MOTOR DEVELOPMENT AND MOVEMENT ACTIVITIES FOR PRESCHOOLERS AND INFANTS WITH DELAYS

Second Edition

MOTOR DEVELOPMENT AND MOVEMENT ACTIVITIES FOR PRESCHOOLERS AND INFANTS WITH DELAYS

A Multisensory Approach for Professionals and Families

By

JO E. COWDEN, PH.D.

University of New Orleans Professor

and

CAROL C. TORREY, Ph.D.

Coordinator of Special Education Programs Jefferson Parish Public schools



CHARLES C THOMAS • PUBLISHER, LTD. Springfield • Illinois • U.S.A.

Published and Distributed Throughout the World by

CHARLES C THOMAS • PUBLISHER, LTD. 2600 South First Street Springfield, Illinois 62794-9265

This book is protected by copyright. No part of it may be reproduced in any manner without written permission from the publisher. All rights reserved.

©2007 by CHARLES C THOMAS • PUBLISHER, LTD.

ISBN 978-0-398-07764-8 (hard) ISBN 978-0-398-07765-5 (pbk.)

Library of Congress Catalog Card Number: 2007014825

With THOMAS BOOKS careful attention is given to all details of manufacturing and design. It is the Publisher's desire to present books that are satisfactory as to their physical qualities and artistic possibilities and appropriate for their particular use. THOMAS BOOKS will be true to those laws of quality that assure a good name and good will.

Printed in the United States of America MM-R-3

Library of Congress Cataloging in Publication Data

Cowden, Jo E.

Motor development and movement activities for preschoolers and infants with delays : a multisensory approach for professionals and families / by Jo E. Cowden and Carol C. Torrey. -- 2nd ed.

p. cm.

Ref. ed. of: Pediatric adapted motor development and exercise. c1998. Includes bibliographical references and index.

ISBN 978-0-398-07764-8 (hard) -- ISBN 978-0-398-07765-5 (pbk.)

1. Children with disabilities--Development. 2. Exercise therapy for children. 3. Motor ability in children. 4. Physical fitness for children. I. Torrey, Carl C. II. Cowden, Jo E. Pediatric adapted motor development and exercise. III. Title.

RJ138.C68 2007 615.8'2083--dc22

2007014825

PREFACE

The second edition of the book is intended to provide information for professionals, families, and students interested in learning about motor development of young children with delays or disabilities. A practical approach is used so that families and caregivers can provide instruction utilizing the ecological dynamics of the home environment. The book emphasizes the age group of infancy (6 months) to 6 years. However, families with older children and professionals who work with older children who have significant motor delays will also benefit from the information and activities in this book. Activities are specifically designed for parents of children with delays/disabilities and specialists of motor development, adapted physical education, special education, early childhood, early intervention and allied health.

The purpose of the book is to explain the principles of motor developmental theories and relate them to practical intervention, answer questions about muscle tone (hypotonicity, hypertonicity) related to positioning, lifting, carrying, and feeding of young children, provide directions for early diagnosis and assessment of symptoms recognizable in developmental domains including autism, and help professionals and families understand the impact of medical conditions on motor development and related daily living skills for young children. In addition, practical suggestions and activities for families and professionals to enhance sensory motor development of the young child during structured motor intervention and throughout the day are provided.

Throughout this book, the term "movement specialist" has been used to refer to one of the many professionals that provide motor assessment and activities to young children with disabilities. This array of professionals may include, but is not limited to: adapted physical educator, occupational therapist, physical therapist, early childhood educator, preschool classroom teacher, home-based early intervention teacher, and so forth. Regardless of the title of this professional, a movement specialist will have been trained in the psychomotor domain, and will have knowledge to provide appropriate and valuable motor assessment and intervention to young children with disabilities. Additionally, it must be noted that a para-educator (teacher assistant) may also be provided specific training to complete intervention.

> JO E. COWDEN CAROL C. TORREY

ACKNOWLEDGMENTS

The authors wish to acknowledge: Connie L. Phelps, Chair of Reference Services Earl K. Long Library at the University of New Orleans who provided detailed assistance for the references in this book.

The families and children with delays or disabilities who have participated in motor interventions during the past 25 years at The University of New Orleans, and who have provided us learning and expertise in the field of motor interventions.

Jean Burke, whose friendship, faith, humor, and love have provided me with the wisdom necessary for completion of this revision.

Margaret Huffman, Jo's sister, who has provided love, faith, and incredible strength.

Peter Torrey, and my two daughters, Alexandra and Alanna Torrey, for their patience, encouragement, and love while I worked endlessly on the revision of this book.

Our friend, Anita Hartzell Hefler, who administers the program at the Greater New Orleans Therapeutic Riding Center, encouraging excellence in the young children with disabilities and working with university students in adapted physical education practices.

