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Post-Stroke Apathy and Depression: Addressing Psychosocial Barriers to Patient Success

Shannon Compton PT, DPT, NCS, CBIS

CONTINUED

- Presenter Disclosure: Financial: Shannon Compton has received an honorarium for presenting this course. Non-financial: Shannon Compton has no relevant non-financial relationships to disclose.
- Content Disclosure: This learning event does not focus exclusively on any specific product or service.
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About me

- Shannon Compton is a physical therapist with extensive experience in rehabilitation across the continuum of care for individuals with stroke and traumatic brain injury. She received her Doctor of Physical Therapy degree from the University of Oklahoma Health Sciences Center. She is an ABPTS Board Certified Clinical Specialist in Neurologic Physical Therapy, and a Certified Brain Injury Specialist. She currently practices in outpatient at the Healthy Aging and Neurology clinic of Northwest Rehabilitation Associates in Salem, OR.

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Learning Outcomes

After this presentation, participants will be able to:

- Identify at least two aspects of the pathophysiology, clinical course, and prevalence of post-stroke apathy and depression.
- Describe at least three clinical features which distinguish post-stroke apathy from post-stroke depression.
- List at least two outcome measures that can be used in clinical practice to assess the severity of patients' post-stroke apathy and depression.
- Describe at least two clinical strategies to help patients overcome post-stroke apathy and depression to improve clinical outcomes

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Questions we will answer today

- Why are post-stroke apathy and depression important for rehab professionals to assess?
- What interdisciplinary care team members should be involved for patients with apathy/depression?
- Is there a way we can structure our treatments to best support individuals with these emotional side effects of stroke?

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Post-Stroke Apathy (PSA) - Definition

- Described as an impairment of "goal-directed behavior"
  - Previously described as a loss of motivation or "motivational impairment"
  - Argument to shift definition towards behavior, as behavior is an output which can be observed and measured
- How do you describe your patients?
  - "Lack of initiation"
  - "Poor task persistence"
  - "Self-limiting behavior"
- (Le Heron et al, 2018; Robert et al, 2018)

CONTINUED

PSA - Prevalence and Clinical Features

- Prevalence: About ⅓ of patients post-stroke (Cairo et al, 2013)
  - Seems to be no difference in occurrence in hemorrhagic vs ischemic strokes
- Clinical features of apathy (Ferro et al, 2016)
  - Low motivation
  - Reduced initiation
  - Loss of self-activation
  - Emotional indifference

CONTINUED

PSA – Associated Factors

- Associated:
  - Impaired cognition (MOCA scores)
  - Aphasia
  - Lower FIM scores
  - Lower Fugl-Meyer scores
  - Presence of neglect
- NO Association:
  - Gender
  - Age
  - Chronicity of stroke
  - Years of education
- (Kennedy et al, 2016)

CONTINUED

PSA - Outcomes

- Apathy is persistent throughout initial hospitalization and over first year post-stroke
- Higher level of apathy - more likely to be discharged to SNF
- Greater caregiver burden

- (Kennedy et al, 2015; Carnes-Vendrell et al, 2019)

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Diagnostic Criteria for PSA

(Robert et al, 2018)

1. Loss of goal-directed behavior
2. Symptoms must be observed in at least 2 out of the 3 domains:
   a) Behavior/cognition
   b) Emotion
   c) Social interaction
3. Symptoms cause clinically significant impairment in personal, social, occupational, or other areas of functioning
4. Symptoms are not exclusively explained due to physical abilities, change in motor function, change in consciousness, direct effects of substance (medication, drugs), or major changes in patient's environment (natural disasters, acts of terrorism)

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Post-Stroke Depression (PSD) - Definition

- Definition
  - DSM-V diagnostic criteria of major depressive disorder: 5 or more symptoms present in a 2 week period
    - Depressed mood or anhedonia
    - Appetite or weight changes
    - Sleep difficulties
    - Psychomotor agitation
    - Fatigue or loss of energy
    - Diminished ability to think or concentrate
    - Feelings of worthlessness or excessive guild
    - Suicidal ideation
- (Tolentino & Schmidt, 2018)

CONTINUED

PSD - Prevalence and Associated Factors

- Prevalence: about ⅓ of stroke survivors, most common in 1st year post-stroke
- Associated with:
  - Greater cognitive impairment
  - Greater physical impairment
  - Higher education level
  - Previous history of depression
  - Greater social isolation
  - Institutionalization after stroke
- (Nickel and Thomalla, 2017, AHA 2017)

CONTINUED

PSD - Outcomes

- Greater return to inpatient hospital setting
- Higher mortality rates
- Worse functional outcomes (Barthel Index, Modified Rankin Scale)
- Lower quality of life
- Individuals with family caregivers have lower rates of depression (but what about the depression rates of family caregivers?)

