Physical Therapy Diagnosis and the Relationship Between Impairments and Function

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Physical therapy diagnosis refers to both a process and a particular label within a classification scheme. This article reviews the development of the concept of diagnosis in physical therapy and evaluates the clinical utility of using the World Health Organization's International Classification of Impairments, Disabilities, and Handicaps (ICIDH) as a taxonomy for physical therapy. In place of the ICIDH, a model developed by Nagi is suggested. If this model is applied to physical therapy, the relationship between impairments and functional limitations is identified as the primary diagnostic focus of physical therapy. Exploration and expansion of this model may best serve the development of a classification scheme for physical therapy diagnosis. [Guccione AA. Physical therapy diagnosis and the relationship between impairments and function. Phys Ther. 1991;71:499–504.]

Key Words: *Classification; Decision making; Diagnosis; Physical therapy profession, professional issues.*

Is diagnosis an activity pertinent to physical therapy? Do we have to invent terms and categories unique to physical therapists in order to have a system of physical therapy diagnosis? These questions have driven the development of the concept in physical therapy, and each question has followed from the two meanings of the term "diagnosis"—the process of making a judgment and a particular category within a classification system.[1(p12)] Although an affirmative answer to the first question has generally been accepted by the profession, we still have entertained few suggestions for a clinically useful taxonomy for physical therapy classification. This article will review the concept of diagnosis as it has been accepted as activity pertinent to physical therapy and evaluate a recent proposal of a specific classification scheme for its clinical utility to physical therapists.

As a process, diagnosis is not the exclusive domain of any one professional group. Physical therapists engage in the diagnostic process every time they assess a patient, cluster findings, interpret data, and label patient problems. When Rose[2] first "mused" upon physical therapy diagnosis in the political-legal context of the profession's specific goal to gain direct access, the concern was to demonstrate that the kind of problem identification or "diagnosis" made by a physical therapist was different from the type of diagnosis made by a physician and not to challenge the physician's responsibility for the diagnosis of disease.

In response to this concern, some authors have emphasized the criteria for "physical therapy diagnosis" relating to the external limits of a profession and not the tasks of the professional. Based primarily on the legal differences between professions, Gordon[1] and Sahrmann[3] identified some of the characteristics of professional diagnoses and discipline-specific classification schemes. First, the overall classification scheme should be consistent with the boundaries on a profession's focus. These boundaries include legal accountability for making certain kinds of diagnoses and societal approval to treat specific kinds of problems or conditions. Second, the tests and measurements that are used to validate a particular diagnosis must fall within the legal purview of the professional making the diagnosis. Finally, the particular label used to categorize the patient's condition should describe the problem in a way that implies or directs treatment procedures that also must be in the legal

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purview of the professional. Only the last criterion addresses the specific need of clinical practice: a classification system that structures patient findings into patterns that are useful for planning physical therapy.

In affirming that "physical therapists may establish a diagnosis within the scope of their knowledge, experience and expertise,"[4] the American Physical Therapy Association's (APTA's) House of Delegates in 1984 merely legitimized "diagnosis" as an activity pertinent to physical therapy practice. The fact that all or part of a patient's problem has been labeled by a physical therapist, however, is not sufficient evidence to conclude that the therapist provided a "physical therapy" diagnosis. This policy statement did little to clarify what kind of classification system might be appropriate for generating *physical therapy* diagnoses. The question remains: What concepts are necessary to structure clinical observations into a recognizable pattern that also suggests physical therapy intervention?

Jette[5] has recently proposed that the terminology of the *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH) could be used as a framework for physical therapy diagnosis and classification. Specifically, he suggested that the three terms comprising the ICIDH taxonomy—"impairment," "disability," and "handicap"—could be used to categorize clinical observations systematically and generate a diagnosis useful to physical therapy practice. Furthermore, Jette argues that adopting the widely accepted terms of the ICIDH should facilitate communication across disciplines. A closer analysis of these terms demonstrates, however, that the ICIDH taxonomy is inadequate for the overall task of physical therapy diagnosis on several counts. In place of the ICIDH taxonomy, I contend that a conceptual model articulated by Nagi[6,7] should be explored for its utility to the further development of physical therapy classification and diagnosis. This model utilizes four terms: "disease," "impairment," "functional limitation," and "disability" (Fig. 1). Each of these terms, which are presented in the Appendix, will be discussed in relationship to the ICIDH.

