

REHAB PROGRESS



News from the University of Pittsburgh Medical Center Institute for Rehabilitation and Research

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From the Director's Desk

Culture and the Courage to Change

In "Culture and the Courage to Change,"* the presidential address delivered at the 2007 annual meeting of the Association of American Medical Colleges, Darrell Kirch, MD, spoke about the dissatisfaction he sensed in many physicians when he listened to them discuss their professional lives.

Intrigued, Dr. Kirch questioned some of his colleagues about what terms they considered emblematic of the prevailing culture of academic medicine. They responded with descriptors such as *autonomous*, *competitive*, *focused*, *scholarly*, *hierarchical*, and *individualistic*.

Do these terms still describe the cultural ideal in medicine? Or do they convey only a sense of nostalgia? Recent trend lines seem to indicate a shift *away from* the ideal of autonomy and individual achievement toward models that favor cooperative efforts among individuals and across disciplines.

As the title of his speech suggests, Dr. Kirch considers that his colleagues' choice of "code words" exposes a clash between "the way it used to be" and the current emphasis on collaboration. The incongruity between academic medicine *then* and academic medicine *now* could be the source of his colleagues' discontent. Reality stubbornly belies memory and expectation alike.

To increase physicians' sense of professional fulfillment, Dr. Kirch advocates that medicine embrace a cultural code that is "collaborative, transparent, outcome-focused, mutually accountable, team-based, service-oriented, and patient-centered."

From my own perspective, Dr. Kirch has just described the prototypical physiatry practice. Since its inception as an "independent" specialty, physical medicine and rehabilitation has always inclined in this direction. This is one reason why I believe the typical academic physiatrist continues to be satisfied with his or her career choice.

At the UPMC Institute for Rehabilitation and Research (IRR), collaborative efforts with our nationally recognized colleagues in the School of Health and Rehabilitation Sciences have been mutually reinforcing and have strengthened patient care, research, and training in rehabilitation medicine throughout our network.

I am proud to present this issue of *Rehab Progress*, in which we highlight some of the multidisciplinary initiatives made possible through the collective efforts of researchers, clinicians, trainees, and staff of the IRR. In future issues, I look forward to highlighting more programs, more research initiatives, and the achievements of many more colleagues and partners.



Michael L. Boninger, MD

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University of Pittsburgh School of Medicine
Professor and Interim Chairman
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*The full text of Dr. Kirch's address is available at
<http://www.aamc.org/newsroom/pressrel/2007/2007presidentsaddress.pdf>

Good-as-Golden Rules for manipulation

By Anthony Delitto, PhD, PT, FAPTA

Professor and Chairman, Department of Physical Therapy



Dr. Delitto

Manual therapy has a long history in the management of musculoskeletal conditions, particularly those involving the spine. Of particular interest are the “high-velocity, short-lever arm” techniques, which are referred to as manipulation, grade V mobilization, thrust techniques, or — in common terms — “cracking” the back. Widely practiced in osteopathic medicine, physical medicine, chiropractic, and physical therapy, these approaches have been demonstrably effective in managing acute low-back pain (LBP).

Although most of the systematic and quantitative reviews of the literature have demonstrated the effectiveness of thrust techniques, the limitation has always been in the marginal effect sizes seen in these studies.

Marginal effect sizes would appear to contradict the clinical experience of practitioners who commonly use thrust techniques — techniques that provide dramatic pain relief in many cases and virtually no effect in others.

With such seemingly equivocal outcomes, the best we have been able to offer the patient with LBP is a trial of thrust techniques, knowing that a given patient might (or might not) obtain relief.

From a decision-making standpoint, the trick is to be able to identify, *a priori*, the patient characteristics that predict a greater probability of success with manipulation. Such issues are tailor-made for *Clinical Prediction Rule* approaches.

