Integrating evidence-based medicine in prosthodontic practice

Asbjørn Jokstad
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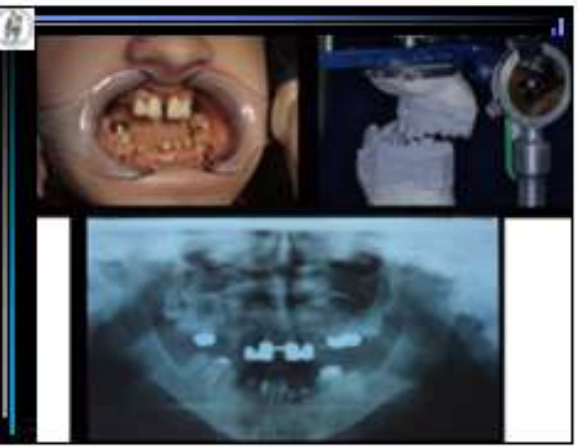
What is a prosthodontist?

The prosthodontist: A clinician specially trained to recognize and solve patients' needs for rehabilitation of a complex nature:



*"**Prosthetic Dentistry**: Branch of dentistry dealing with construction of artificial appliances for the mouth"**

*Thomas CL. *Taber's Cyclopedic Medical Dictionary*, 18th ed. Philadelphia: Davis, 1997.

define:prosthodontist - Google Search - Microsoft Internet Explorer

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Web

Definitions of **prosthodontist** on the Web:

- (pros-tho-DON-tist): A dentist with special training in making replacements for missing teeth or other structures of the oral cavity to restore an individual's appearance, comfort, or health.
  www.upmccancercenters.com/dictionary/p.html
- a dental specialist who has undergone additional training and certification in the restoration and replacement of broken teeth with crowns, bridges, or removable prosthetics (dentures).
  medicalcenter.osu.edu/patientcare/healthinformation/otherhealthtopics/OralHealth/OralHealthGlossary/
- A dentist who specializes in providing prosthetic appliances for oral structures.
  www.cleftline.org/aboutclp/glossary.htm
- dentist who specializes in making oral appliances such as dentures and bite plates.
  www.nffr.org/FamilySupportDictionary.htm
- Board Certified Dentists who specialize in the replacement of missing teeth by bridges and dentures. See Bridges. See Dentures.
  www.toothpick.com/Dental_terms.htm
- A dental professional who works within the branch of dentistry dealing with the replacement of teeth and related mouth or jaw structures by artificial devices. In the area of TMJ, this type of dentist may work with the patient

Internet

It seems like prosthodontists are regarded simply as

(*specialized/certified/board approved)*

”*makers of oral appliances*”.

Why is it so?

Evidence-Based Dentistry (2002) 3, 2-4

www.nature.com/ebd

editorial

Prosthodontics 21: towards a new era?

Asbjørn Jokstad
Associate Professor, Institute of Clinical Dentistry, Dental Faculty, University of Oslo, Norway

As we enter a new century have we also er
Recent papers and editorials have started
evidence-based approach in prosthodont
obsession with micro-measurement to one
Evidence-Based Dentistry (2002) 3, 2–4. DOI:

Has a new era in prosthodontics begun? Did it begin with the editorial published concurrently in the four leading international prosthodontic journals in 1994 entitled "Prosthodontics 21: a new beginning"?[1] Did the statement made by GA Zarb in that editorial sum up the frustration many felt within the discipline?

"We have allowed ourselves to be perplexed in part by the ruthless demands of accuracy in our technical performances. We have also been obsessed with micro-measurements and the severe standards of a handicraft approach to problem solving."

To what extent this allegation is valid

are perhaps responsible:

- An increasing number of elderly patients retain their teeth throughout life, often generating complex treatment decisions. Many papers report large discrepancies between

however, resistance to using implants from traditionalists and prosthodontists remembering implantology from the pre-Brånemark era. Unfortunately, serious research on the benefits and potentials of implant based prosthodontics over

"We have allowed ourselves to be perplexed in part by the ruthless demands of accuracy in our technical performances. We have also been obsessed with micro-measurements and the severe standards of a handicraft approach to problem solving."

What needs to be done?

Areas for improvement and consolidation

1. Endorse our core characteristics
2. Educate students and dentists
3. Converge postgraduate teaching
4. Focus our clinical research
5. Liaise with colleagues
6. Inform the general public

Areas for improvement and consolidation

1. Identify and endorse the core characteristics of our clinical discipline

What is prosthodontics?

Int J Prosthod 1998; 11: 295-301

A Definition of Prosthetic Dentistry

Asbjørn Jokstad, DDS, Dr Odont[a]
Jon Ørstavik, DDS, Dr Odont[b]
Tore Ramstad, DDS[c]

Purpose: A more precise and up-to-date definition of prosthetic dentistry is warranted. The aim of the present review is to present a new core definition of the discipline on the basis of a discussion of existing definitions. **Materials and Methods:** Clinical textbooks in prosthetic dentistry and dental implantology, as well as medical and dental glossaries were reviewed. **Results:** Two main categories of definitions of prosthetic dentistry were identified: first, definitions that emphasized the technologic aspects of the discipline, ie, the fabrication of prostheses; and second, definitions that incorporated some reference to the objectives or aims of prosthetic treatment, ie, the restoration of one or more aspects of oral function. Slightly more than half of the citations contained such aim-related references, and this aspect tended to be most pronounced in recent publications. **Conclusion:** The following definition is ventured: prosthodontics is the discipline of dentistry concerned with the consequences of congenital absence or acquired loss of oral tissues and with the methods for and assessment whether more good than harm is done by inserting artificial devices made from alloplastic materials. *Int J Prosthodont 1998;11:295–301.*

An updated register of scientific research originating from the prosthodontic departments of Scandinavian dental schools has recently been introduced on the Internet (http://www.odont.uio.no/prosthodont/sspd.htm). An evaluation of this material revealed that much activity had been focused on subjects that could hardly be labeled as prosthodontic research in a narrow sense of the term. One could of course define *prosthodontic research* pragmatically as research carried out in prosthodontic departments. On the other hand, the organization of clinical departments in dental schools is primarily the result of historic, logistic, academic, and economic factors and restraints. As a result, the scope of borderline disciplines will vary among clinical departments. Accordingly, such a pragmatic definition of prosthodontic research will necessarily be rather vague and does not answer the question, "is there a common core?"

A review of several clinical textbooks and glossaries indicated a wide spectrum of definitions of the discipline of prosthetic dentistry. The majority of these definitions emphasize the discipline as a provision of a technology rather than a form of therapy. This reflects the outdated technocratic view of patient care as proposed in the Flexner reports early in this century[1] that has frequently been questioned by medical practitioners and scientists.[2] Finally, the various definitions reflect a semantic incoherence, and few definitions include terms used in current biomaterials science.

Prosthodontists experience the need for the exchange of specialized knowledge in a combined operation with other fields of clinical dentistry. It is therefore essential that the dental community have

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Prosthetic Dentistry*

The discipline of dentistry concerned with

the consequences of congenital absence or acquired loss of oral tissues

*Jokstad A, Ørstavik J, Ramstad T. A Definition of Prosthetic Dentistry. International J Prosthodontics 1998; 11:295-301.

Prosthetic Dentistry

The discipline of dentistry concerned with the consequences of congenital absence or acquired loss of oral tissues

on appearance, stomatognathic function, comfort, and local and general health of the patient

*Jokstad A, Ørstavik J, Ramstad T. A Definition of Prosthetic Dentistry. International J Prosthodontics 1998; 11:295-301.

Prosthetic Dentistry

The discipline of dentistry concerned with the consequences of congenital absence or acquired loss of oral tissues on appearance, stomatognathic function, comfort, and local and general health of the patient,

and with the methods for, and assessment if more good than harm is done by, inserting artificial devices made from alloplastic materials to change these conditions.

Areas for improvement and consolidation

1. Identify & endorse our core characteristics
2. Educate students and dentists







Current situation:

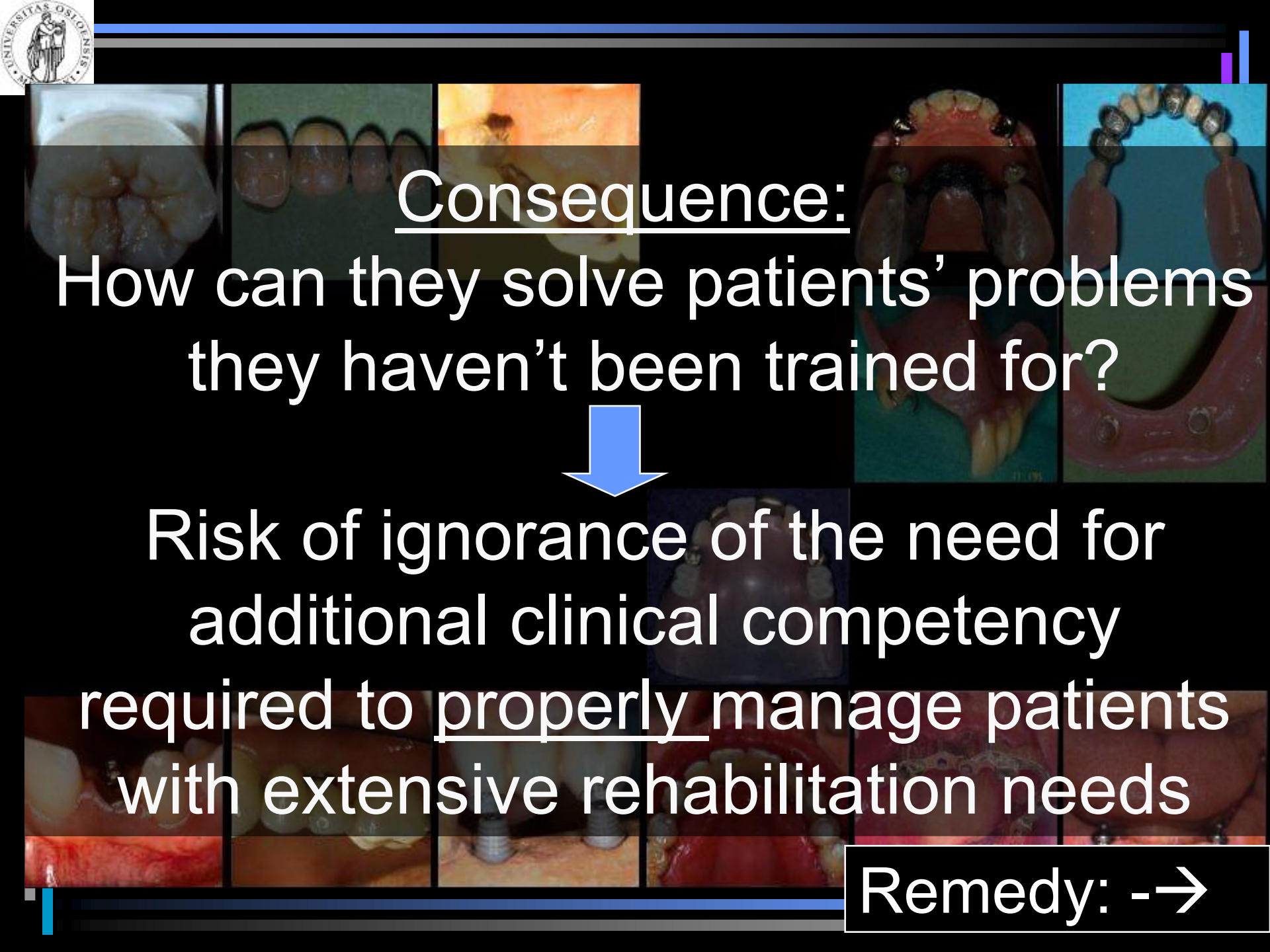
Students make few prostheses today

(for a number of reasons)









Consequence:

How can they solve patients' problems they haven't been trained for?

