Evidence-based practice is an established guiding principle in most medical and health care disciplines. Central to establishing evidence-based practice is the assessment of clinical outcomes. Clinical outcomes represent a form of evidence on which to base medical decisions, as well as providing the mechanism for assessing the effectiveness of evidence-based interventions. However, clinical outcomes are not routinely assessed in sport rehabilitation. If sport rehabilitation clinicians fail to incorporate clinical outcomes assessment and, as a result, evidence into daily practice, they may be missing an opportunity to improve patient care and putting their professional reputation at risk within the medical community. The purposes of the article are to highlight the emergence of clinical outcomes assessment in the medical community and the current health care system, illustrate the role of clinical outcomes assessment as it pertains to providing the best patient care, and identify challenges that could potentially impede the implementation of outcomes assessment in sport rehabilitation.

Keywords: evidence-based-practice, athletic therapy

Evidence-based practice (EBP) is a guiding principle for most medical and allied health care disciplines. However, in sport rehabilitation, it is still considered somewhat of a novel concept that has yet to be fully embraced by its members. Rather than a novel intervention, EBP should be regarded as a clinical attitude, mindset, or approach by which health care decisions are based on the best available evidence, the practitioner’s clinical expertise, and the patient’s values and expectations.1 Through this process, the informed patient and the clinician, as well as any collaborating health practitioners who have the common goal of providing the patient with the best possible whole-person care, can make collective decisions.

Central to the successful implementation of EBP into routine, daily practice is the assessment of clinical outcomes. Clinical outcomes assessment is the study of the end result of health care, specifically examining the changes in health status for a patient or a group of patients after medical intervention.2,3 Not only do clinical outcomes constitute a form of valuable evidence for informed patient health care, but they also represent the means by which we can evaluate the effectiveness of evidence-based rehabilitation.4,5
Like EBP, the assessment of clinical outcomes has yet to be routinely incorporated into the daily practice of clinicians in the field of sport rehabilitation. Although the concept is simple, collecting, analyzing, and interpreting clinical outcomes can be quite challenging. Furthermore, unfamiliarity with the basic concepts of outcomes assessment for patient care and research, the lack of appreciation for its role in establishing and evaluating EBP, and a variety of other barriers have limited the implementation of routine clinical outcomes assessment in sport rehabilitation. In light of these barriers, the potential contribution of clinical outcomes to the development of evidence-based sport rehabilitation is relatively unfulfilled.

The purposes of this article are to highlight the emergence of clinical outcomes assessment in the medical community and the current health care system, illustrate the role of clinical outcomes assessment as it pertains to providing the best patient care, and identify challenges that could potentially impede the implementation of outcomes assessment in sport rehabilitation.

Evolving With the Health Care System

The notion of evaluating the effectiveness of medical intervention was initially introduced in the early 1900s by E. Amory Codman, a prominent surgeon who was the first practitioner to systematically track the outcomes of his patients after medical treatment. However, it was not until the latter part of the century, when the cost of health care grew disproportionately to the rest of the economy, that the medical community began to recognize the importance of evaluating quality of care and the need for clinical outcomes assessment. The period of growth of health care and government spending on health care was termed the era of expansion, which was subsequently succeeded by the era of cost containment. In short, treatment options grew and costs increased, but the end result of patient care (ie, the patient outcome) remained relatively unknown. As a result, there was a heightened interest in the medical community in quality of care and the effectiveness of interventions. These attitudes marked the beginning of a new era of assessment and accountability, commonly referred to as the “third revolution,” in which the health care system was primarily driven by consumers (ie, patients), third-party providers, and medical professionals. Under this new movement, practitioners are required to demonstrate, through the use of established evidence, that their medical interventions are both effective and cost-efficient. Although common in some settings, this approach is not routine in many sport rehabilitation settings.

