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Evidence-Based Dentistry: Integration in Predoctoral Curriculum

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ABSTRACT

Scientific evidence is one of the fundamental principles of dental practice. Evidence-Based Dentistry (EBD) integrates the use of the best evidence by taking into consideration the expertise of clinicians and the needs and preferences of patients to inform therapeutic decision-making. Therefore, the practitioner needs to acquire this skill. Considering the constant development of new therapeutics, technologies and the demand for quality of treatment in contrast to the lack of training in this field, the integration of EBD in the curriculum has become a necessity.

Our work aims to define the interest of EBD, to make an inventory but also to highlight the applicability of evidence-based dentistry by focusing on the organizational aspect and the various constraints that can accompany the integration of EBD in the learning of dental students.

Materials and methods: A search and review of the literature were conducted to highlight the importance of the acquisition of this skill and its application in the field.

Results: The integration of critical thinking and EBD into the undergraduate curriculum prepares graduates to maintain a state-of-the-art evidence-based clinical practice.

EBD has the potential to change the future course of oral health education, patient care, reimbursement, research programs, and evidence-based health policy.

Key words: Evidence-Based Dentistry, Therapeutic decision-making.

1. INTRODUCTION

Cognitively, therapeutic decision-making is a complex process with biases. Every instruction we give, every course of action we set, every outcome we desire begins with a decision, and this decision-making process is often based on what we think we know.

It is common knowledge that many practicing clinicians have opinions or professional beliefs about the delivery of oral health care that may negatively impact their treatment outcomes.

The Evidence-Based Dentistry (EBD) model has been specifically designed to make it easier for the clinician to navigate the wealth of available literature, thus becoming more evidence-based.

Evidence-based dentistry is based on evidence-based health care, which Sackett and al. define as "the conscientious, explicit and judicious use of the best current evidence to make decisions about individual patients.

Our work aims to define the value of EBD, to review the current state of the art but also to highlight the applicability of evidence-based dentistry by focusing on the organizational aspect and the various constraints that may accompany the integration of EBD into dental students' learning.

2. MATERIALS AND METHODS

The Medline (Pub Med), The Cochrane Library, and Google Scholar databases were searched for information on evidence-based dentistry (EBD) and evidence-based medicine using a combination of these keywords: evidence-based dentistry, dental education, dental curriculum, curriculum change, dental university, and evidence-based practice.

The search was limited to articles published between 2004 and 2019.
A first pre-selection was carried out based on the reading of titles and abstracts to exclude articles not dealing with the subject, a second full-text reading was completed by two independent readers using the grids of critical reading of articles, in case of disagreement between the two readers discuss until a consensus is reached, this step allowed to keep only the articles with a high level of scientific evidence.

3. RESULTS

The American Dental Association (ADA) established its Evidence-Based Dentistry Center in March 2009 to provide clinicians with access to resources and strategies for evidence-based dentistry (EBD) practice. (8,3)
At the same time, the American Dental Education Association's Commission on Change and Innovation in Dental Education (ADEA CCI) drew attention to the need for dental schools to teach content that is based on EBD principles, to prepare faculty for EBD modeling, and to teach
students literature review techniques during their studies. (8,7)

3.1 Why EBD

The integration of EBD has become a necessity for the following reasons: (5,14,19,28)
-Professional and ethical imperatives
-Effective management and reduction of iatrogenic complications by clinicians (due to technological innovations and advances)
Better response to patients' expectations (patient-centered care)
-Better efficiency (better management of information flow)

3.2 Objectives of integrating EBD into the undergraduate curriculum: (12)

1. To strengthen the knowledge of the students: to enable them to realize their shortcomings and to try to fill them
2. The development of a comprehensive curriculum that includes both theoretical knowledge and the ability to transform it into clinical skills
3. To produce lifelong learners: to produce students who are constantly eager to learn and discover new techniques or to explore them and why not to set up clinical projects and become in turn researchers and stimulate clinical activity.
Benefits of integrating EBD into the undergraduate curriculum: (24,15)
Problem-based reasoning: Encourages the student to think and ask why something is done in a certain way and think instead of just learning by rote.
Learning is better and students retain content better through EBD; they learn through understanding instead of waiting to be told.
2. Application of research skills: by maximizing students' interest in research, their projects will be of better quality, they will be able to argue their choices and treatment plans in the clinic.
3. Transfer of knowledge from theory to practice: helps students prepare for real practice; learn to think for themselves and be ready to make decisions in private practice, not depend on the faculty for answers.
4. Enhancing the learning experience through EBD: teaching EBD will encourage students to take more responsibility for their learning, make the most of the different lessons they receive, and adapt them to their dexterity and preferences.