I also want to dedicate this publication to the memory of my beloved pup, Chelsea Makala Cowden, who stayed very close to her mom for 15 years providing companionship for hours of writing.

Michael Payne Thomas and Claire Slagle of Charles C Thomas Publisher who provided incredible leadership and support for developing this book.

> JEC CCT

CONTENTS

Page
Prefacev
Chapter 1. Motor Development
Interaction of Child and the Environment
Motor Development Theories
Traditional Developmental Theories
Neurodevelopmental Theories
Principles of Motor Development Theories10
Contemporary Dynamic Systems Theory
Components of Dynamic Systems Theory
Summary
Chapter 2. Organization of the Nervous System
Development of the Nervous System
Spinal Cord Development and Functions
Cranial Nerves
Central Nervous System
Perceptual Motor Response Theory Model
Sensory Systems and Sensory Input
Tactile Modality
Vestibular Modality
Auditory Modality
Visual Modality
Kinesthetic Modality
Intact Central Nervous System
Motor Output
Motor Output as a Reflex
Motor Output as a Reaction

Motor Output as Skill
Chapter 3. Muscle Tone
Importance of Muscle Tone
Assessment of Muscle Tone and Reflexes
Positioning and Handling
Guidelines for Positioning and Handling
Carrying
Feeding
Lifting
Summary
Chapter 4. Medical and Biological Considerations
Prematurity and Low Birth Weight
Premature Labor
Placenta Previa
Abruptio Placenta
Amniotic Fluid and Premature Rupture
Entangled Umbilical Cord
Meconium Aspiration Syndrome
Hyperbilirubinemia
Apgar
Medical Conditions
Genetic Variations
Chromosomal Abnormalities
Down Syndrome
Turner Syndrome
Fragile X Syndrome
Single Gene Defects
Phenylketonuria (PKU)
Hypothyroidism
Tuberous Sclerosis
Abnormalities or Syndromes of Unknown
Etiology
Spina Bifida
Hydrocephalus
Microcephaly100

Prader-Willi Syndrome	.101
Cogenital Infections	.101
Toxoplasmosis	
Rubella	.102
Cytomegalovirus (CMV)	.102
Herpes	.103
Syphilis	.103
Human Immunodeficiency Virus (HIV)	.104
Hepatitis B Virus (HBV)	.105
Sensory Impairments	.106
Visual Impairments	.106
Auditory Impairments	.107
Orthopedic and Neurologic Conditions	.108
Cerebral Palsy	
Seizures	.110
Hypoxia Ischemic Encephalopathy	.112
Significant Intracranial Hemorrhage	
Intraventricular Hemorrhage (IVH) (Grade III	
or IV)	.113
Periventricular Leukomalcia (PVL)	.113
Technology Dependence	
Respiratory Distress Syndrome (RDS)	.114
Bronchopulmonary Dysplasia (BPD)	.114
Tracheostomy	
Gastrostomy	.119
Gastroschisis	.120
Exposure to Known Teratogens or Drugs	.121
Fetal Alcohol Syndrome (FAS)	.121
Fetal Hydantoin Syndrome	.122
Prenatal Exposure to Cocaine/Crack and Tobacco	.123
Psychiatric Disturbances of Infancy	.124
Developmental Delay	.125
Pervasive Developmental Disorder	.125
Autistic Spectrum Disorders	.127
Motor	.129
Cognition	.130
Social	.130
Communication	.131
Infantile Autism: Early Indicators of Delay	
Sensory Dysfunction	.133

Team Decision-Making Process
Summary
Chapter 5. Assessment
Team Approach150
ROADMAP Model152
Purposes and Procedures for Assessment
Assessment Instruments
Screening Instruments
Ages and Stages Questionnaire: A Parent-
Completed, Child-Monitoring System,
Second Edition (AS.)
Battelle Developmental Inventory Screening Test162
Denver II
Eligibility Instruments
Battelle Developmental Inventory, Second Edition .165
The Bayley Scales of Infant and Toddler
Development, Third Edition
Brigance Diagnostic Inventory of Early
Development-II
Developmental Programming for Infants and
Young Children (Rogers & Donovan, 1981) 173
Peabody Developmental Motor Scales, Second
Edition
Instruments for Program Planning
Assessment, Evaluation, and Programming System
for Infants and Children, Second Edition
(AEPS)
Carolina Curriculum for Infants and Toddlers
with Special Needs, Third Edition (CCI)
(Johnson-Martin, Jens, Attermeier, &
Hacker, 2004)
Carolina Curriculum for Preschoolers with
Special Needs, Second Edition (CCPSN)179
Hawaii Early Learning Profile (HELP)
Curriculum and Assessment Materials181
Movement Assessment of Infants (MAI)184
Transdisciplinary Play-Based Assessment
Instrument Recommendations
Summary

