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Myofascial Trigger Points

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MYOFASCIAL TRIGGER POINTS

Pathophysiology and Evidence-Informed Diagnosis and Management

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Dedication

Jan Dommerholt would like to dedicate this book to Mona, Taliah, and Aram.

Peter Huijbregts would like to dedicate this book to his parents, who taught him to work hard, and to Rap, Arun, and Annika, who gave him a reason to work less.

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Introduction by the Series Editor

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Other than a summary mention of myogelosis as a possible palpatory finding that might be relevant when choosing from among massage techniques, I remember no discussion of pain of myofascial origin as part of my entry-level degree in physical therapy in The Netherlands. And although at least one of the required texts for the postgraduate degree in manual therapy that I completed in Belgium discussed the topic in depth,[1] clinical diagnosis and management of myofascial trigger points similarly was not dealt with in class during this degree program. During further postgraduate study in orthopaedic manual therapy in the United States, myofascial trigger points were either not discussed or were summarily dismissed as a nonexistent condition.[2] When I served as a physical therapy clinical instructor while working in the United States, I insisted that my interns provide some convincing evidence or otherwise stop wasting their time (and, more importantly, their patients' time) on unproven concepts and instead concentrate on the tried-and-true articular dysfunction as the main cause for most patients' complaints. I considered any myofascial abnormality I found in my patients to be secondary to the primary articular dysfunction and was quite convinced that such minor issues would disappear once I had adequately dealt with the dysfunctional joint.

Of course, I could deny some of the responsibility for my past joint-centered convictions by stating that the account above is just reflective of earlier and simpler times. However, to some (certainly not minor) extent this primacy of the articular dysfunction remains at the core of many educational programs in orthopaedic manual therapy available to physical therapists today. For me personally, myofascial trigger points only entered into my clinical reasoning process as a relevant construct after completing a course in dry needling. It was not that I agreed with the hypothesis of a radiculopathic etiology for all chronic myofascial pain presented there.[3] Rather it was the admittedly anecdotal evidence of clinical effects I observed in my patients once I incorporated dry needling into my existing approach of education, manual therapy, and specific exercise interventions. Perhaps even more important was the fact that I started considering myofascial trigger points as a possible primary or at least contributory dysfunction rather than solely as an almost irrelevant secondary problem. Based both on the literature and on my own clinical experience, I started considering

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myofascial trigger points in the differential diagnosis for a great variety of patients, including those with radiculopathy, intervertebral disk dysfunction, joint dysfunction, tendinopathy, craniomandibular dysfunction, headaches (including migraine, tension-type, and cluster headache), whiplash-associated disorder, pelvic pain and other urologic syndromes, postherpetic neuralgia, fibromyalgia, and complex regional pain syndrome.[4–6]

However, even as I eagerly incorporated myofascial trigger points into my everyday clinical practice, I realized that there were a lot of questions that remained to be answered. The expanded integrated trigger point hypothesis has been proposed to explain trigger point pathophysiology. Centering on endplate dysfunction and a cascade of associated biochemical changes, this elegant hypothesis has the potential to guide both clinical management and ongoing research.[7] In fact, recent microdialysis studies of the local chemical milieu of active myofascial trigger points seem to support the hypothesis.[8] A multitude of genetic abnormalities have been described that can lead to the endplate dysfunction that is central to this hypothesis.[9] The integrated hypothesis also allows us to almost seamlessly integrate emerging knowledge in the area of pain neurobiology on the role of central and peripheral sensitization, as have been shown to occur in chronic myofascial pain states. But how does this hypothesis relate to suggestions seemingly plausible in some of my patients that neuropathic changes of the nerve root or peripheral nerves might be responsible for the clinical signs and symptoms that we commonly associate with myofascial trigger points?[3,10]

Questions also remain with regard to diagnosis and management. With equivocal opinions on the relevance of the electrodiagnostic findings of endplate noise proposed to be specific to trigger points,[8,11] recent research into magnetic resonance elastography[12,13] is promising from a research perspective, but it hardly has the potential to provide us with a readily accessible clinical gold standard test. Many interventions have been described for myofascial trigger points, but research support often barely exceeds the anecdotal level. Dry needling can serve as an example. Although preliminary evidence exists for its use in patients with chronic low back pain,[14] a recent meta-analysis[15] could not support that it is superior to other interventions or even to placebo. However, this might be due less to actual effect size of this intervention and more to lack of study homogeneity which, considering the multitude of treatment and interaction-related variables, may not come as a surprise.[16] Similar problems occur when studying other proposed interventions.

