

2000 Eleanor Clarke Slagle Lecture

## Our Mandate for the New Millennium: *Evidence-Based Practice*

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If the next several patients you were to see asked you, “How do you know that what you do and how you do it really works?” would you be able to provide them with research evidence similar to that found in the pamphlets that come with your prescription medications? The evidence would include a summary of research on each occupational therapy intervention option you are considering. It would delineate the percentage of patients who benefited from each option and the percentage of those who did not. It would also clearly describe *what* each intervention consists of and *how* each is to be implemented for yielding the best outcomes for particular patient populations. Additionally, the data that support the recommended frequency and duration for each intervention would be included. It is unlikely that you could provide such evidence today. Will you be able to provide the evidence by 2010? As professionals, we have gone on record committing ourselves to evidence-based practice in Principle 2.B. of our *Occupational Therapy Code of Ethics*, which states, “Occupational therapy personnel shall fully inform the service recipients of the nature, risks, and potential outcomes of any interventions” (American Occupational Therapy Association [AOTA], 1994, p. 1037). *Can we meet this commitment?*

In this year’s Slagle Lecture, I will use a common definition of *evidence-based practice* and discuss why it has meaning for the context in which our profession finds itself today. First, I will use a five-level measuring stick (see Table 49.1) to examine the strength of the evidence or the lack of evidence associated with occupational therapy interventions—*what* we do and *how* we do it—the same measuring stick that is also being used by referring physicians, educational services administrators, and health maintenance organization purchasers of services as they appraise our evidence. Second, I will raise throughout the lecture dilemmas that face us when we try to reconcile some of the principles in our Code of Ethics with the practice of occupational therapy based on limited evidence. Third, I will use the framework of continued competency to discuss what is needed to practice occupational therapy, based on research evidence, in the new millennium.

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**Table 49.1. Hierarchy of Levels of Evidence for Evidence-Based Practice**

Level	Description
I	Strong evidence from at least one systematic review of multiple well-designed randomized controlled trials
II	Strong evidence from at least one properly designed randomized controlled trial of appropriate size
III	Evidence from well-designed trials without randomization, single group pre-post, cohort, time series, or matched case-controlled studies
IV	Evidence from well-designed nonexperimental studies from more than one center or research group
V	Opinions of respected authorities, based on clinical evidence, descriptive studies, or reports of expert committees

Note. From "Evidence-Based Everything," by A. Moore, H. McQuay, & J.A.M. Gray (Eds.), 1995, *Bandolier*, 1(12), 1. Copyright © 1995 by Bandolier. Reprinted with permission.

## Evidence-Based Practice

As we are all aware, the health care environment of the past quarter century underwent numerous evolutionary processes that greatly affected *how* occupational therapy services were provided! For example, in many practice settings, we were confronted with prospective payment reimbursement, capitation models, reduced staffing ratios, and job losses. Additionally, we are now being judged by the functional outcomes our patients achieve. The fact that patient outcomes are improved with occupational therapy services is no longer sufficient to justify our services, unless we can also explain *what* we do and *how* we do it so that others can replicate our interventions and achieve similar outcomes with comparable patients with like needs, wants, and expectations. The emphasis on justifying our practice patterns has been reflected in the increasing numbers of requests for the research-based evidence that supports what we are doing.

So, what is evidence-based practice? It has been defined as "integrating individual clinical expertise" with the "conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71). Thus, in our Code of Ethics we have also affirmed our commitment to evidence-based practice in Principle 3.D., "Occupational therapy personnel shall perform their duties on the basis of accurate and current information" (AOTA, 1994, p. 1037). *Can we meet this commitment?*

Gray (1997) described the evolution of evidence-based practice as progressing from providing services as efficiently and cheaply as possible, to "doing things better," then to "doing things right," and finally to "doing the right things" (p. 17). He has also proposed that evidence-based practice for the new millennium must focus on "doing the right things right" (p. 17). In other words, the necessary shift to the evidence-based practice of occupational therapy will require us to justify *why* we do *what* we do in addition to *how* we do it. Of course, Gray's proposal implies that for any given patient population, we *know* what is "right" and, furthermore, that we *know* the "right" way to do what we do. Silverman (1998) put it another way: "How do we go about drawing a line between 'knowing' and 'doing' . . .

and when do we know enough about the . . . consequences of our interventions to proceed with confidence” (p. 5)?

As occupational therapy practitioners, we have always used multiple sources of evidence, or “ways of knowing,” to guide our “doing,” including evidence derived from the oral tradition, our own beliefs and values, patient preferences, assessment data, the opinions of experts, and research evidence (Brown, 1999; Bury & Mead, 1998). Historically, our evidence resided within individual practitioners and was handed down from practitioner to practitioner; thus, it was not accessible to all. With the advent of occupational therapy textbooks and journals, opinions of experts and research evidence have been published and are now accessible to all. Although each source of evidence has inherent value for some aspect of our practice, no single source of evidence, or even all of them together, enables us to know enough to proceed to our “doing” with *absolute* confidence.

