The purpose of this article is to present activities that can be used to integrate evidence-based practice (EBP) into clinicians’ daily work so that they may be better informed when planning intervention with their clients. The article includes a short history of EBP, a description of an eight-step EBP process taught in an academic setting using a student project as an example, and suggestions for ways in which individual practitioners and occupational therapy managers can promote the implementation of EBP in daily practice.


This descriptive article is based on a course in evidence-based practice (EBP) taught to postprofessional occupational therapy student–clinicians. The purpose of the article is to present a process that can be used to integrate EBP into clinicians’ own practice so that they may be better informed when planning interventions with their clients. Student–clinicians selected past clients that would allow them to investigate specific interventions. Our premise was that, if at the time of planning intervention they had the expertise and resources to search for a base of evidence, they would have had more options to offer their clients.

Development of EBP in Occupational Therapy

According to the National Institute for the Dissemination of Disability Research (NIDDR), “Evidence-based research emerged in the field of medicine over 50 years ago, and has resulted in major advances in the treatment and prevention of disease” (NIDDR, 2003, p. 1). In occupational therapy, however, we generally trace the beginnings of EBP to the development of evidence-based medicine (EBM) by R. Brian Haynes, a physician at McMaster University in Ontario, Canada, in the early 1990s (Law, 2002). Haynes joined forces with several physicians in Canada and the United Kingdom (notably the British epidemiologist, Dr. Archie Cochrane, known for the Cochrane EBM databases), and they developed the seminal literature on EBM (Gray, Haynes, Sackett, Cook, & Guyatt, 1997; Haynes, Sackett, Gray, Cook, & Guyatt, 1996, 1997; Sackett, Richardson, Rosenberg, & Haynes, 1997; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). In the late 1990s, EBP began to catch on as a way for occupational therapists in Canada, the United Kingdom, and Australia to improve their clinical care, and in 1999 the American Occupational Therapy Association (AOTA) appealed to U.S. practitioners to commit to EBP (Hasselkus, 1999).

Occupational therapists have become accustomed to the EBP definitions and principles developed by Sackett, Haynes, and colleagues from the field of medicine. In their classic work on EBM, Sackett and colleagues (1996) described EBM as “the conscientious, explicit, judicious use of current best evidence in making decisions about the care of individual patients” (p. 71).

It is noteworthy that the Evidence-Based Forum began as a regular column in the American Journal of Occupational Therapy at the end of 1999. Also of significance
They selected a theoretical approach or model through which they would conceptualize the client’s needs and desires and the intervention being investigated. This model would guide them through the literature in search of evidence. For example, they would search medically oriented databases such as Medline (www.PUBMED.gov) if the client’s problems and likely interventions were of a medical nature. At this point in the process, student–clinicians’ clinical-reasoning skills and abilities were tested. They needed a solid grounding of occupational therapy theories and clinical decision-making skills to make an appropriate choice of intervention model based on each client’s unique problems and needs.

4. Next, student–clinicians developed PICO questions to guide their search for evidence. PICO questions describe the specific needs of the Person, various Interventions that will be investigated for evidence, Comparison interventions, and Outcomes from interventions desired by the client (Richardson, Wilson, Nishikawa, & Hayward, 1995).

5. Student–clinicians then conducted a search of the literature concerning their client's needs and the intervention under consideration.

6. Once articles were retrieved and read, tables were constructed as a way to analyze the usefulness and applicability of the evidence for the client (Law & Philip, 2002; Sackett et al., 1997). Student–clinicians made decisions as to the soundness of the study, the similarities and differences of the study participants to the client, and the potential for the evidence intervention to address the client’s problems, allowing him or her to reach stated goals.

7. Based on their findings, student–clinicians used their clinical-reasoning skills to generate a tentative plan of intervention to be presented to the client.

8. Finally, they wrote a script and role-played the discussion they would have with the client about the proposed intervention (Tickle-Degnen, 1998, 2002).

