
Neurological Aspects of Spinal Cord Injury

Norbert Weidner • Rüdiger Rupp
Keith E. Tansey
Editors

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 Springer

Editors

Norbert Weidner
Spinal Cord Injury Center
Heidelberg University Hospital
Heidelberg
Germany

Rüdiger Rupp
Spinal Cord Injury Center
Heidelberg University Hospital
Heidelberg
Germany

Keith E. Tansey
Methodist Rehabilitation Center
University of Mississippi Medical Center
Veterans Administration Medical Center
Jackson
Mississippi
USA

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Preface

Neurorehabilitation is a newer and smaller subspecialty in neurology and is largely dominated by neurologists concerned with stroke and brain injury. Spinal cord injury and disease has been more the realm of trauma physicians, spine surgeons, and physical medicine and rehabilitation doctors, but neurologists interested in this area are becoming more common for several reasons. For one, neurologists are specifically trained to detect, monitor, and treat neurological abnormalities. There is also a cultural tradition of research training, both clinical and preclinical, in neurological education with a growing interest in the areas of neural plasticity and neural repair. Finally, many are appreciating that lessons learned scientifically and clinically in spinal cord injury and disease may serve to enlighten investigations in other areas of neuropathology and provide new paths forward for those inquiries.

Until now, a comprehensive textbook specifically focused on addressing the neurological aspects (scientific and clinical) of spinal cord injury and disease has been missing. On the one hand, neurologists are less familiar with spinal cord injury and disease, since they are rarely exposed to this condition. On the other hand, spinal cord specialists coming from a variety of medical specialties other than neurology would like to obtain concise information regarding the neurological presentation, diagnosis, and treatment of spinal cord injury and disease.

Basics regarding epidemiology, anatomy, and pathophysiology as well as neurological signs and symptoms indicating lesions of the spinal cord including the cauda equina are provided. Differential diagnosis of nontraumatic spinal cord disease is extensively covered. Specific diagnostic procedures (imaging, neurophysiology), which allow one to differentiate various disease conditions, help to better predict the clinical outcome and, going forward, provide specific information regarding structural damage and/or neural repair. Spinal cord injury and disease causes not only the loss of normal neurological sensorimotor function but generates the emergence of pathoneurophysiology in the form of spasticity and neuropathic pain, both of which are extensively considered in this volume.

Spinal cord injury represents not just a disease condition with a segmental sensory and motor level in combination with below level loss of sensorimotor function. Damage to the autonomous nervous system leads to impairment of highly important body functions such as bladder/bowel evacuation, respiration and cardiovascular function, which are also covered here by leading experts.

Chronic neurological sequelae of spinal cord disease require a solid knowledge base as a prerequisite to properly treat symptoms, which can substantially affect quality of life beyond the immediate spinal cord injury or disease-related disability. It is rather difficult to identify an organ system not impacted by high spinal cord injury and disease and rather than consider this impact as pathology of those organ systems, one should consider the pathology being of lost neurological control. That is to say neurogenic bladder and detrusor/sphincter dysynergia are products of altered neuropathology and are not, at least initially, pathology of the bladder or urinary tract.

Beyond aspects related to acute care, neurorehabilitative concepts, with an emphasis on restorative approaches to recover function in both the upper and lower extremities, are discussed and will help those in the subspecialty of neurorehabilitation. Translational research approaches to protect and restore the nervous system after spinal cord injury are considered.

Many chapters go from bench to bedside with true translational (all the way to practice implications) intent. This will help clinicians to get an up-to-date overview regarding developing therapeutic strategies, which might further improve outcomes beyond the current state of acute and rehabilitative care.

The editors wish to congratulate all the contributing clinicians, therapists, and scientists, who have written such a comprehensive book. We are convinced that this book will provide new and valuable information to professionals dealing with the neurological aspects of spinal cord injury and disease in the clinical and research context.

Heidelberg, Germany
Heidelberg, Germany
Jackson, MS, USA

Norbert Weidner, MD
Rüdiger Rupp, PhD
Keith E. Tansey, MD, PhD

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