



Evidenced-Based Practice in Acute Stroke Rehabilitation

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Overview

- **Evidenced Based Practice Model**
- **Changes and Trends in Stroke Rehab**
- **Evidenced-Based Practice in Acute Care Rehab**
- **Key Neurological Assessments**
- **Safe Lifting and Handling of the Acute Stroke Patient**
- **Preventable Injuries and Deformities Post-Stroke**
- **Designing an Acute Care Stroke Rehab Program to Maximize Outcomes**

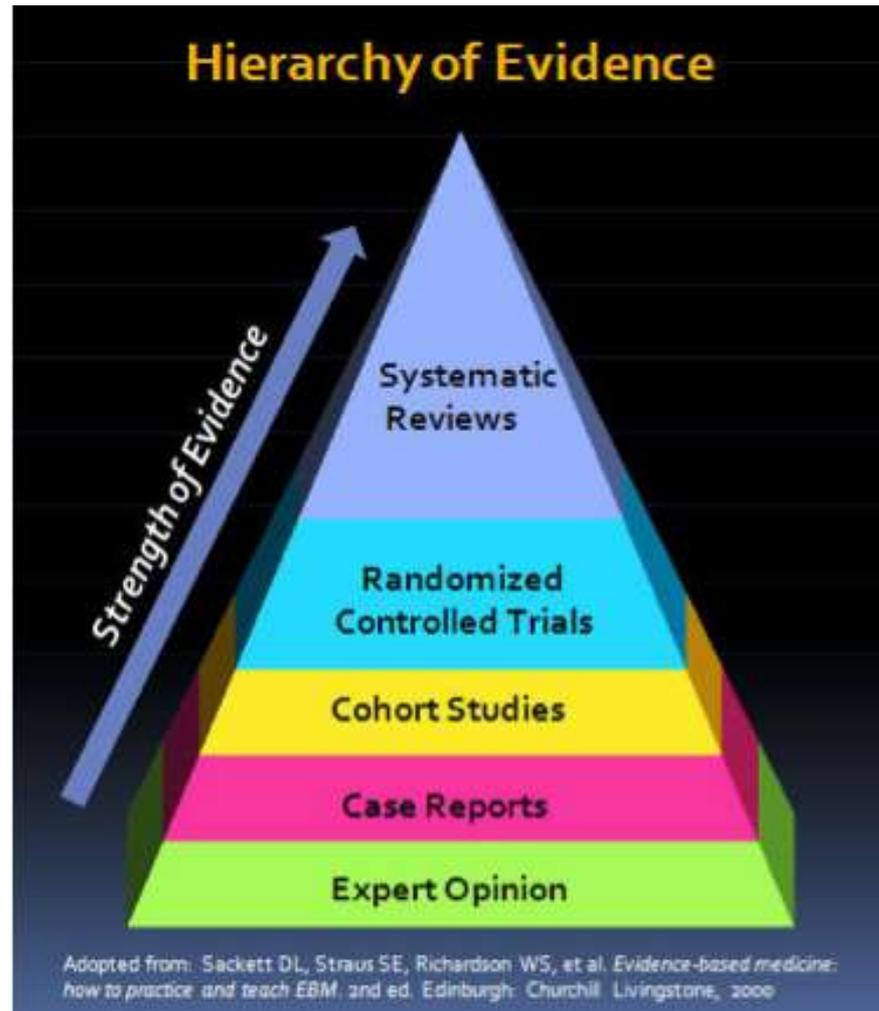
Evidenced Based Practice Model

What is evidence-based practice?

- Evidence based practice is the judicious integration of best available research combined with sound clinical reasoning and patient preferences to guide clinical decision-making. (Sacket D, 1996)



Evidenced Based Practice Model



Evidenced Based Practice Model

- **Why is an understanding research and EBP important?**
 - ✓ *Guides clinical practice*
 - ✓ *Enhances the opportunity for optimal clinical outcomes and quality of life*

Acute Care Stroke Rehab

Monkey Business



Changes in Stroke Rehabilitation



- **Standard Rehab Practices Changes**
- **Result of**
 - ✓ *Scientific Developments*
 - ✓ *Regulatory Requirements*
 - ✓ *Structure of Reimbursements*
- **Subtle vs Breakthrough Changes**
- **“Work in Progress”**

