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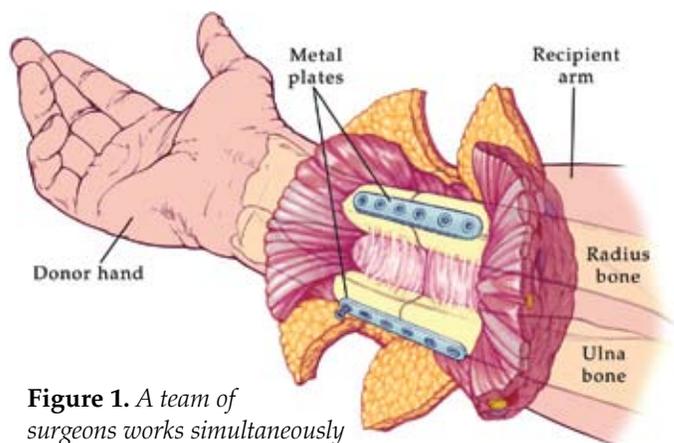
## Mayo Clinic Launches Hand Transplant Program

Mayo Clinic is on the leading edge of a new era in transplantation aimed at improving the quality of life for people who have sustained debilitating injuries. Mayo's new hand transplant program in Rochester, Minnesota, can make a dramatic difference in the day-to-day lives of people with severe hand injuries or amputation of both hands.

Until recently, people with severed or severely damaged limbs received a prosthesis or had tissue moved from another area of the body to the hand to restore function. A hand transplant can restore both function and sensation. And it gives patients the opportunity to return to a state of wholeness.

### Filling a Real Need

There is a growing population of US military veterans with missing limbs, many of whom lost limbs in the wars in Iraq and Afghanistan. While body armor saves lives, it does not protect the extremities, and many servicemen and -women have sustained severe extremity injuries. According to Steven L. Moran, MD, Mayo Clinic plastic surgeon and codirector of the Mayo Clinic Hand Transplant



**Figure 1.** A team of surgeons works simultaneously to attach the hand. Attachments are made in the following order: bones, arteries, veins, tendons, muscles, and nerves. The bones are attached using standard 3.5-mm plates.

## Did You Know?

### Facts About Physical Medicine and Rehabilitation Services at Mayo Clinic

All medical records, including patient history and demographics, clinical notes, radiology reports, tests, and images, are completely electronic/paperless.

Patient Online Services, [www.mayoclinic.org/\\_portal/html/C/index.html](http://www.mayoclinic.org/_portal/html/C/index.html), is a secure Web-based portal that provides patients with the ability to

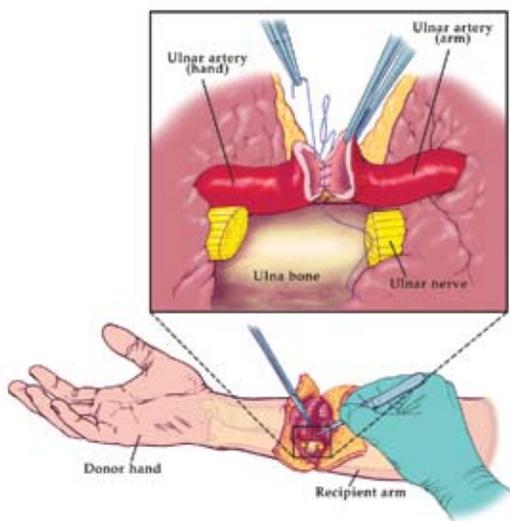
- Access their lab results
- View their appointments
- Review and update their medications, allergies, and immunizations
- Complete previsit questionnaires and patient registration information
- Send a message, request an appointment, or complete an electronic visit (eVisit) with a health care provider

Online Services for Referring Physicians is a secure and user-friendly communications Web site that allows a referring physician to

- Make appointment requests electronically, 24 hours a day, 7 days a week
- View and print Mayo Clinic medical documents through Online Services, including summary letters, laboratory and radiology reports, and hospital discharge summaries

The new “living lab”—The Healthy Aging and Independent Living (HAIL) Lab—is a revolutionary laboratory that will support seniors “aging in place” and help them remain at home and stay healthy and independent. More information will be provided in upcoming issues of this newsletter.

