50th 1958-2008 Anniversary of Hope and Healing

The Madonna Minute

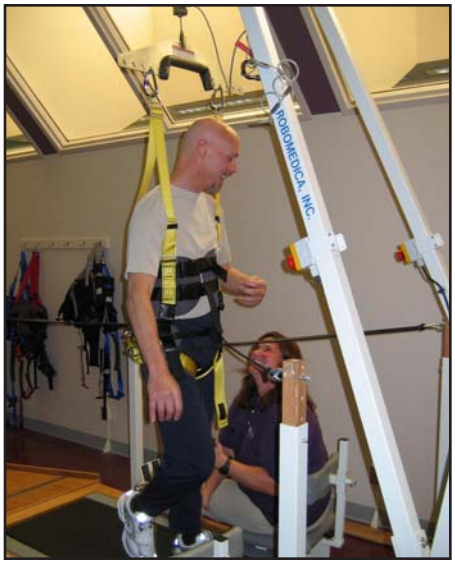
A briefing about the programs and innovations at Madonna Rehabilitation Hospital

February 2008 www.madonna.org

The role of task-specific training in stroke rehabilitation

Recent evidence suggests that task-specific therapy regimens can increase the use and function of the affected limbs of patients who have suffered a stroke. However, repetition alone, without usefulness or meaning in terms of function, is not enough to produce increased motor cortical representations. For people recovering from stroke, less intense, but task-specific regimens with the more affected extremity can produce cortical reorganization and associated meaningful, functional improvements.

Recent advances in neuroscience have demonstrated that task-specific training strategies, such as treadmill training, functional electrical stimulation (FES), and forced limb use can promote brain plasticity and functional changes both in animals and humans. These findings support the theory of the nervous system's potential for recovery following stroke-related brain damage.



Body weight support treadmill training is one example of a task-specific training strategy used to treat patients with stroke-related mobility deficits.

Madonna's stroke program integrates many unique specialty treatment techniques to achieve optimal outcomes for patients. The primary goal behind incorporating these technological interventions into treatment is to help people with stroke avoid learned nonuse of the affected limb and to discourage the development of inappropriate compensatory movement patterns.

Body weight support treadmill training (BWSTT) is one example of a task-specific training strategy used to treat patients with stroke-related mobility deficits. One of the major disabilities after stroke is the inability to walk. Approximately 40 percent of stroke survivors will require assistance with walking and for those who are able to walk independently, 60 percent will be considered limited in community ambulation.[1] The greatest predictor of community ambulation is walking speed according to Perry et al.[2] Studies suggest retraining gait with BWSTT results in improved walking ability, over ground walking speed, endurance, balance, and lower limb motor recovery.

Functional electrical stimulation (FES) combined with repetitive task training has been shown to improve upper extremity function and motor recovery in patients with stroke. Upper extremity dysfunction after stroke is a significant determinant of disability and loss of independence. As many as 30-60 percent of stroke survivors will sustain some degree of residual UE motor deficits, which may be due in part to the inability to integrate ADL or task-specific hand functions into daily therapeutic techniques/interventions.[4]

> "Madonna's stroke program integrates many unique specialty treatment techniques to achieve optimal outcomes for its patients."

A new approach to FES is the use of a neuroprosthetic device called the NESS H200™ to improve specific functions or ADLs such as eating, grasping, and performing self care tasks. There are many benefits to the use of electrically induced neuromuscular stimulation of the hemiparetic upper extremity following stroke, including: decreased spasticity, increased ROM, increased muscle strength and improved motor control/ motor recovery. The use of FES has also been shown to minimize a patient's risk for shoulder subluxation and upper extremity pain. The NESS H200 can be used to activate the affected wrist and hand and allow the patient to practice grasping and

continued on reverse

Madonna Rehabilitation Hospital
5401 South Street • Lincoln, NE 68506

To update your contact information or receive *The Madonna Minute* via e-mail, contact Nancie Ninneman at (402) 483-9891 or e-mail nninneman@madonna.org.

Inpatient scheduling: (402) 486-8260 or (800) 676-5448
Outpatient Scheduling: (402) 483-9534
Admission Department Hours: 8 a.m. to 4:30 p.m., Monday-Saturday.
Madonna prohibits concealed weapons on all its premises.

continued from front

releasing objects or perform ADLs. Intensive, task-specific training can begin in the acute phase of stroke rehabilitation, providing valuable feedback to the central nervous system with cortical reorganization and assist in facilitating brain plasticity for improved motor recovery.

Most recently, Madonna acquired another revolutionary FES neuroprosthetic device called the NESS L300™ to assist patients with foot drop regain lost mobility and facilitate gait recovery following stroke or other neurological injuries. The wireless NESS L300 delivers electrical stimulation to the common peroneal nerve to activate the peroneal and tibialis anterior muscles, facilitating ankle dorsiflexion throughout the swing phase of gait thus improving foot drop. The NESS L300 has been effective in increasing gait speed, stability and symmetry for patients experiencing foot drop after stroke.[3] It can also be used for neuromuscular reeducation, to prevent/retard disuse atrophy, to maintain or increase joint ROM and to decrease spasticity.

The NESS H200 and L300 can be used to improve motor recovery for patients with stroke in the acute phase and continue as patients transition through the continuum of care to outpatient therapy. Both of these devices are available for use at home to assist in promoting continued motor recovery and enable patients to complete daily ADL and mobility activities with increased independence.

The Bioness H200, an advanced therapy system, uses mild electrical stimulation to improve the way a patient's arm works.

The NESS L300 is an advanced foot drop system designed to use mild stimulation to lift the foot to help patients walk more safely and easily.

[1]Jorgensen HS et al. Recovery of walking function in stroke patients: The Copenhagen Stroke Study. Arch of Phys Med Rehabil 1995;76:27-32.

[2]Perry J et al. Classification of walking handicap in the stroke population. Stroke 1995;26:982-989.

[3]Ring H, et al. The immediate effects of a new FES Neuroprosthesis on gait stability and symmetry, 15th European Congress of Physical and Rehabilitation Medicine, Madrid Spain, May 2006 (conference proceedings).

[4]Van der Lee JH, et al. Forced use of the upper extremity in chronic stroke patients: Results from a single blind randomized clinical trial. Stroke 1999;30:2369-2375.

For more information about Madonna's stroke program and services, please contact Amy Goldman, program manager, at (402) 486-8620.

Madonna
Rehabilitation Hospital
5401 South St.
Lincoln, NE 68506