IT’S NOT JUST FOR NEURO ANYMORE....

Movement disorder

Staci Freudiger, PT, MBA

Objectives

- Define movement disorders and understand their clinical presentation in your practice setting
- Develop a multi-level approach to exercise prescription
- Develop a preferred battery of standardized tests to capture QUALITY and MEANINGFUL progress
- Gain the skills to develop and use new evidence based treatment techniques
Define

- Movement Disorder: What does this mean?
- Who is at risk for movement disorders?
- How do you currently treat a patient with movement disorders? Set your goals? Pick a functional test?

Movement Disorders Model: expanded

- Multi-tiered, fluid system for treatment of impairments (balance deficiencies, postural decline, lack of coordination and overall decreased ADL performance)
- To be utilized as standardized approach in multiple settings for best practices and measurable outcomes
Blended Intervention Approach

- Why consider these techniques together?
  - Evidence based research backing each of these
  - Elements of each philosophy – not full techniques/treatment protocols
  - Interdisciplinary therapy team integration
- Still have to incorporate ALL of your skills as a therapist – treat the WHOLE PERSON (low vision, vestibular, etc.)

Background Basics

- Why do we need to address this?
  - Need for more standardized approach to movement disorders to create a continuum of care and success across all practice settings
- Benefits of using this type of programming?
  - Increase efficiency and positive outcomes
  - Expanding the tool box for therapists
- Proof is in the pudding!
  - Use of recognized and appropriate functional assessments for accurate OUTCOME representation
Founding Principles

- NDT
- PNF
- LSVT BIG
- Tai Chi

Basic Principles of NDT

- Developed in 1940’s by Berta (PT) and Dr. Karl Bobath for treatment of children with cerebral palsy
- Successfully implemented in the treatment of all individuals with neurological impairments, including adults with hemiplegia
- Treatment re-creates movement patterns by emphasizing some basic principles:
  - Midline and symmetry
  - Mobility on stability patterns
  - Proximal to distal progression
  - Recreating the ‘Feeling’ of normal movement
- Develop Symmetry
- Normalize muscle tone
- Analyze components of patterns of movement.
- Utilize “key points of control”
  - Proximal > Distal
Basic Principles of PNF

- Rehabilitation of patients with spasticity and weakness by facilitating muscle elongation
- This is theorized to be accomplished through enhanced inhibitory mechanisms affecting the spastic muscle, and improving the muscle strength through improved excitation mechanisms in the weakened muscle
- The patterns of movement associated with PNF are composed of multijoint, multiplanar, diagonal, and rotational movements of the extremities, trunk & neck. There are 2 pairs of foundational movements for the upper and lower extremities; UE/LE D1 flexion & extension, UE/LE D2 flexion & extension
- Various PNF pattern techniques based on Kabat’s concept are: Hold Relax, Contract Relax, and Contract Relax Antagonist Contract (CRAC) etc.

Basic Principles of LSVT BIG

- Developed by Dr. Becky Farley, PhD, PT in early 2000's based off LSVT as an intensive amplitude-based exercise program for the limb motor system
  - Reeducation of the sensory motor system
  - Uses principles of neuroplasticity and neuroprotection as treatment rationale
- Exercise is Medicine!!
  - Target: Amplitude – “Big” whole body movement
  - Mode: Intensive and High Effort – No Junk Minutes!!
  - Sensory Calibration: Generalized carry-over (internal cueing, perception of movement)
- Standardized exercise protocol: 8 movements, 4 consecutive days of treatment x 4 weeks. Daily homework 30 days of month
Basic Principles of Tai Chi