The inpatient rehabilitation program has one of the largest nontraumatic spinal cord injury programs (in association with Mayo Clinic's neurology department) in the United States. More information to come in upcoming issues.



**Figure 2.** Following osteosynthesis of the forearm bones, the blood vessels are repaired using standard microsurgical technique. Once blood flow has been reestablished, the muscle tendon units are repaired, followed by nerve repair. After all structures have been repaired, the skin is closed.

Program, many other patients would also benefit from hand transplantation.

Candidates for hand transplantation at Mayo Clinic include people aged 25 to 65 years, with severe or mutilating injuries to both hands or, in special cases, to a single hand. Although the Mayo Clinic program has yet to conduct its first transplant, several patients are currently going through the extensive screening process. After screening is completed, the wait begins for the right donor. Mayo Clinic hopes to complete its first hand transplant sometime in 2011.

### Hand Transplantation and Rehabilitation

The hand transplantation procedure and rehabilitation process are highly complex (Figures 1 and 2), and it has

only recently become possible. According to Dr Moran, hand transplantation is a natural extension of what Mayo Clinic already does well, including heart, lung, liver, kidney, and pancreas transplantation, and surgeries to reimplant or reattach severed arms and hands.

"We have extensive experience and national recognition with transplantation and hand surgery," explains Dr Moran. "This experience, coupled with one of the strongest rehabilitation programs in the country, is one of the many reasons Mayo has embarked on this endeavor to help people who have had traumatic loss of their hands. This program will allow us to stay on the forefront of regenerative and transplant medicine," Dr Moran adds.

Following surgery, the care team will carefully monitor blood flow, infection, rejection, muscle

strength, and nerve regeneration. And like all transplant recipients, patients who receive a hand transplant must take immunosuppressants every day for the rest of their lives to prevent their bodies from rejecting their new hands.

Intensive rehabilitation and regular follow-up clinic visits are necessary to ensure long-term success of the transplant. Physiatrists and physical and occupational therapists are critical members of the rehabilitation team. While the procedure promises the return of sensation in the hands and fingers, daily physical or occupational therapy is required, and feeling in the fingers may not occur for up to a year. Patients must be highly motivated to do the exercises because there is a risk that motion and function in the transplant will fail.

"Mayo Clinic rehabilitation specialists play a key role in restoring function after these complex surgeries," says Mayo Clinic physiatrist Mary L. Jurisson, MD. "Our rehabilitation team provides comprehensive rehabilitation services for patients who are treated with traditional approaches, such as the use of prosthetics. Hand transplantation offers another option when a prosthesis is not adequate to the patient's needs, and our rehabilitation team is prepared to help these patients regain function and learn to use their new hands."

Several dozen successful hand transplants have been performed over the past decade, but Mayo Clinic's program is the first clinically approved hand transplant program in the United States. The transplant and rehabilitation team traveled to Paris earlier this year to learn more from the innovators of hand and face transplantation.



Mary L. Jurisson, MD



Steven L. Moran, MD

## Mayo Clinic Offers Implantable Diaphragmatic Pacing System for Spinal Cord Injury Patients

### Selected Patients Can Reduce Dependence on Mechanical Ventilators

Over the past 2 decades, researchers have explored the possibility of developing an implantable diaphragmatic pacing device to improve the quality of life for ventilator-dependent patients. In June 2008, the US Food and Drug Administration (FDA) approved the use of a diaphragmatic pacing stimulation system for ventilator-dependent spinal cord injury (SCI) patients who lack voluntary

control of their diaphragms. The goal of this pacing device is to reduce or end a person's dependence on a ventilator over time.

At Mayo Clinic, surgeons implant a pacing device as a minimally invasive procedure using a laparoscopic approach. Using direct visualization, surgeons place electrodes on the diaphragm in a location that elicits the optimal contraction. The



Ronald K. Reeves, MD

electrodes are connected to wires that run through the skin to an external device about the size of a remote control (Figure). After implantation, the device provides electrical stimulation that induces diaphragm contraction and inhalation of air to fill the upper and lower parts of the lungs. Patients who use the device describe the impulse sensation as similar to a flick of the finger.

