EVIDENCE BASED DENTISTRY: BENEFITS, ADVANTAGES AND PITFALLS

Gregor Slavicek, MD, DDS
Head of Steinbeis Transfer
Institut Biotechnology in Interdisciplinary Dentistry
Steinbeis University Berlin

Evidence Based Medicine, Evidence Based Dentistry

Abstract. Evidence Based Medicine (EBM) and Evidence Based Dentistry (EBD) have become central part in the contemporary medical / dental developmental process. EBM / EBD could be defined as the **combination of individual clinical expertise and the best external evidence**. *"Evidence based medicine, whose philosophical origins extend back to mid 19th century Paris and earlier, remains a hot topic for clinicians, public health practitioners, purchasers, planners, and the public. There are now frequent workshops in how to practice and teach it; undergraduate and postgraduate training programs are incorporating it (or pondering how to do so); British centers for evidence based practice have been established or planned in adult medicine, child health, surgery, pathology, pharmacotherapy, nursing, general practice, and dentistry; the Cochrane Collaboration and Britain's Centre for Review and Dissemination in York are providing systematic reviews of the effects of health care; new evidence based practice journals are being launched; and it has become a common topic in the lay media [Sacket DL, 1996]"*.

Key words: Evidence Based Medicine (EBM), Evidence Based Dentistry (EBD)

Today we have to admit that treat our patients solely according to the principles of EBM. In dentistry, because of the immense difficulties (technical and institutional) encountered by clinical research, validated scientific knowledge is rare, often simplistic, and sometimes contestable [Orthlieb JD, 2009]. Furthermore, decisions in clinical situations are often based on fragile evidence or on opinions. That leads to an opinion based treatment, often auxiliary impacted by hierarchic structures.

"When we meet a fact which contradicts a prevailing theory, we must accept the fact and abandon the theory, even when the theory is supported by great names and generally accepted". This statement von Claude Bernard (1813 - 1878) expresses the spirit of EBM / EBD. It seems, that the current medical world seems too returned to this principle thought of Claude Bernard. But, in terms of Claude Bernard, we have to accept, that "Theories are only hypotheses, verified by more or less numerous facts. Those verified by the most facts are the best, but even then they are never final, never to be absolutely believed". The curious thing about EBM / EBD is the always existing space for counter evidence and lack of evidence.

The basis of EBM / EBD is the published reports of research projects. They are, brought together and analyzed systematically in Meta Analysis, the source for evidence based decisions. An immense responsibility has come up to authors to a great extend, but also on editors and publisher, respectively.

Publication Ethics

Authorship right and duties have to be understood as multidimensional concern. Publication ethics affect authors, researchers, principle investigator, and senior person in institutions, editors and publisher. But unethical behavior on authorship may have direct impact on the health and welfare of patients; in addition, such a performance may compromise the safety of participants in clinical trials and experimental settings. Editors play a central part in the enforcement of the publication guidelines, established by the so called Vancouver Group at a convention in 1978, Vancouver, and British Colombia. An international committee (**ICMJE I**nternational **C**ommittee of **M**edical **J**ournal **E**ditors) aroused from this first meeting, and developed the *Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication*. These rules of action have been updated on a regular base.

Persons, who are listed and mentioned as authors on a submitted manuscript, have to fulfill and meet all three of the following criteria [Graf C and Wagner E 2007; Laflin MT et al 2005]:

1) Substantial contributions to conception and design, or acquisition of data or analysis and interpretation of data
2) Drafting the article or revising it critically for important intellectual content
3) Final approval of the version to be published

The ICMJE determines negative criteria for persons, who should not be mentioned as authors:
- Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship
- All persons designated as authors should qualify for authorship, and all those who qualify should be listed
- Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content

A supervisory position, providing funding, involvement in patient care or providing patient samples, routine technical work, proofreading or editing of manuscripts or providing laboratory space or uses of instrumentation do not quality individuals for authorship. Persons, who do not meet the authorship criteria, but should be credited, have to be mentioned in the Acknowledgment section. Name, position, institution and the completed contribution to the research project should be mentioned here.
Publication ethics are an important and notable rationale in biomedical science. The welfare of patients and participants in clinical trials and research projects are based, not only, but to a great part on these principles. An author should know the liability. Each author listed on a manuscript has to take the full public responsibility of the reported research results.

The Concept of the Steinbeis University: Transfer of Knowledge

The Steinbeis-Stiftung für Wirtschaftsförderung (StW) is the umbrella organization of the Steinbeis Transfer Network. The non-profit foundation and the Steinbeis GmbH & Co. KG für Technologietransfer (StC), responsible for all commercial activities involved in knowledge and technology transfer, are headquartered in Stuttgart, Germany. Centers based at Steinbeis Forschungs- und Entwicklungszentren GmbH are specialized in market and transfer-orientated contractual and developmental research, as well as research on behalf of the network. The Steinbeis University Berlin encompasses a variety of Transfer Institutes offering tangible knowledge and technology transfer via training and degree programs.
Founded in 1998, Steinbeis University Berlin (SHB) is a private and state-recognized institution and a subsidiary of the Steinbeis Foundation. The university provides students in employment and companies with real-world courses complete with state-recognized degrees. The educational services portfolio ranges from certification training courses to bachelors and master's degree programs as well as doctorates. Today, more than 3000 business professionals are enrolled at SHB and nearly 2500 have graduated. The Project Competence Program of study at SHB acts as a solid underpinning for transfer between academia and business – and it answers the call of leading experts in education for institutions of higher education to bridge the gap between theory and practice. In keeping with the principles of "dual education" that have shaped the university's degree programs, students partner with companies to develop a project they will oversee on-site – in other words, hand-in hand with the company for which the project is intended. This set-up is an excellent opportunity to apply lessons learned in the classroom.