Clinical prediction rules (CPRs) are tools designed to improve decision making in clinical practice by assisting practitioners in making a particular diagnosis, establishing a prognosis, or matching patients to optimal interventions based on a parsimonious subset of predictor variables from the history and physical examination. CPRs have been developed and adopted to improve decision making in many situations. They are useful diagnostic aids for conditions as diverse as strep throat, proximal deep vein thrombosis, coronary artery disease, and pulmonary embolism. CPRs are also valuable for evaluating prognostic indicators in, for example, deciding whether to discontinue resuscitative efforts following in-hospital cardiac arrest, determining the four-year mortality risk for a person with coronary artery disease, identifying children at risk for urinary tract infection, or recognizing risk factors for post-anesthesia nausea and vomiting.

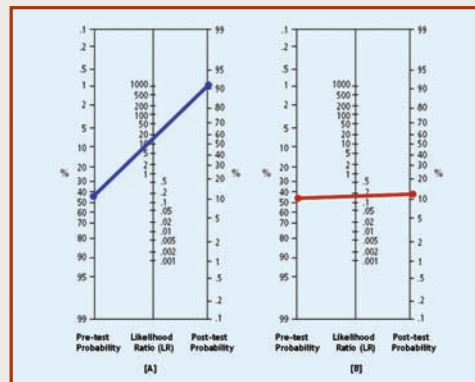
Given the variable responsiveness of patients to thrust techniques, many practitioners would welcome a scheme of clinical prediction rules applicable to this approach. Pioneering work at the University of Pittsburgh Department of Physical Therapy attempts to identify characteristics that predispose patients to a positive response to lumbar thrust techniques.

In the process of establishing clinical prediction rules, the first step is simply to develop the rule. For thrust techniques, an experiment is carried out in which patients with general acute low-back pain enter the study and undergo a series of tests and measures, each of which is presumed to have some value for predicting responsiveness to manual therapy. From among these measures, a reasonable list of predictors is selected, on the basis of clinical experience and prior research supporting the prognostic value or diagnostic accuracy of the given patient characteristic, measurement, or test result.

Once a clinical prediction rule is established, it must be validated in a randomized, controlled trial. Lastly, the rule's impact is assessed with a cost-effectiveness analysis.

Researchers in the Department of Physical Therapy found that a CPR consisting of five simple variables was highly predictive of a positive response to a thrust technique. The variables include:

- duration of pain < 16 days
- no pain distal to the knee
- low fear avoidance beliefs (*Fear Avoidance Beliefs* score < 19)
- hypomobility of the lumbar spine
- greater hip internal rotation (> 35 degrees)



Clinical Prediction Rule Illustrated. Patient [A] has no pain below the knee and duration of symptoms ≤ 15 days; positive LR = 12.6. The pre-test probability of success from manipulation was 45%; post-test probability of success is 92%. Patient [B] has pain distal to the knee; negative LR = 0.16. The pre-test probability of success from manipulation was 45%, but post-test probability is only 12%.

The presence of 4 of the 5 variables resulted in a likelihood ratio of immediate success of 13.2. “Immediate success” was defined as >50% improvement in symptoms within 72 hours of treatment.

Further, if a patient has symptoms distal to the knee, the negative likelihood ratio was 0.16, indicating only a remote likelihood that patients with distal symptoms will realize any benefit from manual therapy.

These studies have been extended to postpartum women, a number of whom have shown excellent responsiveness to thrust techniques.

As a result of clinical prediction rule experiments, we are better equipped to recommend interventions for people with LBP. This investigation has progressed to “impact analysis,” for which we have partnered with UPMC Health Plan to assess the cost effectiveness and potential long-term cost of using thrust techniques in select cases of low-back pain.

Selected References

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IRR and PAM&R join forces in research gala

Research is the engine that drives advances in patient care. As a multidisciplinary clinical and academic enterprise, the UPMC Institute for Rehabilitation and Research (IRR) annually recognizes the individual and collaborative achievements of young investigators in all aspects of rehabilitation science.