Trends in Stroke Rehab



- **Population Trends**
- **Acute Care Management Trends**
- **Therapy Delivery Trends**
- **Rehab Practice Trends**
- **Rehab Research Trends**

Stroke Rehab

Population Trends

- ✓ **Incidence:** "decreased incidence of strokes in developed western countries but not developing countries" *(World Heart Federation, 2014)*
- ✓ **Disability caused by strokes is on the rise - DALY**
Currently the 3rd leading cause of disability in US.
(Global burden of disease study, 2010)
- ✓ **Severity:** (15-30% of stroke survivors have severe disability, 40% have moderate disability, 1.1 million have difficulty with ADL's)
- ✓ **Stroke death rate has fallen by 25% in past decade**
(still 2nd leading cause of death of people +60) *(Feigin et al, 2014)*
- ✓ **# of stroke survivors steadily increases (33 million stroke survivors worldwide)**

Stroke Rehab

Acute Management Trends

- **Reduced early mortality**
 - ✓ *Better acute management?*
(Pharmacological Interventions)
- **Increasing post-stroke longevity**
 - ✓ *Improved methods of rehab?*
 - ✓ *Better long term care?*
 - ✓ *Improved secondary prevention?*
- **Organized vs Traditional stroke units**
(Acute and IP Rehab unit transitions)

Stroke Rehab

Therapy Delivery System Trends

- **Clinical practice varies depending on the payor**
- **“Medical Necessity” rules**
- **Change in Structure of Reimbursements**
- **Access to Inpatient Rehab Facilities**
- **Referral Patterns of Individual Physicians**
- **Prevalence of comprehensive OP day facilities and HH services**
- **Quality of SNF Stroke Rehab Programs**

Stroke Rehab Therapy Practice Trends

- **Advanced Swallow Assessments**
- **Neurodevelopment Motor Retraining**
- **Constraint-Induced Movement Therapy**
- **Tone Reducing Medications/Techniques**
- **EMG Biofeedback**
- **Partial Body Weight Treadmill Training**
- **Cognitive/Mood Disturbance Remediation**
- **Community Classes/Programs**
- **Alternative Medicine – Acupuncture**

Stroke Rehab

Research/Development Trends



- **Power Mobility**
- **Computer/Communication Technology**
- **Robotics**
- **Orthotics**
- **Cortical - Electrical Stimulation**
- **Repetitive Transcortical Magnetic Stimulation**

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Acute Care Stroke Rehab



- Practice Guidelines
- Organized Stroke Units
- Use of the NIHSS
- Early Mobilization
- Timing and Intensity of Rehab
- Patient Education
- Continuum of Care
- Other Related Findings

Evidenced-Based Practice

Clinical Practice Guidelines in Acute Care Rehab

- In 2000, of more than 20,000 VA clients surveyed, half reported that “rehabilitation care of stroke patients was incomplete, fragmented, and not well coordinated”.
(VA stroke questionnaire, 2002)
- Most important goal of the clinical practice guidelines for the management of stroke rehab is to provide scientific evidenced based evaluations and treatments.
- “Greater adherence to post-stroke guidelines was associated with improved outcomes” (Duncan et al, 2001)

Evidenced-Based Practice Definitions

- **Acute Stroke Rehab:** *Therapy is provided in a hospital setting immediately stroke onset*
- **Post-Acute Stroke Rehab:** *Therapy is provided in the period of time immediately after discharge from the acute care hospital.*
- **Inpatient Rehab:** *Rehab provided during an inpatient stay in a freestanding rehab hospital or a rehab unit in an acute care hospital.*
- **Skilled Nursing Facility Rehab:** *Rehab provided during a patient stay in a nursing facility.*
- **Outpatient Rehab:** *Rehab provided in an outpatient clinic*
- **Home-based Rehab:** *Rehab provided in patient's place of residence.*