### **Information Overload and Hierarchies of Evidence**

Our level of confidence in our clinical decisions should be based, in part, on the strength of the evidence we use. Fortunately, the evidence that is available has been expanding at an exponential rate; however, this expansion has created two problems: (a) There is too much evidence to sift through, and (b) the quantity of evidence does not equal quality of evidence. Shenk (1997) addressed the problem of expansion when he noted, “Just as fat has replaced starvation as [the] number one dietary concern, information overload has replaced information scarcity” (p. 29). An editorial in the *Journal of the American Medical Association (JAMA)* expressed concerns about the second problem: the quality of the evidence in which we may place our confidence. Rennie (1986) lamented that publication alone does not mean quality. The author noted wryly that there is

no study too fragmented, no hypothesis too trivial, no literature citation too biased or too egotistical, no design too warped, no methodology too bungled, no presentation of results too inaccurate and too contradictory, no analysis too self-serving, no argument too circular, no conclusion too trifling or too unjustified, and no grammar and syntax too offensive for a paper to end up in print. (p. 2391)

It is because of the glut of evidence and concerns about quality control that ranking systems, or hierarchies, were developed to rate the strength of the research designs being used to generate the evidence (Moore, McQuay, & Gray, 1995; Sackett, Haynes, & Tugwell, 1985; Sackett, Richardson, Rosenberg, & Haynes, 1997). These *hierarchies of evidence* were designed to help practitioners sort through the options and select the “current best evidence” available to guide decisions about *what* to do and *how* to do it for a particular patient or patient population.

### **Examples of Occupational Therapy Evidence**

Although evidence hierarchies vary somewhat in their rigor, the rank order of the levels of evidence is similar, with the best evidence ranked at Level I and less convincing evidence ranked at lower levels (see Table 49.1). Each level represents the research strategies that were used to structure the investigations. At the top of the hierarchy are those designs deemed

(a) least vulnerable to bias, (b) more generalizable, and (c) more likely to yield patient outcomes that can confidently be attributed to the intervention being studied (see Table 49.1). Therefore, if it is current, and available, you want the “best” evidence, which is a Level I research design. The evidence hierarchy, or measuring stick, that I will use has five levels (Moore et al., 1995). At the top of the hierarchy, or Level I, are studies in which we, and those we must convince about the efficacy and effectiveness of occupational therapy, should have the most confidence. They are also the studies that we must strive to plan, implement, and publish.

*Level I evidence.* Level I studies are defined as “strong evidence from at least one systematic review of multiple well-designed randomized controlled trials” (Moore et al., 1995, p. 1). Level I systematic reviews usually take one of two forms: (a) meta-analytic studies or (b) systematic reviews. Both methods (a) require adherence to rigorous procedures, with well-defined study criteria for inclusion, and (b) are usually restricted to studies that use randomized controlled clinical trials. Additionally, both methods use statistical analyses to evaluate the data from each study and the studies in total.

So, what does this mean for everyday practice? Picture yourself in this scenario: You work on a neurorehabilitation unit and a new medical resident asks you, “Why does my patient need both a physical therapy exercise program and occupational therapy? What evidence do you have that cooking tasks, adapted checkers games, and those other things you do make any difference in upper-extremity motor performance?” An appropriate response would be the provision of *current best evidence* in the form of a Level I study. Occupational therapy researchers Lin, Wu, Tickle-Degnen, and Coster (1997) carried out a meta-analytic study of 17 articles, including 4 articles on studies of patients with neurological impairments. They found that in studies designed to improve the motor performance of patients with neurological impairments, the outcomes were significantly better when the patients’ exercises were embedded into everyday tasks than when the patients only performed rote exercises. This study is just one example of evidence that you can use to support *what* we do and *how* we can do it to yield improvements in patients with neurological impairments and upper-extremity motor deficits.

What about Level I current best evidence for other areas of practice? A meta-analytic study of the efficacy of sensory integration treatment was recently conducted by an occupational therapy researcher (Vargas & Camilli, 1999). This rigorous meta-analysis of 22 studies considered every possible influence on the outcomes of sensory integration treatment, including (a) adherence to sensory integration treatment criteria, (b) total treatment hours, (c) diagnosis and age, (d) design and sampling, (e) number of outcomes and measurement categories, (f) professional affiliation of the researchers, (g) geographic location of the studies, and (h) publication years. The results of the study, however, provide us with a stark reminder of the difference between preferred practice and evidence-based practice.

Many therapists prefer to use a sensory integration approach to intervention with both children and adults. But *current best evidence*, namely those studies published since 1983, indicated “an absence of sensory integration effects in recent studies and the equivalence of sensory integration and alternative treatments,” neither of which yielded improvement in the sensory-perceptual area (Vargas & Camilli, 1999, p. 197). In other

words, the experimental groups' outcomes following sensory integration interventions were no better than those of the control groups that received no treatment, regardless of the outcome being measured. When compared with alternative types of treatment, outcomes of the sensory integration groups were equivalent but not very effective. Although we may *prefer* to ignore the findings of this study, our actions would be in conflict with Principle 2.B. of our Code of Ethics in which we commit to "fully inform the service recipients of the nature, risks, and potential outcomes of any interventions" (AOTA, 1994, p. 1037), especially if their effectiveness is in question. Tickle-Degnen (1998) developed excellent sample dialogues for communicating mixed or nonsupportive evidence about proposed interventions to patients.