Mayo Clinic is one of a handful of centers offering a pacing device to selected patients with high cervical SCI who currently require ventilator support for breathing.

“The goal of implanting this device is to reduce the amount of time patients require mechanical ventilation,” explains Ronald K. Reeves, MD, a physiatrist at Mayo Clinic in Rochester, Minnesota, who is monitoring and training Mayo Clinic patients with spinal cord injury in the use of this device.

Reducing the number of hours spent on mechanical ventilation facilitates greater independence and other benefits for patients with SCI. Benefits include easier transfers, improved mobility without tubing or a ventilator to accommodate, reduced secretions, and improved speech. Additionally, because the pacing device is battery-powered, it continues operating during power outages.

Candidates for device implantation at Mayo Clinic must be hemodynamically stable and have intact bilateral phrenic nerve function and support at their home or care facility to assist with the

conditioning process. During conditioning, patients transition off the ventilator to the pacing device and then back to the ventilator, several times a day for several days.

Dr Reeves’s team reports that 2 SCI patients have undergone device implantation at Mayo Clinic thus far. During the first month following implantation, one of these patients was able to stay off the ventilator for up to 8 hours a day, while the other was off the ventilator for 2 to 3 hours at a time. Dr Reeves expects that some patients will condition faster and remain off the ventilator for up to 24 hours using the pacing device. In the future, Dr Reeves and colleagues are also hopeful that the pacing device can be implanted in SCI patients acutely after injury to help wean them from ventilators during the days and weeks after injury, to help reduce the incidence of hospital-acquired pneumonia and other possible adverse effects associated with long-term use of a ventilator.



**Figure.** An external electronic stimulator is attached via wires through the skin to 4 electrodes implanted in the diaphragm near the phrenic nerves. The device generates an electric impulse that triggers the diaphragm to contract and allows air to fill the upper and lower parts of the lungs.

## Chair Appointment

### Mayo Clinic in Rochester, Minnesota, Appoints New Chair of Physical Medicine and Rehabilitation

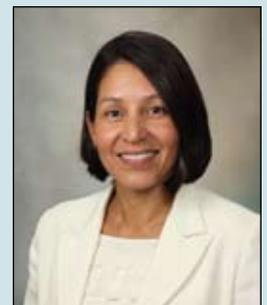
Carmen M. Terzic, MD, PhD, has been named chair of the Department of Physical Medicine and Rehabilitation at Mayo Clinic in Rochester, Minnesota, effective May 1. Dr Terzic has been a member of the Mayo Clinic staff since 2003. She holds the academic rank of associate professor and is board certified by the American Board of Physical Medicine and Rehabilitation. She holds a joint appointment in the Division of Cardiovascular Diseases of the Department of Internal Medicine.

Dr Terzic earned her medical degree from Universidad Centroccidental Lisandro Alvarado, in Barquisimeto, Venezuela, and a PhD from Mayo Graduate School. She completed postgraduate training at Mayo Clinic in Rochester in the Department of Physical Medicine and Rehabilitation, the Cardiovascular Research Laboratory of the

Division of Cardiovascular Diseases, and Mayo Graduate School.

Dr Terzic has served as associate medical director of the Cardiovascular Rehabilitation Clinic since 2004. She has published more than 50 peer-reviewed articles and has extramurally funded research, with 2 active R01 grants from the National Institutes of Health. She has been the recipient of numerous national and international awards, is active in a number of national and international specialty societies, and is recognized globally for her state-of-the-art research. For more details about Dr Terzic’s research, see a related article on page 5.

Dr Terzic succeeds Kathryn A. Stolp, MD, who served as department chair for the past 8 years.



Carmen M. Terzic, MD

# Association of Academic Physiatrists Honors

Three Mayo Clinic physiatrists received honors at the 2011 annual meeting of the Association of Academic Physiatrists (AAP). Kathryn A. Stolp, MD, was named president-elect of the organization. Andrea L. Cheville, MD, received the Research Writing/Best Paper Award. And Carmen M. Terzic, MD, PhD, received the Research Writing/Best Paper Award.

