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Peripheral Nerve Stimulation

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Series Editor’s Note

The 24th volume of Progress in Neurological Surgery brings an excellent analysis of the state of the art of peripheral nerve stimulation for a wide variety of chronic pain states. Konstantin Slavin has assembled an international cadre of physicians and surgeons with extensive experience in the use of stimulation for these steadily increasing indications. The authors clearly demonstrate that this technology is a mainstream management strategy for a group of conditions that are often misdiagnosed and undertreated. This volume provides much needed technical know-how based on the extensive experience of the authors. Indications, methods, results and complications are covered in detail. As with many chronic pain conditions, high-level evidence-based medicine studies are difficult to design and perform. For many conditions such as the management of chronic pain states, we must rely on the accumulated experience of practitioners from across the world. This new volume should be an excellent resource for both students and chronic pain specialists. Hopefully, it will also assist others to realize that peripheral nerve stimulation is a valuable procedure that deserves recognition and reimbursement. I am indebted to Dr. Slavin for his efforts to bring this volume to fruition and to Karger Publishers for their superb work to edit, set and illustrate this important monograph.

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Preface

Since the introduction of dorsal column stimulation by Shealy, and soon thereafter peripheral nerve stimulation (PNS) by Sweet, the use of neurostimulation has become the foundation of the field of neuromodulation. The concept that paresthesia-inducing electrical stimulation could be analgesic was revolutionary, and was based largely on the gate control theory of Melzack and Wall and earlier work by Noordenbos. What follows this preface is literally the first chapter of this excellent monograph, presenting a detailed history of the field. I would encourage readers not to skip over that rendition of what is almost certainly one of the most interesting and successful epochs in the history of clinical neuroscience. Given this, I will not dwell further on this fascinating background.

PNS has given us ready access to the central systems of pain modulation. Our knowledge of these systems has certainly advanced since the first publication of the gate theory, yet this knowledge remains rudimentary. Physiologic studies at the level of the periphery, spinal cord, brainstem, basal ganglia, and cortex have begun to paint a picture of a complex ascending influence of PNS on sensory processing. Positron emission tomography (PET) and functional MRI (fMRI) have complemented these insights and hold tremendous promise for further understanding of the central effects of PNS.

While neurostimulation has played an undeniably important role in the development of clinical neuromodulation, realistically, we cannot be satisfied with the level of evidence that supports its clinical use. The inception of spinal cord stimulation (SCS) as a clinical tool came well before our current concepts of evidence-based medicine had matured. Although many of us believe SCS can be an effective measure for the control of neuropathic pain, it may, to some degree, be too late to produce convincing evidence of its efficacy. Because SCS is an established (and funded) procedure, the best clinical studies that can now be performed on SCS are compromised by the current standards of practice, and both patient and surgeon expectations. The actual evidence that neurostimulation works is, at best, modest. This is a parable we cannot ignore.

I believe that we are now at a point when we can begin to answer fundamental questions regarding the mechanism of PNS-induced analgesia. Going forward, we
should hold ourselves to a high standard of understanding before venturing into new applications of PNS. Given the deceptive ease of application, the temptation to apply this approach nonspecifically is great. Clinical outcome data acquired by the most rigorous methodology and vetted by contemporary analytical standards will be crucial to the vitality of this field.

It is for this reason that I congratulate Dr. Slavin for assembling this important monograph. In the evidence presented herein, he has set a high bar for authoritative exposition and a basis for clinical practice. I think this book will provide a landmark in our progress in PNS therapy, and a reference for both veterans and neophytes.

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