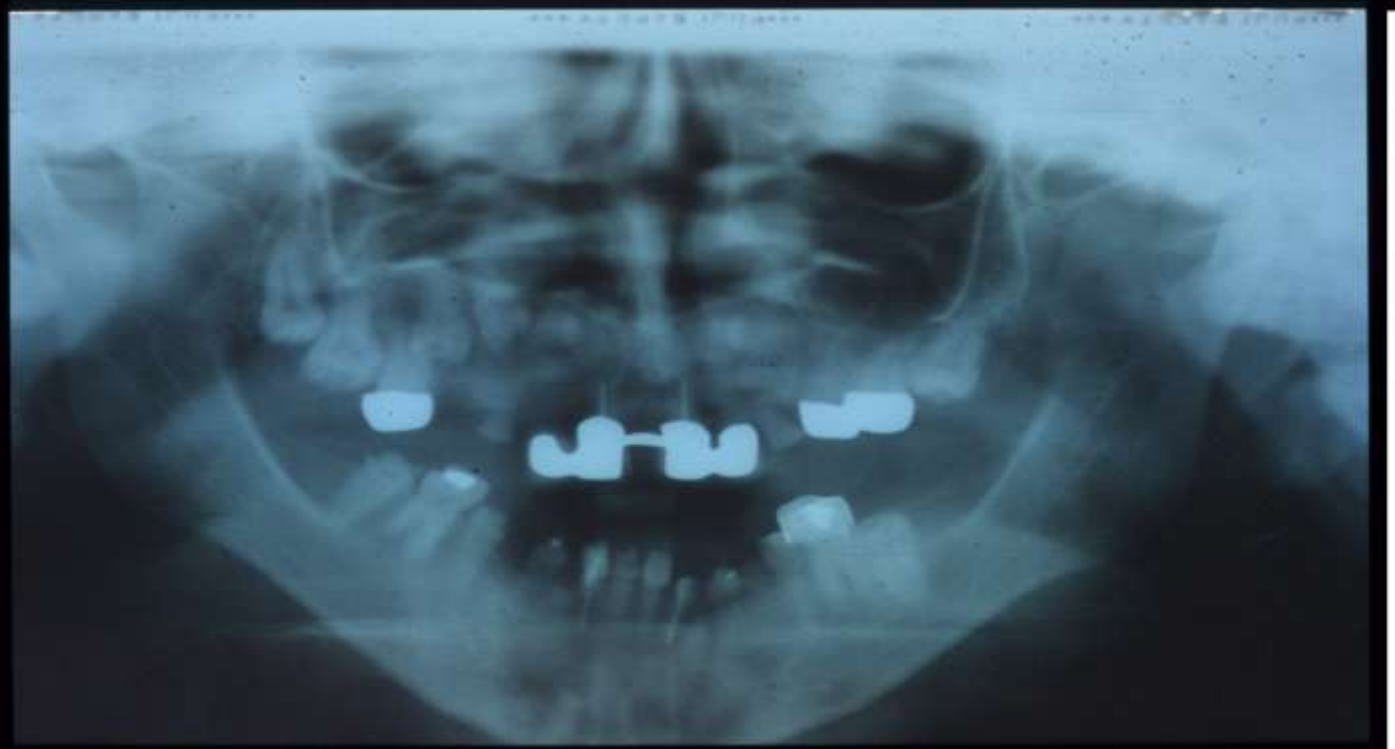
Risk of ignorance of the need for additional clinical competency required to properly manage patients with extensive rehabilitation needs

Remedy: -→

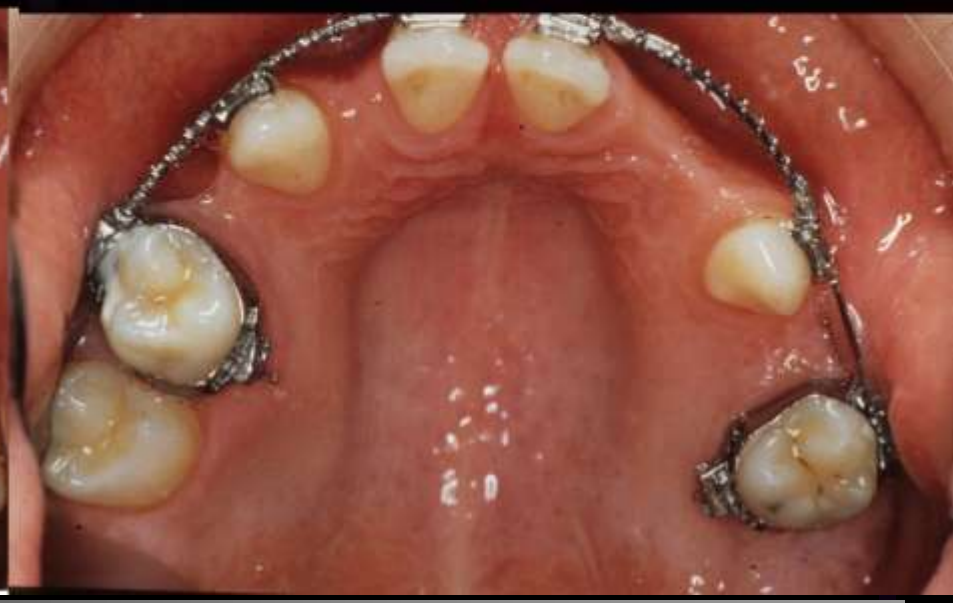
Students - and general dentists - should be shown patients...

.. with complex rehabilitative needs

.. with complex rehabilitative needs



.. with complex rehabilitative needs

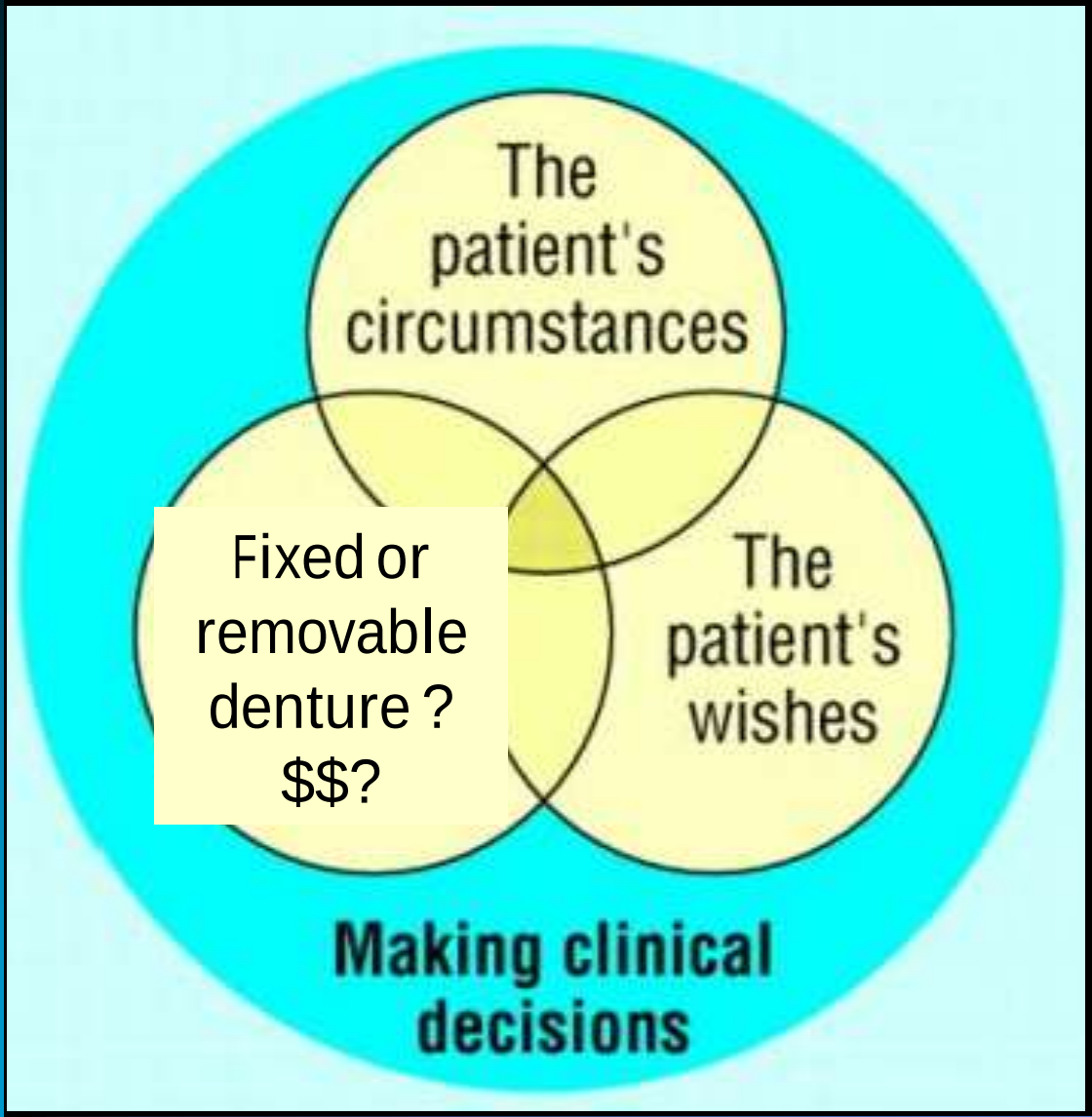


.. with complex rehabilitative needs

Areas for improvement and consolidation

1. Identify & endorse our core characteristics
2. Educate students and dentists
3. Converge postgraduate teaching

Prosthodontic Rehabilitation



Historically, prosthodontic decision making has always been influenced by:

1. a narrow range of technical solutions (limited by biology) and

2. the patient finances.

What is new is….

1. More treatment options are available today than ever before.

What is still the case….

1. More treatment options are available today than before

2. Economic constraints frequently limit the number of treatment options

1. Economic constraints frequently limit the number of treatment options
2. More treatment options are available today than before

Consequence:
Specialist candidates needs to be trained to critically consider what is achievable with alternative prosthodontic therapies - i.e. converge treatment decision reasoning on relevant outcomes

Outcomes relative to prosthodontic therapy

a) Surrogate

b) Clinical

c) Patient relevant

e) Societal

Jokstad A, Brägger U, Brunski JB, Carr AB, Naert I, Wennerberg A

Quality of Dental Implants

Int Dent J 2003; 53 Sup 2: 409-33
&
Int J Prosthodont 2004; 17: 607-41

Quality of Dental Implants

Background

More than 220 implant brands produced by about 80 manufacturers are commercially available worldwide. These are made from different materials, undergo different surface treatments and manifest in different shapes, lengths, widths and forms. The clinician can in theory choose among more than 2000 implants.

