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New Rehabilitation Medicine Research Center to Focus on Translational Research

Mayo Clinic is pleased to announce the formation of the Mayo Rehabilitation Medicine Research Center (RMRC). Drawing upon the strong clinical practice, research and education efforts in rehabilitation medicine and surgery already present at Mayo Clinic, the new center will focus on the discovery, translation and application of new knowledge to provide hope and improved quality of life to all people with disabilities.

“The Mayo leadership has long recognized the value of rehabilitation in integrated health care,” explains Carmen M. Terzic, M.D., Ph.D., chair of the Department of Physical Medicine and Rehabilitation at Mayo Clinic in Rochester, Minn. “As our nation’s population ages, we expect to see an increased burden of disability from chronic musculoskeletal and neurological disease. One of this center’s goals is to help identify better solutions and care models to

make sure those affected by disabilities maintain optimal function and quality of life.”

The RMRC’s stated mission is to “advance the science of rehabilitation medicine through research (discovery and translation), education and innovative clinical practice.” Many of the resources required to accomplish this mission are already in place at Mayo Clinic. The center will support a large rehabilitation practice that includes more than 60 physiatrists and a full team of psychologists; nursing specialists; physical, occupational, recreational and respiratory therapists; speech pathologists; social workers and technicians. Staff work closely with providers in other specialties to care for patients in the acute care setting, in the Inpatient Rehabilitation Unit and in more than two dozen outpatient specialty areas.

Centerwide programs will focus on three key areas: assistive and restorative technology, functional outcomes, and muscle-cartilage

Mayo Rehabilitation Medicine Research Center *Regeneration, Recovery, Reintegration*

Center Administration	Director Executive Committee Administrator		
Center-Wide Programs	Assistive and Restorative Technology		
	Functional Outcomes		
	Cartilage Regeneration		
Clinical Themes	Neurological	Musculoskeletal	Medical
Disease-Oriented Groups	Neurodegenerative	Spine & Osteoporosis	Cancer
	Brain (TBI-Stroke)	Ultrasound Imaging & Sports	Heart-Lung-Blood
	Spinal Cord Injury	Muscle & Arthritis	Pediatric
			Aging

Figure. Clinical research will be aligned with three clinical themes, each with multiple corresponding disease-oriented foci: neurological, musculoskeletal and medical rehabilitation.



Carmen M. Terzic, M.D., Ph.D.

regeneration. Clinical research will be aligned with three clinical themes, each with multiple corresponding disease-oriented foci: neurological, musculoskeletal and medical rehabilitation (Figure). "These themes were carefully chosen to augment current research and to advance science that promises to improve the health of people with disability," says Ralph E. Gay, M.D., a Mayo physiatrist in Rochester, Minn., who has been the center's acting director during the initial planning and development stages. All three areas will rely on expertise that exists at Mayo and in new expertise that will be recruited to the center.

"Organizing the center around these themes will lead to natural collaborations between investigators and will also provide new research questions that will arise from relationships between clinicians and scientists working in related areas," explains Dr. Gay.

Many of the faculty that will be working in the RMRC are established Mayo scientists and physicians who are already collaborating on numerous projects. They include investigators in many areas such as neurology, orthopedics, rheumatology, health sciences research and biomechanical engineering. The RMRC will also work closely with several other strategic initiatives and research centers at Mayo Clinic, including the Robert and Arlene Kogod Center on Aging, the Center for Individualized Medicine, the Center for the Science of Health Care

Delivery, the Center for Regenerative Medicine, and the Center for Innovation. The RMRC organization and these collaborations will further organize Mayo Clinic's rehabilitation research efforts to increase efficiency.

These efforts are designed to continue Mayo's efforts to bridge the gap between basic science and clinical application. "We are excited to see what this new center will generate. Our patients will be the first to benefit from scientific advancements that lead to clinical trials and subsequent adaptation of new treatments," says Dr. Gay.

The RMRC has been officially approved by the Mayo Clinic Research Committee, and initial funding has been provided by Mayo leadership. Christopher Evans, Ph.D., a leader in the field of gene therapy in the treatment of arthritis, has been recruited as RMRC director.

Dr. Evans comes to Mayo Clinic from Beth Israel Deaconess Medical Center, a major teaching hospital of Harvard Medical School in Boston. In his previous post, Dr. Evans served as director for the Center for Advanced Orthopaedic Studies and was named the Maurice Mueller Professor of Orthopaedic Surgery.

