Improving our clinical decisions

Should we stop using evidence-based medicine?

Introduction

The treatment of a patient can be viewed as a succession of clinical decisions and actions. As clinicians, we have all made decisions which have led to complications or errors, and which we would change with the benefit of hindsight. Since the early nineties, clinical decision-making has mainly been studied through the prism of evidence-based medicine (EBM). The aim of this article is to assess whether EBM is the only way to improve our clinical decisions.

1. Implementing EBM

The aim of EBM is to ensure that clinical decision-making is based on a judicious use of evidence, taking into account both clinical expertise and the needs and wishes of patients. Contrary to popular belief, EBM is not based on a ‘cookbook’ approach where protocols are followed like recipes. EBM takes a broad view of the evidence and is not restricted to randomised controlled trials and meta-analyses. Rather than promoting practice that is ‘tyrannised’ by evidence, its aim is to ensure that decision-making in healthcare incorporates the best available evidence. Patients expect clinicians to use a large amount of up-to-date scientific data to consider the ‘best’ therapeutic option. But as clinicians we are aware that despite more than 25 years of EBM, there are many variations in how the best available evidence is implemented into clinical practice.

Two examples of clinical factors where evidence is not currently put into practice consistently are the roughness of the implant surface and the prosthetic retention mode. Both of these are risk factors for peri-implantitis. However, to achieve faster osseointegration, about 99% of implants currently placed have a rough surface, even though scientific evidence relating to the long-term risk/benefit of rough surfaces has not been clearly established. This suggests a questionable over-implementation of the (limited) available data. On the other hand, there is currently an increasing body of evidence that cement excess is one of the major co-factors leading to peri-implantitis. Despite this, according to many dental lab technicians and one of the main companies involved, it seems that – in France at least – cemented prostheses represent the majority of implant-supported dental restorations, suggesting a disturbing under-implementation of the data.

A number of factors have been proposed to explain these variations, including habit; industrial propaganda; academic influence; lack of critical thinking; and a lack of safety culture. But, according to Louise Bate et al., these gaps are mainly the result of multiple individual decisions. Even if decision-making remains an uncertain enterprise, a better knowledge of the processes involved could lead to a greater number of better decisions.


It is a common belief that the human brain is capable of processing a lot of potentially relevant information in order to reach decisions that are as good as possible, suggesting computational thinking behaviour. However, the political scientist and psychologist Herbert Simon states that, faced with the complexity of our environment and as a trait of evolution, our brains truncate large volumes of information to make decisions that are ‘good enough’. Simon calls this ‘satisficing’, based on the idea that the ‘cost’ of ongoing research cannot justify the expected benefit. This theory is relevant to how we process scientific data. Allen & Harkins illustrated that a clinician who referred to the relevant guidelines provided by major scientific societies would need to spend 122 hours reading 3,679 pages of information in order to manage 18 patients admitted in a 24 hour on-call period. ‘This is clearly not realistic’ and we have to admit that the majority of our decisions are made with a satisficing approach.

3. Dual process theory: Daniel Kahneman, 2002 Nobel Prize in economic sciences

Study of the decision-making process by the psychologist Daniel Kahneman led him to establish the concept of dual process theory. He states that humans can make decisions in two different ways: a fast one, named system 1, which is essentially intuitive, automatic and effortless; and a slow one, system 2, which is rational, analytic and time-consuming. Neither of these two systems can be seen as ‘good’ or ‘bad’. Both are necessary in our daily practice because they have opposite qualities. Studies have shown that on average in general medical an inquiry is needed before treating one in three patients, but clinicians only search for an answer once a week on average.

4. FORDEC: a decision-making tool

According to Croskerry and Bate et al., gaps between evidence and practice can occur when a clinician develops a pattern of knowledge which they then rely on to make system 1 decisions, without the activation of a system 2 check. Medicine is not the only field where a system 2 check is needed. The development of human factors science in the aircraft industry has led to the development of different decision-making tools, including FORDEC (Facts, Options, Risks, Decision, Execution, Check). Franck supported dental restorations, suggesting a disturbing

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We will also let you know when the actual treatment protocols are available to view on the website!
Laigneau, former dental surgeon and currently a pilot on long-haul flights, states that this tool is intended for non-emergency situations, in which listing the different options and working through the risk evaluations tend to allow a system 2 check.

