

guidelines. Tips for staying healthy after stroke are included, along with a glossary of related terms and a listing of additional resources for stroke survivors and their families.

Hoffmann, T., McKenna, K. (2007) **Written education materials for stroke patients and their carers: Perspectives and practices of health professionals.** *Topics in Stroke Rehabilitation*, 14(1), 88-97. [NARIC Accession Number: J52084.](#)

Abstract: Twenty stroke team health professionals were surveyed regarding their use of and perspectives on written materials used to educate patients and their caregivers about stroke. Fourteen of the participants (70 percent) provided materials to 25 percent or fewer stroke patients and 90 percent believed that patients and caregivers are only occasionally or rarely provided with sufficient written information. Most participants provided written education materials to help patients remember information that had been presented verbally. Participants were not sure which team members provided written information and identified the need to improve the quality of materials used. Strategies are needed to facilitate the routine provision of quality written materials to patients and caregivers, improve communication among stroke rehabilitation team members, and increase documentation and verbal reinforcement of the information provided.

Kautz, D. (2007) **Hope for love: Practical advice for intimacy and sex after stroke.** *Rehabilitation Nursing*, 32(3), 95-103. [NARIC Accession Number: J52575.](#)

Abstract: Article briefly reviews the changes in intimacy and sexuality caused by stroke and comorbid diseases and provides practical advice that nurses can give to patients and their partners to help them overcome these problems. Multiple resources are cited to provide additional information for nurses, patients, and family members.

Desrosiers, J., Noreau, L. (2007) **Effect of a home leisure education program after stroke: A randomized controlled trial.** *Archives of Physical Medicine and Rehabilitation*, 88(9), 1095-1100. [NARIC Accession Number: J53075.](#)

Abstract: Study evaluated the effect of a home leisure education program on participation in and satisfaction with leisure activities, general well-being, depressive symptoms, and health-related quality of life (HRQOL) after stroke. Sixty-two people with stroke were randomized to two groups. The experimental participants received the leisure education program at home once a week for 8 to 12 weeks. Control participants were visited at home for a similar number of visits. Participants were evaluated before and after the program to assess changes in minutes of leisure activity per day, number of leisure activities, satisfaction with leisure, general well being, level of depression, and HRQOL. Results showed that after the leisure education program, individuals in the experimental group presented fewer depressive symptoms, increased their participation in active leisure activities, and were more satisfied with their leisure activities compared to those in the control group. No significant differences were found between the groups' well-being or HRQOL.

Hammel, J., Jones, R. (2006) **Examining barriers and supports to community living and participation after a stroke from a participatory action research approach.** *Topics in Stroke Rehabilitation*, 13(3), 43-58. [NARIC Accession Number: J51381.](#) Project Number: H133B031127; H133B031134.

Abstract: This project used a participatory action research approach to actively involve people who have had a stroke in evaluating barriers and supports to community participation. Results of community site audits from the first 20 participants document: (1) participation goals; (2) individual, environmental, and system barriers that interfere with or prevent participation; and (3) supports and strategies used to promote, enhance, and sustain participation. A consumer-directed, Web-based tool for documenting participation barriers and supports is described.

Holland, A. (Ed.). (2006) **Consumer comments, control, and communication.** *Topics in Stroke Rehabilitation*, 13(1), 1-97. [NARIC Accession Number: R08730.](#)

Abstract: The articles in this issue examines the lives of people with aphasia following stroke. Topics include: social communication in older age, perspectives of quality of life by people with aphasia and their family, living successfully with stroke and aphasia, success stories in aphasia, coping by stroke caregivers, and bedside etiquette for dying patients. Additional feature articles describe an investigation of barriers to achieving patient-centered communication with patients who have stroke-related communication and discuss the provision of health information to stroke patients within an acute hospital setting. The articles are available for document delivery under accession numbers J50699 through J50707.

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## **NIDRR Grantees on the Cutting Edge**

**Rehabilitation Research and Training Center on Enhancing the Functional and Employment Outcomes of Individuals Who Experience a Stroke** *Rehabilitation Institute Research Corporation* (H133B080031) led by Elliot J. Roth, MD. Theresa San Agustin, MD, Project Officer.

Abstract: This project studies rehabilitation interventions and assessments focused on improved mobility and secondary conditions that have been designed with the intent of promoting efficient function in the workplace or at home. It also looks at the barriers and facilitators for return-to-work from the perspective of stroke survivors who are seeking employment. The RRTC research projects include: (1) a study of the effectiveness of stretching as hand therapy for sub-acute hemiparesis; (2) development of a low-cost, non-mechanized gait retraining device; (3) testing a self-management approach to community living, participation, and employment; (4) examining the barriers and enablers for return-to-work from the perspective of the individual who experienced the stroke; and (5) development of a return-to-work vocational assessment using virtual reality technology.