The failure of these studies to demonstrate the superiority of sensory integration techniques over no treatment does not negate the possibility that (a) the outcome measures were insensitive to the changes produced, (b) the wrong outcomes were measured, or (c) the effects were obscured by the application of sensory integration techniques to inappropriate populations. Another possibility is that the statistical power, or sample size, may have been inadequate. Ottenbacher and Maas (1999) pointed out that often the effect sizes in our studies, or the magnitude of the difference between the experimental and control groups, indicate that our interventions do yield clinically worthwhile differences. However, we often do not have large enough samples to reject the null hypotheses, and therefore we conclude wrongly that our interventions are not effective (Mulligan, 1998; Ottenbacher & Maas, 1999; Vargas & Camilli, 1999).

Just as our practices change over time, so too should the evidence base of our practice. It will be important to revisit the evidence to see whether new sensory integration interventions being used in clinics and promoted in workshops, new measures such as those related to the family's perspective suggested by Cohn and Cermak (1998), or larger sample sizes can provide better support for *what* we do and *how* we do it when using sensory integration interventions.

Now, put yourself into this second scenario: The budget administrator in your hospital is questioning the use of life skills groups with a chronic mental health population. You do a computer search, and using the Cochrane Database of Systematic Reviews ([www.update-software.com/cochrane/cochrane-frame.html](http://www.update-software.com/cochrane/cochrane-frame.html)), you find a review entitled, "Life Skills Programmes for People With Chronic Mental Illness" (Nicol, Robertson, & Connaughton, 1999). The review examined life skills programs that focused on interpersonal skills, self-care, time management, financial management, nutrition, and household skills as well as use of community resources. Unfortunately, only two randomized clinical trials were found that met the criteria, and both were conducted more than 15 years ago. Even though evidence was sparse and not what one would call current, it was the best evidence available, and the reviewers proceeded to conclude that

there is next to no evidence that life skills training programmes are of value to those with serious mental illnesses . . . [and] until such time as any evidence of benefit is available it is questionable whether recipients of care should be put under pressure to attend such programmes. (Nicol et al., p. 10/21)

The reviewers went on to state, "If life skills training is to continue as a part of rehabilitation programmes a large, well designed, conducted and reported pragmatic randomized trial is an urgent necessity" (p. 2/21), but then they added, "There may even be an argument for stating that maintenance of current practice, outside of a randomized trial, is unethical" (p. 2/21).

Providing this current best evidence for life skills training with a chronic mental health population to any budget administrator could pose a threat or an opportunity. The threat comes if only the reviewers' *conclusions* are noted, namely that occupational therapy life skills groups are ineffective for chronic mental health populations at best and unethical at worst. If we provide no new evidence that counteracts the findings of the Cochrane reviewers, then it could be implied that we are in tacit agreement with the recommendation. If we take this stance, however, the threat could be generalized to other settings or populations in which life skills programs are used. We then would have to ask ourselves the next logical question: "If there is no evidence that life skills programs make any difference with chronic mental health populations (with whom they have been used since time immemorial), what evidence is there that life skills programs are effective with developmental disability or traumatic brain injury populations?" Our opportunity lies in responding to the reviewers' *recommendation* to design, carry out, and report the findings from a large, randomized controlled trial, a design that is also known as a Level II study in our evidence hierarchy. This is the next level of evidence.

*Level II evidence.* The evidence needed to confirm or reject the Cochrane database findings about life skills programs is not found in the ivory towers of universities but, rather, in occupational therapy clinics and community-based practices. The study suggested by the Cochrane reviewers was a Level II research design, which consists of "strong evidence from at least one properly designed randomized controlled trial of appropriate size" (Moore et al., 1995, p. 1). For example, to conduct a randomized controlled trial in a clinic, this would mean that after a practitioner has collected baseline performance data on a patient, any patient who meets the criteria already established for participation in a life skills program would be randomly assigned to one of three groups: (a) a control group or attention group (no occupational therapy), (b) an alternative therapy group (e.g., a social work group that talks about life skills), or (c) an occupational therapy life skills group. Typically, randomized clinical trials include large numbers of participants. These participants can be accrued either slowly over time at one site or more quickly through collaboration among multiple clinical sites. The latter, multisite studies can dampen the spirits of even the most enthusiastic of researchers because of scheduling problems, budgeting issues, and philosophical differences. The problems with randomized control trials at single or multiple sites can be overcome by planning carefully, educating therapists in systematic data collection methods, ensuring that research intervention protocols are delivered in a standardized manner, and monitoring adherence to research procedures.

