Test Bank for Therapeutic Exercise for Children with Developmental Disabilities 4th Connolly

FOURTH EDITION

Therapeutic Exercise for Children With Developmental Disabilities

Instructor's Manual

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Preface

The primary focus in the *First Edition* (1993) of *Therapeutic Exercise for Children With Developmental Disabilities* was on therapeutic techniques. The *Second Edition* (2001) and the *Third Edition* (2005) incorporated more empirical evidence to support intervention strategies. The *Fourth Edition* continues the process of updating empirical evidence relevant to clinical practice. Major changes in the *Fourth Edition* include the addition of 3 new chapters, an *Instructor's Manual*, and numerous videos of assessments or interventions. The videos supplement information in the various chapters and provide practical examples for students.

Chapter 4 is a new chapter on Communications to Establish Rapport With Children and Their Families and provides a rationale for and methods of modeling to improve interpersonal communication in constantly changing environments. This is a particularly relevant chapter as more students and patients now represent an increasingly greater variety of cultures and experiences. Two additional new chapters include Chapter 11, a review of recent research regarding methods for Facilitating Early Mobility in children with or at risk for disabilities, and Chapter 16, a review of the rationale and methods for Aquatic Therapy.

Five cases studies of children with developmental disabilities continue to be used throughout the text to facilitate a practical problem-solving approach to the focus of individual chapters. The case studies include 2 children with cerebral palsy (Gross Motor Function Classification System Levels I and V), a child with myelomeningocele, a child with Down syndrome, and a child with developmental coordination disorder/attention-deficit hyperactivity disorder. A major change in the application of the case studies is a focus on the World Health Organization *International Classification of Functioning, Disability and Health* model. Although students may use a "bottom-up" process of identifying Impairments, then Activity Limitations and Participation Restrictions, we requested that authors use a "top-down" strategy by first identifying Participation Restrictions, then Activity Limitations and Impairments before determining intervention objectives and goals. The ages of children in the case studies range from 15 months to 7 years. However, the ages vary in some chapters to emphasize specific interventions. For example, children are addressed at younger ages in the chapters on Physical Therapy in the Neonatal Intensive Care Unit and Facilitating Early Mobility. Children are addressed at older ages in the chapter on Physical Therapy in the Educational Environment: Early Intervention and School-Based. Instructors may wish to add additional case studies or vary ages of children in the case studies to illustrate specific diagnoses, problems, or interventions.

Six general chapters comprise the early portion of the text. The first chapter is an overview of Foundational Sciences for Intervention. A summary of major tenets of motor control and motor development with clinical examples provides a theoretical framework for subsequent chapters. This chapter also contains a major portion of information in a previous chapter in the *Third Edition* on Motor Learning and adds a new section on Neuroplasticity. Chapter 2 on Examination and Evaluation: Tests and Measures provides a review of standardized norm-referenced and criterion-referenced tests used in pediatric examination and evaluation. New tests and measures developed after 2005, as well as newer editions of older tests, have been added. Detailed information on reliability and validity of the tests is provided. Chapter 3 on Establishing Functional Goals and Organizing Intervention uses the framework of the *International Classification of Functioning, Disability and Health—Children and Youth*, replacing the Nagi model used in the *Third Edition*, to determine appropriate goals and to organize overall treatment plans, as well as individual therapy sessions. Chapter 4 is on Communications to Establish Rapport With Children and Their Families. The fifth chapter presents The Children: History and Tests/Measures of each child in the 5 case studies, and Chapter 6 is updated for Applying the *Guide to Physical Therapist Practice 3.0*.

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Authors of the remaining chapters have updated the empirical evidence related to the topics discussed and added more recent intervention strategies where relevant. Evaluation and treatment methods applicable to the preterm infant and neonate are emphasized in Physical Therapy in the Neonatal Intensive Care Unit (Chapter 7). The Influence of Oral, Pharyngeal, and Respiratory Functions (Chapter 8) provides information on the evaluation and treatment of oral-motor, feeding/swallowing, and respiratory-phonatory functions. Sensory systems are described and relevant applications are suggested in Chapter 9 on Sensory Considerations in Therapeutic Interventions. Chapter 10 on Developing Postural Control addresses principles related to responses to perturbations, anticipatory postural responses, and adjustments necessary for efficient movement, as well as the development of head and trunk control. Recent research regarding methods for Facilitating Early Mobility is addressed in Chapter 11. In Chapter 12, Assessment and Development of Gait Skills, basic components of ambulation and strategies to expand the function of walking in meaningful contexts, as well as research studies on the use of treadmill training, are presented. Chapter 13, Promoting Upper Extremity Control, expands on the chapter in the *Third Edition* on developing hand function and includes new information regarding constraint-induced motor therapy and mirror therapy. Equipment and technology applicable to children with disabilities are discussed in Chapter 14, Selection and Use of Assistive Technology Devices. Chapter 15, Physical Therapy in the Educational Environment: Early Intervention and School-Based, provides information on state and federal laws and guidelines related to early intervention and public school education. Aquatic Therapy is covered in Chapter 16. Chapter 17, The Children: Physical Therapy Management, is a summary of interventions suggested throughout the text as applied to each of the 5 cases. Finally, Issues in Aging in Individuals With Lifelong Disabilities are discussed in Chapter 18.

