Multidisciplinary Management of Migraine

Pharmacological, Manual, and Other Therapies

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In Memoriam

I am greatly saddened by the loss of my close friend and colleague Peter Huijbregts, who suddenly passed away on November 6, 2010. His death was a horrible tragedy and a great loss to his family and friends, the profession of physical therapy, and society in general. Peter was one of those individuals whom you never forgot once you were fortunate enough to have him cross your path.

I was aware of Peter's substantial contributions to the physical therapy profession well before I had an opportunity to meet and work personally with him. I first became friends with Peter during his tenure as Editor for the *Journal of Manual and Manipulative Therapy.* I was also extremely fortunate to work with him as Editor of *Contemporary Issues in Physical Therapy and Rehabilitation Medicine* for Jones & Bartlett Learning, as he entrusted me with editing the first textbook of the series, along with this book.

Peter was wonderfully articulate and never at a loss for words. I can recall some late-night evenings spent at national conferences enjoying conversations with Peter, who would frequently discuss his love for his wife, Rap, and his two children, Arun Joseph and Annika Dani. I will also never forget his sense of humor and can remember numerous occasions where Peter would entertain an entire room with his wit and comedy.

Peter has had a remarkable influence on many professionals who have had the fortunate opportunity to know him. His passing leaves a huge void in the manual therapy community around the entire world. Peter was a truly great gentleman, a wise scholar, and an inspiring man.

I will miss him greatly!

—César Fernández-de-las-Peñas

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Contents

FOREWORD xiii

INTRODUCTION xv

CONTRIBUTORS xvii

REVIEWERS xxi

PART I INTRODUCTION 1

Chapter 1 **Epidemiology and Quality of Life with Migraine** 3
Kathleen R. Merikangas, PhD, and Tarannum Lateef, MD, MPH
Introduction 3
Magnitude of Headache Syndromes in the General Population 4
Risk Factors and Correlates 5
Incidence and Course of Disease 5
Impact of Migraine 6
Conclusions 7

Chapter 2 **The Differential Diagnosis and Boundaries of Migraine** 11
Michael Bjørn Russell, MD, PhD, Dr. Med Sci
Introduction 11
Differential Diagnosis for Migraine Without Aura 11
Differential Diagnosis for Aura 12
Differential Diagnosis for Typical Migraine with Aura 12
Differential Diagnosis for Hemiplegic Migraine 13
Conclusions 13

Chapter 3 **The Comorbidities of Migraine** 15
Marcelo E. Bigal, MD, PhD
Introduction 15
Mechanisms of Comorbidity 16

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The Comorbidities of Migraine. . . . 17
Conclusions 24

Chapter 4 **Aggravating and Trigger Factors for Migraine** 29
Anne Donnet, MD
Introduction. . . . 29
Precipitating Factors 29
Aggravating Factors 33
Conclusions 34

Chapter 5 **The Trigeminocervical Complex and Migraine** 37
Thorsten Bartsch, MD, and Peter J. Goadsby, MD, PhD
Introduction. . . . 37
The Neural Substrate of Pain in Migraine: Anatomy and Convergence 37
Pharmacology of Trigeminovascular Nociceptive Transmission in the Trigeminocervical Complex 39
Central Mechanisms of Pain Processing: Central Sensitization and Descending Inhibition 42
Conclusions 43
Acknowledgments 43

Chapter 6 **Peripheral and Central Sensitization Mechanisms in Migraine** 47
Marina de Tommaso, MD, PhD, Alessandro Capuano, MD, PhD, and Massimiliano Valeriani, MD, PhD
Introduction. . . . 47
What Is “Special” in Migraine Sensitization? 48
Neurobiology of Peripheral and Central Sensitization in Migraine 49
Mechanisms of Sensitization in Migraine: A Neurophysiological Approach . . . 52
From the Mechanisms to Clinical Practice: Features of Central Sensitization in Primary Headache Patients 53
Why Evaluate Central Sensitization Signs in Migraine? 54
Conclusions 54