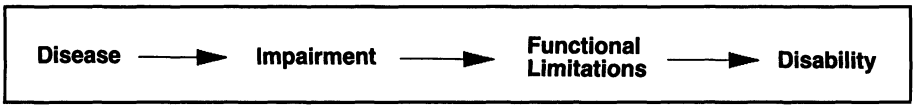

Figure 1. *Schematic representation of Nagi's[6,7] model of the process of disablement.*

The ICIDH taxonomy was created by the World Health Organization as standardized terminology to be used for the broad epidemiological study of the consequences of disease. The ICIDH classification scheme is based on the theoretical work of Wood,[8,9] who conceived the process of disablement as a continuum: disease leads to impairment, which in turn results in disability and handicap. An "impairment" was defined as an alteration in anatomical, physiological, or psychological structures or functions that is the result of some underlying pathology. The term "disability" was used by Wood to designate any diminution in the performance of routine activities and behaviors. The social disadvantage of a particular disability (eg, being unemployable unless the environment is wheelchair accessible) qualifies the disability as a handicap.

In contrast to the ICIDH's notion of disability, Nagi[6,7] clarified several key issues surrounding disability by providing some distinctions that are omitted from Wood's[8,9] formulation. Like Wood, Nagi proposed a process of disablement that begins with disease and leads to impairment. Nagi's definitions of disease and impairment are equivalent to those of Wood and the ICIDH. Nagi, however, recognized the need for a concept that served as a bridge between the presence of impairment and an individual's disability. He proposed, therefore, the concept of

> functional limitations which impairments set on the individual's ability to perform the task and obligations of his usual roles and normal daily activities. These include roles within the family, peer group, community, work and other interaction settings as well as activities involved in self care.[6(p102)]

Not all impairments are functionally limiting or lead directly to disability. As Nagi noted, the "degree of limitation is not dependent only on the type of impairment but also on the nature and requirement of these roles and activities."[6(p102)] Loss of full shoulder flexion range of motion may be an extreme functional limitation to an assembly line worker but a rather minor limitation to a typist.

Nagi[6,7] reserved the term "disability" for patterns of behavior that emerge over long periods of time during which an individual experiences functional limitations to such a degree that he or she cannot create some semblance of "normal" overall role performance. Although all of these terms involve some consensus on what is "normal," disability in Nagi's model connotes the judgment that an individual's *overall* behavior is less than adequate to meet the expectations typical for one's age and sex as well as one's cultural and social environment. Using examples from their own clinical practice, most physical therapists can identify situations in which there was disparity between the number of functional limitations and the degree of disability. These distinctions help to integrate clinical observations in a way that orients a therapist to the patient's current level of function and the likelihood of improvement, thus helping to identify the intended outcomes of treatment.

In explicating disability, Nagi[6,7] also accounted for how a person's perception and experience of disease, impairment, or functional limitation (ie, a person's illness) might influence or change overall behavioral patterns, particularly in individuals

with chronic conditions. The term "disabled" denotes a particular status in society. Being labeled as having a disability involves an individual in an intrapersonal and interpersonal process to establish an identity as a "disabled" person and in a sociolegal process that is particular to the United States to gain access to social entitlements.

Four clinical applications of Wood's model and the ICIDH terminology have appeared in the physical therapy literature.[10–13] Each demonstrates that the ICIDH does not adequately capture the range of intellectual considerations made by physical therapists in planning physical therapy regimens. Wagstaff provided this example of how a patient's condition might be reported using specific ICIDH code numbers: "Rheumatoid arthritis (ICD 714) with stiffness and loss of movement of both knee joints (I 71.66), inability to climb stairs (D 42), remaining independent in an adapted environment (H 2.2)."[10(p234)] As this statement illustrates, the terminology summarizes a patient's condition in a way that might be meaningful across disciplines, as Jette[5] has noted. This example, however, also reveals the difficulty of the ICIDH terminology. What sense does it make to label a patient with a particular functional limitation (eg, inability to climb stairs) as "disabled" when the limitation does not prevent overall independent living and may even be remediated by treatment?

Harris and Dyrek[11] have proposed a model for orthopedic dysfunction by modifying the ICIDH classification scheme. As not all orthopedic dysfunction is the result of disease, they eliminate the term "disease" from their model. Instead of "disease," their model proposes the notion of a stimulus and a subsequent response by internal tissues to explain the development of musculoskeletal impairment. The analysis that follows from this modification is therefore particularly strong in structuring data on impairment at the tissue level. The limited ICIDH conceptual framework did not facilitate a discussion of how orthopedic impairments contribute to functional limitations. For example, they present a case study of a 53-year-old dentist with a painful, stiff right shoulder who had limitations in dressing and combing his hair with his right arm. Similar to the manner in which they suggest a clinician hypothesize about the mechanism of injury and the resulting impairment, one could also propose hypotheses relating the impairment to this particular set of functional limitations.