xii

Contents	xiii
Chapter 6. Principles of Intervention: Progressive	
Interactive Facilitation	195
Theoretical Principles of Intervention	
Intervention Principles	
Progression of Balance Development	
Progressive Model of Infant Stepping Movements	
Implementation and Evaluation of PIF	.217
Summary	221
Chapter 7. Activities for Children with Hypotonicity	225
Introduction to Developmental Activity Programs	
Exercises and Activities for Increasing Muscle Tone	
and Strength	229
Supine Position	229
Prone Position	237
Rolling Position	244
Four-Point Creeping	246
Exercises for Progression to Standing and	
Locomotion	
Enhancing the Exercises	259
Chapter 8. Activities for Reflex Integration and Decreasing	
Muscle Tone	263
Assessment of Asymmetrical Tonic Neck Reflex	200
$(0 \text{ to } 4-6 \text{ mos.}) \dots \dots$	264
Activities for Integration of Asymmetrical Tonic	201
Neck Reflex	265
Assessment of Tonic Labyrinthine Supine Reflex	
Activities for Integration of Tonic Labyrinthine	
Supine Reflex	267
Assessment of Tonic Labyrinthine Prone Reflex	
Activities for Integration of Tonic Labyrinthine	
Prone Reflex	271
Assessment of Symmetrical Tonic Neck Reflex	
Activities for Integration of Symmetrical Tonic	. –
Neck Reflex	271
Relaxation Activities	
Enhancing the Activities	
Therapeutic Riding	
r	

Chapter 9. Activities For Sensory Motor Development
Activities for Postural Reactions and Vestibular
Stimulation
Activities for Visual Motor Control
Activities for Auditory Discrimination
Activities for Tactile Stimulation
Activities for Kinesthetic and Spatial Awareness
Chapter 10. Manipulative Activities: Reach, Grasp, Hold
and Release
Assessment of Reaching
Reaching Activities
Assessment of Grasping
Grasping Activities
Assessment of Hold and Release
Hold and Release Activities
Glossary
Author Index
Subject Index

MOTOR DEVELOPMENT AND MOVEMENT ACTIVITIES FOR PRESCHOOLERS AND INFANTS WITH DELAYS

Chapter 1

MOTOR DEVELOPMENT

Chapter Objectives: After studying this chapter, the reader will be able to:

- 1. Relate the importance of the interaction between the child and environment;
- 2. Give a meaningful definition of motor development;
- 3. Explain the principles of Motor Development Theory;
- 4. Provide a summary of traditional developmental theories, neurodevelopmental theories and Dynamic Systems Theory (DST).



Figure 1.1. Motor development begins prenatally and continues throughout the lifespan as repetitive practice and increasingly difficult challenges expand one's motor skills.

INTERACTION OF CHILD AND THE ENVIRONMENT

The interaction of a young child with his/her environment provides critical opportunities for motor development, as well as development within all of the other learning domains (language, self-help, cognitive, social). The interplay between forces within the individual and the environment is referred to by Gallahue and Ozmun (2006) as *adaptation*, while Sherrill (2004) referred to changes within the individual, the environment and the blend of both the individual and everything in his environment as *ecological theory*. Most professionals agree that the child's environment is critical in the learning process and that valuable opportunities for learning experiences are provided through interaction with an enriched environment. Thus, the importance of early intervention is highlighted.

An understanding of motor development theory and principles of normal motor development influence one's ability to administer motor assessments and to develop motor intervention programs for young children with delays or abnormal motor development. The needs of young children place specific challenges on movement specialists or teachers who provide service delivery in the motor domain. A unique understanding of varied theoretical perspectives, combined with the talents of selecting the appropriate plan of action result in development of optimal movement programs. Philosophical concepts are applied and incorporated into performance objectives for intervention and provide the framework or structure for long-term goals or outcomes. Combining elements from the various traditional, neurodevelopmental, and contemporary theories is the key to successful individualization of intervention curricula for preschoolers and infants with delays. An overview of selected theoretical perspectives will be briefly discussed within this theoretical framework.

A theoretical basis of motor development provides a basis for linking assessment and intervention processes. A theoretical background assists the movement specialist in understanding the relationship between normal and abnormal motor development. Each movement specialist who participates in the evaluation process develops an internal schema that depicts mature versus immature patterns of movement. A critical reference is then needed to determine if the immature patterns actually have a neurological orientation that would indicate possible central nervous system damage associated with abnormal motor developmental patterns (e.g., cerebral palsy). The specialist establishes an assessment approach based on his or her theoretical frame of reference. The following model (see Figure 1.2) will assist in clarifying the link between theory, assessment, and intervention. Theories included in this model are summarized following the model.



An Interactive Model of Theory-Assessment and Intervention

Figure 1.2. The Model for Linking Theory, Assessment, and Intervention.