FDI recognizes that:

- Implants made from titanium and titanium alloys appear to perform well clinically in properly surgically prepared bone, regardless of small variations in design.
- The scientific evidence of the influence of dental implant material, geometry and surface topography on their clinical performance is limited and the study methodology is not strong. Hence there is inconclusive evidence for promoting specific implants or implant systems over others.
- Implants are manufactured and sold in some parts of the world without compliance to international standards.

It would seem prudent to only use dental implants supported by sound clinical research documentation and which conform to the general principles of good manufacturing practice in compliance with the ISO Standards or FDA (Food and Drug Administration) and other regulatory bodies.

- Most clinical trials on dental implants focus on criteria relative to peri-implant aspects over relatively short observation periods. Such criteria are only surrogate measures for treatment outcome from the patient and general public perspectives.

Submitted by: FDI Science Committee

Reference: FDI Science Committee Project 5-98: Jokstad A, Brägger U, Brunski JB, Carr AB, Naert I, Wennerberg A. Quality of Dental Implants. *International Dental Journal*, 2003; 53: Suppl 3:409-443.

Adopted by the FDI General Assembly
12th September 2004 – New Delhi

a. Surrogate outcomes

A physical sign or laboratory measure used as a substitute for a clinically meaningful endpoint that measures directly how a patient feels, functions or survives.

Changes of a surrogate outcome should reflect changes in a clinically meaningful endpoint (Temple 1995)

Outcomes of low relevance

- Plaque
- Marginal bleeding
- Probing pocket depth
- Probing attachment level
- Radiographic marginal bone level changes on standardised intra-oral radiographs

Outcomes of some relevance

- Implant mobility and implant removal of stable implants dictated by progressive marginal bone loss
- Implant fracture and other mechanical complications that do not allow the use of the implants

Depending on whether the prognosis of the superstructure is jeopardized

Outcomes of high relevance

Perceived/self reported:

- Adaptation to prosthesis (satisfaction)
- Appearance
- Function (chewing, speech)
- Dietary significance (intake, selection)
- Health
- Quality of life (psyche, wellbeing, self esteem)
- Social activity

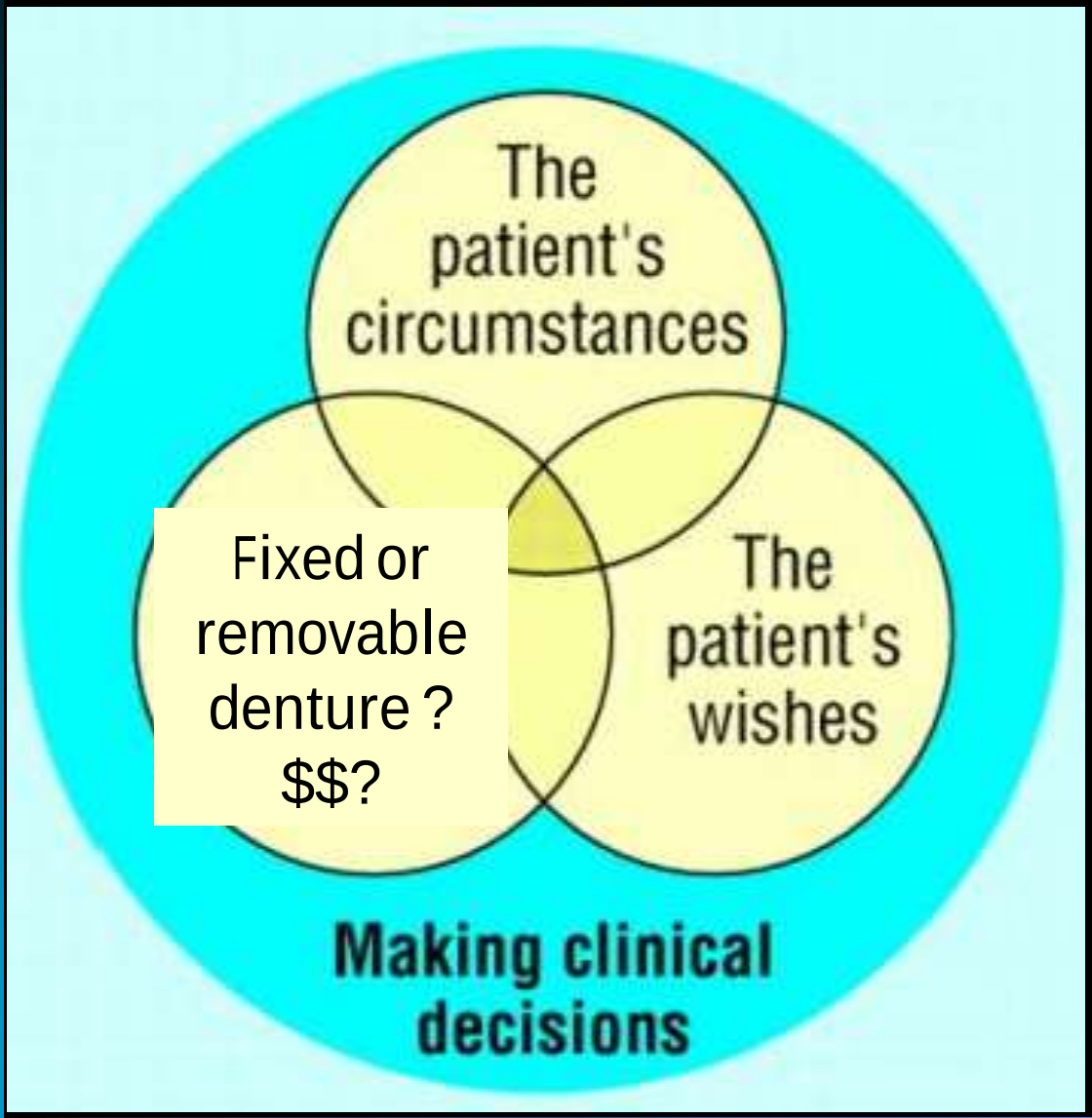
Observed (?):

- Appearance
- Function (bite force, tracking)
- Diet survey
- Health indices
- HRQL indices
- Social activity

Areas for improvement and consolidation

- Identify & endorse our core characteristics
- Educate students and dentists
- Converge postgraduate teaching
  - On outcomes of prosthodontic therapy
  - Evidence-based reasoning

Prosthodontic Rehabilitation

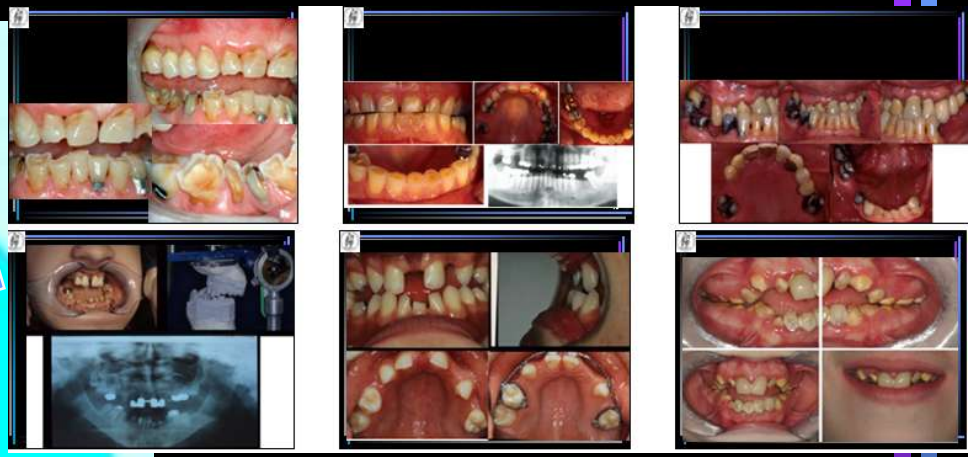


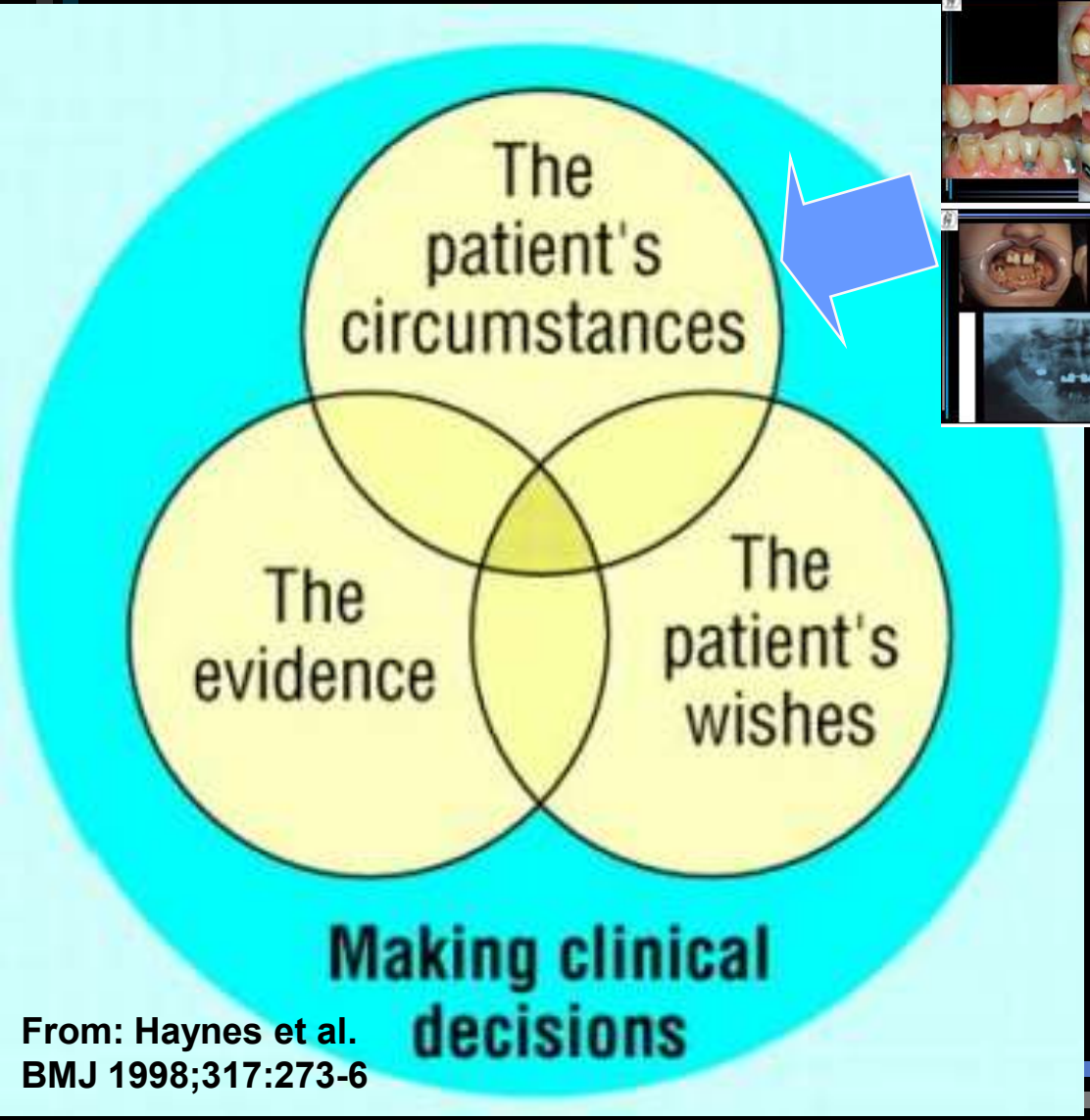
Traditional prosthodontic decision making is equivalent to …

