

Andrew I. Elkwood · Matthew Kaufman  
Lisa F. Schneider *Editors*

# Rehabilitative Surgery

A Comprehensive Text  
for an Emerging Field



Springer

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Emerging Field

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ISBN 978-3-319-41404-1

ISBN 978-3-319-41406-5 (eBook)

DOI 10.1007/978-3-319-41406-5

Library of Congress Control Number: 2017936881

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Printed on acid-free paper

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The registered company is Springer International Publishing AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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# Rehabilitative Surgery

*We dedicate this book to our teachers, who gave us the tools  
and insight to innovate, and to our spouses, whose support  
makes everything possible.*



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## Preface

The paralyzed or severely neurologically impaired patient is one of the greatest challenges in long-term chronic care that we face as clinicians, whether we are occupational therapists or orthopedists or physiatrists or surgeons. Because of the complexity of their treatment and the severity of their injury, these patients may be viewed as a hopeless cause for many physicians, especially surgeons. Optimization of their care – and potentially improvement in quality and length of life – requires a complex and delicate interaction between multiple surgical and medical specialties across disciplines and time.

The current state of rehabilitative medicine works to maximize patient function as well as manage the lifelong maintenance required to continue that level of function. Although surgery has always been part of the treatment of the paralyzed patient, it may be seen as an afterthought or the modality of last resort for the rehabilitation community or even surgeons who have little experience taking care of these patients. Once surgery is considered, the procedures needed to care for these patients and improve their lives often exist at the margins of existing surgical specialties or at the junction of multiple disciplines, performed haphazardly without a unified understanding of a comprehensive treatment approach. These procedures and their context may be difficult to understand, requiring familiarity with different interlocking yet distinct specialties, making approaching this topic particularly daunting for the student of any field.

We introduce the new field of rehabilitative surgery, a unique designation combining state-of-the-art surgeries from multiple surgical specialties in order to reimagine our approach to these patients. In this text, *Rehabilitative Surgery: A Comprehensive Text for an Emerging Field*, we present a completely different framework for understanding, coordinating, and providing treatment for the paralyzed or severely neurologically impaired patient. Contrary to the traditional approach of rehabilitative medicine, surgery is in fact a critical component of the care of the chronically impaired patient and may create opportunities to change their everyday life in a profound way by creating a new baseline of functional status.

We believe that much of the resistance to the surgical treatment of these patients arises from a lack of understanding of how even some straightforward interventions, performed in a coordinated way, can dramatically improve a patient's life. Patients who can now move a joystick on a wheelchair or feed themselves again often have profound appreciation for this

incremental increase in independence, a small but significant liberation from the prison of paralysis.

This compendium represents the first interdisciplinary text for the emerging field of rehabilitative surgery, synthesizing various perspectives into a cornerstone for the rehabilitation field. The text is designed for both surgical and nonsurgical readers. An expert has written each evidence-based chapter with concise and straightforward explanations for clinicians who have no previous experience in that specialty. Specific descriptions of surgical procedures are included as well as surgical videos that can be accessed from the companion website.

Every major aspect of the reconstructive surgical treatment of these patients has been considered from a multidisciplinary vantage point, including orthopedic surgery, plastic surgery, neurosurgery, general surgery, and otolaryngology. We clearly describe and evaluate the most up-to-date and evidence-based surgeries that are currently standard of care including treatment of pressure sores, placement of feeding tubes, and upper extremity interventions to improve function and hygiene. As international leaders in the field of nerve reanimation surgery, we describe our cutting-edge protocols for the surgical treatment of severe nerve injuries, spinal cord injury (SCI) and stroke, or cerebrovascular accidents (CVA). We provide the first description and evidence for phrenic nerve repair to assist weaning paralyzed patients from their ventilators. This includes an exciting subset of patients with amyotrophic lateral sclerosis (ALS), who have shown benefit from phrenic nerve reconstruction in conjunction with nerve stimulation. These patients need our help. It falls on us – their clinicians and caretakers – to do everything we can to maximize their function to help them live as well and as independently as possible.

Shrewsbury, NJ

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Matthew Kaufman

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## Acknowledgments

We gratefully acknowledge the dedication of Catarina Martins and Kristie Rossi, whose tireless work made this manuscript a reality.

We also gratefully acknowledge our illustrator, Jeannine Sico, whose skill and vision are without equal.



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## **Part I**

### **Introduction**





# Introduction to Rehabilitative Surgery

1

Andrew I. Elkwood, Matthew Kaufman,  
and Lisa F. Schneider

The paralyzed or severely neurologically impaired patient is one of the greatest challenges in long-term chronic care that we face as clinicians, whether we are therapists or neurologists, physiatrists, or surgeons. Because of the complexity of their treatment and the severity of their injury, these patients may be viewed as a hopeless cause for many physicians, especially surgeons. Optimization of their care – and potentially improvement in quality and length of life – requires a complex and delicate interaction between multiple surgical and medical specialties across disciplines and time.

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