



Evidence-Based Orthopaedics: Current Concepts, Principles, and Practice

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Since its introduction in 1995 by Sackett et al, evidence-based medicine (EBM) has become a cornerstone of the clinical decision-making process.¹ Conceptually, there are 3 fundamental principles of EBM: (1) optimal clinical decision-making requires awareness of the best available evidence; (2) EBM provides guidance to decide whether evidence is more or less trustworthy; and (3) evidence alone is never sufficient to make a clinical decision. Subspecialties within orthopaedics have adopted these key principles of EBM in order to provide treatment recommendations based on the available evidence to assist their members in providing optimal patient care. For clinicians, however, it is challenging to integrate these principles without an understanding of what constitutes high-quality and low-quality evidence. An EBM hierarchy of evidence thus becomes an important factor for evaluating the strength of evidence as it takes into account the study design in order to determine the quality of evidence it provides.² According to this hierarchy, the confidence in study results should increase when it is less likely to be affected by bias or systematic errors. In order to assimilate the principles of EBM into their practice, all clinicians must be able to perform a literature search for the clinical question at hand and critically appraise all types of relevant literature.

Generally speaking, the hierarchy of evidence should be followed when dealing with various types of studies such as case-control studies, cohort studies and interventional studies. Just as it is important to recognize that meta-analyses and randomized controlled trials are not all inherently level I studies (meta-analyses fall under the same level as the level of articles they include, and randomized controlled trials with poor follow-up can be dropped to level II), it is equally important to recognize that lower level of evidence studies do serve a purpose. In fact, not all clinical questions can be feasibly (or even ethically) answered through randomized controlled trials. Certain types of questions may be better answered through particular study designs. For example, if we want to learn more about natural history of the diseases, observational studies, more specifically, prognostic studies, are appropriate, while randomized control trials and systematic reviews are the best suited for comparing two or more interventions. Once we identify a study that can potentially provide an answer to the clinical question at hand, we must appraise the study.

Using critical appraisal skills, one can assess the quality of research and then be able to make an

informed decision to clinically accept or contest its results. An appraisal of clinical study should be performed by asking three crucial questions: (1) What are the results of the study? (2) Are the results valid? (3) Are these results relevant to the clinical scenario at hand? The abstract can reveal the credibility of the authors and reputation of the peer-reviewed journal, as well as the breadth of research topic and hypothesis being tested. Next the appropriateness of the study design, pertinence for testing the hypothesis, and both the internal and external validity of the study should be assessed. Internal validity refers to how well a study is performed, especially whether it avoids confounding. The less chance for confounding in a study, the higher its internal validity is. External validity is the extent to which an internally valid effect measured in a study sample reliably reflects the effect in a population of interest – also described as the target population.³ For a study that is both internally valid and relevant, it is important to determine whether the results are applicable to the patient or patient population before implementing the evidence. Table 2 outlines some of the critical questions to test for validity of the study.

Although our attempt to provide evidenced-based care can be best served by following the aforementioned principles, the usefulness of applying EBM to individual patients is limited. This is primarily because there are significant variations in individual circumstances and values. Additionally, the uncommon diseases and variants pose a further challenge in designing higher quality studies in order to produce higher quality evidence.^{4,5}

In conclusion, EBM can serve as an effective tool in providing care that is based on evidence. However, individual patient needs must be taken into account before implementing treatment options derived by following the aforementioned steps.

References:

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