Early Mobility and Safe Patient Handling: Evidence, Equipment, and Opportunities
Part I: Role of the Physical Therapist

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Objectives
1. Describe evidence for improved patient outcomes in SPH programs.
2. Describe the opportunities for PTs to play key roles in SPHM programs.
3. Identify appropriate devices for a variety of rehabilitation tasks.
4. Discuss the role of PTs in integrating SPH and early mobility programs.

APTA Vision Statement 2013
Transforming society by optimizing movement to improve the human experience

APTA Position Statement on Safe Patient Handling and Mobility
Issued August 2012

Acute care therapists treat patients across all specialties
• Neuro
• Ortho
• Geriatric
• Psych
• Critical Illness
• Pediatric
• Wound Care
• Cardiopulmonary
• Vestibular
• Oncology
• Medical/Surgical

Therapy Culture
• How therapists see themselves:
  ▫ Hard working and caring
  ▫ Value skill & knowledge
  ▫ Committed to patients
  ▫ Strong sense of duty
  ▫ Unlikely to be injured

• How therapists see themselves when injured:
  ▫ Proud & didn’t expect injury
  ▫ Injury should have been prevented with proper technique
  ▫ Feel pressured


The Effects of WMSDs on Therapists
• Self manage/self treat
• Continue to work
• Accept injuries as a part of the job
• Under report injuries
• Change work setting and work habits

Darragh
Perceptions

- Alerted professional identity
- Effected personal lives
- Decreased job satisfaction
- Presenteeism: At work and productive
- Is it professional?

Culture of Safety

The culture of safety must be a value.
Prevention is the solution.

Our Role in SPHM Programs

- Advocates and role model behaviors
- Manage SPHM programs
- Body mechanic and mobility experts
- Experts on equipment and technology
- Collaborate with vendors and engineers
- Research
- Educate in PT curriculum

Equipment as a Therapeutic Tool

- More productive treatment times
- Enhance weight bearing
- Facilitation/"extra set of hands"
- Improves patient confidence
- Patient's effort is the limiting factor
- Reduces the number of max A +2 transfers
- Improved time and resource management

Equipment

- Therapeutic exercise with leg lifter and blue glide sheet

Integrating Equipment
Integrating Equipment

- Transfer sling

Integrating Equipment

- Non-powered standing aide

Integrating Equipment

- Powered sit-stand lift

Integrating Equipment

- Dependent lift and LEMA strap

Integrating Equipment

- Ceiling mounted lifts

Integrating Equipment

- Lateral transfer aide and shuttle chair
Integrating Equipment
- Specialty beds

Case Studies

Francis
- 71 y/o male
- Brought to ED by EMS after sudden onset of facial droop and difficulty speaking
- Head CT revealed acute left MCA CVA
- Received TPA
- PMH: NIDDM, htn, COPD, CHF, pacemaker
- (I) community ambulator at baseline
- Retired, lives with wife

Arthur
- 64 y/o male
- Admitted with hypotension, AMS, ARF, sepsis, BLE cellulitis
- S/p anterior & posterior RLE fasciotomies
- SBO s/p exp lap with appendectomy
- PMH: Schizophrenia, NIDDM, OA, htn, GERD
- (I) community ambulator at baseline
- On disability, lives in a group home
Delores

- 63 y/o female
- Admitted to acute rehabilitation s/p R BKA
- PMH: PVD, ESRD on HD, DM, HTN, DVT w/ IVC filter
- (I) community ambulator at baseline
- Retired, lives alone

Delores
The Acute Care Mobility Evaluation

- Determining preparedness for mobility—"Just go for it!"
- What is the goal?
- Constant re-evaluation
- Borg Rating of Perceived Exertion

Physical Function ICU Test (P-FIT)

Clinical exercise outcome measure for ICU

1. Sit to stand with assistance
2. Marching on the spot (MOS) as long as possible
3. Shoulder flexion strength
4. Knee extension strength
Bed Mobility Prep Test

Evaluation: Can be completed unilaterally or with modified (I)
  • Raise shoulders off bed
  • Complete bridge
  • Complete straight leg raise
  • Initiate rolling

Dionne’s Egress Test

Purpose: To facilitate the safe progression of a patient’s debut transfer through repetitions.
Tests: Series of sit-stand transfers, marching in place, and advance step and return for 3 repetitions

It’s more than patient care...