An example: the scientific discussion on intraoral splints

The therapeutic concept of intraoral splints, which is essentially very simple, has been avidly and emotionally discussed for a long time, especially at the level of scientific research. If one considers published data, one's own experience, as well as reports from colleagues and patients, one may conclude that splints are used very frequently and to an increasing extent. The reasons for their clinical application (indication), their presumed effect (mechanism of action) and the desired goal of treatment (the effect) are very controversial and clearly reflect the trend one observes in various scientific publications: splints have been the subject of scientific investigation for a long time now, but a uniform consensus is yet to be achieved. Likewise, widely applicable rules for correct application are lacking. A number of highly qualified scientific reviews conclude that the use of splints is not fully supported by the current level of scientific research, and the external level of evidence in this regard is low. In fact, splints go by the rather unflattering by name of "dental crutches". However, I believe it is exactly this byname that expresses the significance of splints for patients who need them. As a scientist, from the academic perspective I fully endorse the view that intraoral splints still need to be conclusively explained and clarified. However, as a practical dentist I could not conceive the idea of deleting this treatment from my therapy spectrum and depriving the patient of this clinically successful and necessary therapy option. No person today would think of depriving an individual of a walking aid that he or she might require in order performing the activities of daily living or refraining from prescribing an aid of this nature. The need to use the walking aid is also not doubted, although the value of such an aid has not been confirmed by scientific experiments. I am sure we all agree that the value of a parachute need not be proven in blinded, randomized clinical trials in cross-over design. If one attempts to answer the question as to why final clinical clarification of the basic aspects of splint use has not been provided thus far, it would not be possible to provide a simple answer. Worthy of note is the fact that the splint or the splint concept does not exist in the scientific literature. Rather, we have a large number of names and suggested uses. A closer look reveals that the diversity of names is based on mild and apparently insignificant differences. Interestingly, the investigations are not focused on clinical application. Rather, they attempt to prove the superiority of a specific type of splint as opposed to its competitor. One gets the impression

of a competition rather than a serious scientific development or debate. However, based on our experience we postulate the following: the therapeutic success of intraoral splints is not dependent on the specific designation of the splint. Rather, the therapeutic success of intraoral splints is based on establishing the correct indication and modality of application. The correct indication for intraoral bite guard splints: My decision to use a therapeutic concept based on a pre-given splint design (a specific type of splint) requires that the patient adjust all of his or her morphological criteria to the splint's design. Our readers will readily agree with the fact that this approach is by no means in conformity with the current requirements of patient-oriented medicine. Today everybody demands target therapy – a therapy oriented to the patient as closely as possible and not vice versa. Looking at the scientific literature from this point of view one frequently observes the opposite. Quite obviously, no type of splint can be proven to be superior in terms of its therapeutic effect. The placebo effect, which also includes the effect of the doctor – patient relationship, appears to be quite pronounced. Thus, the clinical success of daily use depends to a large extent on this individualization of the splint, based on the practician's expertise. Modality of application: Quite often the practician is dissatisfied when he or she reads scientific articles about splints because they provide precious little information about the actual use (splint construction, instructions for the patient, follow-up controls, accompanying measures and possible occlusal corrections). However, these points are the essential aspects of their therapeutic use in practice. The therapeutic clinical success of splints has to be viewed from this perspective. A splint that is not tested for its clinical efficacy at clinical control investigations in intervals of a few months will fail to serve its purpose in clinical use or scientific studies. Hence I believe a basic change of strategy is needed. One should not focus on obtaining evidence of the superiority of a specific type of splint. Rather, scientific studies should focus on individualization of a splint concept. Questions such as whether it would be better to fix a splint in the maxilla or the mandible, with or without a guidance concept, with or without occlusal impressions etc. would then be raised – but only from the patient's viewpoint. I personally use splints in the maxilla as well as (preferably) the mandible. Some splints have a concept of guidance whereas others do not. Yet others are modified in this regard during therapy. The vertical dimension is created individually and not decided upon by a basic operating instruction to the patient. Even occlusal impressions may vary as they are adjusted to the patient's individual needs and condition.

Knowledge and the development of knowledge

The current era is the phase of the knowledge society. In this content, Knowledge can be defined as a raw material, a resource and as primary product. The development of knowledge is of immense importance for the present, but even more for the next generations. Universities thereby play a central role. Resources, which have been detected and used by humans during previous epochs, have often been reduced and exhausted. An attribute of primary products is the quantitative reduction due to utilization. Knowledge, on the contrary, is not reduced, but increase by application. The form of application of knowledge may be defined as thinking. During thinking, knowledge is not reduced, but augmented. Storing and administration of knowledge are not sufficient for the continuous developing process of humans. The World Wide Web, often called the source of all contemporary knowledge, accumulates information, but not knowledge. It is not easy to distinguish between correct and incorrect information in the WWW. But for sure, generating of knowledge is not happening there.

Institutions and persons, involved in the intellectual process of distributing knowledge, can be classified into two typical representatives: the **knowledge bureaucrat**, and the **knowledge entrepreneur**. While the first one is satisfied to keep and conserve the current status, the second is continuous developing and adding new insights and additional thoughts. The knowledge bureaucrat often feels disturbed because of "new" and "unconventional" thinking. The current status should be kept, by all means. Who breaks new grounds and allows himself innovative thoughts will be discredited as wisenheimer. Such persons have to anticipate the adverse wind.

The duty of universities is to develop new knowledge, to transfer this knowledge and to encourage everybody to think novel paths. If this happens at a large scale, then the development of our knowledge will be sufficient to surf the demands of the next generations. If not, the following scenario will come true: "Not enough, that they are not able to think different, in addition, they reject those, who try, and exclude them [Di Trocchio F 1993].

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