Chapter 7 **Neurophysiological Basis of Muscle-Referred Pain to the Head** 57
Thomas Graven-Nielsen, PhD, Dr. Med Sci, Hong-You Ge, MD, PhD, and Lars Arendt-Nielsen, PhD, Dr. Med Sci
Introduction. . . . 57
Referred Head Pain from Myofascial Trigger Points 58
Experimental Referred Musculoskeletal Pain 58
Mechanisms for Referred Pain. . . . 63
Other Headache Models 63
Headache and Descending Pain Modulation 64
Conclusions 64

Chapter 8 **A Comprehensive View of Migraine Pathophysiology** 67
Andreas Gantenbein, MD, Peter Sándor, MD, Franz Riederer, MD, and Jean Schoenen, MD, PhD
Introduction. . . . 67
The Different Pathophysiological Concepts 68
Comorbidities 75
Migraine and the Placebo Effect 76
Conclusions 76

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PART II PHARMACOTHERAPY FOR MIGRAINE 81

Chapter 9 **Acute Anti-Migraine Drugs** 83
Fabio Antonaci, MD, PhD, and Marta Allena, MD
Efficacy and Adverse-Effect Profiles 83
Customized Acute Treatment Strategies 86
Conclusions 88

Chapter 10 **Preventive Anti-Migraine Drugs** 91
Stephen Silberstein, MD, Meryl Latsko, MD, MPH, and Jean Schoenen, MD, PhD
Introduction 91
Principles of Preventive Therapy 92
Specific Migraine Preventive Agents 93
Setting Treatment Priorities and Managing Comorbidities 100
Conclusions 102

Appendix **10.1 AAN Classification of Evidence for the Rating of a Therapeutic Study** 106

Appendix **10.2 Classification of Recommendations** 107

Chapter 11 **Management Specificities in Female Migraineurs** 109
Hélène Massiou, MD, and Geneviève Plu-Bureau, MD, PhD
Introduction 109
Female Hormones and Migraine 109
Menstrual Migraine 110
Migraine and Hormonal Contraception 112
Migraine and Menopause 114
Migraine, Pregnancy, and the Postpartum Period 115
Conclusions 118

Chapter 12 **Pharmacoeconomic Aspects of Drug Treatment for Migraine** 121
Fabio Antonaci, MD, PhD, Cristina Tassorelli, MD, and Marta Allena, MD
Introduction 121
Costs Related to Acute Treatments 121
Costs of Prophylactic Treatments 122
Conclusions 123

Chapter 13 **Pediatric and Juvenile Migraine** 125
Donald W. Lewis, MD, FAAP, FAAN
Introduction 125
Migraine in Infants, Toddlers, and Young Children 126
Migraine in Older Children 129
Management of Childhood and Adolescent Migraine 133
Prognosis 138
Conclusions 139
Case Reports 139

PART III MANUAL THERAPIES FOR MIGRAINE 143

Chapter 14 **Neck and Thoracic Spine in Migraine** 145
Peter Huijbregts, PT, MSc, MHSc, DPT, OCS, FAAOMPT, FCAMT, Paul Glynn, PT, DPT, OCS, FAAOMPT, John R. Krauss, PT, PhD, OCS, FAAOMPT, Bryan S. Dennison, PT, DPT, MPT, OCS, CSCS, FAAOMPT, and Edgar Savidge, PT, DPT, OCS

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Introduction . . . 146
Cervical Spine Physical Examination . . . 149
Thoracic Spine Physical Examination . . . 153
Cervical Spine Interventions . . . 155
Thoracic Spine Interventions . . . 161
Conclusions . . . 163