## Excellence in Research Writing/Best Paper Award

### Research Focuses on Benefits of Exercise Among Cancer Patients



Andrea L. Cheville, MD

Mayo physiatrist Andrea L. Cheville, MD, received the Excellence in Research Writing/Best Paper Award at the 2011 annual meeting of the Association of Academic Physiatrists (AAP). Dr Cheville's article, "Therapeutic Exercise During Outpatient Radiation Therapy for Advanced Cancer: Feasibility and Impact on Physical Well-being," appeared in the August 2010 issue of the *American Journal of Physical Medicine and Rehabilitation*. According to the AAP, this award is given for scientific articles submitted to the *American Journal of Physical Medicine and Rehabilitation* during the year. The selection is made by a committee from the editorial board, appointed by the editor.

"My research team and I were thrilled by this unexpected honor," says Dr Cheville. "Cancer has not historically been a focus of the rehabilitation medicine community's interest. We are hopeful that this may be changing as the societal burden of cancer-related disability continues to grow."

According to Dr Cheville and coauthors, plenty of data support the idea that therapeutic exercise directed by rehabilitation specialists may reduce disability among patients with advanced cancer. "Resistive exercise enhances skeletal muscle anabolic processes and limits the cachexia often associated with cancer and chronic disease," explains Dr Cheville. "We also know that exercise reduces immobility-associated morbidities such as venous thrombi and bone loss that are prevalent in advanced cancers."

Despite patient enthusiasm for therapeutic exercise and its demonstrated efficacy, Mayo researchers note that appropriate programs are seldom offered or delivered to patients with advanced cancer. Lack of availability and other logistical barriers revealed in patient surveys and qualitative research may contribute to underutilization of rehabilitative services by cancer patients. "Survey data underscore the need to examine treatment models that coordinate reha-

bilitative therapies with the delivery of cancer treatments," says Dr Cheville.

The Mayo Clinic research outlined in Dr Cheville's paper examines the benefits and feasibility of delivering a physical therapy (PT)-based exercise program as an integrated part of a multidisciplinary intervention designed to maintain and improve the quality of life for outpatients receiving radiation therapy for advanced cancer. In designing their study, Dr Cheville's team posed 2 questions: Can these patients tolerate or benefit from such a program? Can the exercise program be delivered in a way that integrates fluidly with other care provided?

### Study Design

The multidisciplinary intervention was tested in a randomized controlled trial, enrolling 103 adult patients undergoing radiation therapy for advanced cancer with prognoses of 6 months or longer and 5-year survival estimates of up to 50%.

Study participants were randomly assigned to usual care or participation in eight 90-minute, multidisciplinary interventional sessions, with 30 minutes of each session devoted to PT. PT consisted of truncal and limb isodynamic strengthening targeting major upper- and lower-limb muscle groups as well as education and provision with instructional materials. Physical well-being and fatigue were assessed with Linear Analogue Self-Assessment. The Profile of Mood States-Short form, including Fatigue-Inertia and Vigor-Activity subscales, was also administered.

### Results and Conclusions

This trial yielded several striking results. PT session attendance was 89.3%. Relative to baseline, mean physical well-being Linear Analogue Self-Assessment scores at week 4 improved in the intervention group and declined significantly in the control group.

# Honors 3 Mayo Clinic Physicians

...ing of the Association of Academic Physiatrists. Andrea L. Cheville, MD, earned the Excellence in Research Award and received the Distinguished Academician Award.

“The participants’ baseline functional status (reflected in their Tinetti Scale scores, intact physical examinations, and normal walking speeds), their attendance rate at the PT sessions, and their self-assessment scores suggest that patients with advanced cancer who are undergoing radiation can engage in and benefit from regular exercise,”

explains Dr Cheville.

Acknowledging that intergroup differences were not preserved after completion of the PT intervention, Dr Cheville points out that future work must examine the capacity of telephone, Internet, or in-person follow-up to extend gains beyond the study interval.

## Distinguished Academician Award

Mayo physiatrist Carmen M. Terzic, MD, PhD, received the Distinguished Academician Award at the 2011 annual meeting of Association of Academic Physiatrists (AAP). According to the AAP, this national award honors “a member of the Association who has achieved distinction and peer recognition ... by virtue of excellence as a teacher, researcher and/or administrator.” “It’s a huge honor to receive this prestigious award, especially when I consider the wonderful work done by so many colleagues,” says Dr Terzic.

