

## Evidence based dentistry

## Introduction

“Comparatively few decisions in health services are made as a result of good evidence”

*Richards & Lawrence, 1998*

## What is evidence based dentistry?

Evidence-based dentistry EBD is the practice of dentistry that integrates the **best available evidence** with **clinical experience** and **patient preference** in making clinical decisions.

(Evidence Based Dentistry, 2006).

## What is evidence based dentistry?



## What is evidence based dentistry?

- It is an approach to clinical problems that has evolved from self-directed and problem-based approach to learning.
- Not simply a formula to drive clinical management, without consideration of the patient.
- It cannot be cook-book practice
  - Indicates only what is the best available evidence
  - Needs to be integrated with patients wishes/values

## Why EBD?

- Helps clinicians decide which interventions are most effective
- Favors the uptake of new and better treatments
- Results in the rejection of ineffective treatments
- Helps clinicians with the increasing demands of patients
- Procedures supported by evidence and with good long term outcomes are more likely to be supported by insurance companies

## Advantages

1. Improve effective use of research in clinical practice
2. More effective use of resources
3. Rely on evidence rather than authority
4. Enable practitioners to monitor and develop their own clinical performance

## EBD vs traditional practice

### Evidence-Based Practice

- Uses best evidence
- Systematic appraisal of quality of evidence
- Objective, transparent, less biased
- Acceptance of levels of uncertainty

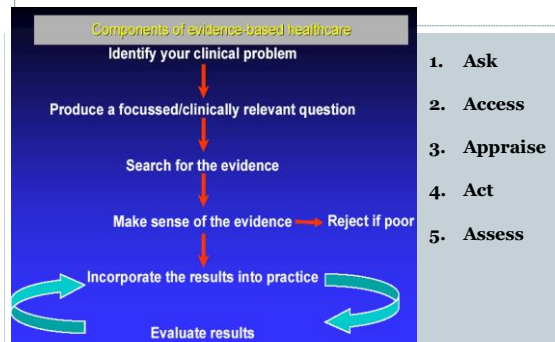
### Traditional Practice

- Unknown basis of evidence
- Limited/incomplete appraisal of quality of evidence
- Subjective, opaque, potentially biased
- Black and white conclusions

## Barriers to change

- Time
- Refusal to change set practices
- Access to evidence
- Complexity of information (quality, quantity)

## Process of EBD



## Step 1: Framing an Answerable Question

□ In defining a question we must pay attention to four elements:

- What is the population (children/adults or smokers/non-smokers etc.),
- What is the intervention?
- What are we comparing it to?
- What is the outcome that we need?

**P** Population or Problem

**I** Intervention

**C** Comparison (Optional)

**O** Outcome

- In children with periodontal disease, will short-term systemic antibiotics, when compared to surgery, reduce pocket depth?

## Step 2: find the evidence

- 1- Colleague or teacher  
*"because it works"*
- 2- Textbooks  
*"out of date before published"*
- 3- Clinical guidelines websites  
*"ADA, RCS"*
- 4- Bibliographical database  
*"www.pubmed.com"*

### Step 2: Appraise the evidence

- The gold standard for evidence is strong evidence from **at least** one published systematic review of multiple well-designed randomised controlled trials.

### Step 3: Appraise the evidence

- Appraise the **validity** and **reliability** of the **evidence**.
- **Validity:** credibility or believability of the research.  
"Are the findings genuine? Is the measure used valid for the outcome?"
- **Reliability:** repeatability of findings.  
"If the study were to be done a second time, would it yield the same results?"

### Types of evidence

- **Pre-appraised:** the evidence has been evaluated according to standard methods by a group of experts with experience and skills in the area of evidence-based dentistry.
  - > **Includes:** clinical guidelines, critical summaries of systematic reviews, systematic reviews.
- **Primary evidence (Not pre-appraised)**
  - > **Includes:** RCTs, cohort studies, etc.



