



What MDs/RNs think we do



What society thinks we do



What Medicare thinks we do



What our moms think we do



What our patients think we do

INNOVATIONS IN POST-STROKE THERAPIES

Margo Abramson, OTR/L, CSRS

Erica Jovanovic, PT, DPT, CSRS

Nicole Schultz, PT, DPT, CSRS

OBJECTIVES

- ◉ Describe the relevance of evidence based practice in stroke recovery
- ◉ Explain the difference between physical and occupational therapy interventions in stroke rehabilitation
- ◉ Identify 2 evidence based therapy interventions currently used in stroke rehab
- ◉ Address the benefits of early mobilization in the critical care setting

BEDREST



IMMOBILITY COMPLICATIONS

- May account for **51% of deaths in the first 30 days** after ischemic stroke
 - > **62%** of complications occurring in the **1st week**

IMPORTANCE OF EARLY MOBILITY

- Specialized acute stroke units may lead to decreased mortality and disability
 - May be related to detection and treatment of secondary complications
 - Deaths at 1-3 weeks were reduced from 14% to 8%

EARLY MOBILIZATION: IMPROVING OUTCOMES?

'For' Early Mobilization

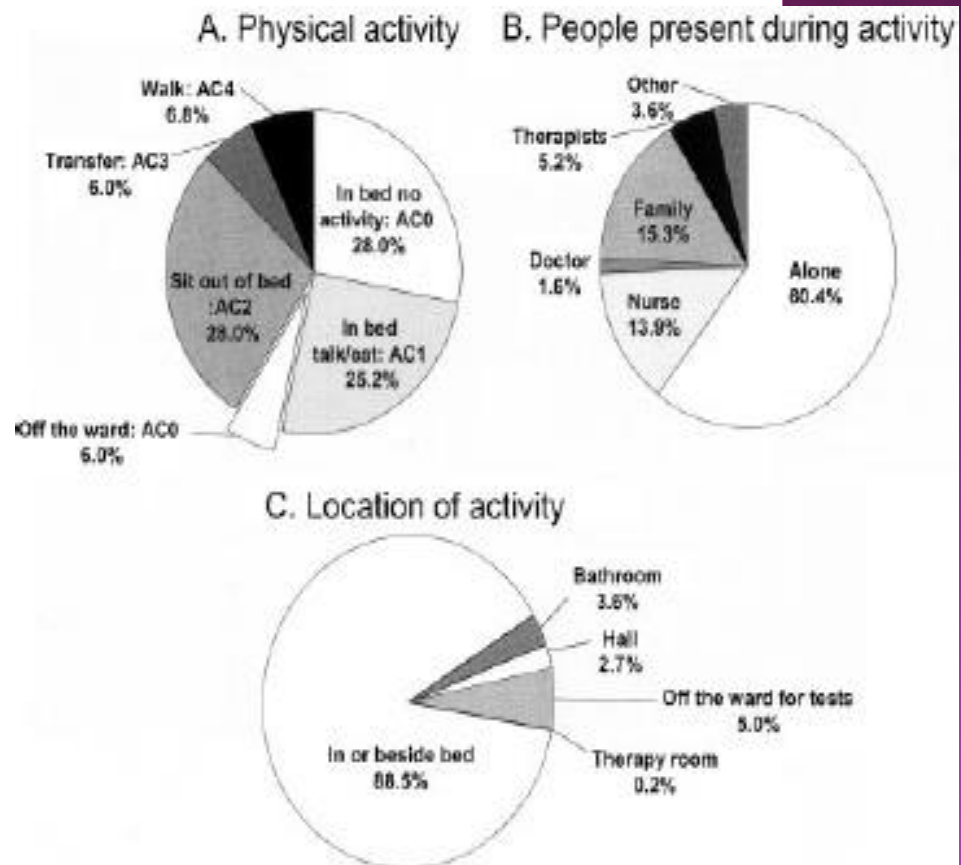
- Negative effects of Bedrest
 - Infection, pressure sores, contracture, DVT, PE, PNA and pain
- Neuroplasticity may be potentiated; especially if there is a narrow window

'Against' Early Mobilization

- Increasing blood pressure early may further neuro damage
- Upright head position may reduce cerebral blood flow, especially important to the penumbric area
- Increased risk of falls

ACTIVITY IN ACUTE STROKE UNITS

- 88.5% of the time patients were either in or beside the bed
- Patients spent >50% resting in bed and 28% sitting OOB
- Patients were alone >60% of the time



AVERT: A VERY EARLY REHAB TRIAL

- Very Early Mobility (VEM) vs Standard Care (SC)
- VEM
 - Starts within 24 hours of onset
 - Focus on sitting, standing, walking, and OOB activity
 - Result in at least 3 additional OOB sessions to usual care
- Intervention period: 14 days or until d/c from stroke unit whichever was sooner

AVERT: A VERY EARLY REHAB TRIAL

○ Phase I

- Observation of activity in acute stroke units
 - Found that stroke patients spent 53% of day in bed, 28% OOB, and 13% doing intentional activity

○ Phase II

- Found early and frequent mobilization (<24hrs) safe, feasible, and cost effective (n=71)
 - No difference in complications between groups @3months
- Promoted early return to unassisted walking

○ Phase III

- Aims to determine the efficacy and cost effectiveness of early mobilization (n=2104)
- Increased daily frequency OOB sessions = improved odds of good outcome
- Increased amount (min/day) of mobilization reduced odds of a good outcome
- VEM cheaper early on

TAKE HOME MESSAGE

- Increased daily frequency OOB sessions → improved odds of good outcome
- Increased amount (min/day) of mobilization → reduced odds of a good outcome

An early, low-dose OOB activity regimen is preferable to very early, frequent, higher-dose intervention

THERAPY EVALUATIONS

Physical

- Functional mobility
 - Balance/Gait training
- AD/Orthotic eval
- Strength/ROM
- Sensation/
Proprioception
- Exercise
- Cognitive/Depression
screen
- Patient/Family training

Occupational

- Cognition/Executive
function
- ROM
- Assess positioning needs
- Vision screening
- Visual-perceptual skills
- Self-care activities
- Adaptive equipment
- Patient & family
training
- Endurance/Activity
tolerance

Disposition needs

HOW DOES SHORTER LENGTH OF STAY AFFECT US?

