GeriNotes

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APTA Geriatrics
An Academy of the American Physical Therapy Association
Age on.

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From the President

Cathy Ciolek
President,
APTA Geriatrics

Do you know what your patients want? How do you know?

With a greater focus from advocacy groups and regulators, person-centered care has become a central focus within healthcare for aging adults. Groups like Patient Priorities Care, the Institute for Healthcare Improvement, and The SCAN Foundation are all leading changes that shift from a paternalistic health system to one that focuses on the needs and desires of the older adult and their caregivers.

I found this recent article from Lubbe et al worth sharing: *The quality of geriatric rehabilitation from the patients' perspective: a scoping review*.[1] They conducted a scoping review of the quality of geriatric rehabilitation from the patient's perspective and discovered 6 themes: 1) the need for information about rehabilitation process; 2) the need for telling one's story; 3) the need for support (physical, psychological, on how to cope with limitations and social); 4) the need for shared decision-making and autonomy; 5) the need for a stimulating rehabilitation environment; and 6) the need for rehab in the home. While I recommend you read the whole article (it was open access when I reviewed), I want to focus on a few key points that stood out to me as ways we need to self-assess.

- People felt that they lacked information about their health status and the rehab process. I think we forget that people not well versed in our world don't understand what rehabilitation means or entails. Take a few minutes to explain this to them and ensure they understand.
- One study found that patients were hesitant to ask questions because they felt healthcare staff were already overwhelmed. Clients shouldn't be left to feel they can't ask us questions. Set aside 5 minutes at the beginning or end of your session to ask what questions they have. They may have several as they approach discharge to home.
- Don't just let them tell their story, encourage them to do so! Whether with you, another patient, or staff member, being "heard" is a key component to building trust and developing a good working relationship.
- The need to feel safe is a basic need. Support is crucial when people are experiencing serious disruption in their lives. Many of our clients have experienced trauma that led them here; falls or other accidents are common. Recognize this and use trauma-informed care approaches to support them physically, psychologically, and socially.
- Learn about and use shared decision-making to empower the person and potentially improve their outcomes. A great article on shared decision making is available from Moore and Kaplan in PTJ.[2]
- Take a look at your rehabilitation environment. Is it engaging? Do people have a chance to talk to others who are experiencing similar challenges? Are families welcomed (if desired by the patient) and given an opportunity to support their loved ones?
- Do you follow up with clients after discharge? Does anyone else? If your team can't accomplish this, do you give the patient/family your contact information in the event of questions or if home health services don't arrive?

Pick 1 item from this list every week for the next two months and see what you can do to help clients find a more positive experience with their rehabilitation. Patients will likely do better, be happier, and be left with a better feeling about physical therapy and rehabilitation. Win win!

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From the Editor

Michele Stanley
Editor,
GeriNotes

A long time ago, in an introduction to PT course, the professor's pearl for getting patient engagement was to lead the conversation with the topic of weather. It is a universally experienced, non-threatening topic, yada-yada when the "new" person in front of you isn't forthcoming about why they are in your office. This is a ploy that I have seldom employed; however, the dramatic weather shifts seen across the country this summer has offered up plenty of fodder for conversation and opportunity for witnessing a person's best ability to function and adapt. This issue offers topics that I hope will be more thought-provoking and useful for getting participation. Among them is an invited commentary from Barbara Billek-Sawhney about an engagement tool that she advocates: the WAMI-3 (Wellness Aging Model Related to Inactivity, Illness, and Injury). This is a continuation of a discussion from the July Journal Club (JClub) and runs alongside the clinical example provided by Mike Studer for using this tool in a different setting with a different population. At the very least, you now have something more useful to discuss than the weather, even with erstwhile reluctant participants.

Journal Club is a highly engaging, popular webinar series that is free to all APTA Geriatrics members and provides a regular opportunity (and topic) for clinicians to get published. Clinical case examples for both the July and September JClubs are in this issue. Leslie Allison (JGPT editor), JClub moderator Susan Pate, and I are preparing to launch a 2-part webinar (also free) this fall to provide guidance and how-to examples for knowledge translation (KT) and generating clinical case examples. The very best KT comes not from academia (sorry professors!), but from the many extraordinary PTs and PTAs that care for and about "ordinary" older adults sharing their experience and knowledge with colleagues. If you've been wanting to further your own knowledge this will help you get started (and published). As the adage goes, "the best way to learn is to teach."

Highlighted in this issue is a "newbie" author and experienced clinician who gives and video-demonstrates an example of learning something from a different discipline (speech) and then applys the principles in a novel way during physical therapy sessions. Read the article on spaced retrieval (and watch the video mock-up) to trigger your own thoughts about teaching those with inherent memory and cognition deficits.

Let's give a BIG shout-out to one of our own, AGPT Board member Jackie Osborne who presents the second part of her experience on the President's Council on Sports Fitness and Nutrition. Her report summarizes and advocates for effective community and individual-level strategies for increasing and sustaining PA engagement among older adults. This is important work by a panel of distinguished professionals, from a variety of fields, who researched and collaborated on ways to engage all citizens in their physical activity.

APTA Geriatrics Journal Club

Cover photo credit: HOP-UP PT

*Register for the free **Journal Club** discussion webinars and earn 1.5 contact hours. Questions for presenters may be emailed to gerinoteseditor@gmail.com before or on the day of the webinar. See what's coming up at https://geriatricspt.org/events/webinars/.*

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Mission: To provide engaging content that empowers the community of physical therapy clinicians to build expertise and expand the delivery of evidence-informed care that promotes health and wellness in aging adults.

Vision: To create an evolving online community through which clinicians develop their knowledge and skills based in shared ideals that are person-centered; and promote a world where aging adults move, live, and age well.

Don't be Fooled! PT Services and Documentation Still Matter in the SNF PDPM Arena

by Jaclyn Warshauer, PT, CRC and Mary Saylor-Mumau, PT, RAC-CT

Disclaimer: *The following article highlights possible coding opportunities that could be easily overlooked. Please note, however, that the Minimum Data Set (MDS) must always be coded accurately and with integrity. Accurately reflecting the resident's condition leads to accurate reimbursement. Resident details must never be misrepresented on the MDS to increase reimbursement.*

The Patient Driven Payment Model (PDPM) in the skilled nursing facility (SNF) focuses on the resident, including their diagnoses, functional status, cognition, behaviors, wounds, treatments, and medications. As PTs, we assess, observe and document many of these resident characteristics that support the MDS components and, ultimately, the SNF daily rate reimbursement. We bring value to the resident and the SNF beyond the physical therapy skilled services we provide.

To appreciate how what we assess, observe, and document supports the MDS and the daily rate, it's important to understand how PDPM reimburses. PDPM considers 5 case-mix adjusted components to reflect resident characteristics and resources used. These components are PT, OT, Speech Therapy, Nursing, and Non-Therapy Ancillary (NTA) needs. The exact number of items that drive reimbursement varies, but approximately 180 MDS elements related to resident characteristics, diagnoses, and services provided determine the reimbursement. These MDS data elements are used to create the Health Insurance Prospective Payment System or HIPPS code that insurers use to make payment determinations. The HIPPS code is composed of 5 characters. The first digit represents the clinical category for PT and OT combined. The second represents the SLP category, the third represents the Nursing category, the fourth represents the NTA category, and the fifth represents the type of assessment being completed, which leads to 28,800 possible HIPPS combinations for those first 4 characters.[1]

The Power of One

Identifying and sharing with the MDS Coordinator and the Interdisciplinary Team (IDT) even a single resident condition identified during a chart review or observed while interacting with the resident can impact care planning and treatment and may also impact reimbursement by capturing a different HIPPS code. Just one observation can have a positive impact on both the resident and the facility.

Section GG Accuracy

The resident's functional status contributes to the PT/OT and the Nursing components. The functional status is derived from the functional scores reported in Section GG of the MDS. There are over 20 mobility and self-care measures reported on the MDS in Section GG. CMS anticipates that an interdisciplinary team of qualified clinicians will be involved in assessing the resident for the GG activities. Residents should be allowed to perform activities as independently as possible, as long as they are safe.[1] It's important for MDS accuracy that the IDT involved in assessing Section GG understands the tasks involved for each measure and the scoring scale.

Section GG Performance Scale

06	**Independent**	Resident completes the activity by him/herself with no assistance from a helper.
05	**Setup or Clean-up Assistance**	Helper sets up or cleans up; resident completes activity. Helper assists only prior to or following the activity.
04	**Supervision or Touching Assistance**	Helper provides verbal cues and/or touching/steadying and/or contract guard assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
03	**Partial/Moderate Assistance**	Helper does LESS THAN HALF the effort. Helper lifts or holds trunk or limbs and provides less than half the effort.
02	**Substantial/ Maximum Assistance**	Helper does MORE THAN HALF the effort. Helper lifts or holds trunk or limbs and provides more than half the effort.
01	**Dependent**	Helper does ALL of the effort. Resident does none of the effort to complete the activity. Or, the assistance of 2 or more helpers is required for the resident to complete the activity.

Several Section GG scoring highlights:[1]

The Section GG mobility activities incorporate various bed mobility, transfer, and ambulation tasks that we, as PTs, measure regularly. These tasks seem intuitive and simple. While measuring the tasks may not be that difficult, to have an accurate MDS assessment, which will ultimately lead to accurate reimbursement, it's imperative to know the tasks involved in each GG activity.

Consider the Section GG activity of "Lying to sitting on side of bed." To report this task as completed, the resident must transition from lying on his or her back to sitting on the side of the bed with his or her feet flat on the floor and sitting upright without back support. Notice the start and end points required for completing this task.[1] If the resident was side-lying in bed and you asked them to come to sitting on the side of the bed, this would not be reported as a completed task because the starting point was not supine.

Many are familiar with the Section GG performance scoring scale, which rates the amount of assist from 01 to 06.[1] See table on previous page.

- Activities may be completed with or without assistive devices. The use of an assistive device does not alter the score.
- If the assistance of two or more helpers is required for the resident to complete the activity, the task is scored as Dependent (01).

Consider this example. A resident walks 10 feet with a wheeled walker while the therapist provides a slight lift on the gait belt to keep them upright and steady, and, because of safety concerns due to cognitive deficits, an aide is asked to follow behind with a wheelchair. This activity, because the assistance of two helpers was required, would be coded as Dependent (01).

When documenting GG functional measures in the medical record, it's important to report the assist level observed/provided each time the task was completed and not limit the reporting to only the PT evaluation. If a GG activity was completed during PT treatment on Day 2, report the GG measure in your daily note.

A common topic of discussion among SNF therapists is the following statement from the Resident Assessment Instrument (RAI) Manual, "The admission functional assessment, when possible, should be conducted prior to the resident benefitting from treatment interventions in order to reflect the resident's true admission baseline functional status." This statement does not mean that Section GG is based on one single observation by a therapist in isolation on the day of admission, as the resident's presentation can vary throughout the day and when performing with different personnel.[2] What constitutes a resident benefiting from treatment? A resident benefiting from treatment, in MDS terms, would occur if the treatment resulted in the resident scoring at a higher numerical level for that specific GG activity. Perhaps after instructing a resident that is post laminectomy in log rolling to facilitate transitioning from lying to sitting on the edge of the bed, this drastically improves their ability from Substantial/Maximum Assistance (Code 02) to Partial/Moderate Assistance (Code 03). Suppose the resident doesn't maintain the improved level when transitioning with nursing that afternoon. In that case, there is not a lasting benefit from your treatment, and it would be important for nursing to capture their assist level in their documentation. In addition, the benefit in this example would just be for the bed mobility component of Section GG, not all the functional assessment components of Section GG.

The MDS is to reflect the "usual performance" observed and documented over the three-day assessment periods at the beginning of the stay, at the end of the stay, and also if an Interim Payment Assessment (IPA) is completed. As noted in the RAI Manual, "Observing the resident's interactions with others in different locations and circumstances is important for a comprehensive understanding of the resident's functional status." The spirit of this language is that the usual performance reported on the MDS should be interdisciplinary and not only from therapy. There should be multiple entries of Section GG activities from various disciplines, and the measures will likely not all match. It's recommended that the IDT collaborates to determine the usual performance for Section GG measures. It's best practice to document this IDT discussion and report the sources the team used to develop the usual performance of the GG items.

Active Diagnoses

Diagnoses reported on the MDS must be "Active Diagnoses." Each of the 4 HIPPS code characters can be impacted by the Active Diagnoses reported. For a condition to qualify as an Active Diagnosis, the diagnosis must meet all 3 criteria established by the RAI Manual. The first requirement relates to the practitioner. The condition or diagnosis MUST be documented by either a physician or a permitted Non-Physician Practitioner (NPP), which is typically a professional such as a nurse practitioner or a physician's assistant, though it can vary among states. The second requirement is timing. The physician or NPP must have documented the presence of the condition within the last 60 days. The third and last requirement is related to how that condition is currently impacting the resident. During the MDS lookback (typically 7 days), that condition must have had a direct relationship with the resident's functional status, cognitive status, mood or behavior, medical treatments, nursing monitoring, or presented a risk of death.[1] Documentation of this relationship is not specifically required but is strongly recommended as it supports the care plan and the appropriateness of the MDS coding.

This relationship can look different from one diagnosis to the next. For example, a diagnosis of diabetes might be supported by insulin injections, blood sugar monitoring, or delivery of oral medications, each event occurring on the

nursing side of care. A diagnosis of morbid obesity may be impacted by the need for a mechanical lift for transfers, a special mattress for pressure relief if bed mobility is impaired, or therapy for mobility training. While we as therapists are restricted in diagnosing medical conditions, we do have the opportunity, and arguably the obligation, to support the medical diagnoses given by physicians or NPPs with the documentation of our assessments, analyses, and treatment modifications related to how these Active Diagnoses impact the resident. In addition, we may observe signs and symptoms that could reflect a condition that is not currently on the Active Diagnosis list, and these observations should also be shared with the IDT and MDS Coordinator for a possible query to the physician or NPP.

