

GeriNotes

May 2020 • Vol. 27 No. 3



APTA Geriatrics.

An Academy of the American
Physical Therapy Association

Age on.™

Gerinotes

May 2020 • Vol. 27 No. 3

In This Issue

6 Delivering Therapy in Challenging Times

Ellen R. Strunk, PT, MS

9 Just Right: Medicine That Works

Mariana Wingood, PT, DPT, and Dale Avers, PT, DPT, PhD, FAPTA

13 Telehealth: A Reflection on Adaptability and Having Intentions for the Future

Christina Crawford PT, DPT, MSHS

16 Moving and Grooving: Exergaming Enhances Physical and Cognitive Function in Older Adults

Tanvi Bhatt, PT, PhD, Savitha Subramaniam, PhD, and Lakshmi Kannan, MSc

22 Spaced-Retrieval: A Practical Guide for Physical Therapists

Nicole Dawson, PT, PhD, and Ashleigh Trapuzzano PT, DPT

25 A Better Way to Gait Train: One Physical Therapist's Journey

Cassi Petsch, PT, DPT

29 Physical Therapists Should Pay More Attention to Cognitive Deficits - We Can Be Very Good at It!

Jean Miles, PT

33 GSA's 75th Birthday

Tim L. Kauffman PT, PhD, FAPTA, FGSA

35 Case Report: Diagnosis and Management for an Older Adult Patient with BPPV

Horace Leung, PT, DPT

38 Blueberries, Birds and Ms. Ramsey (Journal Club Case Study)

Gabrielle Scronce, PT, PhD

40 Take a Stand! Measurement Tools for Chair Rise

Carole Lewis, PT, DPT, PhD, FAPTA and Linda McAllister, PT, DPT



APTA Geriatrics

An Academy of the American
Physical Therapy Association

Age on.[™]

From the President



Greg Hartley
President,
APTA Geriatrics

We are certainly living in unfamiliar and challenging times. Because of the coronavirus, we are living and working in new ways. Some of these changes will affect the way we live and work forever. Some will make us better. Like you, I look forward to that day.

In response to social distancing policies and CDC recommendations, we have had to postpone upcoming live courses. As life returns to normal, we'll announce new dates.

We also understand you need guidance from trustworthy sources, perhaps more now than ever. In response, APTA Geriatrics has increased its offerings of webinars and distance learning opportunities. Some on our own, and some in collaboration with other sections, academies, and the APTA. Several courses have already been offered, and many more are in the works. Courses developed in response to dealing with the pandemic are being offered to members free of charge. We also plan to expand online learning opportunities on many topics so that you can continue to turn to APTA Geriatrics for evidence-based continuing education at a time when conferences and live courses are not an option. Finally, we have developed a COVID-19 resources page with curated online resources from trustworthy sources. Find it at <https://geriatricspt.org/practice/covid-19.cfm>.

We are also beginning to ramp up resources related to the post-acute PT management of patients who are recovering from COVID-19. We expect to see a large increase in patients needing our care for weeks and

months to come. Those of you working in acute care have already felt this. The post-acute care environment (including inpatient rehab, SNF, home health, and outpatient clinics) will be filled with patients who need our care. We must be prepared, and ready with evidence-based care and interventions.

This potential watershed moment in our profession is being watched closely, and how we respond will have long lasting, perhaps permanent, implications for our profession, our professional roles, and society. Here are a few things I believe the future holds.

- I believe that our society will focus more on managing chronic conditions and people with multiple comorbidities.
- I believe health care inequities created by ageism, racism, poverty, education, and more are being forced into the national conversation and will become a truly meaningful component of public health.
- I believe we will pay more attention to health promotion and wellness.
- I believe the health care system (including third-party payors) will see the need to invest in wellness and fitness and not just respond to sickness.
- I believe telehealth will become far more common than we ever thought we'd live to see.
- And I believe this profession, and in particular those of us working with ageing adults, will rise to the occasion, filling the void with a much needed expert/trustworthy/evidence-based voice in managing health, wellness, and fitness in ageing adults.

Take care of yourself and stay well. Our families, our patients, and our society need us. Age on.

APTA Geriatrics, An Academy of the American Physical Therapy Association

Executive Officers

President: Greg Hartley, PT, DPT
Vice President: Cathy Ciolek, PT, DPT, FAPTA
Secretary: Myles Quiben, PT, DPT, MS, PhD
Treasurer: Kate Brewer, PT, MPT, MBA

Board of Directors

Director: Tamara Gravano, PT, DPT, EdD
Director: Ken Miller, PT, DPT
Director: Jackie Osborne, PT, DPT
Director: Susan Wenker, PT, PhD
Delegate: David Taylor, PT, DPT

Editorial Board

Michele Stanley, PT, DPT
Patrice Antony, PT
Debra Barrett, PT
Jennifer Bottomley, PT, MS, PhD
Kathy Brewer, PT, DPT, MED
Chris Childers, PT, MS
Helen Cornely, PT, EdD
Jill Heitzman, PT, DPT, PhD
Ken Miller, PT, DPT
Lise McCarthy, PT, DPT
William Staples, PT, DPT, DHSc
Ellen Strunk, PT, MS

Staff

Executive Director: Christina McCoy, CAE
Membership Management: Kim Siebecker
Marketing and Communications: Jeanne Weiss
Programs and Education: Rachel Connor
Meetings Management: Kim Thompson
Financials: Gina Staskal, CNAP

APTA Geriatrics, An Academy of the American Physical Therapy Association
1818 Parmenter St.
Ste 300, Middleton, WI 53562
geriatricspt.org · 866-586-8247

GeriNotes

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.

From the Editor



Michele Stanley
Editor,
GeriNotes

What the heck?! Have you felt the same way during the past couple of months as you've either been sheltering in place or feeling close to freak-out at times at work? Therapists furloughed and outpatient clinics closed? Really? Not letting people walk in the halls of their ALFs or SNF? Always wearing a mask because our peeps are so, so vulnerable? Juggling the known science, the historical experience from past viral outbreaks, the community fears

and developing conspiracy theories, being the best, most ethical and professional person that you are able to be which doesn't even address your role as parent, spouse, adult child?

I'm sure that each of you has your own story about living through the pandemic that doesn't appear to be ending any time soon. At **GeriNotes**, we love a good story. Please send us yours about the way that you and your patients or family have dealt with the pandemic.

This does not have to be a HUGE task or full-blown paper (unless you are feeling inspired!) A paragraph that details a way that you have successfully worked around the restrictions, a quick tip that other therapists may benefit from, an inspiring or funny quote/anecdote from an adorable patient, action shots, snippets that can be combined into a story about all of us and these strange times. Is video more your style? We can embed even smart phone-based quick videos. Is TikTok your style? We can find a way to make that work too.

As I have always told my patients, especially the obviously apprehensive ones, PT actually stands for Party Time because we make it fun! I know that you are all creative – just do it!

Meanwhile check out our pages for some helpful clinical tips: telehealth, spaced retrieval learning, improving your exercise prescription, the NIH toolbox.

A new and recurring feature will be "Journal Club today, Clinic Tomorrow" featuring a clinical case report based on a recent **JGPT** article. If you've never attended a Journal Club, we've switched to a Zoom format. The next one will be July 21. Only an hour, they open a fascinating discussion of the whole research vs application business (the medical farm-to-table concept) – another member benefit of our Academy.

Have you noticed all the fantastic resources that APTA-Geriatrics, as well as the other APTA components, have been offering up? Check out the APTA website.

Join in on the discussions on the APTA Geriatrics Discussion Group: www.facebook.com/groups/geriatricspt and follow us on [Facebook](#) and [Twitter](#).

CSM Abstracts Ready to Download

There is a LOT of great information presented at every CSM! Check out these poster and platform abstracts presented by our Academy members in the past two years. Also find them on the lower right-hand side of the home page at www.jgeript.org.

[2020 Poster Abstracts](#)

[2020 Platform Abstracts](#)

[2019 Poster Abstracts](#)

[2019 Platform Abstracts](#)

If you are in the PAP version, click on the PDF icon to download them.

PICTURES! Send your favorite photos of active interesting older adults or therapy sessions for possible future use on the cover of GeriNotes. We'd love to feature the work of the photographers amongst us. You must own the copyright to the photo and be able to obtain a subject's release. Send to gerinoteseditor@gmail.com.

GeriNotes

Editor

Michele Stanley, PT, DPT
gerinoteseditor@gmail.com

Authorized Organization's Name and Address

APTA Geriatrics, An Academy of the American Physical Therapy Association
1818 Parmenter St.
Ste 300 Middleton, WI 53562

Newsletter Deadlines:

February 10
April 15
July 10
September 1
November 15

Statement of Frequency

5x/year:
January
March
May
August
November

GeriNotes is the official magazine of the Academy of Geriatric Physical Therapy. It is not, however, a peer-reviewed publication. Opinions expressed by the authors are their own and do not necessarily reflect the views of the APTA Geriatrics. The Editor reserves the right to edit manuscripts as necessary for publication.

All advertisements that appear in or accompany GeriNotes are accepted on the basis of conformation to ethical physical therapy standards, but acceptance does not imply endorsement by the APTA Geriatrics.

Copyright © 2020 by APTA Geriatrics, An Academy of the American Physical Therapy Association. All rights reserved.
ISSN 2692-1588

Thoughts From the Front Line

Thoughts and Personal Experiences on the Pandemic

Where am I personally/professionally? The two are intertwined at this time. My work has become me — full time. My family has been so supportive as I continue to acknowledge that they have taken a back seat and are doing so much to support me mentally and physically. As you know, Mardi Gras did not serve Louisiana well this year. It put us in the hot seat with COVID-19. I will give you a very personal account of happenings, but ask they stay between [therapists] as the media has a way of putting a negative spin on the most valiant acts of service within nursing homes at this time. Of the many facilities we contract therapy into, only two have a significant number of cases. Those two have tested all residents.

The SNF where I am assigned has been proactive from the beginning. In March, to help lower the risk of cross contamination, the facility assigned “usual” staff to work in only one home. They closed the doors to non-essential visitors/vendors, families of residents, etc., and began strict handwashing protocols, temperature checks, and masking before it was mandated by State government or CMS. In spite of these efforts, COVID came in. We began with a positive patient and a positive CNA; then more patients began having fever. A small isolation hall was established for anyone going to dialysis or out to hospital, as their risk for exposure was higher. We tried to carry on with “therapy as usual,” providing activity, exercise, and occupation for a home full of elderly individuals deprived of “normal activity” and a reduction in socialization.

I literally had daily emotional breakdowns, from anxiety and bad news that came too often. I would hold my breath, even masked with two masks, every time I would be close enough to breathe on a patient. I did not want my toilet training to possibly kill someone I loved so dearly, always in fear I may have been exposed and not knowing if I was shedding virus. It is like the grim reaper was walking down our halls, randomly pointing out individuals. We began to lose people. COVID tore through our hospice patients (I am crying just typing; we are in desperate need of closure when this is over).

In a truly heroic call between our administrator and director of nursing, all residents were packed up with a few days worth of clothes and three personal items. All closets and other personal belongings were moved to the cleared-out dining room to be thoroughly sterilized. EVERY resident was then tested. A hall was locked down and residents were re-roomed based upon test results. We were half positive. That was a hard day for every staff member, as well as for all families that needed to be notified. That was a Saturday. On Monday, we re-organized our caseloads and got back to our modified version of work.

I was not OK. I prayed and felt like I was not where I needed to be. I began talking to my bosses and to the heads of the nursing home. I reminded them that this is a respiratory virus, and being bed-bound would increase the risk of things going bad. They decided to allow therapy to begin on the COVID hall, but we had to be fully committed and NOT return to the other side of the home until this whole thing is over. So, for the past two weeks, a PTA and I have transitioned to full-time corona therapists. My anxiety is so much better, which is odd since I know I am working with ONLY positive people. It wasn't the virus that scared me, it was all of the unknowns.

I feel we have adequate PPE to protect ourselves and those we are treating. I love being able to provide them with activity and engagement. Our hospitalizations have slowed, and we have not had any more deaths. Our first group of nine asymptomatic patients have tested negative, and await one more negative result before they head to the other side of the fire doors, into our step down unit. We have a team of therapists on the other side that eagerly await their transition.

Don't get me wrong, it still sucks. However, I am a hard-core optimistic, so this little ray of sunshine has renewed my spirit. I wear a mask all of the time, and watch people in public look at me as if I am part of this radical anti-corona come-back movement. I believe in things slowly opening, but in my mind, I accept their inappropriate judgement and know that I am protecting THEM because I know how I just spent my day. So, as of now, I am an exhausted, never been more fulfilled, geriatric, COVID treating therapist. I still could not love my job any more than I do. I work with heroes who are taking so much pride in loving and protecting our GREATEST GENERATION. Nursing homes always bear some of the heaviest burdens. It will be that way again. The good that we are doing will go undocumented, but I believe God sees it all.

Our profession: I feel the biggest supporter of therapy, in these times, lie with the Corona survivors. While media highlights doctors and nurses (and they should be recognized), I have heard on NUMEROUS occasions the recovered persons themselves state, “I still have a lot of rehab to get me back to where I was before.” They mention PT and OT. Is there any way to harness what we mean to these people, and let that message be a reminder that we are here, we have not stopped, and we will continue to be on the frontlines to maximize quality of life?

—Name withheld by request

Gerinotes and APTA Geriatrics welcome your letters, ideas and opinions. Please sign the letter; we will withhold your name from publication if you desire. Mail correspondence to gerinoteseditor@gmail.com.

Delivering Therapy in Challenging Times

by Ellen R. Strunk, PT, MS

This issue’s President’s Message said it well: “We are certainly living in unfamiliar and challenging times.” Therapists working in post-acute care settings have experienced a number of highs and lows over the last 12 months. The Patient Driven Payment Model and Patient Driven Grouper Model came and went, along with the revised definition of group therapy in the Skilled Nursing Facility (SNF) and the allowance of therapist assistants providing maintenance therapy in Home Health Agencies (HHA). These changes brought rough waters to navigate, but also enormous opportunities to rethink how we delivered care.

And now, before we even had a chance to “settle in” to these models, we are having to rethink how we deliver care *again*. The coronavirus public health emergency is challenging our health care system in ways never seen before. And we, as physical therapists and physical therapist assistants are stepping up to meet those challenges.

Our collective voice in advocating for changes to the system has been heard. At the time of this writing, there has been legislation or waivers that allow the following:

3/17/2020: The U.S. Department of Health and Human Services notified it is “exercising discretion” in how it applies HIPAA privacy rules during the COVID-19 health emergency, saying it won’t impose penalties against

covered entities or business associations for disclosure of private health information if the disclosure was made in “good faith” by the business associate as part of public health efforts, and if the business associate notifies the covered entity of the disclosure within 10 days. (However, state privacy and data protections still apply, unless they were waived by the state.) (<https://www.hhs.gov/about/news/2020/03/17/ocr-announces-notification-of-enforcement-discretion-for-telehealth-remote-communications-during-the-covid-19.html>).

3/18/2020: Therapists to provide and bill for limited digital communication services, including e-visits.




3/20/2020: Financial relief to current students and graduates with student loan debt during the national emergency (<https://www.ed.gov/news/press-releases/delivering-president-trumps-promise-secretary-devos-suspends-federal-student-loan-payments-waives-interest-during-national-emergency>).

3/22/2020: Waivers relaxed quality reporting deadlines for the MIPS program and other Quality Reporting Programs. Reimbursement programs for employers required to provide COVID-19 related paid leave to their employees.

3/27/2020: CARES Act temporarily lifted the 2% Medicare sequestration on all Medicare providers. The 2% across-the board cut is lifted between May 1, 2020 and

Table 1. Remote Patient Monitoring

Accurate as of 5/5/2020

SERVICE	DEFINITION	APPLICATION	EXAMPLES
Remote Patient Monitoring (RPM)	The collection of physiologic data (for example, ECG, blood pressure, glucose monitoring) digitally stored and/or transmitted by the patient or caregiver to the provider. Asynchronous: Data goes one way. 	PART A – HOME HEALTH SERVICES <ul style="list-style-type: none"> Remote patient monitoring can be ordered as part of a HH POC but they cannot be reported as a “billable” visit without the provision of another in-person skilled service. Visits to a beneficiary’s home for the sole purpose of supplying, connecting, and/or training the patient on the remote patient monitoring equipment, without the provision of another skilled service are not separately billable. However, HHAs may include the costs of remote patient monitoring as an allowable administrative cost if remote patient monitoring is used by the HHA to augment the care planning process. 	<ul style="list-style-type: none"> The use of RPM must be related to skilled services already being provided by the nurse/therapist/therapist assistant; Can be utilized by nurse/therapist/therapist assistant to ‘optimize’ care The use of RPM must be included on the HH POC: <ul style="list-style-type: none"> Include a description of how it will help to achieve the goals in the POC without substituting for an in-person visit; The use of RPM can be added through a verbal order Glucose monitors can be used for patients with diabetes to monitor blood sugar levels, and blood sugar response to exercise sessions. Blood pressure monitors can be used to monitor hypertension, but also to insure patients’ blood pressure responds appropriately to exercise sessions. Heart rate monitors can be used to monitor patient adherence to exercise prescription. Oxygen saturation can be used to monitor COPD, but also to insure patients’ oxygen saturation responds appropriately to increased activity. Step monitors can help therapists know the frequency and type of activities the patient is engaging in at home, as well as their level of engagement in their home exercise program. Using a combination of one or more of these data points, a therapist might be able to reduce the frequency of in-person visits per week to reduce the risk of infection to the patient.
	Does not include use of phone or video.  Non –billable service 	PART B <ul style="list-style-type: none"> Same as above Can be used as an adjunct to an outpatient therapy plan of care if state practice act allows, but Medicare does not recognize PTs as eligible to furnish and bill for these services. 	

