

1987 YEAR BOOK OF

REHABILITATION

KAPLAN  
SZUMSKI

1987

# The Year Book of REHABILITATION

Editors

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Acta Medica Scandinavica  
American Journal of Mental Deficiency  
American Journal of Obstetrics and Gynecology  
American Journal of Occupational Therapy  
American Journal of Physical Medicine  
American Journal of Roentgenology  
American Journal of Sports Medicine  
American Journal of Surgery  
American Surgeon  
Annales Chirurgiae et Gynaecologiae  
Annals of Neurology  
Annals of Rheumatic Diseases  
Archives of Disease in Childhood  
Archives of Internal Medicine  
Archives of Neurology  
Archives of Physical Medicine and Rehabilitation  
Arthritis and Rheumatism  
Australian and New Zealand Journal of Psychiatry  
Brain  
Brain and Language  
British Journal of Plastic Surgery  
British Journal of Psychiatry  
British Journal of Urology  
British Medical Journal  
Calcified Tissue International  
Canadian Journal of Public Health  
Chest  
Chirurgia Plastica  
Circulation  
Clinical Orthopaedics and Related Research  
CRC—Critical Reviews in BioMedical Engineering  
Developmental Medicine and Child Neurology  
Electroencephalography and Clinical Neurophysiology  
Endocrinology  
Engineering in Medicine  
Epilepsia  
European Neurology  
Geriatrics  
Gerontologist  
Heart and Lung  
Hospital Practice  
International Rehabilitation Medicine  
Italian Journal of Neurological Sciences  
Journal of Advanced Nursing  
Journal of the American Academy of Child Psychiatry  
Journal of the American College of Cardiology  
Journal of the American Geriatrics Society  
Journal of the American Osteopathic Association  
Journal of Bone and Joint Surgery (American vol.)  
Journal of Bone and Joint Surgery (British vol.)  
Journal of the Canadian Association of Radiologists  
Journal of Cardiopulmonary Rehabilitation

Journal of Chronic Diseases  
Journal of Communication Disorders  
Journal of Computer Assisted Tomography  
Journal of Consulting and Clinical Psychology  
Journal of Gerontology  
Journal of Neurological Sciences  
Journal of Neurology, Neurosurgery and Psychiatry  
Journal of Neurophysiology  
Journal of Neuroscience  
Journal of Neurosurgery  
Journal of Orthopaedic and Sports Physical Therapy  
Journal of Otolaryngology  
Journal of Parenteral and Enteral Nutrition  
Journal of Pediatric Orthopedics  
Journal of Pediatrics  
Journal of Physiology  
Journal of Urology  
Lancet  
Laryngoscope  
Mayo Clinic Proceedings  
Medical Journal of Australia  
Muscle and Nerve  
Nature  
Neurology  
Neuropediatrics  
Neurosurgery  
New England Journal of Medicine  
Occupational Therapy Journal of Research  
Orthopaedic Review  
Pain  
Paraplegia  
Pediatric Neurology  
Pediatrics  
Physical and Occupational Therapy in Geriatrics  
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Prosthetics and Orthotics International  
Quarterly Journal of Medicine  
Rehabilitation Nursing  
Rehabilitation Psychology  
Respiration  
Scandinavian Journal of Rehabilitation Medicine  
Science  
Southern Medical Journal  
Spine  
Stroke  
Surgery, Gynecology and Obstetrics  
Surgical Neurology  
Transplantation  
Western Journal of Medicine

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## Introduction

The Editors and Contributing Editors are pleased to present the second issue of the newly reintroduced YEAR BOOK OF REHABILITATION. We have completed another year of selective searching of the world literature and present to the readers the most pertinent published studies in our vast field of rehabilitation. This year we increased our coverage as our Editors, each representing specific fields, identified important journals that were not on our original reviewing list. More than 700 journals are now included in the review process, and new journals have been added to practically every specialty area.

Unfortunately, this year, because of the pressure of his work, we lost Gerry Warren as a Contributing Editor. However, we were fortunate to recruit Dr. Otto Payton, who will assist us in reviewing the areas of education, research, and clinical physical therapy. We also asked Dr. James Lieberman to join our group of Contributing Editors, all of whom we feel establish a representative, interdisciplinary editorial board.

Our Table of Contents reflects developing trends in patient rehabilitation and our expanded coverage. In addition to topics covered last year, some of the new areas reviewed are the following: animal studies in motor physiology; clinical rehabilitation of polio, arthritis, and head injury patients; expanded areas of assessment and diagnosis; and a section covering various aspects of interdisciplinary rehabilitative care that includes areas of administration, hearing, nursing, and psychology. Finally, we round out our coverage with geriatric and surgery studies as they relate to rehabilitative care.

The Editors and Contributing Editors are dedicated to selecting and commenting on the most recent and innovative literature in our field and we do it with enthusiasm. Year Book Medical Publishers has responded positively to our requests regarding specific journal subscriptions and production of the series to ensure a quality book for our readers. Because our coverage is so diverse, we sincerely invite your suggestions and criticisms so that we can make future YEAR BOOK OF REHABILITATION volumes your reference of choice to keep abreast of the vast literature in the field of rehabilitation.

Paul E. Kaplan, M.D.  
Alfred J. Szumski, Ph.D., P.T.





# 1 Exercise

## Basic Animal Studies

### **On the Specificity of Sensory Reinnervation of Cat Skeletal Muscle**

William F. Collins, III, Lorne M. Mendell, and John B. Munson (SUNY at Stony Brook and Univ. of Florida)

*J. Physiol.* 375:587–609, June 1986

1–1

Anatomical and physiologic studies have been made on the time course and adequacy of reinnervation of sensory receptors of adult mammalian skeletal muscle after nerve injury. In none of these studies could the specific identity of the afferents that reinnervate sensory structures be determined. A study was conducted to investigate the specificity of sensory reinnervation after nerve section in 19 anesthetized cats. The left medial gastrocnemius muscle nerve was sectioned and resutured in the 11 cats in the experimental group. Eight cats were normal controls. Medial gastrocnemius afferent fibers were impaled in dorsal rootlets for recording and stimulation. Electrophysiologic measurements were made of receptor innervation by manipulation of the medial gastrocnemius muscle. Afferent type was determined by the presence or absence of field potentials in the homonymous motoneuron pool.

After section and suture of the medial gastrocnemius muscle nerve, about 75% of afferents regenerated into the medial gastrocnemius muscle. Many more spindles than tendon organs became reinnervated. Random populations of groups Ia and Ib, and probably spindle group II, fibers reinnervate spindles. The lack of selectivity of regenerating group Ia and group Ib fibers is in marked contrast with the precision with which cutaneous afferent fibers have been found to reinnervate appropriate receptors in the skin after transection of the sural nerve.

► This is a very interesting study in the cat, monitoring muscle receptor reinnervation after denervation. At 9 months postoperatively, 60% of tested afferents innervated spindles, the same as in normal muscles. This suggests that nearly all muscle spindles become reinnervated. In contrast, only a few tendon organs became reinnervated. Also, muscle spindles appear to be reinnervated at random by former spindle and tendon organ afferents; many of these connections are inappropriate and may be inappropriate for motor activity. The authors hypothesize that, with time, inappropriate inputs are reduced or abolished because of loss of synaptic efficacy. This plasticity of central synapses of muscle afferents may represent an adaptive response to inappropriate reinnervation (See also Burgess, P.R., Horch, K.W.: *J. Neurophysiol.* 36:101–114, 1973.)—A.J. Szumski, Ph.D., P.T.