Schenkman and Butler[12,13] have presented two applications of Wood's model. In order to capture the complexities of central nervous system disorders, Schenkman and Butler expanded on Wood's model by distinguishing among the effects of disease on impairment as direct, indirect, and composite. Their work also emphasizes the need to sort out what is remediable by physical therapy from what is a permanent deficit and what is a single limitation from what is overall disability, reflecting Nagi's[6,7] distinction between particular functional limitations and long-term disability.

Applying Wood's[8,9] model to physical therapy requires substantial adaptations of the original concept. The ICIDH forces using the term "disability" to categorize deficits in the performance of functional activities, although no socially recognized disability exists. In contrast, Nagi's model does not force the conclusion that impairments are disabling, especially given the term's overload of meanings, and allows a therapist to relate clinical data to the patient's problems as they are very likely to be perceived by the patient (ie, as functional limitations). Nagi's model also permits physical therapists to provide data that may help other professionals to establish diagnoses of disease, impairment, or disability. The model does not tie physical therapists to using any predetermined list of impairments, such as those of the ICIDH, which are too imprecise to be useful for clinical practice. The concern regarding the loss of communication across disciplines if there were a *physical therapy* taxonomy seems premature. If all classification labels for impairment were similar to Sahrmann's[3] hypothetical example, "lumbar hyperflexion with neural impingement," these categories should be very understandable to other professionals.

Nagi's[6,7] model describes the major concepts of a diagnostic process that is potentially useful to physical therapists for planning and directing treatment. The key diagnostic question for treatment planning is not "What are the patient's impairments?" but "Which impairments are related to the patient's functional limitations and can also be remediated by physical therapy intervention?" Integrating these two sets of observations allows one to sort through the amassed data on impairment to identify which impairments presumably "caused" the functional limitations and should therefore be the focus of treatment.[14] Many patients have multiple impairments, many of which can be identified by a physical therapist and treated using physical therapy procedures. Those impairments that are identified during patient assessment, but not associated with any current or potential functional limitations, are excluded from treatment planning. This process of linking impairment data with functional limitations is similar to the initial steps in the hypothesis-oriented algorithm of Rothstein and Echternach.[15]

Is Nagi's[6,7] model sufficient in itself to understand the process of disablement and how physical therapy may prevent disability? Although this model identifies the key diagnostic concerns of physical therapy, it does not fully account for other factors that can alter the trajectory of disability (Fig. 2). First, there is the need to expand the concept of "disease" to cover other conditions of interest to physical therapists, as the work of Harris and Dyrek[11] and Schenkman and Butler[12,13] with the ICIDH model indicates. This expansion would include medical syndromes, which are recognized clusters of signs and symptoms, and lesions, which identify previous insults or sites of dys-

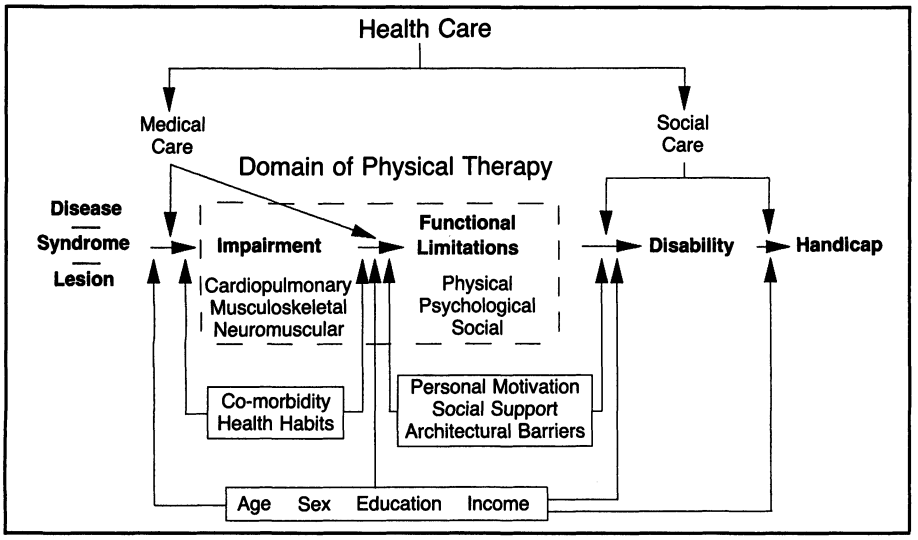

Figure 2. *Working expansion of Nagi's[6,7] model of the process of disablement to account for the influence of service delivery and personal factors.*

function but may not be associated with active pathology. Second, it is helpful to consider the patient's particular clinical presentation in light of the continuum services that have been or should be received. Finally, personal characteristics that either are known to affect or can be hypothesized to affect disablement should also be taken into account. Clarifying the relationship between impairment and functional limitation is only one component of understanding the outcomes of physical therapy for an individual.