how evidence-based medicine is meant to be practiced

From: Haynes et al. Br Med J 1998; 317:273-6

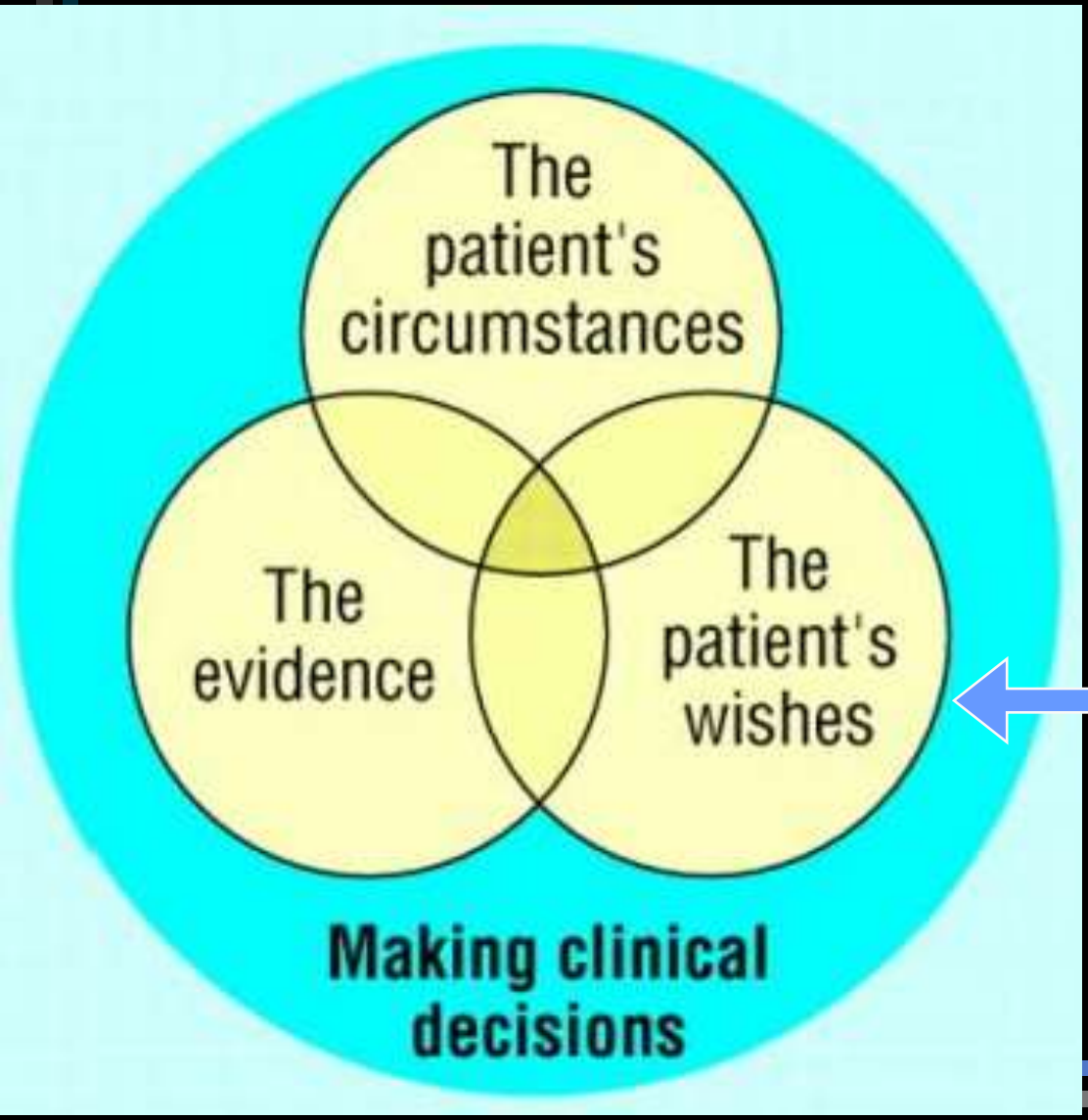
EBM- implemented in prosthodontic rehabilitation





From: Haynes et al.
BMJ 1998;317:273-6

EBM- implemented in prosthodontic rehabilitation



Identify the patient's views and choice of values

Proper patient communication

Would you advise the same technical solution to all these patients?



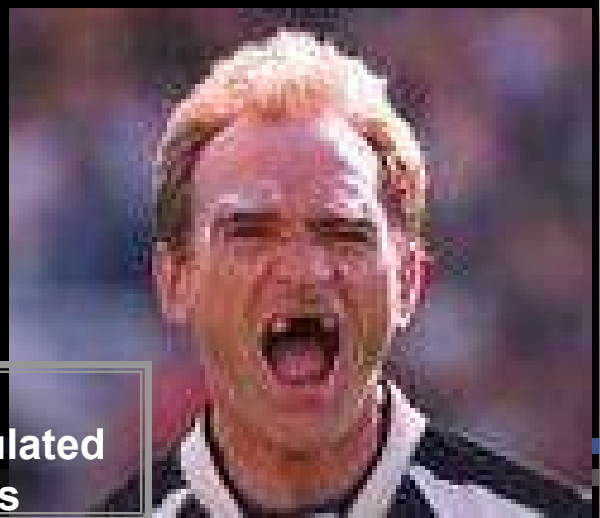



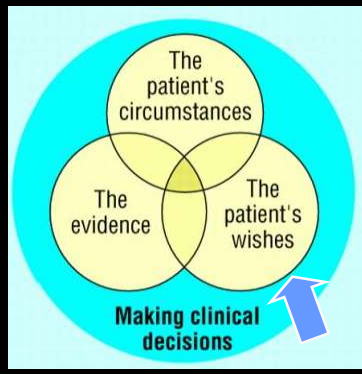
Photo-manipulated pictures

Choice of therapy – patients' preferences

Håkestam et al. (Sweden)

3 personality profiles:

health - appearance - longevity



Lutz et al. (Switzerland)

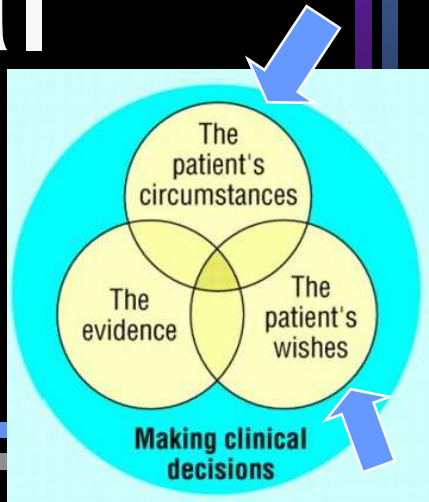
5 personality profiles:

Orally: healthy -presentable -functional -beautiful -metal-free

EBM- implemented in prosthodontic rehabilitation

1. Identify patient views and choice of values
2. Patient communication

3. Recognize all possible technical solutions

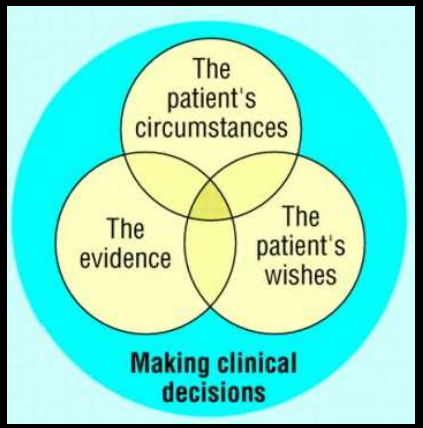


Choice of technical solution…

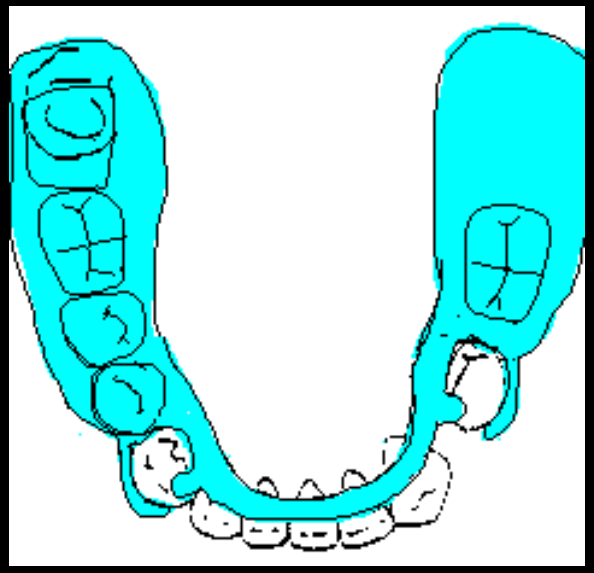
…for a patient with complex rehabilitative needs ?

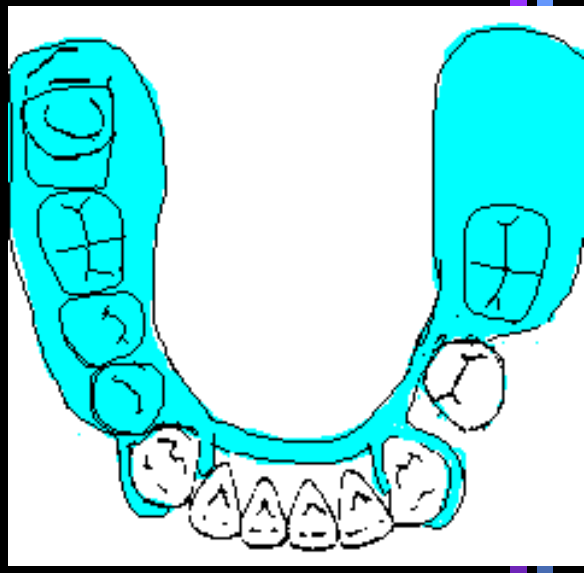

Choice of technical solution ?