To facilitate the process of establishing evidence for medical interventions, Donabedian developed a framework that included structure, process, and outcomes evaluation. Structure evaluation refers to the resources required for patient care (eg, facilities, administrative support), and process evaluation refers to how well the provided services meet professional standards (ie, quality assurance). The third, and arguably the most important, aspect of Donabedian’s framework is the evaluation of outcomes, which are the end products of the structure and process of patient care that include death, disability, and quality of life. It is through the assessment of clinical outcomes that clinicians can gauge the effectiveness of their treatments and clinicians and researchers can partner to establish the evidence needed to support the use of specific medical interventions.
During the early stages of the third revolution, quality of care and the effectiveness of medical interventions were evaluated through clinician-rated outcomes. These types of outcomes are assessed from the clinician’s point of view and are typically represented by changes occurring at an impairment level. Impairments refer to the loss, reduced capacity, or altered state of a specific physiological ability and are often characterized by clinical evaluations such as strength, range of motion, and laxity. For example, a 28-year-old female club volleyball outside hitter who suffers a lateral ankle sprain will likely present with decreased dorsiflexion and eversion strength, decreased ankle active range of motion, and decreased lateral stability. Although clinically relevant and meaningful to clinicians, clinician-rated outcomes rarely capture the complaints that cause patients to initially seek medical care (e.g., inability to jump, difficulty climbing stairs) and often overlook the changes that are meaningful to the patient (e.g., return to the front-row rotation on a volleyball team). In addition, there are limitations to relying solely on clinician-rated measures in patient evaluation, including emphasizing impairments, assuming that impairments directly relate to function and disability, and disregarding the objective assessment of quality of life. As a result, clinician-rated outcome measures may not offer the most relevant information to ultimately guide patient care.

As medical-outcomes research evolved and the scope of outcomes expanded during the third revolution, there was an increased emphasis on identifying the appropriate type of outcomes to evaluate the effectiveness of health care services. Because of the increased role patients were playing in driving the health care system as consumers, the improved ability to measure patient-reported health statuses, and an increased awareness of patient-centered care, a shift from emphasizing clinician-rated outcomes to valuing patient-rated outcomes occurred. Unlike clinician-rated outcomes, patient-rated outcomes are assessed by the patient and provide insight into the patient’s health condition from his or her own perspective. Moreover, patient-rated measures typically capture changes at the level of disability and are often characterized by the patient’s ability to perform functional tasks or fulfill societal roles. In our volleyball player example, the patient may not be able to play volleyball (disability) because she cannot run or jump (functional limitation) or fulfill her role as a mother (disability) because she cannot pick up and carry her young child (functional limitation). This shift in perspective (i.e., from impairment level to disability level) suggests that changes in patient-rated outcomes may best represent the way an injury, illness, or disease directly affects the patient’s daily life. Because patient-rated outcomes are more relevant to patients than clinician-rated outcomes, the information gathered through patient-rated measures may be more appropriate to guide patient care and answer questions related to best clinical practices. An excellent review of the importance of the patient’s perspective for assessing health-related quality of life as a primary patient outcome is provided in this thematic issue of JSR by Parsons and Snyder.

Over the last 3 decades, our health care system has undergone some radical changes. From a global perspective, it has evolved into a system in which medical practitioners are held accountable for each intervention used during the various phases of patient care. By failing to incorporate clinical outcomes assessments and, as a result, evidence into our daily practice, sport rehabilitation clinicians are putting their professional reputation at risk within the medical community. Furthermore, by overlooking the importance of both clinician- and patient-rated
outcomes, clinicians are unable to address problems that are directly meaningful to their patients, which, in turn, diminishes the quality of their patients’ care and potentially their health-related quality of life. In the end, sport rehabilitation clinicians must evolve with the ever-changing health care system not only because their own professional viability depends on it but also, and more important, because their patients deserve it.22,23

Providing Our Patients With the Best Possible Care

Whereas outcomes research is an important clinical research tool, clinical outcomes assessment is deeply rooted in individualized patient care. The process of clinical outcomes assessment begins with the patient’s initial entry into the health care system, continues through the various stages of medical intervention, and typically ends when the patient is discharged from medical care. Clinicians are often more comfortable observing and evaluating patients during the assessment of clinician-rated outcomes and functional tasks, likely because of greater familiarity with these measures. However, patient-rated measures should also be incorporated into the standard care of patients, because without these measures it is difficult to develop meaningful, patient-centered goals, treatment may not be directed toward individual functional limitations and disabilities, and comprehensive patient care may be lacking (eg, no assessment of overall health status). On the other hand, patient-rated outcomes measures offer the ability to assess multiple dimensions of health, impose less patient and clinician burden, and provide useful and applicable information, assuming there is sufficient evidence to support the instrument’s reliability and validity. Furthermore, by consistently using clinician- and patient-rated outcomes measures throughout the various phases of a patient’s rehabilitation process, clinicians can gather information that can then be easily and immediately applied to patient care, as appropriate and necessary.