In some cases, our PT medical record documentation could be the only documented support for the relationship between the condition and functional status that allows the MDS Coordinator to capture a particular diagnosis as an Active Diagnosis on the MDS. Our PT documented support, or lack of support, could have a significant impact on reimbursement.

Contrary to the RUGs system of old, payment for the PT/OT component will be the same if the resident is receiving PT/OT services as it would be with no PT/OT services provided. Under PDPM, the PT/OT component of the HIPPS code is determined solely by the clinical reason for the stay, represented by the medical diagnosis reported in field I0020B on the MDS, and the functional status.[4] This I0020B ICD code is a chief driver of payment, but other conditions also impact payment. Many SNF residents come with multiple active medical conditions. PTs should not assume that the MDS Coordinator will catch them all. PTs should help the IDT see all the conditions impacting treatment and care delivery and how other conditions could be considered the primary reason for the stay. Remember, the reason for the skilled stay in the SNF might not be the primary admitting diagnosis from the hospital stay. Still, it must be a condition present during the qualifying hospital stay, and it must be an active condition in the SNF.

A PT's focused observation of Active Diagnoses contributes to accurate MDS coding, which may positively impact reimbursement for the SLP, Nursing, and Non-Therapy Ancillary (NTA) components as well. Active Diagnoses that fall into the acute neurological clinical category on CMS's PDPM ICD10 mapping file, if appropriately reported in I0020B, would capture one of the 5 elements of the SLP clinical component.[4]

Consider this scenario: a resident with a history of CVA, hemiplegia, and dysphagia is admitted to a skilled nursing facility following a prolonged hospitalization due to a COVID-19 infection with complications. During their qualifying hospital stay for COVID-19, the resident's CVA-related right-sided weakness and dysphagia progressed, and it was these 2 symptoms that placed the resident's safety most at risk if they had returned directly to their home where they lived alone following their hospitalization. The CVA diagnosis is an alternate and potentially equally viable option for the I0020B diagnosis. Still, it could be easily overlooked because the COVID-19 diagnosis was recent, and the CVA was not. The PT could offer significant value to the IDT in reporting this observation. Not only would this be an appropriate clinical consideration for this resident, but if selected, it would reflect a higher level of complexity on the MDS. It would favorably impact the PT/OT and SLP components of the HIPPS code.

Similarly, PTs have the opportunity to identify Active Diagnoses that could favorably impact the Nursing and NTA components.[4 5] PTs should familiarize themselves with the conditions that can capture a Nursing component category and report those conditions to the IDT when they are noted during chart review or actively observed. Diagnoses like septicemia, COPD, pulmonary fibrosis, MS, Parkinson's Disease, and morbid obesity are among the diagnoses that can be easily overlooked and subsequently not reported on the MDS.

Additional Pertinent Observations

There are also risks, interventions, and behaviors that PTs observe that can and should be reported to the IDT and MDS Coordinator, as they too may impact reimbursement for the SLP, Nursing, and NTA components if appropriately coded on the MDS. PTs should recognize the value of documenting and reporting observed risks related to these elements. For example, signs of malnutrition or risk of malnutrition may be recent weight loss, physician/NPP documentation of nutrition concerns, or physician-ordered nutritional supplements. Malnutrition and/or risk of malnutrition is worth 1 NTA point[5] and should be reported on the MDS if applicable. You may witness a vomiting episode before, during, or after a therapy session, but do you know that this should always be documented and reported to the MDS Coordinator? This event may allow the resident to fall into a higher Nursing component category.[4] Reimbursement for the SLP component is increased with certain elements of swallowing issues that include pain with swallowing, coughing while eating or drinking, pocketing food, or loss of food or drink from the mouth.[4] These events may and should be reported on the MDS, even if they only occur once during the lookback window. They may be observed, reported, and documented by any facility or therapy caregiver. Do you see this as one of your responsibilities to observe and report these elements, or do you mistakenly think those elements are exclusive to the SLP's scope of practice? We have an obligation to contribute to the resident's assessment and the IDT communication with these observations. Similarly, the use of supplemental oxygen[4] is an important MDS detail that we should document and report as it will not only contribute to the accuracy of the MDS but it may also impact the IDT's awareness of the

Additional observations that could impact HIPPS Components	
SLP Component	•Loss of liquids/solids from mouth when eating or drinking
	•Holding food in mouth/cheeks or residual food in mouth after meals
	•Coughing or choking during meals or when swallowing medications
	•Complaints, difficulty or pain with swallowing
	•Mechanically altered diet requires change in texture of food or liquids (pureed diet, thickened liquids)
Nursing Component	•Shortness of breath when lying flat
	•Fever and/or vomiting
	•Use of supplemental oxygen
	•Wounds (surgical, pressure, arterial, venous, other lesions)
	•Hemiplegia/hemiparesis
	•Hallucinations, delusions, physical/verbal behaviors, wandering, rejection of care
NTA Component	•Malnutrition (or risk of)
	•Morbid obesity
	•Diabetic foot ulcer, foot infection, open lesion on foot
	•Stage 4 pressure ulcer

resident's medical complexity. Note that these examples represent only some of the risks, interventions, and behaviors that should be reported to the IDT.

PTs should be comfortable accessing and searching the "Clinical Categories by Diagnosis" tab of the CMS PDPM ICD-10 Mapping file.[3] Pay close attention to those diagnoses that may be eligible for reclassification into a surgical category. When reviewing the chart and interacting with the resident, make note of the resident's conditions and recent surgeries, and share those observations with the IDT for consideration and discussion. It's important also to be familiar with the SLP comorbidity tab and NTA diagnoses tab on the CMS PDPM ICD-10 Mapping File. PTs should also be familiar with the NTA components not listed in the Mapping File. These can be found on the Fact Sheet: NTA Comorbidity Score resource from CMS.[5] The NTA elements found on the Mapping File will have a source of I8000. Those elements not included on the Mapping File will have another MDS source other than I8000 listed in the NTA resource. Lastly, PTs should be aware of the conditions and services for the Nursing categories[4] so they can alert the IDT and MDS Coordinator if they identify any when reviewing the medical record or observing/treating residents.

PDPM Awareness

As PTs, we don't code the MDS and, as such, we don't need to be experts on all the RAI Manual rules related to the individual criteria for each HIPPS component. Being aware of the details that matter, the details that allow the MDS Coordinator to capture that level of resident complexity on the MDS, demonstrates our value to the IDT beyond our clinical skills. For example, if a resident has a physician's order for isolation and is receiving PT services, your documentation should make it clear that your services were provided in the room due to isolation and that isolation criteria were followed. As PTs, we have the luxury of time with our residents that nurses, doctors, and others on the care team don't have .We see, hear, and observe things beyond those areas of focus needed for the delivery of physical therapy services. We have opportunities to see details that others may have missed and, if communicated and documented well, those details will reflect the PT's value as a contributing member of the IDT by making a significant impact on care planning, care delivery, and subsequently, reimbursement.

The recommendation for PTs for each of the HIPPS components is this: know what details matter and alert the IDT and the MDS Coordinator when pertinent details are observed . How that communication works best will vary among facilities. It may be necessary to navigate these interactions carefully and approach the conversations merely as a contributor. Depending on the location, this communication may need to be channeled through a rehab manager or team lead, relayed through a PDPM rehab communication form, or discussed at a Medicare meeting.

Not all teams are receptive to PTs contributing to the MDS discussion. Under the RUGs system, many MDS Coordinators were accustomed to working alone and may not initially be receptive to a collaborative method. It is recommended that the PT proceed carefully and ease into the process. Make it clear that the suggestions provided aren't final decisions but observations that could lead to improved care planning, increased MDS accuracy, and appropriately higher reimbursement, all of which are good things. For many, this will be well received. If obstacles are encountered, the PT should be diplomatic and keep trying at whatever frequency they think is appropriate.

Even though the number of PT therapy minutes provided no longer impacts the SNF reimbursement rate under PDPM, the relevance of the PT is as important as ever, maybe more so now than in the previous RUGs reimbursement system. PTs should assess their contributions to the IDT, identify and address any existing barriers, and focus on opportunities for improvement. When we commit to thorough patient assessment and advocate for MDS accuracy through enhanced communication and documentation, it allows SNFs to plan for and meet the needs of their residents ,to receive appropriate reimbursement for their efforts, and everyone benefits.

[This article was prepared by the authors in their personal capacity and based on their program presentation at CSM 2023. The opinions expressed in this article are the authors' own and do not necessarily reflect the views of Aegis Therapies, Inc nor those of APTA_Geriatrics]

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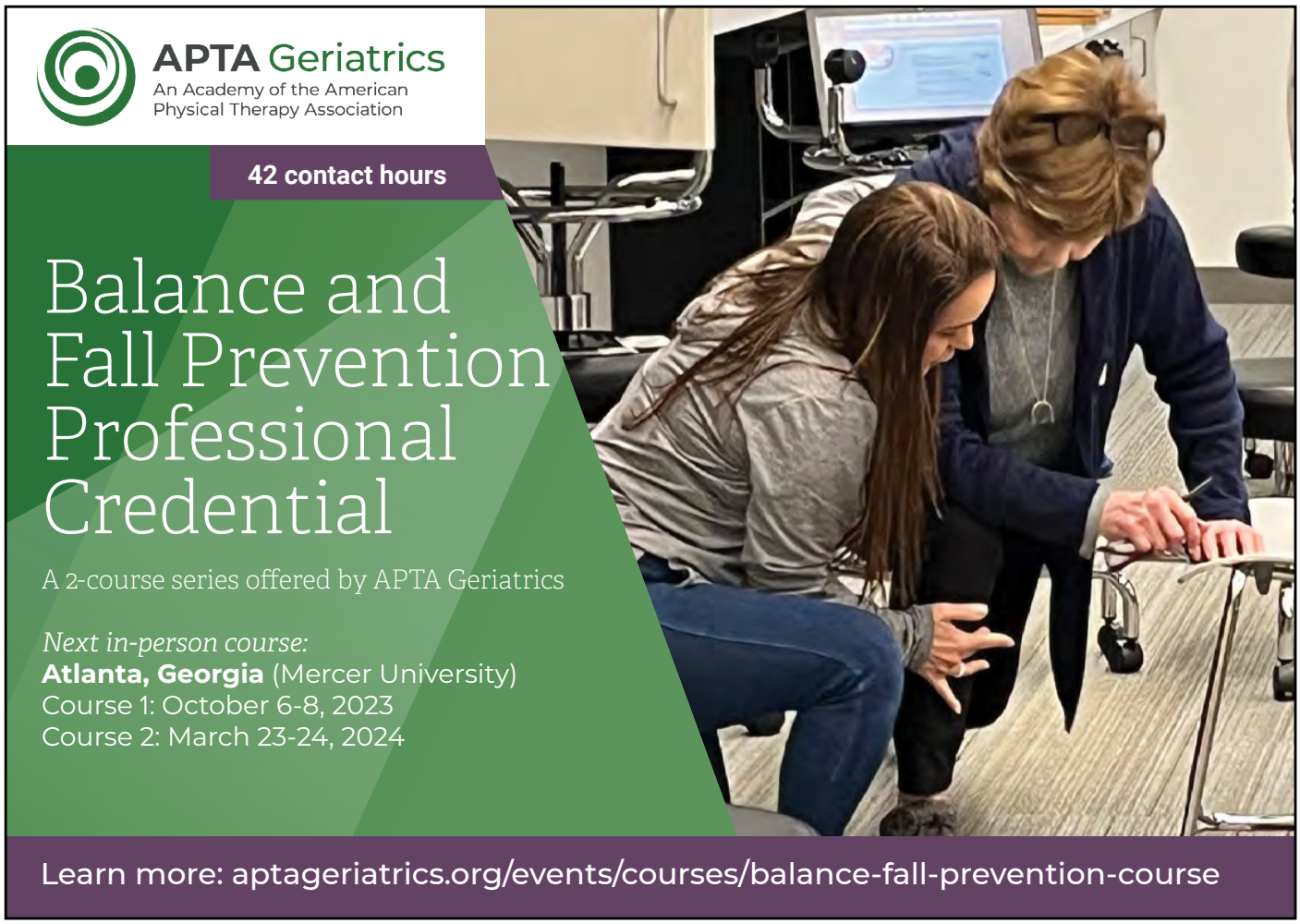

Wellness Aging Model related to Inactivity, Illness, and Injury (WAMI-3): Applied to Parkinson Disease

by Barbara Billek-Sawhney, PT, EdD, DPT

Editor's Note: The July Journal Club webinar featured presentation of Dr. Billek-Sawhney's research resulting in development of the WAMI-3. The clinical example given by Dr. Mike Studer during the presentation featured applying the WAMI-3 to an outpatient. This invited article is an example of how to use this model within the more time-limited constraints of acute care.

Parkinson disease (PD), the fastest growing neurological disorder in the world,[1] is the 10th leading cause of death in United States (US) in individuals ≥65 years of age.[2] In US the prevalence rate of PD has increased >50% in 5 years and affects an increased number of individuals between the ages of 30 and 64.[3] Factors such as increased longevity and industrialization have transitioned PD from a rare disorder to what is described as a "Parkinson pandemic."[1]

The WAMI-3 model, a simple tool that to enhance patient education and facilitate knowledge translation was published in the *Journal of Geriatric Physical Therapy* (October-December 2022). This article will briefly review the WAMI-3 and present a case study on a person with Parkinson's (PWP) applying the model.[4]

Brief Overview of the WAMI-3

As a visual tool, the WAMI-3 depicts; aging, inactivity, illness, injury, and the impact of wellness, see Figure 1. Briefly, aging affects every system of the body beginning at the age of 30. Up to a 3% decline in 13 systems of the body has been described for individuals between 30 and 70 years of age.[5]

The first "I" of the WAMI-3 refers to 'Inactivity.' Inactivity or a lack of physical activity is both a risk factor for non-communicable disease (NCD) and mortality. In individuals who are inactive or insufficiently active there is a 20-30% increased risk of death compared to active individuals.6 In older adults who are sedentary 9 hours/day, there is a 46% greater risk of difficulty performing activities of daily living and greater risk of experiencing comorbidities and mortality.[7]

Illness is the second "I" of the WAMI-3. In the U.S. almost 95% of older adults have 1 or more chronic health problems and about 84% have 2 or more chronic diseases. Conversely, only 5.1% report no health conditions.8 Many of the causes of death are due to NCDs such as heart disease, cancer, chronic respiratory disease, and diabetes, which are the leading cause of death worldwide and represent an emerging global health threat.9 The behavioral risk factor of physical inactivity and NCDs is well described in the literature and in the WAMI-3 article.