Choice of technical solution for a patient with complex rehabilitative needs



Acrylic partial denture

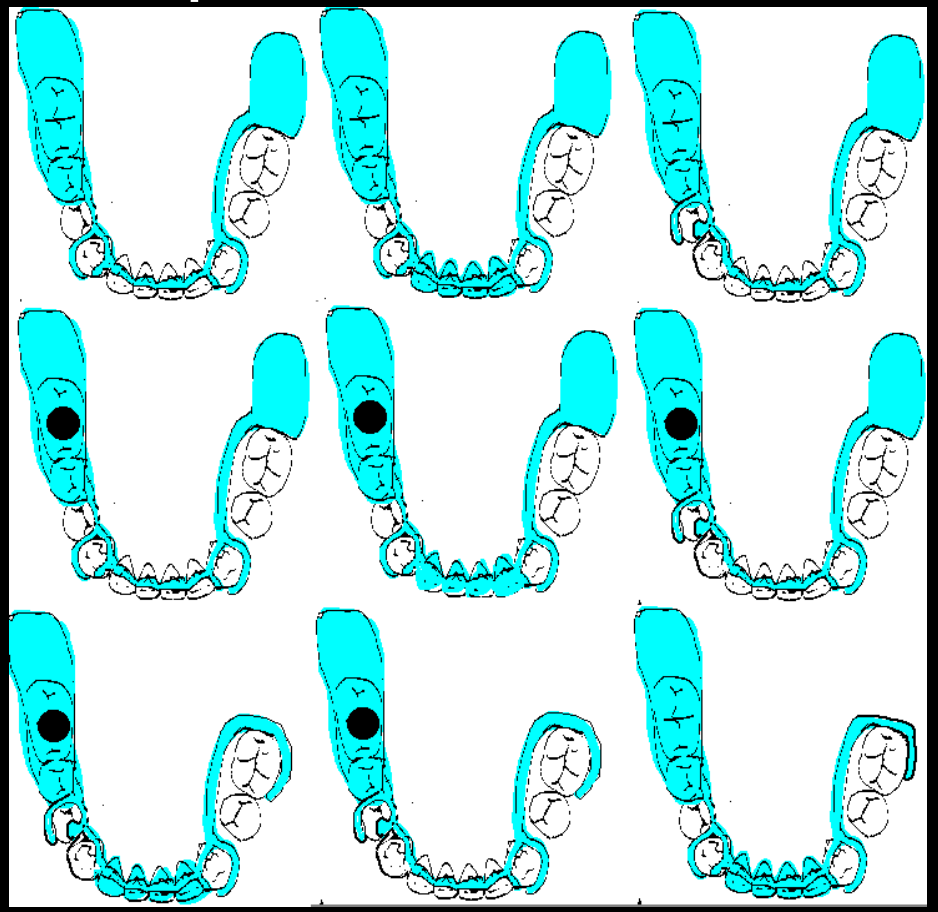




<u>Clinical knowledge</u>

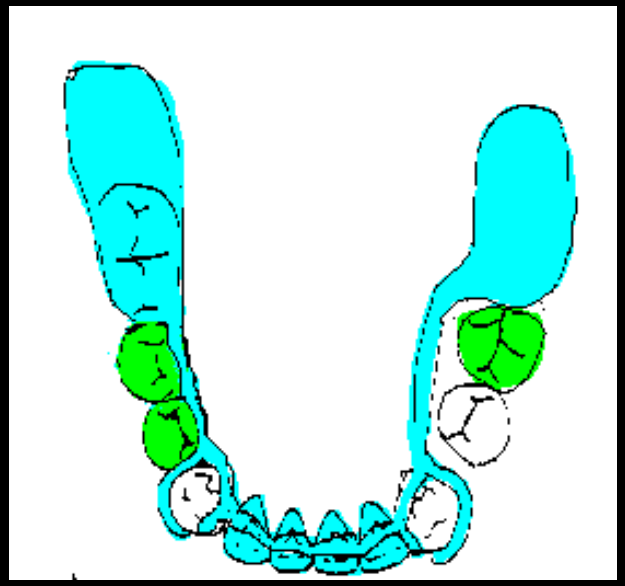
- Prosthesis design
- Prognosis

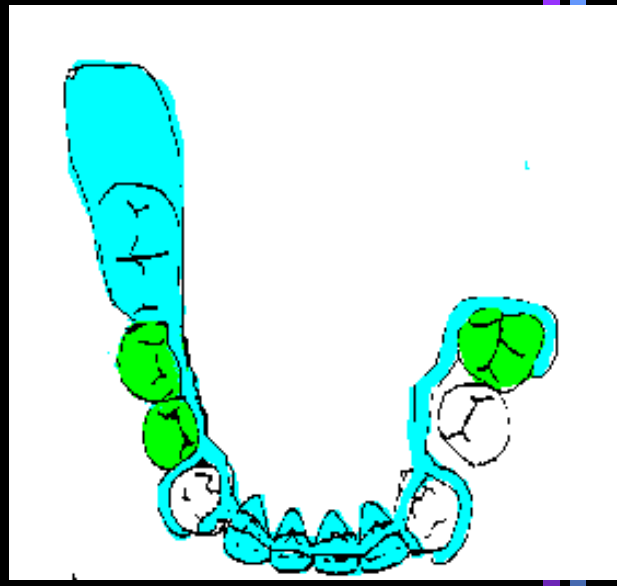
Cast partial denture



Clinical knowledge
Prosthesis design
Prognosis
Retention

Crowns + cast partial denture





<u>Additional clinical knowledge</u>

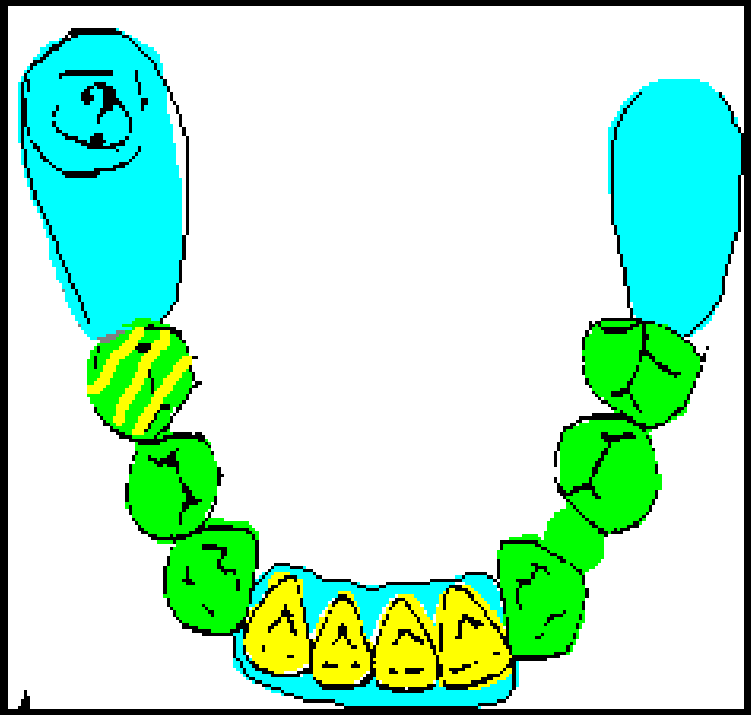
36 extraction or crown?

Soldered 44 + 45?

Milled crowns?

Intra- or extracoronal attachments?

Conus bridge

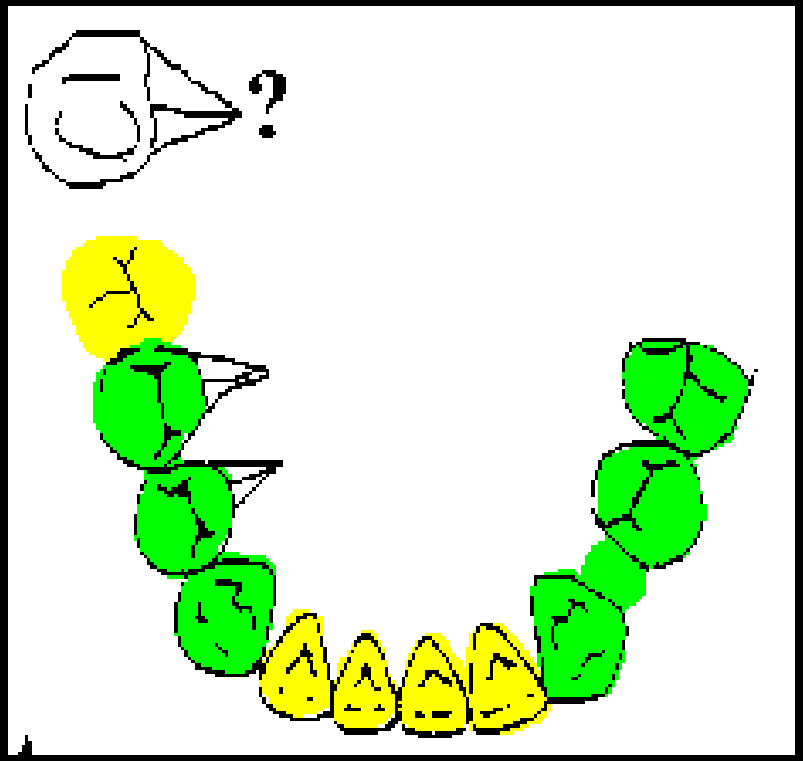


<u>Clinical knowledge:</u>

47, 36, 45: extraction … gold coping … attachment?

43/44/45: separation?

Fixed bridge



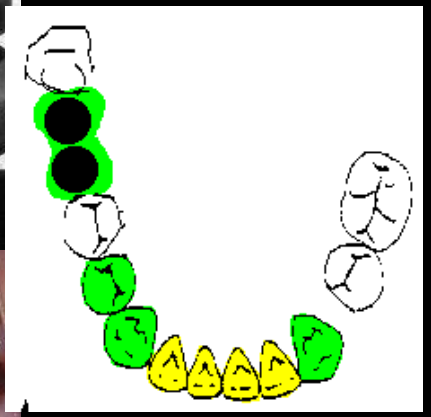
<u>Clinical knowledge</u>

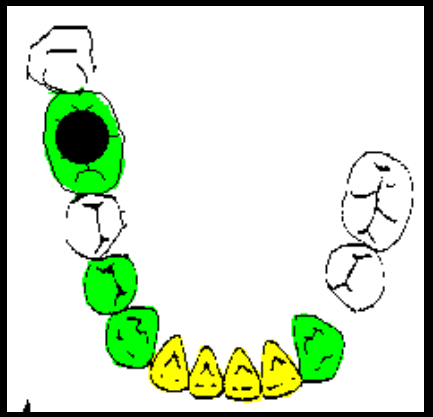
Conventional alloy, titanium-ceramic or gold acrylic?

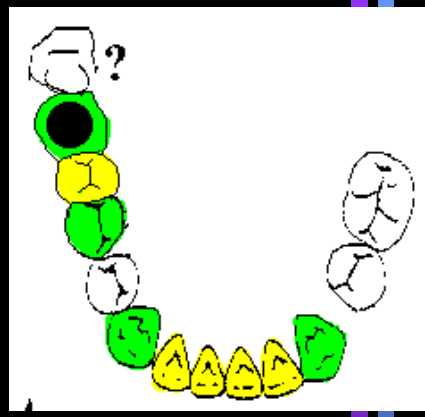
Zn-phosphate, GIC or resin cement?

Bridge extension 46? 46+47 ?

Implant retained prosthesis







<u>Clinical knowledge</u>

One / two implants?

Wide collar - standard diameter?