This year's celebration, IRRDay2008, will be held in conjunction with the annual meeting of the Pennsylvania Academy of Physical Medicine and Rehabilitation (PAPM&R). The daylong event will take place on June 6 at the University of Pittsburgh Thomas E. Starzl Biomedical Science Tower. The PAPM&R meeting will take place during the morning session, beginning at 8 a.m., while the afternoon session will be devoted to IRRDay events. In addition to an open poster viewing session, poster grand rounds, and poster presentations, the program includes talks by guest speakers.

Addressing the attendees of the PAPM&R meeting will be Mitchell K. Freedman, DO, and Jeremy Simon, MD, both of the Rothman Institute in Philadelphia.



Dr. Freedman

At Rothman, Dr. Freedman serves as director of Physical Medicine and Rehabilitation and Pain Management and fellowship director in Musculoskeletal Pain. He is also a clinical assistant professor at Thomas Jefferson University Hospital. He is a member of the 2008 Study Guide Committee for the Annual Assembly of the American Academy of Physical Medicine and Rehabilitation, chairman of the 2008 Pain Study Guide, and chief editor of the textbook *Minimally Invasive Musculoskeletal Medicine*. Dr. Freedman is the 2006 recipient of the Gerald Herbison Award for mentoring residents at Thomas Jefferson University Hospital. Dr. Freedman's talk is entitled "Diagnosis and Treatment of Complex Regional Pain Syndrome."



Dr. Simon

Dr. Jeremy Simon is an attending physician at the Rothman Institute. He is board-certified in pain management and physical medicine and rehabilitation. His publications cover topics such as cervical and lumbar zygapophyseal joint disease, cervical disc disease, and lumbar stenosis. Dr. Simon will present a discussion of "Lumbar Zygapophyseal Joint Pain."

The afternoon IRR session will feature lectures on "Translational Research in Rehabilitation Sciences," by Martin K. Childers, DO, PhD, and "Modulating Physical Stresses to Manage Skin Breakdown and Help Prevent Amputation in People with Diabetes and Peripheral Neuropathy," by Michael J. Mueller, PT, PhD, FAPTA.



Dr. Childers

Dr. Childers is an associate professor of neurology, and regenerative medicine at Wake Forest University School of Medicine, Winston-Salem, N.C. He has extensive experience in the functional evaluation of golden retriever muscular dystrophy (GRMD), a canine model of Duchenne muscular dystrophy. Dr. Childers was the first to report the use of a single skeletal muscle fiber assay in GRMD. This work was cited in *Nature* as an outcome measure during preclinical study of muscle progenitor cells in the GRMD model. Over the last 13 years, Dr. Childers has focused his research on the evaluation of skeletal muscle function in GRMD to define and quantify measures of muscle injury and regeneration, effects of exercise, effects of mechanical stretch, and preclinical effects of treatment with systemic compounds such as prednisone and calpain inhibitors. Dr. Childers' research is funded through grants from the National Institutes of Health and the Wake Forest Translational Science Institute. He is widely published and has been invited to present at national and

international conferences. His IRRDay presentation addresses the importance of the flow of information between researchers and clinicians.



Dr. Mueller

Dr. Michael Mueller is an associate professor and division director of research at the Program in Physical Therapy and the Department of Radiology, Washington University School of Medicine, St. Louis. His research focuses on the biomechanical factors that contribute to injury and tissue adaptation in chronic disease, particularly diabetic peripheral neuropathy. He has been the principal investigator on a number of interdisciplinary projects funded by the NIH to investigate foot problems associated with diabetes.

Dr. Mueller is widely published and has contributed numerous textbook chapters. Last year, the American Physical Therapy Association presented him with the Chattanooga Research Award and the Jules M. Rothstein Golden Pen Award for Scientific Writing.



University of Pittsburgh Thomas E. Starzl Biomedical Science Tower

Program introduces med students to research in rehabilitation



Dr. Dicianno

Significant strides have been made in recent years in increasing rehabilitation research capacity and academic leadership through programs such as the Rehabilitation Medical Scientist Training Program, initiated by the National Institutes of Health, and the Program for Academic Leadership, funded by the Roosevelt Warm Springs Foundation. Until now, there has been no equivalent program for medical students.