This book does not purport to answer all of the questions surrounding myofascial pain and myofascial trigger points; admittedly, there are many. In fact, on many occasions it will provide the reflective clinician with new and unexpected questions. It is also not meant as a comprehensive or uncritical resource on all things myofascial. Rather, with its combination of research, clinical experience and expertise, suggestions relevant to everyday clinical practice, critical analysis, and the presentation of hypotheses, it intends to serve solely as an introduction for those clinicians willing to look beyond the joint-centered paradigm that is still so central in many schools of thought within orthopaedic manual therapy and thereby perhaps provide some suggestions for managing patient problems not adequately addressed under that paradigm.

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Introduction

Myofascial pain is arguably one of the more common clinical findings in patients presenting with musculoskeletal pain. However, only a very limited number of academic programs in physical therapy, medicine, osteopathy, and chiropractic include specific courses on the identification and management of myofascial trigger points. Despite the impressive surge over the last decade in the number of high-quality research articles, literature reviews, and case studies providing a solid basis for integrating myofascial pain concepts into clinical practice and academic preparation, there seemingly remains a noted degree of resistance among health-care providers, academicians, and legislators. Some state boards of physical therapy, associations, charters, and societies continue to be reluctant when it comes to acknowledging and incorporating trigger point therapies. For example, as recent as October of 2008 the Nevada Board of Physical Therapy Examiners concluded unanimously that trigger point dry needling would not be within the scope of physical therapy practice.

Interestingly, although skeletal muscle constitutes nearly half of our body weight, it is the only organ that is not linked to a specific medical specialty.[1] This may partly explain why the scientific study of muscle-specific ailments in the sense of epidemiology, pathophysiology, and diagnostic and treatment options has not evolved until fairly recently. Articles and information on myofascial pain and trigger points are scattered over many disciplines and journals, with many of these journals not included in the more easily accessible literature databases that have become a cornerstone to current evidence-informed clinical practice. Despite these obstacles to professional discourse and scientific study, the last decade has seen a near-explosive increase in the literature discussing the nature, characteristics, and relevance of muscle pain.[2] We should note that the literature is far from uniform in the relevance it attaches to myofascial pain states. Some authors consider muscle pain as merely an epiphenomenon to tendonitis, joint degeneration, muscle strain, inflammation, or injuries to peripheral nerves or joints. Exercise-related

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muscle pain or delayed-onset muscle soreness is often summarily dismissed as temporary discomfort in the context of eccentric loading. Patients complaining about widespread muscle pain often noted in myofascial pain conditions are frequently regarded as most likely suffering from somatoform disorders.

Another likely reason knowledge with regard to myofascial trigger points has not permeated mainstream medicine and physical therapy to a greater degree is that historically manual physical therapists and physicians have directed their attention mostly to articular dysfunction. This occurred even though manual medicine pioneers, such as medical physicians James Cyriax and John Mennell, did include muscle dysfunction and myofascial trigger points in their thinking. Cyriax was strongly influenced by publications by Kellgren on pain referred from muscles[3,4] and advocated treating nodules and taut bands of abnormal muscle tissue with deep friction massage.[5] Cyriax is generally acknowledged as the founding father of modern manual medicine and orthopaedic manual physical therapy (OMPT) practice.[6] Mennell has been honored for his contributions to OMPT with an award named after him by the American Academy of Orthopaedic Manual Physical Therapy. Medical physician Janet Travell, who is generally credited with the introduction of the myofascial pain concepts and who documented common referred pain patterns from trigger points,[7] worked closely with Mennell. However, in contrast to Mennell, she is rarely mentioned in the manual medicine literature. In fact, in the history of OMPT, and perhaps contributing to the lack of emphasis within OMPT on the concepts she developed, Travell is mostly remembered for blocking physical therapists from membership in the North American Academy of Manipulative Medicine, an organization she founded in 1966 with Mennell.[6]

In the past decade, there has been an increased research emphasis on the neurobiology of pain and, with that, on the mechanisms of muscle-related pain. Muscle pain, and more specifically, trigger point pain have been shown to activate cortical structures, including the anterior cingulate gyrus.[8–10] Under normal circumstances, pain initiated from muscles is inhibited strongly by the descending pain-modulating pathways, with a dynamic balance between the degree of activation of dorsal horn neurons and the descending inhibitory systems. Prolonged nociceptive input from myofascial trigger points can be misinterpreted in the central nervous system and eventually can lead to allodynia and hyperalgesia and an expansion of receptive fields.[11,12] The scientific basis of trigger point therapies has evolved much beyond the empiric observations of many astute clinicians over the past five decades. The integrated trigger point hypothesis, introduced in 1999, is the best available model to explain the trigger point phenomena.[13] Several publications have since expanded upon this hypothesis based on more recent electrodiagnostic and histopathological studies and other related fields.[14–17]