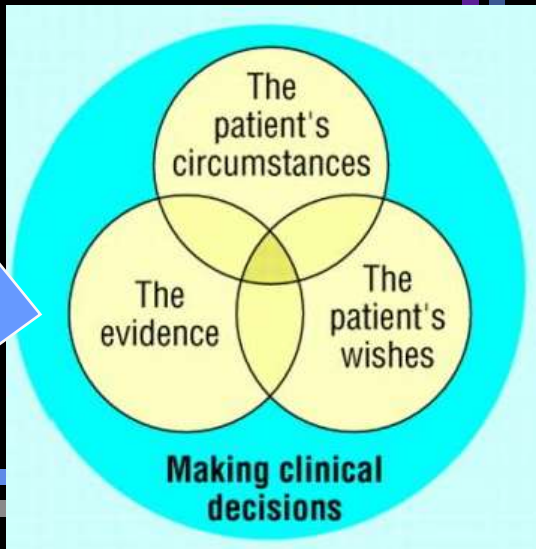
Splintet - non-splintet FPD?

Cement / screw-retained ?

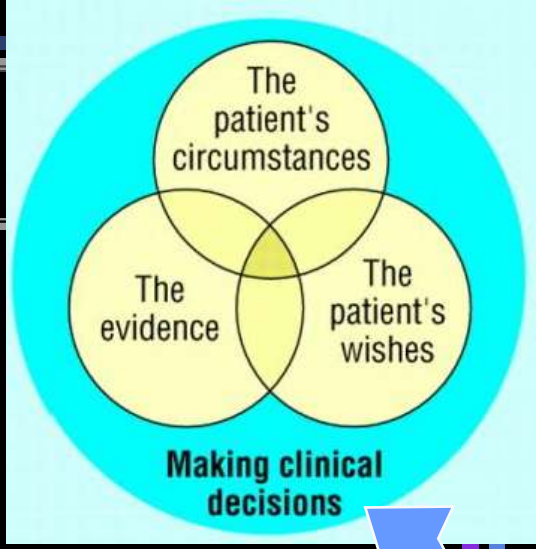
Nobelbiocare, AstraTech, 3i, Endopore, Straumann, Friadent…?

Appropriate strategy

1. Patient views and choice of values
2. Patient communication
3. Possible technical solutions
4. Realistic outcome with different technical solutions



Appropriate strategy



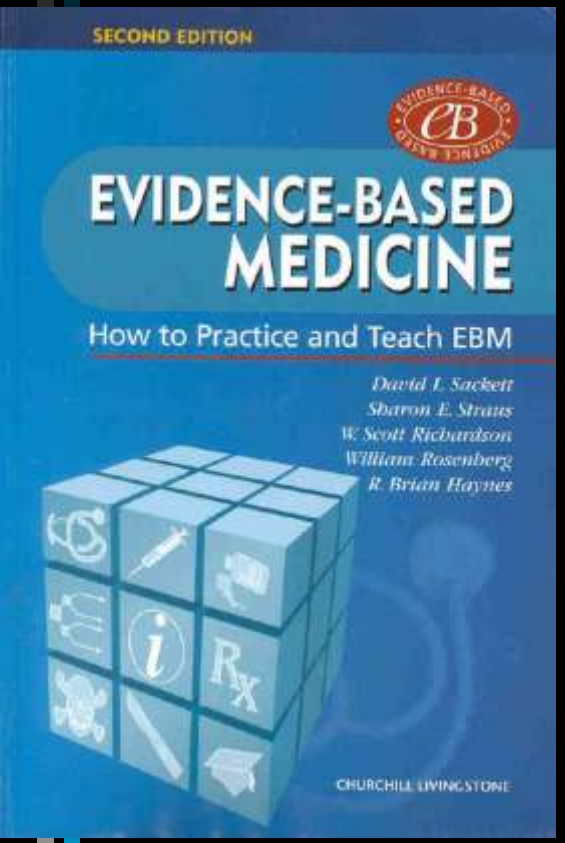
1. Patient views and choice of values
2. Patient communication
3. Possible technical solutions
4. Realistic outcome with different technical solutions

5. Informed choice among the alternative technical solutions

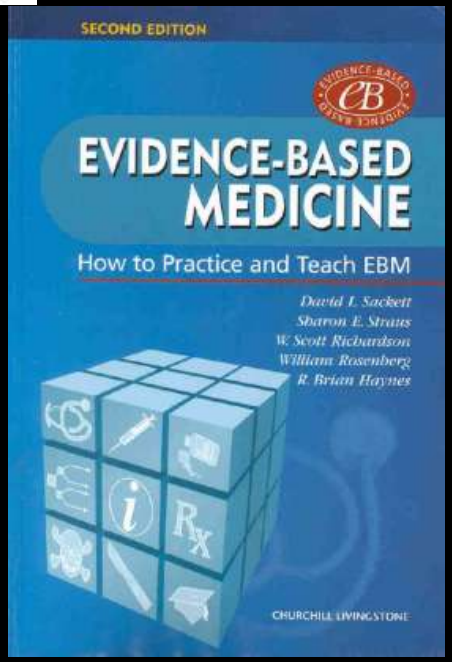
Integration of: expected esthetics and function; costs; probabilities of survival, maintenance need & ”worst-case-scenario”

Areas for improvement and consolidation

1. Identify & endorse our core characteristics
2. Educate students and dentists
3. Converge postgraduate teaching
4. Focus our clinical research

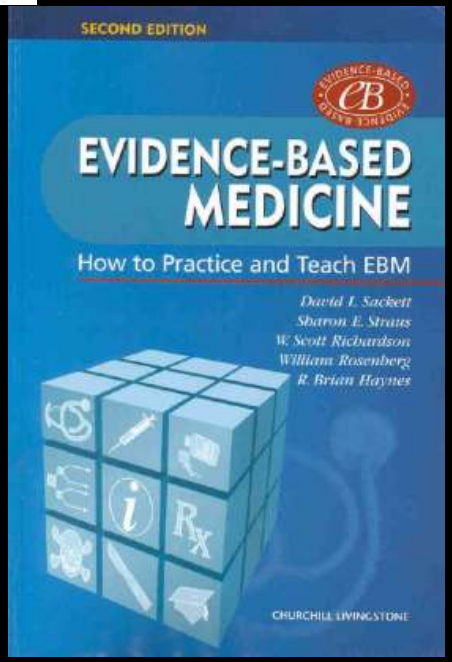


Evidence that prosthodontists do more good than harm needs to be demonstrated using relevant outcomes and appropriate study design



Appropriate study design

Treatment outcomes



Treatment outcomes:

Dentist or Patient-Centered ?

Outcomes of prosthodontic therapy

a) Surrogate

b) Clinical

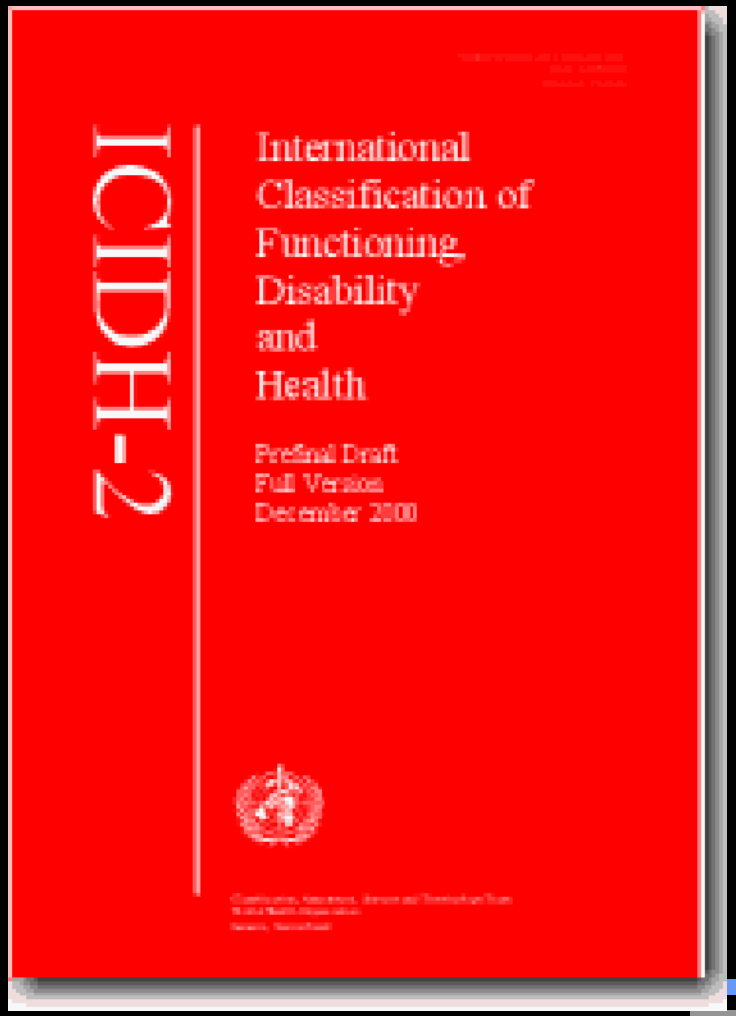
c) Patient relevant

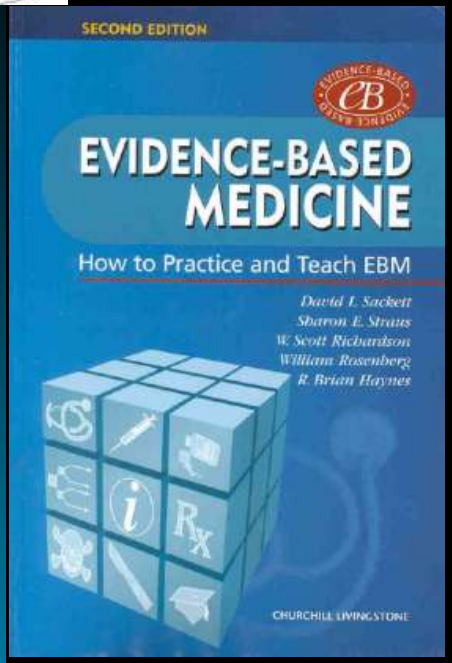
e) Societal

Adopt the WHO ICIDH-2 and criteria

No / Mild / Moderate / Severe / Complete impairment of: or
No / Mild / Moderate / Severe / Complete difficulty to carry out; e.g.