(AHA, 2017; Dong-Heun Ahn, et al 2015)

CONTINUED

So is there a physiological basis for PSA/PSD?

- The short answer is maybe.
- The longer answer is “it’s complicated.”
- The whole picture is fascinating!

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Brain Structures Associated with Apathy

- Certain brain structures are associated with apathy across many diagnoses (PD, Huntington's Disease, TBI, HIV infection, stroke) (LeHeron et al, 2018)
  - Dorsal anterior cingulate cortex
  - Ventral striatum (including the nucleus accumbens)
- These structures are important for normal motivated behavior
- In patients with apathy, lesion location was not always correlated with development of apathy
  - Although some evidence for higher occurrence in ACA strokes (blood supply to frontal lobes)
  - Apathy present if lesion affected white matter networks connecting to frontal lobes or reduced frontal lobe metabolism

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Pathophysiology and Metabolic Changes in PSD

- No clear relationship between lesion location or volume and depression
  - Largely due to methodology of studies
  - As imaging has improved, more evidence to indicate frontal lesions or impact of basal ganglia leads to higher rates of PSD
- Some evidence that different genotypes are more likely to have ongoing issues with depression after stroke
  - Related to val66met polymorphism (gene related to BDNF production)
- Metabolic changes in PSD
  - Lower serum BDNF
  - Decreased brain perfusion
  - High cortisol levels
  - High serum levels of inflammatory cytokines
- (Nickel & Thomalla, 2017, AHA 2017)

CONTINUED

Why should we be measuring this?

- Short answer - evidence shows depression/apathy have a huge impact on patient outcome
- Earlier intervention is better - making sure patients have appropriate referrals to neuropsychiatrist, hospital psychologist, counselor, social worker
  - Evidence in PSD indicates SSRI use improves motor learning and neuroplasticity
- Making sure caregivers have necessary support
  - Team approach
  - Hospital-based stroke support groups specifically for caregivers

CONTINUED

Who should be measuring this?

- Nursing?
- PT?
- OT?
- SLP?
- Case manager?

CONTINUED

PSA - Clinical Outcome Measures

- Apathy Evaluation Scale
  - Three versions: self-rated, caregiver-rated, clinician-rated
  - Items scored 1 (not at all characteristic) to 4 (a lot characteristic)
  - Score ≥37 indicates apathy (higher score indicates more apathy***)
- Apathy Inventory
- Score of ≥4 indicates clinical presence of apathy
- Three domains measured, scored from 0-4
  - Lack of interest
  - Lack of initiation
  - Lack of emotion
- Total score out of 12

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PSD - Clinical Outcome Measures

- Beck Depression Inventory
  - >10 indicates some form of depression
- Geriatric Depression Scale
  - >5 indicates likelihood of depression and need for follow up
- PHQ-2, PHQ-9
  - On PHQ-9, score >5 indicates presences of mild depression (or more severe, depending on score)
- Aphasic Depression Rating Scale
  - Outcome measure specifically for individuals with aphasia
  - Important because of high correlation between aphasia and depression

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From the StrokEDGE II Document from ANPT

These outcome measures have some questions that relate to mental health, as well as physical function

originally recommended outcome measures. 14 measures of gait, balance, transfers, and patient-stated goals were excluded because these domains were reviewed under the ANPT Core Measures Clinical Practice Guideline Task Force. This document summarizes stroke-specific recommendations for the inpatient and outpatient rehabilitation settings. Additional measures are recommended but not as strongly. Complete materials are available at http://www.neuropt.org/professional-resources/neurology-section-outcome-measures-recommendations/stroke.