- Fewer sessions of therapy
- Altered prioritization of our services
- Patients more acutely ill in therapy in every setting
- Missing anything?
 - Depression
 - Executive function
 - Visual perception

NEUROPLASTICITY

- **Aerobic Activity releases Brain-Derived Neurotrophic Factor (BDNF)**
- **BDNF**
 - Important in learning and memory
 - Neural sprouting
 - Increased synaptogenesis
 - Increased synaptic potentiation
 - Increased dendritic branching

Aerobics & BDNF = Decreases depression & enhances motor recovery

RECOVERY VS COMPENSATION

Recovery

- Use it or lose it
- Neural tissue restoration
- Movement restoration
- Task completion as done previously

Compensation

- Residual neural tissue takes over
- New movement patterns
- Task completion using alternative movement/ limbs

MOTOR LEARNING

- Motor learning is known to be better if the practice method is
 - Meaningful
 - Repetitive
 - Intensive
 - Task-specific

MEANINGFUL REST

- Sleep is essential for healthy brain function and plasticity underlying learning & memory
- May be important supporting critical recovery of motor function
- Sleep enhances motor performance after stroke

Patients need rest

REDUCING READMISSION

- ⦿ Readmission rate: 15.2% after 30 days
- ⦿ Patients need to be better prepared for return home
 - Bathroom safety
 - Self-care support
 - Medication management
 - Falls reduction

Hospitals with higher use of OT are associated with lower readmissions

POST-ACUTE CARE

○ Settings

- Acute Inpatient Rehab
- Rehab in SNF
- Early Discharge Support (EDS)
- Home health care
- Outpatient

As many as 42% of patients post-stroke are not referred to post-acute care

ACUTE INPATIENT REHAB

○ Criteria

- Diagnosis/comorbidities
- Tolerate 3 hrs/day
- Need for 2 of 3 services (PT, OT, SLP)
- Need for post rehab disposition
- Fine line regarding mobility (too good/too bad)
- Pre-morbid status
 - Cognition
 - Mobility
 - Family support

INPATIENT REHAB CHANGES OVER TIME

○ Multicenter observation: 2001, 2005, 2011

○ Results

- Longer LOS
- On admit and discharge → greater limitations in functional tasks
- At discharge → greater limitations in walking and arm function

EARLY SUPPORTED DISCHARGE (ESD)

- Emergency Room or Acute care → Home
 - Better IADL reintegration
 - Provides resources for community engagement
 - Decreased depression

Goal: to reduce long term dependency,
reduce the length of hospital stay

ESD VS HOMECARE

⦿ Homecare

- Discharge from acute care or rehab
- Homebound status

⦿ ESD

- Discharge from ER or acute care earlier
- Increased caregiver burden
- Earlier community reintegration

EARLY SUPPORTED DISCHARGE

- ◉ Meta-analysis of RCTs

- ◉ Results

- 6 fewer adverse outcomes for every 100 patients receiving ESD service
- LOS 8 days shorter for ESD group
- Increased patient satisfaction with services
- Increased ADL scores

ESD reduces long term dependency, admission to institutional care, & shortens hospital stays

LIMITS OF HOME BASED THERAPY

○ Decreased resources

- Equipment
- Technology
- Difficulty completing outcome measures for higher functioning patients
- Environmental constraints
- Psychosocial factors

Transition to Outpatient

TECHNOLOGY



○ Functional Electrical Stimulation

- Uses low energy electrical pulses to artificially generate body movements in individuals who have had injury/disease to the CNS
- Bioness, ReWalk

○ Pros

- No bulky brace
- More footwear options including sandals
- Promoted use of limb

○ Cons

- Cost (\$5000)
- Need therapist or vendor to fit/adjust
- Needs to be protected from water

TECHNOLOGY

⊙ BWSTT

- LEAPS trial
- Appears more appropriate for those already able to walk
- May improve walking speed and endurance

⊙ Robotic

- Function and motor outcomes
- LE robotic devices may or may not offer additional benefit compared with conventional therapy

⊙ Virtual reality

- Preliminary evidence may improve motor outcomes post stroke
- May enhance gait performance
- May be useful tool in promoting attendance of neglected space

TECHNOLOGY

◎ Body Weight Support Training

- Overhead suspension system that supports a percentage of body weight as patient walks
 - LiteGait, ZeroG
- Those already able to walk
 - High repetition without therapist fatigue
 - Improves walking speed and endurance



TECHNOLOGY



○ Robotics

- Transmit power to key joints of legs by computer assisted technology
 - ReStore, Lokomat, G-EO, Exoskeleton
- Helps achieve independent walking

TECHNOLOGY

○ Virtual reality



KEY POINTS

- ⦿ Update bedrest orders
- ⦿ Interdisciplinary approach to mobilization
- ⦿ OT lowers readmission rates
- ⦿ Post acute follow up

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THANK YOU