December 31, 2020. The bill included grants to colleges and university students whose education was disrupted due to the COVID-19 outbreak (<http://www.apta.org/PTinMotion/News/2020/04/14/CARESActStudentGrants/>);

3/28/2020: The Centers for Medicare and Medicaid Services (CMS) expanded the Accelerated and Advance Payment Programs for Medicare providers. However, beginning April 26, CMS will not accept any new applications for the Advance Payment Program. CMS will be reevaluating all pending and new applications in light of historical direct payments made available through HHS's Provider Relief Fund. Additional funding will continue to be available to hospitals and other health care providers through other programs (<https://www.cms.gov/files/document/accelerated-and-advanced-payments-fact-sheet.pdf>);

3/30/2020: State Medicaid programs received federal 1135 waivers on a number of requirements such as prior authorization, provider enrollment, public notice mandates and fair hearing request timelines (check with your state Medicaid agency for details).

4/10/2020: COVID-19 funds sent directly to health care providers for relief during the crisis (<https://www.apta.org/PTinMotion/News/2020/04/17/CARESReliefInstructions/>);













[org/PTinMotion/News/2020/04/17/CARESReliefInstructions/](https://www.apta.org/PTinMotion/News/2020/04/17/CARESReliefInstructions/));

4/30/2020: CMS issued guidance via an interim final rule that it would now include PTs in private practice to bill for services provided through real-time face-to-face technology (<https://www.cms.gov/files/document/covid-medicare-and-medicaid-ifc2.pdf>). APTA continues to seek clarification regarding whether hospital outpatient departments, SNF outpatient departments and HHAs billing for outpatient services are eligible to bill for telehealth services furnished by PTs under Medicare Part B, as the language in the interim final rule and accompanying guidance is unclear.

In the midst of these "wins," patient care must go on. The rules and guidance about how to deliver that care is rapidly changing. While that makes it more challenging to track, it is also evidence we are (hopefully) learning along the way. Tables in this article provide general information about what technology-based services are available to physical therapists at the time of this writing (as of May 5, 2020). APTA has a series of web pages dedicated to current information relative to federal payer coverage,

Table 2. Communication Technology Based Services

Accurate as of 5/5/2020

SERVICE	DEFINITION	APPLICATION	EXAMPLES
<p>Communication Technology Based Services (CTBS)</p>	<p>Services delivered via telecommunications technology but are not considered Medicare telehealth services. Includes services that are ordinarily furnished in person but can be furnished using a telecommunications system.</p> <p>4 kinds PTs can furnish and bill under Medicare:</p> <ol style="list-style-type: none"> Remote Evaluations of Recorded Video and/or Images (G2010) Virtual check-ins (HCPCS G2012) E-visits (HCPCS G2061-G2063) Telephone assessment and management services (CPT codes 98966-98968) <p><i>For all services 4 services, if the furnishing of the service is related to a service provided in the previous 7 calendar days, OR if the service is related to a visit made in the next 24 hours or next available appointment, the service cannot be billed.</i></p>	<p>PART A</p> <ul style="list-style-type: none"> CTBS represent patient care strategies that can be included as part of a POC. They are not separately "billable" services. They cannot be used to replace an in-person visit <p>PART B</p> <ul style="list-style-type: none"> In its March 30 interim final rule, CMS gave billing guidance for CTBS for "private practice" therapists. It is unclear whether Hospital OP departments, SNFs, HHAs or Rehabilitation Agencies (as an institutional setting) can bill these codes when delivering home care services to outpatients under the Medicare Part B benefit. Check with your Medicare Administrative Contractor. <p>*Asynchronous: Data goes one way.</p>  <p>¹Response via text </p> <p>²Response via audio </p> <p>³Response via secure email </p> <p>⁴Response via portal: </p> <p>#Billable service </p>	<ul style="list-style-type: none"> HCPCS G2010*^{1,2,#} (<i>Remote evaluation of recorded video and/or images submitted by an established patient</i>): <ul style="list-style-type: none"> On 5/8, an established patient sends video to therapist of a movement causing pain. It was not a complaint the patient reported on the evaluation conducted on 5/1; On 5/2, therapist reviews the video and calls the patient to discuss and offer guidance;  Therapist plans next visit on 5/4.  HCPCS G2012*^{1,2,#} (<i>Brief communication technology-based service (5-10 minutes of discussion), e.g. virtual check-in</i>): <ul style="list-style-type: none"> A patient was evaluated on 5/1 and treated again on 5/5. New exercises were added on 5/5 to his HEP; On 5/8, established patient leaves message with therapist asking a question about his HEP; Therapist contacts patient to answer his questions, spending approximately 5 minutes;  Therapist confirms patient's next appointment on 5/12. HCPCS G2061-G2063*^{3,4,#} (<i>E-visits: non face-to-face patient-initiated digital communications that require a clinical decision that otherwise typically would have been provided in the office</i>) <ul style="list-style-type: none"> A patient was evaluated on 5/1 and told about the option for e-visits to limit her exposure to infection;  On 5/8, patient contacts therapist through secure email and reports difficulty with using her cane on stairs; On 5/9, therapist responds to patient via email to answer her questions, spending approximately 5 minutes;  Therapist confirms patient's next appointment on 5/12. Telephone assessment and management service*^{2,#} are services provided to an established patient who initiates the call. The patient/guardian must give their consent. <ul style="list-style-type: none"> CPT 98966; 5-10 minutes of medical discussion  CPT 98967; 11-20 minutes of medical discussion CPT 98968; 21-30 minutes of medical discussion

commercial payer telehealth coverage, state-related actions related to nonfederal payers, state actions permitting PTs to provide telehealth, and occupational medicine providers telehealth coverage. Members are encouraged to bookmark the following pages in order to stay current on COVID-19 payment and regulatory topics:



- <http://www.apta.org/Telehealth/>
- <https://www.apta.org/Telehealth/COVID-19/Modalities/>
- <http://www.apta.org/PTinMotion/News/2020/4/30/CMSOpensTelehealth/>
- <http://www.apta.org/Coronavirus/>



Ellen R. Strunk is President and Owner of Rehab Resources & Consulting, Inc., a company providing consulting services and training to providers in postacute care settings with a focus on helping customers understand the CMS prospective payment systems. She also lectures nationally on the topics of pharmacology for rehabilitation professionals, exercise & wellness for older adults, and coding/ billing/ documentation to meet medical necessity guidelines and payer regulations.

Table 3. Telehealth

Accurate as of 5/5/2020

SERVICE	DEFINITION	APPLICATION	EXAMPLES
Telehealth	<p>A health service delivered by a health professional licensed, certified, or otherwise entitled to practice in this state and acting within the scope of the health professional’s license, certification, or entitlement to a patent at a different physical location than the health professional using telecommunications or information technology.</p> <p>It is not delivery of health care services by means of audio-only telephone communication, fax machine, or electronic messages alone.</p>	<p>Synchronous: Two-way electronic audio and visual communications where both the patient and the provider are communicating in real-time.</p>  <p>Medicare Billable service – it depends!</p> <ul style="list-style-type: none"> • Private practitioners: Yes, PTs & PTAs • Hospital OP departments: Yes, although the services are not technically “telehealth”, hospitals may bill for services provided by PTs & PTAs to registered outpatients, provided they register the patient’s address as a temporary expansion location. • Rehabilitation agencies, SNFs, and HHAs billing Part B: it is unclear whether Medicare allows it. • HHAs billing Part A home health services can use telehealth with its homebound patients, but they cannot replace needed in-person visits as ordered on the plan of care. They cannot be reported on the HH claim. 	<p>The therapist is generally in his/her office, referred to as the “distant” site. The patient is generally in his/her home referred to as the “originating” site. <i>Note: Medicare typically does not allow the patient’s home to be the “originating” site, but it is allowed during this public health emergency.</i></p> <p>Physicians and private practice physical therapists can furnish telehealth services as the distant site provider and bill Medicare for such services.</p> <p>In a recent CMS Office Hours teleconference, it was announced hospitals could choose to follow a process that would enable PTs and PTAs who furnish therapy in the hospital outpatient department to furnish remote care to registered outpatients — provided the hospital registers the patient’s address as a temporary expansion location. It’s up to each hospital to determine whether it’s necessary and feasible to add a temporary expansion location to its provider-based department, but if it’s within scope of practice and doesn’t run counter to state laws and regulations, hospital-employed PTs and PTAs could be eligible to provide remote therapy to patients registered as hospital outpatients, and the hospital would bill as if the services were provided in person. But the hospital first must register the patient’s home as a temporary expansion location of the hospital’s outpatient department, referred to as the provider-based department or PBD, during the public health emergency. Registration includes justifying the need to add a relocation site such as a patient’s home.</p> <p>There are no special CPT codes for telehealth services. The one-to-one codes regularly billed by physical therapy are placed on the claim, representing the type of service delivered. Although Place of Service (POS) code ‘02’ was the means by which the payer identified the service was provided via telehealth in the past, many payers, including Medicare have advised providers to bill using the POS code where the services would have been provided if not for the COVID-19 pandemic (e.g. office). It is important to check with your payer since it varies by payer and payer type. There are non-Medicare payers allowing an institutional setting, such as a Hospital OP department, Rehabilitation Agency, or SNF and HHA providing outpatient services to furnish and bill for telehealth services However it is dependent on the payer. These are all things that need to be verified with each payer and Medicare Administrative Contractor (MAC) as well as which codes and modifiers need to be used.</p>



Just Right: Medicine That Works

by Mariana Wingood, PT, DPT, and Dale Avers, PT, DPT, PhD, FAPTA

Physical therapists are experts in movement systems and exercise prescription, particularly among adults who are older and/or need modifications of an exercise prescription secondary to comorbidities, impairments, mobility limitations, or activity restrictions. Appropriately dosed exercise prescription can make significant changes in any older adults' function, activity participation, and quality of life.

In fact, when exercise is appropriately prescribed, sedentary and frail older adult's maximal strength (defined by 1 repetition max -RM) increases by 6.6 - 37%, muscle mass increases from 3.4 - 7.5%, muscle power increases by 8.2%, and functional capacity improves by 4.7 - 58.1% in as little as 12 weeks.¹ These gains require therapists to be fully current in research advances for best exercise prescription. APTA Geriatrics assembled a working group to assimilate all the latest literature into the Table on the next page.

The table headers are based on the ACSM's FITT (Frequency, Intensity, Time, and Type) principles. The use of the FITT principles can ensure that the exercise domain is appropriately dosed. Exercise domains: aerobic capacity, strengthening, flexibility, and balance are located in the table's rows. The intensity column provides clinicians with guidance on starting and progressing deconditioned individuals.

The following cases provide examples on how to implement the FITT principles into your daily practice:

1. Patient with COPD

A 72-year-old former smoker has a BMI of 37 and a history of sedentary activity involving television watching and socializing from a chair. He has stable COPD with a forced expiratory volume (FEV) of 45%. He has been on disability since the age of 57. He uses oxygen at 1L/min prn. Other medical history includes medication-controlled hypertension (Propranolol), hyperlipidemia, diabetes (Metformin), prostatitis, and bilateral knee arthritis (pain with transitions and weight-bearing of more than five minutes at an intensity of 3-6/10). He uses a cane for ambulation outside his home. He desires to be able to walk comfortably up to one mile to visit his friends and family and to not feel so tired. He is accepting of pool exercise, which may be more comfortable for his knees.

Exercise Test/Outcome Measure: Six-Minute Walk: 235 feet (76.5 meters) with two standing rest breaks of 25 seconds each with an increase in heart rate of 12 beats/minute (78 to 90) and blood pressure from 148/90 to 160/92. Self-reported dyspnea was 3 and perceived exertion was 4.

Exercise Prescription (FITT): aquatic exercise in waist

Table 1: Compiled Exercise Prescription for Older Adults¹⁻⁷

	Intensity	Volume	Frequency	Type
Aerobic Capacity	Moderate intensity: May need to start at 30-50% for severely deconditioned individuals. Progress towards: <ul style="list-style-type: none"> • 40-60% HRR* • 5-6/10 RPE 	<ul style="list-style-type: none"> • 30 up to 60 min/day in bouts of at least 10 minutes (longer time for greater benefit) • Total 150-300 min/week 	5/week	<ul style="list-style-type: none"> • Walking • Dancing • Swimming • Water aerobics • Speed walking or jogging • Aerobic exercise classes • Bicycle riding (non-recumbent stationary or on a path) • Elliptical type machines • Some gardening activities such as raking and pushing a lawnmower, tennis, and golf (without a cart) • General: any exercise type that does not impose excessive orthopedic stress.
	Vigorous Intensity: <ul style="list-style-type: none"> • 60-90% HRR • 7-8/10 RPE 	<ul style="list-style-type: none"> • 20-30 min/day of more vigorous exercise • Total 75-100 min/week. 		
Strengthening	Moderate intensity: 60%-70% 1-RM	Initially focus on form and comfort with exercise before increasing resistance <ul style="list-style-type: none"> • 8-10 exercises involving the major muscle groups • 1 set of 10-15 reps each (if done to failure, equates to 60-70% 1RM) 	<ul style="list-style-type: none"> • 2/week 	Progressive resistance training such as lifting weights, using machines, working with resistance bands, using body weight for resistance (such as push-ups, pull-ups, and sit-ups), climbing stairs, carrying heavy loads, and heavy gardening.
	Power** incorporating power when patient can perform full set with no pain or compensations	<ul style="list-style-type: none"> • 1-6 sets of 4-20 reps at 20-80% 1 RM • 1-11 exercises 	1-3/week	Any of the above exercises with the addition of a speed component.
Flexibility	Stretch to the point of feeling tightness or slight discomfort.	Shoulders, hips, back, wrists, hamstrings, ankles Hold the stretch for 30-60 seconds.	2/week- preferably performed on days aerobic activity is performed.	Slow movements into sustained positions that result in a stretch.
Balance	<ul style="list-style-type: none"> • Rated moderate intensity. • Progressively challenging postures that reduce the base of support and challenge sensory input. • Start static if necessary and quickly progress to dynamic. 	90 minutes/week	2-3 days/week	Any activity that promotes agility during movement such as multi-planar walking, stepping over and around obstacles, moving the head while walking, transitioning to different height surfaces, moving in different environments, stooping, crawling, bending, etc.

Abbreviations: HHR-Heart Rate Reserve; RM: one repetition max

* Recommend bookmarking a Heart Rate Reserve Website or downloading an app calculator such as: Karvonen Formula Calculator (HIOX Softwares Pvt Ltd)

**A lot of variability in the literature

high water⁹ 2x/week for up to 45 minutes/session, monitoring blood pressure because of hydrostatic pressure. Land-based resistance exercise¹⁰ 1x/week progressing to 3x/week over an eight-week period.

Frequency: 3x/week of supervised exercising, progressing to daily walking

Intensity: 60% of VO₂ peak or 1 RM (3-4 on m-Borg scale) for two weeks; then increase to a target intensity of 80-85% VO₂ peak or 1RM. One-set to failure of each exercise, progressing to two sets. High-intensity interval training in bouts that are feasible, but challenging.¹¹

Time: minimum of eight weeks, transition to physical activity program that includes aerobic walking and strengthening for a minimum of 150 minutes/week.

Type: aquatics (aerobic) and land-based therapy (strengthening). Start with aquatics to increase exercise tolerance in weight-bearing with one session/week of land-based therapy for strengthening legs (e.g. leg press, sit-to-stands, mini-squats, lateral walking, shallow lunges off BOSU). Progress to 3x/week of land-based therapy with a gradual decrease in aquatic therapy sessions.

2. Patient who is identified as being frail

An 87-year-old female with a BMI of 23 who lives in a retirement home with meals provided, complains of being tired and having no energy. Active medical history of osteoporosis (BMD of hip of -3.0), two old compression fractures at L3 and L4, kyphosis, stress and urinary incontinence and two falls in the past year without fracture. Walks with a wheeled walker. Wants to have better balance and protect herself from falling and “breaking.”