The common argument against doing randomized trials is the belief that patients who are randomized to the control or placebo conditions will not benefit or progress if they do

not participate in occupational therapy treatment, for example, the sensory integration interventions or life skills groups. However, Portney and Watkins (1993) noted that

in situations where the efficacy of a treatment is being questioned because current knowledge is inadequate, it may actually be more ethical to take the time to make appropriate controlled comparisons than to continue clinical practice using potentially ineffective techniques. (p. 29)

Three examples of Level II randomized controlled occupational therapy clinical trials, which accurately followed intent-to-treat principles—in other words, carried out their statistical analyses on the basis of the number of participants that entered the study, not only those who completed it—were published in *JAMA* (Ray et al., 1997), *Lancet* (Close et al., 1999), and the *Journal of the American Geriatrics Society (JAGS)* (Cummings et al., 1999). These studies examined the impact of occupational therapy interventions on falls reduction among nursing home residents and community-based frail older adults. In the large multicenter nursing home study published in *JAMA*, the proportion of recurrent fallers in the experimental facilities was significantly less ( $p = .03$ ) than in the control facilities (Ray et al., 1997). In addition to the physician and nursing components, the occupational therapy interventions consisted of wheelchair positioning and maintenance and resident and staff instruction on safe transfers.

In the study of community-based older adults with a history of falls published in *Lancet*, the experimental group had significantly fewer falls ( $p = .05$ ) at the 12-month follow-up than the control group. The experimental group had received a home visit and a follow-up phone call by an occupational therapist that focused on home safety and modification of the home environment (Close et al., 1999).

In the study published in the *JAGS*, community-based older adults who presented to hospital emergency rooms after falls were randomly assigned to either a post-acute-event occupational therapy intervention group or a control group. The occupational therapy intervention consisted of home safety recommendations, education, and minor home modifications. At the 12-month follow-up, the risk of falling, the risk of recurrent falls, and the odds of being admitted to a hospital were significantly lower in the occupational therapy group than in the control group (Cummings et al., 1999).

These three studies provide strong Level II evidence of the efficacy of occupational therapy for falls reduction among nursing home residents and community-based frail older adults. These are but three examples of Level II studies that you can provide to nursing home administrators, outpatient rehabilitation coordinators, or emergency room physicians as supporting evidence that *what* we do and *how* we do it can make a significant positive difference to older adults at risk for falling.

*Level III evidence.* However, what happens when Level I and Level II studies are not available? According to Gray (1997), “The absence of excellent evidence does not make evidence-based decision making impossible; in this situation, what is required is the best *evidence available*, not the best evidence possible” (p. 61). For example, picture yourself in this third scenario: The new physiatrist at your rehabilitation facility came from a setting where the occupational therapists used Bobath axial rolls for patients with stroke who had

hemiplegia and shoulder subluxation, and she writes specific orders for their use. You are not convinced that the axial rolls work very well, and you prefer the type of sling that you have been using for the past 10 years—the same one that your physical disabilities professor preferred. In addition, the axial rolls seem to increase your patients' shoulder pain. Even though you found no Level I or Level II studies in your literature search, you located four studies that meet Level III criteria (Brooke, Lateur, Diana-Rigby, & Questad, 1991; Hurd, Farrell, & Waylonis, 1974; Williams, Taffs, & Minuk, 1988; Zorowitz, Idank, Ikai, Hughes, & Johnston, 1995).

Level III studies derive their “evidence from well-designed trials without randomization, single group pre–post, cohort, time series, or matched case-controlled studies” (Moore et al., 1995, p. 1). Although you are pleased to find that the best evidence available indicated that the Bobath axial roll made no difference, or even increased shoulder displacement (Zorowitz et al., 1995), you also find that the sling that you prefer fared no better. In fact, you find that the evidence for use of an axial roll, a sling, or a wheelchair trough for reducing shoulder displacement is mixed at best, and some of the most recent evidence indicates that the sling you prefer actually increases vertical asymmetry (Brooke et al., 1991). At that moment, Principle 1.C. of our Code of Ethics comes to mind—“occupational therapy personnel shall take all reasonable precautions to avoid harm to the recipient of services” (AOTA, 1994, p. 1037)—only now its relevance has new meaning. You have learned two lessons from your search: (a) You are appalled to learn that your preferred intervention may have done harm, and (b) you have learned that although you are not from a state that requires continuing education for licensure, the relevance of one aspect of our Code of Ethics (Principle 3.C.) is now clearer: “Occupational therapy personnel shall take responsibility for maintaining competence by participating in professional development and educational activities” (AOTA, 1994, p. 1037).

Next, imagine that you are an occupational therapy practitioner employed by a skilled nursing facility. You frequently encounter new residents who qualify for rehabilitation services because of a 3-day hospital stay. However, because they have a primary diagnosis of dementia of the Alzheimer type and severe memory impairments, their ability to benefit from any rehabilitation is frequently challenged. A Level III study combining occupational therapy compensatory strategies and behavioral techniques featured in *JAGS* (Rogers et al., 1999) may have the type of evidence you are looking for. The study found that during a 1-week occupational therapy skill intervention condition using compensatory strategies and a structured environment, the residents with dementia significantly increased the proportion of time they engaged in self-dressing and significantly decreased their disruptive behaviors compared with the usual care. During the 3-week occupational therapy habit training condition that followed, residents were able to maintain their gains. Additionally, during both occupational therapy intervention conditions, the use of labor-intensive physical assists decreased significantly. A Level III study such as this can be used to provide fiscal intermediaries with supporting evidence that *what* we do and *how* we do it can benefit even nursing home residents who are severely disabled and cognitively impaired.

