

**American Academy of Neurology
Neural Repair and Rehabilitation Section
Resident Core Curriculum**

10/01/01

Neurorehabilitation is the medical discipline that seeks to restore functioning or facilitate compensatory or adaptive functioning for persons with disorders of the nervous system.

Core content and knowledge base

Residents in neurology should gain an understanding of how disorders of the nervous system affect a person's ability to function and how functional recovery occurs as a result of a dynamic interaction among regeneration, plasticity, learning and compensation. Residents will develop some of these concepts as they master the pathophysiology and natural history of various neurological disorders they encounter and study. Residents should also gain an understanding of specific aspects of neurorehabilitation including:

- functional assessment and outcome measures
- the availability and range of inpatient, outpatient acute and postacute rehabilitation services
- the functioning of an interdisciplinary rehabilitation team
- the use of orthotics, wheelchairs and other forms of adaptive equipment
- restorative neuropharmacology
- functional neuroimaging and recovery
- emerging and investigational restorative and rehabilitative technologies, such as partial body weight supported treadmill training, robotics and stem cell transplants.
- management of common problems in rehabilitation
 - spasticity
 - chronic pain
 - neurogenic bowel and bladder
 - cognitive and behavioral disorders
 - depression
 - eating and swallowing problems
 - sexual dysfunction
 - prevention of complications of persistent disability, *e.g.*, contractures, pressure ulcers, DVTs

Residents should develop particular familiarity with the role of rehabilitation for common debilitating neurological disorders such as:

- stroke
- traumatic brain injury
- multiple sclerosis
- spinal cord injury
- peripheral nerve and muscle disorders.

In addition, residents should develop an awareness of the role of rehabilitation in treating other neurological problems such as:

- chronic pain
- multiple systems disorders
- anoxic brain injury
- encephalitis
- neoplasms
- Parkinson's disease and other movement disorders
- degenerative disorders and aging
- pediatric neurological disorders.

Formal Training

The experiences denoted above should be attained in rotations across all three years of the neurology residency. Principles of impairment, disability and handicap, effects of neurologic disorders on ADLs and everyday functioning, and effect of a patient's disabilities on family and social functioning should be considered in all rotations involving patients with chronic or disabling neurological disorders. However, residents should also take a minimum of one-month rotation in an inpatient and/or outpatient clinical rehabilitative service in which the bulk of experience is with patients with neurological causes for disability.

Teaching resources

- **References**

- **Cerebrovascular disease**

- Ozer MN, Materson, Caplan LR. (eds.) Management of Persons with Stroke. St. Louis: Mosby, 1994

- Gresham GE, Duncan PW, Stason WB, Adams HP, Adelman AM Bishop DS, Diller L, Donaldson NE, Granger CV, et al. Post-Stroke Rehabilitation. Guideline Report , Number 16. AHCPR Pub. No. 95-0662. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services. May 1995.

- **Chronic pain**

- Wall PD, Melzack R, et al. (eds.) Textbook of Pain (3rd Edition). Edinburgh: Churchill Livingstone, 1994.

- **Degenerative disorders and aging**

- Katzman RK, Terry RD, Bick. Alzheimer's Disease. (eds.) New York: Raven Press, 1994.

- **Interdisciplinary management and social barriers**

- DeLisa JA, Gans BM (eds.). Rehabilitation Medicine Principles and Practice (2nd Ed.). Philadelphia: J.B. Lippincott Company, 1993.

- **Multiple systems disorders**

Shapiro RT. Symptom Management in Multiple Sclerosis (2nd Ed.). New York: Demos Publications, 1994.

Burks JS. Interdisciplinary Rehabilitation of MS and Neuromuscular Disease. Philadelphia: J.B. Lippincott Company, 1985.

Neuromuscular disease

Ringel SP. Neuromuscular Disorders: A Guide for Patient and Family. New York: Raven Press, 1987.

Stiegel I. Muscle and its Diseases: An Outline Primer of Basic Science and Clinical Methods. Chicago: Year Book Medical Publishers, Inc., 1986.

Orthotics

Aisen M. Orthotics in Neurologic Rehabilitation. New York: Demos Publications, 1992.

American Academy of Orthopaedic Surgeons. Atlas of Orthotics. St. Louis: Mosby Company, 1985.

