Physical Therapy Management of Low Back Pain

A Case-Based Approach

Julia Chevan, PT, PhD, MPH, OCS
Professor of Physical Therapy
Springfield College
Springfield, MA

Phyllis A. Clapis, PT, DHSc, OCS
Associate Professor of Physical Therapy
American International College
Springfield, MA
Contents

Preface ......................................................... vii
Acknowledgments ......................................... ix
About the Authors ........................................... xi
Contributors ................................................ xiii
Reviewers .................................................... xv
Introduction ................................................. xvii

Chapter 1: Low Back Pain in the United States ......................... 1
Julia Chevan, PT, PhD, MPH, OCS
Phyllis A. Clapis, PT, DHSc, OCS

Introduction .................................................. 1
Prevalence of Low Back Pain .......................... 2
Risk Factors for Low Back Pain ..................... 3
Low Back Pain and Recurrence ...................... 5
Disability Due to Low Back Pain ..................... 6
Healthcare Utilization Due to Low Back Pain .... 7
Outcomes Measurement in Low Back Pain ........ 10
Summary ....................................................... 12
References ................................................... 12

Chapter 2: Meet Joe Lores .................................... 15
Julia Chevan, PT, PhD, MPH, OCS
Phyllis A. Clapis, PT, DHSc, OCS

Background ................................................... 15
Examination ................................................... 17
Evaluation ..................................................... 18
The Next Steps ............................................... 18
References ..................................................... 28
Chapter 3: The Cyriax Approach ........................................ 29
Elaine Atkins, DProf, MA, MSCP
Jill Kerr, MSc, BSc, MCSP
Emily Goodlad, MSc, MCSP

Background .......................................................... 30
Application of the Cyriax Model to Joe Lores ................ 45
Summary ............................................................. 60
References ............................................................ 60

Chapter 4: The Kaltenborn-Evjenth Concept ..................... 67
John Krauss PT, PhD, OCS, FAAOMPT

Background .......................................................... 67
Application of the Kaltenborn-Evjenth Approach to Joe Lores ... 70
Summary ............................................................. 92
References ............................................................ 93

Chapter 5: The Maitland Concept ................................... 95
Kenneth E. Learman, PT, PhD, OCS, COMT, FAAOMPT
Christopher R. Showalter, PT, OCS, COMT, FAAOMPT, FABS

Background .......................................................... 95
Application of the Maitland Concept to Joe Lores ............. 101
Summary ............................................................. 110
References ............................................................ 111

Chapter 6: McKenzie Approach: Mechanical Diagnosis and Therapy .... 113
Helen Clare, PhD, FACP, Dip Phy, Dip MDT

Background .......................................................... 113
Application of McKenzie Model to Joe Lores .................. 116
Summary ............................................................. 130
References ............................................................ 131
Appendix 6–1: The McKenzie Institute Lumbar Spine Assessment .... 133
Appendix 6–2: McKenzie Institute Assessment Forms: Guidelines for the Completion of the Assessment Forms ... 137

Chapter 7: The Mulligan Concept ................................ 141
Donald K. Reordan, PT, MS, OCS, MCTA

Background .......................................................... 141
Chapter 8: The Paris Approach ................................. 157
Jeffrey A. Rot, PT, DHSc, OCS, MTC, FAAOMPT
James A. Viti, PT, MSc, DPT, OCS, MTC, FAAOMPT
  Background ....................................................... 157
  Application of the Paris Approach to Joe Lores ................. 160
  Summary .......................................................... 180
  References ....................................................... 180
  Appendix 8–1: Blank Paris Assessment ........................ 183

Chapter 9: The Osteopathic Approach .......................... 191
Maria Meigel, PT, DPT, CFMT, OCS
  Background ....................................................... 191
  Application of the Osteopathic Approach to Joe Lores .......... 199
  Summary .......................................................... 211
  References ....................................................... 211

Chapter 10: Movement System Impairment Syndromes Approach .... 213
Shirley Sahrmann, PT, PhD, FAPTA
  Background ....................................................... 213
  Application of Movement System Impairment Syndromes Model for Joe Lores ........................................ 221
  Summary .......................................................... 232
  References ....................................................... 252
  Appendix 10–1: Lower Quarter Examination ..................... 255
  Appendix 10–2: Movement System Lower Quarter Examination ................................................................. 237
  Appendix 10–3: Movement System Syndromes of the Low Back ................................................................. 241

Chapter 11: A Treatment-Based Classification Approach ............ 247
Paul E. Mintken, PT, DPT, OCS, FAAOMPT
Mark D. Bishop, PT, PhD
  Background ....................................................... 247
  Application of The TBC Approach to Joe Lores ................. 268
## CONTENTS