The next Level III study could be helpful if you find yourself in the following scenario: You work for a private therapy company that provides services to several group homes for

adults with developmental disabilities. The owner of the homes tells you that he had been “surfing the Net” and had found the Cochrane Database Systematic Review on the ineffectiveness of life skills groups. Given the conclusions of the reviewers, he wants to know what evidence you have that indicates that the life skills groups you are implementing are effective. You tell him that you also read the review and point out that applying the findings from the Cochrane review to his clients might not be in their best interest because the participants in the studies described in the review had chronic mental illness and were in hospital-based programs—a population very different from his community-based clients with developmental disabilities. You explain that since reading the review, you have been using the methods and outcomes described in a Level III study by Neistadt and Marques (1984), whose participants also had developmental disabilities. You then show him the data you have collected over the past 3 months, documenting the specific life skills groups each client in his facilities has participated in as well as their outcomes. You note that all clients have made gains.

A fourth example of a Level III study pertains to school-based practice and pediatrics wherein occupational therapy practitioners are frequently associated with *fine motor* skills training. This association with fine motor skills is not surprising, though, because when you use the key words fine motor to search through the 10 million journal articles indexed in MEDLINE, 1 of the 10 subject headings you are presented with, and the only profession, is *occupational therapy*. A Level III intervention study by Case-Smith et al. (1998) found that preschoolers with fine motor delays who received direct occupational therapy services improved their fine motor skills and related functional performance significantly, and the rate of gain was greater than that of their peers who had no fine motor delays (p. 788). The next time you need to convince your educational services administrator about the benefits that occupational therapy can offer to preschool populations with fine motor delays, bring this supporting evidence, along with a Level IV study by McHale and Cermak (1992).

*Level IV evidence.* According to Moore et al. (1995), Level IV studies consist of “evidence from well-designed nonexperimental studies from more than one center or research group” (p. 1). Sometimes our inquiry into the need for, or effectiveness of, an intervention begins with a multisite descriptive study. The Level IV study by McHale and Cermak (1992) described the time allocated to fine motor activities and tasks in six elementary classrooms. Minute-by-minute data collection indicated that 30% to 60% of the day was dedicated to fine motor tasks, with writing tasks predominating. This study provides the context and relevance of occupational therapy interventions for preschoolers with fine motor delays—preschoolers who will soon become elementary school students.

*Level V evidence.* The lowest level of the hierarchy of evidence is Level V, which is defined as “opinions of respected authorities, based on clinical evidence, descriptive studies, or reports of expert committees” (Moore et al., 1995, p. 1). Unlike Level IV descriptive studies, Level V studies do not need to be from multiple centers or research groups. Studies that use qualitative designs are also identified as Level V studies. One such study published recently in the *Occupational Therapy Journal of Research (OTJR)* (Bye, 1998) involved in-depth interviews of therapists who worked with terminally ill patients. For a profession that is used to facilitating functional gains in patients rather than in preparing them for death, this Level V study

provides a framework for guiding the practice of occupational therapy in end-of-life care. The study had as its core aim "Affirming Life: Preparing for Death" (Bye, 1998, p. 8). Interventions focused on "building against loss," achieving "normality within a changed reality," regaining "client control" over daily routines and activities, providing "supported and safe" environments, and finding "closure in some aspects of their lives" (p. 8). It is Level V studies like this one that enable researchers to describe and probe aspects of our practice that cannot be accomplished with Level I and Level II studies and simultaneously pave the way for future research. Level V evidence also can help us define new programs that have the potential to benefit populations not typically associated with rehabilitation or occupational therapy and point the way to new areas of inquiry and program development.

Also included in Level V evidence are the opinions of respected authorities. Although all the other examples of evidence I have cited were based on research, or from external sources, Level V evidence allows for the evidence *residing within the practitioner*. When we use opinion-based evidence, we are grounding our clinical reasoning and therapeutic decisions and actions in the advice of experts, established practices, continuing education information, or reference texts by known leaders in the field (Brown, 1999; Bury & Mead, 1998). It is not unusual for fieldwork students, entry-level practitioners, and practitioners changing practice areas to rely primarily on the opinions of master practitioners, supervisors, or therapists with specialty certification. It is also not unusual for us to continue to provide interventions that are based on the wisdom of the "form in the file drawer," which represents established practices that have "always been done that way."

When we use Level V evidence based on clinical experience and expertise to guide decision-making with our patients, we must be aware of how our own values, beliefs, and biases influence our decisions. In a study of physicians' perceptions of their patients' preferences, patients were asked to rate four preferred courses of action for a life-threatening illness, and their physicians were asked to predict their patients' preferences as well as to state their preferences for themselves. Unfortunately the physicians' predictions of their patients' preferences more closely matched their own preferences than those of their patients (Schneiderman, Kaplan, Pearlman, & Teetzel, 1993). It is because of the potential power associated with clinical expertise that ethicists Lidz and Meisel (1983) remind us that we must take care that we do not view the decision-making process with patients as one of merely persuading the patient to accept what we believe to be the proper course.