**Find out more at: [www.rrtc-stroke.org](http://www.rrtc-stroke.org)**

**Rehabilitation Robotics and Telemanipulation Machines Assisting Recovery from Stroke Rehabilitation Engineering Research Center (MARS-RERC)**

*Rehabilitation Institute Research Corporation* (H133E070013) led by W. Zev Rymer, MD, PhD & Jim Patton, PhD. Thomas Corfman, Project Officer.

Abstract: Machines Assisting Recovery from Stroke Rehabilitation (MARS-RERC) is a multi-institutional center designed to evaluate the utility of simple robotic devices for providing rehabilitation therapy after hemispheric stroke. The broad objective is to develop devices that assist the therapist in stroke treatments that are rationally based, intensive, and long in duration. The Center designs and implements a program of research and development, investigating the use of robot devices and related engineering technologies for better restoration of function in stroke survivors. MARS-RERC includes six programs of study: (1) Development of new capabilities of the Lokomat® walking robot; (2) development of hand technology involving reaching; (3) development of telerehabilitation using an arm gravity- assistance device; (4) research benefits of error augmentation in relearning after stroke; (5) research benefits of overground walking the KineAssist® robot; and (6) training initiative on rehabilitation-oriented engineering design.

**Find out more at: [www.mars-lerc.org](http://www.mars-lerc.org)**

### **Quick US stroke facts:**

6.5 million Americans have experienced a stroke.

It is the 3rd most common cause of death.

The death rate for stroke has dropped by 76% since the 1950s.

The average length of hospital stay (not including rehabilitation) is 4.9 days.

Source: *FastStats*.

[www.cdc.gov/nchs/fastats/stroke.htm](http://www.cdc.gov/nchs/fastats/stroke.htm)

*Please note: These abstracts have been modified. Full, unedited abstracts, as well as any available REHABDATA citations, are available at [naric.com](http://naric.com).*

**Thousands of additional resources on these topics are available from NARIC's resource pages at [www.naric.com/public](http://www.naric.com/public)**

NIDRR's research in stroke falls primarily in the Health and Function, Participation, and Technology priorities.

### Does the Non-Lesioned Hemisphere Influence Paretic Lower Limb Motor Function Following Stroke?

Sangeetha Madhavan, PhD (H133F090009) led by Sangeetha Madhavan, PhD.

Margaret Campbell, PhD, Project Officer.

Abstract: This project explores the neurophysiological and behavioral consequences of ipsilateral cortical activation relating to paretic leg movement within the target population of individuals with subcortical chronic stroke. A recently developed transcranial magnetic stimulation (TMS) technique and magnetic resonance diffusion tensor imaging (DTI) are used to assess ipsilateral corticomotor connectivity from lower limb motor cortex to paretic limb spinal motoneurons. Project results lead to the effective application of non-invasive brain stimulation techniques to the appropriate hemisphere and to the individualization of rehabilitation strategies to maximize the effect of gait training, with the long-term goal of significantly increasing the number of independent community walkers among stroke survivors.

### Subject-Specific EMG Pattern Classification to Promote Hand Rehabilitation in Stroke Survivors

Sang Wook Lee, PhD (H133F090018) led by Sang Wook Lee, PhD. Kenneth D. Wood, PhD, Project Officer.

Abstract: This project develops a robust electromyography (EMG) pattern classification method from the muscle activation patterns of stroke survivors performing functional manual tasks and incorporates this technique into a rehabilitative training study. The EMG pattern classification method allows stroke survivors to incorporate their volitional drive with performing functional tasks, which is assisted by rehabilitative devices. The project tests the rehabilitative benefit of a training protocol that incorporates the EMG classification method. The EMG pattern classification method is incorporated with the Actuated Cable Orthosis Glove (ACOG) system which provides external assistance for the finger extension, and the rehabilitation protocol is tested with a selected group of stroke survivors, who benefit the most from the specific functional tasks employed in the protocol.

### Overcoming Gravity Induced Arm and Hand Dysfunction to Restore Functional Reaching Following Stroke

Northwestern University (H133G070089) led by Julius Dewald, PT, PhD. Thomas Corfman, Project Officer.

Abstract: This study uses a 3-D force-controlled robot to test whether electrical stimulation of extensor muscles can overcome the associated abnormal flexor activity of the elbow, wrist, and fingers during reaching under progressively larger gravitational loads. The project measures the progressive increase in abnormal wrist and finger flexion associated with supporting increasing amounts of the upper limb's weight. This is accomplished by using a 3-D force-controlled robot to virtually manipulate the amount of gravity experienced during reaching in 45 chronic stroke survivors. Next, the project quantifies the impact of electrical stimulation of the elbow, wrist, and finger extensors on elbow, wrist, and finger extension range of motion when progressively increasing the weight of the paretic limb with the robot during reaching. Finally, the project investigates the application of an existing multi-electrode stimulation array to determine if wrist and finger extensors can be selectively stimulated. Find out more at: dewaldlab.com

### A Low-Cost Portable/Wearable Device for Intelligent Stretching and Movement Training of Hypertonic Forearm in Stroke with Outcome Evaluation

RehabTek, LLC (H133S080076) led by Yupeng Ren. Delores Watkins, Project Officer.

