The Role of Occupational and Physical Therapy After Stroke Paula Kane, OTRL Supervisor, Occupational Therapist Henry Ford Hospital Detroit, MI

"What's the Difference between OT and PT?"

- **Both:** provide detailed assessments and interventions (task modification, strengthening, neuromuscular re-education, trunk stabilization, balance activities)after injury or illness.
- Occupational Therapy: Assess and promote independence with activities of daily living (ADLs), daily life roles, including the ability to bathe, dress, groom, toilet or feed themselves. Cognition and perception as it relates to safety and basic mobility.
- **Physical Therapy:** Assess and promote proper movement strategies and safety with bed mobility, transfers, gait and stairs. Interventions that will maximize performance of the oxygen transport system, musculoskeletal and neuromuscular systems, titration of activity in response to changes in physiological status.

WHAT DOES THAT REALLY MEAN???



We are Detectives



It means....

We take what we know about what is "normal" about movement and function and apply it to what we discover through our assessment to determine if there are deficits (or abnormalities). If so, how much has the person changed (or declined) from usual level of function and what do they need in order to regain previous level?

- ADL/social history
- Cognition/mentation
- Strength
- Vision
- Coordination
- Sensation/perception

Acute Phase

- Flaccid
- Weak
- Hypotonicity
- Lethargy
- Pusher syndrome
- Anxious/fearful
- No joint stiffness or muscle shortening.....yet!

Get Up, Get Moving

• WHY?????

- Studies show that early intervention/mobility in the ICU setting increases mobility, potential for discharge home and decreases LOS
- In randomized controlled trial of 71 non-ICU patients with stroke, mobilization within the firs 24 hours of treatment led to less depression and marginally less anxiety. (Cummings J, Krsek C, Vermoch K, et al: University HealthSystem Consortium ICU Telemedicine Task Force: Intensive care unit telemedicine: Review and consensus recommendations. *Am J Med Qual* 2007; 22:239-250)

Acute Care and Early Intervention

- Evaluated within 12-24 hours of admission (and medical stability).
- Departmental Competencies: Lab Values and Stroke Unit
- Discharge recommendations placement, home, equipment, etc
- *Education patient AND family. Not restricted to "exercise program" (why is their family member acting this way? Often explaining lobe function/responsibility etc.)

Early Treatment

- Aim: prevention of soft tissue tightness and alignment problems anticipated in the future (ie: subluxation, impingement, contracture)
- Edema management in the hand-early muscle activation, UE weight bearing, patient/family/staff education.
- Should never cause pain. Slow gentle ROM; patient/family/staff education.
- Should include retraining of sensory/perceptual/motor systems (awareness, self management, B/L activities.

Subacute to Chronic Phase

- Weakness
- Spasticity leads to malalignment, impingement, tendonitis, frozen shoulder.
- GH subluxation
- Joint stiffness/pain
- Muscle shortening/contractures
- Learned non-use and compensatory movements
- Pain, possibly CRPS

Problem Solvers



Activity Analysis

- What specific components (motor control and musculoskeletal) are needed to accomplish a particular task?
- Identify: starting position/alignment, direction of movement/weight shift, initiation of movement.
- What components does the individual have?
- What components are lacking/abnormal/missing?
- EXAMPLE: Lower extremity dressing donning pants
 - Vision
 - cognition
 - Sensation
 - Balance
 - Strength
 - perception

Hand Function

- Redevelopment of hand skills closely parallels normal development.
- A prerequisite for normal movement is for all relevant muscles to act synchronously and apporpriately.
- Visually guided reaching and hand function depends upon coordination of visual and sensorimotor mechanisms (ranges from automatic to voluntary)
- Development and progression of motor patterns (J. Ayres):
 - a) Control of neck and eye movements
 - b) Trunk stability and balance
 - c) Scapular and shoulder stability and movement
 - d) Elbow motion

Hand Function continued

- e)Wrist position and movement
- f) Gross grasp
- g) Release of grasp
- h) Individual finger manipulation

Each stage of progression overlaps previous stage which results in one component still being completed as the next begins.

Hand function continued

- The trunk functions as a general transport while the arm contributes corrective positioning and the hand functions for more precision
- Integrity of the anatomical relationships within the hand are critical for normal manipulation
- Amount and type of training and practice influences amount of recovery (forced use, task-specific, bimanual training, repetition, concrete task.
- Individual motivation.

Teachers



Neuroplasticity and Motor Learning

- Neuroplasticity: ability of the brain to change throughout an individual's life.
- Motor Learning: Learning new information allowing for skill mastery and control
- Factors that contribute to neuroplastic changes through activity dependent plasticity:
 - Behavior
 - Environmental Stimuli
 - Thought
 - Emotions

Practice Makes Perfect

- Rewire the brain through **high** repetition
 - Physical exercises, functional tasks
 - Mental Visualization
 - Mirror Box Therapy

Home Programs

- Keep them short and simple to encourage carryover.
- Choose activities that enhance carryover.
- Should be reasonably successful.
- Do not have to be "exercises" can be positions, movements or portions of an activity that should be performed in a special way.
- Provide written or diagrammatic instructions.
- Review home activities frequently.
- Consider patient/family learning style as well as deficits
- Do not crowd information on one page spread out so it is easier to read.
- Short simple sentences.

Cheerleaders





- Post-stroke Rehabilitation fact sheet : <u>http://www.ninds.nih.gov/disorders/stroke/poststrokerehab.htm</u>
- Improving Post-stroke Recovery: The role of the multidisciplinary health care team: <u>http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4590569</u>
- Important Facts of the First Stage of Stroke Recovery: <u>https://www.saebo.com/important-facts-first-stage-stroke-recovery/</u>
- Klein K, Mulkey M, Bena JF, Albert NM: Clinical and Psychological Effects of Early Mobilization in Patients Treated in a Neurologic ICU: A Comparative Study. *Critical Care Medicine*. April 2015. volume 43 number 4. <u>www.ccmjournal.org</u>
- Creutzfeldt CJ, Hough CL: Get Out of Bed: Immobility in the Neurologic ICU. *Critical Care Medicine*. April 2015 volume 43. number 4. <u>www.ccmjournal.org</u>
- Krakauer JW. Motor Learning: Its Relevance to Stroke Recovery and Neurorehabilitation. 2006 Lippencott Williams & Wilkins 1350-7540 pp 84-90.