Exercise Test/Outcome Measures and Results: Floor-to-stand transfer (unable without personal assistance), Six-Minute Walk Test (completed four minutes with 6x 4 standing rest breaks due to fatigue, distance of 84 meters with an increase in heart rate of 10 beats/min, no change in blood pressure (128/86mm/Hg), timed 30-second sit-to-stand (0 - unable to stand without using arms), four Square Step Test (22 seconds using 2 canes), Functional Gait Assessment (8/30).

Exercise Prescription (FITT): Purpose is to improve balance and agility and strength to facilitate transfers with control and less effort and long-distance walking.⁵

Frequency: 5x/week of supervised balance/agility training and strengthening

Intensity: Perceived effort of 3-5/10 and balance and agility till deterioration in performance indicating fatigue. One-set to failure of each strengthening exercise, progressing to two sets. Progress to power activities.

Time: A total of two hours balance/agility training/week for a minimum of 12 weeks spread out over five days/week. Strengthening of 20-30 minutes/session each day alternating lower extremity/total body/ trunk/core for a minimum of 12 weeks transitioning to physical activity program. Goal is active engagement in an exercise program without rest breaks unless requested.

Type: Multi-planar stepping and walking, minimizing hand holds using Clock-me App; reactive balance control (starting and stopping, stepping over obstacles, turning, figure 8, resisted walking, incorporating head movements, rapid movements using Blaze-Pods, etc); strengthening of lower extremities and trunk (e.g. partial lunges, wall sits, sit to stands, leg press, mini-squats, sumo-squats, kettlebell swings, bent-over rows, deadlifts, overhead press, log rolls with arms overhead, resisted PNF trunk patterns, functional tasks).

3. Patient with arthritis and chronic pain

A 72-year-old female with chronic history of disabling knee, hip and back pain has limited mobility and promoted excessive sedentary activity. BMI of 42. Ambulates in her apartment using a rolling walker. Rarely leaves the home which requires three stairs to the outside. Medical history includes s/p R and L total knee replacements five and seven years ago, spinal stenosis with symptoms brought on with standing, diabetes (insulin controlled), controlled hypertension, ASCD (controlled with beta-blockers which can cause dizziness upon standing), and occasional gout in feet. Patient desires to “feel better” which translated to walking around her apartment without fear of falling, going outside to meet her driver without using a wheelchair, and being able to socialize (go out to lunch) with her brother and friend.

Exercise Test/Outcome Measures: Six-Minute Walk Test (using 20-foot walkway in home 140 feet in two minutes without rest break with self-perceived dyspnea of 5/10 and mBorg of 6/20 and knee and back pain of 8/10 requiring patient to sit down); usual walking speed (0.35m/s); Timed Up and Go (14 seconds with walker), 30-s Sit to Stand (unable), Functional Gait Assessment (12/30).

Exercise Prescription: Home-based therapy¹² to improve strength, balance and agility, and tolerance to activity within pain tolerance of 2 points higher than at rest.⁷

Frequency: Work up to 150 minutes/week starting with 10-minute “exercise snacks” multiple times/day to break up sitting episodes.

Intensity: Start at 30-50% of 1 RM (3-4 m-Borg) increasing to 60-80% 1 RM and 5-7 m-Borg. One set to failure of each strengthening exercise, progressing to two sets. Balance/agility exercises to failure. Pain may be limiting factor initially, until tolerance increases.

Time: Minimum of 16 weeks transitioning to physical activity program in the community.

Type: Sit-to-stands using arms, lower self slowly (eccentric); heel rises, mini-squats, back extensions as tolerated. Multi-planar stepping with a walker, then transitioning to two canes as tolerated. Incorporate head turns during stepping. Sit-backs, bent over rows, deadlifts, standing marches for trunk strength (keeping trunk erect as tolerated).

References:

1. Lopez P, Pinto RS, Radaelli R, et al. Benefits of resistance training in physically frail elderly: a systematic review. *Aging Clin Exp Res.* 2018;30(8):889-899.
2. Fragala MS, Cadore EL, Dorgo S, et al. Resistance training for older adults: position statement from the National strength and conditioning association. *The Journal of Strength & Conditioning Research.* 2019;33(8).
3. American College of Sports Medicine RD, Ehrman JK, Liguori G, Magal M, eds. *ACSM's Guidelines for Exercise Testing and Prescription.* Tenth Edition ed. Philadelphia, PA: Wolters Kluwer; 2018.
4. Committee PAGA. *Physical Activity Guidelines Advisory Committee Scientific Report* Washington, DC2018.
5. Jadozak AD, Makwana N, Luscombe-Marsh N, Visvanathan R, Schultz TJ. Effectiveness of exercise interventions on physical function in community-dwelling frail older people: an umbrella review of systematic reviews. *JBI database of systematic reviews and implementation reports.* 2018;16(3):752-775.
6. Papa EV, Dong X, Hassan M. Resistance training for activity limitations in older adults with skeletal muscle function deficits: a systematic review. *Clin Interv Aging.* 2017;12:955.
7. Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *Cochrane Database of Systematic Reviews.* 2017(4).
8. Byrne C, Faure C, Keene DJ, Lamb SE. Ageing, Muscle Power and Physical Function: A Systematic Review and Implications for Pragmatic Training Interventions. *Sports Med.* 2016;46(9):1311-1332.
9. McNamara RJ, McKeough ZJ, McKenzie DK, Alison JA. Water-based exercise in COPD with physical comorbidities: a randomised controlled trial. *European Respiratory Journal.* 2013;41(6):1284-1291.
10. Loprinzi PD, Sng E, Walker JF. Muscle strengthening activity associates with reduced all-cause mortality in COPD. *Chronic illness.* 2017;13(2):140-147.
11. Shiraev T, Barclay G. Evidence based exercise: Clinical benefits of high intensity interval training. *Australian family physician.* 2012;41(12):960.
12. Sato M, Ye W, Sugihara T, Isaka Y. Fracture risk and health care resource utilization and costs among osteoporosis patients with type 2 diabetes mellitus and without diabetes mellitus in Japan: retrospective analysis of a hospital claims database. *BMC musculo-skeletal disorders.* 2016;17(1):489.



Mariana Wingood, PT, DPT, GCS, CEEAA is a PhD student at the University of Vermont and a clinician at the University of Vermont Medical Center-Inpatient Rehab.



Dale Avers, PT, DPT, PhD is a professor of physical therapy education at Upstate Medical University and is a Fellow of the American Physical Therapy Association.

Telehealth: A Reflection on Adaptability and Having Intentions for the Future

by Christina Crawford PT, DPT, MSHS

Telehealth physical therapy has been implemented for years.¹⁻² Yet, this digital practice is not used by everyone for various reasons.³ During the COVID-19 crisis, many therapists successfully explored and implemented telehealth to maintain a therapeutic connection with patients while respecting the social distance guidelines. Reflecting on the populations served, this may have been the most responsible choice. According to the Centers for Disease Control and Prevention, telemedicine is a known way to maintain infection control standards while providing evidence-based health care.⁴ As one example, digital practice has kept immunocompromised individuals with cancer at a lower risk while improving patient satisfaction, clinical outcomes, and care coordination.⁵ When the threat of the coronavirus is reduced and we demask ourselves, the risk of other infections do not leave with it. Before we return to what we once thought was normal, a few lessons may be worth carrying forward.

Telehealth Readiness

Implementation of telehealth should be well planned with sufficient setup time. Assuring all staff are ready for digital practice will be important. Staff training may want to include front line personnel, schedulers, providers, and the business team that helps manage reimbursement. Educating the cleaning crew may also be important. From experience, having equipment unplugged and re-arranged for a nightly cleaning in the clinic can cause delays in care the next day. Any patient care staff that interacts with a patient should be able to have a conversation about telehealth between setting up an appointment or providing a handout to guide the patient once they are home. If telehealth can become a daily practice, the conversation becomes much easier for all in the office.

In a telehealth appointment, maintaining best practice is essential.⁶ Adhering to the state practice act will guide each organization. Generally speaking, a telehealth platform should have the proper encryption to secure patient privacy. A provider should be located in an enclosed area for physical privacy on that end while the patient may elect to have family or friends present on their end. The use of a headset may help with audio to reduce background noise. During the appointment, the patient should also be encouraged to close other browsers and minimize use of the Internet on other devices in the home. This may improve their connection and also minimize the risk of privacy violations on their end.

The provider will want to document who is present and the physical location of the provider and patient. This may be required for billing but may also be important for an emergency. At the initial visit, a provider may want to consider discussing and documenting the patient's emergency plan if anything were to happen in the telehealth appointment. Knowing where the patient is physically located and their emergency contact will be essential if the patient needs help while under digital care. Providers should get consent as well.⁶ The informed consent must reflect the state practice act.⁶ This consent may include limitations of telehealth compared to in-person or technology failure risks.⁶ The consent may need to be done in-person or done digitally depending on the state and payer source. An example of a consent form can be found [here](#), compliments of the Upper Midwest Telehealth Resource Center. Keep in mind, that form may not meet your legal requirements.

“Telehealth is social distancing while keeping patient-centered care at the forefront of the intentions.”

In an environment when laws and coverage is ever-changing, call insurance companies frequently. Check the [state practice act](#) for updates and stay in communication with your [geriatric state advocate](#). Check for [telehealth policy updates and changes](#) regularly. With the abundance of considerations to implement telehealth lawfully and safely, it will take a team. APTA continues to update information on [telehealth](#) to guide practice. Getting connected with the local [Telehealth Resource Center](#) can be helpful as well.

Equipment

Telehealth requires innovation. Each end will need a computer, smart phone, or tablet with Internet and camera. Once connected with a patient, the equipment needs might vary. Proper lighting is a part of setting up a telehealth appointment. Having the face illuminated and using warm lighting is beneficial.⁶ A general rule is to have

the background darker than the face.⁶ Room lighting that is the same throughout the room may make it difficult for an older adult's eyes to adjust.⁶ Eye contact is important but consider shifting the gaze occasionally throughout the session.⁷ Direct eye contact is good but there are cultural considerations.⁷ Placing the camera about seven degrees above the eyes is recommended for a natural visual set up.⁷ Minimize clutter in the background and avoid having the camera face a door or window.⁶

What do you do once you're in a telehealth appointment? Since you do not have your hands or machines in the patient's home, you continue to use clinical decision making. In fact, the need for using other skill sets may even be amplified. Anecdotally, a provider may likely need the experience and expertise to optimize the digital appointment. Ideally, an initial evaluation is done in-person. With the coronavirus and social distancing, many first encounters were done remotely. Clearly communicating and documenting the limitations about a remote evaluation has been important in practice. Keeping a focus on objective measures remains important. For example, a

ample, a scarf or dog leash could be used for stretching depending on the body part and patient's strength. Filling an empty gallon jug with water or sand can be useful for strengthening during a sit to stand. Telehealth is not much different than what we would typically do, except we are now able to get a visual of the home and perhaps better guide them in their daily setting. Objectively progressing the interventions is important, as is dosing the intensity. Using a patient's blood pressure cuff, pulse oximeter, or rate of perceived exertion is a great way to objectify baseline measurements or the intensity of the intervention.

Patient Response

Take a moment to think about the patients using telehealth today. They vary in age, sex, ethnicity, and complexity. Why are they coming back to the telehealth appointments? Looking at the literature, patients are satisfied with telehealth.¹⁰⁻¹³ From an experience standpoint, patients express gratitude and surprise. They are intrigued at the ease of connecting and yet impressed by

“With such cases of uninterrupted physical therapy during the COVID-19 pandemic, it is difficult to deny the value of digital practice. Telehealth has effectively enhanced the patient experience and treatment options while leaving room for sustainable functional gains.”

small weighted item in the patient's home can be substitute for the 30 second arm curl test. Although that is not how the test is recommended, it may serve as an objective measure when under strict isolation and restricted access to a patient. This modification still allows for a functional assessment as influenced by a standardized test. The test modifications should be documented accordingly. Using the same weighted item again when retesting the patient is indicated. Consistency matters. Additionally, modifying the two-minute step test and the 30-second sit-to-stand test are also objective considerations when under such limitations. Having the patient count during those tests may be helpful as there may be video delays or broadband issues with movements that are fast. Multiple balance assessment tools have been used successfully through telehealth but more research can strengthen the validity.⁹

When it comes to the interventions, stay creative. Using practical things in a patient's home may enlighten them to better understand how to stay independent with a home exercise program between sessions. For ex-

ample, the physical challenges they can have through a digital appointment. Teaching a patient proper dosing has helped the success of many of their programs whether they are working with me or doing it independently. Telehealth in post-operative physical therapy care has also demonstrated better adherence to home programs when compared to standard physical therapy.¹⁴ Let's teach them to fish!

Telehealth also reduces missed appointments.¹⁶ If transportation becomes an issue, the patient can stay home to attend a digital appointment. Empowering them to be productive despite transportation barriers could be very valuable. Self-efficacy has a major role in the theory of behavior change.¹⁵ Telehealth likely requires that a provider has a grasp on the role of self-efficacy as it pertains to the patient and their goals. Exploring the theoretical implications of telehealth in the future will help all of us better understand why patients like this treatment option and what makes it successful.

Reflection

Working with older adults, many underestimate the ability to adapt to technology. In reality, could this cohort be the most resilient among all of us? As a provider who has used telehealth for years, this pandemic did not cause me or the older adults that I serve to flinch. The plans of care and interventions were not altered, but were used to help train other providers during this time. These patients were ready and they helped teach professionals who were uncertain to change. With such cases of uninterrupted physical therapy during the COVID-19 pandemic, it is difficult to deny the value of digital practice. When I reflect on years of this digital practice, telehealth has effectively enhanced the patient experience and treatment options while leaving room for sustainable functional gains.

Physical therapists are essential but adhering to national recommendations during the time of COVID-19 forced doubt about our role for many. Not me. Telehealth is social distancing while keeping patient-centered care at the forefront of the intentions. You cannot have other patients in the digital clinic while treating with telehealth. Conceivably, this digital practice may enforce a higher standard of care. Perhaps that is why patients like it. If not for infection control, telehealth can potentially enable a provider who has physical limitations to continue to provide care or it can be used as a way to quickly engage a patient who has lost their transportation last minute. Assuring evidence-based practice continues to be implemented remains one of our professional obligations. This should now include digital practice. Perhaps, it is time we recognize the importance of advocating for telehealth as an ethical obligation to better serve patients.