Accidents, aka unintentional injuries, are the 7th leading cause of death among older adults (≥65 years of age).[5] Injury is also, the third "I" in the WAMI-3. In 2018 in the US, 27.5% or slightly more than 1 in 4 adults ≥65 years of age sustained a fall. Slightly more than 10% reported a fall-related injury.[10]

The trajectory of aging may be negatively influenced by each "I" (inactivity, illness, and/or injury), alone or in combination, in the WAMI-3 and result in a leftward shift. Conversely, by adding wellness through physical activity and exercise, a rightward shift may be achieved.[4] There are numerous benefits from physical activity and activity for older adults that address whole body health, brain health, and the health of individuals with chronic health conditions and disability. These benefits range from decreasing cancer risk to improving cognition.[4,11]

The WAMI-3 Model Applied to Pardinson Disease

Parkinson disease is marked by a decrease in lifespan, years of healthy life lost, greater risk of injury, and multiple impairments. The degenerative nature of PD and its growing prevalence, call for physical therapists and assistants to be aware of the need for primary prevention. Physical activity and exercise are instrumental in reducing the risk of developing PD.[12-16]

In individuals with PD there is a decrease in quality of life and survivorship. Estimates on mortality in PD is estimated to be 1.5 times increased compared to those without PD. Survivorship or the duration from the onset of PD to death ranges from 7 to 14 years.[17] The average Blue Cross Blue Shield Health Index was applied to PD in 2017; the PWP has an average of 10.7 years of healthy life lost compared to the person without the disease. This average loss of 10.7 years reflects the first "I," illness in the WAMI-3.

When applying the second "I," injury to individuals with PD, there is an increase from the slightly more than 1 in 4 adults ≥65 years of age in US10 to 45 to 68% in individuals with PD.[14,18] In addition, 50 to 86% of individuals with PD fall recurrently.[19] Whether an injury occurs or not, falls have a major impact on quality of life and may result in a fear of falling. Thus, people who fall may self-restrict their

activities further worsening physical decline strength, ambulation, depression, and other co-morbidities.[20] Falling and fear of falling may compound the inactivity, in the WAMI-3.

To attain a rightward shift on the WAMI-3, the reader is referred to the article by Billek-Sawhney and colleagues[4] and Osborne and colleagues article entitled, "Physical Therapist Management of PD: A Clinical Practice Guideline From the American Physical Therapy Association."[21] Numerous practice resources for knowledge translation were developed by the Academy of Neurological Physical Therapy (ANPT) and are available at https://neuropt.org/practice-resources/anpt-clinical-practice-guidelines/pt-management-of-parkinson-disease.[22]

An educational infographic developed by ANPT for patients explains the value of physical therapy interventions.[23] The PWP can look at interventions and determine what may be most effective for a specific need. For example, to improve functional mobility, the patient can see that aerobic, resistance, community-based exercise, and/or task-specific training are beneficial. The infographic can be downloaded from https://www.neuropt.org/docs/default-source/default-document-library/cpg-infographic-3-13.pdf?sfvrsn=fc5f5a43_0.

Knowledge translation resources include a PD CPG toolkit, resembling a toolbox with 10 drawer addressing various aspects of the CPG. Some of the drawers are" aerobic, resistance, balance, task-specific training, community-based exercises, external cueing, and behavioral change. Within each drawer are additional resources for therapists and patients; some materials for patients are under construction as the CPG was published in 2022.

Clinical Example

Mrs. MJ, a 73-year-old female was admitted to the hospital secondary to confusion and a fall. She was diagnosed with a urinary tract infection (UTI). Her past medical history included: PD, hypercholesterolemia, diabetes mellitus, and intermittent back pain. During admission, she was taking 4 medications: Trimethoprim and sulfamethoxazole (Bactrim DS) for UTI; Carbidopa-levodopa (Sinemet) for PD; Lipitor (atorvastatin) for hypercholesterolemia, Metformin (diabetes); Calcium with Vitamin D for bones; and Tylenol prn for pain.

Mrs. MJ was referred to acute physical therapy secondary to a fall. Nursing reports her confusion has cleared and that the patient is pleasant, cooperative, and anxious for return home.

Prior Level of Function and Social History

Mrs. MJ is a retired librarian who lives with her spouse in a 3-story home with 1 step to enter without rail or through the garage and 1 flight of steps. Her bed and bath are on the second floor, half bath on first floor, and laundry in basement; each staircase has 1 railing. Prior to this admission, Mrs. MJ was independent in basic and instrumental activities of daily living; she was still able to drive. She currently volunteers for blood drives. She reports there is a built-in grab bar in the bath-shower combination and denies difficulty doing her current activities although she reports it is getting more difficult due to "slowing down from her PD." Mrs. MJ reports was diagnosed and prescribed Sinemet 5-years ago but believes she had it several years prior.

Physical Activity as a Vital Sign (PAVS): Mrs. MJ reports walking 30 mins every day except Saturdays but does not participate in formal exercise programs. Her PAVS score is 30 times 6 for 180 mins, exceeding the recommended 150 minutes. She does not use any assistive device and pre-morbidly was a community ambulator.

STEADI 3 Item Screening for Fall Risk: Mrs. MJ reports she had fallen 1 time previously when carrying a basket of laundry from the basement and yesterday. She denied injuries, was not fearful of falling, but does report sometimes feeling unsteady when standing or walking. Mrs. MJ expresses a desire to prevent future falls and a willingness to do other exercises.

Patient Health Questionnaire-2 (PHQ-2): Mrs. MJ's depression screening is 0 points and negative. Over the last 2-weeks, Mrs. MJ denies anhedonia and feelings of being down, depressed, or hopeless.

Mrs. MJ thinks she has lost about 2" (5 cm) of height. She denies difficulty swallowing, episodes of choking or coughing during or after eating. She reports she is not on a specific diet. Mrs. MJ reports occasional leakage of urine when laughing, sneezing, or hurrying. Cognitive screening was deferred secondary to patient's ability to describe and provide a history in detail.

Examination

On arrival to Mrs. MJ's room, the patient was performing morning care standing at her sink. She was alert and oriented to person, place, time, and situation. She was able to follow multi-step commands. On inspection she appeared to be of small frame with a flexed posture and a slight pill rolling tremor was noted in her left hand.

Mrs. MJ independently walked back to her bed, approximately 10' (3m) with slight shuffling in her gait, limited arm swing, and flexed posture. Sitting balance did not require use of arms and Mrs. MJ was able to doff her slippers using her arms. She independently but slowly performed bed mobility without onset of dizziness. Orthostatic vitals were unremarkable. She was able to stand without upper extremity support.

Grossly Mrs. MJ's active range of motion and strength for both arms and legs were within functional limits with ankle dorsiflexion to neutral. Grip strength was fair. Mrs. MJ denied sensory loss; sensation was intact on distal extremities to light touch.

Due to hallway crowding, a timed walk test was stopped. Self-selected gait speed for Mrs. MJ was 0.8

m/s. Mrs. MJ performed 9 repetitions for the 30s-chair rise test; the norm for a 73-year-old female is ≥10 repetitions without use of arms. When turning 180 degrees while walking, Mrs. MJ required approximately 12 steps.

Assessment

Mrs. MJ was admitted to the hospital due to a fall and confusion secondary to a urinary tract infection; the confusion has resolved. The patient has a history of PD with increased fall risk as noted by gait speed and the 30s-chair rise test. Goals for the acute care physical therapy focused on patient education, specifically, the benefits of physical activity and exercise and awareness of fall risk. Mrs. MJ was interested in a progressive walking program and working with an outpatient physical therapist to decrease her fall risk. Recommendations were made for a dietary consultation due to the impact of protein on Sinemet.

Interventions

During her initial consultation, teach back was employed using the WAMI-3 model to educate her on the benefits and need for physical activity and exercise.

Discharge recommendations were made at the time of admission for outpatient physical therapy. Although independent, Mrs. MJ has a progressive degenerative disorder. Through secondary and tertiary prevention interventions that emphasize aerobic, balance, and strengthening interventions, a multitude of benefits can improve the quality of her life. Mrs. MJ was discharged before a second physical therapy visit.

Integrating Evidence in Clinical Practice

Parkinson disease is the fastest growing of all neurological disorders globally.[1] Physical therapists and assistants must be prepared to educate patients and use evidence-based interventions addressing primary, secondary, and tertiary prevention. The WAMI-3 can be used to enhance patient education on the benefits of physical activity and exercise for the PWP.

Numerous benefits may be attributed to physical activity and exercise; benefits are well described in the WAMI-3 article, the physical therapist CPG on PD, and supplemental resources.[4,11,2] Use of the patient education infographics for the WAMI-3 and the infographic PD may be instrumental in facilitating a patient's knowledge of the benefits of physical activity and exercise for PWP.

Concisely, physical activity and exercise will cause a rightward shift on the WAMI-3 model and positively impact signs and symptoms of PD (such as less stiffness, improved strength, and speed of movement); PD related movement (such as balance, walking speed, endurance); and general health and wellness (including quality of life, memory, and sleep).[21]

As physical therapists and assistants, we are uniquely positioned to 'transform society' and make a change in the lives of those we treat! Through effective physical therapy interventions that emphasize education, physical activity, and exercise, we may 'improve the human experience!' Make it a WAMI-3![24]

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The President's Council on Sports Fitness and Nutrition and Physical Therapy, Part 2

by Jacqueline Osborne, PT, DPT

The May 2023 Issue of *GeriNotes* featured Part One of this two-part article titled *The President's Council on Sports Fitness and Nutrition and Physical Therapy. What's the Connection?*[1] In that article, I shared the historical perspective of The President's Council on Sports, Fitness, and Nutrition (PCSFN) including the role of the Council and the various subcommittees appointed to assist the Council to fulfill its purpose. I also shared the process for how the Physical Activity Guideline for Americans are updated and the origin of the accompanying Midcourse Report. Lastly, I placed a Call-to-Action at the end of the article urging physical therapists to seek out opportunities though the Office of Disease Prevention and Health Promotion (ODPHP) so that physical therapists are represented in the development of resources related to our area of expertise, physical activity, and human movement.

The Council, led by the ODPHP under the Department of Health and Human Services (HHS), is responsible for promoting programs and initiatives that motivate people of all ages, backgrounds, and abilities to lead active, healthy lives.[2] To assist the Council in meeting this purpose and in collaboration with the ODPHP, Center for Disease Control (CDC), and the National Institute of Health (NIH), the 2022 PCSFN Science Board was appointed in January 2022 and was charged with conducting a systematic literature review called the *Physical Activity and Older Adults Systematic Literature Review*[3] to inform the development of the Physical Activity Guideline Midcourse Report on Older Adults. This work was concluded in December 2022 and was subsequently submitted to the Council. The Midcourse Report was vetted and a public comment period open to various communities of health professions including physical therapy was launched.

In March 2023 President Joe Biden appointed 29 members (professional and Olympic athletes, physicians, fitness and nutrition professionals, and entrepreneurs) to the 2023 PCSFN and on June 27, 2023 the *The Physical Activity Guidelines Midcourse Report: Implementation Strategies for Older Adults*[4] was officially released to the public at the PCSFN Annual Meeting held in Washington D.C. During this meeting, 20 of the 29 appointed Council members were present and shared their priorities including how to best support federal efforts to promote health through physical activity (PA), sports, and nutrition. The mission of the Council is to educate, to engage, and to empower all Americans to adopt a healthy lifestyle that includes regular physical activity and good nutrition. The message from this Council at their annual meeting was clear: there are many knowledgeable groups across this country doing important work to promote this mission; now this Council must leverage their networks to *accelerate* the work that has already started. José Andrés, a decorated chef, humanitarian, and the Co-chair of this Council had the following message that I will paraphrase here:

> *The members of this Council need to focus on closing the gap between what happens at the level of the decision maker and what happens on the ground so that every American has the same chance at life and health. We, as Council members, have the power to knock on the President's door, with the permission of the Secret Service, and show him how we aim to close that gap. The future of our nation depends on how people feel. If we are smart and persistent, we can bring the message from the communities we represent that good food and fitness are not privileges for the few, but are fundamental needs of all communities for the America they want to live in.*

This message resonates with me. Hopefully, it does with you too. As physical therapists and physical therapist assistants with advanced knowledge in the rehabilitation and preventative care of older adults we are a community who know and understand the value of physical activity for "life and health" but face barriers to implementing these recommendations every day. The remainder of this article will serve 2 purposes:

1. Provide a summary of the Literature Review conducted and developed by the 2022 Science Board to inform the Midcourse report; and
2. Highlight the findings of the Midcourse Report.