Outcomes measures

Wade DT. Measurement in Neurological Rehabilitation. Oxford: Oxford Medical Publications, 1992.

Herndon RM. Handbook of Neurologic Rating Scales. New York: Demos Vermande, 1997.

Pediatric neurorehabilitation

Molnar GE. Rehabilitation Medicine Library. Baltimore: Williams & Wilkens, 1992.

Thompson CE. Raising a Handicapped Child. New York: William Morrow and Company, Inc., 1986.

PT, OT, speech therapy

Trombly CA. Occupational Therapy for Physical Dysfunction. Baltimore: Williams & Wilkens, 1995.

O'Sullivan SB, Schmitz TJ. Physical rehabilitation: assessment and treatment. Philadelphia: F.A. Davis, 1994.

Caplan D. Language: Structure, Processing and Disorders. Cambridge: MIT Press, 1992.

Umphred D. Neurological Rehabilitation (2nd Ed.). St Louis: Mosby Company, 1990.

Johns DF. Clinical Management of Neurogenic Communicative Disorders (2nd Ed.). Boston: Little, Brown and Company, 1985.

Regenerative, recovery, neural plasticity

Spear NE, Spear LP, Woodruff ML. Neurobehavioral Plasticity: Learning, Development and Response to Brain Insults. Northvale: Lawrence Erlbaum Associated, 1995.

Kidd G, Lawes N, Musa I. Understanding Neuromuscular Plasticity: A Basis for Clinical Rehabilitation. London: Edward Arnold, 1992.

E.G. Gonzalez, S.J. Myers, J.E. Edelstein, J.S. Lieberman, J.A. Downey (eds.)
Downey and Darling's Physiological Basis of Rehabilitation Medicine (3rd Ed.),
Boston: Butterworth-Heinemann Publishers, 2001.

Rehabilitative orthopedics and neurosurgery

Salter RS. Textbook of Disorders and Injuries of the Musculoskeletal System:
Disorders and Injuries of the Musculoskeletal System: An Introduction to
Orthopaedics, Fractures and Joint Injuries, Rheumatology, Metabolic Bone
Disease and Rehabilitation. Baltimore: Williams & Wilkins, 1983.

Nickel V, Bolte M. Orthopedic Rehabilitation (2nd Ed.). Edinburgh: Churchill
Livingstone, 1992.

Spinal cord injury

Contemporary Management of Spinal Cord Injury. Parkridge: American Association
of Neurological Surgeons, 1995.

Ozer M. The Management of Persons with Spinal Cord Injury. New York: Demos
Publications, 1988.

Buchanan LE, Nawoczenski DA. Baltimore: Williams & Wilkins, 1987.

Traumatic brain injury

Rosenthal M, et al. Rehabilitation of the Adult and Child with Traumatic Brain Injury
(3rd Ed.). Philadelphia: F.A. Davis, 1999.

General

DeLisa JA, Gans BM (eds.). Rehabilitation Medicine Principles and Practice (2nd
Ed.). Philadelphia: J.B. Lippincott Company, 1993.

Dobkin BH. Neurologic Rehabilitation. Philadelphia: F. A. Davis, 1996

Good DC, Couch JR. Handbook of Neurorehabilitation. New York: Marcel Dekker,
1994.

Greenwood R, Barnes MP, McMillan TM, Ward CD. Neurologic Rehabilitation.
Edinburgh: Churchill Livingstone, 1993.

Illis LS. Neurological Rehabilitation (2nd Ed.). Oxford: Blackwell Scientific, 1994.

Lazar RB. Principles of Neurologic Rehabilitation. New York: McGraw Hill, 1998.

Mills VM, Cassidy JW, Katz DI. Neurologic Rehabilitation: A Guide To Diagnosis,
Prognosis and Treatment Planning. Massachusetts: Blackwell Scientific, 1997.

Ozer M (ed.) Management of Persons with Chronic Neurological Illness. Boston:
Butterworth-Heinemann, 2000.

Stuss DT, Winocur G, Robertson IH(eds.) Cognitive Neurorehabilitation. London
UK: Cambridge University Press, 1999.

- **Neurorehabilitation and Neural Repair** (<http://www.uphs.upenn.edu/nnr/>)
- Web sites and links available through the **SNRR** (<http://www.aan.com/>) and the **ASNR** (<http://www.asnr.com/>)