Recommendations for Patients with Stroke in Rehabilitation:

Highly recommended measures:
- Fugl-Meyer Assessment (Motor Performance)
- Functional Independence Measure
- Postural Assessment Scale for Stroke Patients
- Stroke Impact Scale
- Stroke Rehabilitation Assessment of Movement

Recommended measures:
- 9 Hole Peg Test
- Action Research Arm Test
- Arm Motor Ability Test
- Assessment of Life Habits
- BESTest
- Box and Blocks Test
- Chedoke-McMaster Stroke Assessment
- Dynamometry
- EuroQOL
- Fugl-Meyer Assessment of Motor Performance
- Modified Rankin Scale
- Motricity Index
- Rate of Perceived Exertion
- Rivermead Motor Assessment
- SF-36
- Stroke-Adapted SIP-30
- Stroke Impact Scale (outpatient only)
- Trunk Impairment Scale
- Wolf Motor Function Test

CORE MEASURES

The core measures of gait, balance, and transfers recommended for *ALL* adults with neurologic disorders are:

- 6 Minute Walk Test
- 10 Meter Walk Test
- Berg Balance Scale
- Functional Gait Assessment
- Activities-Specific Balance Confidence Scale
- 5 Time Sit to Stand Test

HTTP://WWW.NEUROPT.ORG/PROFESSIONAL-RESOURCES/ANPT-CLINICAL-PRACTICE-GUIDELINES/CORE-OUTCOME-MEASURES-CPG

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Distinguishing PSA vs PSD

PSA

1. Patients will typically deny feeling sad
2. Disinterest in personal relationships
3. Will not report fatigue

PSD

1. Sadness is a clinical feature
2. Typically remain interested in personal relationships
3. Fatigue is common

40% of patients with apathy also present with depression (Carnes-Vendrell et al, 2019)

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Medical interventions for PSA/PSD

- SSRIs
  - PSD: early intervention with SSRIs improves functional outcomes and motor recovery
  - PSA: negative effects associated with SSRI use
- Some research into dopamine supplementation for PSA
- Early intervention means that team approach to treatment is key, especially in acute, IRF, SNF
- (AHA 2017)

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OPTIMAL Theory of Motor Learning

- Three major components:
  - Enhanced expectancies
  - Learner autonomy
  - External focus of attention

CONTINUED

OPTIMAL Theory: Effects on the Brain

- Increased dopamine production
  - Improves long-term potentiation (greater neural connectivity)
  - Enlargement of spiny processes on medium spiny neurons
- Greater co-activation of neural networks
  - "Neurons that fire together, wire together."
- Improved activation of neural networks involved in task-related functions and motor learning

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OPTIMAL Theory: Enhanced Expectancies

- Patient beliefs about what will happen
  - "Expectations are not motivationally neutral." - Wulf
  - Patient: "There is no way I can do that."
- How do we accomplish this?
  - Positive feedback - giving positive feedback after "good" trials = better motor learning
  - Social-comparative feedback - tell them they are doing better or improving more than average
  - Self-modeling - videos of best performances
  - Perceived task difficulty - people with their same condition succeeded at a task
  - Conceptions of ability - portraying tasks as something that can be learned rather than something that you need inherent ability for
  - Extrinsic rewards - expectation of a reward is more important than receiving the reward
  - Positive affect - anticipation of interaction that is pleasant and rewarding

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Enhanced Expectancies - Examples

- "That was a really great walk where you did a great job picking up your left foot." (Positive feedback)
- "Most people have a really hard time getting the hang of this, but you are picking it up very quickly." (Social-comparative feedback)
- "Look at how good your posture is in this video." (Self-modeling)
- "With how well you just did on that walk, I think you've shown you have the reactions to do well on this balance exercise." (Perceived task difficulty)
- "Balance is something we can all improve and work on if we practice enough." (Conceptions of ability)
- "If you are able to hold this balance position for more than 30 seconds, you will get your name on our wall of honor." (Extrinsic rewards)
- "Q: What's sour, yellow and fuzzy? A: A lemon wearing a sweater." (Positive affect)

CONTINUED

OPTIMAL Theory: Autonomy

- Giving patients a measure of control
- Implementation:
  - Control over practice conditions - type/frequency of feedback, assistive device choice
  - Instructional language - give patient a choice in how to implement instructions
  - Incidental choices - order of exercises, color of equipment used