• Educating others healthcare providers
• Educating caregivers
• Discharge recommendations
• Transition to home care and other facilities
• Managing expectations

It’s more than “Get the lift...”

• How much it too much?
• High risk and high frequency activities
• Repositioning in bed
• Push/pull forces—58 lbs
• Inherent risk of equipment itself
• Communication

Benefits of SPH in Rehabilitation

• Supports Culture of Safety
• Improve therapist safety and extend careers
• Favorable patient outcomes
• Improves patient-centered care
• Promotes safe early mobility in acute care setting

Therapist Injury Rates at DRH

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<td>32 total injuries</td>
<td>9 total injuries</td>
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Thank you!

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Safe Patient Handling: Evidence, Equipment and Opportunities

Part II: Patient Outcomes
Margaret Arnold, PT, CEES, CSPHP
Margaret@inspireoutcomes.com

Objectives
- Relate patient case studies to relevant and current evidence-based interventions
- Describe three new treatment ideas using safe patient handling technology to implement evidence-based practice for acute care rehabilitation
- Compare and contrast use of safe patient handling technology versus manual technique for rehabilitation in the acute care setting

"Because People Matter"

Ensuring Quality

Safe for the Patient
Consistent w/Functional Goals
Safe for the Caregiver
Quality of Care

EBP for Mobility Interventions
- Early Mobility
- Neuroplasticity
- Basic strength training
  - Maximal versus submax effort
  - Optimal frequency and repetition
- Cardio pulmonary conditioning/exercise intensity
- Contextual relevance of therapeutic activities
- Epidemic of immobility
- Decreased mobility after transfer to the ward after EM program in CCU

EBP: Early & Progressive Mobility
- Medical complications increase with prolonged bed-rest for hospitalized patients.
  
  
  JAMA. 2008;300:1585-1690

- Low levels of physical fitness are directly associated with all-cause mortality and cardiovascular disease
  
  

- Most hospitalized patients currently spend most of their time in bed.
  
  J Am Geriatr Soc. 2006;54(9):1440-5
EBP: Early Mobility

- Early Mobility is feasible and safe
- Early Mobility is Feasible and safe, requires a team approach
- Early Mobility results in Better outcomes

EBP: Exercise and Diabetes

- Many studies show that exercise and physical activity reduces type 2 Diabetes and improves insulin resistance and glycemic homeostasis.
- Frequent activities found more beneficial than once daily

Exercise and Cardiac Markers

- Increased walking related to decrease in biomarkers for cardiac disease

Exercise and Depression

- Link between increased exercise and decreased anxiety and depression

Exercise and Inflammation

- Daily Exercise found to increase IL-10 without significant increase in IL-6. Higher dosage may be more beneficial
Inflammatory markers in cancer

- Significant reduction in IL-6 among exercisers with breast cancer who reached 80% of the intervention goal compared with those who did not.


Neurological effect of exercise

- Physical activity found to increase activity in Astrocytes:
  - clean up debris within the brain
  - provide neurons with some of the chemicals needed for proper functioning
  - help control chemical composition of fluid surrounding neurons
  - play a role in providing nourishment to neurons


Neurological effect and afferent Input

- Acute Passive Vibration decreased stiffness and improved aortic wave reflection in paretic limbs post acute stroke


Neural Signaling

- Increasing evidence linking afferent input and skeletal influence via CNS signaling, for homeostatic functions of bone.


Benefits of Exercise on endothelial repair

- The acute exercise-induced changes in CAC function increased with exercise training, suggesting that repetitive exercise bouts progressively lead to functional endothelial repair.


EBP: Neuroplasticity

- 100s to 1000s of repetitions are needed to achieve motor plasticity

EBP: Intensity

- In a retrospective cohort study of 173 patients: amount of PT ortho pt receives in acute care is directly related to degree of improvement in function.
- Duration of PT an important predictor for functional status at DC after controlling for age, LOS, co-morbidity, and initial functional status


EBP: Intensity

- Earlier and more intensive mobilization in the acute phase of stroke can accelerate recovery of walking and functional independence.

