Health Professionals' Guide to

PHYSICAL MANAGEMENT OF PARKINSON'S DISEASE

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Human Kinetics

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This book is dedicated to my parents,
Bernard and Mary Boelen,
and all people with Parkinson's disease.

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Contents

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List of Case Examples and Reproducible Items

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Abbreviations and Acronyms

ACSM—American College of Sports Medicine
ADLs—activities of daily living
AFO—ankle–foot orthosis
APAs—anticipatory postural adjustments
APDA—American Parkinson Disease Association
BOS—base of support
BP—blood pressure
BPM—beats per minute
CNS—central nervous system
COG—center of gravity
COM—center of mass
COMT—catechol-O-methyltransferase
COP—center of pressure
DBS—deep brain stimulation or stimulator
FOG—freezing of gait
GPi—globus pallidus internus
HEP—home exercise program
L-dopa—levodopa
MAO-B—monoamine oxidase B
MSA—multiple systems atrophy
NPF—National Parkinson Foundation
OH—orthostatic hypotension
OT—occupational therapy or occupational therapist
PD—Parkinson's disease
PT—physical therapy or physical therapist
RAS—rhythmic auditory stimulation
Reps—repetitions
ROM—range of motion
RPE—rating of perceived exertion
S&E ADL Scale—Modified Schwab and England Activities of Daily Living Scale
STN—subthalamic nucleus
TENS—transcutaneous electrical nerve stimulation
POMA—performance-oriented mobility assessment
TUG—timed up and go
UPDRS—Unified Parkinson's Disease Rating Scale
YOPD—young onset Parkinson's disease

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Preface

While we await the discovery of a cure for Parkinson's disease (PD), its medical management, which includes pharmacologic and surgical measures, is directed at the control of symptoms. Medical management has its limitations, however, when addressing secondary conditions resulting from rigidity and bradykinesia. Such management does not directly address potential or existing physical impairments such as loss of flexibility, strength, or cardiovascular endurance. Ignoring these aspects of PD can lead to unnecessary functional limitations or substantial disability. Physical interventions, however, can address these issues. Medical and physical interventions can work together to enhance overall quality of life significantly.

Yet in my 30 yr of experience as a physical therapist, the most recent 18 of which have been exclusively in treating patients with PD and similar hypokinetic movement disorders, I have been continually frustrated by the lack of a comprehensive clinical reference for selecting useful physical interventions. Physical therapy curricula provide minimal exposure to the care of people with PD or other movement disorders. Tidbits of information are scattered throughout a number of textbooks on a variety of subjects and are often difficult to obtain. Journal articles present useful research findings, but they often fail to make their way into clinical practice. Over the years I have also stumbled onto effective maneuvers through experience, which I desired to share with the wider caregiver community. This material was begging to be brought together in a single reference that would advance the treatment of patients with PD. This book is the result.

The focus of this text is to fill the existing void by comprehensively addressing the physical component of PD management in a single volume. The book is intended to be a complete yet concise and easy-to-use clinical guide. In addition to exercise, physical interventions covered include compensatory strategies such as visual and auditory cues, attention strategies, and adaptive devices. Although much of the book draws on evidence-based work, a substantial portion of it is based on my clinical experience with patients with PD. This book will be used primarily by physical therapists, although any health care professional who has contact with patients with PD can benefit from its contents.

Part I provides a general understanding of PD and discusses the scope of care provided by therapists, physicians, patients themselves, and their caregivers. Chapter 1 offers an overview of interventions for the physical management of the disease. At the end of this chapter is a case example to illustrate how this book can be used in a clinical setting. Most clinicians will benefit from reading the chapters in part I before they use the rest of the manual.

Because patients with Parkinson's do not all exhibit the same symptoms, the chapters in the remainder of the book are written as independent units to address discrete problem areas. These chapters can be used in any order as the need arises in clinical practice, and a preceding chapter need not be read to understand a subsequent chapter. Typically, the theory or background for each chapter is covered at the beginning of the chapter, and the interventions and practical information follow.

Because most readers will not be reading the book from cover to cover but will be looking for answers to specific questions, chapters are extensively cross-referenced. A glossary at the end of the book will help the reader with commonly used terminology. Appendixes

provide established PD questionnaires, tests, and norm values. The appendixes also contain patient handouts on compensatory strategies, suggestions for physical therapy goal setting and interventions, and sample evaluation forms that can be used as guides.

Each chapter contains a case example specific to the topic of the chapter. These examples have been simplified to emphasize the area being discussed. The case example in chapter 1 offers additional guidance about how to use this book and how to implement interventions based on problem areas.

Items in appendixes C and D, including informational sheets that can be given to patients, can be reproduced for clinical use. On page ix you will find a listing of these reproducible items as well as a listing of all the case examples.

I hope that you will find this book useful in making your clinical practice more productive and in improving patient outcomes. It is my wish that your patients with Parkinson's disease will be the ultimate beneficiaries of my work. This book was written for them.

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A special thank you to all the people who have allowed their pictures to be printed in this book for the purpose of helping others.