Example of the American model: (20)
In 2008, the Texas College of Dentistry at Texas A&M University launched a comprehensive four-year Evidence-Based Dentistry (EBD) curriculum and a series of faculty development initiatives to create an EBD culture.

First-year:

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The objective of this first-year course was to introduce students to the principles and tools of EBD that form the basis for the evaluation of scientific papers.
This two-semester course combined one hour of lecture per week with nine small group discussion sessions (two in the first semester and seven in the second).
The discussion sessions served as an "EBD workshop" in which students evaluated clinical research papers. The sessions concluded at the end of the second semester with students presenting a critical reading of an article.
To create a culture of EBD, EBD courses were then introduced in series for the second, third and fourth years.

Second-year:
The course was designed to reinforce the skills presented in the first-year course. It consisted of seven small group discussions spread over the academic year, in which students discussed articles based on their current work and prepared two conducts for scenarios written by the faculty. The timetable for these courses was adjusted by allocating students to discussion groups in the afternoons when they were not scheduled for other academic activities.

Third-year:
The third and fourth-year courses represented the crucial transition of EBD into a clinical setting. As such, both were integrated into existing clinical courses.
An EBD module was included in six critical analysis scenarios as part of the case presentations in which students present the patients they are currently treating. Each scenario dealt with a difficult problem related to the patient's proposed treatment.
As part of this exercise, students were asked to assess the relevance of the evidence of a problem related to the scenario.

Fourth-year:
Students are asked to work in groups of four or five to identify a clinical issue generated by the management of a clinical case.
They then interact with each other (with the help of the supervising teachers) via e-learning management software (Blackboard) to produce a case report.
All groups then present their cases later in the semester.

4. DISCUSSION

The ADEA competencies for the new general dentist approved by the 2008 ADEA House of Delegates include:
-Critical thinking: a skill to evaluate and integrate research findings
Clinical expertise and patient-centered care for evidence-based practice. (1,16) The emphasis on patient-centered care, which gives patients a voice, and the exploration of resources available to patients also supported the new emphasis on EBD. Patients have immediate access to a wealth of information through multimedia, made available by a variety of content providers whose purposes include information sharing, marketing of a product or philosophy, and advertising services. Unfortunately, there is limited oversight or quality control of the accuracy or validity of this information, and our educational system does not prepare the general public to effectively evaluate this information.
Thus, the clinician must be able to help patients navigate oral health resources and evaluate the content using evidence-based practice strategies.
One of the desired outcomes of integrating EBD into the undergraduate curriculum is the creation of a new graduate ready to practice at the advanced level of EBD.
This requires an understanding of the basic knowledge of EBD (terminology, facts, and concepts) and the applications of EBD (application of principles and assimilation into practice). To move from a competent practitioner to one who has mastered EBD requires experience, lifelong learning, and professionalism in the years following dental training.
Curriculum design and development is therefore a key factor in the quality of dental education.

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Curriculum design and development:

The development of a new curriculum is a process that must balance current reality with an idealized future, controlled by logistical constraints of energy, time, and money. (5) The process is repetitive and requires gathering information, identifying outcomes, considering resources, and assimilating these components into workable approaches as a result:

Introspective review: (25,19,18,17)

1. Identification of the problem: consideration of curricular change is usually motivated by a concern; recognizing that something is not working, that the teaching process can be done more efficiently, or that new knowledge needs to be communicated to students.
Although individual faculty members can identify needs, unless these are recognized by the administration or department, complete change is difficult.

2. Identification of the desired outcomes of the new curriculum content from the perspective of the faculty and administration is necessary.
While key faculty members understand the strategic directions of the program and know what is missing, they do not have clear outcomes in mind. A thorough review of the literature, practice guidelines, interactions with private practitioners, and conversations with faculty members and experts in the field help to identify desired outcomes for EBD integration.
The desired outcome for students is to graduate with the skills to independently apply EBD principles to clinical practice.
For faculty members, the desired outcome includes graduation with a student who is prepared to read and integrate scientific evidence, during treatment planning and clinical activities, necessary to maintain a state-of-the-art evidence-based clinical practice.
To achieve this outcome, it is, therefore, necessary to develop a coherent interdisciplinary curriculum that teaches EBD knowledge and encourages critical analysis, self-evaluation, and professionalism. (19)

3. Having identified the desired outcomes, the next step in curriculum development is the identification of activities to achieve the desired outcomes.