Cumming TB, Thrift AG, Collier JM, Churilov L, Dewey HM, Donnan GA, Bernhardt J. Very early mobilization after stroke fast-tracks return to walking: further results from the phase II AVERT randomized controlled trial. Stroke 2011; 42(1): 153-158

EBP: Immobility Issues

- Evidence for decreased mobility levels on the ward after Early Mobility program in ICU
- 40% of patients reduced their activity level when they moved into regular unit


The scope of the problem

Study of 45 patients’ activity levels during hospitalization

- Spent <3% of the day standing or walking versus at least 20 of the 24 hours per day lying in bed.


Improved Patient Outcomes in Safe Patient Handling Environment

- 47 patients with CVA before safe patient handling program
- 47 with CVA 18 months after SPHM program
- FIM scores for Mobility tasks analyzed.
- In 4/5 tasks, patients improved more from admission to discharge in SHPM group


Tasks analyzed

- Bed/chair transfers
- Toilet Transfers
- Tub transfers
- Locomotion
- Stairs
Arnold, Radaweic, Campo and Wright, 2011. Study of 94 patients with CVA showed greater gains in group treated with SPH.


"In parallel bars, my patient could not walk more than a few feet. I had to work "really hard" to stand him. With equipment, patient ambulated 300 feet & performed upper extremity work that he could not in the bars because he was holding on so tight."

Outcomes: Patient Care

National Obesity Rates

State and National Average

Source: Centers for Disease Control and Prevention

Barriers to Early and Frequent Mobility

- Productivity requirements
- Staffing
- Obesity indices
- Time
- Medical Complexity
- Physical difficulty of getting patients up

Equipment: Conceptual framework for assistance

- Other areas where we routinely use technology
  - CPMs
  - Traction
  - Walkers, canes, crutches
  - Standing frames
  - Pediatrics
  - Weights and pulleys (Why don't we just apply manual resistance?)
  - Robotics
  - Lite Gait
- Use of SPH needs further understanding to maximize patient outcomes
Equipment: Active versus Passive

Equipment is merely a tool:
- The way equipment is used - *decides* whether patients are active or passive.
- We would never give a patient a walker if they were safe with a cane
- Premise holds true: "Never do for a patient what they can do for themselves"

Equipment: Evaluation

- Integration of SPH equipment into the evaluation process
- Goals of evaluation
- Comparison of manual versus technology assisted techniques
- Compare evaluation of walking aids

Equipment: Evaluation

- Evaluation
  - Begins with reading the order
    - 270lb female, 5'6", 39, ETOH, Fx tibial table, PwB Rt LE.

Equipment: Evaluation

- However, if patient is uncooperative, unwilling to help, weak, painful, syncopal, dependent, or is at high risk for falling when we move away from the bed, then our thoughts should be directed to more assistive and safer levels of devices
Bed Mobility

- Considerations:
  - Patient participation
    - How much is active?
    - How many repetitions can the patient perform?
    - How do we hold/lift the patient?
    - Is friction an issue?
    - Is the patient always safe?
  - Evidence considerations
    - Frequency and duration, repetition, active participation, duration of intervention, cardiovascular conditioning effect (of the patient)

Rolling and Turning

Consider: Caregiver Risk; Dependent portion of task; ability of PT to facilitate. Perform high repetitions, varied range of motion, utilize quick stretch etc.

Lying to sitting

- Considerations
  - Risk to patient
    - Falling backwards
    - Sliding off the bed
  - Risk to Therapist
  - How many repetitions does the patient perform?
  - How much is active?
- Evidence considerations
  - Frequency and duration, repetition, active participation, duration of intervention, cardiovascular conditioning effect (of the patient)

Lying to Sitting

Consider: Caregiver risk; utilization of resources; ability to make patient work in varied ranges of motion, ability to perform repetitively, ability to let patient initiate movement, ability to progress difficulty

Sitting to Standing Assessment

- LE strength
- Movement in bed
- Ability to assist with supine to sit
- Hip extensor strength (Bridge)
- Sitting balance
- Other Medical Considerations
  - Syncope
  - Anemia
  - Pain

Sitting to standing: Ortho

- Use of technology allows us to free up our hands and let the technology do the lifting, and our hands do the facilitating, such as helping a patient know how much “toe-touch weight bearing is”
Sitting to Standing with Technology

There are many different options for ambulation and sit-stand with SPHM technology.