- Tai Chi is based on Taoist philosophy dating back to 1500’s
- Tai Chi is the synergistic practice, integration and interaction of three subjects namely: Meditation, Martial Arts and Health
- Medical research has found evidence that tai chi is helpful for improving balance and for general psychological health, and that it is associated with general health benefits in older people
- All Tai Chi movements are circular and spiraling; the circularity of Tai Chi corresponds with the structure of the human body, and allows unbroken continuous movements; the spiraling of Tai Chi works in perfect consonance with all of the body’s systems because the Chi is spiraling around the body
- All body movements in Tai Chi must be directed by the waist. This transfers the power from the lower to the upper body; the waist directs the rooting power from the Earth and the legs. It uses that power to generate a great amount of centrifugal and centripetal force by turning the torso from side to side
- In Tai Chi the objective is to unify and integrate the different aspects of one’s being with the external world such that one is not only cognizant but become unified and integrated

Remember

Purpose: Multidirectional Repetitive and Sustained FUNCTIONAL Movements

Repetition creates muscle memory...
Practice creates accuracy (quality)!

(+ ) ENERGY: “exaggerated” movements with a purpose
Clinician’s Autonomy

- It all starts with the **THOROUGH EVALUATION**
- It is the therapist’s discretion as to which level, repetitions, etc. **BASED ON STANDARDIZED TEST RESULTS** and patient/caregiver goals
- Break down elements of each level to accommodate medically complex and/or lower level patients **<<always patient specific>>**
- For additional progression, each level can add components of other levels (ie. 4 square step pattern with weight shifts in chair)

PT vs. OT

- [https://www.youtube.com/watch?v=VGvVyOHeJ_s](https://www.youtube.com/watch?v=VGvVyOHeJ_s)
- Multi-disciplinary treatment protocol
- Differentiation is demonstrated in documentation and goals
Tools for Testing and Treatment

- Testing space with equipment in reach.
  - Chair (with and without armrest)
  - 10’ mark for pre-measured distance
  - Cones
  - Yard stick or tape measure (functional reach)
  - Stopwatch
- Mat table
- 4-square tape pattern on floor (+)
- Stability Ball and weights optional

Therapy Evaluation

Lower Level Measures

Initial/Mid/Discharge/Post Assessment (circle one)

<table>
<thead>
<tr>
<th>9-hole peg test</th>
<th>Modified Elderly Mobility Scale (MEMS)</th>
<th>Patient-specific Functional Scale</th>
<th>Chair Rise Test (30 Second CRT)</th>
<th>One Rep Max</th>
<th>MOCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score:</td>
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<td>Notes:</td>
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</table>

*Do a minimum of 2*
Therapy Evaluation
Lower Level Measures

• G Code
  ○ Helpful links: CBOR G-Code Conversion Calculator
    • http://www.mediware.com/rehabilitation/tools/item/g-code-conversion-calculator
    • App Store: G-code Modifier application by Mediware

Functional Limitations

*Interpretation of scores from standardized functional assessment tool(s)*

*Additional objective data including pain, motion, strength, etc.*

*Other considerations that impact the severity of the patient including comorbidities, age, cognition, prognosis, time since onset, etc.*
Functional Limitations
Lower Level

- Questions
  - What are the primary functional areas impacted?
  - What functional area do you assess will make the most progress?
- Primary impairments targeted at level
  - Transfers, posture, dynamic sitting balance, bed mobility, midline, reaching, sensation, cognition, BADL’s
- Considerations
  - Changing Basic Body Position [G8981/G8982/G8983]
  - Self Care [G8987/G8988/G8989]

Therapy Evaluation
Mid-Level Mobility Measures

Initial/Mid/Discharge/Post Assessment (circle one)

<table>
<thead>
<tr>
<th>Timed Up and Go (TUG) Trial</th>
<th>Barthel / Modified Barthel Score:</th>
<th>Activity Specific Balance Confidence (ABC) Score:</th>
<th>Chair Rise Test (30 Second CRT) Score:</th>
<th>BORG / RPE Score:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
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Notes: Notes: Notes: Notes: Notes:

*Tinetti Gait and Balance to be used only for assessment of balance related to movement disorder, not as a fall predictor.

• Do a minimum of 2
Therapy Evaluation  
Mid-Level Mobility Measures

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Functional Limitations  
Mid-level Mobility Measures

• Questions
  ○ What are the primary functional areas impacted?
  ○ What functional area do you assess will make the most progress?