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Table. Key Literature Review Findings

Intervention Strategies to Increase Physical Activity	Level of Evidence*
Cognitive behavioral strategies (goal setting, problem solving, self-monitoring, PA counseling, PA barrier identification, PA knowledge and awareness)	Strong
Lifestyle based strategies (engage in active behavior over the course of a day)	Strong
Individually tailored exercise programs	Moderate
Structured exercise programs	Grade not assignable due to insufficient evidence
Use of physical activity monitors	Moderate
Aerobic Activity	Strong
Strengthening Activity	Moderate
Balance Activity	Limited
Multi-component physical activity	Moderate
Mode of Physical Activity Delivery	**Level of Evidence**
In-person face-to-face counseling or coaching	Moderate
Written or digital education educational materials	Limited
Phone call-based education	Moderate
Multi-modal delivery method	Moderate
Social Media; Video Games	Grade not assignable due to insufficient evidence
Setting of Physical Activity Engagement	**Level of Evidence**
Assisted Living Facilities	Limited
Community settings (YMCA)	Limited
Health care settings (hospitals, clinics)	Moderate
Home/independent living/neighborhood settings	Strong
Home with a virtual component	Limited
Combination of home and community settings	Moderate
Combination of health care and home settings	Strong
Barriers to Physical Activity Engagement	**Level of Evidence**
Compromised health status	Strong
Relocation	Moderate
Loss of Interest	Moderate
Lack of time	Limited
Study burden	Grade not assignable due to insufficient evidence
Lack of motivation	Grade not assignable due to insufficient evidence
Dislike for the intervention	Grade not assignable due to insufficient evidence
Low health literacy	Grade not assignable due to insufficient evidence
Older age	Grade not assignable due to insufficient evidence
Personal Characteristics of Participants	**Level of Evidence**
Mobility ability	Grade not assignable due to insufficient evidence
Age	Grade not assignable due to insufficient evidence
Sex	Grade not assignable due to insufficient evidence
Race/ethnicity	Grade not assignable due to insufficient evidence
Socioeconomic status	Grade not assignable due to insufficient evidence
Health Status Characteristics of Participants	**Level of Evidence**
Mental Health	Moderate
Quality of Life	Moderate
Well-being	Grade not assignable due to insufficient evidence
Resilience	Grade not assignable due to insufficient evidence
Social Connection	Grade not assignable due to insufficient evidence
Social Isolation	Grade not assignable due to insufficient evidence
PSE Strategies to Increased Physical Activity	**Level of Evidence**
National, state, or local transportation policies	Grade not assignable due to insufficient evidence
National, state, or local housing policies	Grade not assignable due to insufficient evidence
National, state, or local land-use policies	Grade not assignable due to insufficient evidence
Walkability (residential density/land use mix/street connectivity	Moderate
Access to destinations (parks/recreational facilities) in urban areas	Moderate
Access to destinations (parks/recreational facilities) in rural areas	Limited
Positive perceptions of neighborhood safety	Limited
Equity and inclusion	Grade not assignable due to insufficient evidence

*Level of Evidence is defined in the Physical Activity and Older Adults Systematic Literature Review
PA = physical activity
PSE = Policy, systems and environmental

Summary of the 2022 Science Board Systemetic Literature Review

The 2nd Edition of the *Physical Activity Guidelines* emphasized the importance of regular physical activity (PA) for health, wellness, and disease prevention. Lacking in the 2nd Edition, however, is guidance related to the most effective ways *to implement* the recommended dose of PA especially among the fastest growing population in America, older adults. The Science Board attempted to identify barriers experienced by people over age 60 who were a part of PA intervention trials and examined whether there are reported differences in physical activity outcomes among adults of varying physical and cognitive abilities, races and ethnicities, health conditions and literacies, sex and gender identities, living contexts, and income and education levels. Specifically, this review examined original literature published from 2012 to 2022 and excluded other reviews and meta-analyses to determine the following:

1. What are effective intervention strategies to increase PA among older adults?
2. Does the mode of delivery (i.e., virtual, in-person, phone) impact the effectiveness of interventions?
3. Does the setting impact the effectiveness of interventions?
4. What barriers exist to engaging or participating in the intervention? What are the rates of retention, attrition, and/or attendance?
5. Do personal characteristics (e.g., ability, age, sex, race/ethnicity, socioeconomic status) or chronic health conditions influence participation?
6. Do interventions assess changes in participant mental health, quality of life, well-being, resilience, or social connection and isolation?
7. What are effective policy, systems, and environmental (PSE) strategies to increase physical activity among older adults?
8. Does the success of an intervention vary by certain characteristics (geographic location, physical ability, age, sex, race/ethnicity, or socioeconomic status?)

For questions 1-7, 52 articles were reviewed and 45 were analyzed; and for question 8, 24 articles were reviewed and 19 were analyzed.

Key Literature Review Findings

The Table summarizes key findings from the literature review. The primary outcome of interest is physical activity engagement which is measured in a variety of different ways and included self-report of PA engagement (90% of studies reviewed) or the use of accelerometers and other consumer wearables. Many studies combine types of physical activity into one intervention and are described as multi-component. Aerobic activity is the most prevalent type of PA engagement. However, because of the multi-component nature of most studies, it is not possible to discern if one type of physical activity is more beneficial than another for increasing PA levels. The delivery mode or method of physical activity is also diverse and variable. Multi-modal delivery methods are most beneficial for indicating an increase in PA engagement and it is identified that printed or digital educational materials when provided without face-to-face or individualized coaching are ineffective for increasing PA levels. An additional challenge in determining the most effective combination of intervention strategy, mode of delivery, and setting is the variable length of the physical activity interventions period as well as the follow-up assessment period each ranging from as short as one session to as long as 3 years. Several studies also investigate settings where behavior change interventions result in increased PA engagement. The home environment alone, health care settings alone, and the combination of health care settings and home environment, or home environment and community settings are identified with strong or moderate evidence as settings where physical activity engagement is successfully implemented. However, the variability in the type, timing, outcome measurement, and dosing of the PA intervention complicates the ability to recommend one specific setting for increasing physical activity engagement over another. Many potential barriers to participation in PA interventions are identified; only compromised health status is identified as a barrier with a strong level of evidence. Specific attrition, retention and attendance rates could not be discerned because most studies reviewed did not report this information. Personal characteristics are largely underreported in reviewed studies. Of the 12 studies reviewed that reported personal characteristics, 7 include non-Hispanic, older white adults or did not report race/ethnicity information. Only 1 study included older black adults, 1 study included Spanish participants, 1 study included people from Hong Kong, and 2 studies included Japanese participants. There are significant variabilities in the range of psychosocial indicators of healthy aging identified in the studies reviewed. Due to variability in the type of PA intervention implemented and methods of outcome measurement, conclusions could not be made related to how these psychosocial factors influence physical activity engagement. Only 1 study measures the effect of physical activity engagement on social isolation and no studies measure the effects of increasing PA on resilience.

The last question examined in this literature review focused on policy, system, and environmental (PSE) strategies rather than individual-level determinants or behavior change strategies. No studies included in this review examine environmental attributes such as transportation access to green spaces, agricultural and recreational land use, or roadway design attributes and its effect on physical activity engagement. Walking is identified as the most common type of physical activity engagement among older adults. Walkability, which includes characteristics

such as sidewalk, intersection, and curb quality, as well as easy to access destinations, is positively associated with meeting the recommended PA guidelines by walking. The odds of walking in one's neighborhood are related to those living in urban areas who report good health and higher income when compared to those residing in rural communities. Perceptions of neighborhood safety and its effect on physical activity engagement vary due to differences in comparing traffic-related safety and crime safety, comparing walking for recreation, and walking for a job, and comparing perceptions of those in urban or suburban settings and rural settings. Lastly, among the PSE studies reviewed, >100,000 of 113,000 study participants are women, mostly white. Clearly, diversity in study populations is needed.

The Science Board's Literature Review revealed important areas that warrant further investigation using specific and targeted methodology so that factors affecting behavior change and physical activity implementation can be clearly defined and classified. Below is an abbreviated sample of recommendations from the Science Board to researchers:

1. Ensure that study samples are diverse and inclusive of marginalized and unrepresented populations.
2. Consistently use valid and reliable outcome measurement tools and summary assessment tools.
3. Standardize effect size reporting.
4. Specifically report the timing of outcome measurement.
5. Clearly define the behavior change strategy implemented including all aspects of the associated dosing parameters.
6. Implement intervention strategies that promote participation in strength and balance activities.
7. Specifically determine the effect of intervention strategies on sedentary behavior.
8. Purposefully report barriers to participation and reasons for drop out.
9. Describe the setting where the interventions are carried out.
10. Explore connections between policy adoption, systemic changes, and infrastructure changes.
11. Examine disproportionate harms from PSE strategies.

In addition, any area identified as having limited or insufficient supporting evidence represents critical areas for further investigation to determine how each of these areas influence the overall ability for older adults to implement and sustain physical activity. It is also important to note that evidence graded as "moderate" does not indicate a weakness to the evidence, but rather should be interpreted as a limited scope of evidence that met the inclusion criteria.

The 2023 Midcourse Report

One purpose of the Midcourse Report is to extend the most recent Physical Activity Guidelines (2nd Edition)5 to inform "how" and "where" to implement current PA recommendations for older adults. Actionable evidence-based individual-level and community-level activities to help older adults participate in and sustain a healthy and fit lifestyle are summarized in this report and require a comprehensive and coordinated effort from policymakers; exercise and health professionals; clinicians; gerontologists; built-environment professionals; local, state, territorial, and tribal leaders; and others working with older adults.

Strategies – The 'How'

Physical activity implementation strategies are largely identified as individual-level or community-level strategies. Effective individual-level strategies for increasing and sustaining PA engagement among older adults include having an awareness of different types of and dosing parameters for physical activity. Other strategies designed to mitigate personal limitations include goal setting, self-monitoring, problem-solving, and developing a social support network. The mode of delivery for physical activity interventions is also important. Behavior change strategies are optimally supported when an older adult engages in PA with face-to-face (in-person or virtual) support. Phone contact is also identified as beneficial for increasing and sustaining PA engagement. It is important to note that printed or digital educational materials do not appear helpful when delivered in isolation and are most helpful when paired with in-person, individualized support. One valuable individual-level strategy (identified as beneficial for physical activity engagement when delivered in-person or via phone) is physical activity counseling and tailored physical activity guidance. It is important to note that physical activity counseling:

- should likely continue over a sustained period of time.
- should be contributed to by many different members of an older adult's health care team and support network.
- should not be done in an isolated way or on an infrequent basis such as at the end of a structured plan of care.

Settings – The 'Where'

Community settings, health care settings, and the home environment emerge as appropriate settings to successfully implement physical activity interventions. Community settings include the outdoor environment, faith-based organizations, gyms, senior centers, primary care clinics, hospitals, tribal health facilities, and skilled nursing facilities. These settings represent locations where individualized and supervised PA programs can be implemented and adjusted. This means that there is no need to wait until someone discharges to their home en-

vironment to begin or restart a physical activity program. The home environment offers an opportunity to help an older adult adopt lifestyle strategies to achieve needed physical activity levels. In other words, daily routines that include physical activities like doing household chores and playing with grandchildren should be positioned as appropriate physical activities that count towards meeting PA recommendations.

Racial and socioeconomic disparities that limit access to supported interventions and safe outdoor settings for successful PA engagement are apparent. Even when outdoor spaces are perceived as safe, many are not designed to accommodate varied sensory abilities, chronic conditions, disabilities, or with considerations for cultural diversity. Walking is identified as the most common type of physical activity engaged in by older adults. However, it is also identified that the environmental build poses several barriers to this preferred type of intervention. Specifically, the design of intersections, curbs and sidewalks and access to everyday destinations can deter the desire to participate in PA outdoors regardless of the type of physical activity (i.e. walking, biking, or rolling).

One More Call to Action

In conclusion, the barriers to physical activity engagement that older adults face cannot be addressed with one strategy or within one setting. A large majority of the evidence points to the effectiveness of multi-component exercise: that which incorporates aerobic, muscle strengthening, and balance components into a physical activity strategy. The evidence also supports that aging people who engage in physical activity in their homes, in their communities, *and* as part of the health care institutions are more successful in sustaining PA levels over time than those who only engage in a single setting. These pragmatic findings support the idea that salience and socialization are valuable components to facilitate long-term physical activity engagement. As physical therapists and physical therapist assistants we must look for ways to quantify the amount of active time versus sedentary time clients engage in so that we can support PA levels in multiple ways over the course of a day, not just within the confines of a "home exercise program." We must also be vocal in educating patients and their support systems that engaging in physical activity is not an individual responsibility; it is a collective one. We all have an important role to play in supporting ALL older people to move more and sit less.

Sign up for email updates from the President's Council at www.health.gov/about-odphp/contact-us. Follow on Twitter @FitnessGov and LinkedIn @The US Department of Health and Human Services.

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Using Spaced Retrieval for Motor Learning for a Stroke Patient with Short Term Memory Deficits in Performing Transfer Technique

by Reynaldo D. Candolea, PT, DPT and Michelle Chronowski, PT, DPT

Memory disorders are said to be one of the most consistently disabling mental impairment resulting from acquired brain damage such as cerebrovascular accident (CVA). Two thirds of the total number of patients with cerebrovascular accident or stroke will have a cognitive impairment and will have 10X increased risk of developing dementia than those who did not have a stroke.[1] Rehabilitation is affected by memory. Spaced Retrieval (SR) is a technique, based on memory theory, to improve rehabilitation.[2]

Spaced Retrieval provides individuals with the ability to effectively recall the information at prolonged intervals.[3] SR can be utilized to teach safety techniques, ambulation skills, and can decrease the person's anxiety to repetitive questions.[3] Spaced retrieval is geared for use with people with dementia. An organizing perspective by Larry Squire discusses 2 different kinds of memory systems. The first one was declarative or explicit memory which deals with awareness recall of events and facts. This is exemplified by a dementia patient asking a question repetitively even after being provided with an answer. The second system is procedural memory which is also referred to by Larry Squire as nondeclarative or implicit memory.[3] Procedural memory is a long term memory of motor skills that is automatic.[4] This type of memory includes memory functioning which comprises motor learning that is important after CVA.[1] Brush and colleagues indicate that in their study of Parkinson's Disease, "the ability to learn simple motor sequences and to combine motor learning with verbal learning implies that even persons with PD may be able to benefit from SR training."[3] Since Parkinson's Disease and CVA are both neurological conditions, it was decided to trial SR as a clinical study of a person undergoing physical therapy post CVA. The purpose of this case report is to utilize spaced retrieval in motor learning for a stroke patient with short term memory deficits.