Dr Terzic has distinguished herself directing Mayo Clinic’s state-of-the-art program on regenerative rehabilitation applied to cardiovascular patients. By integrating advanced technology with a focus on clinical problems addressed at a fundamental level, Dr Terzic has advanced the application of stem cells for cardiac repair and the establishment of diagnostic platforms to define individual regenerative capacity of patients with ischemic heart disease. She has also excelled in integrating advanced methods of cellular biology, enriched through imaging and biomarker methodologies, to generate the framework for the developing diagnostic and therapeutic strategies in the context of tissue repair and organogenesis.

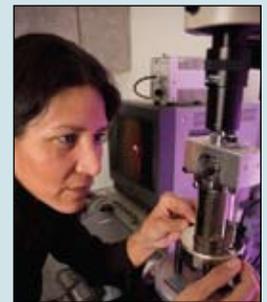
“Dr Terzic’s work is an essential step in the development of algorithms that target dysfunctional pathways in disease and an area of top priority in the developing field of personalized physical medicine and rehabilitation,” says

Kathryn A. Stolp, MD, past chair of the Department of Physical Medicine and Rehabilitation at Mayo Clinic in Rochester, Minnesota.

Demonstrating a continuous track record of publications in highest quality journals, Dr Terzic has reported research findings in more than 50 manuscripts and textbook chapters. Her work has been published in leading journals of general interest, such as *Nature Cell Biology*, *Science*, and *Science Translational Medicine*, as well as in specialized journals, including *Journal of Cardio-pulmonary Rehabilitation and Prevention*, *Circulation*, *Circulation Research*, *Clinical Pharmacology and Therapeutics*, *Genome Biology*, and *Stem Cells*.

Overall, Dr Terzic’s work has been extensively cited by peers in the field and highlighted in the scientific literature. Underscoring the importance of the research, Dr Terzic’s contributions have also been recognized by professional organizations, foundations, and funding bodies. Dr Terzic has been the recipient of National Institutes of Health funding as well as American Heart Association funding in support of her multidisciplinary research program. She has been a member of national grant review panels, as well as an editorial board member and referee for prestigious journals.

Dr Terzic has been a vigorous educator and educational leader. She has established a leading research and educational program enhancing academic excellence not only at Mayo Clinic, but also more broadly at national and international levels.



Carmen M. Terzic, MD, PhD

## Inpatient Rehabilitation Unit Renovation Nears Completion

Located at Saint Marys Hospital in Rochester, Minnesota, the inpatient rehabilitation unit has continually updated its services and infrastructure to provide the best care to every patient every day. The unit serves Mayo Clinic patients of all ages with a comprehensive spectrum of accredited rehabilitation programs.

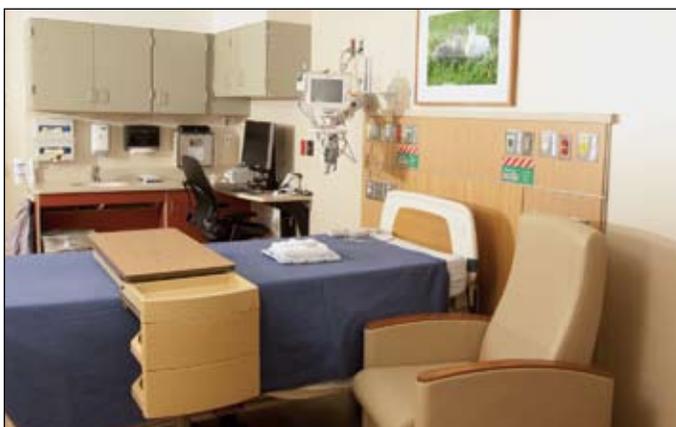
In recent years, the program has incorporated innovative treatment strategies for locomotor training, virtual environment therapeutic interventions, electrical stimulation, and robotics. In 2009, a comprehensive team rounding process was initiated, which enhanced patient satisfaction and resulted in a 2010 5-star patient satisfaction award. Continuing that long track record of excellence in patient care, the unit is completing a major renovation in 2011. The design reflects an unwavering focus on the needs of patients and families, who provided extensive guidance to the design team.