References .................................................................................................................. 300

Appendix 11–1: Treatment-Based Classification
Stage I Lumbar Evaluation ....................................................................................... 315

### Chapter 12: Synthesis and Conclusions ................................................................. 317

Julia Chevan, PT, PhD, MPH, OCS
Phyllis A. Clapis, PT, DHSc, OCS

Theoretical Comparisons ......................................................................................... 317
Practical Comparisons ............................................................................................. 324
An Integrated Approach to Treating Joe Lores ...................................................... 329
Summary .................................................................................................................. 330
References ............................................................................................................... 331

Index ......................................................................................................................... 333
Preface

Back pain, put simply, is a universal human problem for which there exists no magic bullet. There are many therapeutic options for patients and many practitioners who claim to have the answer to the conundrum of back pain. A quick search for treatment yields options that include surgery, injection, medication, exercise, and practitioners who range from physicians and physical therapists to acupuncturists and yoga teachers. The array of options can be confusing to both patient and provider. Within physical therapy, approaches to the problem of back pain are also numerous. As physical therapist educators, we are challenged by the task of introducing our students to the vast assortment of physical therapy approaches to lower back pain (LBP), some of which have sound scientific rationale and others that do not. Our goal in writing this book was to provide a resource on the models that are used in physical therapy to treat acute low back pain using the example of a single patient case. The book is intended primarily for students entering the profession of physical therapy but may also be of interest to practitioners trying to understand the array of intervention options used in physical therapy. Both students and clinicians are encouraged to further their knowledge in these approaches by reading the primary sources cited or by attending continuing education courses.

We are indebted to our own students who pushed us to pull all of this material into one text. These students always returned from their clinical experiences asking us to explain why two therapists in two different clinics would treat the same patient so differently. To those students we can finally say that we have some of the answers and they are in this book.
Acknowledgments

When I look up at the full moon, I know that the full moon is there. And I want only to focus my attention, my whole attention, on the presence of the full moon. So I take an in-breath and I say, “full moon.” And then full moon suddenly reveals herself to me very clearly. There’s only the full moon at that moment. And when I breathe out, I smile and say, “Thank you for being there.” So, I and the full moon were very real in that moment. And I repeat, I do it two, three, four times, and my happiness increases all the time. I feel very alive in that moment.

—From a dharma talk by the Venerable Thich Nhat Hanh entitled “Be Like the Earth” given at Plum Village on July 23, 1996.

Thank you for being there:

Patricia, Saadya, and Nava, my family, the keepers of my heart

My friends and colleagues at Springfield College

Regina Kaufman, who inspires and critiques in the same breath

David Miller, a leader I am always following

Gail Stern and Esther Haskvitz, my fan club

Phyllis, for helping birth this baby and many others

—Julia Chevan
ACKNOWLEDGMENTS

There are so many people who deserve my heartfelt thanks for helping this book come to fruition:

Thank you to my colleague and coeditor Julia Chevan for conceiving the idea for this book and for her expertise, professionalism, and sense of humor throughout the process. I can’t imagine working with a better partner.

Thank you to each of the chapter authors. I have been honored to work with such brilliant clinicians and I am keenly aware that this project would not have been possible without their expertise.

Thank you to my students and colleagues at American International College who have inspired and supported me, especially Gail Stern and Sue Davis for their never-ending encouragement and enthusiasm.

A special thanks and dedication to my parents who are, quite simply, the greatest teachers I’ve ever had, and to my family for their daily love and support.

Finally, thank you to the individual pioneers of our profession who developed the models we have presented in this book. It is through their contributions that we have been able to so greatly impact the lives of our patients.

—Phyllis Clapis
About the Authors

Julia Chevan graduated with a BS degree in physical therapy from Boston University in 1985. Since that time, she has worked in a variety of clinical settings mostly focused on providing care for patients with orthopedic problems. In 1993 she joined the faculty of Springfield College where she now serves as Professor and Chair in the Department of Physical Therapy. Julia is a board-certified clinical specialist in orthopedic physical therapy through the American Board of Physical Therapy Specialties and has passed the credentialing examination with the McKenzie Institute. Her academic background includes advanced degrees in public health from the University of Massachusetts, in orthopedic physical therapy from Quinnipiac University, and a doctoral degree in health studies from Virginia Commonwealth University. Julia’s research interests have drawn her into examining health services issues related to the care of persons with low back and neck pain. In addition to her professional life, Julia is the mother and soccer coach for two young children who can almost run faster than she can. She is the partner of Patricia Jung, a physical therapist of exceptional ability who can run as fast as anyone.