4. Identify curriculum gaps: The differences between the desired outcomes and current practice define the gaps to be filled by the new curriculum content. These program gaps include structured critical analysis activities; use of EBD language, principles, and processes; and opportunities for guided EBD practice. (18,17)

General considerations:

1. For existing dental schools, curricula must evolve within their current environment (i.e., physical facilities, current activities, student commitments, and faculty resources); it must also respect faculty concerns and include evaluation of content resources.
To introduce change, a careful assessment of the existing environment and exploration of different pedagogical models is necessary to formulate revised pedagogical methods.
The evaluation of available resources with the resources required for potential teaching strategies is a key factor in determining the structure of the new curriculum content.

2. identification of faculty concerns: this is summarised as the capacity as well as sufficient knowledge of the faculty about the principles and application of EBD.
It is also worth drawing attention to the need for continuing education for faculty to address this deficit.
The identification of pedagogical resources (textbooks, videos, online tutorials) and the development of additional course materials are taking place simultaneously with the construction of the program structure. (25,19,2,3)

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Feasibility:

In the case of program change, the question of feasibility, defined as a realistic or logical possibility or feasible under the given circumstances, should always be addressed. The rationale for the program change and the desired outcomes should be clearly and openly communicated and considered important by the stakeholders. Multiple strategies for finding ways to address the identified gaps should be identified and critiqued. Objective identification of the obstacles, strengths, and weaknesses of each proposed strategy must be balanced to ensure that the solution is the most appropriate for the situation. Although anything is feasible, it is necessary to take into consideration the burden on teachers (perceived or real) to minimize resistance and facilitate acceptance of the proposed changes. (25)

Several groups of researchers have advocated a greater emphasis on EBD to improve undergraduate training and patient outcomes.

In a rapidly changing environment, clinical training needs to extend beyond graduation. Dental faculty members can model the lifelong learning process by keeping abreast of innovations.

Haden and al. emphasized that dental curricula should be "contemporary, appropriately complex, and designed to encourage students to take responsibility for their learning". (14,7) A 2010 report on a survey of fifty dental schools in the United States and five in Canada indicated that two-thirds were engaged in curriculum review, while half had organized their curriculum by discipline and used reinforced case-based learning. (14, 8)

A study conducted at the University of Alabama at Birmingham School of Dentistry describes how a conceptual framework and associated systematic procedures were beneficial in developing and improving the integration of EBD into the undergraduate curriculum. The mixed-methods approach maximized the strengths of both qualitative and quantitative methods and further described the attitudes towards EBD among various audiences. This systematic integration process generated credible data for informed decision-making for curriculum improvement. (14)

A study conducted at Texas A&M University Baylor College of Dentistry found that students trained in 2009 were significantly more supportive of EBD principles, felt that EBD had changed the way they read articles and, as expected, performed significantly better than second-year students not trained in EBD principles. (20,10)

Trained students had more EBD knowledge, greater confidence in evaluating research papers, and a greater belief that EBD was important to dental practice.(20,11) The same study in Texas also showed that EBD knowledge scores for all faculty members did not improve from 2009 to 2013. (20)

All faculty members who had taken the "EBD Fundamentals" course showed significant gains. They had significantly higher knowledge scores, read more peer-reviewed articles, and were more confident in evaluating research articles than faculty members who had not taken the course. This highlights the importance of intensive training for EBD teachers. (20)

In an evaluation of EBD training in another dental school, Teich and al. reported that 46% of third-year students who had received EBD training in their first year expressed doubts about using the literature to support the clinical aspects of the treatment plan and only 40% chose articles with a high level of evidence to support a treatment plan. (20, 24)

As with any program, ongoing evaluation of outcomes is essential to address the various limitations of integrating EBD into the undergraduate curriculum.

A study at the University of Iowa College of Dentistry identified time, knowledge, and resources as barriers to their ability to teach critical thinking and EBD. (25)

They also identified student preparation as a barrier to teaching EBD; clinic faculty members anecdotally report that students are challenged to provide adequate patient care, especially with complex patients, promptly. The idea of adding critical thinking and EBD content to the current expectations of clinics could be a factor of resistance. With this in mind, this university has developed an online teaching aid to help students move from EBD to EBP (evidence-based practice). (25)

Karin Hannes and al. explore in a qualitative study the barriers to the integration of EBP into clinical practice and classified them as:(9)

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1. Barriers related to evidence:(9)

- Difficulty in keeping up to date with rapidly changing knowledge in the field of dentistry
-Lack of up-to-date evidence for many devices and products
-Lack of clear outcome measures to evaluate practice
-Complexity of the dental field regarding treatment choices
-Delay between scientific knowledge and application in practice
-Lack of information on negative effects
-Difficulties in interpreting research results due to academic language
- Conflicting and subjective information in the scientific literature
-Lack of familiarity with information retrieval technology
-Lack of clear answers to clinical questions
-Expensive specialist academic journals