Sample EBP Project

The following example is a description of one EBP project written by a student–clincian during the course to illustrate how the process played out in the classroom. It is not our intent to present all the evidence found regarding the intervention under investigation—constraint-induced movement therapy (CIMT)—nor is it our intent to endorse this treatment intervention. Our goal is to provide some examples of the evidence and how it could be used to plan intervention for a particular client.

Case Description

Mrs. Charles (pseudonym) was admitted to acute rehabilitation 1 week after experiencing a left-sided cerebrovascular
accident (CVA). She was evaluated by an occupational therapist, a physical therapist, and a speech-language pathologist. I [Jodi Bornstein, one author of the current study] worked with Mrs. Charles during this admission. Mrs. Charles, a 70-year-old semi-retired schoolteacher, lived with her husband and had two adult children. According to Mrs. Charles, before her CVA she was independent with her personal activities of daily living and her instrumental activities of daily living, including driving, cooking, cleaning, and shopping. She described herself as someone who enjoyed her independence and loved going to church and spending time with family and friends.

On admission to rehabilitation, Mrs. Charles was cognitively and perceptually intact; she was right-hand dominant and initially demonstrated only trace motor return in her right upper extremity. Within days of her admission, however, she rapidly gained neuromuscular return. Although she achieved gross movements of the shoulder, elbow, wrist, and hand, including gross grasp and release, her fine motor coordination remained impaired. She achieved a set-up level of assistance with her self-care and could perform light kitchen tasks at an ambulatory level, using a quadruped cane and contact guard (walking assistance) from one person.

**The Client’s Desired Outcomes and Goals for Therapy**

On admission to rehabilitation, Mrs. Charles clearly articulated her goals for occupational therapy. She said, “I want to regain as much movement in my right arm and hand as possible, such that I’ll be able to use it again”; “I want to be able to take care of myself as much as possible”; and “I would like to cook or bake something simple in the kitchen.” I converted her wishes into what Mattingly and Fleming (1994) called occupational therapy “chart talk” (p. 60); Mrs. Charles wanted to maximize the neuromuscular return of her right upper extremity and increase her independence in ADL, functional mobility, and light IADL. Use of this language facilitated my literature search.

**Investigating and Selecting a Treatment Approach**

For my EBP project, my intention was to examine a treatment approach that might address Mrs. Charles’s occupational therapy goals—to increase neuromuscular return of her hemiparetic upper limb using functional and goal-directed tasks. I subsequently decided to investigate evidence relating to the use of CIMT with persons who have had a stroke. CIMT forces the use of the affected arm by restraining the unaffected one while the client engages in functional activities (Taub & Wolf, 1997; Winstein et al., 2003). This treatment is intended to promote increased use of the affected upper extremity while assisting stroke survivors in overcoming “learned nonuse” of the affected arm (van der Lee et al., 2003, p. 41).

**Developing PICO Questions**

I developed a PICO question to lead the search for evidence about CIMT and to judge the usefulness of any evidence found for Mrs. Charles:

- **P (Person):** Adult with CVA
- **I (Intervention):** CIMT
- **C (Comparison):** No comparison intervention used
- **O (Outcomes desired):** Increase arm and hand function, increase functional independence in ADL and IADL

The question ultimately read as follows:

For an adult with CVA, does CIMT increase arm and hand function and increase functional independence in ADL and IADL?

**Selecting Databases and Conducting a Literature Search**

Working on this project in a university setting made access to online databases and electronic journals straightforward. The databases I used to search for evidence on the effectiveness and usefulness of CIMT included Medline, CINAHL, PsycINFO, OTseeker (see Appendix for Web addresses of these databases), and the Evidence-Based Medicine (EBM) databases (which are not easily accessed on a personal computer). The keywords used were constraint-induced movement therapy, and stroke paired with occupational therapy.

**Table Construction and Identifying Levels of Evidence**

I constructed tables for all of the articles I found that used CIMT for people with CVA. The tables allowed me to compare study participants with my client, to see if the studies addressed the outcomes my client desired, and to examine the details of the intervention and the strength of the evidence. Table 1 is an example comparing the clients and findings in studies by Dromerick, Edwards, and Hahn (2000) and van der Lee and colleagues (1999) with Mrs. Charles’s characteristics and needs.