• Primary impairments targeted at level
  ○ Dynamic standing balance, activity tolerance, gait, righting reactions, cross body motions, coordination, trunk, IADL’s

• Considerations
  ○ Mobility [G8978/G8979/G8980]
  ○ Self Care [G8987/G8988/G8989]
# Therapy Evaluation

## High Level Measures

### Initial/Mid/Discharge/Post Assessment (circle one)

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Notes: Notes: Notes: Notes: Notes:

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# Therapy Evaluation

## High Level Measures

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Functional Limitation
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- Considerations
  - Mobility [G8978/G8979/G8980]
  - Self Care [G8987/G8988/G8989]

Prepare Muscles for Movement

- Goals
  - Sensory (joint proprioception)
  - Scapular Mobilization
  - Postural Stretching
  - Tone facilitation/reduction
  - Muscle elongation

- Techniques
  - Standing squats; wall presses
  - Move neck up/down; side to side; circle
  - Shoulders shrug up/down; roll forward/backward
  - Squeeze shoulder blades together
  - Raise arms up while inhaling, exhale as lowering arms
  - Marching (seated, standing)
  - Trunk side bending and rotation on stabilized pelvis
  - Cross legs while seated, prolonged piriformis stretch
  - Unilateral long sit (hams and lumbar stretch)
  - Dorsiflexion
Considerations

- Clap
- Vocalize
- Exaggerated movements
- Speed/Timing variability
- Interact with participants providing input and perturbations
- Isometric holds
- Mix and match the exercises to create a routine specific for each person

Directional Reaching

- Fingers to the floor ~ Reach to the sky ~ hands to the left ~ hands to the right
- ADL: Reaching in the restroom, kitchen, etc.; engaging with environment; w/c management; showering

<table>
<thead>
<tr>
<th>Low Level</th>
<th>Mid Level</th>
<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform exercise</td>
<td>Perform exercise</td>
<td>Perform exercise</td>
</tr>
<tr>
<td>seated</td>
<td>seated</td>
<td>standing</td>
</tr>
</tbody>
</table>

|
### Interactive Target

- Reach toward opposite side at target of various heights and distances to emphasize trunk rotation and posture control
- May add small weights or objects of various size and grip
- ADL: multi-surface transfers; dressing; overhead activities

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<tr>
<th>Low Level</th>
<th>Mid Level</th>
<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sit unsupported</td>
<td>• Stand unsupported</td>
<td>• Stand unsupported</td>
</tr>
<tr>
<td>• Emphasize seated</td>
<td>• Emphasize standing</td>
<td>• Add perturbations to increase intensity</td>
</tr>
<tr>
<td>balance</td>
<td>balance</td>
<td>intensity</td>
</tr>
</tbody>
</table>

### Draw the sword

- Hands in lap, crossed at forearms. Uncross while reaching for the stars. D2 PNF pattern
- Hold at end range for posture training
- ADL: Grooming; dressing; wheelchair management

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<td>• Sit unsupported</td>
<td>• Stand unsupported</td>
<td>• Stand unsupported</td>
</tr>
<tr>
<td>• Add perturbations to increase intensity</td>
<td>• Emphasize standing balance</td>
<td>• Add perturbations to increase intensity</td>
</tr>
</tbody>
</table>
**Smell the Roses**

- Wrists at hips. Reach for opposite ears, crossing at forearms. D1 PNF pattern
- Hold at end range for posture training
- ADL: wheelchair management; reaching in a cabinet; posture correction; deep breathing

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<td>• Sit unsupported</td>
<td>• Stand unsupported</td>
<td>• Stand unsupported</td>
</tr>
<tr>
<td>• Add perturbations to increase intensity</td>
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**Joint compression + elongation**

- Partner activity. Sit palm to palm. Take turns being the leader.
- Move hands in an arc motion, forward, and backward
- Works on core stabilization and joint compression
- ADL: multi-level surface transfers; dressing; positioning; cleaning