Presentation

Joe (not his real name) is an 83-year-old male with a recent episode of CVA. He originally had a left sided weakness that has since recovered, a left facial droop and slurred speech. He also had dysphagia and both his speech and swallowing issues were being addressed by speech therapy. In addition, he had short term memory deficits. Joe was born in Poland, but he and his wife had lived in the United States for 59 years. Aside from Polish, he was able to communicate in English. He has a history of atrial fibrillation, hypertension, degenerative joint disease and underwent a previous left hip surgery. He had a distant episode of GI bleeding.

Head CT imaging showed chronic white matter ischemic changes with brain atrophy a lacunar infarct in the right centrum semiovale.

A SLUMS™ (The Saint Louis University Mental Status) examination conducted by the speech therapist determined a total score of 10 out of 30 indicating memory impairment but he was able to follow verbal cuing which made him a good candidate for a trial of spaced retrieval.

At the beginning of physical therapy treatment Joe required moderate assistance with transfers. He committed 15 mistakes out of 15 SR trials in verbalizing the transfer techniques. He initially committed 4:9 mistakes during trials when motor learning was started. He would not scoot forward on the chair, and he could not demonstrate proper placement of his hands and feet prior to standing. Cuing was needed for each component of the transfer technique namely: lock the wheelchair; scoot forward; place hands on the armrest and feet flat on the floor; sit to stand with the walker; stand pivot; reach back to sit. His functional outcome measure for transfers using the FIM™ (Functional Independence Measure) score was 3.

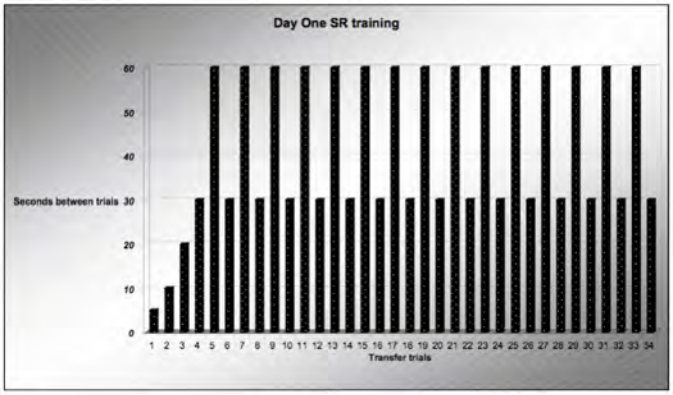
Spaced Retrieval as a clinical technique is a verbal statement and response; utilizing SR for physical activity performance, transfers, is a deviation from the original procedure of SR. The focus of this study, motor learning through spaced retrieval, required several consistent practice repetitions for task learning based on the power law of practice. 5 For practice levels, subject performance improves quickly in practice of a task that was just performed. This compares to subject performance after a time interval since the practice task which then improves slowly.[5] Joe was scheduled on consecutive days to work on a transfer training activity that was a new skill for him to learn. Setting up distracters was a challenge particularly when the time intervals for spaced retrieval were increased from 5 seconds to 10 seconds to 20 seconds to 30 seconds to 60 seconds to 2 minutes. Distracters have been found to be important in SR to prevent people from rehearsing the words used in training.[6] In this case, distracters had to be given to prevent Joe from rehearsing the transfer activity in between the interval time. Distracters must be unrelated to transfer activities; Joe was asked to perform exercises for the very short intervals in between each transfer. Eventually, this progressed to gait training activity when the time interval reached 8 to 16 minutes.[3] Slowly lengthening time between testing should

increase the challenge of the retrievals; this should facilitate retention to long term memory.[7,6] Spacing is a very important part of repeated retrieval effects.[7] In one study the introduction of long spacing intervals during repeated intervals resulted in a 200% improvement in retaining for long term recall.[7]

Intervention

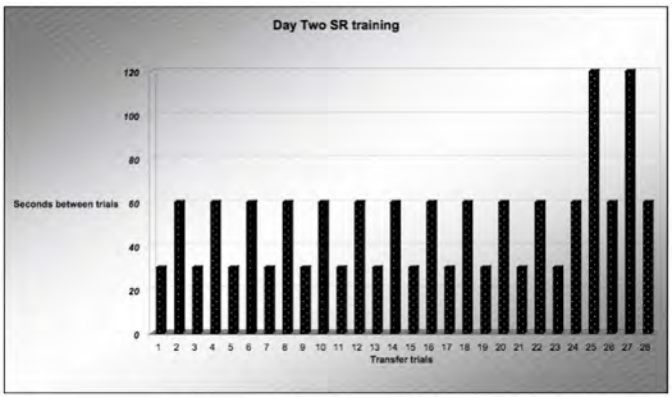
Distributed practice, amount of rest between trials equal to or greater than the time for a trial,5 was the initial choice due to Joe's age and decreased endurance. This compares to massed practice in which the amount of practice time is greater than the time of rest between trials.5 However, because the initial phase of spaced retrieval warranted short intervals of 5, 10, 20, 30, 60 seconds and 2 minutes while he was making mistakes, the time did not allow for distributed practice alone. A combination of distributed and massed practice was utilized. Spaced retrieval involves retention of verbal cuing prior to adding another cue, Joe was suited for blocked practice versus random practice with blocked practice as practicing one activity for a block of trials prior to proceeding to the following activity and random practice as practicing various activities in random order. 5 Whole practice, versus part training practice, was utilized to prevent Joe from fixating on component parts of the activity to facilitate executing the whole activity. 5 Initially, Joe was verbally cued to respond to this statement: "tell me what you need to do before you transfer" for spaced retrieval. When motor learning was initiated, the cue changed to: "demonstrate to me what you need to do for transfers." This study was done for 2 weeks, a total of 10 sessions/visits; each session for spaced retrieval training alone lasted for a total of 30- 35 minutes.

Outcomes

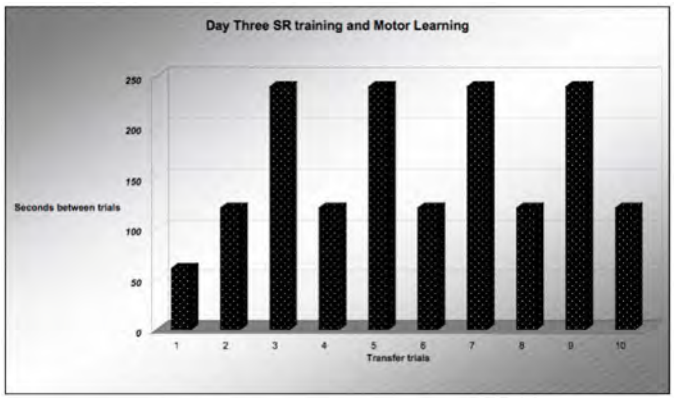


Day 1: Joe was introduced to SR and the activity was entirely verbal responses; he was asked to verbalize in his own words the components of the transfer in proper sequence. Joe progressed from 5 seconds to 10 seconds to 20 seconds to 30 seconds. He started making mistakes at the 60 second mark and was returned to the last interval time — 30 seconds. During each of 15 trials of 30 seconds/ trial he committed mistakes each time he reached 60 seconds. He would either forget a part of or the sequence of the technique.

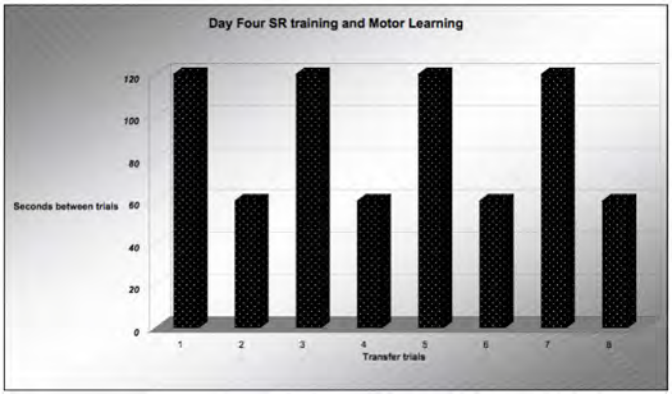
Figures 1-10 present interval times Joe underwent during the SR training and motor learning from day one to day ten. Whenever he made a mistake, he went back to the last interval time. When he succeeded, he went to the next interval time. Unless Joe was not successful at the 2-minute mark, the 2-minute mark was used as the starting time since this is the time that motor learning was initiated.[8]



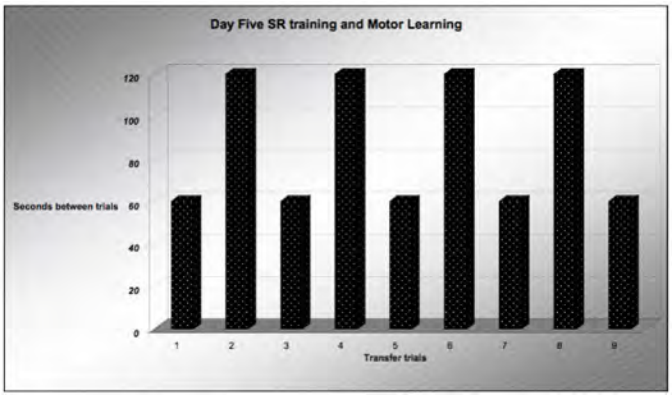
Day 2: Joe made mistakes 13:15 trials during the 60 second interval times which resulted in going from 30 to 60 seconds on 2 of the trials; he had to return to 60 seconds when the mistakes occurred at the 2-minute mark. Mistakes were occurring during verbalization of the various components of the transfer activity.



Day 3: Joe was able to go up to the 4-minute mark before committing any verbalization mistakes. Motor learning was started on this day. Mistakes were made 4:9 trials during the 2-4-minute mark. Motor learning was done only on the last 2-minute trial so as not to confuse him and reinforce memory through SR training.

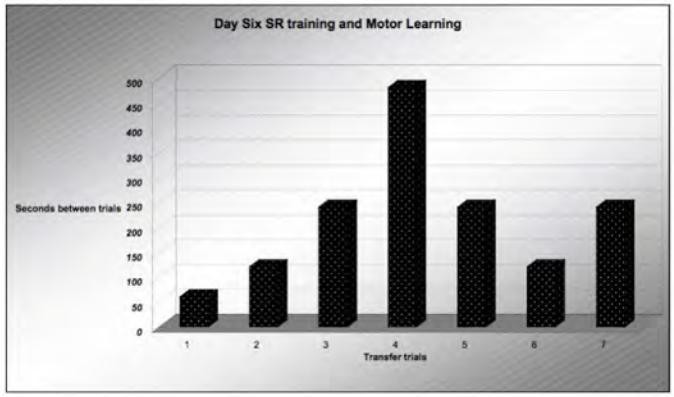


Day 4: Joe was no longer asked to verbalize the transfer activity but was asked to demonstrate this through motor learning. Joe was able to reach the 2-minute mark but was committing mistakes afterwards, the interval time was adjusted back down to 60 seconds. He became fatigued and unable to demonstrate success past 2 minutes, with errors in 4:8 trials during 2-4-minute intervals. An enforced rest following the eighth trial used up his 30-minute duration.

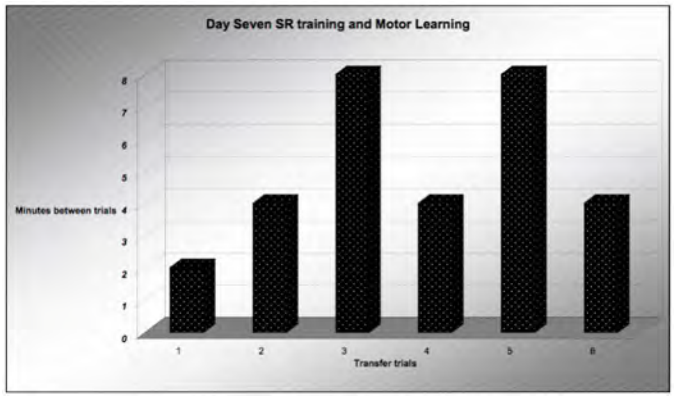


Day 5: Joe repeated the same 4 mistakes out of the 9 trials of the 2-4-minute mark. As he approached the 2-minute time mark, Joe required cueing for components of the transfer technique, namely: lock the wheelchair; scoot forward; place hands on the armrest and feet flat on the floor; sit to stand with the walker; stand pivot; and reach back to sit.

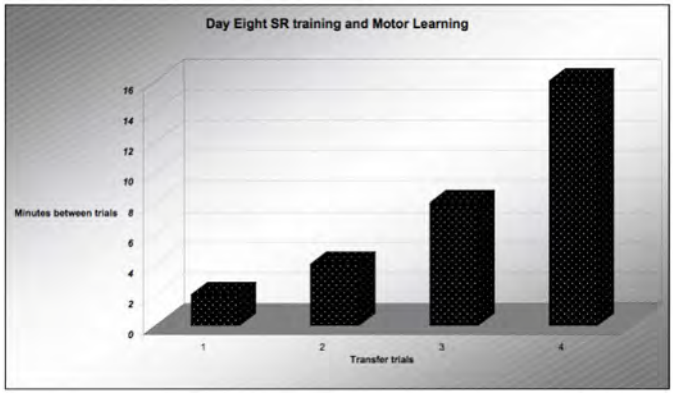
The author, Reynaldo D. Candolea, PT, DPT demonstrates how to use space retrieval in the clinical setting.
Watch now!



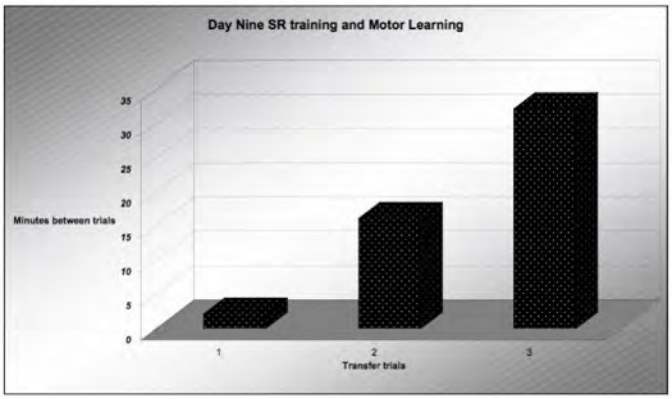
Day 6: Joe was able to pass the 2-minute mark and reach the 4-minute mark, but he was only able to progress from the 4-minute to 8 minute marks one time before committing a mistake on the 8-minute mark. He made one mistake on the 4-minute mark and one error on the 8-minute mark.



