Evidence-Based Practice (EBP) and PRI

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Why we should care

"Within the PT profession, the call for a commitment to EBP has gradually become more strident and has corresponded with similar ongoing efforts in other health care professions. Many PT professional organizations have identified EBP as a priority. Numerous authors have stated that physical therapists have a moral, professional, and ethical obligation as professionals to provide evidence based service and to move away from interventions based solely on anecdotal testimonies, expert opinion, or physiologic rationale. The ultimate goal of this increased emphasis on using evidence to guide practice is to build a body of knowledge that supports the effectiveness of that practice. As Harris noted, 'It is high time for physical therapists to ensure that the treatments they are endorsing and providing for their clients are based on the strictest rules of experimental design and scientific evidence.'"[1]

The most common definition of EBP has 3 components, all of which are consistent with the PRI approach: "Integration of the best <u>research evidence</u> with <u>clinical expertise</u> and <u>patient values</u>".[2]

Regarding patient values

- Patients appreciate less frequent therapy visits, having the cause of their issues resolved, avoiding surgery or medications, and potentially preventing future health problems.

Regarding clinical expertise

- Often overlooked is that the clinical expertise component should be strongly tied to patient outcomes because experience does not necessary equate with efficacy.

Regarding research evidence[3-8]

- This is only ONE of three components of EBP. It is no more important than the other two.
- Randomized controlled trials (RCTs), studies in which patients are either assigned to groups that do or do not receive an intervention, are regarded to be of high quality along a hierarchy of level of evidence. However, applying RCT findings to clinical decisions can be challenging.
    - *Internal validity* is the degree to which the results of an intervention were caused by the intervention alone or something else and is related to how well researchers were able to control for extraneous variables.
        - Although the RCT design attempts to control threats to internal validity with random selection of subjects, random assignment to groups, blinding, and the use of control and intervention groups with similar baseline characteristics, RCTs for PT interventions tend to be replete with confounding factors that weaken internal validity. A common major threat to internal validity is the underlying pattern of neuromuscular imbalance of the study subjects, an unappreciated and uncontrolled variable in published RCTs.
        - Internal validity for any RCT would be strengthened if all participants could maintain neutral positioning prior to group assignment.
        - Researchers should be aware that many interventions may be more effective if patients are first repositioned to better receive them. Neutrality is a starting point, not treatment, and it should be a starting point for many types of therapy, not just those based on PRI techniques.
    - *External validity* is the degree to which results of a study can be generalized to patients outside the experimental situation.
        - It is a common practice when conducting an RCT to strive to enroll a homogeneous population of subjects with as little variability as possible by following stringent inclusion and exclusion criteria so that the study findings will be more likely to produce statistically significant results. Unfortunately, this stringency can limit external validity by making it more difficult to generalize the results to the specific patients that clinicians treat. Never is there a group of subjects studied who are all exactly like an individual patient being treated.

        - Clinicians often perceive that this methodology diminishes the clinical relevance of much of the published research for PT interventions.
- In contrast, **PRI is an approach that is effective for a heterogeneous population of patients**. The fact that PRI principles and techniques can be applied to a wide variety of conditions in patients of all ages is what makes the science of PRI so powerful.
- PRI therapists in every day practice use the **A-B-A single subject experimental design** (also called a withdrawal design or within-subject comparison) not only to inform patients but also to build upon their own clinical expertise, thus fostering all three components of EBP.
    - In an A-B-A design a treatment variable is introduced and then withdrawn. During the first "A" phase a baseline measurement of the dependent variable(s) is obtained through PRI testing. In the "B" phase an intervention is introduced, the patient is retested, and any changes in the dependent measure are noted. The strength of this type of research design lies in the second "A" phase, when the intervention is withdrawn. If the intervention leads to improvement with a return to the baseline level after it is withdrawn, one can conclude with a high degree of certainty that the intervention was the factor causing the change during the "B" phase, especially if the change is large (as determined by PRI testing) and immediate (which eliminates the possibility of change due to passing of time). Support for the sole influence of an intervention is also convincing when large and immediate changes occur in A-B designs where the second "A" phase is not conducted.
    - Importantly, the A-B-A study design utilizes the best control subject for a particular patient, which is the patient himself or herself.
    - The internal validity of this design is strong because it is highly unlikely that confounding factors would coincidentally occur at both the onset and the cessation of the intervention.
    - Although only one subject at a time is being studied in an A-B-A design, it is different from a case report or case series design for which the management of a patient is described without controls that would minimize the possibility of the influence of variables other than the intervention on the results.
    - Since therapy sessions typically end with an intervention phase, the process would be considered an A-B-A-B design if the dependent measure is tested again after the final intervention. If a different intervention is used for comparison, it would be labeled alphabetically and sequentially, i.e. A-B-A-C.
    - A plan of care involving a home exercise program that replicates the intent of an intervention would ideally result in a more persistent carryover effect than might be seen after a single PT session.
- The A-B-A design as a **clinical decision-making tool** allows for systematic, objective testing and retesting to be conducted during daily clinical PRI practice in order to rule in and rule out causes of pain and dysfunctional movement. The results can be immediately applied to direct a treatment plan that addresses each individual patient's specific needs.
- **Are there any other physical therapy approaches for which A-B-A experiments can be routinely conducted with every patient to guide clinical decisions?**

References

1. Schreiber J, Stern P. A review of the literature on evidence-based practice in physical therapy. *The Internet Journal of Allied Health Sciences and Practice.* 2005;3(4).
2. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. 1996. *Clin Orthop Relat Res.* 2007;455:3-5.
3. Backman CL, Harris SR. Case studies, single-subject research, and N of 1 randomized trials: comparisons and contrasts. *Am J Phys Med Rehabil.* 1999;78(2):170-176.
4. Gonnella C. Single-subject experimental paradigm as a clinical decision tool. *Phys Ther.* 1989;69(7):601-609.
5. Romeiser Logan L, Hickman RR, Harris SR, Heriza CB. Single-subject research design: recommendations for levels of evidence and quality rating. *Dev Med Child Neurol.* 2008;50(2):99-103. doi: 110.1111/j.1469-8749.2007.02005.x.
6. Jewell DV. *Guide To Evidence-Based Physical Therapist Practice*. 2nd ed: Jones & Bartlett Learning; 2010.
7. Portney LG, Watkins MP. *Foundations of Clinical Research: Applications to Practice*. 3rd ed: Prentice Hall; 2008.
8. Maher CG, Sherrington C, Elkins M, Herbert RD, Moseley AM. Challenges for evidence-based physical therapy: accessing and interpreting high-quality evidence on therapy. *Phys Ther.* 2004;84(7):644-654.