2-Barriers related to health care partners:(9)

• Governmental factors related to health care that may be counterproductive for EBD:

-Current nomenclature and reimbursement systems are outdated
-Evidence-based practice is not financially supported
-Patients prefer reimbursed treatments to evidence-based treatments
-High focus on cost-effectiveness
-Strong focus on cure, less on prevention
-Little impact of dental professional organizations at the policy level
-Professional organizations focus on economic rather than educational issues

• Commercial factors related to health care that can be counterproductive for EBD:

-Companies sponsor academic projects
-No research budget from independent sources
-Potentially subjective research results are presented
-Economic attitude of researchers
-Influence of commercials
-No verification of the accuracy of the companies' medical information
-Managers are starting to take over dental practices

• Patient-specific factors related to health care that may be counterproductive to EBD:

- Patients are becoming more emancipated
- The objectivity of the information presented by popular media is questionable
- Media raises high expectations for treatment
- Little or no accurate information on preventive actions
- Compliance with recommendations is low
- Patients are not sensitive to worsening tooth condition
- High expectations regarding availability of dentists
- Unique patient characteristics difficult to standardize

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3-Barriers related to the field of dentistry:(9)

- The concept of EBD is new to many
- The gap between younger and older dentists in knowledge and skills related to EBD
- Perception of EBD as serving a limited audience of dentists (academics)
- No time or money to experiment with new evidence-based devices
- No exchange of information between practitioners and academics
- Patient satisfaction is used as the main criterion for justifying actions
- Competence strongly influences patient outcomes
- Rely on expert advice for problems
- Lack of quality labels to distinguish EB products from others
- Dental courses are not up to date with evidence
- The high workload in dentistry

In 2004, the Association of Dental Education in Europe (9, 4) published a report guiding dental education on the professional skills and profile of the newly qualified dentist. In addition to having a broad academic and dental education in all areas of clinical dentistry and being able to network with other health professionals, dentists should have good communication skills, engage in continuing education and be able to practice evidence-based dentistry.

Firstly, communication skills training and the inclusion of communication skills training in the dental curriculum could facilitate the decision-making process with an empowered generation of patients. Secondly, dentists should be encouraged to engage in continuing education. This would be very helpful in spreading the evidence-based message. (9)

The Flemish government has introduced an accreditation system in which doctors and dentists are financially rewarded for participating in training programs organized and developed by academics or dental colleagues. Since the introduction of this system, more than 80% of Flemish dentists have participated in training programs, compared to 25% in previous years. Theories on EBD put forward by academics have their merits but do not contribute much to improving patient outcomes unless they are supported by extensive training. (9)

In dental care, training is all the more necessary because dental care also involves technical skills. The emphasis on the technical dimension of the oral health profession has further led to the realization that the rapid changes in know-how in the field of dentistry seem to outstrip the ability of dentists to gather the necessary skills and use them effectively. (9)

CONCLUSION

The development of a new program requires the identification of educational objectives and desired student outcomes, both of which are integrated with institutional logistics. Implementing a new program requires collaboration, patience, flexibility, and continuous evaluation.

It is, therefore, necessary to design a program that integrates critical thinking and EBD to model-independent learning and focus on accessible online resources, effective strategies for applying EBD, and streamlining EBD. Such a program will prepare graduates to maintain a state-of-the-art, evidence-based clinical practice.

The realization of this integration program is dependent on a commitment from policymakers to make available the necessary human, financial and educational resources. Buy-in from both faculty members and students would help change the mindset towards patient-centered care by making various modifications to the current practitioner-centered care programs.

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REFERENCES

1. American Dental Education Association. ADEA competencies for the new general dentist. J Dent Educ 2012; 76(7):891-4.
2. American Dental Association Center for Evidence-Based Dentistry. ADA/Forsyth course. 2013. At: www.ada.org/ forsythcourse.aspx. Accessed: April 25, 2013.

3. American Dental Association Center for Evidence-Based Dentistry. Volunteer to become an ADA evidence review- er. 2013. At: http://ebd.ada.org/Volunteer.aspx. Accessed: April 25, 2013.

4.Association for Dental Education in Europe. Profile and competences for the European dentist, November 200. At: http://adee.dental.tcd.ie/ec/repository/EJDEProfile ---final---formatted-for-web-.pdf. Accessed: January 30, 2008.