Evidenced-Based Practice Organized vs Traditional Rehab Care Rehab

- **“Considerable evidence indicates that better clinical outcomes are achieved when patients are treated in an acute care setting that provides coordinated, multidisciplinary stroke related services” (Cochrane Database, 2009)**
- **“Patients receiving organized inpatient stroke unit care were more likely to survive, regain independence, and return home” Regardless of age. (Cochrane Database, 2009)**
- **It is clear that rehabilitation is a dominant component of organized stroke services and that patients with moderate to severe stroke symptoms should be offered a referral to a facility with such a team.**
- **Other predictors for improved functional outcomes are the increased level of functional skills gained in the acute care setting and early admission to an Inpatient Rehab facility.**

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Supporting the Stroke Team

- **Daily stroke/hospitalists rounds**
- **Onsite rehab clinical PT/OT experts**
(Participate in mandatory stroke CE's/year)
- **Required annual stroke rehab competencies for PT/OT/SLP**
- **Bedside Pt functional status updates**
- **Advanced neuro/stroke Education/certification incentives**

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Use of the NIHSS Tool in Rehab Care

- **NIHSS score of 4 or less was correlated with very favorable functional outcomes in retrospective analysis in randomized clinical trials.**
- **A score of greater than 16 forecasts a high probability of death or severe disability.**
- **AHA/ASA Endorsed practice guidelines strongly recommends all staff involved in any aspect of stroke care be trained and certified in use of the NIHSS.**

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Early Mobilization in Acute Rehab Care

- **Studies generally support early mobilization of the patient with an acute stroke. Primary benefits to prevent: DVT, skin breakdown, contracture formation, constipation, pneumonia, and more recently deep depression.**
- **The word “early” has not been defined well in acute stroke rehab settings.**
- **ASA recommends as soon as possible once medical stability is reached.**
- **Controversy regarding the Penumbra and very early mobilization (VEM). (Cochrane Database, 2009)**
- **AMC endorses the 24 hour rule but makes provision in the stroke order sets for the managing physician to order Rehab ASAP.**

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Timing and Intensity of Acute Rehab Care

- “Effective Rehab initiated early after an acute stroke enhances the recovery process and minimize functional disability”
- “Initiating stroke rehab soon after the onset of an acute stroke appears to be the most important factor associated with early discharge from the hospital” (Wang et al, 2011)
- Greater duration of therapy sessions, 60 vs 30 minute sessions had a weak relationship with improved functional outcomes (dose response relationship) (Langhorne et al, 2010)
- Greater frequency of moderate to high activity resulted in improved functional outcomes. (Bernhardt et al, 2009)
- Adding weekend therapy services reduced the LOS only by the same # of comparable treatment days. (Rapoport et al, 2008)

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Patient and Caregiver Education

- **Dissemination of stroke care information to patients and caregivers is sometimes poor and patients and family members are not able to take advantage of the recourses available (respite, support groups, financial aid).**
- **Evidence suggests that stroke caregivers have elevated levels of depression in the acute and chronic stroke phase. (Evans et al, 2012)**
- **Provision of information in a passive format is not effective.**
- **Recommendations:**
 - ✓ ***Consider a specific team member to be responsible for core education***
 - ✓ ***Make education interactive***
 - ✓ ***Use family conference/trainings is a useful means of education***
 - ✓ ***Include personal support (home visit, classes)***

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Continuum of Rehab Care

- There was a lack of long term benefits after short term inpatient rehab suggesting that therapy should be extended to the home or sub acute care settings rather than being discontinued at hospital discharge.
- Screening for possible admission to an Inpatient Rehab program should begin as soon as the stroke patient is medically stable.
- “Better functional outcomes were achieved if a stroke patient was admitted into an inpatient rehab facility within the first 20 days”
(Paolucci et al, 2005)
- The organized team approach should also be continued in the home health and outpatient settings for optimal outcomes.
- “If multidisciplinary team exists in the community. Rehab services may be successfully provided directly after acute care hospital discharge to an outpatient setting. (Cochrane Database, 2012)

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Other related findings in Rehab Care

- **Patients benefit most when they participate in regular strengthening and aerobic exercise at home and in the community in programs designed with functional limitations and co-morbidities in mind.**
- **Most stroke patients day is spent inactive, alone, in their room (48.1% to 53.7%) and very little time doing moderate to high level of activity (only 57 to 63 minutes/day) usually in Rehab or walking on the stroke unit. (West and Bernhardt, 2012)**
- **Prefabricated brace should be initially used and patients who demonstrate a long-term need have custom made orthotics.**
- **Caregivers cope with physical limitations better than cognitive or emotional ones. (Evans et al, 2012)**
- **Acute stroke patients seen in a teaching hospital are significantly more likely to be accepted into an Inpatient Rehab Program. (Safer et al, 2006)**

Key Neurological Assessments



What is the role of OTs, PTs and SLP in acute care?