Chapter 15 Manual Approaches for Myofascial Trigger Points . . . 167
Robert D. Gerwin, MD, and César Fernández-de-las-Pénas, PT, DO, PhD
Overview: Myofascial Trigger Points . . . 167
Myofascial Trigger Points in Migraine Headache . . . 169
Treatment of Myofascial Trigger Points . . . 171
Manual Treatment Principles . . . 171
Manual Treatment of Specific Muscles . . . 176
Conclusions . . . 182

Chapter 16 Muscle Energy Techniques . . . 185
Gary Fryer, PhD, BSc, ND
Introduction . . . 185
Muscle Energy Techniques Applied to the Cervical Muscles . . . 189
Muscle Energy Techniques Applied to the Cervical Joints . . . 197
Acknowledgments . . . 202

Chapter 17 Neuromuscular Therapies in Treatment of Migraine . . . 205
Leon Chaitow, ND, DO
Introduction to Neuromuscular Therapy . . . 206
Central Sensitization: Its Biomechanical Correlates and Contribution to Migraine . . . 207
Methods to Reduce Peripheral and Central Sensitization . . . 209
Dysfunctional Peripheral Features Contributing to Central Sensitization . . . 212
Examples of NMT . . . 216
Conclusions . . . 220

Chapter 18 Neuromusculoskeletal Assessment and Management in Pediatric Migraine . . . 225
Michiel Trouw, PT, MT (OMT), and Harry Von Piekartz, PT, MSc, PhD
Introduction . . . 225
Epidemiology . . . 226
Classification . . . 226
Clinical Presentation of Pediatric Migraine with Overlapping Secondary Headache Forms . . . 227
Contributing Factors . . . 228
Why Neuromusculoskeletal Examination Is Useful in Pediatric Migraine . . . 229
Neuromusculoskeletal Examination in Pediatric Migraine . . . 230
Treatment and Management: Case Reports . . . 234
Conclusions . . . 237

Chapter 19 Neurodynamic Approach for Migraines . . . 241
Emilio Puentedura, PT, DPT, PhD, OCS, GDMT, CSMT, FAAOMPT, Adriaan Louw, PT, MAppSc, GCRM, CSMT, Paul Mintken, PT, DPT, OCS, FAAOMPT, and Ina Diener, PT, BAppSc, PhD
Introduction . . . 241

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What Is a Migraine? . . . 242
The Biological Plausibility of a Neurodynamic Mechanism in Headache . . . 243
Assessment of Neurodynamics in Headache Patients . . . 247
Treatment of Neurodynamic Dysfunction . . . 248
Exercise, Blood Flow, and Nerves in Migraine Headache . . . 249
Conclusions . . . 249

Chapter 20 **Manual Therapy in the Cranial Region** . . . 255
César Fernández-de-las-Peñas, PT, DO, PhD, Javier González-Iglesias, PT, DO, PhD, Harry Von Piekartz, PT, MSc, PhD, and Graham Gard, DO
Perspectives on the Management of the Cranium . . . 256
Basic Sciences Supporting the Management of the Cranium . . . 257
Basic Anatomy of the Bones of the Cranium Relevant to Migraine . . . 259
Basic Anatomy of the Cranial Nerves Relevant for Migraine . . . 262
Manual Therapy Interventions for the Cranium . . . 264
Conclusions . . . 273

Chapter 21 **Trigger Point Dry Needling** . . . 277
Jan Dommerholt, PT, DPT, MPS, Johnson McEvoy, BSc, MSc, DPT, MISCP, MCSP, PT, and Christian Gröbli, PT
Introduction . . . 277
Approach to Needling Trigger Points in All Muscles . . . 279
Neck Muscles . . . 280
Head Muscles . . . 284
Shoulder Muscles . . . 286

Chapter 22 **Vestibular Rehabilitation for Vestibular Migraine and Motion Sensitivity** . . . 291
Nicole Elizabeth Acerra, PT, PhD
Introduction . . . 291
Vestibular Migraine . . . 292
Sensitivity to Movement and Visual Stimuli . . . 294
Vestibular Assessment and Rehabilitation . . . 296
Motion Sensitivity Assessment . . . 305
Prognosis . . . 307
Conclusions . . . 307