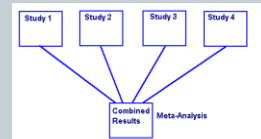
Level of evidence	
1++	High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias
1+	Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
1-	Meta-analyses, systematic reviews, or RCTs with a high risk of bias
2++	High quality case control or cohort studies with a very low risk of bias
2+	Well-conducted case control or cohort studies with a low risk of bias
2-	Case control or cohort studies with high risk of bias
3	Case report
4	Expert opinion

Stronger ↑

↓ Weaker

## What is a systematic review?

“A formalized and stringent approach to combining the results from all relevant studies of similar investigations of the same health condition”



## Systematic review

- Formulate a question
- Conduct a literature search
- Inclusion and exclusion criteria
- Extracts the appropriate data and assess their quality and validity
- Report data

## What is a meta analysis?

- **Meta-analysis** is a review that uses quantitative methods to combine the statistical measures from two or more studies and generates a weighted average of the effect of an intervention, degree of association between a risk factor and a disease, or accuracy of a diagnostic test

## Example of a systematic review and meta analysis

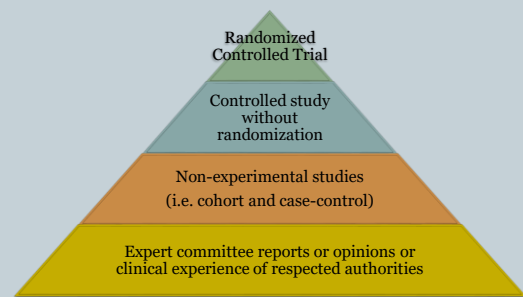
- Efficacy of preformed metal crowns vs. amalgam restorations: in primary molars: A systematic review

### Results

Their failure rates, based on need for subsequent treatment or retention of the restoration at final evaluation, ranged from 1.9 to 30.3 % for PMCs and 11.6 to 88.7% for amalgam restorations

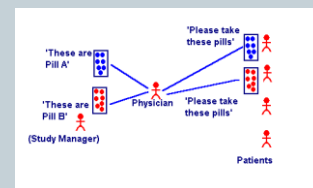
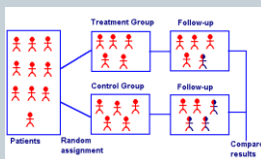
Randall et al., efficacy of preformed metal crowns vs. amalgam restorations in primary molars: a systematic review. The journal of the American Dental Association. Volume 131, Issue 3, March 2000, Pages 337–343

## Primary evidence



## What is a randomised controlled trial (RCT)

“A comparative clinical trial in which there is random allocation of patients to treatments”



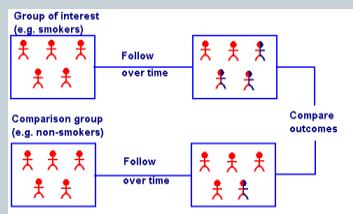
## Example of a RCT

- A randomised controlled trial of paediatric conscious sedation for dental treatment using intravenous midazolam combined with inhaled nitrous oxide or nitrous oxide/sevoflurane

Averley A, Girdler N, Bond S, Steen N, Steele J. A randomised controlled trial of paediatric conscious sedation for dental treatment using intravenous midazolam combined with inhaled nitrous oxide or nitrous oxide/sevoflurane. *Anaesthesia*, 2004, 59, pages 844–852

## Cohort studies

A study in which patients who presently have a certain condition and/or receive a particular treatment are followed over time and compared with another group who are not affected by the condition under investigation”



## Example of a cohort study

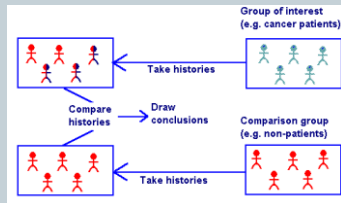
- Early Preventive Dental Visits: Effects on Subsequent Utilization and Costs