However, it is precisely our clinical experience, clinical expertise, and clinical reasoning that Sackett et al. (1996) referred to in their definition of evidence-based practice when they speak of "*integrating individual clinical expertise*" [italics added] with the "use of current best evidence in making decisions about the care of individual patients" (p. 71). I would like to emphasize that if we are to practice evidence-based occupational therapy, evidence can only be used to inform clinical expertise, not replace it, and clinical expertise must be used in conjunction with the best available evidence, not substituted for it (Bury & Mead, 1998; Sackett et al., 1996).

We have made a commitment in our Code of Ethics to "collaborate with service recipients or their surrogate(s) in determining goals and priorities throughout the intervention

process" (AOTA, 1994, p. 1037). It is in the fulfillment of this commitment that patient and practitioner together must consider the evidence before them and make informed decisions about the occupational therapy interventions that will best meet the patient's needs, wants, and expectations. *Can we meet this commitment?*

*Collective evidence.* I have applied a five-level measuring stick to some of our evidence and cited examples of evidence associated with each level. But what about the strength of our collective evidence as a scholarly profession? To get a snapshot of the bigger picture, I applied the same hierarchy to all articles published in *OTJR* for the past 5 years (1995–1999). I chose the *OTJR* because it is "devoted to the advancement of knowledge through scientific methods" (Abreu, Peloquin, & Ottenbacher, 1998, p. 757). As you can see in Table 49.2, over the past 5 years, the preponderance of the evidence in our research journal was at Level V, which is defined as "opinions of respected authorities, based on clinical evidence, descriptive studies, or reports of expert committees" (Moore et al., 1995, p. 1). Obviously, a journal must receive manuscripts before they can be published. As our collective research competence improves, so will the levels of evidence that we are able to generate and submit for publication.

### Evidence-Based Practice and Continued Competency

At graduation, more than one class has heard the speaker say something similar to, "Half of what we taught you will not be true in 5 years. Unfortunately, we do not know which half" (Sackett et al., 1997, p. 38). Therefore, a commitment we have made to ourselves and to our service recipients in our Code of Ethics is to "take responsibility for maintaining competence by participating in professional development and educational activities" (AOTA, 1994, p. 1037). The importance of continued competency to occupational therapy practitioners was confirmed in a recent report entitled "Continued Competency in Occupational Therapy: Recommendations to the Profession and Key Stakeholders" by the National Commission on Continued Competency in Occupational Therapy (NCCCOT) (Mayhan, Holm, & Fawcett, 1999). From a survey of a stratified random sample of 550 of the 88,885 occupational therapists and 550 of the 33,512 occupational therapy assistants in the database of the National Board for Certification in Occupational Therapy (response rate = 33%), the NCCCOT found that more than 85% of the respondents endorsed the importance of continued competency for occupational therapy practitioners. Members of the NCCCOT also

**Table 49.2. Hierarchy of Evidence Applied to Articles Published in the *Occupational Therapy Journal of Research*, 1995–1999**

Level	Design	Number of Articles
I	Systematic reviews, meta-analytic studies	1
II	Randomized controlled trials	6
III	Trials without randomization	21
IV	Nonexperimental studies from more than one center	11
V	Opinions of respected authorities, descriptive studies	41

Note. Based on hierarchy by Moore, McQuay, and Gray (1995).

conducted in-depth interviews with representatives of other stakeholders in the future of our profession. These stakeholders included employers, payers, institutional and individual private accreditation program representatives, consumer advocates, and health policy analysts. These stakeholders shared the common perception that our continued competency is important to consumer protection and that individual occupational therapy practitioners have “the primary and ultimate responsibility for assuring their own continued competency” (Mayhan et al., 1999, p. 54).

Although we must be able to demonstrate competency in the core functions delineated in our *Standards of Practice* (AOTA, 1998) and the functions associated with the professional roles we fulfill (AOTA, 1993), we must also develop competence in research skills. Because of the changes in clinical practice as well as the changes in the evolving evidence base of occupational therapy, if we do not develop the research skills necessary to make use of the current best evidence for our patients, the result will be a progressive *decline* in our clinical competency.

In a special issue of *The American Journal of Occupational Therapy* (AJOT) devoted to professional competence, Abreu et al. (1998) led off their article with a prediction that in a practice environment that is continually changing, the survival of the profession depends, in part, on the “capacity of therapists to achieve competence in scientific inquiry and research” (p. 751). Then, using the levels of research competence identified by the American Occupational Therapy Foundation (1983) and Mitcham (1985), they explicated descriptors of the associated knowledge, skills, and attitudinal research competencies for practitioners at the beginning, intermediate, and advanced levels of occupational therapy research. What is necessary for continued competence in research and for our professional survival is for all of us to increase the number and level of our research competencies—not just to “maintain competence” as is the wording in our Code of Ethics but, rather, to improve our competence. *Can we meet this challenge?*

## **How Do I Become an Evidence-Based Practitioner?**

At the *individual* level, each of us could fulfill all the research competencies identified by Abreu et al. (1998) and still not be an evidence-based practitioner, unless we also use the evidence and use it appropriately. This means that even if the evidence is clear and we decide that we can easily fit it into our preferred practice patterns, if it is not appropriate or acceptable to the patient, it is not evidence-based practice for that patient. As individuals, we must examine our practices to determine whether we are “integrating individual clinical expertise” with the “conscientious, explicit and judicious use of current best evidence” (Sackett et al., 1996, p. 71) by asking ourselves five questions. If we can answer affirmatively to any of the questions, we are making the right moves toward evidence-based practice.