CONTINUED

Autonomy - Examples

- "Would you like to try a single point cane today, or continue with the walker?" (Control over practice conditions)
- "I would suggest leading with your left foot to go up the step." (Instructional language)
- "Would you like to walk first, or try the leg press first?" (Incidental choices)

CONTINUED

OPTIMAL Theory: External Focus of Attention

- For motor learning, better to focus on the outcome of the movement rather than the quality of the movement
- Areas for cueing:
  - Movement effectiveness - achieving a certain result with movement
  - Movement efficiency - achieving an outcome in the most efficient way possible
  - Movement form - achieving an outcome with a certain level of coordination

CONTINUED

External Focus of Attention - Examples

- "Try to keep the balance board level as you turn your head." (Movement effectiveness)
- "Let's see if you can walk to that target in the fewest steps possible." (Movement efficiency)
- "Let's reach for this target as you go to stand up." (Movement form)

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Case Study - Mr. H.

- 53 year old male
- 5 years post-CVA (unknown if hemorrhagic or ischemic, unknown lesion location - incomplete records)
- Left-sided hemiparesis
- Resides in a long-term care facility

CONTINUED

Case Study- Mr. H.

- Initial evaluation
  - Arrived in wheelchair
  - Flat affect
  - Stated goal: "Go back to my life - everything. Go back to work."
  - Unable to identify barriers to long term goals, unable to identify short-term goals
- Early treatment sessions
  - Low motivation, low initiation
  - Resistant to try any intervention
  - Multiple times arrived to therapy wearing slippers without his AFO
  - "I can't - you think I can do things I can't do."
- Turning point - OPTIMAL theory

CONTINUED

"Vulnerability sounds like truth and feels like courage. Truth and courage aren't always comfortable, but they are never weakness."
-Brené Brown

CONTINUED

A Brief History of My Journey with OPTIMAL

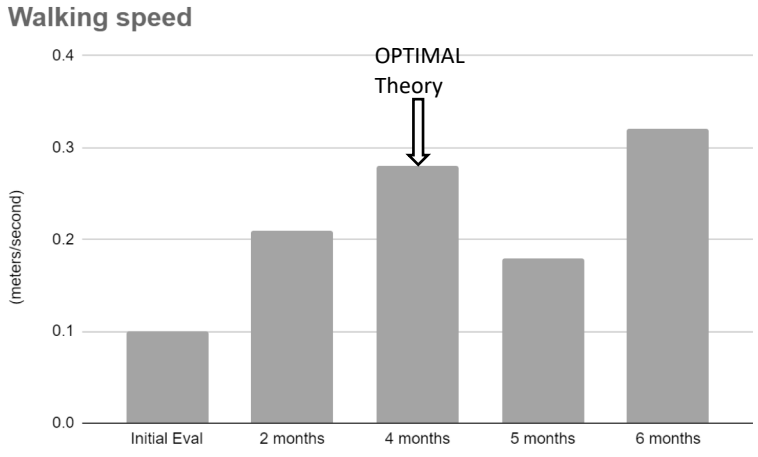
- I graduated from PT school before this article was published
- I knew the mechanics of different aspects of motor learning
  - External focus of control
  - External feedback
  - Salience of task to individual
- I did NOT have a good synthesis of the information in my mind
- I applied these principles inconsistently with patients
- I spent the formative years of my career in a treatment environment where the interaction style with patients with post-stroke apathy did very little to foster patient independence - so I carried that internal model with me