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**In/Out of the car**

- Starting with feet together, move one leg out to the side (hip flexion then abduction. Return to starting position. Repeat with other leg.
- ADL: Getting in and out of the car; tub transfers

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</tr>
</thead>
<tbody>
<tr>
<td>• Sit unsupported</td>
<td>• Sit unsupported</td>
<td>• Stand unsupported</td>
</tr>
<tr>
<td>• Include isometric</td>
<td>• Include isometric</td>
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<tr>
<td>holds</td>
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<td>holds</td>
</tr>
</tbody>
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**Sit to Stand**

- Unsupported sitting with forward rocking motion up to standing.
- Goal is to stand without UE support
- Use stop/go/slow/fast commands to increase intensity
- ADL: all mobility!

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<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Focus on weight shift if unable to stand.</td>
<td>• Place a playground ball on the seat to practice eccentric holds</td>
<td>• Place a playground ball on the seat to practice eccentric holds</td>
</tr>
</tbody>
</table>
Lunge and Reach

- Stand with feet shoulder width apart. Lunge forward or to the side with one foot and reach in specified direction. Reaching can be done with same side or opposite side.
- ADL: stepping over thresholds; stepping up on curb; wheelchair management; opening doors;

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<tbody>
<tr>
<td>• Extend leg forward and reach with hand</td>
<td>• Hold on to chair during lunge and reach. Be sure to switch sides.</td>
<td>• Stand unsupported. • Start with a small lunge and increase step length.</td>
</tr>
</tbody>
</table>

4-Square

- Seated or standing, step in the direction called out by the instructor. Directions include forward, backward, right, left, and diagonal.
- ADL: Functional mobility; obstacles; turning; visual perception

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<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sitting unsupported, follow stepping patterns while seated.</td>
<td>• Hold on to chair with one hand.</td>
<td>• Stand unsupported. • Incorporate one leg stance</td>
</tr>
</tbody>
</table>
Pre-gait

- Promote rocking pattern in modified tandem stance with rolling heel/toe on feet.
- ADL: functional mobility; IADL’s;

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</tr>
</thead>
<tbody>
<tr>
<td>• Sitting unsupported, follow heel/toe pattern.</td>
<td>• Hold on to chair with one hand.</td>
<td>• Stand unsupported.</td>
</tr>
<tr>
<td>• Incorporate reciprocal arm swing.</td>
<td>• Incorporate arm swing on one side then switch sides.</td>
<td>• Encourage reciprocal arm swing.</td>
</tr>
</tbody>
</table>

Lion King

- Standing shoulder-width BOS, turn at waist and push palms out and upward toward direction of turn, opposite leg steps out to side
- Postural hold for up to 30 seconds
- ADL: Reaching and pulling activities

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<th>High Level</th>
</tr>
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<tbody>
<tr>
<td>• Follow arm movements while seated</td>
<td>• If needed, use one arm at a time while holding chair with other arm.</td>
<td>• Stand unsupported.</td>
</tr>
</tbody>
</table>
Modified Warrior Pose

- Standing shoulder-width BOS, raise arms so they are overhead. Step forward into a lunge and turn back toe so it is facing to the side. Slowly move arms to 90 degrees.
- Return to neutral standing and reverse sides. Goal is to complete recovery unassisted.
- ADL: any activity requiring co-activated core; any activity requiring staggered stance

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<tr>
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<th>High Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Perform movement while sitting at an angle on the chair.</td>
<td>• Hold chair as needed.</td>
<td>• Stand unsupported. • Hold up to 30 sec.</td>
</tr>
</tbody>
</table>

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Recommended Protocol

- Minimum of three times per week
- Expectation of daily homework
  - Exercise physiology
  - Neurological rehab principles
  - Expectation of progress towards goals with intensity
- Re-assess standardized tests/functional measures results (at a minimum of 10 visits/30 days, whichever is less)
- Transition exercises to group setting under skilled services prior to Wellness discharge or
- Transition RNA program with training sessions under skilled services BEFORE discharge
Strategies for lower functioning individuals

