of guidelines, educational outreach, audit and feedback, reminders and media campaigns. Reviews have been carried out to assess which interventions are most effective at promoting sustained changes in clinical behaviour. In particular, two recent detailed overviews of published systematic reviews on interventions to improve professional performance have provided some useful insights.[3,4]

In brief
This article:
- Highlights the complexity of changing practices
- Adds to the debate of evidence-based dentistry
- Identifies barriers to implementing change in clinical practice
- Provides debate on possible options for educational interventions

The aim of the first overview was to examine systematic reviews of different strategies for the dissemination and implementation of research findings to identify evidence for the effectiveness of different strategies.[3] A detailed search of the relevant literature was conducted. The identified papers were then subjected to a rigorous quality assessment procedure. Eighteen reviews satisfied the inclusion criteria. In the second overview, information was collated on 44 systematic reviews of different dissemination and implementation interventions designed to change professional practice.[4] Some of these interventions were Cochrane reviews. The interventions were categorised into reviews of broad strategies (continuing medical education; dissemination and implementation of guidelines); reviews of interventions to improve specific behaviour (preventive care, prescribing and other behaviours); and reviews of specific interventions (dissemination of educational materials, educational outreach, local opinion leaders, audit and feedback, reminders — manual or computerised and other interventions).

The common findings from both overviews are summarised in Table 1. Most of the systematic reviews identified modest improvements in clinical performance as a result of the intervention, although no intervention was effective under all circumstances. The most effective interventions were educational outreach (though only specific for one area of practice), reminder systems, multi-faceted and interactive educational meetings. The passive dissemination of information either through the distribution of educational materials or attendance at didactic meetings were generally ineffective at changing clinical practices. Both overviews highlight that 'no magic bullets' exist to change clinical practice.[5] The vast majority of studies considered in

Table 1 Effects of interventions to change clinical practice from systematic reviews

	Consistently effective interventions	Interventions with variable effectiveness	Interventions with little or no effect
Interactive educational meetings (participative workshops encouraging discussion and practice)	✓		
Multi-faceted interventions (combination of audit, reminders, consensus processes and marketing)			
Reminders (manual or computerised)	✓		
Educational outreach (prescribing in USA)	✓		
Audit and feedback		✓	
Local opinion leaders		✓	
Patient mediated interventions (feedback from patients incorporated into interventions)			✓
Distribution of educational materials (passive distribution of clinical guidelines and publications)			✓
Didactic educational meetings and lectures			✓

Bero *et al,* 1998; Effective Health Care, 1999

both reviews were based upon research with the medical or nursing professions. Both reviews concluded that multi-faceted interventions based upon an assessment of potential barriers were more likely to be effective than single interventions.

Barriers to implementing change in clinical practice

Interventions that target the barriers to change have been found to have a greater impact on changing clinical practice.[4] It is essential therefore to identify potential barriers that may block clinicians' ability to implement research evidence into their clinical practices. Table 2 lists the range of barriers that may limit the implementation of research evidence in clinical care. The factors that potentially prevent a clinician from changing their routine clinical practice are the practitioners' knowledge and attitudes, patient demands, the practice environment and the wider aspects of the health system including funding and the social environment .[6,7]

The extensive and diverse range of potential barriers cannot be addressed through basic educational interventions alone. The range of environmental, structural and organisational issues require radical policy shifts to facilitate practitioners' ability to change their clinical practice.

Factors influencing change in dental practice

Research assessing the implementation of research evidence into clinical practice has largely focused upon the medical profession. Very few studies have investigated the process of change in dental practice. Although many of the factors may well be similar to medical practice, there may also be considerable differences in medical and dental practice given the different funding and organisational structures. In order to discuss the likely factors influencing change in dental practice, it is necessary to look at specific studies that have investigated some of these influences. Although these have not been subjected to systematic review procedures, they do give some indication of the important factors influencing dental practice and the likely barriers to changing towards an evidence-based approach.

The factors influencing dentists' clinical practices reflect the potential barriers to change found in the medical literature.[6,7]

Table 2 Potential barriers to changing clinical practices

Knowledge and attitudes of practitioner
- Information overload
- Clinical uncertainty
- Influence of opinion leaders
- Obsolete knowledge

Patient factors
- Demands for care
- Perceptions and beliefs about appropriate care
- Compliance with clinical guidance

Practice environment
- Time constraints
- Poor practice organisation

Educational environment
- Outdated undergraduate education
- Inappropriate continuing education
- Lack of incentives to participate in effective educational activities

Wider health system
- Inappropriate funding system
- Lack of financial support for innovation
- Failure to provide practitioners with access to appropriate information

Social environment
- Media influence in creating demands for treatment
- Commercial concerns promoting products and equipment