Suggested Links

- [Podcast: Telehealth for Physical Therapy: Why Now More Than Ever?](#)
- [Podcast: Using Telehealth To Help Patients With Advanced Cancer Improve Quality of Life](#)
- [Thinking About Providing Telehealth? Here's Our Top 10 'To-Do' List](#)
- [6 Reasons to Consider Telehealth Physical Therapy](#)

References

1. Cowper-Ripley, Diane C., et al. "Trends in VA Telerehabilitation Patients and Encounters over Time and by Rurality." *Federal practitioner: for the health care professionals of the VA, DoD, and PHS*, vol. 36, no. 3, March 2019, pp. 122-28.
2. Grona, Stacey L., et al. "Use of Videoconferencing for Physical Therapy in People with Musculoskeletal Conditions: A Systematic Review." *Journal of Telemedicine and Telecare*, vol. 24, no. 5, June 2018, pp. 341-355, doi:10.1177/1357633X17700781.
3. Bierman, Randal T., et al. "State Occupational and Physical Therapy Telehealth Laws and Regulations: A 50-State Survey." *International Journal of Telerehabilitation*. vol. 10, no. 2, 2018, pp. 3-54. doi: 10.5195/ijt.2018.6269.
4. Kuhar, David T., et al. "Infection Control in Healthcare Personnel: Infrastructure and Routine Practices for Occupational Infection

- Prevention and Control Services." *CDC Stacks*, pp. 1-70, October 2019, <https://stacks.cdc.gov/view/cdc/82043>
5. Williams, Rob, et al., "Utilization of Telemedicine at Two High-Volume Cancer Care Organizations." *Journal of Clinical Oncology*, vol. 36, no. 15, June 2018, doi: 10.1200/JCO.2018.36.15_suppl.6604.
6. Federation of State Boards of Physical Therapy. "Telehealth in Physical Therapy: Policy Recommendations for Appropriate Regulation." April 2015, <https://www.fsbpt.org/Portals/0/documents/free-resources/TelehealthInPhysicalTherapy2015.pdf>
7. American Telemedicine Association. "Let There be Light: A Quick Guide to Telemedicine Lighting." November 2017.
8. American Telemedicine Association. "A Concise Guide for Telemedicine Practitioners: Human Factors Quick Guide Eye Contact." February 2016.
9. Nithman, Robert W. "The Use of Telerehabilitation Delivery System for Fall Risk Screening." Dissertation. Nova Southeastern University, 2018.
10. Kairy, D., et al., "The Patient's Perspective of In-Home Telerehabilitation Physiotherapy Services following Total Knee Arthroplasty." *International Journal of Environmental Research and Public Health*. vol. 10, no. 9, 2013, pp. 3998-4011. doi: 10.3390/ijerph10093998
11. Kuether, J., et al., "Telerehabilitation for Total Hip and Knee Arthroplasty Patients: A Pilot Series with High Patient Satisfaction." *HSS Journal*. vol. 15, 2019, pp. 221-225.
12. Levy, C., et al., "Effects of Physical Therapy Delivery via Home Video Telerehabilitation on Functional and Health-Related Quality of Life Outcomes." *Journal of Rehabilitation Research and Development*. vol. 52, no. 3, 2015, pp. 361-369.
13. Lovo, S., et al., "Experience of Patients and Practitioners with a Team and Technology Approach to Chronic Back Disorder Management." *Journal of Multidisciplinary Healthcare*. vol. 12, 2019, pp. 855-869. doi:10.2147/JMDH.S2
14. Bettger, Janet P., et al., "Effects of Virtual Exercise Rehabilitation In-Home Therapy Compared with Traditional Care after Total Knee Arthroplasty: VERITAS, A Randomized Controlled Trial." *The Journal of Bone and Joint Surgery, American volume*. vol. 00, 2019, pp. 1-9. doi: 10.2106/JBJS.19.00695
15. Bandura, Albert & Adams, Nancy E. "Self-Efficacy: Toward a Unifying Theory of Behavioral Change." *Psychological Review*. vol. 84, no. 2, 1977, pp. 191-215. doi:10.1037/0033-295X.84.2.191
16. Covert, L. T., et al., "The Effect of Telerehabilitation on Missed Appointment Rates." *International Journal of Telerehabilitation*. vol. 10, no. 2, 2018, pp. 65-72. doi: 10.5195/ijt.2018.6258



Dr. Christina Crawford completed a Doctorate in Physical Therapy at A. T. Still University and is currently researching falls and fear of falling to complete a PhD in Human Services and Counseling. As a Board-Certified Clinical Specialist in Geriatric Physical Therapy, she is focused on empowering older adults to live and function optimally, typically through telehealth appointments. Dr. Crawford advocates for telehealth physical therapy as an innovative means of health care expansion. She serves on the leadership committee of the Arizona Falls Prevention Coalition and is a state advocate for the Academy of Geriatric PT.

Moving and Grooving: Exergaming Enhances Physical and Cognitive Function in Older Adults

by Tanvi Bhatt, PT, PhD, Savitha Subramaniam, PhD, and Lakshmi Kannan, MSc

The COVID-19 global pandemic is rapidly changing lifestyles from ambulatory to sedentary if following the shelter-in-place restrictions and mandates to maintain at least six feet of distance between individuals to prevent the spread of infection. The Centers for Disease Control and Prevention (CDC) warns that certain groups of people are at high risk for COVID-19 infections that can lead to hospitalizations due to a significant impact on the pulmonary system. These include older adults over 65 years, individuals with pre-existing respiratory or cardiovascular disorders, and other secondary health conditions such as diabetes and obesity.¹

Meta-analyses in rehabilitation research indicate that increasing physical activity (PA) in older adults has shown to provide significant health benefits, such as improved functional mobility, cardiovascular fitness, cognitive function, and reduction in fall risk and health comorbidities.²⁻⁴

While the importance of an active lifestyle is well known, older people often believe themselves to be too old or frail to engage in PA.⁵ Movement is seldom considered as a necessary prescription medicine. In addition, older adults, due to a preponderance of health problems, encounter more barriers to PA and exercise participation.⁶ Among which, falls and fear of falling has shown to increase sedentary behaviors in older adults.⁷ Various studies providing a range of different interventions (e.g., strength training, walking, balance exercises, and flexibility exercises) have examined ways to enhance exercise participation, and have consistently revealed limited evidence for long-term compliance to PA among this age group.⁸ Further, the reduced motivation and compli-

ance toward conventional methods of physical exercise training among older adults makes it difficult to receive the maximum health benefits from these methods.⁹ Two alternative forms of intervention to enhance physical activity that can be an adjunct to traditional exercises are being studied in our lab.

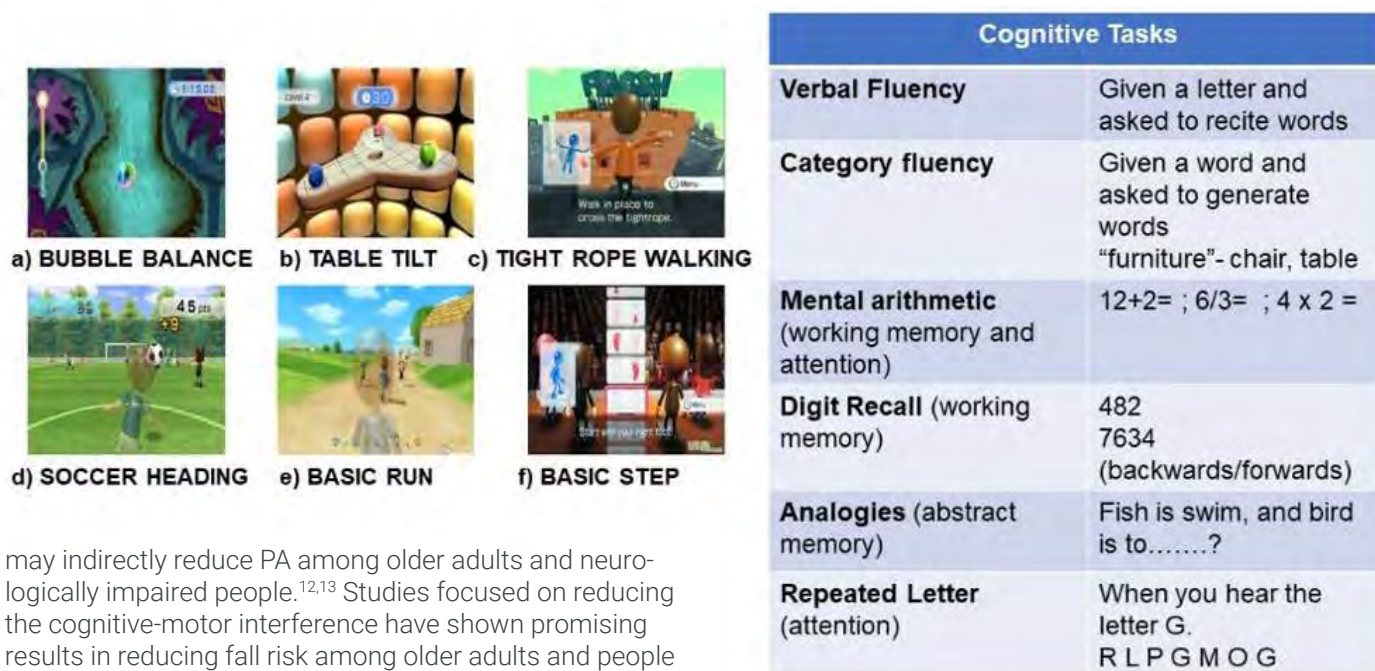
Exergaming to Improve Physical Activity

Exergaming, a combination of “exercise” and “gaming,” has gained popularity and is known to be a suitable tool for promoting physical fitness and motivation among the elderly.¹⁰ This method is based on live performance feedback (according to the body movements) and rewards (achieving high scores on games), and it increases motivational levels by engaging the individual in a real-life like environment.¹¹ There are commercially available devices like Wii Fit Nintendo, Sony Play Station, etc. that have proven to be safe to use at home.¹² Using such devices, studies have shown significant improvements in balance control, gait, cardiovascular fitness muscle strength, motivational levels, and decreased incidence of falls among older adults [Fig 1].^{10,12} These few studies have not assessed cognitive function and have focused mainly on cognitively intact older adults. Most daily living activities require performing two tasks simultaneously (e.g., walking and talking) often termed as dual tasking. Studies have shown that increase in the complexity or type of either of the tasks may lead to deteriorated performance on either one or both, known as cognitive-motor interference.^{12,13} An increase in cognitive-motor interference has shown to increase the risk of falls, which

Figure 1. Advantages of exergaming and its effects on improving physical activity domains



Figure 2. CogXergaming played using Wii fit Nintendo and simultaneously performing cognitive task



may indirectly reduce PA among older adults and neurologically impaired people.^{12,13} Studies focused on reducing the cognitive-motor interference have shown promising results in reducing fall risk among older adults and people with stroke, thereby promoting PA levels.^{14,15} Here, we describe two alternative forms of intervention that can be an adjunct to exercise-based interventions to enhance physical activity.

CogXergaming

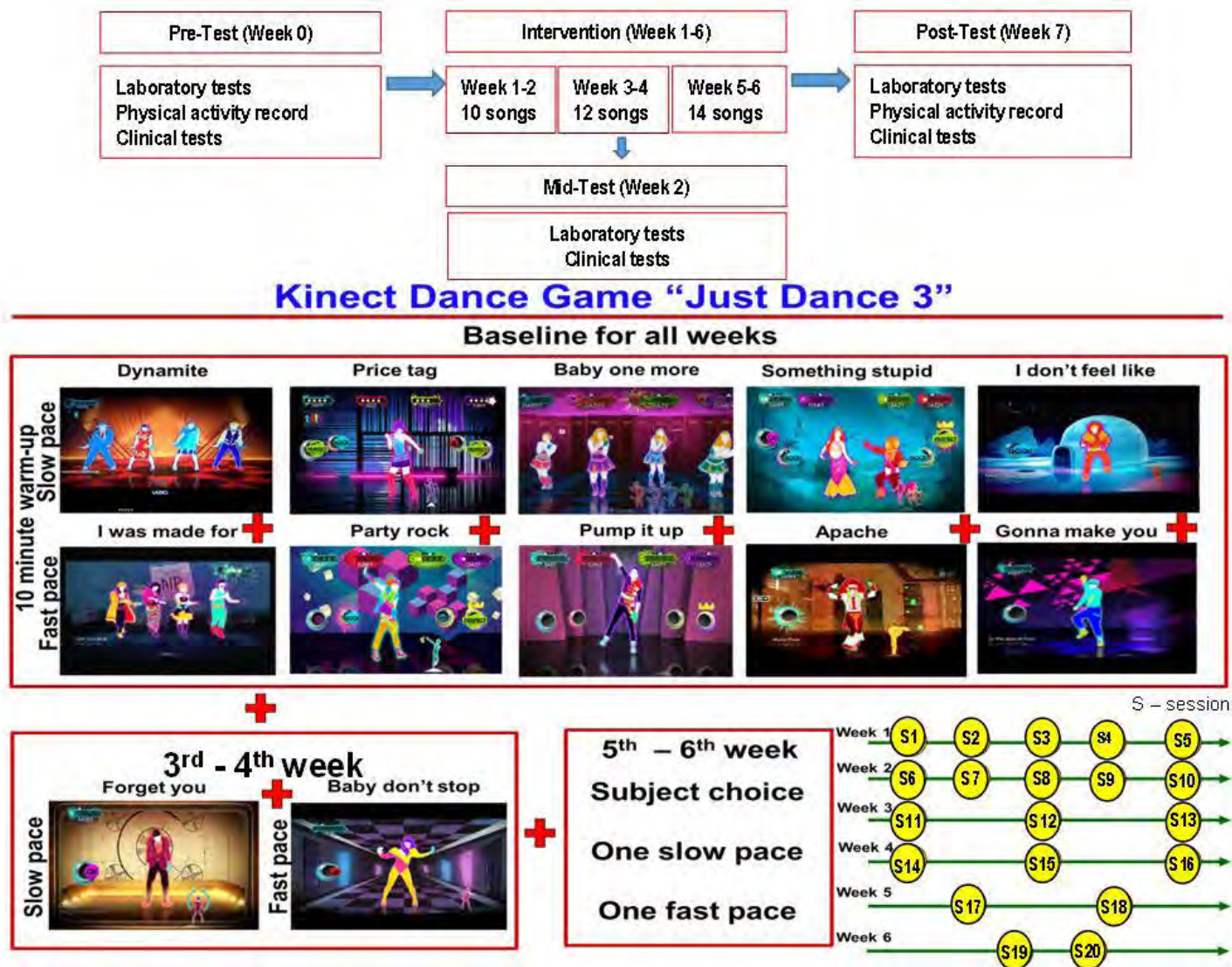
Our laboratory has designed a CogXergaming protocol that combines exergaming with dual-task training. Healthy older adults and those with chronic stroke were asked to game on the Wii Fit Nintendo platform while simultaneously performing a cognitive task under supervision of a physical therapist [Fig 2].¹⁶ Individuals were tested on two different balance control domains: volitional (self-initiated) and reactive (externally induced balance loss) while performing a cognitive task (which was not the same task used during training), along with monitoring cardiovascular parameters such as heart rate and physical activity with wearable sensors (in form of # of steps).¹⁶ The study resulted in CogXergaming significantly reducing cognitive-motor interference under both balance control domains, significant improvements in clinical balance test, cognitive function and number of community steps. This may indicate that such training has the potential to prevent the risk of falls.¹⁶ Given these positive results, we are currently applying a similar protocol to test feasibility, applicability, and tolerability among older adults with mild cognitive impairment. The study aims to see if this training has similar effects on the two balance control domains and reduces cognitive-motor interference during dual-task performance. As a part of outcome measures, we use NIH toolbox, which is a comprehensive performance-based battery of tests which can be performed using a simple iPad and iPod to

evaluate certain cognitive and motor constructs. Health care professionals may consider using this tool to evaluate an individual's progress remotely.

Dance-Based Exergaming

Another alternative approach is dance which can have a similar effect to walk-jog exercise.¹⁷ Dance may be particularly helpful for older adults; it facilitates fast, repetitive, full-body movements. Dance training has shown to decrease response time (decreased time to initiate center of pressure excursion on the limits of stability test) and symmetrical weight distribution during self-initiated postural weight shifts while performing functional tasks in older adults.¹⁸ Studies with dance training have also shown improvements in static balance, dynamic balance, cognition, and gait function.^{19,20} Habitual PA has also been associated with improved cardiovascular fitness (increased heart rate variability, HRV - autonomic control of the heart) among older healthy adults.²¹ Other recent studies have demonstrated that an exergaming environment provides highly customizable, controllable, multimodal simulation, ensuring high levels of motivation and compliance towards intervention. Thus, integrating dance with exergaming (DBExG) could potentially address balance control, cognitive control, and functional mobility, and also facilitate cardiovascular conditioning for a better quality of life. We have piloted the use of DBExG in older adults with chronic stroke via the commercially available and cost-effective Kinect dance video game "Just Dance 3".¹⁸ Currently our laboratory is conducting a six-week 90-minute session randomized control study to examine

Figure 3. A schematic illustration of the study protocol represented with the screenshots of the Kinect “Just Dance 3” games (song numbers) used for the intervention



the efficacy of an aerobic-dance based high-intensity PA training in this population. [Fig 3]^{18,22,23} The training is delivered in a tapering method with a total of 20 sessions. We hypothesize that DBExG will increase balance, gait, and cognitive function, along with increasing PA levels and cardiovascular function.