Originally from Great Britain, Dr. Evans holds a bachelor's degree in genetics and microbiology, a Ph.D. in biochemistry from the University of Wales, a master's degree in history and philosophy of science from the University of Pittsburgh and a D.Sc. from the University of Wales.



Ralph E. Gay, M.D.

Improving Outcomes During and After Pregnancy for Patients With Spinal Cord Injury



Lisa A. Beck, R.N., C.N.S.

Women with spinal cord injury face many challenges during pregnancy and throughout the physically demanding years of early parenthood. But awareness and monitoring of risk factors for secondary complications, the patient's commitment to self-care, and guidance from a collaborative rehabilitation and obstetrics team can help patients achieve successful outcomes throughout the pregnancy, delivery and postpartum periods.

The first trimester

During any pregnancy, each patient's individual need for medications should be weighed against their possible risk(s) to the fetus. When possible, patients should be weaned from medications such as antispasmodics, anticholinergics and anticonvulsants, all of which may compromise fetal growth, before pregnancy or as early in the pregnancy as possible.

Because they can worsen constipation, the

use of iron supplements to address anemia during pregnancy may complicate a previously effective bowel program. Patients may need to alter dietary and fluid intake, as well as frequency of bowel care. Stool softeners and stimulants can also help re-establish an effective bowel program if diet and fluid intake changes are ineffective. Some patients may also require topical anesthetic gels to reduce the risk of autonomic dysreflexia during bowel care.

Headaches also are common in the first trimester of pregnancy. However, patients with spinal cord injury at or above T-6 who experience severe headache, high blood pressure or bradycardia should be evaluated to differentiate between autonomic dysreflexia and preeclampsia.

"Autonomic dysreflexia can be triggered throughout pregnancy and delivery with stimuli such as pelvic examinations, full bladder or bowel, uterine contractions, and delivery," says Lisa A.

Beck, R.N., C.N.S., a member of the Mayo Clinic team in Rochester, Minn., that guides women with spinal cord injury through pregnancy. “The health care team can assist in reducing the stimuli by using warm, small speculums, bladder and bowel management programs, and collaborative labor and delivery planning,” says Beck.

The second trimester

Bladder management may need to change sometime during the second trimester. Decreased bladder capacity and increased risk of bladder spasms and infection, especially in women using indwelling catheters, are potential problems. Severe bladder spasms may also cause expulsion of the catheter.

As with any pregnancy, care providers must consider the potential risk to the fetus when considering treatment for bladder infection. “To reduce the risk of bladder infections, we advise re-evaluating and, when needed, adjusting bladder management and urine continence methods on an as needed basis,” says Beck. Methods to reduce bladder complications include: aseptic technique with intermittent catheterization, more frequent bladder emptying, increased size of indwelling catheter and maintaining adequate fluid intake.

Weight gain, edema and anatomic changes that accompany a progressing pregnancy make providing proper pressure-relieving and transfer techniques more difficult. Daily skin inspection as well as regular seating system and cushion evaluations by seating clinic specialists can be helpful.

Increased spasticity in women with upper motor lesions also is a very common problem. A twice-daily at-home stretching program can help reduce spasticity in patients who have been weaned off their antispasmodics. Implantation of an intrathecal baclofen (ITB) pump has been a reported consideration for patients with severe spasticity during pregnancy.

Body changes and fatigue that occur during pregnancy in women with SCI also can cause difficulty with activities of daily living, driving, transfers and their ability to propel a wheelchair. Outpatient therapy can help patients increase endurance and strength and learn new techniques to compensate for changes in function and body habitus.

The third trimester

Decreased diaphragm movement that occurs as the fetus grows can lead to respiratory compromise. Women with spinal cord injury at and above T-10 are at risk of atelectasis and pneumonia. Patients with cervical and high thoracic lesions also may require increased ventilatory

Points to Remember

- Special care needs to be taken during pregnancy to keep women with spinal cord injury from experiencing complications such as autonomic dysreflexia, urinary tract infections, pressure ulcers, deep vein thrombosis or respiratory difficulty.
- Before and throughout pregnancy, each patient’s individual need for medications should be weighed against their possible risk(s) to the fetus.
- Body changes and fatigue that occur during pregnancy in women with SCI can also cause difficulty with activities of daily living, driving, transfers and their ability to propel a wheelchair. Outpatient therapy can help patients increase endurance and strength and learn new techniques to compensate for changes in function.

support due to decreased respiratory reserve and vital capacity. Patients in their third trimester are also at risk of thrombophlebitis and bilateral lower extremity edema as the growing uterus compresses the pelvic veins.