5. Is a tool like FORDEC effective in dental practice decision-making?

At the 2012 French Dental Association (ADF) congress, Serge Armand (president) and Franck Renouard (member of the scientific committee) developed a ‘serious game’ session dedicated to clinical decision-making and treatment planning. A multidisciplinary team made up of Sandrine Dahan, Christine Muller, Florent Trévelo, David Nisand and Martin Brient conducted the session under the scientific responsibility of Jean-Pierre Attal. They presented a complex case to a group of 719 clinicians at the congress (Figures 1–4). This concerned a 28 year old patient with a lower right first molar (n°46) and second premolar (n°45) with resorbed roots as a result of a supernumerary retained tooth (n°45’). Table 1 shows the demographics of the audience. The following scenario was described to them:

The patient comes to the dental clinic for a check-up. He is in good health and isn't experiencing any static or dynamic occlusion problems. He doesn't have any other supernumerary teeth.

First, the participants had to make a diagnosis. Secondly, they were asked to make a clinical decision about the treatment required, responding to an open-ended question. Thirdly, they carried out a FORDEC decision-making process. Next, the different treatment options were listed and a risk assessment was performed for each one. Finally, the 719 participants could reselect a therapeutic option.

At the end of the session, 63% of the audience reported having changed their mind and chosen a different option from the one they had selected initially. To illustrate this, Table 2 shows the answers to the question ‘Which tooth or teeth do you plan to extract?’ before and after the FORDEC process. At the end of the session, the actual decisions made by the team treating the patient were presented to the audience.

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Now it’s your turn!

If this was your patient, what would your clinical decision be? Which treatment option would you propose to him? Read on to be inspired by the clinical decisions of Professor Alberto Sicilia. Afterwards, why not email us your own proposed treatment option for publication on the Inspyred website?

Professor Alberto Sicilia’s proposed treatment protocol:

We don’t have any medical or periodontal information on the patient. However, based on his age and the absence of loss of attachment of neighbouring teeth, we will assume that he is in good medical and periodontal health.

It seems that tooth 45 has a deep localised loss of attachment and also deep root resorption affecting two thirds of the distal side of the root, and its prognosis is hopeless. On the other hand, tooth 46 seems to have resorption limited mostly to the crown, and, according to the 3D reconstruction, there could be suprabony healthy root, at least in the buccal side, and also a very mild mesial loss of attachment and no furcation involvement. Finally, tooth 45’ is healthy and partially erupted in the lingual side and, hence, at this level, soft tissues could be inadequate.

If the patient would accept orthodontic treatment, I would propose a very conservative 45 extraction, exploring the mesial root of tooth 46 under anaesthesia. If the situation as described above was confirmed, I would recommend endodontic treatment and reconstruction of the first molar, as well as orthodontic repositioning of 45’ into the 45 position. Depending on the mucogingival situation on the lingual side, a connective tissue graft could be required. Taking this approach, we would end up with a very conservative result comprising a healthy repositioned ‘new’ 45 tooth, with a good prognosis, and a 46 that had been endodontically treated and reconstructed. If in the following years the patient suffered a non-treatable complication of this particular tooth, it could be easily replaced by a dental implant.

6. Risk assessment

When FORDEC is used in daily clinical practice, it appears that the risk assessment element is the key stage in the decision-making process. Two different kinds of risk can be described. ‘External’ risks relate to therapeutic options, and include biological cost; reversibility; prognosis; and complication rates and consequences as evaluated from the literature. ‘Internal’ risks relate to the capacity of the clinician to achieve the result he/she intends, including how their skill will influence the result. These include surgical skills (i.e. competence) and how the situation allows these skills to be used (i.e. situational awareness and performance). The following clinical situation (Figures 5–9) will help illustrate the difference between the two types of risks: A 29-year-old man is seen the day after a dental trauma he experienced during a Tae Kwon Do training session. He had visited the dental emergency service at a public hospital less than two hours after the trauma and the on-call clinician had diagnosed a complicated crown-root fracture (pulp involved) of the upper left central incisor (n°21) and an enamel-dentin fracture to the upper-right central incisor (n°11). As the coronal fragment of tooth n°11 had been preserved, the on-call clinician had bonded it to the tooth. The fragment of tooth n°21 was still maintained by the palatal periodontal ligament. It had also been bonded but could be easily removed at the beginning of the examination. The palatal level of the remaining root is very close to the bone level.
Imagine that this patient is in your dental chair and you are the only clinician in the room. Taking into account internal and external risks, what decisions would you make and what actions would you take? Bear in mind that you have to manage the short-term treatment on your own, but that you can work with a multidisciplinary team for the long-term treatment planning. Read on to be inspired by the clinical decisions of Dr Tommie Van de Velde.