For example, when our volleyball player injured her ankle, she entered the health care system when she sought evaluation from a health care professional. On initial evaluation, clinician-rated measures revealed diminished dorsiflexion and eversion strength, decreased dorsiflexion and plantar-flexion active range of motion, and a positive anterior drawer test, which provided the clinician with knowledge about the state of the injury at the body-systems level. In addition, the patient completed a widely used region-specific, patient-rated outcomes instrument, the Foot and Ankle Disability Index,24 and the score indicated that she is experiencing a number of symptoms and disabilities associated with her injury. With the collection of these baseline clinician- and patient-rated outcomes, the clinician can create a reference point by which to evaluate the effectiveness of the rehabilitation plan through the assessment of changes at the body-systems level (clinician-rated measures) and at the person level (patient-rated measures) during subsequent follow-up visits (eg, 2 wk postinjury or at discharge). Without the objective knowledge of the patient’s perception of her own health, it is difficult to establish whether she experienced true and meaningful improvements that are important to her as a result of medical intervention. A series of 4 clinical application articles (on concussion, shoulder, low back, and ankle) are provided in this thematic issue that provide brief patient scenarios and then demonstrate the value of adding patient-oriented outcomes measures to the clinical assessment.25–28
One consideration when incorporating patient-rated outcomes assessments into routine clinical practice is selecting the most appropriate outcome measure for each patient in terms of criteria such as population, condition, and dimensions of interest. For instance, before assessing clinical outcomes, the health constructs or dimensions that are most important for the patient must be identified. In sport rehabilitation, assessing functional capacity that reflects the higher ability levels of physically active individuals is often a primary outcome of interest. In addition, impairments such as strength, range of motion, neuromuscular control, and girth are often assessed in the interim, sometimes in the form of short-term goals, as functional capacities improve. Once the desired outcomes are identified, the clinician should select the most appropriate instruments to accurately measure the outcomes.

There are many self-reported, patient-rated outcomes measures available for clinicians to use for patient care and, in most cases, numerous instruments for each body region. For example, there are more than 50 outcomes instruments for the ankle and foot and over 40 for the shoulder. As a result, choosing the most appropriate outcomes measure that captures how a specific pathology affects the most important aspects of a specific patient’s life can be a dubious process. Compounding this problem for sport rehabilitation clinicians is that very few of these outcomes measures were designed and validated for patients with high levels of function, such as young athletes and highly physically active individuals. Many of the available outcomes instruments, therefore, potentially suffer from ceiling effects, leaving the true ability of the patient unknown because the selected instrument, simply stated, was not robust enough to capture changes at the highest levels of activity. As a result, although there may be existing evidence to support the validity of a particular outcomes measure, it may not be appropriate to assume the measurement properties of the instrument if its validation process did not include patients with similar ability levels. In light of these potential limitations, research establishing the validity of outcomes instruments in athletic populations, as well as development of instruments specific to athletes, is needed.

Although change can be difficult, the time has come for sport rehabilitation clinicians to incorporate the collection of patient-rated outcomes as a standard component of patient evaluation to establish the evidence necessary to support the use of clinical treatments and to illustrate the value of our profession within the health care system. Currently, most sport rehabilitation research establishes the efficacy, not the effectiveness, of medical interventions. Efficacy is the end result of treatment intervention provided under ideal conditions. In fact, efficacy is often determined in relatively controlled environments (eg, research laboratory) where subjects are explicitly chosen for a patient sample and divided into control and treatment groups, with subjects receiving the same intervention as the others in their respective groups. Although clinically important, the findings related to the efficacy of medical treatments are discovered in such controlled environments that they may not be generalizable to real-world environments and, thus, may not have direct implications for clinical practice. In contrast, effectiveness is the end result of health care applied under “average” circumstances and often entails the study of typical patients who are treated by typical clinicians during standard daily practice under average conditions, without an emphasis on controlling for the samples or intervention. The design of clinical outcomes research is often observational in nature because there may not be a control group and the types of
interventions may vary greatly. As a result, in contrast to efficacy, findings related to the effectiveness of medical interventions may be more applicable to real-life settings and immediately implemented into clinical practice.

Clinical outcomes research is aimed at determining effectiveness of medical treatments and has been referred to as effectiveness research. If it is performed consistently, clinicians can use these clinical outcomes to reflect on their patient outcomes and evaluate their own performance, look for trends in their rehabilitation interventions, and use this information to ultimately improve their patient care. The importance and power of effectiveness research to the future of the health care system and as it relates to health care reform has been formally recognized by the federal government. For example, the term *comparative effectiveness research* (ie, identifying the most effective treatment by comparing 2 or more medical interventions) acts as the centerpiece to the Patient-Centered Outcomes Research Act of 2009, which seeks to help patients make more informed medical decisions related to their health care. An excellent article by Michener detailing how the use of outcomes data can affect clinical decision making is published in this thematic issue of JSR.