Evidenced-Based Practice Key Neurological Assessments

- **ADLs, Ambulation ability and Strength**
- **Speech/Swallowing difficulties**
- **Cognitive/Emotional impairments**
- **Abnormal movement patterns (Tone, apraxia, dysmetria, coordination, dysdiadokokinesia)**
- **Sensory loss/neglect (tactile discrimination, proprioception, kinesthesia, stereognosis)**
- **Loss of motor/postural control**
- **Vestibular/Balance deficits**
- **Vision and visual perception skills**

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Key Neurological Assessments

- **Based on skilled evaluations therapists provide:**
 - ✓ *Training for patient, family members and caregivers in self care skills, safe transfers and mobility, and make recommendations for diet and liquid consistencies.*
 - ✓ *Neuromuscular re-education, trunk stabilization, and balance activities to improve participation in client centered goals.*
 - ✓ *Training to facilitate recovery of muscle weakness, loss of ROM, sensation and cognitive/perceptual skills.*
 - ✓ *Training in safe use of adaptive equipment and assistive devices such as orthotics, canes, crutches, and walkers*
 - ✓ *Contribution to discharge planning recommendations including DME, transition to next level of care or home health services.*

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Key Neurological Assessments

- ***A retrospective study published in *American Journal of Physical Therapy in 2010* looked at PT discharge recommendations for 743 patients and found:***
(Smith et al, 2010)
 - ✓ ***83% of discharge recommendations were implemented***
 - ✓ ***Patients were 2.9 times more likely to be re-admitted to hospital if the therapist's discharge recommendation was not implemented or follow-up services were lacking***
 - ✓ ***Of those likely to be re-admitted – 40 patients missed Home Health Therapy despite PT recommendations***

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Safe Patient Handling (SPH)



Safe Acute Care “Stroke” Patient Handling Incidence and Practices

- Health care occupations rank among those professions with the highest incidence of Work-related Musculo-skeletal Disorders (WMSD’s). **US depart of Labor and Industry** (some studies suggest up to 90% of currently practicing acute care PT’s have experienced a WSD’s)
- Safe patient handling (SPH) is the use of equipment and techniques to reduce staff injury.
- 8 states have enacted legislation to mandate SPH programs: CA, IL, MN, NJ, RI, TX, and WA.
- Development of national SPH standards: Risk Assess, Safety Committee, Policy Dev., Eq. mandate, Staff train, Lift team, and Program eval.
- PT/A’s need to be seen as leaders in the development, implementation, and refinement of SPH programs. **APTA**

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Safe Handling of the Acute Stroke Patient

Staff training:

- Plan the move
- Team communication
- Patient engagement
- Use good body Mechanics
- Levels of assist
- Making it functional
- Using the right equipment
- Pushing the edge safely

Incident reporting/learning



Evidenced-Based Practice Transfer Alternatives



- **Dependent or assisted slides**
- **Sliding boards**
- **Scoot pivot**
- **Mechanical lift**
- **Suspension Slings - Transfers and Gait**

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Wheelchair Mobility



Safe Acute Care “Stroke” Patient Handling

Perceptions and Evidence Based Practice

- **Arguments: Injuries from manual lifting can be avoided. The design of standard SPH programs do not facilitate patient participation in functional training.**
- **Staff working at a facility with a SPH program reported increased confidence moving difficult patients, were more likely to practice safely, and had lower incidence of WMSD’s.**
- **Studies focusing on the influence SPH programs: The use of SPH equipment and practices resulted in similar or slightly better patient functional outcomes compared to outcomes of facilities without SPH programs. (Campo et al, 2008)**
- **The greatest factor limiting SPH was lack of lift equipment.**
- **No curriculum content for Evidenced–based SPH for entry-level PT’s or Joint Commission evaluative standards about SPH programs.**