Phyllis A. Clapis has been practicing in the area of orthopedic physical therapy for over 25 years. She graduated with a BS degree in physical therapy from University of Connecticut in 1983 and received her Master’s degree in orthopedic physical therapy from Quinnipiac University in 1994. In 2004 she received a doctorate in health science from the University of St. Augustine. She started her academic career in 1996 at American International College where she currently serves as an Associate Professor in the Division of Physical Therapy. Her teaching focus includes spinal and extremity orthope-
dic patient management as well as evidence-based physical therapy practice. Phyllis has been a board-certified specialist in orthopedic physical therapy through the American Board of Physical Therapy Specialties since 1994. She is a consultant at Mount Holyoke College and is a regular contributor to McKesson Clinical Reference System’s *Sports Medicine Advisor* series. She resides in western Massachusetts with her family.
Contributors

Elaine Atkins, DProf, MA, MCSP owns a private practice in London, United Kingdom. She holds a doctorate in Professional Studies (Orthopaedic Medicine Education), is a Fellow of the Society of Orthopaedic Medicine and the programme leader for the MSc Orthopaedic Medicine.

Mark D. Bishop, PT, PhD is an Assistant Professor in the Department of Physical Therapy at the University of Florida in Gainsville, Florida.

Helen Clare, PhD, FACP, Dip Phy, Dip MDT is in private practice in Sydney, Australia and serves as Associated Academic Staff with Sydney University. She is a Fellow of the Australian College of Physiotherapists and an instructor, and the International Director of Education with the McKenzie Institute.

Emily Goodlad, MSc, MCSP is in private practice in Edinburgh, United Kingdom. She is a Fellow of the Society of Orthopaedic Medicine.

Jill Kerr, MSc, BSc, MCSP is in private practice in Edinburgh, United Kingdom. She is a Fellow of the Society of Orthopaedic Medicine and a course principal for the society’s Diploma in Orthopaedic Medicine.

John Krauss, PT, PhD, OCS, FAAOMPT is an Associate Professor at Oakland University in Rochester, Michigan. Dr. Krauss received his Orthopedic Manipulative Therapy Certification through the International Seminar of Orthopedic Manipulative Therapy and completed an orthopedic residency training and received his Graduate Certificate in Orthopedic Manual Physical Therapy through Oakland University. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists.
Kenneth E. Learman, PT, PhD, OCS, COMT, FAAOMPT is an Associate Professor at Youngstown State University in Youngstown, Ohio. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists and is senior teaching faculty for Maitland-Australian Physiotherapy Seminars.

Maria Meigel, PT, DPT, CFMT, OCS is in private practice in Long Island, New York. She is a member of the teaching faculty at both Touro College and Stony Brook University. Dr. Meigel is a principal in Integrative Manual Therapy Solutions.

Paul E. Mintken, PT, DPT, OCS, FAAOMPT is an Assistant Professor in the physical therapy program at the University of Colorado in Denver, Colorado. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists and teaches for Evidence in Motion.

Donald K. Reordan, PT, MS, OCS, MCTA is in private practice in Jacksonville, Florida. He is a certified member of the Mulligan Concept Teachers Association and serves as the regional manager for the Mulligan Concept.

Jeffrey A. Rot, PT, DHSc, OCS, FAAOMPT is an Associate Professor at the University of St. Augustine at the St. Augustine, Florida campus. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists and teaches the S3 coursework for the University’s Institute of Physical Therapy.

Shirley Sahrmann, PT, PhD, FAAPA is an Associate Professor of Physical Therapy and Neurology at Washington University School of Medicine, St. Louis, Missouri. She is a Fellow of the American Physical Therapy Association. Dr. Sahrmann is the director of the Movement Science Program at Washington University.

Christopher R. Showalter, PT, OCS, COMT, FAAOMPT, FABS is in private practice in New York. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists and is the clinical director for Maitland-Australian Physiotherapy Seminars.