Consider: Intensity, risk to caregiver, ability to facilitate, ability to achieve repetitions, cardiopulmonary effects

Sitting to Standing: Other considerations

- Manual Technique
  - How much is the patient participating?
  - Neuro: Weight bearing symmetry?
  - Ortho: Protection of weight-bearing precautions?
  - Able to work patient in various ranges of sit-stand?
  - "All or nothing"
  - Length of time in weight bearing
  - Dual laxing?
- Technology-assisted
  - Bed technology
  - Sit-stand devices (Powered and non-powered)
    - Show ability to start and stop in various ranges
  - Slings
  - Ability to push the patient in various ranges
  - Ceiling lifts with ambulation slings
  - Various ranges
  - Lift-off position training

Ambulation Assessment

- How far from the bed will we go?
- Static and Dynamic Balance
- Endurance
- Tolerance to activity
- Risk for falling
- Goals of treatment

Ambulation and balance

- Manual technique (gait belt)
  - Patient safety (unpredictability)
  - Distance (chair pulled behind, push IV pole etc)
  - Repetition and speed
  - Rest and repeat
- Technology assisted
  - Various powered and non powered devices
  - Sling versus no sling
  - Ceiling lifts and mobile floor lifts

Equipment: Ambulation

- Ceiling lifts or floor based lifts with ambulation slings can be useful for ambulation and balance work.

ADL – Grooming/eating

- Supine versus standing
  - Evidence on contextually relevant task performance
- Ability to achieve weight bearing concurrently with task
- Ability to dual task and hands free to challenge the patient more
ADL - Toileting

- Ability to allow patient to stand more during toileting task, clothing management etc
- Psychological advantages of upright positioning, ability for patient to do for themselves while equipment assists with dependent portion of the task

Increasing exercise Intensity

- http://www.youtube.com/watch?v=5RqVNO1NmA&list=PLEsfy3chKA3XPakTC7mSVGyhpvPX-2tk6
- http://www.youtube.com/watch?v=eOBX01NjQXw&list=PLEsfy3chKA3XPakTC7mSVGyhpvPX-2tk6

Other uses of SPHM equipment

Use of friction reducing devices

- “Exerslides”
- On/off the bed practice
- Combination with Stand up bed
- Use to move body parts on other body parts
- Assist with upper body/lower body dressing
- “Bed Boogie” Orthostatic tolerance work
Friction reduction solutions: Exer-slides

Discharge Planning: Look to the future
- Maximizing mobility in transition to next level care
  - Home
  - Inpatient Rehab Facility
  - Skilled Nursing
  - Long Term Acute Care
  - Long term Residential Care
  - Assisted Living

Opportunities
- Equipment still needs refining
- Optimal uses at optimal times important
- Collaboration with vendors and manufacturers
- APTA vision Statement
- Thinking outside the box to achieve BEST patient outcomes across the continuum of care

Summary
- Ability to implement Evidence Based Practice for increased frequency and duration of activity
- Increased repetitions possible
- Rest then repeat
- Graded exercise – eliminates the “All or nothing experience”
- Safer for the patient
- Reduces the paralysis through fear
- Increases patient participation
- Safer for Caregiver, Safer for patient, Consistent with Rehabilitation Goals

Questions
- Margaret.arnold@mclaren.org

Early Mobility references
- Topp R, Dünser M, King K, Doherty K, Hontzak J III. The effect of bed rest and potential of rehabilitation on patients in the intensive care unit. AACN Clin Issues, 2002;13(2); 263-276
Success of SPH program references