Abstract: This project develops a wearable/portable robotic device, IntelliStretch, to perform therapeutic rehabilitation of the arm with the following three integrated steps: (1) stretching a spastic/stiff joint to its extreme position under intelligent control to loosen the stiff joint, (2) voluntary movement training using virtual reality games interfaced with assistance/resistance control when needed, and (3) quantitative outcome evaluation. The device is low cost and portable so that patients can use the device conveniently and frequently in a local clinic under monitoring of a clinician or at home with initial instruction/training from a clinician.



### Did you know the Internet Stroke Center has a clinical trials registry?

The ISC, maintained by Washington University in St. Louis, has an excellent registry of clinical trials in stroke research. They also have a list of scales and instruments used in stroke research. These are available online at [strokecenter.org/trials/index.aspx](http://strokecenter.org/trials/index.aspx). Click around there, you'll find a ton of excellent resources for professionals, researchers, and stroke survivors and their families.

### Where Can I Find More?

A quick keyword search is all you need to connect to a wealth of disability and rehabilitation research. NARIC's databases hold more than 80,000 resources. Visit [www.naric.com/research](http://www.naric.com/research) to search for literature, current and past research projects, and organizations and agencies in the US and abroad.



### The Cochrane Library

The Cochrane Library features systematic reviews of healthcare interventions designed to help practitioners make evidence-based decisions for their patients. Their stroke review categories include diagnosis, haemorrhagic and subarachnoid haemorrhagic stroke, ischemic stroke prevention and treatment, stroke services, prevention and treatment of complications, rehab policies, and specific mechanisms. Visit [www.thecochranelibrary.com](http://www.thecochranelibrary.com).

### Current Literature - Selections from REHABDATA

Stehle, C., Albrecht-Buehler, C. (2008) **Developing more desirable products for stroke survivors.** *Topics in Stroke Rehabilitation*, 15(2), 109-117. [NARIC Accession Number: J54326](#). Project Number: H133B031127.

Abstract: This case study illustrates the process of developing a desirable assistive technology (AT): an egg cracker to be used by stroke survivors. The differences between the product development processes for AT and for consumer products are outlined. The study demonstrates that combining elements from both processes can lead to the development of innovative product ideas that would not be uncovered through either process alone. The key is to focus simultaneously on functionality, user experience, and profitability. Developing an AT as a consumer product should result in a product that is more appealing to people with disabilities and potentially better satisfies functional needs of the general population.

Skidmore, E., Koenig, K. (2008) **Do clinical rehabilitation education programs really improve stroke-related knowledge?** *American Journal of Physical Medicine and Rehabilitation*, 87(8), 637-641. [NARIC Accession Number: J55243](#).

Abstract: Study evaluated the effectiveness of a clinical stroke education program for improving stroke-related health knowledge after inpatient rehabilitation in a "real-world" setting. Thirty-four patients participated in an inpatient rehabilitation clinical stroke education program. Participants were evaluated at admission and again 12 weeks later using the Marginal Homogeneity test and the McNemar test. Their stroke-related knowledge was assessed in 3 key domains: risk factors, warning signs, and appropriate actions to take if a stroke is suspected. Small, non-significant improvements in stroke-related health knowledge were detected following the program. At 12 weeks after the education program, 29 percent of participants were unable to name a single risk factor, 32 percent were unable to name a single warning sign, and 29 percent were unable to name appropriate emergency action in the event they suspected a stroke.

Roth, E., Lovell, L. (2008) **Design of products and environments for people with stroke.** *Topics in Stroke Rehabilitation*, 15(2), 73-176. [NARIC Accession Number: R08931](#). Project Number: H133B031127.

Abstract: This journal issue contains articles that reflect the topics presented at the State of the Science Conference on Strategic Development of Products and Environments for People with Strokes. Topics include: the Chicago perspective on design for people with disabilities, creating engaging experiences for rehabilitation, the role of people with disabilities in the design process, the design of a progressive building constructed by an independent living center, a new model for universities and companies to work together to meet the needs of 50+ consumers, developing more desirable products for stroke survivors, designing an accessible waterfront park, designing the experience of health care, and the design and development of a robotic overground gait and balance therapy device. In addition, several articles illustrate the products and process of design for stroke survivors conducted in an undergraduate engineering design class at Northwestern University.

Sutton, A. (Ed). (2008) **Stroke sourcebook, second edition.** *Health Reference Series*, 1-681. [NARIC Accession Number: R08948](#).

Abstract: Book provides basic consumer health information about stroke, its causes, risk factors, diagnosis, acute and long-term care treatment, and recent advancements in post-stroke care. Information is provided about the types of stroke, including ischemic, hemorrhagic, and transient ischemic attacks; stroke triggers; diagnostic tests; treatments; and prevention and rehabilitation