Labor and delivery

Recent studies have shown that between 30 and 40 percent of women with SCI enter labor during the 37th week. Signs and symptoms of labor may present differently in women with SCI, and can include pain above the level of injury, increased spasticity, increased autonomic dysreflexia,

Answering questions about SCI, pregnancy and parenting

A team of Mayo Clinic physical medicine and rehabilitation staff and patients recently worked together to draft a new patient education booklet entitled *Pregnancy and Parenting: Spinal Cord Injury*. Written for a patient audience, the new booklet addresses:

- How issues related to spinal cord injury can affect pregnancy, labor and delivery
- The possible effects of pregnancy, labor and delivery on the body
- Parenting issues and concerns

In addition to project leaders Lisa Beck, R.N., C.N.S., and Tamara L. Vos-Draper, O.T., ATP, three new mothers who were followed by Mayo Clinic’s spinal cord injury rehabilitation team throughout their pregnancies played valuable roles in developing the informational booklet. “These advisors did a great job of helping to keep the content and organization focused and useful for a patient audience,” says Beck. “We think that this booklet pulls together a lot of valuable information into a concise read, and we are pleased to make this available to our patients considering pregnancy.”

Medical Editors:

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

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

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866-629-6362

Florida

800-634-1417

Minnesota

800-533-1564

Resources

mayoclinic.org/medicalprofs

Clinical trials, CME, Grand Rounds, scientific videos, and online referrals

change in breathing and anxiety. Because the risk of autonomic dysreflexia increases during labor in patients with injuries at and above T-6, unattended labor should be avoided as much as possible. Autonomic dysreflexia symptoms peak during contractions and abate after the contraction ends. Use of epidural or spinal anesthesia can block afferent impulses, reducing autonomic dysreflexia episodes. Use of anti-hypertensives must be monitored to avoid rebound hypotension, which can cause a reduction in placental perfusion.

Postpartum

Because orthostatic hypotension is common during the postpartum period, slow acclimation to sitting with compression stockings and an abdominal binder may be

necessary. Continued use of pain medications or epidural should be considered to help avoid autonomic dysreflexia triggered by pain during breast-feeding or other postpartum pain. Proper positioning, decreased nipple sensation and decreased milk production also can be challenging for patients attempting breast-feeding. Other postpartum problems include bowel and bladder difficulties, thrombophlebitis, fatigue, spasticity and headaches. Postural changes that may have occurred during pregnancy also can lead to difficulty in seating and functional activities.

Mayo Clinic's Spinal Cord Injury Program offers a collaborative team approach with obstetricians to assist women with spinal cord injury through safe and successful pregnancies.

Mayo Clinic Establishes Two Physical Therapist Residency Programs

Mayo Clinic recently established physical therapy residency programs in geriatrics and orthopedics. The geriatrics residency, a yearlong program for one student at Mayo Clinic in Arizona, graduated its first resident in July, 2013. The orthopedics residency, a yearlong program for up to two students at Mayo Clinic in Rochester, Minn., welcomed its first two residents in August, 2013. Both residency programs are seeking credentialing from the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) council of the American Physical Therapy Association (APTA).

These residencies are planned programs of post-professional clinical and didactic education designed to advance significantly the physical therapist's preparation as a provider of patient care services in a defined area of clinical practice. After completion of a residency, a physical therapist is qualified to take a specialty board certification exam. You can read more about both of these residencies, at www.mayo.edu/mshs/careers/physical-therapy.

Education Opportunities

23rd Annual Mayo Clinic Symposium on Sports Medicine

Nov. 8-9, 2013, in Rochester, Minn.

This program provides an integrated approach to the injured athlete and includes case presentations, lectures and video demonstrations. Health care professionals with an interest in sports medicine and athletic trainers will find this program appropriate. Contact: Call 800-323-2688 (toll-free) or email cme@mayo.edu

Mayo Clinic EMG, EEG and Neurophysiology in Clinical Practice

March 2-8, 2014, in Phoenix

Regularly recurring course for CNP, annual meeting. Contact: Call 800-462-9633 (toll-free) or email cme-jax@mayo.edu

Neurorehabilitation Summit

May 19-20, 2014, in Rochester, Minn.

This summit covers a wide range of topics related to common diagnoses, including brain disorders, spinal cord injury and disorders, and neurodegenerative diseases. The summit addresses research initiatives, advances in medicine, innovative technology and clinical applications to strengthen the continuum of care for this population. Contact: Call 800-323-2688 (toll-free) or email cme@mayo.edu

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