A BASIS FOR SENSORIMOTOR DEVELOPMENT— NORMAL AND ABNORMAL

A BASIS FOR SENSORIMOTOR DEVELOPMENT— NORMAL AND ABNORMAL

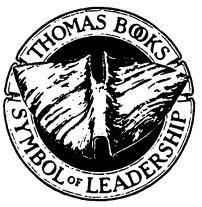
The Influence of Primitive, Postural Reflexes on the Development and Distribution of Tone

By

MARY R. FIORENTINO, Mus.B., O.T.R., F.A.O.T.A.
Consultant and Lecturer
Wethersfield, Connecticut

With a Foreword by

Josephine C. Moore, Ph.D., O.T.R.
Professor
University of South Dakota
School of Medicine
Department of Anatomy
Vermillion, South Dakota



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

Published and Distributed Throughout the World by
CHARLES C THOMAS • PUBLISHER
Bannerstone House
301-327 East Lawrence Avenue, Springfield, Illinois, U.S.A.

ISBN 0-398-04179-2 (cloth)
ISBN 0-398-06120-3 (paper)
Library of Congress Catalog Card Number: 80-24600

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.

Library of Congress Cataloging in Publication Data

Fiorentino, Mary R
A basis for sensorimotor development-normal and abnormal.

Bibliography: p.
Includes index.
1. Motor ability in children. 2. Child development. 3. Reflexes. 4. Movement disorders in children. I. Title. [DNLM: 1. Central nervous system diseases—Diagnosis. 2. Motor skills. 3. Reflex. 4. Reflex, Abnormal. WL 141 F518b]
RJ133.F54 618.92'7 80-24600
ISBN 0-398-04179-2.— ISBN 0-398-06120-3 (pbk.)

Printed in the United States of America
PS-OK-1

To "Jo"
With Deep Appreciation
For Her Many Years
Of Friendship
And For Her
Professional Support

FOREWORD

Retirement is a gift of time that may be spent in the pursuit of leisure, long neglected hobbies, or perhaps in travel. For some it may constitute a new era when one is free from the demands of work, research, and publications. Not so for Mary. Once again Mary has used her precious time and talents for writing and sharing her depth and breadth of knowledge with her professional colleagues.

Mary's gift to all of us has been her ability to analyze the various stages of normal and abnormal development in relation to reflex/responses and movement and to put this complex subject into an integrated and meaningful sequence of events. Each and every critical stage of sensorimotor development, behavioral pattern, and/or changes in posture and muscle tone resulting from underlying reflex/responses is well documented with photographs. Explanations accompanying each photograph are succinct. Important points, critical for understanding each overlapping yet fundamental stage of development, are clearly presented.

Mary's writing technique utilizes two vital and conjugate avenues for learning: pictorial analysis accompanied by precise explanatory sentences. This enables the beginner, as well as the experienced clinician, to use this text as an invaluable teacher, especially while observing infants and children in a home environment or in a clinical setting.

This book also teaches one how to observe, what to observe, and to understand that which is being observed. By the time the last chapter is read, the necessity of memorizing this volume of material is negated. Instead, one realizes that through the active process of personally synthesizing this information, i.e. comparing this richly endowed text with actual behavioral patterns of normal and neurologically involved infants and children, one has gained an in-depth understanding of this important subject. Learning, per se, has become a *fait accompli.*

Josephine C. Moore, Ph.D., O.T.R.

PREFACE

Our total postural behavior is the result of the interaction of reflexes and the relative strength of each one of them. Postural reflexes involve changes in tone and distribution which primarily affects posture and movement.

Early reflexes and postures are basic developmental patterns that are processed within the CNS. They are integrated, modified, and incorporated into more complex patterns in order to form the background for normal, voluntary movement and skills.

ACKNOWLEDGMENTS

Grateful appreciation is extended to the children and parents who allowed their pictures to be used in this book; to Josephine Moore and Margot van Homm for their review of the text; to Donald Gale and Raymond Martin of the photography department; to Jean Long, medical librarian, all of the Newington Children's Hospital; to Kathleen Bagioni for preparation of the index; and to Dorothe Gustafson, former secretary, and friend, for all of their assistance.

M.R.F.

CONTENTS

A BASIS FOR SENSORIMOTOR DEVELOPMENT— NORMAL AND ABNORMAL

INTRODUCTION

Movement is an essential characteristic of living organisms. The simplest, like the fish, make spontaneous and rhythmical movements. Man, with his complex movements, shows more complicated patterns of motor activities. The basic elements of these activities include tone, control, and strength. These underlie specific functions such as movement, postural stability, balance, and coordination, and the integration of these functions leads to the development of skill.

This monograph is not intended to be a highly theoretical, neurophysiological treatise on the components underlying CNS function and influences. It is an attempt to place the reflexes in their proper perspective to tone and its distribution, and how they relate to the development of movement.

To understand and interpret the normal processes of sensorimotor development as this relates to the development of normal postural behavior and total patterns of motor coordination, it will be necessary to:

1. Identify and sequence normal, developmental, postural reflexes.
2. Relate postural reflex sequences to sensorimotor development.
3. Place postural reflexes in their proper perspective to movement, tone, and intervention.

PURPOSE

The purpose of this book is to orient occupational, physical, and speech students and therapists, physical educators, movement therapists, physicians, and any other professional involved with sensorimotor development as to the importance of knowing the processes involved in creating change, and consequently development, in the motor system. An explanation of the influence of reflexes on tone and movement and the relative control or dominance each one has that is basic to sensorimotor development, normal and abnormal, will be given.

PROCEDURE

The following pages will present certain basic neonatal and postural reflexes that contribute to the enhancement of tone to develop the balance between flexor and extensor muscles. In this way, the basis for movement at higher levels is provided and coordinated skills will result.

Photographs, with accompanying interpretations, will illustrate this development, modification, and integration in normal and abnormal sensorimotor development.

DEFINITIONS

arm: upper arm from shoulder to elbow
ASTN: asymmetrical tonic neck reflex
asymmetry of movement: dissociation of movement from one part or side to the other part or side
body: total anatomical structure including head, neck, trunk, and extremities
CNS: central nervous system
crawling: moving along the floor on the abdomen (marine crawl)
creeping: mobility in the 4-foot quadruped position, on hands and knees
digits: total hand, four fingers and thumb
dissociation: movement of one part(s) separate from another part(s), as limb movements separate from the trunk
forearm: lower part of the limb, from elbow to wrist
leg: foreleg of the lower limb from knee to ankle
long sit: sitting position with hips flexed and knees extended
lower limb: includes thigh, leg, and foot
quadruped: 4-foot position, on hands and knees
raking movement: an early developmental stage in which the baby uses a swiping movement of the hand on attempting to pick up an object
scratching movements: palmomandibular reflex; flexion-extension movements of the fingers as the baby is feeding at the breast or the bottle, or on clothing
STN: symmetrical tonic neck reflex
symmetry of movement: the infant moves the extremities, two lower limbs and/or two upper limbs, in the same direction at the same time, such as both in flexion or both in extension
thigh: upper part of the limb from the hip to the knee
upper limb: includes arm, forearm, and hand
windswept position: both lower extremities turned in the same direction, resulting in one limb in external rotation and the other limb in internal rotation