Members of the Association of Academic Physiatrists (AAP) Task Force on Medical Student Research, notably Michael L. Boninger, MD, and Brad E. Dicianno, MD,

have worked to develop the Rehabilitation Research Experience for Medical Students (RREMS), a new scholarship program for first-year medical students. Through an eight-week summer externship, RREMS allows students to experience the rewards of scholarly research within the specialty of physical medicine and rehabilitation.

The RREMS was developed for medical students with strong research interests. This program will benefit students by giving them a challenging and structured research experience and exposing them to some of the most successful and respected faculty mentors in our field. It will benefit sponsoring institutions by attracting highly motivated and academically oriented medical students who may be candidates for future residency or research programs.

This program is supported by the Ernest W. Johnson Fund, the Roosevelt Warm Springs Foundation, the Foundation for PM&R, and the AAP. The program funds up to five medical students each summer, beginning in July 2008.

Medical student applicants will contact participating host institutions, establish a primary mentor, and submit a proposal project. Dr. Dicianno is overall director of the RREMS program, as well as director of RREMS at the University of Pittsburgh.

A list of participating institutions, additional details, and application forms can be found at http://www.physiatry.org/Education_RREMS.cfm.

SHRS announces new master's program in prosthetics and orthotics



Dr. Cooper

The University of Pittsburgh School of Health and Rehabilitation Sciences (SHRS) has added a new master's program to its curriculum. The Master of Science in Health and Rehabilitation Science with a concentration in Prosthetics and Orthotics (MSPO) will be available to students this fall. The two-year program within the Department of Rehabilitation Science and Technology is designed to prepare students to be certified prosthetists and orthotists.

Orthotics and prosthetics is the evaluation, fabrication, and custom fitting of artificial limbs and orthopaedic braces.

Also known as orthoses, orthopaedic braces are used to stabilize or unload joints, normalize motion and stresses on tissue, substitute for muscle weakness or paralysis, and assist in normal growth, development, or function. Orthoses can be applied to the head, neck, trunk, or limbs.

Artificial limbs, also known as prostheses, are used to replace missing limbs or portions of limbs, and to restore more normal function for the upper and lower extremities.

"The field of prosthetics and orthotics is rapidly changing, with recent advances in materials and intelligent components, and in assessment and limb-fitting technologies," says Rory A. Cooper, PhD, chairman of the Department of Rehabilitation Sciences and Technology at SHRS and director of the Human Engineering Research Laboratories (HERL). "The University of Pittsburgh has been at the forefront of advancing technology for people with disabilities and older adults and we are excited about expanding our activities in prosthetics and orthotics."

For more information about academic programs at the University of Pittsburgh School of Health and Rehabilitation Sciences, visit the school's website at <http://www.sbrs.pitt.edu>.

\$4.75 million grant funds Rehab Engineering Center on SCI



Dr. Brienza

The National Institute on Disability and Rehabilitation Research has awarded a \$4.75 million grant to the University of Pittsburgh to create the Rehabilitation Engineering Research Center (RERC) on Spinal Cord Injury.

The School of Health and Rehabilitation Sciences (SHRS) designed the center to address significant issues for people with spinal cord injury (SCI). The RERC team includes researchers of the Department of Rehabilitation Science and Technology, the Department of Physical Medicine and Rehabilitation, the McGowan Institute for Regenerative Medicine, and the Department of Occupational Therapy at the University of Pittsburgh, in addition to Case Western Reserve University, Northwestern University, Baylor College of Medicine, IBM, and Immunetrics.

The RERC on SCI will research, develop, and evaluate innovative approaches to improve treatment, rehabilitation, employment, and social reintegration for people with SCI.

One aspect of the center's research is the creation of mathematical models of inflammation and healing — which can vary widely from person to person — to develop novel technologies for detecting pressure ulcers and preventing shoulder injuries in wheelchair users, to improve evaluation of bladder function and musculoskeletal injuries, and to assess therapies for individual patients. The center will also disseminate information, train future researchers, and transfer technology concepts to industry.