Oxman & Flottrop, 1998; Haines & Donald, 1998

Patients influence various dental treatment decisions. Discussions with patients and patients' values are two of the main factors governing treatment philosophies.[8] Patients also influence specific treatment techniques including periodontal and endodontic treatments.[9,10] Patients' opinions and dentists' fear of medico-legal action have affected dentists' bitewing radiography practices.[11]

Practitioners' knowledge and attitudes towards care options can influence treatment decisions. Attitudes and knowledge of sealants and preventative dentistry have been correlated with sealant adoption.[12] Dentists' feelings of self-esteem and conscience are further factors influencing treatment philosophies.[8]

At a practice level, there are also a variety of factors likely to influence clinical decisions. The organisational and social milieus of the practice setting are inevitably going to affect information diffusion and educational activities. In a wider context, funding arrangements appear to be a major factor influencing treatment decisions in dentistry. Restrictions in the National Health Service fee scale have been found to limit the adoption of new techniques and preventive care.[10,13] The employment of a hygienist has been found to be related to sealant use and knowledge.[14]

Knowledge will inevitably be a vital factor influencing treatment decisions. How this knowledge is accrued may be critical. Understanding how educational information is diffused within the dental profession may provide essential information on the process of change. Sealant adoption has been correlated with the number of journal articles read, the number of local meetings attended, and integration into the dental community.[12] In a later study of sealant adoption,[14] participation in continuing education was associated with sealant use. Dentists' technical behaviours associated with oral radiology have been found to be influenced by education.[11] Endodontic practice is also influenced by undergraduate and postgraduate education.[10]

The specific way in which this education is delivered may be critical. The 'hands on' courses for dental practitioners reflect the interactive approach found to be effective in intervention trials.[3,4] However, barriers to attending postgraduate courses include practice time lost because of attendance.[15] Addressing these barriers may be crucial if dentists are to be encouraged to attend such courses. Clinical guidelines may also be used to achieve change, though referral guidelines were found to be unsuccessful for orthodontic treatment.[16] Some dental practices encourage in-house development of skills through peer review and clinical audit, whilst others have unstructured approaches to in-house learning.[10] Audit and peer review activities may therefore be another activity that may influence practices and could form part of a multi-faceted approach. If the multi-faceted approach to education has been shown to be effective in intervention studies, then it is reasonable to assume that dentists who participate in a number of educational activities are likely to have access to the most up to date evidence. Whether or not they are then likely to change practices in accordance with this evidence requires further research.

Implications of findings for implementing evidence-based dentistry

What is the relevance of this information for the future implementation of evidence-based dentistry? The findings of the systematic reviews highlight the fact that clinical practice is influenced by a complex range of factors. It is very evident that decisions in clinical practice are not based upon rational thought alone. Major gaps exist however in our understanding of the process by which health professionals, especially dentists, change their clinical practices. *The Effective Health Care Bulletin*[4] suggested that 'any attempt to bring about change should first involve a diagnostic analysis to identify factors likely to influence the proposed change. Choice of dissemination and implementation interventions should be guided by the diagnostic analysis and informed by knowledge of relevant research'. This is essential given the types of factors that may influence dental practice.

The wide and diverse range of barriers that limit practitioners' ability to change their routine clinical practices need to be addressed if the evidence-based dentistry movement is to achieve any significant results.

The systematic reviews of interventions to promote change in clinical practice demonstrate the limitations of current approaches. The passive dissemination of information through the distribution of educational materials and clinical guidelines or attendance at didactic meetings have been shown to have very little effect. These methods still dominate both under- and post-graduate dental educational programmes. More participative, multi-faceted and interactive approaches appear to have a greater long-term impact on producing sustained changes in medical clinical practice. Postgraduate dental tutors need to consider how they can integrate more effective educational techniques into continuing professional development for dentists and their team members. A more detailed and comprehensive evaluation of the impact on clinical practice of current postgraduate courses is also required.

The wide and diverse range of barriers that limit practitioners' ability to change their routine clinical practices need to be addressed if the evidence-based dentistry movement is to achieve any significant results. Professional organisations and consumer groups need to work together with the Department of Health to remove the obstacles blocking change. Wide ranging reforms to the dental system may be required before any meaningful change is possible.

Finally, it is apparent that simply reviewing the latest evidence on dental interventions and then circulating clinical guidelines will have only a very limited effect on most dental practitioners' routine practices. At present very little is known about what factors are most influential in determining dentists' clinical practice and their ability to update practice in line with contemporary evidence. Research is needed to uncover the detailed range of factors involved in the process of change in dental practice and to disentangle the various influences on clinical practice. Research is also needed to assess the mechanisms of support that are necessary to achieve the changes that are being advocated.

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