

NEW YORK-PRESBYTERIAN Rehabilitation Medicine

Affiliated with COLUMBIA UNIVERSITY COLLEGE OF PHYSICIANS and SURGEONS and WEILL MEDICAL COLLEGE OF CORNELL UNIVERSITY

Fall 2006

Resident Authors Guide for Doctors In Training

Grant Cooper, MD, a fourth-year physical medicine and rehabilitation resident at New York-Presbyterian Hospital, recently published his third book, *Essential Physical Medicine and Rehabilitation* (Humana Press, April 2006).

The guidebook, targeted toward medical students in physiatry rotations, is a collaborative endeavor that pooled the efforts of top specialists in the

nation. Many of the chapter authors serve on the Rehabilitation Medicine faculty of Columbia University College of Physicians and Surgeons and Weill Medical College of Cornell University.

"I think the book reflects extremely well on the skill, dedication, and extraordinary talent of New York-Presbyterian Hospital," said Dr. Cooper. He gives special credit to his Residency Director, Nancy Strauss, MD, and to Michael O'Dell, MD, Associate Chief of Rehabilitation Medicine, for their assistance.

Dr. Cooper is now working on an International Spine Intervention Society-funded multicenter study examining the predictive value of discography. Another book, *Current Applications of Botox* (Humana Press), edited by Dr. Cooper with the help of physiatrists within New York-Presbyterian Hospital, is set to appear in print early next year.



Spinal Rehabilitation Programs Use Multidisciplinary Approach

Effective management of spine pain requires attention to the individual needs and characteristics of each patient. In the Department of Rehabilitation Medicine at New York-Presbyterian Hospital, the control of acute and chronic pain has been integrated into a multidisciplinary team approach that includes the collaboration of physiatrists, physical therapists, and surgeons as part of a larger strategy to restore patients to the level of function they had prior to injury. The parallel but independent programs at New York-Presbyterian Hospital/Columbia University Medical Center and New York-Presbyterian Hospital/Weill Cornell Medical Center view pain control as a means to successful rehabilitation and mobilization, rather than an end point in and of itself.

"Pain may not have the same cause even in individuals with similar complaints," said Kevin T. Sperber, MD. "Even if the cause is the same, the response to therapies may differ."

An individualized assessment mandates both an accurate diagnosis and choice of the most effective treatment approach. Clinicians involved in the program at

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Continuing Medical Education

Stroke Rehabilitation Symposium 2007:
Innovation and Technology

March 23-24, 2007

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Therapists Help Patients With Vestibular Disorders

Lori Safdieh was diagnosed with benign paroxysmal positional vertigo (BPPV) at NewYork-Presbyterian Hospital/Weill Cornell Medical Center a few months ago. She experienced dizziness, wooziness, or nausea anytime she put her head back or turned from side to side.

"I felt like I was off balance," she said. "It affects your daily life."

BPPV is caused by small crystals of calcium carbonate, called *statoconia*, which have become dislodged from their normal spot at the base of the ear canal. With head movement, the displaced *statoconia* shift, sending false signals to the brain. Quick changes in head position, looking up or down, or rolling over can trigger this type of vertigo, explained occupational therapist Lisa Finnen.

"[For Ms. Safdieh] I conducted a complete vestibular evaluation and medical history," said physical therapist Gina M. Sauro, who confirmed her diagnosis of BPPV and developed a treatment plan. To test for BPPV, Ms. Sauro used the Hallpike-Dix maneuver, which involves sitting the patient on an examination table with her legs extended, turning her head to one side and quickly laying her on her back. She then looked for rhythmic beating eye movements called *nystagmus*. Ms. Sauro can determine which ear canal is affected by BPPV depending on the direction of these eye movements. In Ms. Safdieh's case, both ear canals were involved.

"I treat the side that is more affected first," said Ms. Sauro. She used a canalith or particle-repositioning procedure called the *Epley maneuver*. With this treatment the therapist starts with patients sitting upright, quickly lays

them down, turns their head to the side, rolls them on their side in the same direction, and then returns them to the sitting position.

Other vestibular conditions that NewYork-Presbyterian Hospital physical and occupational therapists may sometimes see are peripheral hypofunction involvement, and dizziness and imbalance stemming from central nervous system involvement. Peripheral hypofunction may be caused by an ear infection causing neuritis or labyrinthitis, and central vestibular involvement can be seen with brain injuries, including stroke. Symptoms in these cases most often do not include vertigo with positional changes, but rather dizziness and imbalance with head turns and in busy environments. Treatment in these cases is not as quick as treating patients with BPPV. These patients may have 6 to 8

Dizziness in Patients Over 60 Years of Age 1994-2000

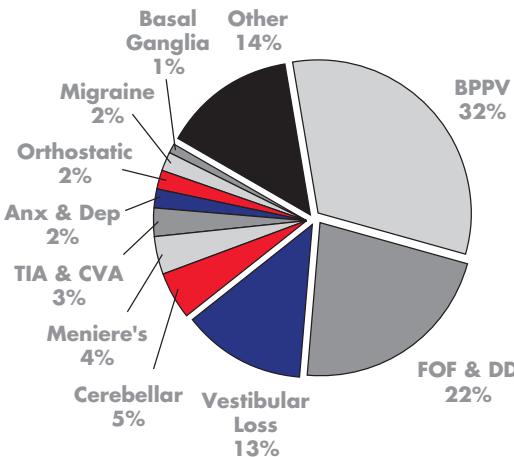


Figure. The etiology of vestibular involvement in patients over 60 years of age.

