



Foundational Sciences for Intervention

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When designing intervention for children with developmental disabilities, physical therapists apply principles derived from various fields of research, including motor control, motor learning, motor development, and neuroplasticity. Having studied these foundational sciences, therapists consciously or unconsciously subscribe to theories of how the central nervous system (CNS) is organized and how children develop and learn motor skills. Theories then are used clinically in the following ways:

1. To select tests and examinations that identify children's participation restrictions, impairments, and activity or functional limitations
2. To set objectives for intervention
3. To plan and sequence intervention activities

In the best of worlds, sufficient research would be available to guide decision making across the range of functional limitations and impairments demonstrated by children with developmental disabilities. As a profession, the American Physical Therapy Association continues to emphasize and support basic and clinical research to expand evidence-based practice. Yet, much of what we currently do has not been researched, and we often must rely on theoretical models for decision making. This chapter focuses on reviewing the foundational fields of science that guide physical therapy practice with children.

BASIC DEFINITIONS

Motor Control

The term *motor control* refers to processes of the brain and spinal cord that govern posture and movement. Neuroscientists initially focused their research on neural processes underlying animal movements. Investigations centered on the chemical or electrical activity of single nerve cells or nuclei to understand the organization of spinal motor mechanisms and mechanisms of higher control mediated by various brain structures. With the advent of noninvasive methods, such as