The *Fourth Edition* emphasizes examples of treatment activities to achieve the Participation and Activity outcomes proposed for the children. Physical therapy students and clinicians with limited experience in pediatrics will benefit from having specific examples of treatment activities in addition to general intervention strategies.

In this *Instructor's Manual,* we provide the purpose of each chapter, several student learning objectives, suggestions for related student/class activities and examples of multiple-choice examination questions. When used with videos, this information is designed to assist the instructor in organizing class materials and student experiences.

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1 Foundational Sciences for Intervention

Patricia C. Montgomery, PT, PhD, FAPTA

Purpose

To examine 4 foundational sciences for pediatric intervention. Theories of motor control, principles of motor learning, elements to enhance neuroplasticity, and critical periods and motor sequences in child development are reviewed.

Objectives

Following review of Chapter 1, the student will be able to:

- Define 4 foundational sciences for therapeutic intervention
- Describe at least 3 theories of motor control
- Provide examples of "open-loop" vs "closed-loop" tasks
- Explain why motor learning principles from research with adults may not apply to children
- Contrast motor performance from motor learning
- Differentiate knowledge of results from knowledge of performance
- Apply the concepts of primary and secondary variability to motor development in children with brain injuries
- Explain the "myth" of a single, best developmental sequence for acquiring early motor milestones
- Describe how central nervous system sensory mapping is done in animal and human brains
- Contrast the effect of task-specific vs general activity on the motor cortex
- Define 4 types of neuroplasticity that may account for recovery following injuries to the central nervous system
- List at least 4 elements during therapy that may contribute to neuroplasticity

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Student/Class Activities

1. Divide class into small groups. Give each group a child of a different age range all with a traumatic brain injury. Child has adequate attention and cognition to cooperate during therapy. As a physical therapist, what types of reward(s) or feedback would be appropriate for children ages 0 to 18 months, 2 to 4 years, 6 to 10 years, 13 to 16 years? After the students summarize ideas on reward/feedback, ask them to consider how this might change for (a) the same patient with decreased attention and /or intellectual skills, or (b) the patient with visual or auditory deficits?
2. Have each student pair with a partner. Have one student "teach" his or her partner to write the sentence ("Mary had a little lamb") with his or her nondominant hand. AFTER the activity, ask the students: What type of guidance/instructions did you use (verbal? demonstration? physical guidance?)? What type of feedback did you give (knowledge of results? knowledge of performance?)?
3. This activity can be done by the individual student or with small groups. Provide the student or groups with patient scenarios (3 examples provided below). The task is to develop 2 patient goals and report on a strategy or strategies to differentiate motor performance from motor learning.
   - Scenario 1: Patient is 15 months old with right spastic hemiparesis cerebral palsy. You are providing a home visit once per week. Child is able to support weight in standing at a support, but is not yet cruising sideways.
   - Scenario 2: Patient is 8 years old and is 3 weeks post traumatic brain injury secondary to a motor vehicle accident. You are seeing him twice daily in his hospital room and working on transfers to and from his bed, wheelchair, and lounge chair. Currently, he needs hands-on physical guidance to accomplish each transfer.
   - Scenario 3: Patient is a 12-year-old child with spina bifida. He recently had surgery for repair of a tethered cord. As a result, he is very weak and is having difficulty walking with his long leg braces and forearm crutches, which he was doing for distances up to 500 feet prior to surgery.

Sample Multiple-Choice Examination Questions

1. Motor learning
   A. **relies on experience**
   B. is not related to motor control
   C. primarily occurs between 0 to 2 years of age
   D. applies only to gross motor skills

2. When damage to the central nervous system results in limited primary variability in motor behavior
   A. secondary variability can compensate for limited primary variability
   B. **secondary variability will be limited**
   C. there will be no effect on secondary variability
   D. none of the above

3. The reflex hierarchical model
   A. is based on a theory proposed by Sherrington
   B. was challenged by research documenting preprogrammed movements
   C. was a framework for intervention in physical therapy in the 1940s
   D. **all of the above**

4. Sean is a 2-year-old child with cerebral palsy. He always transitions from prone into a W-sitting position. In dynamical pattern theory, this movement transition
   A. **is an order parameter**
   B. is a control parameter
   C. is not an attractor
   D. none of the above

5. During treatment, Sean, with physical guidance, can "tailor sit." Sean is demonstrating
   A. improved motor learning
   B. **improved motor performance**
   C. both improved motor learning and motor performance
   D. neither improved motor learning nor motor performance

6. Examples of "open-loop" movements include *all but one* of the following?
   A. throwing a baseball
   B. snapping your fingers
   C. **sawing a board**
   D. kicking a football

7. Application of feedback—knowledge of results
   A. follows the same procedures with children as with adults
   B. is always done immediately following task completion
   C. **can be provided too frequently**
   D. is not related to task difficulty

8. Critical periods in human development
   A. are similar to critical periods in animals
   B. are limited to 0 to 2 years of age
   C. do not apply to sensory functions
   D. **none of the above**

9. Motor skill development in typically developing human infants
   A. is not affected by cultural expectations
   B. **is characterized by varying sequences and strategies**
   C. requires that children creep on hands and knees before walking
   D. is not related to cognitive and perceptual development

10. Sensory and motor brain maps in humans are
    A. topographical
    B. proportional to how that body part is used
    C. remodeled throughout the life span
    D. **all of the above**

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