BPPV, benign paroxysmal positional vertigo; **CVA**, cerebrovascular accident; **DD**, disuse dysequilibrium; **FOF**, fear of falling; **TIA**, transient ischemic attack.

weeks of therapy focusing on improving the processing of vestibular information. One of the devices to work with clients experiencing these problems is the Smart Equitest Balance Master.

The device is used to provide assessment and retraining of the sensory and voluntary motor control of balance with visual biofeedback. By isolating which sensory systems—visual, somatosensory, or vestibular—are contributing to their dizziness or imbalance, occupational and physical therapists evaluate how the body compensates when 1 system is taken out of the equation. "Using the Balance Master, we can usually single out which 1, and it's usually vestibular," said Ms. Finnen. The machine determines a patient's sense of base support and how he or she can move safely without falling. Therapists use this information to develop an exercise program that focuses on the specific deficit which can allow for reintegration of environmental information to maintain balance and minimize dizziness.

For example, some patients may not want to lean forward for fear of falling, said Ms. Finnen. However, they can learn how to shift their weight so they can lean without feeling unbalanced. This, in turn, can be translated to everyday activities such as climbing stairs. This type of therapy usually requires 2 sessions per week for 6 to 8 weeks, said Ms. Finnen. Some patients are able to carry out exercises at home. Patients with vestibular disorders are often able to return to their normal daily activities.

"It's like a fog lifts once you regain your balance," said Ms. Safdieh. "And, hopefully, my lifestyle will quickly return to normal."

Lisa Finnen, MS, OTR/L, is Assistant Chief of Occupational Therapy in the Department of Rehabilitation Medicine at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. E-mail: ril9009@nyp.org.

Gina M. Sauro, PT, is Assistant Chief of Physical Therapy in the Department of Rehabilitation Medicine at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. E-mail: gsauro@nyp.org.

New Robotics System Facilitates Arm Recovery Following Stroke

Physicians and therapists in the Rehabilitation Medicine Department at NewYork-Presbyterian Hospital/Weill Cornell Medical Center are leading the way in the use of robotics to reestablish lost neural pathways and muscle function in persons with stroke. This tool is just the latest in a series of technological innovations that are matched with traditional occupational therapy designed to promote motor recovery—sometimes years after the patient has suffered a stroke.

Occupational therapists are using a robotics system originally developed at the Massachusetts Institute of Technology, the MIT-MANUS. To use the device, patients insert their lower arm and wrist into a trough attached to the “arm” of the robot. Therapists guide patients through a series of evaluations, which are then recorded in the machine’s memory. With the data now stored in the on-board memory, the system is able to assist patients through the exercises, without the assistance of a therapist. As patients recover and initiate movement on their own, the machine can sense how much force the patient is applying and adjust the amount of assistance it provides.

“Patients who are 1 to 2 years out generally plateau in regard to motor recovery,” noted Michael W. O’Dell, MD. “However, this may not be inevitable. Tools such as the robot provide us with options that permit patients to gain additional function through repetition of activity to rebuild strength and movements.”

The robotics device at NewYork-Presbyterian/Weill Cornell is 1 of only a relatively few such systems available in the country, and the only 1 in use in New York City. According to Dr. O’Dell, the technology is being integrated into rehabilitation treatment not only for acute recovery but also for motivated patients still seeking improved function years after a cerebrovascular event.

“Qualitatively, patients who have been working with the robot have demonstrated marked improvements in movement,” occupational therapist Lisa Finnen noted. “In a recent patient, there was essentially no arm movement when the work with the robot began, but we are now seeing voluntary motor function.” She added that the robot is suitable for patients with well-preserved motor strength who are attempting to improve their *quality* of movement as well as for patients with little to no movement requiring extensive assistance from the robot.



Lisa Rivera, OTR/L, supervises a session on the new stroke rehabilitation robotics system donated by the Orentreich Family Foundation.

According to Ms. Finnen, it is reasonable to anticipate that greater motor function with the device will translate into better functional task performance. Robotics are especially well suited to reestablish muscle memory, she noted.

“The theory is that through repetition, the brain learns the pathways for muscle control,” Ms. Finnen explained. “The robot is capable of allowing the patient to make more than 1,000 repetitions in a period of about 45 minutes. It actually senses the patient’s ability and provides an assist when necessary to complete the movement, so it permits those with essentially no function at baseline to work on the machine.”