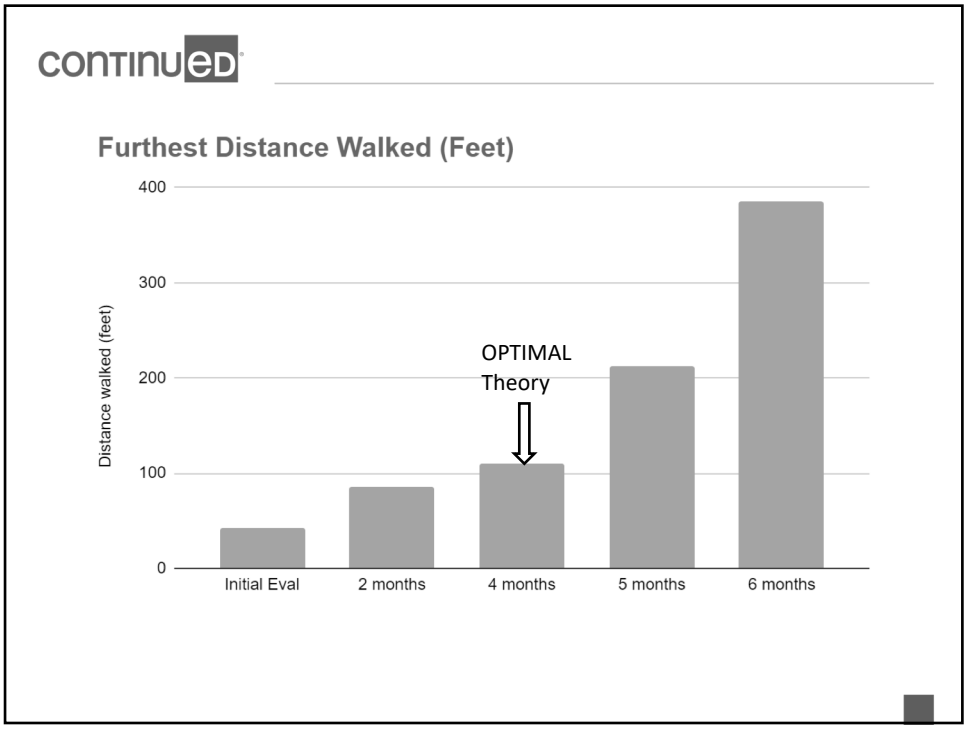
CONTINUED

	Initial Eval	6 Months Later
Apathy Inventory	8/12	4/12
2-Minute Walk Test	43 ft (SBQC, SBA)	120 ft (no AD, supervision)
6-Minute Walk Test	N/A	385 ft (no AD, supervision)
Four-Square Step Test	84 seconds, minA	45 seconds, SBA
Isokinetic Strength Testing	BLE = 17 Watts	BLE = 38 Watts

Mr. H. Treatment Trajectory

- In PT for a total of 7 months (so far - interrupted due to COVID-19)
- OPTIMAL theory implemented at 4 months
- So far demonstrating greater self-agency, goal-setting, motivation, improved interaction with others




Furthest Distance Walked (Feet)
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400
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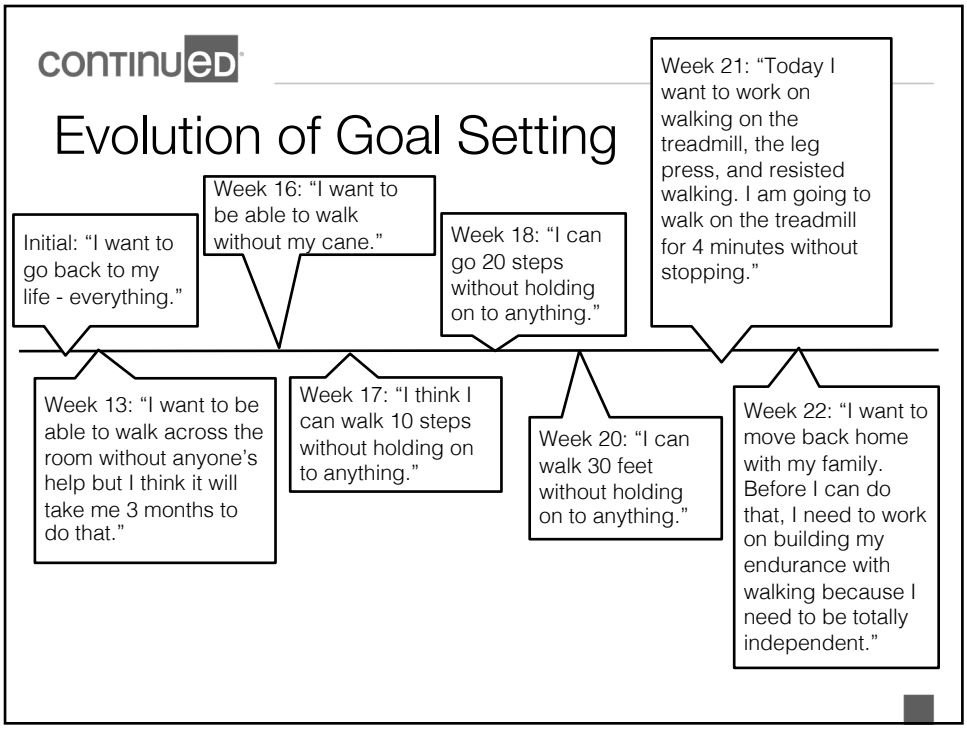
OPTIMAL
Theory
Initial Eval
2 months
4 months
5 months
6 months