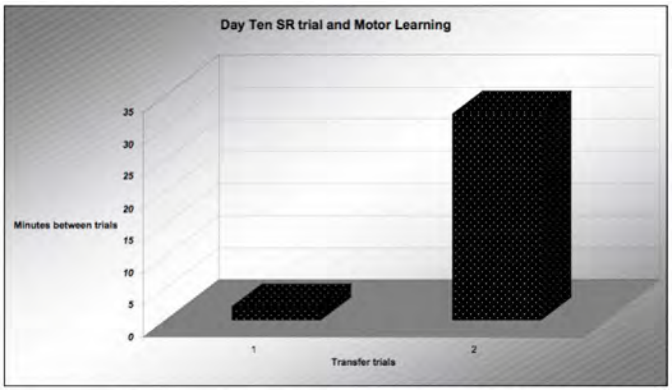
Day 7: the 8-minute mark was reached without error; distracters consisted of therapeutic exercises incorporated and initiated between the 4-to-8-minute interval time.



Day 8: Joe was able to perform the transfer activity through combined SR and motor learning up to 16 minutes (from 2 to 4 to 8 to 16 minutes) without making any mistakes. (Figure 8)



Day 9: Joe started on SR from 2 minutes by the time the timer was set to initiate SR training; he utilized the 16-minute interval time and progressed to 32-minute interval time following performance of transfer activity. He did not make errors. He performed gait training activity during the interval time of 16 minutes and therapeutic and balance training activity during the interval time of 32 minutes.



Day 10: Joe was able to perform the transfer activity from the start time of 2 minutes when the timer was set and to perform the transfer activity without mistakes or cuing at the 32-minute mark. During the interval time Joe was required to perform therapeutic exercises, balance training, and gait training activity as distracters.

The FIM™ score is the most used measure during the assessment of the functional status of stroke patients from the time of admission in the rehabilitation facility, during sessions in checking the treatment efficiency, and in determining prognosis upon discharge.9 As an outcome measure and tool, the FIM™ is a standard which is used for inpatient rehabilitation in the subacute setting and was the basis of the Prospective Payment System (PPS) for Medicare.9 In this study, the patient improved from a score of 3 to 5 in FIM™ scoring.

Discussion

Results of the spaced retrieval training showed an improvement during transfer activity; Joe also demonstrated recall of the transfer activity sequencing. Functional change was measured with his FIM™ score. Part of this success may be attributed to consistency of other factors, specifically the environment wherein he was taught the activity. Training occurred in the same area, in the same gym, at the same time (11 AM – 12 PM), with the same physical therapist. In future research, these may be variables that could be changed to see how much of these changes would affect the results.

Prior to the start of the training, the patient was allotted 32 - 35 minutes for SR training with 16 minutes as the target time for mastery of the technique. 8,10 This was eventually extended up to 32 minutes for a longer spacing interval to achieve long term recall.7 The study was completed in 2 weeks and 10 visits because the majority of insurance companies require an assessment of patient progress every 2 weeks; Medicare Part B requires a physical therapist assessment every tenth visit. Further studies could also be done to see how much procedural memory a person after sustaining a stroke is able to retain once they were completely off SR and motor learning training for 2 weeks.

The speech language pathologist retested the patient using the SLUMS™ Examination and the patient scored 11, which is one point higher than his initial testing. During retesting, the patient gained points in some areas but lost points in other areas. This new score is significant because Joe improved in the area of memory and did not overall lose ground in the SLUMS™ examination as a result of the SR intervention. The SLUMS™ Examination covered various areas in testing memory as opposed to spaced retrieval in this study that was focused only on one activity.

During the transfer activity, Joe repeated the activity whenever he committed an error in any of the components of the transfer technique. When a mistake occurred, the interval time reset to the last interval time that was successful. Joe made many errors during the first week of ttreatment but he improved rapidly during the second/final week. His overall functional mobility status and ambulation improved as measured by requiring only stand-by supervision at the end of the two-week period.

A carryover effect of Joe's participation in this study was anecdotally noted. The nurse's aides, Joe's wife, and his daughter all expressed the increased ease and safety in which transfers were performed.

At the time of this study, current research regarding Spaced Retrieval was focused on using SR for recall of names, items, and vocalization of procedures during speech therapy but none discussed using SR for active functional mobility training post stroke. Joe's progress demonstrates that SR may be beneficial to reduce memory impairments from a recent cerebrovascular accident. Hopefully, this case study could serve as an outline or guide to other physical therapists. Further research is needed to test the efficacy of spaced retrieval on motor learning for other functional activities particularly with gait training activity.

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Michelle D. Chronowski has been a physical therapist for 16 years working in a variety of settings including Acute care, Acute inpatient rehabilitation, transitional care, home care, assisted living and subacute rehabilitation settings. Primary focus of care has been in the acute and subacute inpatient rehabilitation setting. She graduated with a doctor of Physical Therapy from University Baltimore School of Medicine in 2007. She has been an adjunct faculty member for University of Maryland Baltimore, Department of Physical Therapy and Rehabilitation Sciences from 2007 through current. She has also been involved with University of Montana as a capstone advisor from 2010 through current. She pursued her Geriatric Clinical Specialist certification and achieved in 2017 from ABPTS. Current endeavors include initiating a high -intensity gait training clinic at Medstar Good Samaritan Hospital.

Reynaldo D. Candolea has been a physical therapist for 37 years and has worked in a multitude of settings: acute care, sub-acute and rehabilitation setting, skilled nursing facility, outpatient center and home health setting both as full time and PRN basis. He is a member of the Advisory Committee for physical therapy assistants of the St. Petersburg College and is also a member of the Continuing Health Advisory Committee and the Advisory Committee for Allied Health professionals of the St. Petersburg College since 1993. He graduated from University of South Florida in partnership with Rehab Essentials with the degree of Doctor of Physical Therapy in May, 2016. He was a board-certified clinical specialist in Geriatric Physical Therapy granted by the ABPTS from 2010 to 2020. He is NDT trained since 1994.

Raising the Standard of Care in Fall Prevention Practice

Achieve Your APTA Geriatrics Balance and Fall Prevention Credential

The APTA Geriatrics **Balance and Fall Prevention in Community-Dwelling Older Adults Professional Credential** course series is an in-depth, comprehensive, evidence-based, and engaging professional educational encounter taught by a team of experts in the field with – literally! – decades of clinical and teaching experience. This advanced course was the brainchild of Mindy Renfro, PT, PhD, who brought together eight PTs with a demonstrated commitment to fall prevention to develop the curriculum and design an interactive credential course series whose graduates would become highly critical thinkers and fall prevention leaders in their clinics and communities. From the get-go, the faculty combined respect for practicing clinicians and all they could bring to the table with a belief that the current standard of fall prevention practice could and should be raised to achieve improved outcomes.

This credential course series is designed not just to impart knowledge, but also to equip graduates to *change how they practice* to provide superior balance training and fall prevention services. The credential course series includes preparatory work before the first weekend, and a comprehensive portfolio assignment before the second weekend. As part of the portfolio assignment, participants implement key course concepts with one of their own clinical cases, and analyze resources in their own community they can leverage to enhance fall prevention.

The credential course series timeline includes:

- **Preparatory work** prior to the first course
- **Course One: a two-day in-person** program that includes a kick-off onsite skills check
- **Portfolio completion:** between the two in-person course weekends, a guided clinical case report, a community asset and gap analysis, and the online Otago Exercise Program certification training are completed
- **Course Two: a two-day in-person** program with a case-based skills check
- **An online final exam**, following the course

Is this credential course series worth the commitment?

Following is some student feedback from the first two groups of graduates that indicates to us, the answer is a resounding yes! Following, instructors share a favorite quote or two from a student and explain why it was meaningful to them.

"The course content was relevant and valuable, but the best part of the course was working with other clinicians on patient cases and being challenged by faculty to consider other interventions or ways to improve the interventions that we initially provided. This reminded me of my residency training, and it was refreshing. I've discussed this with other attendees, and we all found this most valuable for growth and knowledge translation."

The development team worked hard to design real-life, challenging patient cases that provided opportunities to think more deeply and reflectively and perhaps differently. The instructors resisted offering "our" answers and instead questioned and supported the clinician peer groups to see where their own thinking and problem-solving could take them. As an instructor it was wonderful to see the gears turning and those "Aha"! moments as these experienced clinicians saw that by taking what they already knew and then applying what they had learned in the course they could create highly individualized, customized, and patient-centered intervention plans to really target the most critical balance deficits and fall-risk factors. I love it that this student perceived what was occurring as "knowledge translation" – exactly!

— Leslie Allison, PT, PhD

"[We learned] An evidenced-based approach for immediate application to clinical intervention"

"Teaching the specificity of balance interventions that can be applied based on a multi-factorial assessment."

"Discussing interventions, so many courses focus solely on assessment."

"I also loved learning alongside other professionals with the same passion for geriatric health and fall prevention. I have learned so much from participating in this workshop and feel very inspired to apply my knowledge & skill!"

"This course helped to reignite my love of learning in my profession and helped me 'snap out' of my stale treatment patterns that had become habitual versus the best patient-centered care I could provide."

This collection of participants' comments encourages me that the faculty development teams' original dream of a credentialed training program that would support advanced skill development and inspire passion for the prevention of falls in older adults appears to be on target. All too often society at large as well as many health care professionals accept falls in older adults as expected and unavoidable. As physical therapists and health advocates we are well positioned to be "myth busters" of this obsolete concept. The development of the content and requirements to achieve the expertise required for this credential has been the result of countless hours of collaboration, review and rewrite by the faculty development cohort. These comments indicate to me that the participants do "get" what we are striving to achieve – the advanced skills required and a passion for prevention of falls in older adults.

— Diane Huss, PT, DPT

"This project made me realize that there are a lot of people/organizations working on fall prevention initiatives. It prompted me to join the state falls prevention coalition and to start conversation around initiatives that we can implement in our clinic. I made some good contacts through the state coalition."

"Thank You Very Much! I learned so much from this course. Was an eye opener for me on how I can use the community resources we have in our area to maximize the potential of the clients we work with as they transition back to their communities."

"I am really thankful I got to be a part of this course."

Back when the development team first discussed credential objectives, one of the ideas that kept coming up was that PTs should be fall prevention leaders - both in the clinic and in the broader community. We wanted to support PTs being part of falls prevention coalitions and help them make better use of community resources to enhance clinic-to-community care. These comments tell me this participant achieved one of our goals with this credential and that is exciting! It means a lot to hear participants say the credential work helped them achieve these goals.

— **Lori Schrodt, PT, PhD**

"What I learned is how to have a much more systematic way of developing a plan of care for my patients, and a more comprehensive set of resources to discharge them into the community."

In this credential course series, attendees actively participate and receive the perfect dosage of intensity, repetitions, and task-specific practice. What more could a therapist ask for? If you are looking to build your skills AND your self-efficacy in the practice of balance and fall prevention - this is your prescription!

— **Mike Studer, PT, DPT, MHS, FAPTA**

"I really appreciated the information about technology and adherence, two important fall prevention aspects not usually included in fall prevention courses."

This quote illustrates to me how comprehensive this credential course series is, and how knowledgeable about different topics our instructor team is.

— **Mariana Wingood, PT, DPT, PhD, MPH**

Other instructors on the team include:
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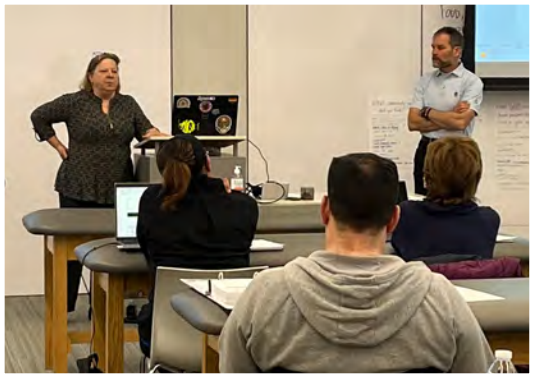
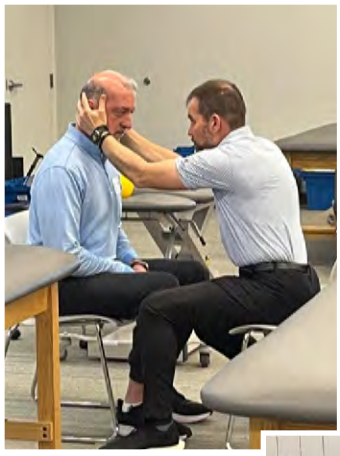
Jennifer Nash, PT, DPT
Emma Phillips, PT, DPT





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Even A Little Can Be A Lot

by Mike Studer, PT, DPT, FAPTA

Editor's Note: This clinical case commentary was part of content for the July 2023 Journal Club. These case studies are intended to demystify the more formal statistics and format of a peer-reviewed article and translate key concepts into clinically usable information. Join us for Journal Club on the third Tuesdays of January, March, May, July, September, and November at 8 p.m. ET to discuss current concepts with a wide range of peers.

Case study presentation based on the research article from Journal of Geriatric Physical Therapy: Billek-Sawhney B, Criss M, Galantino ML, Sawhney R. Wellness Aging Model Related to Inactivity, Illness, and Injury (WAMI-3): A Tool to Encourage Prevention in Practice. J Geriatr Phys Ther.2022;45(4):168-177.[1]

When considering physical activity education and prescription for persons with a history of being inactive, clinicians may benefit from considering their word choices and approach. The following case study leverages the term physical activity. This highlights the difference between physical activity and exercise, which can be more subtle to health care practitioners, yet strikingly different to patients.