PART IV OTHER THERAPIES FOR MIGRAINE . . . 311

Chapter 23 **The Placebo Response in Migraine Treatment** . . . 313
David Peters, MB, ChB, DRCOG, DMSMed, MFHom, FLCOM
Introduction . . . 313
Understanding the Placebo Effect . . . 313
The Placebo Effect in Migraine and Migraine Research . . . 317
Are Randomized Controlled Trials a Reliable Research Method? . . . 322
Is Homeopathy a "Super-Placebo"? . . . 322
Implications for Practice (and Optimizing the "Human Response") . . . 323
Conclusions . . . 324

Chapter 24 **Biobehavioral and Psychological Management of Migraine** . . . 327
Frank Andrasik, PhD, and Dawn C. Buse, PhD
Introduction . . . 327
Patient Education, Motivation, and Adherence . . . 328

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Empirically Supported Biobehavioral Therapies for Migraine 330
Empirical Evidence Base for Biobehavioral Therapies 333
Integrating Biobehavioral Treatment with Pharmacological Treatment. 334
Migraine and Psychological Comorbidities, Health-Related Quality of Life, and Productivity 335
Conclusions 335

Chapter 25 Hypnosis for Pain Management 339
Nicole Malaise, MA, Irène Salamun, MA, Valérie Palmaricciotti, MA, and Marie-Elisabeth Faymonville, MD, PhD
Introduction. 339
Some Definitions 340
Neurophysiological Correlates of Hypnosis and Its Pain Modulation. 340
Hypnosis in the Treatment of Chronic Pain 342
Clinical Hypnosis for Chronic Headaches. 342
Efficacy of Clinical Hypnosis with Migraine 343
Consensus on Hypnosis as an Effective Treatment for Migraine 343
Practical Issues 344
Conclusion. 345

Chapter 26 Neurostimulation and Neuromodulation in Migraine. 349
Thorsten Bartsch, MD, Koen Paemeleire, MD, PhD, and Peter J. Goadsby, MD, PhD
Introduction 349
Neurostimulation and Neuromodulation: Current Concepts. 350
Neurostimulation of the Occipital Nerves in Migraine 352
Transcranial Magnetic Stimulation 354
Sphenopalatine Ganglion Electrical Stimulation 355
Vagus Nerve Stimulation 355
Supra-Orbital Nerve Stimulation 356
Nerve Blocks 356
Transcranial Direct Current Stimulation 356
Conclusions 356
Acknowledgments 356

Chapter 27 Botulinum Toxin 361
Stephen Silberstein, MD
Introduction. 361
Headache Treatment 361
Botulinum Toxin in Headache Disorders 362
Botulinum Toxin Treatment Techniques. 363
Conclusion. 366

Chapter 28 Chinese and Traditional East Asian Medicine 369
Stefan Chmelik, MSc, MRCHM, MBAcC, and Mark Bovey, MSc, MBAcC
Brief Introduction to Traditional Chinese Medicine 370
Traditional East Asian Medicine Therapies. 370
Acupuncture for Migraine: The Evidence 374
Herbal Medicine 384

Appendix Latin Names for the Most Frequently Used Herbs. 392

Chapter 29 Naturopathy: Including Nutritional Considerations 397
Joseph Pizzorno, ND
Introduction. 397

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Background 397
Immunoglobulin E, Mast Cells, and Histamine: Butterbur and Food Allergies 398
Mitochondrial Dysfunction: Riboflavin and Coenzyme Q10 400
MTHFR and Homocysteine: Folate, Vitamin B_{12}, and Vitamin B_6 402
Nitric Oxide Hypothesis of Migraine: Vitamin B_{12} 403
Glutamate, Dopamine, and Trace Amine Receptors: Melatonin, Magnesium, and Diet 404
Additional Nutritional Associations/Therapies 406
Conclusions 409