Key aspects of the renovation include the following:

- The majority of rooms are private rooms.
- Safety features such as observation windows

allow staff to monitor patients when needed while being outside the room.

- Computers at the bedside enhance medication safety with armband bar code scanning.
- Environmental control units for rooms accommodating high tetraplegia patients allow control of the blinds, lights, temperature, television, telephone, and other room features.
- Ceiling lifts in every room facilitate safe patient transfers when needed.
- Specially designed expanded capacity room allows patients to use expanded capacity equipment to achieve maximal independence.
- Dedicated pediatric rooms have optimally sized features and aesthetics for children.
- Dedicated pediatric treatment spaces are designed to meet the unique needs of children.
- Patient-focused amenities in the rooms include refrigerators, height-adjustable tables, and seating for family meals.
- Bathtubs in patient rooms allow greater opportunity for bathing practice before discharge.
- Inspirational art and aesthetics throughout the unit add visual appeal.
- Comprehensive ventilator monitoring in staff workrooms provides state-of-the-art ventilator patient safety.
- Centrally located family lounge provides comfortable space for visitors.



*Pediatric treatment spaces are designed to meet the unique needs of children. Dedicated pediatric rooms have optimally sized features and aesthetics for children.*

## Mayo Clinic Researchers Test the Feasibility and Efficacy of Telehealth-Based Cognitive Rehabilitation for Individuals With TBI

Traumatic brain injury (TBI) is a serious public health concern associated with extensive residual impairments, including cognitive difficulties, such as memory and executive dysfunction, which can result in lifelong disability. Recent studies estimate that more than 3 million people in the United States live with severe disability due to TBI. A growing body of research suggests that cognitive rehabilitation is an effective intervention to help improve functioning and diminish disability in TBI. Various interventions have been shown to be effective in clinical settings to improve attention, memory, executive functioning, and other major cognitive domains that are affected after brain injury.

Many of the treatments studied use a compensatory approach that teaches patients techniques and strategies to help them compensate for impaired functioning in 1 or more cognitive domains. One strategy that improves patients' functioning in daily life is the 3-stage calendar acquisition approach. This approach, combined with other interventions, has been the basis of Mayo Clinic's outpatient brain rehabilitation program for many years. For successful results, this approach requires numerous face-to-face therapy sessions necessary to learn and apply the strategies that allow persons with a brain injury to compensate for areas of impaired functioning.

Unfortunately, individuals with a brain injury in need of this important therapy often have to travel some distance to find a therapist who is skilled in delivering this kind of specialized treatment.

"Distance from specialized services particularly affects patients in rural regions," explains Mayo Clinic neuropsychologist Thomas Bergquist, PhD, LP. "While some therapy services are available in many small communities, they are often provided by therapists with limited expertise in addressing the unique needs presented by TBI." As a result, people with TBI from rural areas often relocate to be closer to specialized services, typically at their own expense, or they simply do not receive the best level of service.

Advances in communications and computer technology have helped overcome some of these logistical barriers and made telehealth services a viable means of providing a variety of services for TBI. Through telehealth, specialized clinical services may be delivered to those in need who live considerable distances from specialized service providers.

Mayo Clinic researchers recently tested the effi-

cacy of using telehealth to deliver specialized post-acute rehabilitation services to individuals with TBI. The goal of this research was to assess the feasibility of providing cognitive rehabilitation using an instant messaging (IM) system for individuals with TBI and associated memory impairment. Specific study aims were to identify factors that predicted who could participate in and potentially benefit from telehealth-based cognitive rehabilitation and to evaluate the effects of this care on emotional and cognitive functioning.

"The first phase of our research was meant to determine types of disability, such as severity of brain injury, cognitive impairment, level of emotional distress, personal preference, or participant preferences that precluded participation in telerehabilitation," says Dr Bergquist. "We assessed attitudes toward receiving rehabilitation in this manner and attempted to determine which factors differentiated those who responded to telehealth from those who did not." Subsequent studies measured the impact of telerehabilitation on emotional and cognitive functioning.

