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Muscle Biofeedback at the Computer: A Manual to Prevent Repetitive Strain Injury (RSI) by Taking the Guesswork Out of Assessment, Monitoring, and Training

By Erik Peper and Katherine H. Gibney. Amersfort, the Netherlands: Biofeedback Foundation of Europe. 2006.

Reviewed by Donald Moss, PhD

Repetitive strain injury (RSI) is one of the more costly forms of occupational injury. With many office workers today spending 50% or more of their time at a computer keyboard, RSI has taken on epidemic proportions. Annual employer costs for RSI surpassed $20 billion per year by the early 1990s (Pascarelli, 1994).

Erik Peper is a respected figure in both the biofeedback world and the world of occupational health. Peper began publishing an abundance of research studies on biofeedback in the early 1970s and has contributed especially in developing practical methods for applying surface electromyography (SEMG) biofeedback to the assessment and treatment of occupational injuries. In addition, he has pioneered practical programs in workforce education, designed to increase wellness and prevent injury, one of which won the State of California's Governor's Employee Safety Award in 2004. Erik is the current president of the Biofeedback Foundation of Europe, a past-president of the Association for Applied Psychophysiology and Biofeedback, and a professor and co-director of the Institute for Holistic Healing Studies at San Francisco State University.

Katherine H. Gibney is a biofeedback therapist, an ergonomic evaluator, and a risk-management consultant. She has published numerous articles on health care and is the co-author of two books. She has served as a consultant to the Risk Management Department at San Francisco State University (SFSU) and collaborated with Dr. Peper in designing the SFSU workplace safety program, which won the Governor's Employee Safety Award.

The present volume is an expanded second edition of a previous manual, and it provides a comprehensive overview of the problem of RSI and especially computer-related disorders (CRDs). The book includes nine chapters.

Chapter 1 is an overview of the problem of RSI, emphasizing a holistic mind-body perspective. One major emphasis of the book is that a mechanistic ergonomic approach cannot account for RSI; repetitive motion alone may or may not produce a pain syndrome. On the other hand, repetitive motion combined with life stress, negative emotion, and deficient muscle awareness is deadly and frequently produces pain.

Chapter 2 provides guidelines for the reader designed to optimize the use of the resources in this book, explaining the author's use of biofeedback and self-regulation education in work settings.

Chapter 3 provides a system perspective on CRDs, emphasizing eight factors: work style, ergonomics, somatic awareness, stress management, regeneration, vision care, fitness, and positive work settings. This chapter also applied Peter Nixon's human function curve to work-site problems.

Chapter 4 advocates the use of SEMG as a tool in work-place wellness. This chapter reviews the basic technology of SEMG, describes the effective skin preparation and placement of electrodes for monitoring muscle activity, and provides instructions for using simple portable SEMG instruments.

Chapter 5 provides more advanced discussion of the clinical use of the SEMG and detailed guidelines for use of the SEMG in work-site applications. This chapter describes commonly used electrode placements, describes how SEMG monitoring can assist breath training, provides a format for psychophysiological assessment using SEMG, and presents a number of specific strategies to identify and reverse dysfunctional muscle use in the workplace.

Chapter 6 teaches the practitioner how to integrate muscle biofeedback training with general wellness education in the workplace. The eight factors introduced in chapter 3—ranging from work style and ergonomics to positive work-site atmosphere—are used in this chapter to organize a number of practical interventions to improve health-supportive work habits and reduce factors conducive to stress, negative emotion, and muscle injury.

Chapter 7 provides a practical framework for applying the strategies addressed throughout the book in a systematic and methodical integrative program for workplace wellness. This chapter provides a conceptual model but also describes

the actual award-winning workplace wellness program implemented by the authors with the employees at SFSU. The program provides employees with training in ergonomic principles, psychophysiological wellness and control, and SEMG practice at the actual workstation. In addition, employees extend their own learning by coaching fellow employees. The program is designed to be implemented in a 7-week sequence, and each week's training focus and activities are reviewed.

Chapter 8 identifies some of the key challenges and obstacles to workplace wellness. The authors describe the employees' and supervisors' key concerns and misgivings, which become obstacles to implementing new learning. Specific remedies are discussed to address each concern and maximize effective cooperation and implementation.

Chapter 9 includes a glossary of technical terms, including definitions of specific muscles often involved in work-site muscle problems, definitions of electrical concepts and measurements used in biofeedback, and concepts and terms useful in ergonomics and work-site wellness education. This chapter also provides lists of books, technical articles, and Web sites that can be helpful to professionals addressing work-site wellness and a list of the references, which are often research-based technical publications drawn on by the authors throughout the book.

This volume is well organized and well indexed. It is written at a practical level, accessible to most college-educated professionals. The technical knowledge imparted is well introduced with clear explanations of relevant physiology and instrumentation. The authors draw on current research, and their recommendations are well supported by this research as well as their own extensive experience in workplace health.

Although this book is focused on the prevention of work-site injuries, the many perspectives it introduces have a rich relevance for treatment as well. Just as one needs to address the negative emotional atmosphere in many work sites to reduce injuries, correcting negative motivational environments is necessary to make rehabilitation to the workplace more successful.

Employers frequently adopt a reductionistic view that the problem resides in the injured employee, whose carelessness or psychological maladjustment produced an injury. Many workplaces with negative work-site cultures appear to contribute to the frequency and chronicity of work-site injuries and disabilities. Reintroducing a comprehensive psychosocial and psychophysiological model to account for injuries raises the likelihood of successful prevention and successful rehabilitation. The challenge here is in communicating this larger model to the relevant employers for its successful adaptation in industry. Peper and Gibney provide useful guidelines for how psychophysiological knowledge can be packaged and organized in a clear and effective way, gaining the support and cooperation of the employee and the employer as well.

The latter observations should not take away from the potential of self-regulation. Most employees will be exposed to a negative emotional atmosphere intermittently in most workplaces. Peper and Gibney provide evidence to employers of the value of improving negative workplace cultures but also provide employee exercises to regulate one's own negative emotional responses. This includes exercises to deflate anger, cultivate calmness, and reverse negative thoughts about coworkers.

I recommend this book to practitioners in the field of occupational safety, work-site wellness education, and the clinical treatment of work-site injuries. This is not a comprehensive scholarly summary of the entire research on work-site injuries. For example, the authors cite the work of Skubick, Clasby, Donaldson, and Marshall (1993) on carpal tunnel syndrome as an expression of muscle dysfunction yet pay scant attention to this important research. Furthermore, they fail to delineate the potential role of SEMG in the detection of malingering in disability claims. Nevertheless, the book provides a rich practical exposure to a variety of psychophysiological insights and interventions. I have worked with chronic pain and rehabilitation for more than two decades and have rarely read a book that has provided so many useful strategies for worker wellness per chapter.

References

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