Perhaps the true beauty and power of clinical outcomes assessment lies in collaborative efforts between clinicians. If gathered as a collective group (eg, within a single clinic, between numerous affiliated regional sites, or a national patient-based research network), the information can be pooled together, allowing for more detailed analyses, broader generalizations, and further insight into the effectiveness (or ineffectiveness) of current clinical practices. Establishing multisite collaborations, in essence, is the framework for clinical outcomes research and the key to enhancing quality of care. An example of such collaboration for the purpose of engaging in clinical outcomes research is the Secondary School Athletic Training Practice-Based Research Network (www.coreat.org/practice-based-research-network.htm). In fact, the concept of a large-scale, national collaboration for clinical outcomes assessment is something that organizations including the National Athletic Trainers’ Association consider integral to the establishment of their professional identity as the health care delivery system continues to evolve and progress. Nonetheless, it is important to consider that outcomes research requires the cooperation of practicing clinicians who are willing to document their clinical records and patient outcomes in a manner that allows for quantification and entry into a large database, without compromising their ability to provide efficient care.

**Potential Challenges in Implementing Clinical Outcomes Assessment in Sport Rehabilitation**

Although there is an increased emphasis on EBP in sport rehabilitation literature and educational forums, it is still not a routine component in daily sport rehabilitation practice. Thus, there is a disconnect between the literature and everyday patient care, which may be explained by several factors. For instance, sport rehabilitation provided in the more traditional scholastic, collegiate, and professional sport environments is not traditionally reimbursed on a fee-for-service basis. Therefore, the external demands from third-party payers have not been present, resulting in virtually no external influence or motivation on the care provided. In contrast, sport
rehabilitation provided in the outpatient clinical setting, which is typically operated on a fee-for-service basis, does fall under the scrutiny of third-party providers and is more likely to practice EBP and collect clinical outcomes.

Second, the disability and subsequent need for intervention provided to an active population can appear to be relatively transient in sport rehabilitation, with some cases lasting days and weeks (eg, lateral ankle sprain) instead of months or years (eg, stroke, cancer). The transient nature of some sport-related injuries may hinder long-term follow-up because, in these cases, there may be only a few visits with the clinician and the perception is that there is little to no measureable change in health status even though deficits still exist. This perceived absence of measureable health consequences may expose a general lack of understanding of, or appreciation for, health-classification systems that provide a framework for the components of assessing all the components of health (eg, Nagi’s disablement model, World Health Organization’s International Classification of Functioning, Disability, and Health). Furthermore, because many athletes still receive treatment after they have returned to participation, selecting consistent outcome criteria that can be compared across a large sample may seem overwhelming to coordinate. Whereas the influence of third-party payers often dictates that this type of information be collected in the outpatient sport rehabilitation setting, the same is not necessarily true for the traditional sport rehabilitation environment. This ultimately has influenced the contrasting levels of sophistication in sport rehabilitation outcomes provided in outpatient settings relative to the more traditional sport rehabilitation settings.

An additional explanation for the absence of clinical outcomes assessment in daily practice is that most clinicians and educators in the field of sport rehabilitation have a limited base of knowledge in regard to clinical outcomes assessment. This lack of fundamental understanding produces a 2-fold problem. First, and most obvious, if clinicians are not educated on clinical outcomes assessments, the likelihood of them incorporating outcome measures into their daily practice is relatively low. Second, if educators do not have a basic understanding of clinical outcomes assessments, they may not recognize it as an essential component for the clinical education of their students. When outcomes are addressed, it may often be from the perspective of satisfying third-party billing requirements rather than improved patient care. The clear and explicit inclusion of clinical outcomes assessment into educational guidelines would undoubtedly address the limitations in the sport rehabilitation profession and help bring clinical outcomes assessments to the forefront of daily clinical practice.

**Conclusion**

Although there are several challenges associated with the incorporation of patient-rated outcomes into standard patient care, the sheer magnitude of the potential benefits, as related to patient care, clinical research, and professional standing within the health care system, far outweigh any initial inconveniences experienced by members of the sport rehabilitation field. Recently, the Institute of Medicine recommended that, as health care continues to evolve through the 21st century, all health professions emphasize the need for patient-centered care, EBP in clinical care, and quality improvement in their clinical practice.41,42 Thus, to practice high-
quality medicine, sport rehabilitation clinicians must meet these new standards. And, in the end, the only way to truly address these standards is by incorporating outcomes assessment into daily clinical practice.

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References