Savage et al. Early Preventive Dental Visits: Effects on Subsequent Utilization and Costs. *Pediatrics* Vol. 114 No. 4 October 1, 2004 pp. e418 -e423



## Case control study

“Studies in which patients who already have a certain condition are compared with people who do not”



## Example of a case control study

- Maternal Periodontal Disease and Preterm Low Birth weight: Case-Control Study

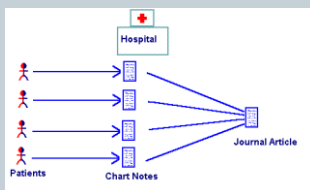
Cases: premature Low birth weight infants

Controls: full term normal weight infants

Davenport et al. Maternal Periodontal Disease and Preterm Low Birth weight: Case-Control Study *Journal of Dental research*. May 2002 vol. 81 no. 5 313-318

## Case reports

“Consist either of collections of reports on the treatment of individual patients, or of reports on a single patient”



## Example of a case report

- Decoronation for the management of an ankylosed young permanent tooth

Sapir and Shapira. Decoronation for the management of an ankylosed young permanent tooth. *Dental Traumatology* 2008; 24: 131-135

## How to appraise evidence?

- Are the results **valid**?

- **Quality**

- Are the studies well designed and executed?
    - What types of studies are there?

- **Quantity**

- How many studies are there?
    - What are the population sizes?

- **Consistency**

- How consistent are their results?

## How to appraise evidence?

- What are the **results**?

- Certainty of the effect
  - Magnitude of the effect

## How to appraise evidence?

- Can the results be **applied** to my patient?

- Is the population similar?
  - Is the provider similar?
  - Is the setting similar?

## How to appraise evidence?

- Tools to ensure systematic appraisal of evidence are available:

- CASP: [www.casp-uk.net](http://www.casp-uk.net)
- CONSORT (for RCTs): [www.consort-statement.org/](http://www.consort-statement.org/)
- COREQ (for qualitative studies)
- PRISMA (for systematic reviews and meta-analyses): [www.prisma-statement.org/](http://www.prisma-statement.org/)

### Step 4: Acting On The Evidence

- Should be based on the:
  - Evidence
  - Relevance to your patient
  - Willingness of the patient to receive the treatment
  - Practitioners ability to provide the treatment

### Step 5: Assess outcomes

- Assess treatment outcomes for the patient.

### EBD resources

- **Cochrane Collaboration**
- **Evidence Based Dentistry Journal**
- **Centre for EBD**
- **The Centre for Reviews and Dissemination (CRD)**

### Cochrane Collaboration

International organisation that aims to help people make well-informed decisions about health care by preparing, maintaining and promoting the accessibility of systematic reviews of the effects of healthcare interventions

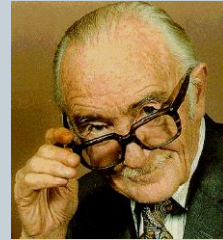


## The Cochrane Oral Health Group



- <http://www.cochrane-oral.man.ac.uk/abstracts.htm>
- Aims to produce systematic reviews which primarily include all randomised control trials (RCTs) of oral health

## Professor Archibald Cochrane (1909 - 1988)



## Evidence Based Dentistry Journal



- [www.nature.com/ebd](http://www.nature.com/ebd)
- Aimed at general dental practitioners to help them keep abreast of the best available evidence on the latest developments in various aspects of clinical dentistry

## Evidence Based Dentistry Journal



- [http://www.rcseng.ac.uk/dental/fds/clinical\\_guidelines/](http://www.rcseng.ac.uk/dental/fds/clinical_guidelines/)
- Royal College of Surgeons of England

## Centre for EBD



- <http://www.cebd.org/>
- An independent body whose aim is to promote the teaching, learning, practice and evaluation of EBD world-wide.

## The Centre for Reviews and Dissemination (CRD)



Centre for Reviews and Dissemination



- <http://www.york.ac.uk/inst/crd/>
- Aims to provide research-based information about the effects of interventions used in health and social care.

Thank you