We can all agree that the management of patients with musculoskeletal and myofascial trigger point–related pain should be based on a thorough understanding of the underlying mechanisms of motor, sensory, and autonomic dysfunction. Understanding the

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motor aspects of trigger points requires detailed knowledge of the motor endplate, the sarcomere assembly, the nature of the taut band, and the impact of trigger points on movement patterns. Recent studies have been able to visualize and explore characteristics of the taut bands, considered one diagnostic feature of myofascial trigger points, by way of magnetic resonance elastography.[18,19] Another study has demonstrated an objective topographical system that can be used to identify trigger points.[20] To better understand the sensory aspects of myofascial trigger points, including local and referred tenderness, pain, and paresthesiae, the mechanisms and function of muscle nociceptors, spinal cord mechanisms, and peripheral and central sensitization need to be explored. Recent studies at the National Institutes of Health in the United States have considerably advanced the basic science knowledge base with regard to the chemical milieu of trigger points.[21,22] We need to acknowledge here that the understanding of the autonomic components of trigger points is still rather unexplored.[23]

In consideration of the still limited incorporation of and at times outright resistance to myofascial pain concepts within the various health professions involved, we aim for this book to offer a current best-evidence review of the etiology, underlying mechanisms, pathophysiology, and clinical implications of myofascial trigger points. We have brought together a collection of both original work and chapters previously published or adapted from published papers with the intent of providing as comprehensive an overview as possible. Contributing authors from seven different countries and three different professional backgrounds (physical therapy, medicine, and osteopathy) highlight important scientific aspects of trigger points. Throughout the book, an emphasis is placed on the scientific merits of the literature. Rather than being a book that without critical evaluation introduces and discusses the trigger point concept, the contributing authors point out where scientific evidence is lacking. Hypothetical considerations are clearly identified as such, giving the reader a realistic perspective of our current understanding with regard to trigger points.

The book is divided into four main sections. The initial pathophysiology section includes three chapters. In Chapter 1, McPartland and Simons take the reader through a fascinating review of the integrated trigger point hypothesis. The main motor, sensory, and autonomic features of trigger points are highlighted within the context of clinical manual medicine and manual therapy. Chapter 2, prepared by Dommerholt, Bron, and Franssen, provides a brief historical review of early publications about trigger points and discusses in detail their clinical relevancy for current clinical practice. Emphasis is on the etiology of trigger points with a critical overview of current concepts. This chapter ends with a section of medical and metabolic perpetuating factors, upon which Dommerholt and Gerwin elaborate in great detail in Chapter 3. Physicians, physical therapists, and other clinicians seem not to consider metabolic perpetuating factors in their clinical practices despite a growing body of evidence supporting their importance.

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The second section of the book deals primarily with the diagnosis of trigger points. The lack of accepted criteria for the identification of trigger points is reviewed in Chapter 4, where McEvoy and Huijbregts provide an in-depth overview of all published reliability studies with regard to the identification of myofascial trigger points. Bron, Franssen, Wensing, and Oostendorp discuss the interrater reliability of trigger point palpation in shoulder muscles in Chapter 5. Fernández-de-las-Peñas, Arendt-Nielsen, and Simons explore the contribution of myofascial trigger points in the etiology of chronic tension-type headaches in Chapter 6. This chapter also includes a detailed review of the proposed role of myofascial trigger points in peripheral and central sensitization.

The third section of the book discusses clinical management of patients with painful myofascial trigger points. In Chapter 7, Rickards provides a systematic analysis of the evidence with regard to effectiveness of noninvasive treatments. Dommerholt, Mayoral del Moral, and Gröbli review invasive therapies with specific attention to trigger point dry needling in Chapter 8. Issa and Huijbregts conclude this section with a detailed case history of a patient with chronic daily headache, emphasizing the integration of trigger point therapy into a broader therapeutic management approach.

The final section of the book contains only one chapter, but it is perhaps the most important and thought provoking. In this final chapter, Gerwin identifies many areas of interest where the scientific basis is lacking. This chapter will be of great benefit to any basic or clinical researcher looking for pertinent research projects addressing the etiology of trigger points, the epidemiology of myofascial pain, specific treatment issues, and the role of trigger points in various pain syndromes.

We hope that this book will bring the subject of myofascial trigger points closer for both clinicians and researchers. We have compiled objective reviews, studies, case studies, and critical commentaries, and we anticipate that an increasing number of clinicians will consider getting trained in the identification and management of myofascial trigger points. Only through a thorough understanding of the scientific literature will clinicians be able to develop evidence-informed management strategies. Eventually, our patients will benefit from we clinicians incorporating this exciting body of knowledge into our clinical practices.

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