Taste functions
Proprioceptive functions
Touch function
Sensation of pain
Articulation functions
Ingestion function
Mobility of joint functions
Muscle power functions
Speaking
Eating
Drinking
Interpersonal interactions
Recreation and leisure



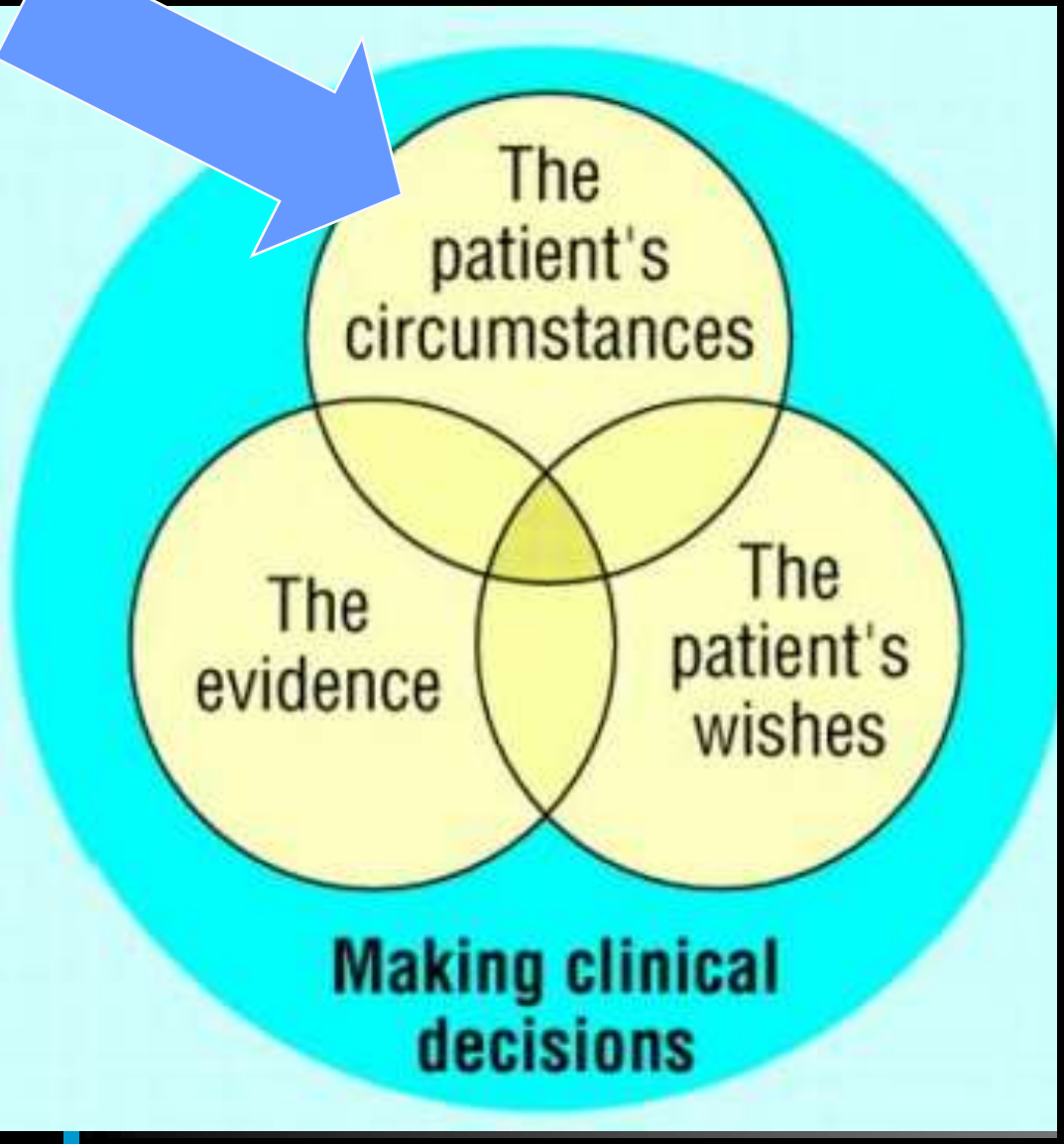


1. Treatment outcomes:

Dentist or Patient- Centered ?

2. Study aims

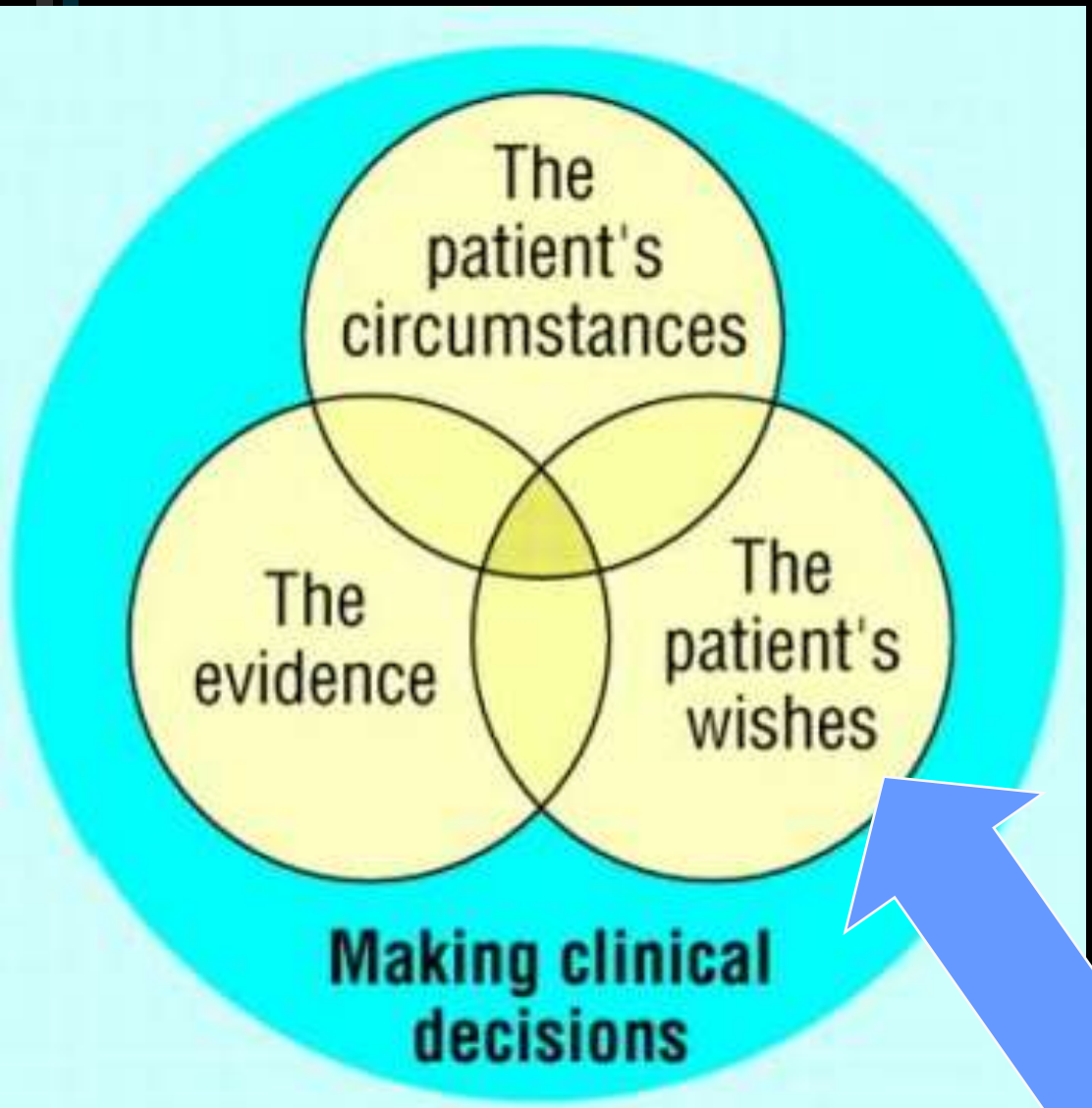
Research focus in prosthodontics



e.g.

- Understand disease processes & organ development
- Improve diagnostic techniques & procedures
- Manage pain response, translation & management

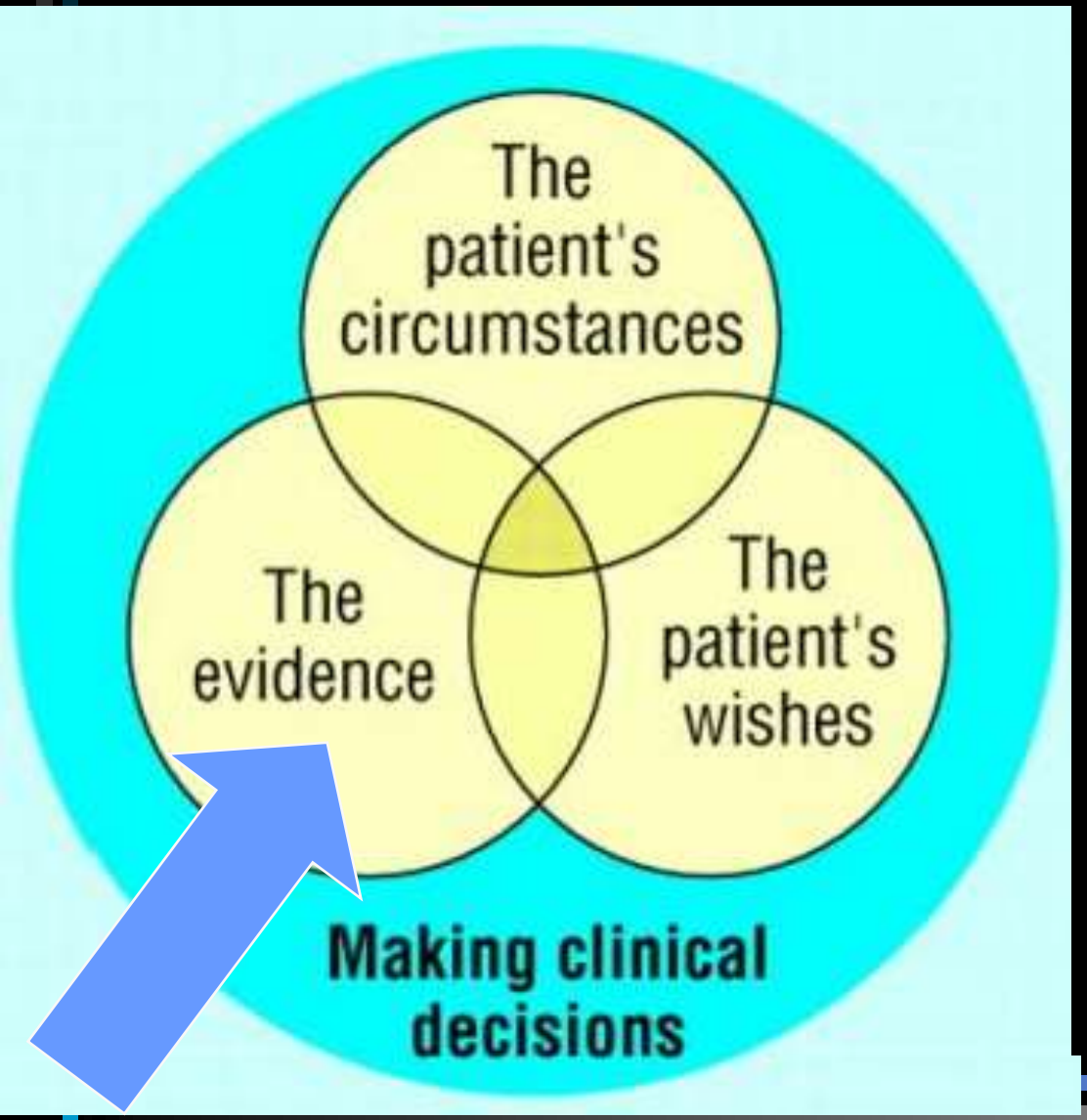
Research focus in prosthodontics



e.g.