Faculty from the departments of Surgery and Critical Care Medicine at the University of Pittsburgh, in collaboration with Gwen Sowa, MD, PhD, and other IRR researchers, are pioneering computational approaches to develop and calibrate models of the inflammatory process in spinal cord injury.

According to David M. Brienza, PhD, professor of rehabilitation science and bioengineering at the University of Pittsburgh and director of the RERC on SCI, the occurrence of pressure ulcers, urinary tract infection, and musculoskeletal injuries stemming from spinal cord injury can be attributed to systemic inflammation. In order to develop patient-specific therapies for spinal cord injury, it is necessary to understand and be able to predict responses to inflammation.

For more information on the University of Pittsburgh Rehabilitation Engineering Research Center on Spinal Cord Injury, visit the center's website at <http://www.rercsci.pitt.edu>.

Speaking of rehab

Faculty members of the UPMC Institute for Rehabilitation and Research remain active and visible at national and international meetings. Following is a sampling of recent presentations.

State-of-the-Science Workshop Quality of Life Technology

January 18

Walter Reed Army Medical Center
Washington, D.C.

Rory A. Cooper, PhD, professor and chairman, Department of Rehabilitation Science and Technology, University of Pittsburgh School of Health and Rehabilitation Sciences, spoke on *Personal mobility and manipulation*.

Katherine Seelman, PhD, professor and associate dean of disability programs, University of Pittsburgh School of Health and Rehabilitation Sciences, discussed the *Policy impact of quality-of-life technology (QoLT)*.

State-of-the-Science Symposium Spinal Cord Injury Medicine

April 11

Walter Reed Army Medical Center
Washington, D.C.

Michael L. Boninger, MD, professor and interim chairman, Department of Physical Medicine and Rehabilitation and associate dean for medical student research, University of Pittsburgh School of Medicine, discussed *Implementation of spinal cord injury (SCI) clinical practice guidelines*.

Rory A. Cooper, PhD, gave a presentation on *Assistive technology*.

Association of Academic Physiatrists 2008 Annual Educational Conference

February 19 to 23

Anaheim, Calif.

Aguila ED, Dicianno BD, Cooper RA, Pasquina PF, Clark MJ, Collins DM, Fitzgerald SG. *Acute mountain sickness in veterans with disabilities*. [Poster]

Sowa GA. *Degenerative intervertebral disc cells demonstrate altered responses to mechanical and inflammatory stimuli*. [Rehabilitation Medicine Scientist Training Program]

Wagner A. *Neurogenesis, information process, and functional recovery*.

24th International Seating Symposium

March 5 to 8

Vancouver, B.C.
Canada

Dicianno BE, Schmeler M, Lieberman J. *State of the literature on power seating functions: What is the scientific evidence?*

22nd National Disabled Veterans Winter Sports Clinic

March 30 to April 4

Snowmass Village
Aspen, Colo.

Dicianno BE, Cooper RA. *Update on research*.

Dr. Weber's group develops novel energy-harvesting device

Report published in *Science*



Dr. Weber

A human-powered bio-mechanical energy harvester developed by Douglas J. Weber, PhD, and colleagues can generate electricity during walking and requires very little extra effort. The technology used in this energy harvester

assists muscles in performing negative work, not unlike the concept of regenerative braking used in hybrid cars. The device, which is secured at the user's knee, generates power at the end of the swing phase of each stride. Preliminary studies were conducted with ambulatory subjects using a prototype of the biomechanical energy harvester. Wearing one device on each leg, the subjects

generated an average of 5 watts of electricity walking a treadmill at 1.5 m/sec. The investigators measured the electrical power output of the generator and estimated metabolic cost using standard respirometry. Using these parameters, the "cost of harvesting" (COH) for this device can be calculated, allowing comparison with other means of power generation. COH is a dimensionless quantity defined as the additional metabolic power in watts required to generate 1 W of electrical power:

$$\text{COH} = (\Delta \text{ metabolic power}) \div (\Delta \text{ electrical power})$$

The capacity to produce meaningful quantities of electrical power, at little additional metabolic cost, makes this method well-suited for charging powered prosthetic limbs, insulin pumps, and other portable medical devices.