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Preventable Injuries and Deformities

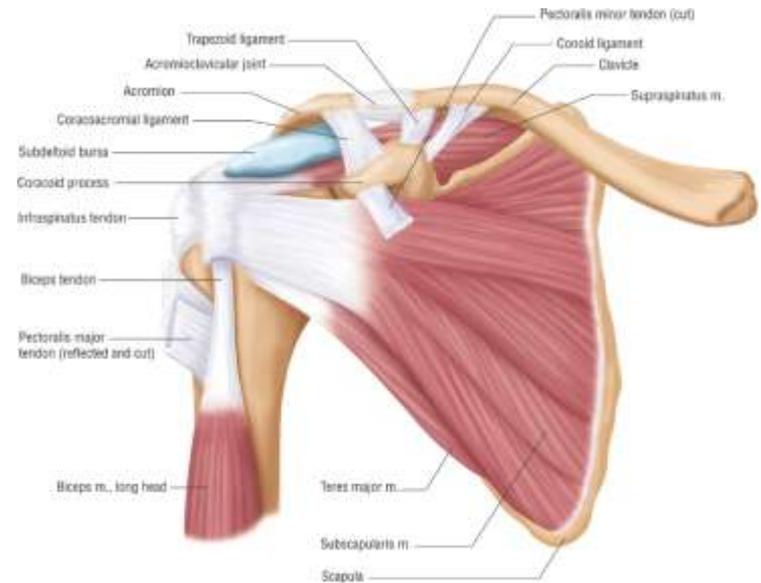
■ Prevention of complications

- ✓ *DVT's*
- ✓ *Aspiration*
- ✓ *Muscle atrophy*
- ✓ *Falls*
- ✓ *ADL dependency*
- ✓ *Pressure sores*
- ✓ *Contractures*
- ✓ *Depression*
- ✓ *Hemiplegic Shoulder Pain (HSP)*

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Hemiplegic Shoulder Pain (HSP)

- The upper extremity is especially prone to tissue damage because of its abundant degrees of movement which is essential for it to fulfill important role in functional activities of daily living. (Li and Alexander, 2015)



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Hemiplegic Shoulder Pain (HSP)



■ What is HSP?

- ✓ Common, complex and distressing complication of stroke on the ipsilateral plegic UE***
- ✓ Affects neuromuscular recovery of upper limb, compromises functional outcomes, and is associated with prolonged hospital/rehabilitation stay.***
- ✓ It is NOT only shoulder pain but an associated psychological distress***

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Hemiplegic Shoulder Pain (HSP)

■ **Incidence:**

✓ ***50% have hemiplegia***

- 70% of those with hemiplegia achieve ambulatory status
HOWEVER.....
- nearly half of those continue to have non-functioning UE

(Vasudevan and Brown, 2014)

■ **Incidence of HSP widely reported - Varies between 12% - 58% of stroke survivors, 65% of which have persistent post-stroke shoulder pain greater than 12 months after stroke (Li and Alexander, 2015)**

■ **Most commonly occurs in first 8-10 weeks post-stroke**

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Hemiplegic Shoulder Pain (HSP)

- **Risk factors: impaired voluntary motor control, diminished proprioception, tactile extinction, abnormal sensation, spasticity (especially elbow flexion), previous shoulder injury (adhesive capsulitis/ rotator cuff injury), and DM II**
(Vasudevan and Brown, 2014)

- **Etiology:**
 - ✓ **Not just a biomechanical alteration of shoulder joint**
 - ✓ **HSP is linked to central post-stroke pain (CPSP). Pain and sensory abnormalities in body parts that correspond to brain territory injured by the cerebrovascular lesion**
 - ✓ **Ultimately, HPS is a complication caused by many factors**