Outcome Measures for both exergaming interventions

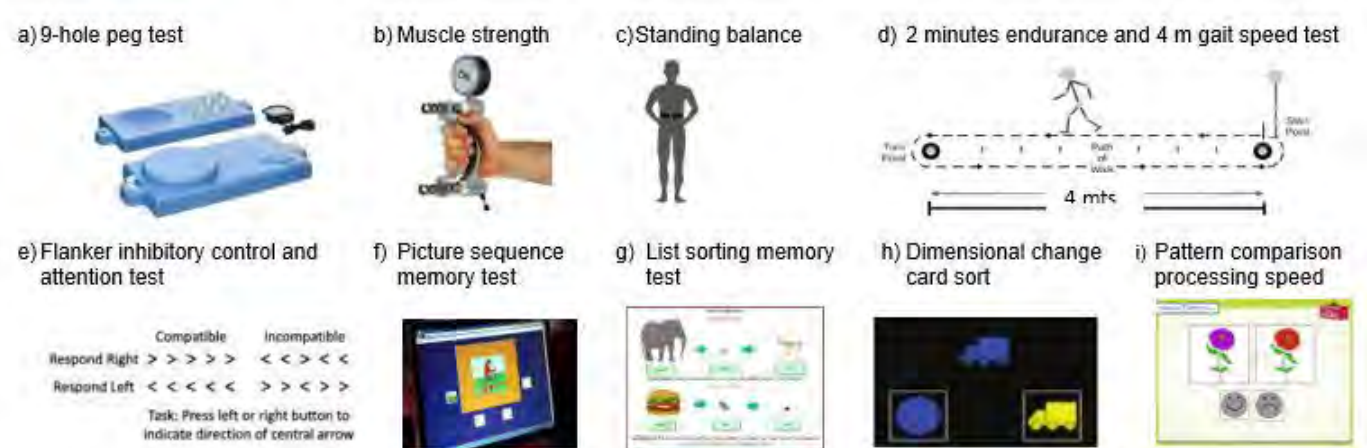
Musculoskeletal and Neuromuscular domain

Balance is measured by examining volitional and reactive balance control. Volitional balance control is assessed on the Balance Master (Computerized Dynamic Posturography, Equitest® Neurocom) using the sensory organization test and limits of stability test.²⁴ Functional mobility is assessed by examining gait function using the GaitRite electronic walkway (CIR Systems, Inc., Sparta,

NJ). Physical activity is assessed using wearable sensors to track # of steps, and total distance walked on a weekly basis. Upper and lower extremity movement control is examined via surface electromyography and 3D motion analysis. Risk of falls is assessed with the Timed up and go test and Berg Balance Scale tests²⁵

The NIH motor toolbox consists of examining dexterity, muscle strength, balance control, endurance and locomotion by administering respective tests. Participants wear a gait belt around for safety purposes while performing standing and walking tasks. Dexterity is assessed via a 9-hole peg test to determine the ability to coordinate fingers and move objects within a given time (Fig4.a). Muscle strength is assessed via Grip strength to determine the ability to maintaining posture and generate movement [Fig 4, b]. Balance control is assessed via standing balance test to measure the ability to maintain an upright posture under static and dynamic challenging

Figure 4. The different motor and cognitive construct tests included in NIH toolbox ²⁶⁻³³



conditions (Fig4.c). Endurance is assessed via a two-minute walk endurance test to determine cardiopulmonary, biomechanical and neuromuscular function (Fig4.d). Locomotion is assessed via a four-meter walk gait speed test to evaluate the gait function at a self-selected pace [Fig 4, d].

Cognitive function domain

NIH cognitive toolbox consists of examining attention, episodic memory, working memory, executive function, processing speed, and language via respective tests. Participants sit with an iPad in the front while the administrator has evaluation cards. The administrator instructs the participant and explains each test in detail and helps navigating the process. Attention and executive function is assessed via Flanker inhibitory control and attention test for determining one’s capacity to allocate details when exposed to large stimulated environment [Fig 4, e]. Episodic memory is assessed via picture sequence memory test for determining the memory acquisition, storage and information retrieval [Fig 4, f]. Working memory is assessed via list sorting memory test to evaluate the ability to store information and further categorize them based on needs [Fig4, g]. Executive function is assessed via dimensional change card sort test to evaluate ability to plan, organize, and execute appropriate behavior strategically [Fig4, h]. Processing speed is assessed with the pattern comparison processing speed test to evaluate the amount of information processed within a given time [Fig4, i]. Language is assessed with picture vocabulary and oral reading recognition tests.

Apart from this, we also use a custom-designed neuropsychological battery of tests to assess various subdomains of executive function and attention via visuomotor reaction time (VMRT) task, word list generation (WLG) task, serial subtraction (SS) task, and the Stroop (STR) task.

Cardiovascular function domain

Heart rate variability is measured after substantial periods of training using a wrist-based heart rate monitor

(Polar RS800CX, Polar, Finland) which has a high reliability and validity. Polar® heart rate monitor consists of an electrode belt, transmitter W.I.N.D., and a heart rate monitor.

Translating Exergaming-Based Physical Activity Interventions to Telehealth

In light of the evidence for the benefits of exergaming-based cognitive and dance training, future research should focus on increasing the availability of such training paradigms for this population. Considering, the accessibility and cost barriers for health care in people aging with disabilities and associated lack of compliance and motivation to participate in traditional physical activity or exercise-based rehabilitation programs approaches such as telerehabilitation are being explored. We are currently evaluating the translation of our exergaming paradigms to be delivered via telerehabilitation specifically to continue ongoing research under the COVID-19 shelter in place and also to further examine ways to maintain recommended levels of physical activity and enhance quality of life via meaningful engagement. If the findings from this proof-of-concept research supports the feasibility and effectiveness of telerehabilitation, we could further expand this to examine and provide foundational guidelines for incorporating exergaming-based PA as a structured exercise program for achieving health benefits and reduce sedentary behaviors (and thus secondary health comorbidities) in older adults. Given the current, and possibly extended, pandemic demands of maintaining social distancing/social isolation, the use of telehealth is a novel approach that can help keep both at-risk populations and therapists safe, and also accomplish the recommended levels of PA in this population.

This research has been funded by National institute of Aging, Midwest Roybal Center for Health Promotion and Translation and the American Heart Association

References

- Centers for Disease Control and Prevention. People Who Are at Higher Risk for Severe Illness. <https://www.cdc.gov/coronavirus/2019-ncov/specific-groups/people-at-higher-risk.html>
- Roberts Ce Fau - Phillips LH, Phillips Lh Fau - Cooper CL, Cooper Cl Fau - Gray S, Gray S Fau - Allan JL and Allan JL. Effect of Different Types of Physical Activity on Activities of Daily Living in Older Adults: Systematic Review and Meta-Analysis. *J Aging Phys Act.* 2017; 25: 653-70.
- Gine-Garriga M, Roque-Figuls M, Coll-Planas L, Sitja-Rabert M and Salva A. Physical exercise interventions for improving performance-based measures of physical function in community-dwelling, frail older adults: a systematic review and meta-analysis.
- Bunce D, Haynes BI, Lord SR, et al. Intraindividual Stepping Reaction Time Variability Predicts Falls in Older Adults With Mild Cognitive Impairment. *J Gerontol A Biol Sci Med Sci.* 2017; 72: 832-7.
- Gomes M, Figueiredo D, Teixeira L, et al. Physical inactivity among older adults across Europe based on the SHARE database. *Age Ageing.* 2017; 46: 71-7.
- Gothé NP and Kendall BJ. Barriers, Motivations, and Preferences for Physical Activity Among Female African American Older Adults. *Gerontol Geriatr Med.* 2016.
- Lavedan A, Viladrosa MA-O, Jurschik P, et al. Fear of falling in community-dwelling older adults: A cause of falls, a consequence, or both? *PLoS One.* 2018; 13.
- Van Der Bij AK, Laurant, M. G., & Wensing, M. . Effectiveness of physical activity interventions for older adults: a review. *American journal of preventive medicine.* 2002; 22.
- Van Cauwenberg JA-O, Nathan A, Barnett A, Barnett DW and Cerin E. Relationships Between Neighbourhood Physical Environmental Attributes and Older Adults' Leisure-Time Physical Activity: A Systematic Review and Meta-Analysis. *Sports Med.* 2018; 48: 1635-60.
- Brauner P, Valdez AC, Schroeder U and Ziefle M. Increase physical fitness and create health awareness through exergames and gamification. *International Conference on Human Factors in Computing and Informatics.* Springer, 2013, p. 349-62.
- Lamoth CJ, Alingh R and Caljouw SR. Exergaming for elderly: effects of different types of game feedback on performance of a balance task. 2012.
- Agmon M, Perry CK, Phelan E, Demiris G and Nguyen HQ. A pilot study of Wii Fit exergames to improve balance in older adults. *Journal of geriatric physical therapy.* 2011; 34: 161-7.
- Patel P and Bhatt T. Task matters: influence of different cognitive tasks on cognitive-motor interference during dual-task walking in chronic stroke survivors. *Topics in stroke rehabilitation.* 2014; 21: 347-57.
- Subramaniam S, Hui-Chan CW-Y and Bhatt T. A cognitive-balance control training paradigm using wii fit to reduce fall risk in chronic stroke survivors. *Journal of neurologic physical therapy.* 2014; 38: 216-25.
- Silsupadol P, Shumway-Cook A, Lugade V, et al. Effects of single-task versus dual-task training on balance performance in older adults: a double-blind, randomized controlled trial. *Archives of physical medicine and rehabilitation.* 2009; 90: 381-7.
- Kannan L, Vora J, Bhatt T and Hughes SL. Cognitive-motor exergaming for reducing fall risk in people with chronic stroke: A randomized controlled trial. *NeuroRehabilitation.* 2019: 1-18.
- Garber CE, McKinney Js Fau - Carleton RA and Carleton RA. Is aerobic dance an effective alternative to walk-jog exercise training? *J Sports Med Phys Fitness.* 1992; 32: 136-41.
- Subramaniam S, & Bhatt, T. Does a virtual reality-based dance training paradigm increase balance control in chronic stroke survivors? A preliminary study. . *Int J Neurorehabilitation* 2015; 185: 2376-0281.
- Keogh JW, Kilding A, Pidgeon P, Ashley L and Gillis D. Physical benefits of dancing for healthy older adults: a review. *J Aging Phys Act.* 2009; 17: 479-500.
- Hwang Pw Fau - Braun KL and Braun KL. The Effectiveness of Dance Interventions to Improve Older Adults' Health: A Systematic Literature Review. *Altern Ther Health Med.* 2015; 21: 64-70.
- Soares-Miranda L, Sattelmair J, Chaves P, et al. Physical activity and heart rate variability in older adults: the Cardiovascular Health Study. *Circulation.* 2014; 129: 2100-10.
- Sampaio LM, Subramaniam S Fau - Arena R, Arena R and Bhatt T. Does Virtual Reality-based Kinect Dance Training Paradigm Improve Autonomic Nervous System Modulation in Individuals with Chronic Stroke? *J Vasc Interv Neurol.* 2016; 9: 21-9.
- Subramaniam S and Bhatt T. Dance-based exergaming for upper extremity rehabilitation and reducing fall-risk in community-dwelling individuals with chronic stroke: A preliminary study. *Top Stroke Rehabil.* 2019; 26: 565-75.
- Liston RA and Brouwer BJ. Reliability and validity of measures obtained from stroke patients using the Balance Master. *Arch Phys Med Rehabil.* 1996; 77: 425-30.
- Steffen TM, Hacker TA and Mollinger L. Age- and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. *Phys Ther.* 2002; 82: 128-37.
- Pinho AA-O, Salazar AP, Hennig EA-O, Spessato BC, Domingo A and Pagnussat AA-O. Can We Rely on Mobile Devices and Other Gadgets to Assess the Postural Balance of Healthy Individuals? A Systematic Review. LID - E2972 [pii] LID - 10.3390/s19132972 [doi]. *Sensors (Basel).* 2019; 19.
- 9 hole peg test <https://www.4mdmedical.com/rolyan-9-hole-peg-test-kit.html>.
- Benavent-Caballer V. The effectiveness of exercise interventions and the factors associated with the physical performance in older adults. https://www.researchgate.net/publication/315698817_The_effectiveness_of_exercise_interventions_and_the_factors_associated_with_the_physical_performance_in_older_adults; University CEU Cardenal Herrera, 2016.
- Flanker inhibitory control and attention <https://erpinfo.org/blog/2019/2/19/reliability-and-precision>.
- Picture sequence memory test. https://www.youtube.com/watch?v=G9Ha_xSxfI
<https://apps.apple.com/se/app/nih-toolbox/id1002228307>.
- Sprague SA, McBee MT and Sellers EW. The effects of working memory on brain-computer interface performance. *Clin Neurophysiol.* 2016; 127: 1331-41.
- Kao K, Nayak, S., Doan, S. N., & Tarullo, A. R. . Relations between parent EF and child EF: The role of socioeconomic status and parenting on executive functioning in early childhood. . *Translational Issues in Psychological Science.* 2018; 4: 22.
- Pattern comparison processing speed <https://slideplayer.com/slide/6882994/>.



Dr. Tanvi Bhatt is an associate professor with the Physical Therapy in the University of Illinois at Chicago. She is the director of the Cognitive, Motor and Balance Rehabilitation Laboratory and co-director of the Clinical Gait and Motion Analysis laboratory. Dr. Bhatt's research interest and expertise is in areas of geriatric and neurorehabilitation with a special emphasis on fall prevention and community integration. Her

research interest lies in examining effects of alternative cognitive and motor therapies (including virtual reality gaming and dance therapy) for improving motor impairment, physical function and participation in older adults and people with neurological disorders with an emphasis on stroke survivors. Her research also involves investigating neuromechanical basis of balance recovery from external perturbations such as slips and trips and subsequently designing perturbation-training intervention paradigms for reducing fall-risk in geriatric and neurologic populations.



Lakshmi Kannan is a PhD student in the Department of Rehabilitation Sciences at the University of Illinois at Chicago. Her research interests include dual-task testing and training among people with stroke and older adults. She is currently working on examining the effects of cognitive-motor training on balance control, cognition with an aim to reduce the risk of falls among older adults with mild cognitive impairment.



Dr. Savitha Subramaniam's research interests include determining the efficacy of alternative therapies on cardiovascular functioning, cognitive-motor interference and its effect on balance and fall risk among young, older and neurologically-impaired adults. She is also interested in evaluating the efficacy of translating alternative therapies to long-term home-based interventions.



Meet the Authors: Be Part of the Discussion in the Journal Club

The APTA Geriatrics Journal Club is a free, facilitated webinar-based discussion about a Journal article that permits you to interact directly with the author and a clinician with a relevant case study demonstrating how that information could be used. It's a fun way to move yourself in the direction of life learning and beef up your evidence-based practice.

The next APTA Geriatrics Journal Club will be held July 16, 2020 at 8 pm ET.

We will discuss [Effects of Corrective Exercise for Thoracic Hyperkyphosis on Posture, Balance, and Well-Being in Older Women: A Double-Blind, Group-Matched Design](#); Jang, Hyun-Jeong; Hughes, Lynne C.; Oh, Duck-Won; More; Journal of Geriatric Physical Therapy. 42(3):E17-E27, July/September 2019.

Watch your email or see the APTA Geriatrics Calendar for log-in information to be posted prior to the event.

Spaced-Retrieval: A Practical Guide for Physical Therapists

by Nicole Dawson, PT, PhD, and Ashleigh Trapuzzano PT, DPT

Spaced-retrieval (SR) is an evidence-based technique that physical therapists can use to bypass declines in short-term memory when working with patients with dementia by capitalizing on the remaining strength of implicit memory.¹ SR is a “method of learning and retaining information by recalling that information over increasingly longer periods of time” [fig 1].²⁻⁴ Physical therapists can use this technique to reach patients with dementia to use a walker, to lock wheelchair locks before standing, to stand in proximity of walker during ambulation, and much more. This technique can also be used by other health care professionals and informal caregivers to teach important pieces of information such as room number, dates, swallowing precautions, and sequencing for various activities.

The general steps for using SR are as follows:⁵

Step 1: Identify the person’s need or desire

Step 2: Conduct screening to determine if the individual would be responsive to spaced-retrieval

Step 3: Develop a lead question and response; implement the practice intervals

Step 4: Modify when needed and reinforce the information the person learned

Screening to ensure an individual is appropriate for SR involves 1) choosing novel information to the individual; 2) choosing the response that you will use; 3) choosing the lead question that you will ask; 4) making sure the person understands the question and answer; and 5) implementing practice beginning with five-second delay, advancing to 10 seconds, then 20 seconds, and ending with 30 seconds. If at any time the individual makes three consecutive errors, you should end the screening.⁵ If screening is successful continue with the process in Figure 1 until the individual is successful.



Ashleigh Trapuzzano demonstrates the Spaced-Retrieval technique to teach a patient how to push from his chair rather than the walker when he stands up. [Watch now!](#)

An **example of an initial spaced-retrieval session with an individual with moderate dementia** might be observed as follows:

Therapist: “Frank, we are going to practice learning how to lock your wheelchair before standing. Before you stand up, I want you to lock your wheelchair (demonstrates). What do you do before you stand up?”

Patient: “I lock my wheelchair (demonstrates).”

Therapist: (waits 5 seconds) “Frank, what do you do before you stand up?”

Patient: “Lock my wheelchair (demonstrates).”

Therapist: “Excellent! (waits 10 seconds) Frank, what do you do before you stand up?”

Patient: “I lock my wheelchair (demonstrates).”

Therapist: “Great. (waits 20 seconds) Frank, what do you do before you stand up?”

Patient: “Make sure both feet are on the ground.”

Therapist: “Actually, before you stand up, I want you to lock your wheelchair (demonstrates). What do you do before you stand up?”

Patient: “I should lock my wheelchair (demonstrates).”

Therapist: “Yes Frank, great job. (waits 10 seconds) Frank, what do you do before you stand up?”

Patient: “I lock my wheelchair (demonstrates).”

Tips for success with spaced-retrieval:

- Identify a goal collaboratively with the patient and/or caregiver to ensure the desire to achieve success.
- Phrasing in the target question and response must be meaningful to the patient (for example: “Cadillac versus rollator”). Words must be commonly used by the patient to ensure capitalization of implicit memory
- Choose cuing that has already proved successful. Be sure to practice words during sessions to ensure the patient will respond to phrasing.
- Educate all formal and informal caregivers on target question and response to ensure necessary carryover into all daily activities.