**The Clinical-Reasoning Process**

Mrs. Charles’s goals were at the core of my search for the ideal treatment intervention for her after her stroke. CIMT, as described in the literature, appears to be an intense intervention that requires great effort on the part of the patient and the occupational therapist, as well as coordination among the rehabilitation team members. Mrs. Charles was a motivated patient who was willing to put effort into her rehabilitation, and members of her rehabilitation team were willing to coordinate their efforts. Mrs. Charles had a pure motor stroke that, coupled with her willingness to try anything that might aid in her recovery, provided an optimal
opportunity for trying this new intervention. In addition to reviewing the CIMT literature, I considered my own clinical and academic experience and decided that within the rehabilitation setting where I treated Mrs. Charles, it would be feasible to incorporate the CIMT approach into her occupational therapy plan.

**Table 1. Comparison of Mrs. Charles’s Case With Participants in Two Studies Using CIMT**

<table>
<thead>
<tr>
<th>Items Compared</th>
<th>Mrs. Charles</th>
<th>Dromerick et al. (2000) (N = 20)</th>
<th>Van der Lee et al. (1999) (N = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Are characteristics of study clients similar to Mrs. Charles’s characteristics?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>Age group</td>
<td>Older adult</td>
<td>Older adult</td>
<td>Older adult</td>
</tr>
<tr>
<td>Condition</td>
<td>Ischemic CVA</td>
<td>Ischemic CVA</td>
<td>Not stated</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Right-side hemiparesis (dominant side)</td>
<td>Persistent hemiparesis</td>
<td>Not stated, but they selected those whose dominant side was affected Minimum of 20° active wrist extension and 10° active finger extension</td>
</tr>
<tr>
<td>Some voluntary control in arm and minimal hand motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognition</td>
<td>Intact</td>
<td>Intact</td>
<td>Intact</td>
</tr>
<tr>
<td>Balance</td>
<td>Intact</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>Living situation</td>
<td>Lives with spouse</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>Treatment</td>
<td>Acute inpatient (1 week to 2 months after CVA)</td>
<td>Acute inpatient</td>
<td>Median time since stroke was 3 years</td>
</tr>
<tr>
<td><strong>What interventions were used in the studies?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time initiated after CVA</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of treatment</td>
<td>—</td>
<td>Both groups—2 hr a day, 5 times a week, 2 consecutive weeks</td>
<td>Both groups—6 hr a day, 5 times a week, 2 consecutive weeks</td>
</tr>
<tr>
<td>Administered by</td>
<td>—</td>
<td>Occupational therapist</td>
<td>1 or 2 occupational therapists or physical therapists</td>
</tr>
<tr>
<td><strong>What were the outcomes desired by Mrs. Charles and the outcomes of the studies?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Arm and hand to work better&quot;</td>
<td></td>
<td>Significant increase in pinch in CIMT group</td>
<td>Gains in both groups on the Action Research Arm test (grasp, gross motor)</td>
</tr>
<tr>
<td>&quot;Be able to take care of myself&quot; (self-care ADL)</td>
<td></td>
<td>Significant increase in dressing independence in CIMT group</td>
<td>No significant changes in ADL for either group</td>
</tr>
<tr>
<td>&quot;Be able to cook something light&quot;</td>
<td></td>
<td>Did not address IADL tasks</td>
<td>Did not address IADL tasks</td>
</tr>
<tr>
<td>Long-term maintenance of gains</td>
<td></td>
<td>Not stated</td>
<td>For both groups, dexterity remained at 1-year follow-up</td>
</tr>
<tr>
<td><strong>What is the Level of Evidence1 of the studies?</strong></td>
<td></td>
<td>Level II: Pilot, RCT</td>
<td>Level II: RCT</td>
</tr>
<tr>
<td>Level of Evidence</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>What are the designs of the studies?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study design</td>
<td>—</td>
<td>Blind</td>
<td>Blind</td>
</tr>
<tr>
<td></td>
<td>Random assignment to experimental or control groups</td>
<td>Random assignment to experimental or control groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pretests and posttests</td>
<td>Pretests and posttests</td>
<td></td>
</tr>
<tr>
<td><strong>Does study provide evidence useful for Mrs. Charles?</strong></td>
<td>Yes:</td>
<td></td>
<td>Yes:</td>
</tr>
<tr>
<td>Evidence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Addresses Mrs. Charles’s goals2</td>
<td>Addresses Mrs. Charles’s goals2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clients have similar characteristics to Mrs. Charles</td>
<td>Clients have similar characteristics to Mrs. Charles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intervention is “doable” by occupa-</td>
<td>Intervention is “doable” by occupa-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tional therapist</td>
<td>tional therapist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trustworthy study design</td>
<td>Trustworthy study design</td>
</tr>
<tr>
<td><strong>Note.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIMT = constraint-induced movement therapy, CVA = cerebrovascular accident, RCT = randomized controlled trials, OT = occupational therapy, NDT = neuro-developmental treatment, ADL = activities of daily living, IADL = instrumental activities of daily living.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 “Level of Evidence” refers to the hierarchy proposed by Sackett and colleagues (Phillips et al., 2004; Sackett, et al., 1997) as a way to determine the strongest evidence for a particular client.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Although neither the Dromerick et al. (2000) study nor the van der Lee et al. (1999) study addressed potential harm associated with CIMT, we are aware through anecdotal reports that there is some risk associated with falls. It is not our intent to indicate that CIMT is the right approach for clients who have experienced a CVA. We are simply using this intervention to demonstrate the process of finding and critiquing evidence for a specific client.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Script for Discussion With Mrs. Charles