Caspersen and colleagues (1974) described physical activity as "any bodily movement produced by contraction of skeletal muscle that results in a substantial increase in energy expenditure." The authors went on to qualify that exercise is a behavior defined as a "planned, structured, and repetitive form of physical activity with the intention or goal of maintaining or improving one's fitness and/or health." [2,3]

Paulette is a 76-year-old female referred to PT due to deconditioning from recent illness, her fear of falling, and her respiratory condition leading to reduced quality of life (QoL). She notes an unhealthy impression of and relationship with exercise for the entirety of her life. "I was never really athletic. I enjoy watching people in sports though." Paulette is retired from teaching, travel agency, and healthcare as a doula. She does enjoy traveling and expresses a concern over an upcoming trip with a very active friend to Rome. "I am not sure that I will be able to keep up with her," referring to her traveling companion's walking speed, endurance, and the number of days of sightseeing planned.

Paulette has 3 adult daughters and 7 grandchildren that she enjoys visiting, despite the long airport walks often associated with these trips.

PMH: Interstitial lung disease requiring supplemental O2 at night, hiatal hernia, sleep apnea, OA with primary involvement in her hands bilaterally.
Pain: Generalized
Exam: [see Table 1]
Goals:

1. Walk for 20 minutes on level surfaces at self-selected pace without feeling shortness of breath.
2. Place 25# bag overhead (planes and train travel); pull for 1000' (airport).
3. Ascend and descend one flight of steps with railing, without feeling shortness of breath.
4. Reduce fear of falling When walking
5. Independently carry-out home program for endurance, strength, balance.

Interventions (initial clinic-based): 2x/week for 45-minute sessions

- Vital sign monitoring to start each session, including SpO2
- Semi-recumbent elliptical warm-up at self-selected pace, 5 minutes (Options-treadmill, UBE, Semi-recumbent bike
- HIIT treadmill training; LE press; computerized balance training (targeting CoP); uneven surface gait and stair climbing treadmill dosed at 125% of SSWS (2.2mph x 1.25 = 2.7mph) for initially :15 second intervals "on" and :45 seconds at 80% of SSWS (2.2mph x .8 = 1.8mph)

Interventions (initial home program): 4x/week for 144 total minutes/week

- Home program options, for Paulette to choose from throughout her week:
- 10x STS = 3.5 minutes/week
- HIIT stationary cycle by couch = 100 minutes/week (5x 20+)
- Wall push-ups = 5 minutes/week (patient choice of :30 seconds a total of 10x/wk
- ½ mile walk 3x/wk = 12 minutes/bout = 36 minutes or 2.2mph
- Progression/personalization = adding 10% per week

Interventions (pt education, WAMI-3)

Paulette was most compelled by the visual depiction of the Wellness Aging Model Related to Inactivity, Illness, and Injury (WAMI-3).[3] She felt that she could identify with each of the three I's in her present condition. She commented on each of the three I's, as follows:

Inactivity: "I know that I need to be more active. My kids and grandchildren tell me that. I read about it and

Table 1. Summary of Physical Therapy Exam

Outcome Measure	Result	Comment
Observation	Trendelenburg gait without device; frequently requires 2-3 attempts to rise to standing	
Physical Activity Vital Signs	See Table 2	
Gait Speed -self selected 10m Walk test	0.95 m/sec (Norm 1.2 m/sec)	
LE AROM	Unremarkable generally	Lacks 5 degrees B dorsiflexion
BLE STRENGTH	WNL generally Heel Raise Testing	B Hip Abd 3-/5
		B Plant Flex 3-/5
Dynamometer	28# RUE; 25# LUE	Inhibited B by thumb pain
30 Sec Chair Stand[5]	7 (age/sex norm is 14)	Dyspnea
4 Stage Balance[5]	Feet Together: 10s Semi-tandem: 8 s; Tandem 2s SOL: RLE 3 s; LLE 2 s	
2 MWT[6]	388' (118m)	Age/sex norm 150 m
TUG	15.45 s	
TUB (Cog)	17.25 s	
BERG	46/56	
Geriatric Depression Scale-15	10	At cut-off likely depression[7]
Fear of Falling Avoidance Behavior Questionnaire[8]	42/56	See Figure 1
Orthostatic Assessment: Supine[5]	BP 122/68; HR 76 SpO2 91%	After 5 min lying down
Orthostatic: 1 min Stand	BP 118/70; HR 78	
Orthostatic: 3 min stand	120/70; HR 80	No indication orthostasis

hear it on the news. Until I saw that I could improve and saw that it could be easy, convenient, and meaningful . . . I did not feel that I was convinced that it was for me."

Illness: "No one really seems to know about my lung condition. No medications, surgery, or procedures. I am just supposed to keep coming back for imaging every so often. I thought that my shortness of breath was about that, and just concluded that my shortness of breath could not be improved."

Injury: "I don't understand why I am so fearful of falling. My mom fell a lot and did have some injuries, but I have never fallen. Still, it is on my mind so much of the time that I am sure that it affects how I move and if I move."

Paulette additionally noted surprise by the notion that, "Replacing 30 min of sedentary time with light PA can reduce mortality by 20%." With this improved understanding of how she could positively influence her health both short and long term, and the relative frictionless introduction to increase her physical activity, she felt engaged.

Reassessment

Three months after discharge from PT, she answered the Physical Activity Vital Sign questions again:

- "How many days a week do you engage in moderate to strenuous exercise (like a brisk walk)?" — 4
- "On average, how many minutes per day do you exercise at this level?" — 25

Clearly, this was an improvement over her answers of "0" and "0" from the initial visit. Since starting PT, she had finalized the itinerary for her October trip to Rome and has mapped out several of the days' walking. Notably, she is now routinely walking farther than the longest of days planned on her trip.

Discussion

To integrate the WAMI-3 model into clinical practice, physical therapists may position themselves for optimal success when they:

1. Understand the bio-psycho-social picture of a person
   - Biology/Physiologic tissue health and current level of fitness
   - Psychological: history with and expectations of exercise, preferences
   - Social: Environmental and cultural nudges, opportunities, and barriers
2. Create programs that include/ensure
   - Baseline measurements for short- and long-term accountability (program efficacy).

Figure 1. The Fear of Falling Behavior Avoidance Questionnaire[8]

Name:

Date:

Please answer the following questions that are related to your balance. For each statement, please check one box to say how the fear of falling has or has not affected you. If you do not currently do the activities in question, try and imagine how your fear of falling would affect your participation in these activities. If you normally use a walking aid to do these activities or hold on to someone, rate how your fear of falling would affect you as if you were not using these supports. If you have questions about answering any of these statements, please ask the questionnaire administrator.

	Please check one box for each question				
Due to my fear of falling, I avoid . . .	Completely disagree (0)	Disagree (1)	Unsure (2)	Agree (3)	Completely agree (4)
1. Walking	☐	☐	☐	☐	☐
2. Lifting and carrying objects (eg, cup, child)	☐	☐	☐	☐	☐
3. Going up and downstairs	☐	☐	☐	☐	☐
4. Walking on different surfaces (eg, grass, uneven ground)	☐	☐	☐	☐	☐
5. Walking in crowded places	☐	☐	☐	☐	☐
6. Walking in dimly lit, unfamiliar places	☐	☐	☐	☐	☐
7. Leaving home	☐	☐	☐	☐	☐
8. Getting in and out of a chair	☐	☐	☐	☐	☐
9. Showering or bathing	☐	☐	☐	☐	☐
10. Exercise	☐	☐	☐	☐	☐
11. Preparing meals (eg, planning, cooking, serving)	☐	☐	☐	☐	☐
12. Doing housework (eg, cleaning, washing clothes)	☐	☐	☐	☐	☐
13. Work or volunteer work	☐	☐	☐	☐	☐
14. Recreational and leisure activities (eg, play, sports, arts and culture, crafts, hobbies, socializing, traveling)	☐	☐	☐	☐	☐

Please make sure you have checked one box for each question. Thank you!

Total: /56

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- Early success without pandering.
- Variety within personal preference to maintain engagement.
- Test/measure selection with both clinical (sensitivity) and personal (salience) consideration.

3. Increase education, intensity of physical activity, and frequency of activity as indicated based on

- Tissue health with consideration for muscle, tendon, and bone response to stress.
- Recovery from exertion to a next session or bout of activity. Unforeseen circumstances (greater or lesser tolerance, injury, success).

4. Understand that modes of education, patient motivations, and myths (surrounding physical activity)

- Are individual to a person and may not be the same values that a health care practitioner holds.
- Some people WILL be motivated by gamification, numbers, competing against themselves, others in an exercise class, or age-adjusted norms. Some people can be motivated by loss aversion (a primary basis for the WAMI-3), averting losses normally associated with aging, as well as those deemed preventable (incurred through illness, injury, and inactivity). Some people are motivated to move only when their actions are purposeful, helping another person, group (family or otherwise), or community.

Clinicians may find it to be more helpful AND beneficial in the long run to start a severely inactive (or frail) client with an intensity and frequency below the recommended minutes, following the science of low intensity replacing sedentary minutes. When coupled with functional measures, this can be gamifying for the person to see unexpected gains. This can be additionally beneficial and warranted when one considers the concept of tissue management. From musculoskeletal tissue through tendons and finally bone density, it is when we start to stress any of these tissues significantly more than what they are trained to/accustomed-to, that people may incur injury that halts their forward progress altogether. This is written with consideration for our tendencies to underdose people with frailty and should be combined with a logical progression of home and clinic time and intensity, as indicated in this case study.

The WAMI-3 provides a visual depiction of loss aversion and an opportunity to take back some quality of life. Consistent with the invited commentaries, I find the model to be intuitive and of value in our PA communication efforts with patients of all ages and diagnoses.

Table 2. Physical Activity Vital Signs Paulette's Initial Responses

Physical activity vital sign: Ask all patients

How many days a week do you engage in moderate to strenuous exercise (like a brisk walk)?

- 0

On average, how many minutes per day do you exercise at this level?

- 0

Gauge willingness to exercise or increase physical activity level

What prevents you from being physically active or exercising?

- I don't know what to do OR I have a hard time getting myself to start exercise.

What will it take for you to increase your physical activity level or start (or increase) exercising?

- If I have a reasonable plan, and a structure for when to exercise, I think that I can follow it.

Gauge self-efficacy

On a scale of 0-10, how confident are you that you can complete the prescribed exercises and activities?

- 5/10

Progress visits: When patient returns for follow-up visits, assess adherence.

On a scale of 0-10, how well did you perform your prescribed exercises this last week?

- 0 = 0%, I did not perform any of the exercises and/or activities as prescribed
- 10 = 100%, I performed all exercises and/or activities as prescribed

9/10 completion

Adapted from Greeenwood et al [9]

However, health care efforts may be more effectively pointed toward health span, rather than life span. This case study is not an appropriate forum to either elaborate on or to deliberate this point.

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Pushing Our Patients: How Perturbation Training Proves Useful in Post-Stroke Rehabilitation

by Sterling Eckert, PT, DPT and Heidi Moyer, PT, DPT

Editor's Note: This clinical case commentary is part of content for the September 2023 Journal Club. These case studies are intended to demystify the more formal statistics and format of a peer-reviewed article and translate key concepts into clinically usable information. Join us for Journal Club on the third Tuesdays of January, March, May, July, September, and November at 8 pm ET to discuss current concepts with a wide range of peers.

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Functional participation in daily activities involves tasks that stress the static and dynamic recovery balance systems.[1] Rapid inhibition accuracy and lower leg strength play a significant role in recovery balance of older adults as noted by findings of Okubo et al.[1] Training for recovery balance should include combinations of task specific activities with internal/external postural perturbations.[1]

"Francesco" is a 71-year-old male referred to outpatient physical therapy for balance and gait training rehab after at least 5 falls in the past 6 months. His past medical history includes cerebral vascular accident (CVA) (right frontoparietal junction), left side hemiplegia, Diabetes Mellitus Type II (DM2), peripheral neuropathy, hypothyroidism, hyperlipidemia, mitral valve stenosis, obesity, and depression.

Subjective and Social History

Francesco experienced a CVA 18 months prior to this encounter. He received multiple therapies (PT, OT, SLP) in the acute care setting for a 7-day period followed by a 3 week stay in inpatient rehab facility where he continued to receive PT and OT services. After a plateau in progress, he was discharged home with his wife with orders for home health PT (HH). His mobility was primarily at wheelchair level, but he was able to ambulate with a hemi-walker for 10 feet. He became discouraged by his lack of progress and requested a discharge after 3 HH visits. He became more sedentary and did not leave the house except for church services. His wife reported that he had fallen at least 5 times in the past 6 months, was requiring moderate assistance (Mod A) for his activities of daily living (ADLs) and could no longer ambulate for more than a "few steps." Despite these factors, Francesco reported high levels of motivation to regain his independence. He requested a referral from his primary care physician during a virtual visit and was seen for skilled outpatient physical therapy evaluation a week later.

Francesco lives with his wife in a ranch style home with no stairs to enter. Prior to his CVA, he was independent for all ADL's and ambulation. Since the CVA, he has been homebound, requires moderate (Mod A) to minimum assistance (Min A) for stand pivot transfers to his

Table 1. Initial Patient Profile using ICF Model

Body Function Structure		Activity Limitations	Participation Restrictions
Result	Normal Value	Bed Mobility: Mod A	Church attendance
30 second chair rise test (30CRT): 3 reps	>10 decreased fall risk[12,13] >15 Age predicted norm[12,13] MCID: >2.5[14]	Sit to stand transfer: Mod A	Grandchildren sporting events.
Timed Up and Go Test (TUG) : Unable to complete	9.1 seconds[10,11] MCID: >8 seconds[14]	Stand Pivot transfer: Mod A w/2WW	Friend and family gatherings
BERG Balance Scale: 19/56	>21 Medium fall risk[17,18] MCID: 2.5[17]	Standing tolerance: 2 minutes	Community engagement events
Six Minute walk test (6MWT): Unable to complete	400 meters[14,16] MCID: 30 meters15	Ambulation: 10 feet with hemi-walker	

wheelchair. He can stand for less than 2 minutes to brush his teeth at the sink. He uses grabbers and a shower chair to perform bathing tasks. Francesco enjoys watching sports (Houston area teams), attending his local Catholic Church, visiting with his grandchildren, playing card games, and eating "real Mexican food." He reports he has a new motivation for improvement to attend grandchildren's sporting events. He was frustrated and embarrassed about his hemiplegia and knew his wife did a lot for him. He demonstrated signs of depression and noted that he was disappointed in himself for quitting his rehab a year ago and letting himself decline to his current level.