This would continue until the end of the session and subsequent sessions until “success” is met. The initial time interval might be lengthened if the individual’s cognitive impairment is milder. Other activities can be completed during the wait-time intervals – it is recommended that these activities begin once intervals are greater than 1-minute. Once SR has begun, **therapists must integrate these strategies of errorless learning into all activities involving the target behavior.** In the previous example, although Frank is completely SR during a given time-frame during each session, all individuals that complete transfers with him must be aware of the intent or else the learning will be delayed or even potentially unsuccessful. If the nursing aide is going to help Frank to the bathroom, when Frank goes to stand, it must be ensured that he locks his wheelchair. So, if he begins to stand without doing so, the nursing aide should say “Frank, what do you do before you stand up?” and this should cue Frank to lock his wheelchair. With proper use, SR can be very successful in helping patients with dementia learn small pieces of information that can substantially improve their functional independence and safety during all aspects of care.

- Brush JA, Camp CJ. Using spaced retrieval as an intervention during speech-language therapy. *Clinical Gerontologist*. 1998;19(1):51-64.
- Benigas JE, Brush JA, Elliot GM. Spaced retrieval step by step: An evidence-based memory intervention. Health Professions Press, Incorporated; 2016.



Nicole Dawson, PT, PhD, GCS is an assistant professor in the Division of Physical Therapy at the University of Central Florida and co-director of the Innovative Mobility Innovative (IMOVE™) Lab. She is a Board Certified Geriatric Physical Therapist with over 17 years of clinical experience along with a PhD in Adult Development and Aging Psychology from Cleveland State University. She has been recognized for excellence in teaching by APTA Geriatrics with the Distinguished Educator Award and the American Physical Therapy Association with the Margaret L. Moore Outstanding New Academic Faculty Award.



Ashleigh Trapuzzano graduated with her Doctor of Physical Therapy (DPT) from the University of Central Florida in 2019. She is a geriatric physical therapy resident for Brooks Rehabilitation in Jacksonville, FL. Ashleigh served as a graduate research assistant at UCF and was recognized by APTA Geriatrics with a 2019 Student Research Award.

References

- Clare L, Jones RS. Errorless learning in the rehabilitation of memory impairment: a critical review. *Neuropsychology review*. 2008;18(1):1-23.
- Camp CJ, Foss JW, O’Hanlon AM, Stevens AB. Memory interventions for persons with dementia. *Applied Cognitive Psychology*. 1996;10(3):193-210.
- Cherry KE, Simmons SS, Camp CJ. Spaced retrieval enhances memory in older adults with probable Alzheimer’s disease. *Journal of Clinical Geropsychology*. 1999;5(3):159-175.

Figure 1: Spaced Retrieval Technique (Brush & Camp, 1998; Camp et al., 1996; Cherry et al., 1999)

Initial Training Session:

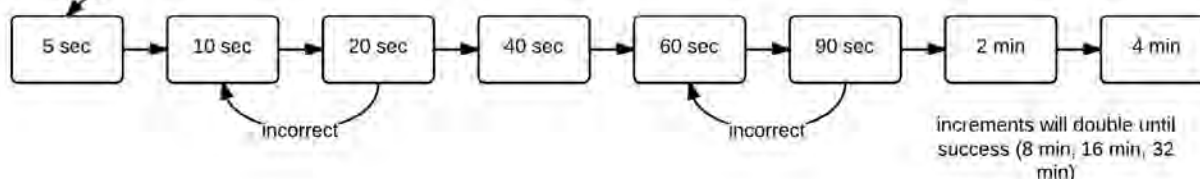
- Begin with prompt question for the target behavior
- Train the individual to recall the correct answer
- When retrieval is successful, the interval preceding the next recall test is increased
- If a recall failure occurs, the individual is told the correct response and asked to repeat it. The following interval length returns to the last one at which recall was successful

Subsequent Training Sessions:

- Ask the target question
- If correct, there is no further training that session
- If incorrect, provide immediate correct answer, ask for immediate recall then ask for recall after the amount of time for the longest successful interval from the last session
- If that is answered incorrectly, the correct answer will be provided immediately and a step backwards will be warranted until the correct response is given

**SUCCESS is achieved when the individual correctly remembers at the beginning of 3 sessions*

Target question asked; immediately given correct response; ask patient for correct response. If able to response, proceed to 5 second interval



StrollinTM by Coyote[®]



Therapeutic Mobility Shoe

- Retractable rollers for fluid gait
- Easier toe clearance
- Normalizes gait pattern
- Immediate therapy usage
- Keeps patient mobile

Patent number US20040061295A1

For Foot Drop caused by:

- Parkinson's disease
- Multiple Sclerosis
- Stroke
- Traumatic Brain Injury
- Spinal cord injury
- Neuropathy



www.strollin.com | (208) 429-0026



A Better Way to Gait Train: One Physical Therapist's Journey

by Cassi Petsch, PT, DPT

Quality of life is significantly influenced by the ability to move. Reduced patient mobility is a problem in hospitals and skilled nursing facilities. The need for continuous mobilization of elder and disabled patients, recognized in nursing care plans, is problematic according to degree of patient dependence.¹ Major complications of immobility are significantly associated with reduced health-related quality of life. Immobility is independently associated with the development of a series of complications including pressure ulcers, deep vein thrombosis, pneumonia, and urinary tract infection.² Mobility is so vital, facilities across the nation are implementing mobility programs to be carried out by CNAs, nurses, and restorative and rehabilitative staff. A positive overall impact of physical activity is reflected in increased confidence of seniors in their own abilities. Despite extensive research promoting mobility, significant barriers to more frequent assisted mobilizations include lack of staff, the increased risk of a work-related musculoskeletal disorders (WMSD), and/or lack of necessary equipment or resources.^{3,4,5,6}

Identifying the problem

I graduated in 2009 and started my career in a skilled nursing facility (SNF). I quickly realized that therapists would rarely have assistance and I would be ambulating my patients by myself. This means that the therapist

holds onto the patient's gait belt, twists through their lower back to pull the wheelchair behind them, all while hoping that the patient doesn't have any sudden loss of balance and that the wheelchair steers evenly. This hinders (eliminates!) evaluative and skilled gait training. I refer to this as the "wheelchair shuffle" — the therapist's hands are tied up, they are distracted by wheelchair mechanics ("Is it close enough for a quick sit?"), and must simultaneously provide balance assist (see image at top of page).

When I started working PRN in acute care, around 2011, I ran into the same obstacles as I did in the nursing home, but multiplied. Often in acute care, the patient is weaker, using supplemental oxygen, and receiving IV fluids. These people need to get out of bed and walk. Therapists are often tasked to gait train while holding onto the patient's gait belt, pulling the IV pole, managing the oxygen and pulling the wheelchair. It is nearly impossible to provide a skilled gait training session with these medically compromised patients.

This realization prompted me to set out to find a way to eliminate the wheelchair shuffle and to allow clinicians the ability to gait train and provide walking practice without needing an additional person to push the wheelchair.

Researching the problem

I began a mission to learn more about problems associated with over the ground gait training.

Lack of Staffing

I performed preliminary market research by interviewing staff at four local SNF's and two physical therapy schools. Feedback revealed that many therapists do not feel comfortable or safe performing over ground gait training with low level (patients who require at least moderate assistance) patients without a second person involved to push the wheelchair. My preliminary market research showed that most therapists (70.6%) will not gait train with low-level patients due to the lack of an extra person. Studies have shown that clinicians will perform fewer demanding therapies (i.e. ther-ex, seated activities) to minimize WMSD risk.⁷ The implication, then, is that patients do not walk as much as desirable to increase skills and endurance which can result in increased length of stay, decreased rehabilitation outcomes, and worsened quality of life.

The use of a second staff member to push the wheelchair behind the patient offers a safe solution, but not a cost-effective answer. The "assist" person is performing a non-billable service that reduces their productivity as well as the wasted time for a staff member to locate an additional pair of hands. Currently this is the only option for approximately 70% of the market.

Risk of injury to therapist and/or patient

Proper body mechanics are difficult to maintain with overground gait training, while performing the wheelchair shuffle. My informal research showed that most of the therapists observed are unable to demonstrate good neutral spine body mechanics during the wheelchair shuffle, increasing their risk of injury.

According to the U.S. Centers for Disease Control and Prevention, in 2015, health care workers accounted for 20% of all nonfatal occupational injuries across the country and were number one for on-the-job injuries.⁸ Patient handling is the most prevalent circumstance of health care worker injury.⁸ Furthermore, recent research articles in the *Journal of the American Physical Therapy Association*, have found that work-related musculo-skeletal disorders (WMSD) for physical therapists, alone, show a lifetime prevalence of 90%. The highest prevalence of WMSD's was in the low back (45-52%). The high incidence of WMSD has resulted in many physical therapists either changing their practice setting or leaving the profession entirely.⁹ Job strain and job turnover costs can be substantial, but are difficult to quantify. Jones¹⁰ calculated that turnover in nursing could result in costs that ranged from \$62,100 to \$67,100 per registered nurse and Waldman et al estimated that turnover costs at a major medical center exceeded 5% of the total annual operating budget. Job strain increases the risk of turnover substantially.¹⁰

Today's clinicians have multiple daily challenges: changing billing structures have forced increased productivity standards, decreased staff metrics, and critically ill patients are surviving longer. As a result, institutional

emphasis on early and frequent patient mobility induces job stress. Job turnover rates are very high in response to these challenges.¹⁰

No affordable solutions or safe solutions

The only commercial equipment options I could find cost >\$2,500 and were bulky, cumbersome body weight support systems, lite gait systems and treadmill training. I could not find affordable, reliable equipment to take into a patients' room and use to safely ambulate low-level patients by myself. Most facilities cannot afford expensive equipment and/or do not have space in their building to store it. Body-weight support systems, treadmill training, and robotic assisted gait training give the therapist two hands free, are ideal for patients who need unweighting, provide metrics for analytics, and result in minimal physical therapist fatigue. However, these are expensive options that require extensive training, non-productive time to set up, and can become bulky. Little research supports this technology for development of normal gait. These options are estimated to be available in 15% of facilities. Overground walking training is more beneficial than body weight-supported treadmill training.^{11,12}

Parallel bars are bulky but readily available in facilities with dedicated therapy rooms. The use of parallel bars allows the therapist to potentially have two hands free, and allows for repetitive, natural weight bearing training. However, the bars offer limited distance (<10 ft) and can result in awkward gait mechanisms. It can be difficult or impossible (in the case of larger size wheelchairs) to pull the wheelchair behind the patient, so it often still requires a second staff member for safety assist.

Creating a Solution

An affordable, easy to use assist did not appear to be commercially available. This spurred my creative energy and led to creating the Gait Buddy™. The Gait



The Gait Buddy attaches the wheelchair directly to the walker, so the wheelchair will track securely behind the patient as they walk.

Buddy attaches the wheelchair directly to the walker, so the wheelchair will track securely behind the patient as they walk. This eliminates the need for a second person to push the wheelchair and prevents the therapist from twisting through his/her lower back to reach and drag the wheelchair. The Gait Buddy™ allows the clinician to ambulate weaker and less mobile patients without secondary staff assist.

With no experience in product design, I started at the best place I could think of: Home Depot. I created a sample version of the Gait Buddy and performed some initial clinical trials. This was enough to provide proof of concept that the solution to the wheelchair shuffle was out there. I spent the next few years working with the Center for Translation of Rehabilitation Engineering Advances and Technology (TREAT) program to design a final product that met all my requirements. TREAT is part of the National Institutes of Health (NIH) Medical Rehabilitation Research Network (MR3). Funding is provided by the National Center for Medical Rehabilitation Research (NRCMR) in the Eunice Kennedy Shriver National Institute of Child Health and Human Development. TREAT is a collaborative consortium that provides education, expert consultation, and direct assistance to accelerate commercialization of rehabilitation and assistive technologies.

The product has undergone various designs and prototypes with their assist. The current design meets several ease-of-use and durability criteria, including:

- The Gait Buddy™ can be connected and disconnected with one hand within 10 seconds in case of a medical emergency.
- The clamps have been engineered to prevent movement or rotation at their attachment sites to the wheelchair and walker.
- The device length can be easily adjusted as a result of the pull pin system in order to match the patient's body frame, size, medical condition, acuity, strength and activity tolerance.
- The clamps have been designed to be universal and fit around all standard 7-8 cm walker legs and wheelchair arms.
- In total, the device weighs under 2 lbs and is easily portable, and can be neatly stored by clamping it to the wheelchair or walker

Case Study

The Gait Buddy was trialed with a 90-year-old female resident of a long-term care facility. Her PLOF for walking was 100 feet with a two-wheeled walker with CGA. Ambulation status at time of PT evaluation was 20 feet, min assist with two-wheeled walker and continual one-word verbal cues to complete. Her past medical history included: DM2, HTN, dementia, depressive disorder, and HOH. Prior to utilizing the Gait Buddy, staff would not ambulate this resident without a second person to push the wheelchair. Trials of gait training were randomized



The patient is hard of hearing, so with the therapist's improved positioning they could provide better instruction, verbal/tactile cues.

to be completed with or without the Gait Buddy. On trials without the Gait Buddy, she was able to ambulate an average of 22 feet. On trials with the Gait Buddy, she ambulated an average of 52 feet.

During the patient's trial with the Gait Buddy, she did verbalize feeling the wheelchair behind her but did not report that it hindered her ability to advance the walker (note: most standard wheelchairs only add approximately 1 lb of resistance). The therapist believes that the increased distance while utilizing the Gait Buddy attributed to multiple factors:

1. The patient is hard of hearing, so with the therapist's improved positioning [see image above] they could provide better instruction, verbal/tactile cues.
2. The PT could now focus on facilitation of toe clearance during the swing phase by facilitating the quads.

More trials need to be completed to determine factors for improved gait distance.

Discussion

The American Physical Therapy Association (APTA) has published a safe patient handling (SPH) program to enable health care workers to move their patients in a way that does not cause strains or injuries. APTA

recognizes that physical therapists and physical therapist assistants have a high rate of injury while performing patient functional mobility. Manual patient handling tasks result in excessive physical loads that can lead to injury. Settings for SPH programs include acute care, rehabilitation, and long-term care facilities where staff provide assistance with patient functional mobility.⁹

In facilities with a SPH program, physical therapists report a reduction in fatigue and an increase in treatment options, as well as earlier and more frequent patient mobilization in lower functioning patients. Despite this, therapists have expressed concerns that current SPH equipment may hinder rehabilitation. The SPH currently available is designed to reduce physical effort during handling tasks but not necessarily to enhance rehabilitation as it promotes passive patient participation.^{9,13}

Additionally, therapists cited factors that limit their use of SPH equipment as being

- the lack of appropriate equipment
- it takes too long to set up
- the device is complicated
- options are bulky and expensive
- limited availability
- patient's fear of lifts

Although therapists have expressed interest in SPH equipment, they have reservations about the current equipment available.^{9,13} APTA encourages physical therapists and physical therapy assistants to be involved in the design and implementation of equipment and strategies to improve safety within their environments for themselves and their patients. With these PT concerns in mind, I set out to find something that wouldn't reduce the patient's physical effort, would promote active patient participation, would be easy to set up, and affordable. The Gait Buddy is a simple solution to this complicated problem with a goal of optimizing gait training for patients and staff across the nation.

Collegial Feedback

"As a therapist, Gait Buddy is a great tool. 1) It saves my back a good bit; 2) allows me to work with someone alone that I'd usually have to ask for help with; and 3) it allows for a much higher safety standard with the patient. It's nice to have both hands and full body available to help in case of LOB or anything of the sort."

"I've had the chance to use the Gait Buddy and I love it! It allows you to be fully hands on while gait training to give cues (which really allows a higher quality session and the patient gets more feedback) and it's safer for you and the patient. Really, I think every SNF, acute, day program, ortho setting could benefit from having one."

Ed Note: APTA Geriatrics does not endorse nor represent this product. This article is part of a series presenting physical therapists who adopt a non-traditional role and shares a bit of their evolution. Readers interested in this product may contact the author directly.