James A. Viti, PT, MSc, DPT, OCS, MTC, FAAOMPT is an Assistant Professor at the University of St. Augustine in St. Augustine, Florida. He is a Fellow of the American Academy of Orthopedic Manual Physical Therapists and teaches full time in the entry-level and advanced studies programs.
Reviewers

Amy J. Bayliss, PT, DPT
Assistant Clinical Professor
Department of Physical Therapy
School of Health and Rehabilitation Sciences
Indiana University
Indianapolis, Indiana

Rogelio Adrian Coronado, PT, CSCS, FAAOMPT
Doctoral Student
University of Florida
Gainesville, Florida

Paul-Neil Czujko, PT, DPT, OCS
Clinical Assistant Professor
Physical Therapy Program
Stony Brook University
Stony Brook, New York

Ronald De Vera Barredo, PT, DPT, EdD, GCS
Head, Department of Physical Therapy
Tennessee State University
Nashville, Tennessee

Patricia M. King, PT, PhD, OCS, MTC
Associate Professor and Chair
Department of Physical Therapy
xvi

Reviewers

Arkansas State University
Jonesboro, Arkansas

Elaine Lonnemann, PT, MSc, DPT, OCS FAAOMPT
Associate Professor
Bellarmine University
Louisville, Kentucky

Jose M. Milan, PTA, MEd
Assistant Professor
Austin Community College
Austin, Texas

Corey B. Simon, PT, DPT, FAAOMPT
Doctoral Student
University of Florida
Gainesville, Florida
Introduction

In the United States, considerable resources are allocated to care related to back pain. Annual expenditures have been estimated to reach the sum of $86 billion per year.\(^1\) Worse, the trend in dollars expended for spine problems, based on data from 1997–2006, indicates that we spend more money each year on care for this condition.\(^2\) Despite the wide variety of treatment options available, the cost of work-related disability continues to rise.\(^3\) For physicians, treatment of low back pain has remained a challenge since most patients with low back pain lack a specific pathoanatomic diagnosis.\(^4\) The term "nonspecific low back pain" has been coined to describe these patients whose pain is of unknown origin.

Physical therapists have also been challenged by the treatment of patients with nonspecific low back pain. These patients make up the majority of an outpatient physical therapist’s case load.\(^5\) Some therapists are intimidated by the seemingly complex signs and symptoms that accompany patients with back pain while others pride themselves in being so-called “spine specialists.”

Today, physical therapy interventions for low back pain are wide and varied, but that was not always the case. During World War I, the first physical therapists, better known then as reconstruction aides, provided simple treatments such as exercise, hydrotherapy, and massage to wounded veterans. Physical therapy was prescription-based; the physician examined the patient and provided the therapist with detailed orders for each intervention, including parameters for duration, frequency, and intensity. Physical therapists were not allowed to evaluate their patients and any form of independent thinking was viewed as a challenge to the authority of the physician. Most patients received the same treatment for the same diagnosis. The profession grew from one that was focused on polio and postwar injuries to...
one that provided intervention for multiple diseases ranging from cardiovascular and pulmonary conditions to neurology and orthopedic conditions.\(^6\)

The 1960s and 1970s heralded an era of growth in the area of orthopedic physical therapy and a growth in the approaches that therapists used for treating low back pain from physician-based approaches to approaches developed and tested by physical therapists.

During the prescription-based era of physical therapy, the primary form of exercise prescribed for patients with low back pain was “William’s Flexion Exercises.” These exercises, named after Dr. Paul C. Williams, were designed to both improve trunk stability while promoting flexibility of the hip flexors and the lumbar extensor muscles. According to Williams, the first rule for those who suffered from back pain was to reduce the lumbar lordosis to a minimum.\(^7\)

Williams’ work in the U.S. was contrasted with the work being done by Dr. James Cyriax who opened a department of massage and manipulation at St. Thomas’ Hospital in London in which methods of massage and manipulation were carried out by physiotherapists working under the auspices of orthopedic physicians.

In the early 1950s and 1960s, Freddy Kaltenborn, a Norwegian physical therapist developed an approach to manual therapy and back care treatment that was based on normalizing joint movement. Kaltenborn was not the only physical therapist working on a manual approach to back pain. As orthopedic physical therapy grew, the work of a number of these early manual therapists including Freddy Kaltenborn, Mariano Rocobado, and Geoffrey Maitland diffused into the United States.\(^8\)

In 1970, Cyriax, Kaltenborn, and an internationally representative group of therapists formed the International Federation of Orthopaedic Manipulative Therapists, bringing many schools of thought and approaches to manual therapy and spine treatment together in one association. In parallel, 1974 saw the founding of the Orthopaedic Section of the American Physical Therapy Association (APTA) in the United States, led by Stanley Paris. At this point, the astute student should note the parallel between the names we are mentioning in this brief history and the names associated with the models presented in subsequent chapters of this book.

The 1980s brought a paradigm shift to the treatment of LBP when Robin McKenzie, a New Zealand physical therapist, introduced the radical notion that extension, not flexion, was the preferred direction of movement for managing acute back pain. He suggested that excessive flexion was actually the cause of one’s low back pain and that most back pain was caused by an accumulation of fluid in the disc. In terms of treatment, now physical therapists were either teaching patients how to reduce their lordosis or how to...
increase it. Ultimately in an era of prescription-based care, it was still the physician’s call.