Assessment and Plan

Outcome measures (see Table 1) demonstrate the impairments in strength, balance, and endurance which have limited Francesco's functional transfers and community mobility.

Testing results were explained, and he agreed to participate in 12 sessions of outpatient physical therapy intervention delivered over the course of 6 weeks. with goals to improve upon the aforementioned deficits and promote functional independence.

Week 1: The initial focus of rehab centered on core stability and postural control through perturbation training in the seated position with stable and unstable surfaces. Anterior/posterior/lateral internal and external perturbations were provided to Francesco in a seated position with eyes open (EO) and eyes closed (EC).[2,3] Dosing was limited to 30-60 (3 sets of 10) internal/external perturbation repetition range as recommended Mansfield et al.[2,3] Perturbations progressed to 3 sets of 10 random combination of external without visual feedback (eyes closed). Surface stability was influenced by the presence of a stability disc under both the gluteal muscles and both lower extremities.[4,5,6] Francesco also began seated lower extremity exercises with short arc quads, marches, ladder climbs, and hip abduction to focus on improving lower extremity strength shown to be a high predictor of falls by Okubo et al. To finish each session Francesco practiced standing tolerance for 3 trials to fatigue with a 90 second rest to improve strength and limit overall fall risk.[6,7]

Strengthening exercises and perturbation training continued as gait training with overhead harness support and hemi walker was added in the next week. Harness support did not provide any unweighting but prevented excessive loss of center of gravity and appeased fear of falling as he trained to maximal fatigue and added standing "cone kick" exercises.

Francesco progressed gait training with the hemi walker and overhead harness for 160 ft CGA without a break during week 3. He noted the harness and previous practice calmed his fear of falling and encouraged him to practice ambulation at home. These previous positive experiences improved overall self-efficacy and likely contributed to rapid improvements in gait training. 8,9 He required less verbal cuing for step height and weight bearing through the left lower extremity. He noted that he felt much more confident ambulating with his left leg after practicing standing exercises and stepping with his left lower extremity. Perturbation training continued in standing with hemi walker with EO and EC; he struggled to maintain his balance relying on his hemi walker and extreme stepping strategy when EC. The dramatic change in performance indicated a heavy reliance on visual feedback for stability. He laughed at his struggles and noted "it's a whole new world the eyes closed" and was encouraged to practice at home with his wife.

TheraBand was added with standing exercises. Progress report was performed during week 4 (See Table 2). His wife made sure to mention he no longer wanted or required her help to get out of bed in the morning. Francesco and his wife were very pleased with his performance, and he made clear he wanted to focus on improving his ambulation using a single point cane. During gait training, form was improved, and Francesco made it clear that he felt "more natural" walking. Perturbation training continued in standing for 3 sets of 12 random perturbations supplied in all directions with Francesco using his SPC instead of the hemi walker. He struggled with lateral force applied to his right side and required a wide step backwards on his right lower extremity to gather himself.

Francesco was able to walk for 10 minutes with his single point cane CGA/SBA without using the overhead harness by week 5. He reported home ambulation only with SPC and only used his wheelchair when they went

Table 2. Patient Progress

Test	Initial Evaluation	Progress Note	Discharge Evaluation	Norm Value	MCID Value	Goal Value	Percent Change at Discharge
30CRT	3 reps	7 reps	11 reps	10 reps	>2.5 reps	10 reps	266.67%
TUG	Unable	65 seconds	37 seconds	Norm: 9.1 sec	>8 seconds	<40 seconds	75.67%
BERG Balance Scale	19/56	26/56	34/56	Norm: >21	>5 points	>30/56	78.95%
6MWT	Unable	110 meters	200 meters	Norm: 400 meters	>30 Meters	>150 meters	81.81%

grocery shopping this past weekend. Perturbation training continued with 3 sets of 12 random direction repetitions and 2 sets of 10 just lateral direction perturbations directed to his left side. Training advanced to obstacle course ambulation for 75 ft with AirEx pads and small stability disc placed every 5 ft-10 ft for "tripping hazards". Francesco was cued not to look down at the hazards to simulate the randomness of daily activities. He performed well with a few trips requiring him to lean into the harness, stop ambulating, and shuffle to gather himself.

During the 6th week, he and his wife reported practice ambulating in the backyard and was even able to walk into church which required him to step over one curb. Obstacle course training continued for 200 ft with random placement of "hazards" approximately every 10-15 ft Perturbations were applied for 3 sets of 10 random direction repetitions with Francesco dynamically marching on an AirEx pad while wearing the overhead support harness and using his SPC for UE support to further stimulate rapid inhibition and proprioception. He noted that he was encouraged by his performance stating, "I don't think I will be in this position, but it is good to know I can manage if I am." Francesco expressed confidence in his performance within therapy. At his discharge session, repeat outcome testing was performed according to his evaluation and progress report performance. His 30CRT reached 11 w/o UE support. His TUG improved to 37 seconds using his SPC.

Discussion

Francesco improved his fall risk level in several clinical outcomes (See Table 2).10-18 At discharge, he was able to ambulate household and small community distances (<500 ft) with his SPC and SBA provided by his wife. He was able to attend church services/sporting events without using his wheelchair; he was modified independent/SBA with all activities within the home. The Okubo et al. article highlights the importance of lower extremity strength and rapid inhibition in fall risk for older adults. The article also calls for task specific interventions, like perturbation training, to be utilized in physical therapy management of high fall risk older adults.[1] The article, along with current evidence supporting the use of perturbation training, heavily influenced Francesco's therapy plan of care. As a result, Francesco was able to progress stabilizing himself, with mild/moderate stepping strategies, against perturbation on unstable surfaces with his eyes closed. Most importantly, these improvements assisted him in navigating within the community across multiple surfaces without fear of falling Francesco was able to regain the confidence to achieve his goals of returning to church activities and grandchildren's sporting events as his fear of falling abated.

This case demonstrates the benefit of performing challenging and functionally relevant exercises in older adults even after a distant CVA event. Perturbation training provided a unique method of challenging Francesco's core stability in multiple positions while making PT intervention engaging and fun. Through this intervention, Francesco was able to receive real time visual and physical feedback of his postural stability performance during each repetition. The random presentation of perturbations also allowed for preparation to handle the unpredictable rapid inhibition challenges present in household/community mobility. Francesco mentioned that the variety of perturbation training made therapy feel less monotonous compared to other PT experiences he has had. This intervention allowed for multiple opportunities to provide frequent encouragement in which fostered strong patient provider connection. A strong therapeutic alliance likely contributed to Francesco's performance throughout PT.[19] In the case of Francesco, unpredictability and real time feedback became a primary motivator for continued adherence to PT interventions. Had other non-perturbation interventions been selected, Francesco's motivation may have dwindled, and physical therapy intervention may not have yielded the results seen.

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Optimizing Evidence for Geriatric Therapeutic Exercise

by Mark Traffas, PT ; Carole Lewis, PT, DPT, PhD, FAPTA; Linda McAlister, PT, DPT

[Editor's Note: This is an article in a series synthesized from lectures in the Great Seminars and Books courses]

It is unlikely that any clinician practicing in 2023 would deny the importance of evidence-based practice (EBP). It has been widely known for some time that best practice should come from what has been proven from published research. However, even as research in physical therapy has burgeoned, translation of new findings into clinical practice is another matter. In 2007, George[1] listed 6 barriers to the use of evidence-based practice (EBP):

1. Lack of understanding of common statistical estimates to report clinical data.
2. Unfamiliarity with what comprises a "quality study."
3. Lack of awareness that clinical experience *is* a valued component of EBP.
4. Inability to access the internet.
5. Unwillingness to change current practices.
6. Sole reliance on the traditional continuing education model.

In 2023, all graduating physical therapy students have their Doctorate of Physical Therapy (DPT) degree. Physical therapists hence will have a better understanding of statistics, research definitions, and even how to conduct trials, especially compared to 20 years ago. But is evidence-based practice used daily in the clinical setting? There are no definitive studies looking at therapists' use of EBP since the DPT was instituted. In the specialty of geriatrics, using EBP is even more imperative, given the complexities and challenges seen in the older adult population.

Below are several principles that we suggest therapists can use to implement EBP when prescribing exercises for various conditions:

1. Adopt the exercise/treatment/techniques that were used in the study into your plan.
2. Use the results/conclusions of the study to guide plan of care.
3. Identify functional deficits from standardized EB tests for a basis of interventions.
4. Combine research results with clinical reasoning.
5. Integrate what other respected clinicians suggest.
6. Use of a therapist's own clinical experience and expertise.

Examples of each of these ways to achieve EBP are described below:

Adopt the exercise/treatment/techniques that were used in the study into your plan

Ylinen et al[2] compared 3 different treatments in participants with non-specific neck pain. All 3 groups performed aerobics and cervical stretching. The control group had no further intervention. The endurance group were instructed in UE dumbbell exercises and head lifts prone and supine. The strengthening group performed UE dumbbell exercises and isometric stabilization exercises using resistance bands for resisted cervical motion. Compared to the other 2 groups, the strengthening group had a significant decrease in pain, increased cervical strength, and significant increases of ROM in all directions. Even though stretching was performed in the other 2 groups, no significant increase in ROM was demonstrated. Ylinen's study has clear explanations of how to do the resistance exercise and can easily be done with clients. Clinicians may implement the specific protocol used in the Ylinen strengthening group into their intervention plan.

Use the results/conclusion of the study to guide plan of care

Shachter et al identified that the scapular stabilizers fire at similar levels as the rotator cuff muscles during functional shoulder internal and external rotation.[3] The discussion of the study states: "This highlights the importance of training the scapular stabilizers in upper extremity athletes and in patients with shoulder pathology."[3] With this information, therapists can use scapular stabilization techniques to improve shoulder biomechanics and address shoulder pathologies. This could include exercises such as shoulder scapular retraction, resisted rows, and latissimus pull downs with emphasis on scapular stability. In addition, to achieve best care, therapists can use a combination of many research studies that identify techniques that activate the scapular stabilization muscles. For instance, in Castelein et al's study, scapular retraction overhead was the most effective exercise (of the exercises assessed) to activate the medial scapular muscles.[4] In yet another study, scapular rows with external rotation of shoulder, elbows at 90 degrees, combined with supination of forearms increased activation of the lower trapezius.[5] By using the guidance of these study conclusions, therapists can prescribe tailored interventions based on the available evidence, in this instance for shoulder pathology.

Identify functional deficits from standardized EB tests for a basis of interventions

The most common research used to identify functional deficits are standardized tests. These include tests such as the Modified Barthel Index, Berg Balance Assess-

ments, Tinetti Gait and Balance Assessment, Timed Up and Go and Dynamic Gait Index, just to name a few. There is also other research that allows therapists to compare patient performance to researched normative data and using these are perfect for the basis of evidence-based treatment.

Let's use a familiar test as an example. The 5 Times Sit to Stand Test, the amount of time it takes a subject to complete 5 sit to stands without upper extremity support, can demonstrate subjects that are at increased risk of falls (>15 seconds[6]) and increased risk of multiple falls (≥ 12 seconds[7]). This test has also been correlated with gait speed, demonstrating increased time required for the sit-to-stand test associated with decreasing values for self-selected gait speed.[8] Therapists can use this information as a basis for their intervention plan, including strength and power interventions that target sit- stand ability and speed.

Combine research results with clinical reasoning.

Combining clinical reasoning with research findings might be the most common way to implement EBP into daily care. This process starts, for example, with studies of EMG activation of muscles. Then using clinical reasoning skills and assessments, therapists can determine which muscles need to be strengthened and use the appropriate research.

For example, let's consider the activation of gluteal muscles in therapeutic exercises. Bolgla et al found that the highest EMG activation to strengthen the gluteus medius was side lying hip abduction and weight bearing hip abduction.[9] The researchers were not looking for exercises but comparing weight bearing and non-weight bearing movements. The hip abductors are key to improving balance and gait and yet many patients with gait and balance deficits cannot perform a side lying hip abduction movement. To implement EBP, based on these results, therapists can then instruct patients in weight bearing movement that incorporates hip abduction. Examples of weight bearing hip abduction exercises are side stepping with and without resistance, sidestep ups with and without resistance, side stepping up and down a ramp and one-legged standing.

If a clinician determines that gluteus maximus strengthening is needed for functional activities such as sit to stand, studies have shown the following exercises significantly activate the gluteus maximus; prone hip extension[10], step ups, lateral step ups, lunges,[11] single leg squats and squats with UE flexion of a therapy ball[12] and bridging with resisted theraband hip abduction.[13]

Integrate what other respected clinicians suggest and use of a therapist's own clinical expertise

The amount of research being done on a daily basis is immense and with the ease of access to the internet and search engines, such as Google Scholar and Pub Med, the information is literally at our fingertips. But that doesn't mean that every condition, or unique combination of morbidity will have usable research associated with it. This is when therapists might rely on suggestions from experienced clinicians. Therapists can also use their personal experience as a resource to provide the best care to their patients. Clinical experience is the lowest level of evidence, so therapists need to constantly be searching for higher levels of evidence.

Conclusion

There has never been a better time for therapists to implement the use of EBP into their practice. Attempting to use EBP in treatments can be intimidating for both new and experienced therapists, but hopefully these examples show how research can be implemented into the area of geriatric therapeutic exercise relatively easily with only a little extra work. Older participants will benefit as we strive to do our part to incorporate research.

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