Participants were individuals with a history of moderate to severe TBI with documented memory impairment. Participants received training in how to use a secure IM system and then scheduled to log into the system weekly to participate in online cognitive rehabilitation therapy sessions over the Internet with a cognitive rehabilitation therapist at Mayo. Treatment focused on training participants to use a calendar system aimed at improving accuracy and efficiency in home and work tasks. Participants underwent assessment of cognitive function, psychological status, level of functioning, and use of compensation techniques both before and after treatment.

"Our findings indicate that the Internet may be an effective delivery mechanism for compensatory cognitive rehabilitation, particularly among individuals who are already utilizing some basic compensatory strategies," explains Dr Bergquist.

Building on these initial findings, research is under way to assess whether participation in this Internet-based cognitive rehabilitation program results in improved daily functioning.



Thomas Bergquist, PhD, LP

Complete details of this research were published in the journals *Brain Injury* (October 2008;22[11]:891-897 and September 2009;23[10]:790-799) and *Telemedicine and e-Health* (May 2010; 16[4]:417-423).

## Mayo Clinic PM&R Update

### Medical Editors:

Carmen M. Terzic, MD, PhD  
Mary L. Jurisson, MD

*PM&R Update* is written for physicians and should be relied upon for medical education purposes only. It does not provide a complete overview of the topics covered and should not replace the independent judgment of a physician about the appropriateness or risks of a procedure for a given patient.

## Contact Us

Mayo Clinic welcomes inquires and referrals, and a request to a specific physician is not required to refer a patient.

**Arizona**  
866-629-6362

**Florida**  
800-634-1417

**Minnesota**  
800-533-1564

## Resources

[mayoclinic.org/medicalprofs](http://mayoclinic.org/medicalprofs)

Clinical trials

CME

Grand Rounds

Scientific videos

Online referrals

## Education Opportunities

### Recently Completed

#### 5th Annual Diagnostic and Interventional Musculoskeletal Ultrasound Course

July 7-9, 2011, Rochester, MN

Mayo Clinic and the American Institute for Ultrasound in Medicine worked collaboratively to offer this 3-day course. This year's course emphasized diagnostic and interventional applications in the upper limb, including musculoskeletal and peripheral nervous system (brachial plexus). Invited guest faculty included leaders in the field such as Carlo Martinoli, MD, Levon Nazarian, MD, Jon Jacobson, MD, Greg Saboeiro, MD, and Ralf Thiele, MD.

The teaching format consisted of lectures, live demonstrations, and extensive hands-on experiences on live models and unembalmed cadavers. Topics ranged from basic to intermediate/advanced and included normal anatomy, pathology, upper limb nerves (including brachial plexus), and interventional techniques ranging from joint and tendon sheath injection to percutaneous treatment of tendon disease, calcific tendinitis, trigger finger, and carpal tunnel syndrome.

Participants in this year course included physiatrists, sports medicine physicians, radiologists, orthopedic surgeons, anesthesiologists, rheumatologists, sonographers, and other clinicians from the United States and all over the world.

For questions and registration for future courses, please visit [www.aium.org](http://www.aium.org), e-mail Brenda Kinney at [bkinney@aium.org](mailto:bkinney@aium.org), or call 800-638-5352 or 301-498-4100.

### Upcoming

#### 21st Annual Mayo Clinic Symposium on Sports Medicine

November 11-12, 2011, Rochester, MN

This case-oriented program provides an integrated approach to the injured athlete. Case presentations, lectures, and video demonstrations make this course interesting to all sports medicine practitioners. The course was developed for health care professionals with an interest in sports medicine, and it also may be of interest to athletic trainers.

For more information about this course call 800-323-2688 or e-mail [cme@mayo.edu](mailto:cme@mayo.edu).

#### The Neurorehabilitation Summit

October 25-26, 2012, Rochester, MN

This summit provides practitioners with focused and diverse updates that address 3 common areas of neurologic care: brain disorders, spinal cord dysfunction, and neurodegenerative diseases. Renowned speakers will discuss cutting-edge advancements in clinical practice, research, and innovation throughout the continuum of care.

For more information about this course call 800-323-2688 or e-mail [cme@mayo.edu](mailto:cme@mayo.edu).

**To view all Mayo Clinic continuing medical education offerings visit [www.mayo.edu/cme/](http://www.mayo.edu/cme/).**

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