Evolution of Goal Setting
Initial: "I want to go back to my life - everything."
Week 13: "I want to be able to walk across the room without anyone's help but I think it will take me 3 months to do that."
Week 16: "I want to be able to walk without my cane."
Week 17: "I think I can walk 10 steps without holding on to anything."
Week 18: "I can go 20 steps without holding on to anything."
Week 20: "I can walk 30 feet without holding on to anything."
Week 21: "Today I want to work on walking on the treadmill, the leg press, and resisted walking. I am going to walk on the treadmill for 4 minutes without stopping."
Week 22: "I want to move back home with my family. Before I can do that, I need to work on building my endurance with walking because I need to be totally independent."

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Modeling Goal Setting – Breaking Things Into Bite Size Pieces

"I want to be able to walk across the room without anyone's help but I think it will take me 3 months to do that."

"Do you think you can stand and walk from here to the center post without help?"

- Autonomy
- External focus of attention

CONTINUED

Modeling Goal Setting– Breaking Things Into Bite Size Pieces

"I want to be able to walk across the room without anyone's help but I think it will take me 3 months to do that."

"Do you think you can stand and walk from here to the center post without help?"

- Enhanced expectancies: "Based on how well you've been walking today, I am sure that you can walk from this table to that center post without my help."
- After success: "I am so impressed by how you accomplished the goal you set for yourself. How do you feel about achieving that goal?"

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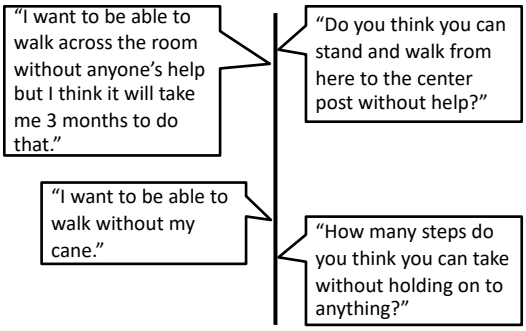
Modeling Goal Setting: Breaking Things Into Bite Size Pieces



- Fostering autonomy of goal setting through modeling
- His initial response: "I think I can take 10 steps without holding on to anything."
- At first: very challenged to achieve this goal due to fear, NOT due to safety
  - Provided positive feedback after successful trials
  - Once he achieved goal a few times, asked if he was ready for a larger goal

CONTINUED

Did OPTIMAL theory "fix" this patient's apathy?

- No, I'm not claiming that
- I <u>am</u> claiming that using the OPTIMAL theory and modeling goal-setting for this patient each session set him on a trajectory towards greater autonomy and independence
- I do think there is evidence to support that he has had an <u>increase</u> in goal-directed behavior
  - On a phone call recently he told me all about his home program he does every day - 100% self-initiated

CONTINUED

What else played a role in his improvement?

- OPTIMAL theory alone was not the only factor at work
- Principles of neuroplasticity
  - Cardiovascular activity to increase brain's production of BDNF, lower inflammatory cytokines, improve cerebral blood flow
- Focus on task-specific strength training
  - Improve functional recruitment of left lower extremity during activities such as sit-to-stands
- Dynamic balance training
  - Work on anticipatory postural reactions and compensatory stepping strategies to decrease need for assistive device

CONTINUED

What am I leaving out?

- Pulling in an interdisciplinary care team
- Coordinating with caregiving team at care facility to promote increased autonomy in home environment
- Connecting with local support groups to decrease social isolation

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Lessons learned

- Post-stroke apathy and depression are widely prevalent and have profound effects on patients' recoveries
- PSA/PSD do not have specific associations with lesion locations but are associated with altered neural connectivity, brain metabolism, and psychosocial adjustment to changes in physical functioning/life roles
- Early intervention is best and can include pharmaceutical or non-pharma strategies (OPTIMAL theory)
- Using the OPTIMAL theory works to foster patient autonomy and achieve successful outcomes

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Questions?