### **Question 1: Do I Examine What I Do by Asking Clinical Questions?**

The process of evidence-based practice begins by identifying the interventions that we use frequently in our practices with particular populations of patients, or for particular problems

in performance, and then posing questions. Richardson, Wilson, Nishikawa, and Hayward (1995) identified the anatomy of a clinical question as having four parts: (a) the patient, population, or problem; (b) the intervention, which may include frequency and duration; (c) the outcome of interest; and (d) the comparison intervention. An example of a clinical question using this format might be: (a) In patients who have sustained a cerebrovascular accident, (b) does the use of a resting splint on the affected hand for 3 hours each day (c) reduce tone and increase function (d) compared with no splinting?

### **Question 2: Do I Take Time to Track Down the Best Evidence to Guide What I Do?**

To answer your clinical question, you must track down the evidence. This involves computer searches with key words and syntax that will efficiently locate the best evidence as well as hand searches (Booth & Madge, 1998). Typical databases you might search are MEDLINE, CINAHL, the Cochrane Database of Systematic Reviews, the ACP Journal Club, Evidence-Based Medicine, DARE, ERIC, PsycLit, and OT SEARCH. In addition to published articles, OT SEARCH includes manuscripts that have not been published but provide evidence that should be considered. You will also need to conduct hand searches of appropriate journals because not all articles on a specific topic will automatically show up in a database search and because not all journals are indexed. In addition to electronic and journal resources, there are human resources who can help you, and reference librarians should be at the top of the list. Additionally, researchers in related disciplines can be helpful because they may have access to important unpublished data, or they may be able to put you in touch with their colleagues who have been conducting studies relevant to the evidence you are trying to track down.

### **Question 3: Do I Appraise the Evidence or Take It at Face Value?**

To appraise the evidence, of course, includes everything you hated about any research course you took, or why you may have avoided taking any. Appraising the evidence requires that you analyze each section of an article and apply the evidence hierarchy to determine at which level the study meets the established criteria. Article analysis is central to evidence-based practice, but it can also be very difficult. One of the structured article review instruments, such as those found on the Web sites of The Cochrane Collaboration, the University of Alberta, McMaster University, and York University, can help you get started, or you can develop a review tool based on the 1993–1994 *JAMA* article series entitled, “User’s Guide to the Medical Literature.” When you get to the section of the article that includes the statistics, get out the snacks and bring up Trochim’s data analysis Web site at Cornell University to reduce your anxiety and start you on your way to understanding the numbers before you (Trochim, February 20, 2000).

### **Question 4: Do I Use the Evidence to Do the “Right Things Right”?**

One way to use the evidence before you is to develop a clinical guideline for your practice and format it according to the six “rights” identified by Graham (1996): Is “the right person, doing

the right thing, the right way, in the right place, at the right time, with the right result” (p. 11)? The clinical guideline for “doing the right things right” is developed by using the evidence you locate to delineate the six “rights”:

1. Who is the *right* person to implement the intervention? What level of competence is required? Is special certification required? Can an occupational therapy assistant implement the intervention?
2. What is the *right* thing to do? What does the evidence tell you? Does the patient agree?
3. What is the *right* way to implement the intervention? Does the evidence suggest a protocol or specifications that must be met? Can the patient’s dignity and privacy be maintained equally in all contexts in which the intervention could be implemented? Does the frequency or duration of the intervention make a difference?
4. What is the *right* place in which to implement the intervention? Is the home better than the clinic? Is the clinic better than the classroom? Is equipment required that dictates where the intervention must take place?
5. What is the *right* time to provide the intervention? Does time since onset of disability or admission to rehabilitation services make a difference? Does delaying the intervention make a difference? Does the time of day make a difference? Does time until, or since, discharge make a difference?
6. What is the *right* result? Did the intervention do what it was intended to do? Is the patient satisfied with the result? Are you satisfied with the result?

After you have implemented the evidence-based guideline, ask yourself Question 5.

### **Question 5: Do I Evaluate the Impact of Evidence-Based Practice?**

To assess the impact of the evidence-based clinical guideline you developed in response to Question 4, you would begin with a chart audit to determine whether the guideline was actually used and, then, whether it was used as intended. Finally, patient outcomes, cost-effectiveness, patient satisfaction, and therapist satisfaction must also be considered. The impact of the latter, therapist satisfaction with evidence-based practice, is pivotal, especially given the barriers to evidence-based practice.