Dr. Weber is assistant professor of physical medicine and rehabilitation, University of Pittsburgh School of Medicine; he holds a secondary appointment in the Department of Bioengineering at the University of Pittsburgh's Swanson School of Engineering. Collaborators on this project represent the University of Michigan, Ann Arbor; and the Simon Fraser University School of Kinesiology, Burnaby, British Columbia. The report was published in the journal *Science* (Donelan JM, et al. *Science*. 2008; 319:807-10). The full text can be accessed at <http://www.sciencemag.org/cgi/content/full/319/5864/807>.

Upcoming presentations

IRR faculty members' conference calendars remain full throughout summer and beyond. Here is a brief preview of upcoming commitments.

John Horton, MD, will address the American Spinal Injury Association (ASIA), at its 34th Annual Scientific Meeting June 19 to 22 in San Diego. For more information, visit <http://www.asia-spinalinjury.org>.

Brad E. Dicianno, MD will give a presentation at the 28th National Veterans Wheelchair Games July 25 to 29 in Omaha. For more information about the National Veterans Wheelchair Games, visit <http://www.va.gov/vetevent/nvwg/2008/default.cfm>.

Anthony Kline, PhD, will speak at the 26th Annual National Neurotrauma Society Symposium July 27 to 30 in Orlando, Fla. For information on the National Neurotrauma Society or the annual symposium, see <http://www.neurotrauma.org/2008/index.htm>.

Presentations planned for RESNA conference

A number of IRR faculty members will participate in the Annual Conference of the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) being held June 26 to 30 in Arlington, Va. Following is a sample of IRR faculty presentations at RESNA 2008.

- Baker BR, Anderson A. AAC (augmentative and alternative communication) vocabulary for educational participation: meeting the challenge. (*Course instruction*)
- Dickerson G, Schmeler MR, Minkel J, Bachenheimer C, Hostak R, Piriano J. Policy and funding for mobility assistive equipment in the USA. (*Course instruction*)
- Hill K, LoPresti E. AAC (augmentative and alternative communication) assistive technology research potholes: avoiding hazards in the road. (*Workshop*)

- Hurd R, Gealsman C, Hill K. How policy affects AAC (augmentative and alternative communication) service delivery for families and professionals. (*Course instruction*)
- Karg P, Buning ME. Update on wheelchair transportation safety for prescribers: the wheelchair, the seating, and the secondary postural supports. (*Workshop*)
- Pearlman J, Noon J, Adams K. The U.N. Convention on the Rights of People with Disabilities — How RESNA can support international mandates. (*Workshop*)
- Schein RM, Schmeler M, Betz K, Saptano A, Fairman A. Opportunities and threats to clinical application of telerehabilitation: an interdisciplinary discussion. (*Workshop*)
- Schmeler MR, Betz K, Berner TF, DiGiovine CP, Kirby RL, Lenker J, Rosen L, Smith C. Clinical application of quantitative measures in the assessment and provision of mobility assistive equipment. (*Course instruction*)
- Simpson R. Evidence-based assessment for computer access — a practical approach. (*Course instruction*)
- Thibault LL, Cooper RA, Steinfeld E. Research in wheeled mobility: an interim report. (*Workshop*)

For RESNA conference information, visit <http://www.resna.org/Conference/Conference.php>.

Recently published

A small sample of representative papers by IRR faculty members

Peer-reviewed papers

Ambrosio F, Boninger ML, Fitzgerald SG, Hubbard SL, Schwid SR, Cooper RA. A comparison of mobility device delivery within the Veterans Administration for individuals with multiple sclerosis and individuals with a spinal cord injury. *J Rehabil Res Dev*. 2007;44:693–702.