Dr Tommie Van de Velde’s proposed treatment protocol:

During the first (emergency) visit I would like to gather some additional information: careful inspection of the root of 21; mobility of 21–11; pain score for 21–11; and occlusal function. If a fracture of the remaining part of tooth 21 was suspected following these diagnostic evaluations, the prognosis would drop to poor and the tooth should be scheduled for extraction. It should also be explained to the patient that if a fracture was diagnosed during the follow-up, the implication would be extraction, and consequently placement of an implant. During the same visit, endodontic treatment of tooth 21 should be started with the placement of a CaOH dressing under isolation with rubber dam. The remaining tooth fragment could be bonded as a temporary restoration.

If the follow-up of tooth 21 revealed no signs of additional problems, there would be a choice of either crown-lengthening or orthodontically extruding it for definitive restoration. I would base this decision on how deep the fracture was located interdentally. If the fracture line was only located on the palatal side, a localised crown lengthening procedure would be indicated. If the fracture line was located subgingivally in the interdental area, crown lengthening would have aesthetic consequences for the interdental papillae and orthodontic extrusion would then be indicated.

When all remaining tooth structure was above gingival level, both incisors would be scheduled for composite reconstruction based on a wax-up. The buccal part of 21 (and 11 if needed) could be restored with a ceramic veneer to achieve the desired aesthetic appearance.

If an implant was indicated, the timing of its placement should be based on patient expectations. We see a rather thin biotype with equal to receded gingival levels (swelling one day after trauma?). If the aesthetic expectations were very high and the smile line showed part of the gingival tissues, a delayed approach could be indicated. If the fracture line was located subgingivally in the interdental area, crown lengthening would have aesthetic consequences for the interdental papillae and orthodontic extrusion would then be indicated.

7. Conclusion

So should we stop using EBM to improve our clinical decisions? Of course not. One reason stated by Eileen Gambrill is that EBM helps us to honour ethical obligations by moving away from authoritarian practices. But we have to go further. Imagine a type of EBM in which the balance between the scientific data, the clinician’s expertise and the patient’s needs and wishes was better. Imagine a decision-making process where the clinician not only considered the complication rate but took into account the external risks, leading to a combined assessment of the complication rate and its consequences. Imagine a decision-making process that allowed the clinician to weight up these external risks in terms of his own performance. Finally, imagine a mode of practice that led to patients having greater knowledge, more accurate perception of risks and lower decisional conflict because they were part of a shared decision-making process. Well, we have some good news for you: this practice exists. It’s called evidence informed practice (EIP). And yes, you’re right, it’s EBM as it was originally described and as it should always have been.

8. Acknowledgements

AFD Congress 2012 – Serious Game Session: Professor Serge Armand, Dr Franck Renouard, Dr Jean-Pierre Attal, Dr Guillaume Reys and Dr Florent Trévelo.

Clinical case n°1 (serious game session):

- Dr Sandrine Dahan (endodontic follow-up)
- Dr Christine Muller (orthodontic treatment)
- Dr David Nisand (surgical treatment and periodontal follow-up)
- Mr Jean-Marc Etienne (laboratory work)

Clinical case n°2:

- Dr Hélène Fron (on-call clinician)
- Dr François Bronnec (endodontic treatment)
- Dr David Nisand (periodontal follow-up)

9. References

9. Croskerry P. Context is everything or how could I have been that stupid? Healthc Q. 2009; 12 Spec No Patient: e171-6.

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