### **Barriers and Motivation for Evidence-Based Practice**

As Law and Baum (1998) noted in an issue of the *Canadian Journal of Occupational Therapy* dedicated to evidence-based practice, there are many barriers to its practice at both the system level and the individual level. The barriers cited include lack of administrative support, lack of access to research evidence, lack of skill in finding the evidence, lack of skill in interpreting the evidence, and lack of time. These barriers were reiterated in a Level V study of Canadian therapists’ perceptions of evidence-based practice (Dubouloz, Egan, Vallerand, & von Zweck, 1999). The authors found that although therapists perceived evidence-based practice as a way of looking for understanding of the interventions they used, it also generated feelings of inadequacy related to research skills. Additionally, there were attitudinal barriers

$$\text{Performance} = \frac{\text{Motivation} \times \text{Competence}}{\text{Barriers}}$$

**Figure 49.1. Factors affecting the performance of evidence-based practice (Gray, 1997, p. 7).**

in that the therapists perceived that the evidence they would find might threaten the ways they preferred to practice.

Gray (1997) suggested a formula that we might find helpful as we seek to identify factors that will influence our performance of

evidence-based practice (see Figure 49.1). He perceived that the performance of evidence-based practice is directly influenced by motivation multiplied by competence divided by the barriers we need to overcome. Many factors in the context in which we practice today can be barriers to us; however, I am choosing to reframe them under motivation. Therefore, legislation, regulation, prospective payment system for skilled nursing facilities, capitations on reimbursement, new patient populations, new practice environments, new collaborations, and a new episodic reimbursement system for rehabilitation hospitals and exempt rehabilitation units can all be entered into the formula as motivation. I perceive them as motivators because they provide for us the impetus to describe, examine, and publish the evidence derived from what we do and how we do it. Also under motivation add the principles in our Code of Ethics that require us, for ethical practice, to “collaborate with service recipients,” “fully inform . . . [them] of the nature, risks, and potential outcomes of any intervention,” and “avoid harm” to them as well as to “perform . . . duties on the basis of accurate and current information” and “take responsibility for maintaining competence” (AOTA, 1994, p. 1037).

At a minimum, competence in this formula refers to competence in searching for, appraising, and applying existing evidence in everyday practice. For professional survival, however, we must be able to generate, publish, and make accessible to all the evidence that we now have to search for. This requires that we learn to gather evidence systematically in our practices as well as learn the knowledge, skills, and attitudes associated with occupational therapy research at the beginning, intermediate, or advanced levels of competence (Abreu et al., 1998).

Although one could dwell on barriers in the work environment and in the laws, regulations, and reimbursement systems, the barrier over which we have most influence is our own attitudes. On the basis of the findings of the Canadian study (Dubouloz et al., 1999), we have been alerted ahead of time that it may not be the external barriers but, rather, our own attitudinal barriers that may hinder the practice of evidence-based occupational therapy in the United States in the new millennium.

However, there are four encouraging examples of our movement toward evidence-based practice in the United States. Perhaps in response to the evidence-based practice initiatives of our Canadian and British colleagues, the new *Standards for an Accredited Educational Program for the Occupational Therapist* developed by the Accreditation Council for Occupational Therapy Education (ACOTE) requires that occupational therapist graduates be able to “provide evidence-based effective therapeutic intervention related to performance areas” (ACOTE, 1999, p. 579). Furthermore, the AOTA Executive Board passed a motion that an evidence-based panel be formed to review and evaluate research that relates to *The Guide to Occupational*

*Therapy Practice* (Moyers, 1999, 2000) in order to make the document evidence based. Additionally, the *AJOT* Associate Editor for Evidence-Based Practice, Linda Tickle-Degnen, instituted the Evidence-Based Practice Forum in which she guides practitioners through some aspect of evidence-based practice.

The best practice example, however, is from the notice in the *Coverage Policy Bulletin* of Aetna US Healthcare in which coverage of cognitive rehabilitation was recently announced. Although the studies were not Level I or Level II studies, the evidence was convincing. It states in the bulletin:

The efficacy of cognitive therapy so far has been measured by its objective influence on function and the subjective value of these changes to the individual. Although current evidence supports cognitive therapy as a promising approach, definitive conclusions regarding its efficacy must await large-scale, well-conducted, controlled trials. (Aetna US Healthcare, 2000)

*We can provide that evidence!*

## Conclusion

Eleanor Clarke Slagle was a proponent of habit development. Therefore, I will suggest two new habit patterns that we need to develop if we are to address proactively the realities of our professional exigencies. Each suggested habit pattern is followed by a question.

### Habit 1: Evidence-Based Practice Now

Although the evidence for *what* we do and *how* we do it may be difficult to find, we have an obligation to become competent in, and make a habit of, searching for the evidence, appraising its value, and presenting it to those we serve in an understandable manner.

*Question 1.* After reading this lecture, could you provide your next several patients with a summary of the research evidence on the occupational therapy intervention options you are considering for them so that together you could make the best decisions?

### Habit 2: The Evidence Base of Occupational Therapy in the New Millennium

We also have an obligation to improve our research competencies, to develop the habit of using those competencies in everyday practice, and to advance the evidence base of occupational therapy in the new millennium. Only then can we be sure that as we seek to do the “right things right,” that we are fulfilling our ethical responsibility to perform our “duties on the basis of accurate and current information” (AOTA, 1994, p. 1037). I will close by asking you to think ahead one decade.

*Question 2.* If in the year 2010 you stand accused of practicing occupational therapy based on research, will there be enough evidence to convict you?

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