- Supine position:
  - Scapula mobilization
  - Upper trunk rotation on lower trunk
  - Segmental rolling techniques
  - Bridging – one hip at a time then the other Bridging bilateral – same time

- Sidelying position: Push up technique on to weight bearing onto forearm and lower trunk on upper moment.
- Trunk elongation /mobilization. Upper trunk on lower trunk to facilitate rolling and vis- versa.
- Sitting-scooting motion. Weight shift and lifting on one side at a time. The scooting forward and back.
Strategies for lower functioning individuals

- Anterior / posterior facilitation
- Dynamic trunk facilitation/stabilization activities
- Pelvic lifts when leaning forward in preparation for sit to stand or transfers.

Goal Examples

**Occupational Therapy**
- The client will demonstrate improved bilateral integration gross motor coordination as evidenced by improvement in Barthel index to ______ in order to improve independence with dressing.
- The client will demonstrate improved awareness of position in space by improving TUG score to_______ in order to decrease fall risk during cooking tasks.
- The client will perform multi-level surface, multi-directional transfers 7/7 trials for daily ADL performance in their environment.
Treatment Note Sample

- **Neuro Re-Ed:** Pt completed series of selected activity with focus toward balance, coordination, posture, kinesthetic awareness and normalizing movement patterns for safe functional mobility. Activity included (#_____ ) reps of seated/standing movement with changing BOS, postural restorative training with trunk-pelvis control/coactivation, functional reaching tasks and sit <> stand transfers. Verbal and tactile cues given (____% ) for instruction and facilitation of movements in amplified motion.

Treatment Note Sample

- **Posture 1:** Pt seen for scapular retraction and depression exercises times (# reps) to improve upright posture for functional mobility. Facilitation of pelvic/ trunk rotation to (FUNCTIONAL ACTIVITY).
- **Posture 2:** Pt seen for neck extension exercises times (# reps) to improve upward visual gaze and upright posture for environmental awareness.
- **Therex:** Pt completed (bilateral, contralateral) UE/LE exercises times (# reps) for improved gross motor coordination for (FUNCTIONAL ACTIVITY).
Treatment Note Sample

- **HEP:** Established home exercise program for movement disorders protocol as indicated in treatment notes, printed worksheets and reviewed all exercises. Patient is able to complete home program with (PARAMETERS).

- **Therapeutic Activity:** Pt completed core strengthening and stabilization activity (position – supine, seated, standing) times (# reps) for increased trunk strength for (FUNCTIONAL ACTIVITY – related to goals).

Discharge Planning

The success of this program depends on daily carryover.
It’s Your Turn

- Using your case study:
  - Select appropriate standardized tests
  - Develop a skilled exercise program using these tools/ideas
  - Document a goal and a sample treatment session for your case study
  - What is your discharge plan?

Case Study 1: Sarah

- 5 days post op (L) THA s/p fall after tripping over her cat; WBAT LLE; admitted to your SNF
- 75 y/o female who lives alone in Assisted Living Apartment
- PMHx: osteoporosis, OA hands and knees, HTN, glaucoma
- PLOF: participating in group exercises three times per week and water aerobics two times per week; ambulatory without AD in community; (I) in all BADL’s and IADL’s. Still driving and likes to knit and play Sudoku. Played basketball in High School.
Case Study 2 : Maxwell

- 78 year old male
- Owns his own exterior painting business. Lives in a bi-level home with 11 stairs to second floor where he sleeps
- PMHX: Type II DM, neuropathy, retinopathy, CABG x 3
- Recent history of falls on the job
- His family insists he come to therapy. He just wants to keep working

Case Study 3 : Lucy

- Retired PT, 84 years old recently widowed after caring for her husband with Parkinson’s
- Reports increased dizziness and occasional losses of balance, but no falls. Not able to “keep up” with her friends on walks
- PMHx: Osteoporosis, episodes of confusion, having difficulty picking up and holding her grandchildren, and preparing meals
Resources

- http://www.taichisociety.net/taichi-principles.html