Chapter 30 Dietary Approaches 413
Damien Downing, MBBS, MSB
Introduction: A Case History 413
Dietary Triggers 414
Conclusions 417

Chapter 31 Normobaric and Hyperbaric Oxygen Therapy 419
Michael H. Bennett, MBBS, MD, FANZCA, CertDHM
Introduction 419
The Goal of Oxygen Therapy 419
Oxygen Therapy in Headache 421
Clinical Evidence for the Use of Oxygen 423
Summary of the Results of Randomized Trials 426
Adverse Effects and Contraindications to Hyperbaric Oxygen 427
Interpreting the Clinical Evidence 429
Conclusions 429
Acknowledgments 429

INDEX 431

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Foreword

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The pharmacological treatment of migraine has progressed enormously over the last two decades. A wealth of randomized double-blind trials has documented the efficacy of the triptans and a huge number of post-marketing research studies have provided guidance on the practical use of these acute treatments. The combination of the triptans and nonsteroidal anti-inflammatory agents has delivered increased efficacy against migraine attacks as well. At the same time, a growing body of evidence has shown that overuse of triptans leads to deterioration and chronification in migraine patients. Although prophylactic treatment for migraine has also progressed, the gains realized have not matched those in acute treatment. Indeed, the gradually acquired knowledge of how to best use the different drugs, how to prioritize them, and when to stop prophylactic treatment, and a number of other clinical issues have been driving the agenda rather than the advent of new drugs.

All of these developments in pharmacotherapy have not obviated the need for a broader therapeutic approach to migraine. While patients with straightforward migraine as the only diagnosis are usually easy to treat, the patients seen at specialized clinics are increasingly being noted to suffer from a combination of problems that require a multidisciplinary therapeutic effort. Medication overuse, as already mentioned, is one problem observed in this setting, but comorbid depression and anxiety are also very important. Furthermore, it has become apparent that a relatively small segment of migraine patients experience deterioration of their condition over the years and may end up with the new diagnosis of chronic migraine. Chronic migraine is defined as suffering attacks for at least 8 days per month plus a total of at least 15 days of headache or more per month. Patients with this type of migraine are relatively resistant to existing prophylactic drugs and need multidisciplinary treatment. Although the efficacy of such regimens has not been proven in randomized controlled studies, the results of multidisciplinary treatment have been uniformly positive in a range of open studies in specialized centers in America, Europe, and elsewhere. These severely affected patients have often suffered with migraines for a decade or more, and so placebo effects are not likely to confound the clinical research picture.

This book is edited by an unusual combination of migraine experts—a physiotherapist, an osteopath, and a neurologist. They have recruited a number of international top-tier authors to write chapters on their areas of specialty. The result is a unique focus on the multidisciplinary aspects of migraine treatment, something to which no book has paid sufficient attention before. This book will undoubtedly be useful for those who specialize in the treatment of migraine and other headaches and, in fact, for all providers who care for headache patients.

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Introduction

During the past decade, scientific research has improved our understanding of migraine pathogenesis, leading to more efficient pharmacological treatment protocols. Many migraineurs, however, remain dissatisfied with their anti-migraine medications because these agents are not sufficiently effective or have unpleasant side effects. It is not surprising, therefore, that in a recent survey by Wells et al. (2011), complementary and alternative medicine (CAM) was reportedly used more often among adults with migraines and severe headaches (49.5%) than by those persons without these diagnoses (33.9%). CAM therapies were grouped into four broad categories: alternative medical systems (e.g., acupuncture, homeopathy, naturopathy), manual therapies (e.g., massage, chiropractic care), biologically based therapies (e.g., herbs, food elimination), and mind–body therapies (e.g., biofeedback, hypnosis, meditation, relaxation).