- Communication
- Patient behaviour
- Quality of life in societal context
- Patient-centered outcomes in trials
- Qualitative research

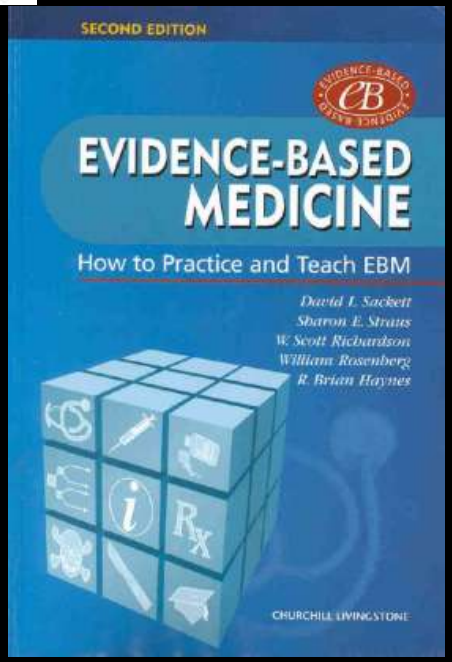
Research focus in prosthodontics



e.g.

- Develop new preventive techniques, biomaterials and treatments
- Evaluate effectiveness of therapies; i.e. doing more good than harm <u>in relevant settings</u>

We have almost no data from clinical studies undertaken in the setting of general practices



1. Treatment outcomes:

   Dentist or Patient- Centered ?

2. Study aims

3. Study design

Can Randomised Controlled Trials be carried out in practice based research ?

Practice based research - challenges

1. Practical

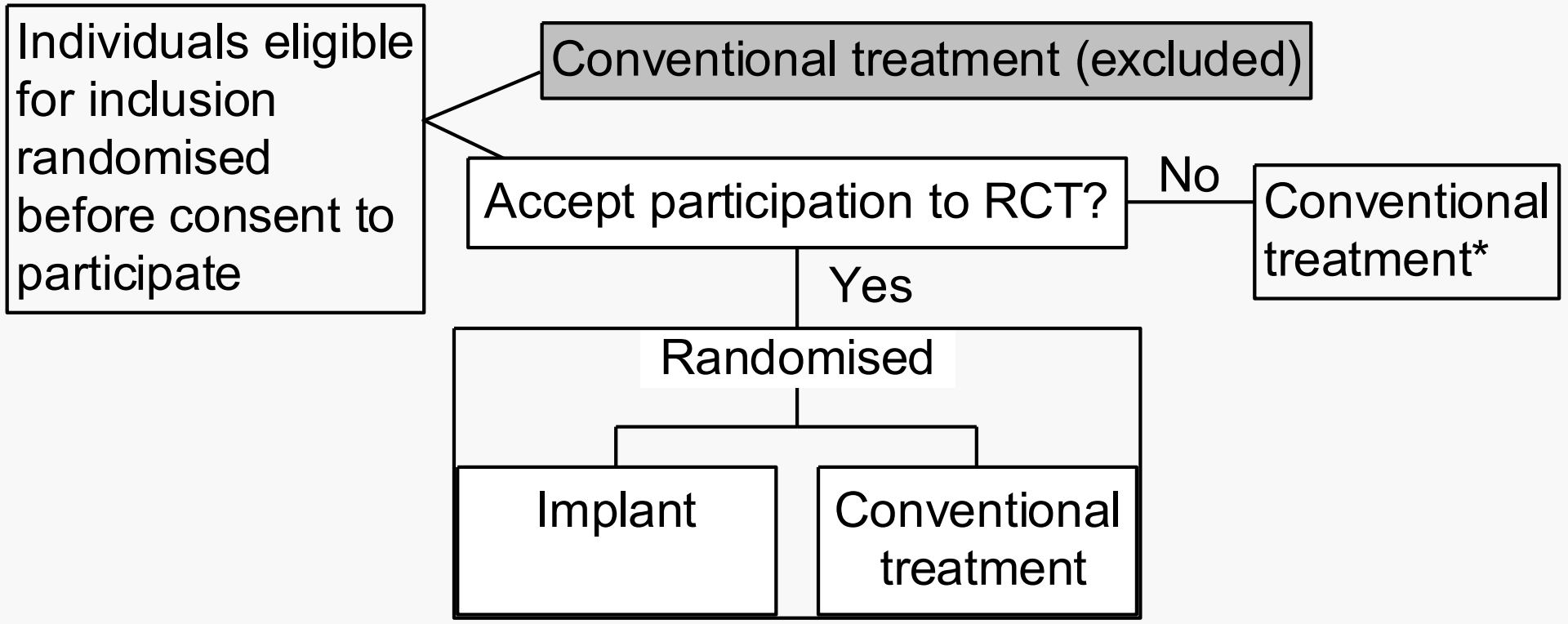
Practice based research challengs

1. Practical
2. Methodological

1. Ethical issue, RCT *vs.* uncertainty
   - Dentist preference
   - Patient preference

Remedy: Apply a study design that take into account patient preferences

E.g. Zelen study design



Zelen M. A new design for randomized controlled trials. N Engl J Med 1979;300:1242-5.

1. Ethical issue, RCT *vs* uncertainty
   - Dentist preference
   - Patient preference
2. Often complex, and thus never identical, treatment managements

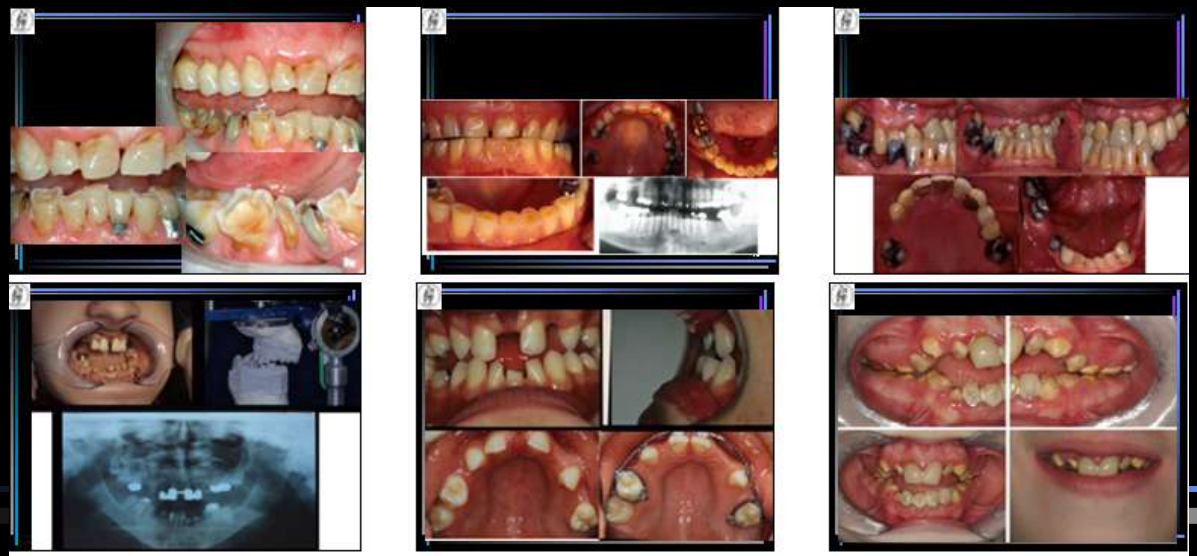
Remedy: Multicenter strategy required

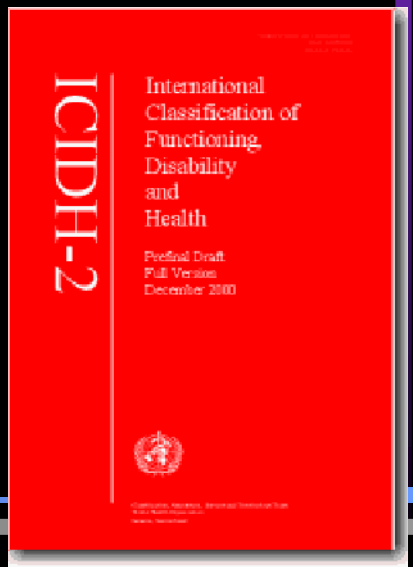
1. Ethical issue, RCT *vs* uncertainty
   - Dentist preference
   - Patient preference
2. Often complex, and thus never identical, treatment managements
3. Operator calibration

Remedy: GLM statistics

Areas for improvement and consolidation

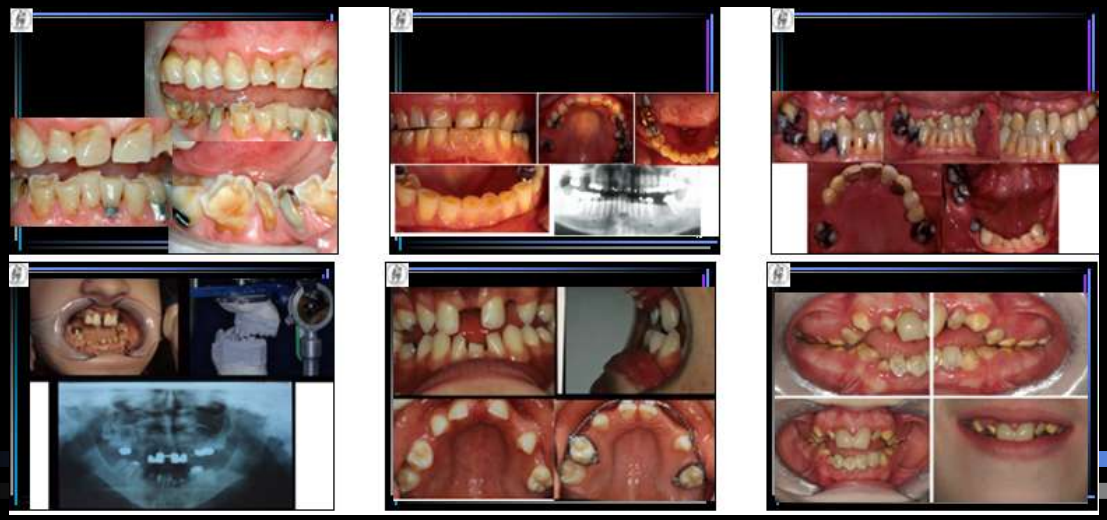
1. Identify & endorse our core characteristics
2. Educate students and dentists
3. Converge postgraduate teaching
4. Focus our clinical research
5. Liaise with colleagues

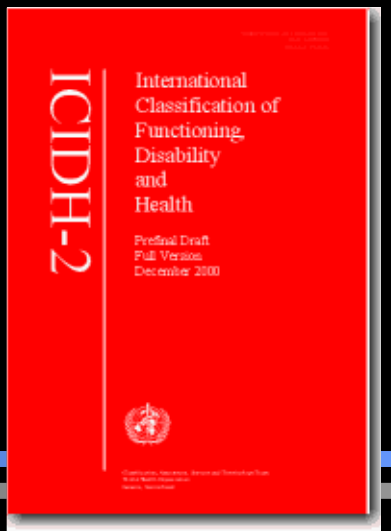




Areas for improvement and consolidation

1. Identify & endorse our core characteristics
2. Educate students and dentists
3. Converge postgraduate teaching
4. Focus our clinical research
5. Liaise with colleagues
6. **Inform the general public**





Thank you for kind attention