Patient response to the robotic device has been excellent. According to Ms. Finnen, there is an emotional reward for some patients, such as those with little movement at baseline. She noted that

discernible progress for some patients provokes a sense of competitiveness in trying to do more and derive optimal recovery. Although the robot itself does not prepare patients for specific tasks, the restoration of muscle strength may provide a basis for improvements in function emphasized in traditional occupational rehabilitation.

According to Kerri Morris, OTR/L, the robotics system will be an important adjunctive tool for traditional rehabilitation techniques, and it also has promise as a research tool in studying the optimal approach to rehabilitation by standardizing intervention.

Another technology recently integrated with traditional therapies at NewYork-Presbyterian/Weill Cornell is the neuromuscular electrical stimulation system (Ness H200). For more information, see *NewYork-Presbyterian Rehabilitation Medicine* newsletter Spring 2006.

“There are 2 major constructs for recovering function in stroke rehabilitation,” noted Dr. O’Dell. “The first is the repetitive muscle movement and strengthening that is needed to regain control. The second is the restoration of task-specific functions made possible by regained muscle activity. These new technologies help us achieve those goals in our patients. We are establishing ourselves as a premier center for stroke rehabilitation. Few centers provide the type of comprehensive care we offer, which not only includes treatment during acute recovery but programs that can assist with longer-term rehabilitation.”

Lisa Finnen, MS, OTR/L, is Assistant Chief Occupational Therapist at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. E-mail: ril9009@nyp.org.

Kerri Morris, OTR/L, is Occupation Therapy Manager at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. E-mail: kam9018@nyp.org.

Michael W. O’Dell, MD, is Associate Chief, Department of Rehabilitation Medicine at NewYork-Presbyterian Hospital/Weill Cornell Medical Center, and is Professor of Clinical Rehabilitation Medicine at Weill Medical College of Cornell University. E-mail: mio2005@med.cornell.edu.

Pain

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NewYork-Presbyterian/Weill Cornell hold monthly "spine conferences," during which physicians and staff from the Department of Rehabilitation Medicine meet with colleagues from anesthesia-pain, surgery, and neuroradiology to review difficult cases, confirm diagnoses, and develop treatment plans. All treatment options are considered, from high-tech options (radiofrequency nerve ablation, nucleoplasty or various surgical procedures) to more traditional options (ie, nonsteroidal anti-inflammatory drugs combined with physical therapy and simple stretching exercises). According to Andre Panagos, MD, care within the program is coordinated so that patients can be seen by all of the specialists on the same day in the same place to minimize patient visits and maximize communication among the treatment team.

"It is essential to fully assess environmental, social, and personal aspects of the pain phenomena in each patient," said Dr. Panagos. "We have a toolbox of options for pain relief, but the challenge is understanding the causes of each patient's pain experience, the obstacles to pain control, and identifying the right tool or combination of tools to allow patients to return to their baseline activities."

Indeed, an open-minded philosophy, according to Dr. Sperber, includes acceptance of alternative methods, such as acupuncture or dietary supplements, for



Grant Cooper, MD (left), and Andre Panagos, MD (right), perform an epidural steroid injection under fluoroscopy at NewYork-Presbyterian Hospital/Weill Cornell Medical Center.

patients who are interested in nontraditional therapies. However, these are generally employed in the context of other treatments, particularly physical therapy that focuses on strengthening core abdominal and lumbar muscles as well as

"It is essential to fully assess environmental, social, and personal aspects of the pain phenomena in each patient."

—Andre Panagos, MD

patient education about back "hygiene." Immediate pain control through pharmacologic or even surgical therapies may provide the basis for progress toward recovery, but sustained pain control often depends on restoring lost function by retraining neuromuscular pathways to tolerate a more advanced level of activity.

"Morphine is certainly a very effective analgesic, and we use it when it is appropriate," noted Dr. Sperber. "However, narcotic drugs can be ineffective as well as counterproductive in many pain states and in many individuals." For example, in patients who are trying to return to physical or mental activities, sedating drugs may impair rather than facilitate recovery. "There is always a great deal of interest in the innovations in pain control, and while these can be helpful, it is critical to bring the right tools to the right patient."

Andre Panagos, MD, is Director, Interventional Psychiatry at NewYork-Presbyterian Hospital/Weill Cornell Medical Center, and is Assistant Professor in the Department of Rehabilitation Medicine at Weill Medical College of Cornell University. E-mail: anp2013@med.cornell.edu.

Kevin T. Sperber, MD, is Director, Clinics, Department of Rehabilitation Medicine at NewYork-Presbyterian Hospital/Columbia University Medical Center, and is Assistant Professor of Clinical Rehabilitation Medicine at Columbia University College of Physicians and Surgeons. E-mail: ks372@columbia.edu.

NewYork-Presbyterian Hospital
Weill Medical College of Cornell University
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**525 East 68th Street
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