Many—though by no means all—anti-migraine drugs have been studied in large, randomized, placebo-controlled trials and are the mainstay therapies cited in evidence-based international treatment guidelines. Such guidelines are chiefly focused on efficacy measures and seldom take into account side effects and tolerance. CAM therapies do not incorporate drugs and have relatively few adverse effects, but they also usually lack evidence-based data supporting their efficacy in treatment of migraine. Admittedly, this lack of research-based evidence is a major handicap according to modern scientific standards, and it is acknowledged that, whenever possible, adequate controlled trials should be performed. This standard can be problematic, however, as funding for such large trials is rarely available, and adequate, biologically nonactive placebos may not exist.

Meanwhile, the potential usefulness of CAM therapies is supported by the multifactorial pathophysiology of migraine and by its high comorbidity. Building on Kerr's principle (1961), Jes Olesen (1991) has conceptualized the *vascular–supraspinal–myogenic model* for headache where "the perceived pain is determined by the sum of nociception from cephalic arteries and pericranial myofascial tissues converging upon the same neurons and integrated with supraspinal effect." According to the author, this model provides "a rational explanation of empirically developed, internationally accepted, multimodal treatment strategies for migraine and tension-type headache." The majority of manual therapies described in this book are relevant to this multisensory convergent model of head pain.

Migraine, however, is also known to be comorbid with more than 20 somatic diseases (Le et al., 2011), among which musculoskeletal disorders, including fibromyalgia, are highly prevalent. Comorbidity with psychological disorders including generalized anxiety disorder, panic disorder, and depression is even more widespread (Radat et al., 2011).

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Thus somatic and mental comorbidities are seen to contribute substantially to migraine disability. Both physical and mind–body strategies can beneficially modify such disability, thereby contributing to an increased quality of life for patients with migraine. Interestingly, only 4.5% of migraineurs who use CAM therapies (49.5%) declare that they use them specifically for migraines or severe headaches, suggesting that the majority use these therapies for comorbid symptoms (Wells et al., 2011).

To the best of our knowledge, this text is the first book that presents a comprehensive and cutting-edge overview of both the classical pharmacotherapies of migraine and the nondrug treatments, including the wide range of manual therapies and mind–body strategies. The chapter authors were asked to include illustrative clinical vignettes as well as therapeutic evidence scores based both on efficacy and tolerance whenever possible and appropriate. We are deeply indebted to them for their highly knowledgeable and well-balanced contributions.

Although this book's table of contents suggests that multidisciplinarity is the key to migraine therapy, the reader will not find a specific chapter on multidisciplinary treatment strategies here, because such an approach would vary with locally available expertise as well as the patient's clinical presentation and preferences. To conclude this introduction, we can do no better than to repeat David Peters' conclusion (Chapter 23) that "today . . . it is not merely a holistic notion of the patient that is needed, but a holistic notion of the medical context itself." We hope that this book will contribute to this model.

REFERENCES

Kerr FW. Structural relation of the trigeminal spinal tract to upper cervical roots and the solitary nucleus in the cat. *Exp Neurol* 1961;4:134–148.

Le H, Tfelt-Hansen P, Russell MB, et al. Co-morbidity of migraine with somatic disease in a large population-based study. *Cephalalgia* 2011;31:43–64.

Olesen J. Clinical and pathophysiological observations in migraine and tension-type headache explained by integration of vascular, supraspinal and myofascial inputs. *Pain* 1991;46:125–132.

Radat F, Kalaydjiana A, Merikangas KR. Psychiatric comorbidity in migraine. In: Schoenen J, Dodick DW, Sàndor P, eds. *Comorbidity in Migraine.* London: Wiley-Blackwell; 2011:1–13.

Wells RE, Bertisch SM, Buettner C, et al. Complementary and alternative medicine use among adults with migraines/severe headaches. *Headache* 2011;51:1087–1097.

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