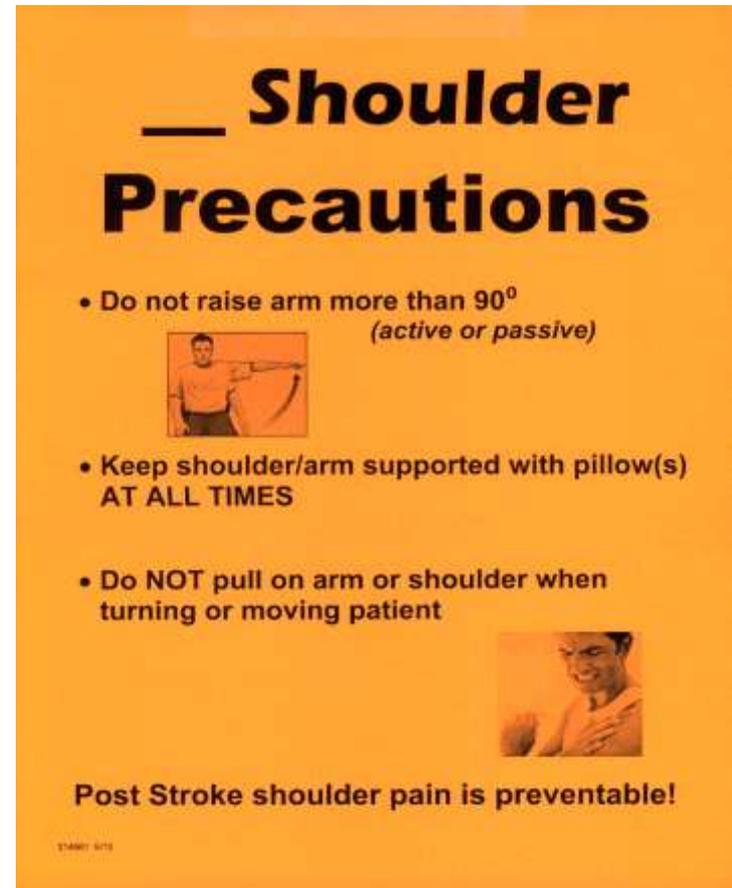
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Hemiplegic Shoulder Pain (HSP)

- **Incorrect handling of UE after a stroke may result in trauma or HSP. (Li and Alexander, 2015)**
 - ✓ **Support hemiplegic arm during transfers**
 - ✓ **Do not pull on the arm during bed mobility**
 - ✓ **Do not flex the arm above 90 degrees**

Evidenced-Based Practice Hemiplegic Shoulder Pain (HSP)

- *Research indicates an integrated care model is necessary for prevention and management of HSP.*
- *(Adventist Health Shoulder Precautions Chart)*



— Shoulder Precautions

- Do not raise arm more than 90°
(active or passive)



- Keep shoulder/arm supported with pillow(s)
AT ALL TIMES

- Do NOT pull on arm or shoulder when turning or moving patient



Post Stroke shoulder pain is preventable!

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POSITIONING FOR PEOPLE AFFECTED BY STROKE



- LYING ON AFFECTED SIDE**
- One or two pillows for head
 - Affected shoulder positioned comfortably
 - Place unaffected leg forward on one or two pillows
 - Place pillows in front and behind

The careful positioning and placement of pillows can be used to achieve safe and comfortable postures.

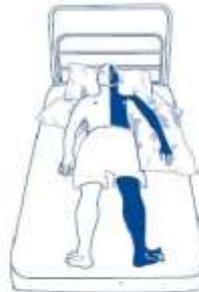
Affected stroke side is in blue. Pictures do not depict bed rails.



- LYING ON UNAFFECTED SIDE**
- One or two pillows for head
 - Affected shoulder forward with arm supported on pillow
 - Place affected leg backwards on one or two pillows
 - Place a pillow behind



- SITTING UP**
- Sitting well back in the centre of chair or wheelchair
 - Place arms well forward onto two pillows on table
 - Feet flat on floor or footrests
 - Knees directly above feet



- LYING ON BACK (if desired)**
- Place three pillows supporting both shoulders and head
 - Place affected arm on pillow
 - Optimal pillow beneath affected hip
 - Ensure feet in neutral position



- SITTING IN BED**
- Sitting in bed is desirable for short periods only
 - Sitting upright well supported by pillows
 - Place both arms on pillows
 - Legs supported for comfort

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Designing an Acute Care Stroke Rehab Program to Maximize Outcomes

■ Benefits of Organized Stroke Units:

- ✓ More likely to survive stroke***
- ✓ Reduced hospital stay***
- ✓ Reduced In-hospital case fatality***
- ✓ More likely to return home with reduce dependency on caregivers***

How can we expand the benefits of stroke units?