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References

- Ahn, D., Lee, Y., Jeong, J., Kim, Y., & Park, J. (2015). The effect of post-stroke depression on rehabilitation outcome and the impact of caregiver type as a factor of post-stroke depression. Annals of Rehabilitation Medicine, 39(1), 74-80. doi: 10.5535/arm.2015.39.1.74
- Douven, E., Schievink, S., Verhey, F., van Oostenbrugge, R.J., Aalten, P., Staals, J. & Kohler, S. (2016). The cognition and affect after stroke – a prospective evaluation of risks (CASPER) study: rational and design. BMC Neurology, 16(65), 1-11. doi: 10.1186/s12883-016-0588-1.
- Ferro, J.M., Caeiro, L., Figueira, M.L., (2016). Neuropsychiatric sequelae of stroke. Nature Reviews Neurology, 12(5), 269-80. doi: 10.1038/nrneurol.2016.46
- Kennedy, J.M., Granato, D.A., & Goldfine, A.M. (2015). Natural history of post-stroke apathy during acute rehabilitation. Journal of Neuropsychiatry and Clinical Neurosciences, 27(4), 333-38. doi:10.1176/appi.neuropsych.15010001.
- LeHeron, C., Apps, M.A.J., & Husain, M. (2017). The anatomy of apathy: a neurocognitive framework for amotivated behavior. Neuropsychologia, 118(2018), 54-67. http://dx.doi.org/10.1016/j.neuropsychologia.2017.07.003.
- Mang, C. S., Campbell, K. L., Ross, C. J., & Boyd, L. A. (2013). Promoting Neuroplasticity for Motor Rehabilitation After Stroke: Considering the Effects of Aerobic Exercise and Genetic Variation on Brain-Derived Neurotrophic Factor. Physical Therapy,93(12), 1707-1716. doi:10.2522/ptj.20130053
- Nickel, A & Thomalla, G. (2017). Post-stroke depression: impact of lesion location and methodological limitations - a topical review. Frontiers in Neurology, 8(498), 1-8. doi: 10.3389/fneur.2017.00498.

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References (continued)

- Robert, P., et al. (2018). "Is It Time to Revise the Diagnostic Criteria for Apathy in Brain Disorders? The 2018 International Consensus Group." European Psychiatry, 54, 71–76. doi:10.1016/j.eurpsy.2018.07.008.
- Tolentino, J. & Schmidt, S. (2018). DSM-5 criteria and depression severity: implications for clinical practice. Frontiers in Psychiatry, 9(450), 1-9. doi:10.3389/fpsyt.2018.00450.
- Towfighi, A., et al. (2017). "Poststroke depression: a scientific statement for healthcare professionals from the American Heart Association/American Stroke Association". Stroke, 48, e30-e43. doi:10.1161/STR.0000000000000113.
- Vecchio, L. M., Meng, Y., Xhima, K., Lipsman, N., Hamani, C., & Aubert, I. (2018). The Neuroprotective Effects of Exercise: Maintaining a Healthy Brain Throughout Aging. Brain Plasticity,4(1), 17-52. doi:10.3233/bpl-180069
- Wang, Z., Shi, Y., Liu, F., Jia, N., Gao, J., Pang, X., & Deng, F. (2018). Diversiform etiologies for post-stroke depression. Frontiers in Psychiatry, 9(761), 1-8. doi: 10.3389/fpsyt.2018.00761.
- Wei, N., Yong, W., Li, X., Zhou, Y., Deng, M., Zhu, H., & Jin, H. (2015). Post-stroke depression and lesion location: a systematic review. Journal of Neurology, 262, 81-90. doi:10.1007/s00415-014-7534-1.
- Wulf, G., & Lewthwaite, R. (2016). Optimizing performance through intrinsic motivation and attention for learning: The OPTIMAL theory of motor learning. Psychonomic Bulletin & Review, 23(5):1382-1414. doi: 10.3758/s13423-015-0999-9.