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Hubbard SL, Fitzgerald SG, Vogel B, Reker DM, Cooper RA, Boninger ML. Distribution and cost of wheelchairs and scooters provided by the Veterans Health Administration. *J Rehabil Res Dev*. 2007;44:581–92.

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Koontz AM, Yang Y, Price R, Tolerico ML, DiGiovine CP, Sisto SA, Cooper RA, Boninger ML. Multisite comparison of wheelchair propulsion kinetics in persons with paraplegia. *J Rehabil Res Dev*. 2007;44:449–58.

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Sharma V, Simpson RC, LoPresti EL, Mostow C, Olson J, Puhlman J, Hayashi S, Cooper RA, Konarski E, Kerley B. Participatory design in the development of the wheelchair convoy system. *J Neuroeng Rehabil*. 2008;5:1.

Simpson RC, Koester HH, LoPresti EF. Selecting an appropriate scan rate: the “.65 rule.” *Assist Technol*. 2007;19:51–60.

Tolerico ML, Ding D, Cooper RA, Spaeth DM, Fitzgerald SG, Cooper R, Kelleher A, Boninger ML. Assessing mobility characteristics and activity levels of manual wheelchair users. *J Rehabil Res Dev*. 2007;44:561–72.

Van Drongelen S, Boninger ML, Impink BG, Khalaf T. Ultrasound imaging of acute biceps tendon changes after wheelchair sports. *Arch Phys Med Rehabil*. 2007;88:381–5.

Venneti S, Wagner AK, Wang G, Slagel SL, Chen X, Lopresti BJ, Mathis CA, Wiley CA. The high affinity peripheral benzodiazepine receptor ligand DAA1106 binds specifically to microglia in a rat model of traumatic brain injury: implications for PET imaging. *Exp Neurol*. 2007;207:118–27.

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Wolf EJ, Cooper RA, Pearlman J, Fitzgerald SG, Kelleher A. Longitudinal assessment of vibrations during manual and electric powered wheelchair driving over selected sidewalk surfaces. *J Rehabil Res Dev*. 2007;44:573–80.

Abstracts

Ambrosio F, Ferrari RJ, Fitzgerald GK, Carvell G, O'Day T, Boninger ML, Huard J. Muscle loading enhances stem-cell contribution to MDX mouse skeletal muscle contractile function. International Society for Stem Cell Research, Cairns, Australia, June 2007.

Cooper RA, Cooper R. The potential of technology to improve quality of life. 9th European Conference for the Advancement of Assistive Technology in Europe, San Sebastian, Spain, October 2007.

Cowan R, Boninger ML, Zelch T, McPherson N. Perceived difficulty of wheelchair propulsion by older adults: impact of wheelchair weight. ACRM-ASNR Joint Conference, Washington, DC, October 2007.

Ding D, Cooper RA, Pearlman J. Incorporating participatory action design into research and education. International Conference on Electrical Engineering, Coimbra, Portugal, September 2007.

Ferrari RJ, Nozaki M, Karthikeyan T, Ambrosio F. Effects of early treadmill running on the regenerative process after muscle contusion. European Muscle Conference, Stockholm, Sweden, September 2007.

Hanks RA, Millis SR, Ricker JH, Giacino JT, Nakase-Richardson R, Frol AB, Novack TA, Kalmar K, Sherer M, Gordon WA. The predictive validity of a brief inpatient neuropsychological battery for persons with traumatic brain injury. International Neuropsychological Society 36th Annual Meeting, Waikola, Hawaii, February 2008.

Kalmar K, Novack TA, Nakase-Richardson R, Sherer M, Frol AB, Gordon WA, Hanks RA, Giacino JT, Ricker JH. Feasibility of a brief neuropsychological test battery for use during acute inpatient rehabilitation after TBI. International Neuropsychological Society 36th Annual Meeting, Waikola, Hawaii, February 2008.