Will a specific classification scheme for physical therapy diagnosis "reflect ownership of the condition,"[5(p969)] as Jette cautions? Other professional groups have been acknowledged as the authorities on the definition of specific diseases (eg, rheumatoid arthritis, schizophrenia) without the exclusive right to treat patients with those diagnoses. Interprofessional boundaries are dynamic, changeable, and often overlapping. The boundaries on physical therapy are not the boundaries of 50 years ago, reflecting changes both internal and external to the profession. Physical therapists have already received nonexclusive social approbation to identify neuromuscular, musculoskeletal, and cardiopulmonary impairments and to treat patients who have those impairments. What sets physical therapy apart from other professions is not merely what kinds of problems are identified, but how the clinical data are integrated, what kind of outcomes are expected, and what procedures are used to treat the problem.

The development of a classification system for physical therapy diagnosis has been delayed by excessive, albeit understandable, concern over the boundaries of diagnosis and scant attention to the categories and content of diagnosis. Recognition of "physical impairment" and "functional limitations" as the core categories of physical therapy classification is long overdue. Interpreting the process of physical therapy diagnosis as generating a problem statement that links impairment to limitation in function is intuitively appealing and consistent with the APTA House of Delegates' current philosophical statement on physical therapy:

> Physical therapy is a health profession whose primary purpose is the promotion of optimal health and function through the application of scientific principles to prevent, identify, assess, correct or alleviate acute or prolonged movement dysfunction.[16]

Physical therapy interventions cannot be shown to be effective for any condition unless there is a clear statement of what the condition is. The breadth of impairments that might be remediated by physical therapy intervention suggests that the process of developing and testing a taxonomy will require extensive resources. Jette's[5] concern that the adoption of a single classification scheme in physical therapy would be premature is warranted. Following the models of other professions, classification schemata should be derived by consensus among experts, validated empirically, and reviewed on an ongoing basis. Choosing to explore the alternatives will best serve the further development of physical therapy theory and practice at this time and lead to a unifying paradigm of physical therapy in the future.

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Appendix. *Definitions of Terminology Used in Models of Disablement*

Impairment: Any loss or abnormality of anatomic, physiologic, or psychologic structure or function.

Functional limitation: Inability to perform a task or obligation of usual roles and typical daily activities as the result of impairment.

Disability: *The International Classification of Impairments, Disabilities, and Handicaps* defines "disability" in terms of the preceding definition of "functional limitation." The sociological model developed by Nagi[6,7] limits the term "disability" to overall patterns of behavior in situations of long-term or continued impairments that result in functional limitations.

Handicap: The social disadvantage of a disability.

Commentary

I enjoyed Dr Guccione's article on diagnosis by physical therapists and his discussion of the relevance of Nagi's disablement model. I share his enthusiasm for the Nagi formulation and agree that it is a very useful taxonomy for classifying the types of phenomena likely to be diagnosed by physical therapy clinicians. Like the World Health Organization's (WHO's) *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH), Nagi's formulation has the advantage of being multidisciplinary and widely known within the United States. To my knowledge, it is not as widely known outside of the United States as the ICIDH.

Like Dr Guccione, I have concerns over the ICIDH, but for different reasons than those he has outlined. I am not concerned that the ICIDH forces the use of "disability" to categorize deficits in the performance of functional activities, although no socially recognized disability exists. I believe proponents of the ICIDH would argue, with some justification, that the ICIDH scheme does address the social consequences of disease through its handicap component. Thus, the ICIDH disability component need not address social consequences.

My concern rests with flaws in the operational components of the ICIDH. Here I believe there are some serious problems that need to be corrected. In research conducted in Göteborg, Sweden, my colleagues and I reported a serious concern with the handicap scales described in the WHO's instructions for using the ICIDH.[1] In an analysis of functional recovery in 76 stroke patients treated in a rehabilitation ward, we identified difficulty in differentiating between the concepts of handicap and disability, as defined and operationalized within the WHO's system.

Specifically, the WHO's system defines *disability* as the objectivization of impairment in the form of composite activities and behaviors that are generally recognized as essential components of daily life. *Handicap* is defined by the WHO as a social phenomenon, and the classification scheme is directed toward the circumstances in which disabled persons are likely to find themselves at a disadvantage in relation to their peers. Examination of the operational handicap scales in the ICIDH, however, revealed that the classification of handicap referred explicitly to the individual's abilities and competence, as is the case in the disability scales. The physical independence handicap scale, for instance, defines *short-term dependence* as dependence on other individuals for meeting short-interval needs, such as those identified under personal hygiene, feeding, and other personal care disabilities. Disability in personal care is operationalized in a similar way. Operationally, the handicap section of the WHO's classification system is very similar to its dis-