Neuroplasticity references

- Mulder T and Hochstenbach J. Adaptability and flexibility of the human motor system: Implications for neurological rehabilitation. Neural Plasticity, 2001; 8(1-2); 131-140

Intensity References

- Hopkins RO, Miller RR, Rodriguez L, Spuhler V. Physical Therapy on the Wards after Early Physical Activity and Mobility in the Intensive Care Unit. Physical Therapy 2012; 92(12);1518-152
EARLY MOBILITY & SAFE PATIENT HANDLING

Evidence, Equipment & Opportunities

Culture of Mobility

Culture of Safety

Historical Perspective

- Incidence and costs of WMSDs in nurses
- 1992 European Union bans manual handling
- 2002 VA VISN 8 Patient Safety Center of Inquiry (Dr. Audrey Nelson)
- 2003 American Nurses Association *Handle with Care* initiative
  - 14th Annual Safe Patient Handling and Mobility Conference (Orlando FL 3/24-3/28)
  - 6th National Healthcare Ergonomics Conference (Portland OR 9/8-9/11)
- 2013 ANA Safe Patient and Mobility Interprofessional Standards released

Evidence SHPM Success

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<tr>
<th>STATE</th>
<th>YEAR</th>
<th>TARGET</th>
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<tr>
<td>New York</td>
<td>2005</td>
<td>Hospitals, nursing homes, licensed home health agencies</td>
</tr>
<tr>
<td>Texas</td>
<td>2005</td>
<td>Hospitals and nursing homes</td>
</tr>
<tr>
<td>Ohio</td>
<td>2006</td>
<td>Nursing homes</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>2006</td>
<td>Licensed health care facilities</td>
</tr>
<tr>
<td>Washington</td>
<td>2006</td>
<td>Hospitals</td>
</tr>
<tr>
<td>Hawaii</td>
<td>2006</td>
<td>Hospitals, nursing homes, licensed home health agencies</td>
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<tr>
<td>Maryland</td>
<td>2007</td>
<td>Hospitals</td>
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<tr>
<td>Minnesota</td>
<td>2007</td>
<td>Hospitals, outpatient surgical centers, nursing homes</td>
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<tr>
<td>New Jersey</td>
<td>2008</td>
<td>Licensed general or special hospitals, nursing homes</td>
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<tr>
<td>Illinois</td>
<td>2011</td>
<td>Hospitals</td>
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<tr>
<td>California</td>
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<tr>
<td>Missouri</td>
<td>2011</td>
<td>Hospitals</td>
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**Federal Legislation**
- Nurse and Health Care Worker Protection Act of 2009

**VHA Safe Patient Handling Program**
- System-wide implementation of evidence-based initiative for safe patient handling (2007)
- Over $200 million allocated over 3 years to implement nationally in all VA Medical Centers
- All patient care settings inpatient, outpatient, diagnostic, therapy, radiology, long term care, morgue
- Program elements include: equipment, ergonomic assessments, training, clinical tools, policy, incident review
- Concurrent and comprehensive evaluation outcomes & process is being done by researchers at VISN 8 Patient Safety Center of Inquiry

**APTA 2004**
- 2004 “White Paper”

**APTA 2012**
- 2012
- Board of Directors HOD Po6-12-21-20 (Position)
- The Role of Physical Therapy in Safe Patient Handling
  - PTs and PTAs experts
  - Unique position to evaluate appropriate use new technology
  - Should be leaders

**PT Leadership**
- Lead efforts on safe patient handling & movement programs, especially related to role of rehabilitation
  - Ergonomics & safety committees, focus groups, equipment selection
  - Patient evaluation for functional mobility
  - Teaching & coaching colleagues
  - Team w/ other disciplines for mutual goals
  - Collect data, do research, share experiences
Evidence WMSDs Therapists


Growing Evidence Mobility


Challenges: Acute Care

- Treat across all patients and specialties
- Hospitals, out-patient centers; often specialty – children’s, university medical center
- Short length of stay
- Acuity level changes frequently
- Mobility & patient handling tasks quite varied
- Focus on rehabilitation & rapid progression toward independence
- Numerous department w/ “high risk” tasks

THANK YOU!
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