“Mrs. Charles, you have told me that your primary goal in occupational therapy is to regain as much movement in your right arm and hand as possible. You also have said that you would like to be able to take care of yourself and do...
Implementing EBP in Clinical Settings

After 6 months back in full-time practice, the two student-clinician authors of this article, Sarah Ryan and Jodi Bornstein, found ways of adapting the EBP process they learned in school for use in their daily work. The following are some suggestions for activities that occupational therapy practitioners and managers can implement to incorporate EBP into their daily practice.

The Individual Practitioner

If occupational therapy practitioners develop a list of clinical questions and issues pertinent to their client population, the list will form the basis for topics to be investigated in the literature when they become issues of concern during practice (Tickle-Degnen, 2000). By collecting data from their own practice and tracking intervention outcomes in terms of effectiveness, practitioners will contribute to a department database that will be useful when deciding on interventions with future clients.

Practitioners should find out whether their facility has access to literature databases that can be searched by employees or whether there is a librarian who can conduct a search. Clinicians also should be aware that it is possible to search several medical and psychological databases on the Internet (Corcoran, 2006; Coster & Vergara, 2004). See this article’s Appendix for a sample of such databases.

It is advisable to search the Internet regularly using, as key words, client conditions and intervention techniques that are common in the clinician’s practice. To save time, first locate articles that synthesize a group of research studies on a single topic. Authors of these meta-analytic studies will have done much of the work by reviewing, synthesizing, and summarizing findings from several studies. The practitioner can then retrieve any of these studies that are of particular interest.

In addition to finding relevant literature, clinicians must hone their critical appraisal skills, learning to recognize when they are reading a well-designed research report, a practitioner’s anecdotal experience, or something in between. Having the ability to critique research is one of the major challenges to becoming a knowledgeable and current practitioner in a clinical specialty. It is helpful to take a course specifically designed to teach clinicians to be critical readers of research. Clinicians might need to lobby their local university or state association to offer such a course.

Another way to get started is to join the AOTA Special Interest Sections or listservs on the Internet that relate to particular conditions found in one’s practice. Clinicians can raise questions about the latest research on treatment techniques, ask for reference material, and join in the critique and discussion. In addition, the AOTA Evidence-Based Practice Resources Tool (see the AOTA Web page at www.aota.org) can be helpful in getting started.