The 1980s also saw an expanded role for the U.S. physical therapist and the end to prescription-based physical therapy. In 1984, the APTA House of Delegates passed a motion that allowed physical therapists to evaluate and treat patients. This solidified physical therapy as a true profession, with its own defined body of knowledge and autonomy. With this newfound role came the ability to evaluate patients and render a diagnosis. The challenge, however, was to differentiate a diagnosis made by a physical therapist from one made by a physician. While the early definition of the term “diagnosis” took on many shapes, it was ultimately adopted by the APTA and is described in the *Guide to Physical Therapist Practice* as “both the process and the end result of evaluating examination data which the physical therapist organizes into defined clusters, syndromes, or categories to help determine prognosis (including plan of care) and the most appropriate intervention strategies.” The key point here is that a diagnosis made by a physical therapist is meant to describe problems in terms of the disablement model in categories that guide treatment. The role and purpose of diagnosis by physical therapists was also clarified by Anthony Delitto and Lynn Snyder-Mackler who stated:

> The classic medical diagnosis can be defined as identifying a patient’s disease by its signs, symptoms, and laboratory data, and the other general definition, which we believe to be synonymous with clinical classification, entails placing a label on clusters of clinical data.

As a profession that has grown into more independent modes of practice and one in which therapists were writing prescriptions rather than just filling them, there was an increased emphasis on the development of diagnostic protocols. Academics and clinicians were being challenged to develop the theory and content for these protocols that were based on a gathering of patient signs and symptoms.

While it was agreed upon that the diagnostic process was meant to guide treatment, there was still little evidence on what constituted appropriate care for treatment of LBP. Clinicians were often using two types of diagnostic processes to guide treatment. One, based on a pathoanatomical model, and the other, which was considered newer, was based on a classification system that would allow the clinician to identify clusters of symptoms, signs, and characteristics of patients who responded to a specific treatment. These
diagnostic processes are the framework on which many of the approaches to LBP today are built, including a number that are presented in this book.

Years ago, an article appeared in the Wall Street Journal in which the writer, who had chronic knee pain, was examined by five different physical therapists and ultimately received five different treatment suggestions.\textsuperscript{12} The author expressed some concern with the level of ambiguity amongst the therapists and concluded that “physical therapy is still as much art as science.”\textsuperscript{12} As a result of the article, our profession was scrutinized for the therapists’ uncertainty and lack of agreement in managing the patient’s knee symptoms.\textsuperscript{13} There was little evidence that supported one treatment approach over the other. The general school of thought when the article was published was that the key to treating patellofemoral pain was to strengthen the vastus medialis obliquus (VMO). With the rise in evidence, we know today that VMO is not necessarily the optimal treatment strategy. The evidence-based practice movement has provided us with more scientific evidence of the impact of clinical interventions, more information on the validity of our tests and measures, and models that are based on sound scientific rationale. Given the current variety of approaches to treating back pain, what would we expect if the patient sought treatment for her low back pain? Would the patient be examined in a similar way by each of the therapists? Would the treatments be similar?

The answers to these questions are precisely what this book is about. We recruited therapists from around the world who are experts in their specified models. Our experts include Mulligan, McKenzie, and Paris certified therapists, along with many more. We selected models that were brought to our attention by our own students who, during their clinical experiences, are exposed to practice that is based both in evidence and in habit.

To write this book, each expert was provided with a hypothetical case of a patient named Joe Lores who had been experiencing LBP for 2 weeks as a result of an injury. We used the documentation template from the Guide to Physical Therapy Practice\textsuperscript{14} as a means to structure the screening and examination, and to initially provide the same generic information to each therapist. This template was chosen for its ability to identify red flags that would indicate a need for immediate medical referral. Once given this basic examination information, the experts were asked what tests and measures they might require as part of their model’s examination strategy. After this information was provided, each author determined a diagnosis, prognosis, and plan of care for the patient. Authors were asked to structure their work using
Introduction

a plan for examination and intervention that would be employed by a therapist working under the paradigm of that model’s science and theory.

While this book is intended to serve as an introduction to each of the common approaches to management of low back pain, it is no way exhaustive. It might be best to think of it as a primer, giving the reader a flavor for each approach, but not a comprehensive description of each one. We urge the reader to delve a little deeper into the information by reading the literature and attending continuing education courses that are specific to each model. Most importantly, we urge the reader to think critically about the information provided by any model or any guru claiming to have the “answer to low back pain.” We are still looking.

REFERENCES