References

1. Hudakova A, Hornakova A. Mobility and quality of life in elderly and geriatric patients. *International Journal of Nursing and Midwifery*. 2011;3(7):81-85.
2. Wu X, Li Z, Cao J, et al. The association between major complications of immobility during hospitalization and quality of life among bedridden patients: A 3 month prospective multi-center study. *Plos One*. 2018;13(10). doi:10.1371/journal.pone.0205729.
3. Anderson HD, Biely S. Mobilization for Persons With Acute Stroke. *Journal of Acute Care Physical Therapy*. 2020;11(1):11-32. doi:10.1097/jat.0000000000000116.
4. Smith CD, Grami P, Haseeb C, Ababio Y. Exercise Physiologists: Key to Providing Early Mobilization in the Intensive Care Unit. *American Journal of Critical Care*. 2019;28(5):385-392. doi:10.4037/ajcc2019816.
5. Alperovitch-Najenson D, Treger I, Kalichman L. Physical Therapists Versus Nurses in a Rehabilitation Hospital: Comparing Prevalence of Work-Related Musculoskeletal Complaints and Working Conditions. *Archives of Environmental & Occupational Health*. 2013;69(1):33-39. doi:10.1080/19338244.2012.719555.
6. Milhem M, Kalichman L, Ezra D, Alperovitch-Najenson D. Work-related musculoskeletal disorders among physical therapists: A comprehensive narrative review. *International Journal of Occupational Medicine and Environmental Health*. 2016;29(5):735-747. doi:10.13075/ijomeh.1896.00620.
7. Think You'll Avoid a Work-Related Musculoskeletal Disorder? Don't Bet On It. *PT in Motion*. November 2015. <http://https://www.apta.org/PTinMotion/News/2015/11/30/PTWorkInjuryWMSD/>.
8. Health Care Worker Injuries Due to Patient Handling Continue to Rise. *PT in Motion*. June 2015. <http://http://www.apta.org/PTinMotion/News/2015/6/24/PatientHandlingInjuries/>.
9. Olkowski BF, Stolfi AM. Safe Patient Handling Perceptions and Practices: A Survey of Acute Care Physical Therapists. *American Physical Therapy Association*. 2014;94(5):682-695.
10. Mark CA, Weiser S, Koenig KL. Job Strain in Physical Therapists. *Journal of the American Physical Therapy Association*. 2009;89(9):946-956. doi:10.2522/ptj.20080322.
11. Combs-Miller SA, Parameswaran AK, Colburn D, et al. Body weight-supported treadmill training vs. overground walking training for persons with chronic stroke: a pilot randomized controlled trial. *Clinical Rehabilitation*. 2014;28(9):873-884. doi:10.1177/0269215514520773.
12. Duncan PW. Body-Weight-Supported Treadmill Rehabilitation after Stroke. *N Engl J Med*. 2011;364(21):2026-2036. doi:10.1056/NEJ-Moa1010790.
13. Darragh AR, Campo MA, Frost L, Miller M, Pentico M, Margulis H. Safe-Patient-Handling Equipment in Therapy Practice: Implications for Rehabilitation. *American Journal of Occupational Therapy*. 2012;67(1):45-53. doi:10.5014/ajot.2013.005389.



Cassi Petsch, a 2009 DPT graduate of Nova Southeastern University, is a physical therapist with particular interest in acute care and skilled nursing facilities. She is responsible for the vision, invention and proof of concept of the Gait Buddy™ and thanks TREAT for their assistance in bringing this concept to fruition. For videos and more information, please visit www.gaitbuddy.com.

Physical Therapists Should Pay More Attention to Cognitive Deficits - We Can Be Very Good at It!

by Jean Miles, PT

It's likely the PT curriculum for many therapists currently in practice provided little or no training about dementia management. This is not meant to reflect badly on our educational programs; historically we relied on occupational therapists and social workers to manage the ramifications of cognitive decline. The end result is that many therapists are uncomfortable discussing things like cognitive screening, caregiver burden, capacity for insight and judgment, and specific impairments in executive functioning. Increasing evidence shows that exercise improves brain health via increased circulatory response and mediation of inflammation.¹ Recent changes in payment models and the influx of patients with multi-focal post-Covid effects make this an ideal time to educate PTs in cognitive management. Opportunity exists to implement a "dementia friendly" attitude that facilitates a comprehensive evaluation and goal setting that reflects knowledge of the patient's cognitive status as well as physical ability.

Most agencies started preparing physical therapists for the impact of Patient Driven Group Models (PDGM) and Patient Driven Payment Models (PDPM) early in 2019. Coding, documentation, and billing are affected as a result of reimbursement rates based on perceived value instead of volume of treatments. Most therapists realize they'll need to be more focused on specific functional improvements because that's how outcomes will be measured.² As health care consumers we understand that "more is better" is not always cost effective. As therapists we strive to ensure patients will receive the appropriate amount of service to benefit from our skills. Physical therapists are in a strong position to achieve both goals if we identify root issues during the evaluation process and implement effective interventions from day one. PTs are known for being mobility experts, however a gray area remains when it comes to assessment of cognition. Approximately 50 percent of home care therapists in a nationwide survey admitted to some uncertainty about their ability to manage persons with cognitive impairment.³ The spotlight will shine brighter on this discrepancy because of the CMS focus on functional outcomes for all patients-- including those with cognitive impairments. More importantly, people with Alzheimer's Disease (AD) and other dementias need our skills to maintain optimal function throughout the course of their disease. There

are many ways every PT can be successful with persons with various stages of cognitive decline through person-centered care plans. That is a winning situation for all stakeholders.

Cognitive Screening

The ability to screen for root causes and devise an appropriate care plan is something therapists do automatically with strength, gait, and balance disorders. It is not difficult to apply the same principles to cognitive deficits once we recognize the value of doing so. Therapists who take on this challenge will likely have a greater impact on fall reduction, hospitalization rates, and functional outcomes. There are many situations illustrative of benefit when documentation of neurocognitive changes is specific. For example, a chart note stating someone was "easily confused" during exercise routines becomes a better representation of a therapist's professional assessment when the documentation states "client benefits from single step instructions due to agitation that resulted from rapid multi-step commands." Similarly, we are better prepared to help a patient when we understand the nuances of malorientation as compared with disorientation.

Medicare began paying physicians to perform annual wellness visits which included the assessment of cognition in 2011.⁴ Despite that incentive, current findings indicate less than 20% of people receive an annual cognitive screen and only 50% of persons with a cognitive decline get a diagnosis within the first five years of exhibiting symptoms,⁵ which often results in patients referred to PT with unexplained neurocognitive issues. PDGM and PDPM guidelines require a specific diagnosis as the primary billing code so it's likely we will have to communicate more often with physicians and their office staff. It's imperative for therapists to articulate findings concisely and clearly so that both diagnosis and treatment plan will logically meet patient needs.

Therapists can achieve proficiency in documentation by practicing two to three basic cognitive screens. Validated screening tools have clear guidelines about how the test should be conducted and referenced. How often do we hear a patient described as "stubborn" or "resistant to treatment?" In many cases those adjectives are

mischaracterizations by staff unaware of the nuances of apathy, decreased judgment, or diminished insight. These impairments may be the result of degenerative changes primarily affecting the frontal lobe.⁶ It is common to see documentation simply stating the client is “forgetful,” when it is far more informative to state the client has “a short-term memory capacity of 30 seconds.” Accurate cognitive findings add significant weight to prognoses about functional goals. To predict functional progress, it seems as imperative to have a grasp of the baseline cognitive level as it is to measure other factors like balance, ROM, and strength.

Evidence shows cognitive screening is a critical component of fall prevention assessment. Older adults with cognitive impairment exhibit a greater prevalence of balance and gait impairments. Blackwood et al reported on the relationship between screening tools that assess the impact of cognition on gait speed and risk of falling to identify older adults most at risk.⁷ Some common outcome measures may help differentiate certain dementias in a rehabilitation setting. For example, Tinetti and Berg Balance scales were lower for persons with Lewy Body Dementia compared with people diagnosed with Parkinson’s Disease or Alzheimer’s Disease, at the same stage of disease progression.⁸ No single cognitive screening tool has been identified as most valid despite a systematic review of 16,179 abstracts and over 1,000 articles that was done to support guidelines for regular screening for cognitive impairment in older adults. The authors discovered only a few instruments had been studied as screening tools in more than one study. Although there are several brief screening tools known to detect dementia, there are still no clear protocols.⁴ No matter which tool you use you will not be making a mistake.

Although no specific cognitive screen has been identified for use as part of a PT evaluation, the literature provides useful comparisons about validated tools that can guide therapists to choose the appropriate tool. For example, the Behavior Dyscontrol Scale (BDS) has been shown to be effective because it identifies a person’s capacity for behavior regulation including disinhibition and apathy. Research favorably compares the BDS to other more well-known tools.⁹ It’s a validated assessment for executive functioning, specifically attuned to areas of attention, goal-setting, inhibition, and insight—all very important to successful PT interventions. The BDS consists of 9 items focused on simple motor responses (making a fist, hand tapping, squeezing), it is easily integrated into a physical therapy assessment was shown to be effective for predicting how well activities of daily living (ADLs) would be performed.⁶ The test is based on a total of 27 possible points, however the client’s performance on one or two isolated BDS task items can also provide helpful information for a therapist. For example, the hand squeeze task on the BDS is designed to screen for inhibition /disinhibition and is referred to as a “go, no go” test.

This task adds assessment information for those who behave so impulsively that safety is a concern as well as clients who clearly articulate the need to use an assistive device yet a moment later may stand and dash across the room without it. Poor performance on this aspect of the BDS, for example, can enlighten both therapist and their caregivers to consider cognitive decline as an explanation for behavior. Contact jim.grigsby@ucdenver.edu for instructions and further information about using the BDS.

Caregivers are surprised to learn people can maintain good residual language ability and social skills yet still have other symptoms of cognitive loss like disinhibition. Validated tools like the BDS uncover impairments that are neurocognitive in origin just as elevated blood pressure or irregular heart rate responses to movement could be indicative of cardiac anomalies. Although clients are sometimes hesitant to reach out to health care professionals for diagnostic cognitive testing, they and their families may be grateful when a PT provides context and support for their vexing issues. When PTs combine a cognitive explanation in tandem with numerous treatment skills it clears a path to sensible goals.

Other screening tools within a physical therapist’s toolbox can provide valuable information. The Montreal Cognitive Assessment (MoCA)¹⁰ was designed as a rapid screening instrument for that detects mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuo-constructional skills, conceptual thinking, calculations, and orientation. There is a fee attached to MoCA use; information is available at <https://www.mocatest.org/>. The Saint Louis University Mental Status (SLUMS)¹¹ screens for math and logic deficits as well as impairments in word and story registration, attention span, and language comprehension. The SLUMS is available free through the elderguru site at <https://www.elderguru.com/download-the-slums-dementia-alzheimers-test-exam/>. Other brief screening tools like clock drawing and the Mini -Cog may not provide the types of information most beneficial for physical therapists but are validated tools for detecting impaired cognition and they will help determine if further screening is warranted.

Adopt a Dementia Friendly Attitude

People with cognitive deficits are often referred to PT because they have fallen; it is not known how many patients with dementia are discharged from physical therapy with minimal intervention. In a survey of home care therapists, a third of respondents believed a dementia diagnosis negatively impacts functional recovery.³ An estimated 30% of clients with AD suffer a fall,⁵ not surprising considering the loss of strength and increase in rigidity that accompanies later stages of the disease. Some therapists instruct clients and families about the known benefits of environmental or adaptive recommendations and then discharge the client, but there is ample

evidence that shows cognitive function is improved for patients with AD when they consistently participate in an exercise regime.¹² How is it possible to provide that participation in the presence of symptoms like disorientation, apathy, disinhibition, or agitation? A dementia-friendly awareness is gleaned from resources such as books written by non-therapists like Dr. G Allen Powers' *Dementia Beyond Drugs*¹³ and *Dementia Beyond Disease*¹⁴, and Dr. Atul Gawande's *Being Mortal*¹⁵. This awareness informs clinical recommendations as much as a Berg or TUG test. Social worker Naomi Feil describes successful behavioral techniques in *The Validation Breakthrough*.¹⁶ Her methods teach us to center ourselves in stressful situations and communicate effectively with people with dementia. Feil's simple, yet specific, recommendations about using factual words to build trust and rephrasing a person's statement to comfort them are techniques adoptable during physical therapy treatment. Feil talks about observing eyes, hand movements, general muscle tone, then mirroring to validate the person nonverbally.¹⁶ For therapists, this may mean matching someone's walking speed, whether it is very rapid or very slow.

Physical therapists may discount their ability to have positive discussions about how cognitive impairments can be managed. Information gleaned from cognitive screening can explain to clients and caregivers how we can help them make the most of their remaining abilities; too often the focus is on what is lost instead of what remains! Physical therapists are experts at assessing the whole person. When we identify cognitive issues as the root cause of the presenting problem, we can discuss difficult topics with clients and families, which can empower them to focus on important underlying issues that were previously ignored. When caregivers observe how validation methods are effectively used during treatment sessions, we are performing caregiver education. Cognitive awareness allows us to recognize opportunities to tailor the exercise approach to the client's specific needs. Physical therapists need to be supportive and proactive about helping people with dementia and their caregivers feel accepted. It's beneficial to know about support groups and other available local resources so we can defuse negativity and foster activity and movement goals.

PTs are health care professionals who can help find solutions for people with cognitive disease. Clients with dementia and their families know they are suffering, whether or not they are given permission to talk about it. Physical therapists have the capability to give them practical information that could prevent injuries and improve quality of life if we demonstrate that we truly understand the journey they are taking. Our profession is perfectly poised to capitalize on the research that puts exercise and movement at the forefront of cognitive deficit prevention and management.

References

1. Kirk-Sanchez NJ, McGough EL. Physical exercise and cognitive performance in the elderly: current perspectives. *Clinical Interventions in Aging*. 2013 Dec 18; 9: 51-62.
2. The New Skilled Nursing Facility and Home Health Payment Models. Available at: <https://www.apta.org/Payment/Medicare/NewPaymentModels/>. Accessed May 11 2020.
3. Miles JD, Staples WH, Lee DJ. Attitudes About Cognitive Screening: A Survey of Home Care Physical Therapists. *J Geriatr Phys Ther*. 2018 Feb 14. doi: 10.1519/JPT.000000000000179. [Epub ahead of print] PMID: 29461340.
4. Lin JS, O'Connor E, Rossom RC, Perdue LA, Eckstrom E. Screening for cognitive impairment in older adults: A systematic review for the U.S. Preventive Services Task Force. *Ann Intern Med*. 2013 Nov 5;159(9):601-12.
5. Alzheimer's Association Facts and Figures. Available at: <https://www.alz.org/alzheimers-dementia/facts-figures>. Accessed May 11, 2020.
6. Belanger HG, Wilder-Willis K, Malloy P, Salloway S, Hamman RE, Grigsby J. Assessing motor and cognitive regulation in AD. MCI, and controls using the Behavioral Dyscontrol Scale. *Arch Clin Neuropsychol*. 2005;20(2):183-9.
7. Blackwood J, Shubert T, Forgarty K, Chase C. Relationships between performance on assessments of executive function and fall risk screening measures in community-dwelling older adults. *J Geriatr Phys Ther*. 2016;39(2):89-96.
8. Fritz NE, Kegelmeyer DA, Kloos AD, Linder S, Park A, Kataki M, Adeli A, Agrawal P, Scharre DW, Kostyk SK. Motor performance differentiates individuals with Lewy body dementia, Parkinson's and Alzheimer's disease. *Gait Posture*. 2016 Oct; 50:1-7.
9. Johnson E, Miller S, and Sweet J. Confirmatory factor analysis of the Behavioral Dyscontrol Scale in a mixed clinical sample. *Clinical Neuropsychology*. 2004;18 (3) 395- 410.
10. Dong Y, Sharma VK, Chan BP, Venketasubramanian N, Teoh HL, Seet RC, et al. The Montreal Cognitive Assessment (MoCA) is superior to the Mini-Mental State Examination (MMSE) for the detection of vascular cognitive impairment after acute stroke. *J. Neurol Sci*. 2010 Dec 15;299(1-2):15-8.
11. Tariq SH, Tumosa N, Chibnall JT, Perry MH 3rd, Morley JE. Comparison of the SLUMS and the MMSE for detecting dementia and mild neurocognitive disorder—a pilot study. *Am J Geriatr Psychiatry*. 2006 Nov;14(11):900-10.
12. Avin KG, Hanke TA, Kirk-Sanchez N, et al. Management of falls in community-dwelling older adults: clinical guidance statement from the Academy of Geriatric Physical Therapy of the American Physical Therapy Association. *Phys Ther*. 2015;95(6):815-34.
13. Powers GA, Thomas WH. *Dementia Beyond Drugs: Changing the Culture of Care*. Ed2. Baltimore: Health Professions Press; 2016 .
14. Powers GA. *Dementia Beyond Disease: Enhancing Well-Being*. Baltimore: Health Professions Press; 2014.
15. Gawande A. *Being Mortal: Medicine and What Matters in the End*. New York: Metropolitan Books; 2014.
16. Feil N, Klerk-Rubin V. *The Validation Breakthrough: Simple Techniques for Communicating with People with Alzheimer's-type Dementia*. Baltimore: Health Professions Press; 2002.
17. Alzheimer's Association Clinical Trials Match. Available at: <https://www.alz.org/alzheimers-dementia/research-progress/clinical-trials>. Accessed May 11, 2020.