McGee JB, Boninger ML, Kant P. Personal student mentor websites to support a new scholarly project requirement. Graylyn Conference on Technology Innovation in Medical Education, Winston-Salem, N.C., September 2007.

Yarossi M, Kwarciak AM, Forrest G, Dyson-Hudson T, Ramanujam A, Kirshblum S, Boninger ML, Sisto SA, Cole J. Methods for interpreting wheelchair propulsion biomechanics in tetraplegia. International Meeting on Upper Limb in Tetraplegia, Philadelphia, Pa., September 2007.

Books and book chapters

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Awards and Honors

Electrode Store Best Papers

The University of Pittsburgh was well represented at the Electrode Store Best Paper presentations February 21 at the Association of Academic Physiatrists 2008 Annual Meeting in Anaheim, Calif. Brad E. Dicianno, MD, assistant professor, Department of Physical Medicine and Rehabilitation, received the Electrode Store Best Paper award in the young faculty member category for his report, titled "Isometric and movement-sensing joysticks for spastic cerebral palsy." Janet Leath won the award in the medical student category for her paper, "A cross-sectional study of carpal tunnel syndrome symptoms, physical examination findings, and nerve conduction studies in manual wheelchair users with spinal cord injury." Ms. Leath's mentors were Michael L. Boninger, MD, professor and interim chairman, Department of Physical Medicine and Rehabilitation, and Jennifer Yang, MD, who is completing an advanced fellowship in spinal cord injury rehabilitation.

Visiting Lectureship

Michael L. Boninger, MD, was invited to deliver the Gail F. Beach Memorial Visiting Lecture, as part of the lecture series established by the Miami Project to Cure

Paralysis. Dr. Boninger discussed "Repetitive strain of shoulder and wrist: What Can we learn from wheelchair users?" on Jan. 9, 2008 at the Lois Pope LIFE Center, Miller School of Medicine, University of Miami, Fla.

On Air: Neurophysiology and ethics

Joseph H. Ricker, PhD, associate professor of physical medicine and rehabilitation, was interviewed by National Public Radio's Margot Adler and participated in a discussion entitled, "NeuroLaw: The New Frontier," which aired as a segment of NPR's

Justice Talking on Jan. 14, 2008. The show was an in-depth exploration of ethical issues arising from the increasing sophistication of neuroscience and neuroimaging technology. Dr. Ricker is also director of neuropsychology and rehabilitation psychology in the Department of Physical Medicine and Rehabilitation, and a research associate at the Center for the Neural Basis of Cognition, a joint project of the University of Pittsburgh and Carnegie Mellon University.

Department ranks second for NIH research funding

According to data compiled by the National Institutes of Health (NIH) for fiscal year 2006, the most recent year for which figures are available, the University of Pittsburgh Department of Physical Medicine and Rehabilitation ranked second among the nation's more than 50 departments of physical medicine and rehabilitation in research-only funding — those awards used for direct support of original research — and fifth-highest in total NIH dollars.

The University consistently ranks in the top 10 among NIH-funded institutions. We also receive numerous federal research

grants from the Centers for Disease Control and Prevention; the Veterans Affairs Rehabilitation Research and Development Center; and the National Institute on Disability and Rehabilitation Research (NIDRR). Ours is one of only three programs with an NIDRR-sponsored Model Systems center grant for spinal cord injury and a traumatic brain injury (TBI) clinical trials center funded by the NIH through the TBI Clinical Trials Network, and we have developed a Musculoskeletal and Acupuncture Research Center that is unique in the region and nationally.

AFFILIATE LINKS

UPMC Institute for Rehabilitation and Research
<http://irr.upmc.com>

School of Medicine, Department of Physical Medicine and Rehabilitation
<http://www.rehabmedicine.pitt.edu>

School of Health and Rehabilitation Sciences, Department of Rehabilitation Science & Technology
<http://www.shrs.pitt.edu/rst>

UPMC Center for Assistive Technology
<http://www.com/Services/IRR/aboutus/cat>

Human Engineering Research Laboratories
<http://www.herlpitt.org>

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