Designing an Acute Care Stroke Rehab Program to Maximize Outcomes

■ Literature strongly supports:

- ✓ Consistent use of Practice Guidelines***
- ✓ Early Mobilization***
- ✓ Initial and Ongoing use of NIHSS***
- ✓ Graded motor imagery (mirror therapy)***
- ✓ Repetitive Task Training for Lower Limb Function***
- ✓ Interactive Education Model***
- ✓ Early Planning for Inpatient Rehab***

Designing an Acute Care Stroke Rehab Program to **Maximize Outcomes**

■ Literature moderately supports:

- ✓ *Functional activities rather than rote exercises***
- ✓ *Constraint Induced Movement Therapy***
- ✓ *Robot-Assisted Therapy and Repetitive Task Training for Upper Limb recovery***
- ✓ *Family Support***
- ✓ *Neurovisual Rehabilitation***
- ✓ *Sensory Stimulation***
- ✓ *Neuromuscular Electrical Stimulation***

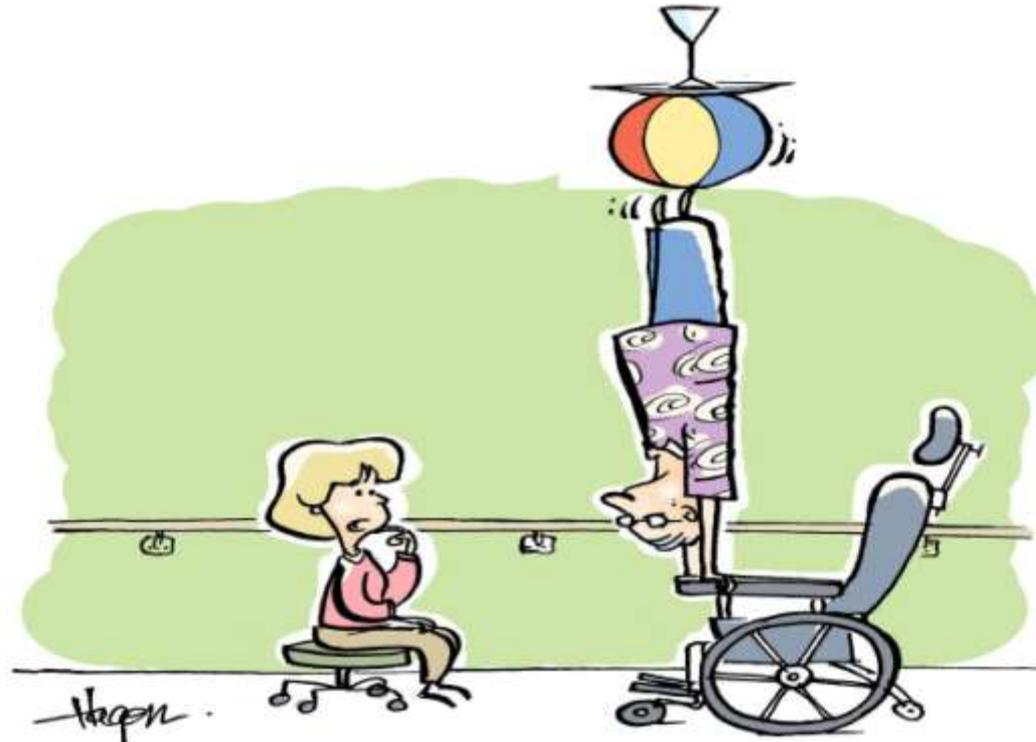
Designing an Acute Care Stroke Rehab Program to Maximize Outcomes

Stroke Unit Challenge

How will our current knowledge change the way we:

- **Set-up patient rooms**
- **Establish Daily Routines**
- **Initiate group therapy/activities/meals**
- **Require family/caregiver training**
- **Encourage patient journal/resource binder**
- **Utilize unit resources and equipment**
- **CNA/RN involvement**

Thank-you



I THINK MY WORK HERE IS DONE.