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part

I

GENERAL ISSUES

This opening part of the book is intended to give you a broad understanding of the umbrella of care required in the management of people with PD. This umbrella encompasses physical management by health professionals such as physical therapists, occupational therapists, speech therapists, and personal trainers. It also includes medical management by physicians, self-management through exercise, and, when self-management is difficult, help provided by the caregiver. This part acquaints you with the symptoms and stages of Parkinson's disease and the benefits of physical management at the various stages. It also guides you in efficient use of this book. Information is provided about medical management, which includes medicinal as well as surgical interventions. The importance of exercise is highlighted, notably its effects on functional abilities and the need for patients to be responsible for self-management. The final chapter in this part discusses caregivers, who are typically closely connected to the patient and often need education to help the patient as well as themselves.

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chapter
1

Introduction to Parkinson's Disease and Its Physical Management

Among patients with Parkinson's disease (PD), the rate of progression and severity can vary greatly (Goetz et al., 2000). Some people can have PD for 20 or 30 yr and continue to function independently in the community. For others the disease course is relatively fast and unrelenting. The rate of this clinical progression is directly related to the rate of loss of dopamine-producing cells of the substantia nigra compacta in the midbrain. The cause for this loss is uncertain (idiopathic). The pattern of disease progression has been described by Hoehn and Yahr's staging of PD (Hoehn & Yahr, 1967). Neuroimaging studies have demonstrated a strong correlation with the loss of nigral dopaminergic neurons and the higher stages of Hoehn and Yahr (Goetz et al., 2004). In contrast to idiopathic PD, secondary Parkinsonism is caused by neuropathologies unrelated to the lack of dopamine production. The distinguishing symptoms of secondary Parkinsonism are reviewed in the next section. Regardless of a patient's Hoehn and Yahr stage or whether symptoms are because of secondary Parkinsonism, opportunities for physical and educational intervention are available. These interventions are outlined toward the end of the chapter. Finally, to facilitate efficient use of this book, a sample patient case is illustrated.

Distinguishing Features of Idiopathic Parkinson's Disease and Secondary Parkinsonism

The presentation of symptoms in people with idiopathic Parkinson's disease may exhibit commonalities with secondary Parkinsonism because of basal ganglia involvement. The precipitating underlying pathology, however, results from various causative factors.

Idiopathic Parkinson's Disease

Idiopathic Parkinson's disease (PD, also known as paralysis agitans) is known for its depletion of the neurotransmitter dopamine in the brain. This depletion is due to the death of

the dopamine-producing cells in the substantia nigra compacta and is of unknown etiology. Dopamine is responsible for normalization of sequential movements, automaticity of learned movements, and normalization of tone. Symptoms of PD do not become apparent until approximately 80% of the neurons in the substantia nigra compacta are lost (Paulson & Stern, 2004).

The prevalence of PD increases with age. It affects approximately 1% of the population over age 65 and 2% of the population over age 80 (Goldman & Tanner, 1998). Young onset PD occurs in the 21 through 39 age group (Quinn et al., 1987) and accounts for approximately 10% of the population with PD. On rare occasions the onset of PD symptoms may occur before age 21, a circumstance classified as juvenile onset (Sethi, 2003). A preliminary diagnosis of PD requires two of the following three symptoms: bradykinesia (slowness of movement), rigidity, or resting tremor (Dewey, 2000). A more definitive diagnosis depends on the previously mentioned symptoms, a good response to dopamine replacement medications (L-dopa), and the absence of symptoms suggestive of another movement disorder. For example, people with PD do not exhibit initial symptoms of postural instability, orthostatic hypotension, or dementia. These symptoms are suggestive of Parkinson's Plus disorders (Sethi, 2003; Suchowersky et al., 2006). The initial symptoms of suspected PD, however, are typically not treated with L-dopa. Therefore, PD may not be ruled in or out until later in the disease progression, after L-dopa is initiated.

A significant number of people with PD who take L-dopa ultimately develop motor fluctuations and dyskinesias (e.g., choreatic movements). From the standpoint of physical management, therefore, any patient who takes L-dopa medication should be asked whether any mobility variations are related to their medication cycle (see chapter 2, "Medical and Surgical Interventions," pages 11–26). Choreatic movements are not a symptom of PD but a side effect of chronic use of L-dopa in combination with disease progression (Clissold et al., 2006; McColl et al., 2002).

Modified Hoehn and Yahr Staging of PD Progression

In 1967 Dr.'s Hoehn and Yahr published their landmark staging system for PD progression in the journal *Neurology* (Hoehn & Yahr, 1967). The original Hoehn and Yahr system had five full stages. The system was later modified slightly to include half-stages 1.5 and 2.5.

Modified Hoehn and Yahr Stages

- Stage 1 = Unilateral disease
- Stage 1.5 = Unilateral and axial involvement
- Stage 2 = Bilateral disease, balance intact
- Stage 2.5 = Mild bilateral disease with recovery on pull test
- Stage 3 = Mild to moderate bilateral disease; some postural instability; physically independent
- Stage 4 = Severe disability; still able to walk or stand unassisted
- Stage 5 = Wheelchair bound or bedridden unless aided