5.Evidence-Based Prosthodontics Fundamental Considerations, Limitations, and Guidelines
Avinash S. Bidra. Dent Clin N Am 58 (2014) 1–17.
6.Elderton RJ, Nuttal NM. Variation among dentists in plan- ning treatment. Br Dent J 1983;154:201-6.

7.Haden NK, Andrieu SC, Chadwick DG, Chmar JE, Cole JR, George MC, et al. The dental education environment. J Dent Educ 2006;70(12):1265–70.

8.Haden NK, Hendricson WD, Kassebaum DK, Ranney RR, Weinstein G, Anderson EL, et al. Changes in dental school curricula, 2003–09. J Am Coll Dent 2010;77(2):27–33.

9. Hannes K, Norre D, Goedhuys J, et al. Obstacles to imple- menting evidence-based dentistry: a focus group-based study. J Dent Educ 2008;72(6):736-44.

10.Higginbotham MG, McCann AL, Schneiderman ED, et al. Improving the EBD skills of dental students through curricular innovation. American Association for Dental Research Annual Meeting, Tampa, FL, March 2012, Abstract #156901.

11.Hinton RJ, Dechow PC, Abdellatif H, et al. The winds of change: creating an EBD culture at Baylor College of Dentistry. J Dent Educ 2011;75(2):279-90.

12. Designing and Implementing a Competency- Based Formative Progress Assessment System at a Canadian Dental School. HsingChi von Bergmann, Charles F. Shuler, Jinli Yang, David Kohler, Connie Reynolds, Leandra Best, Nancy Black, James Richardson, Ruth A. Childs. Journal of Dental Education.Volume 82, Number 6.

13.The Benefits of Evidence-Based Dentistry for the Private Dental Office. Jane Gillette, Joseph D. Matthews, Julie Frantsve-Hawley, Robert J. Weyant. Dent Clin N Am 53 (2009) 33–45.

14. Preparing Students to Practice Evidence- Based Dentistry: A Mixed Methods Conceptual Framework for Curriculum Enhancement. Kent G. Palcanis, Brian F. Geiger, Marcia R. O'Neal, Nataliya V. Ivankova, Retta R. Evans, Lasonja B. Kennedy, Karen W. Carera. Journal of Dental Education. Volume 76, Number 12.

15. Promoting the Teaching of Critical Thinking Skills Through Faculty Development. Linda S. Behar-Horenstein, Gail Schneider-Mitchell, Randy Graff. Journal of Dental Education.Volume 73, Number 6.

DOI: 10.31695/IJASRE.2022.8.5.5

16. Evaluation of an Integrative Model for Professional Development and Research in a Dental Curriculum. Marcia M. Ditmyer, Connie C. Mobley, William D. Journal of Dental Education. Volume 78, Number 3.

17. Marshall T, Finkelstein M, Cunningham-Ford M. Problem- based learning: a vehicle to teach critical thinking, reading the scientific literature. MedEdPORTAL, 2010. At: http:// services.aamc.org/30/mededportal/servlet/s/segment/ mededportal/?subid+7931. Accessed: April 25, 2013.

18. Marshall TA, Finkelstein MW, Qian F. Improved student performance following instructional changes in a problem- based learning curriculum. J Dent Educ 2011;75(4): 466-71.

19. Marshall TA, Straub-Morarend CL, Qian F, Finkelstein MW. Perceptions and practices of dental school fac- ulty regarding evidence-based dentistry. J Dent Educ 2013;77(2):146-51.

20. The Winds of Change Revisited: Progress Towards Building a Culture of Evidence- Based Dentistry. Robert J. Hinton, Ann L. McCann, Emet D. Schneiderman, Paul C. Dechow.Journal of Dental Education.Volume 79, Number 5.

21. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence-based medicine: what it is and what it isn't. BMJ 1996;312:71-2.

22.Sara B. Werb, Hon.B.Sc., M.S.Ed.; David W. Matear. Implementing evidence-based practice in undergraduate teaching clinics: a systematic review and recommendations.Journal of Dental Education.Volume 68, Number 9

23.Sutherland SE. Evidence-based dentistry: part I—getting started. J Can Dent Assoc 2001;67(4):204-6.

24.Teich ST, Demko CA, Lang LA. Evidence-based dentistry and clinical implementation by third-year dental students. J Dent Educ 2012;77(11):1286-99.

25.Integrating Critical Thinking and Evidence- Based Dentistry Across a Four-Year Dental Curriculum: A Model for Independent Learning.Teresa A. Marshall, Cheryl L. Straub-Morarend, Nidhi Handoo, Catherine M. Solow, Marsha A. Cunningham-Ford, Michael W. Finkelstein.Journal of Dental Education.Volume 78, Number 3.

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