The Occupational Therapy Manager

Occupational therapy managers can foster evidence-based departments in many ways. Sometimes staff members must be convinced of the usefulness and possibility of being able to practice based on evidence while still being guided by their clients’ occupational goals. Once staff members have become interested in the idea, they need to be informed about the process. Thus, a manager might invite someone knowledgeable about EBP to conduct in-service training on the necessity and benefits of incorporating EBP into clinical work. If there are no EBP-knowledgeable practitioners in the department, seek out non–occupational therapy colleagues who are practicing according to evidence.

Regular discussions in staff meetings about client-centered practice, evidence about particular interventions, and critical appraisal of that evidence can foster the expectation that all clinicians will take an evidence-based approach to intervention. As a partial solution for limited time, the task of searching for evidence can be shared with...
colleagues (occupational therapists or those in other disciplines). These same colleagues might form a study group or journal club to critique the evidence about client conditions or treatment techniques. The manager can support these efforts by providing resources such as meeting space, time, and access to resources for literature searching, copying, and discussion of ideas at staff meetings.

Managers can organize a system for their staff members to track intervention outcomes for each of their clients. A common format should be established for collecting uniform sets of data on specific client types and assessments and interventions. This information can be pooled to form a large departmental database useful for future clients with similar needs and goals.

Some departments have their Level II fieldwork students prepare and present EBP projects to the whole department as a way to (a) model the EBP process that students will likely have learned in school; (b) establish routine practice of EBP by students; (c) pique practitioners’ interest in EBP during student presentations; (d) allow practitioners to check whether they are using the most effective and current interventions; (e) stimulate departmental discussion around effective interventions for commonly treated client groups; and (f) use the students’ projects to start an EBP library for the department. Every time an EBP study is carried out, it can be added to a database for use by all department members.

Managers can build expectations and rewards regarding EBP into professional development and professional appraisal procedures. They could find ways to acknowledge, publicly praise, and support those who adopt an evidence-based approach to assessment and intervention. Optimally, managers could support staff attendance at continuing education opportunities on EBP. Those persons with no grounding in EBP could take a short course at their local university, state, or national association.

In conclusion, we hope that individual occupational therapists and department managers will embrace a practice that is based on evidence in a way that allows clients to meet their occupational goals. Surely EBP is the way for us all to offer competent client care, and for occupational therapy to maintain a credible presence in the health care arena. ▲

References

Appendix. Databases Available on Personal Computers

- [www.PUBMED.gov](http://www.PUBMED.gov): Free access to the Medline database
- [www.freemedicaljournals.com](http://www.freemedicaljournals.com): Free access to full-text medical journals
- [www.biomedcentral.com](http://www.biomedcentral.com): Free access to full-text medical journals
- [www.tripdatabase.com](http://www.tripdatabase.com): Systematic reviews, some Medline articles, medical guidelines, patient handouts, informational Web site, many full-text articles
- [http://sumsearch.uthscsa.edu](http://sumsearch.uthscsa.edu): Free access to a medical database
- [www.acpcj.org](http://www.acpcj.org): ACP Journal Club—Online journal club of the American College of Physicians that conducts critical appraisals of research reported in a variety of medical journals
- [www.samhsa.gov](http://www.samhsa.gov): Web site of the Substance Abuse & Mental Health Services Administration
- [www.naric.com](http://www.naric.com): Web site of the National Rehabilitation Information Center
- [www.CINAHL.com](http://www.CINAHL.com): $20 per year for access to research in nursing and allied health professions
- [www.apa.org/psycinfo](http://www.apa.org/psycinfo): $12 per 24-hour period to access psychology research through the Web site for the American Psychological Association
- [www.eric.ed.gov](http://www.eric.ed.gov): Free access to full-text articles in ERIC, an education database
- [www.otseeker.com](http://www.otseeker.com): Free access to an international database of randomized controlled trials and abstracts of systematic reviews relevant to occupational therapy (McKenna et al., 2004)
- [www.scholar.google.com](http://www.scholar.google.com): Free Internet database of all types of research articles

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