Jean Miles has been a home care clinician for over 20 years with previous experience in outpatient and acute care. She is an adjunct professor at the University of Hartford where she lectures about physical therapy management of cognitive impairment. Her primary work focuses on person centered care projects for persons with dementia with the Quality Improvement team at McLean Health Care in Simsbury, CT.

Celebrate GSA's 75th Birthday at its Annual Scientific Meeting, Nov. 3-7, 2020

by Tim L. Kauffman PT, PhD, FAPTA, FGSA

Physical Therapists have a wonderful opportunity to attend and participate in the Gerontological Society of America's (GSA) upcoming annual scientific meeting in Philadelphia, Pennsylvania on November 3-7, 2020. This year GSA is celebrating 75 years as a professional association. The theme of the conference is Turning 75: Why Age Matters. By the time this report is published it will be too late to submit an abstract but in mid-July, 2020 there will be an opportunity to submit a Late Breaker Poster Abstract. See geron.org for details.

GSA was established to advance the scientific and scholarly study of aging and to promote human welfare by the encouragement of gerontology in all of its areas. GSA is a multidisciplinary organization and has components of behavioral and social sciences; biological sciences; health sciences; and a section on social research, policy and practice. Thus, this professional organization has much to offer to physical therapists interested in aging and the context in which we treat patients. Personally, I have benefitted greatly by being a member since 1978, the same year I joined the Section on Geriatrics.

The 2019 Meeting

Last year's annual scientific meeting was held in Austin Texas with over 4,000 attendees. Of particular note is that nearly 20% of participants were from outside of the United States. There were a number of physical therapists in attendance and, importantly, APTA Geriatrics member, Michael Harris-Love was named a Fellow of GSA and Academy member. Dennis Klima, also a member of the Academy, presented "Academic Partnering in a Community Based Fall Prevention Program." I apologize to any other physical therapists who gave presentations that I did not report here.

The Health Science Section's Award for Excellence for the Rehabilitation of Aging Persons was given to Neil Alexander, MD from University of Michigan. His superlative presentation was entitled, "Understanding Older Adult Mobility and Physical Activity: Translating Lab to Real Life".

Anne Newman, MD University of Pittsburgh received the Joseph T. Freeman Award. Her forward thinking and provocative presentation was entitled, "Why Can't She

Walk? The Role of Aging Muscle." Both of these speakers are very strong advocates for physical therapy and rehabilitation of aging persons.

Geroscience

What is Geroscience? Does it have anything to do with what we do as physical therapists? The subject was definitely part of the meeting and has been published in GSA journals. Geroscience researches the relationship between aging and disease. It grew from and continues to parallel the study of the biology of aging. According to the National Institutes on Aging, Geroscience deals with the question, "How does aging affect disease and vice versa?"

Dr. Peter Boling stated that aging is a fact of life and inevitable; and, it is not a disease.¹ But, age-related health problems are real and reducing their prevalence can improve care of aging persons. Geroscientists are encouraging a shift in concepts and terminology from "life expectancy" to "health expectancy" with an emphasis on health and wellness, not one disease at a time.²

One dilemma is that medications are developed to treat specific diseases, and because aging is not seen as a disease, drugs have not been developed for aging and its diminutions. However age, itself is known to be one of the biggest risk factors for many diseases.²

Declining function is found in all aging persons and even the 70-year-old who might out perform a person in their 30s still has losses when compared to him/herself.² These age-related declines in various body organs and functions, even in relatively healthy persons, has gained the attention of the National Institutes of Health and a Geroscience Interest Group has been formed. The ongoing studies are determining the age-related changes that are common among typical conditions and diseases like cancer, dementia, neural degeneration, musculoskeletal compromise, and lung and cardiovascular conditions.

There are nine cellular hallmarks of aging consisting of: "genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, deregulated nutrient sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion, and altered intercellular communication".³ These specific biological changes have some commonality and contribute to declines in function and increases in

disease risk. Targeting them with medications can slow the deleterious age-related changes and disease.

All of the presentations at this meeting on geroscience as well as the many others subjects dealing with health care, public policy and psychosocial changes/interventions, provided an enriching milieu. One that is critical for physical therapists working with and treating older persons. To answer the question above, about geroscience; yes, it impacts what we do as physical therapists treating aging persons with functional declines and diseases. The problem is that geroscience is not part of our esoteric body of literature. To be part of the emerging scientific and policy thinking about aging, a requisite for our profession is to continue to learn, grow and expand our knowledge and skills for patient care.

References

1. Boling P. Is aging a disease? A geriatrician's perspective. Public Policy Aging Report. 2019;29 (4):126-127.
2. Kaeberlin M. It is time to embrace 21st-century medicine. Public Policy Aging Report. 2019; 29(4): 111-115.
3. Lopez-Otin C, Blasco MA, Partridge L, Serrano M, Kroemer G. The hallmarks of aging. Cell. 2013; 153: 1194-1217.



Timothy L. Kauffman PT, PhD, FAPTA, FGSA started his physical therapy career 50 years ago. His diverse experience includes work in the U.S. Army and Reserve Unit Hospitals, nursing homes, home care, research, lecturing and private practice. He served as an adjunct professor as well as a clinical instructor for a number of physical therapy schools. He is the lead editor of three editions of A Comprehensive Guide to Geriatric Rehabilitation which is presently being translated into Chinese.

Case Report: Diagnosis and Management for an Older Adult Patient with BPPV

by Horace Leung, PT, DPT

The prevalence of benign paroxysmal positional vertigo (BPPV) has been estimated to be 30% in people older than 60 years old and 50% when greater than 85 years old.¹ These symptoms were generally associated with unsteadiness, fear of falling, and dizziness.² This can be uncomfortable and debilitating which can significantly impact a person's function.³ Older adults also have various comorbidities such as kyphosis, limited cervical motion, and low back pain which may also require attention when evaluating and treating their vertiginous symptoms.¹

The typical presentation of BPPV involved non-harmful, recurrent, and sudden intensification of symptoms based on positional changes that result in the sensation of rotation.^{1,4} BPPV is differentiated into two forms, cupulolithiasis and canalithiasis. Cupulolithiasis is when the canal becomes gravity sensitive which leads to immediate, long lasting symptoms of dizziness that decay gradually over time. The Semont maneuver is a technique used to primarily break the otoconia free from adhering to the cupula and could even reposition free floating otoconia.⁵ As for canalithiasis, free floating otoconia disrupt the flow within the affected canal, resulting in delayed and brief symptoms of dizziness. The Epley maneuver is a treatment technique that uses gravity and changes in head position to move otoconia back to the vestibule.⁵

The purpose of this case study was to acknowledge the impairments and factors of the older adult regarding the assessment and treatment of BPPV in the home. The case study attempted to ascertain the feasibility of using the Semont maneuver primarily over the Epley maneuver when treating canalithiasis in older adult patients with kyphotic changes and limited cervical mobility.

Case Study

Mr. W was a 92-year-old patient with bouts of dizziness and complaints of pressure in his neck in the morning. Dizziness was stated to only be present when taking a shower. Mr. W lived in a senior living community and stated that he had no symptoms when commuting to work as an accountant. The resting baseline intensity of the patient's vertiginous symptoms was a 9/10 in the morning and during the shower, with a 3/10 the rest of the day. With showering, he accounted no difference in the severity of his symptoms when factoring in the

duration of the shower or the temperature of the water in multiple instances.

The patient had no history of falls within the past year. He reduced the frequency of his showers throughout the week secondary to fear of his symptoms being exacerbated. His symptoms interrupt his morning routine, limiting his ability to get ready for work. With further interviewing, the patient reported dizziness and unsteadiness primarily in the morning with minimal-to-no dizziness noted toward the evening. He has a past medical history of type II diabetes, prostate cancer, kidney disease, history of myocardial infarction, high cholesterol and hypotension.

A physical therapy evaluation was requested for this patient to assess his symptoms of dizziness. The assessment must rule out contributing factors based on his extensive past medical history of diabetes, hypotension, medications, or vertebral artery involvement.

Upon examination, Mr. W's vitals were as follows: blood pressure was 124/68 mmHg in supine; heart rate 66 bpm regularly irregular; 98% SpO₂ on room air. His current medications included Xtandi, Warfarin, Atenolol, Metamucil, Zolpidem Tartare, Atorvastatin, Acetaminophen, and Veltassa with no recent changes. The patient had full oculomotor range with normal eye movements noted – negative for spontaneous nystagmus and gazed evoked nystagmus while demonstrating smooth pursuits and saccades appropriately.

An assessment of orthostatic hypotension was warranted based on his history of hypotension and his morning routine requiring more positional changes as compared to the rest of the day where the patient remained upright with sitting and standing for his job. His vitals were recorded to be 120/64 when transitioning from supine to sitting. The patient had no dizziness rising from a chair or bed consistently.

Dizziness is a well-documented and general symptom in BPPV, especially in the older adult population.² In this specific case, the patient had difficulty gauging his symptoms of dizziness as his reports varied throughout the evaluation. The dizziness handicap inventory (DHI) was utilized to define its effect on the patient's activity limitations and participation restrictions. The DHI has a test-retest reliability of 0.97 and internal reliability of 0.89.⁴ The DHI covered the physical domain which assessed at

the patient's perception of disequilibrium and its impact on the emotional and functional domains.⁴ It was useful to establish subjective improvement as subjective impairment and physiological improvements were not correlated. This would indicate that factors of vestibular function were responsible for the subjective impairment.⁴ The patient scored a 14/100 on the subjective measure mostly noting intermittent physical activity limitations like bending over, turning head quickly, and getting out of bed presenting with frustration and embarrassment. The cluster of his reported exacerbations happened with positional changes of his head which would indicate vestibular testing. This functional measure could be used to standardize subjective reporting to efficiently collect information during an evaluation and improve the patient's awareness of their symptoms as answers must fit in three defined categories – "Always," "Sometimes," or "No."

Body function and structures were assessed through the patient's postural assessment noting moderate thoracic kyphosis, rounded shoulders, and forward head. The patient's wall to occiput measure was 11 centimeters. He also presented with 45 degrees of active cervical flexion, 15 degrees of active extension and 45 degrees and 50 degrees of rotation to the right and left respectively. These findings indicated increased difficulty with aligning the posterior canal for the Dix-Hallpike maneuver.

Vertebral artery testing must also be addressed prior the Dix Hallpike maneuver secondary to the similar provocative movements and symptoms reproduced. In order to differentiate between vertebral artery involvement and BPPV, the modified vertebral artery test (mVAT) was an objective assessment that could test the vertebral artery in sitting with minimal effect on the vestibular system.⁶ The patient tested negative on the mVAT, and when accompanied by a positive Dix-Hallpike, vestibulogenic dizziness was the general consensus over vertebral artery involvement.⁶

The Dix Hallpike maneuver was performed in the patient's bed where the initial finding demonstrated a negative result secondary to difficulty reaching 30 degrees of extension needed to align the posterior canal. A pillow under his thoracic spine helped achieve the cervical extension range of motion required without the need for a tilt-table to elicit a response from the Dix-Hallpike maneuver. However, the patient reported a strain with the Dix-Hallpike maneuver. With repositioning and retesting, R Posterior BPPV canalithiasis was noted.

When assessing for BPPV, the Dix-Hallpike maneuver was used to place the posterior and anterior semi-circular canals in a gravity-dependent position while observing eyes for nystagmus while the patient's head was rotated to 45 degrees on one side and extended 20 to 30 degrees beyond horizontal.^{4,5} The patient presented with an immediate onset of vertigo when moved into the provoking position. Symptoms were expected to last between

seconds to minutes with seconds being a defining indicator for canalithiasis.⁴ Nystagmus lasted the duration of the reports of dizziness with an upbeat right torsional movement. The patient had fluctuations in the intensity of vertigo and nystagmus, which increased and was followed by a decrease in symptoms while the patient was in a provoking position. Symptoms dissipated within 60 seconds where signs and symptoms were most consistent with a diagnosis of canalithiasis of the R posterior canal. No symptoms were observed or reported when testing the left side. The Dix-Hallpike maneuver has a reported sensitivity of 82% and a specificity of 71%.⁵ The test has an 83% positive predictive value and a negative predictive value of 52% for BPPV which may warrant a follow-up visit to avoid a false negative result.⁵ The supine roll test was also completed to assess for the presence of BPPV in the horizontal semicircular canals. This was to ensure appropriate intervention was provided through repositioning techniques that align the canals relative to gravity.⁵ The results of the test were negative for both sides upon examination.

Once R Posterior BPPV canalithiasis was established, cervical ROM and postural exercises were completed prior to the Epley maneuver to ensure appropriate form when executing the technique. The client reported that symptoms reached a "12/10" over the week following the repositioning technique which left him "incapacitated." Symptoms returned to a 5/10 for the following session but denied rotational vertigo. The patient continued to report no relief from the Epley maneuver.

The Semont maneuver was then trialed due to its relatively similar effectiveness when compared to the Epley maneuver in treating BPPV canalithiasis^{7,8}. There were fewer steps for the adult learner to comprehend which would allow the patient to further assist in maintaining his head and neck position throughout the maneuver. Possible symptoms and response were discussed with visual demonstrations of how to perform the technique to provide clarity when the patient undergoes the positional changes. Having the patient rotate his own head could decrease discomfort with the Semont maneuver and reduce the likelihood of injury.⁴ The physical therapist instructed the patient to monitor symptoms for 24 hours following treatment. Subjective reports and Dix-Hallpike were reassessed. Within one session, symptoms were mitigated with a negative result on the Dix-Hallpike maneuver. The patient reported continued full symptom relief with no limitations noted and was discharged.

The Epley maneuver was unsuccessful and lead to greater fear of falling and exacerbation of dizziness symptoms. This response warranted a modification to the treatment approach.

With the Semont maneuver, the patient remained consistent with his technique between trials while the physical therapist provided physical guidance and simple verbal cues throughout the maneuver to maintain the

integrity of the patient's head position. The decreased number of steps in the maneuver and reduced number of combined movements of cervical spine increase the success and potential with self-management through an HEP if symptoms resurfaced. The Semont maneuver only requires movement in the frontal plane and does not require 30 degrees of cervical extension to reposition the otoconia since the maneuver uses momentum. The patient's legs were off the edge of the bed allowing the patient to focus more on his head and neck position. The patient was able to tolerate Semont maneuver with no reports of strain or complication. The patient showed an immediate reduction in symptoms to a 1/10 intensity.

When multiple Dix-Hallpike maneuvers were performed within a session, the nystagmus fatigued which diminished the response. This could easily be misconstrued as a negative result. The patient's presentation was evaluated at the start of each session in order to reduce the likelihood of a false negative.

The physical therapist continued to assess and reassess the patient's subjective reports along with utilizing the Dix-Hallpike maneuver each session until full symptom resolution. The patient had a two week follow up with negative results for BPPV in the R posterior canal and was discharged.

The key aspect to treating canalithiasis was recognizing and understanding the signs and symptoms along with contributing factors that may influence the success of the Epley and Semont maneuver based on the client's presentation.²

As seen in the literature,¹ performance of an Epley maneuver was difficult in older adults with kyphotic changes and limited range of motion in the cervical spine due to poor positioning, increasing risk of strain. The use of the Semont maneuver allowed for greater success with head positioning secondary to fewer movements required from the rest of the body. On the other hand, the Semont maneuver required the patient to be mobile and current findings stated that the rapid movements were not recommended for obese and frail older adults.¹ In this case study, the patient had limited active cervical ROM but was able to assist with simple movements of the cervical spine, allowing for greater focus for the physical therapist and patient to address the speed component of the Semont maneuver. In addition, the patient did not need to maintain a combined cervical movement to perform the technique, decreasing emphasis on any head reclination.¹ There was no optimal number of treatments, but research has noted that multiple treatments demonstrated beneficial effects following initial maneuver with persistent nystagmus.^{5,7-8}

A key to the overall success of the patient's resolution of symptoms was to always follow up with the Dix-Hallpike maneuver while acknowledging the patient's subjective reporting of the past 24 hours at the start of each session.⁵ It was important to retest because in

some instances the patient may believe the symptoms were "relieved," but in reality, the patient was avoiding vertiginous provoking activities. Performance of the Dix-Hallpike following a negative result on the Dix-Hallpike in the session prior was indicated to confirm the resolution of symptoms and rule out false negative results.⁵

Potential areas for reconsideration would include assessing BPPV with the side-lying test over the Dix-Hallpike maneuver with a pillow to decrease strain in the cervical spine secondary to the patient's kyphosis.⁵ The side-lying test mimicked the starting position and movement of the first phase of Semont maneuver where cervical extension was not needed, decreasing the likelihood of straining the patient.⁵ Follow up measurements on the ROM and postural exercises would have also provided further insight into its effect on the success of the repositioning maneuvers as these therapeutic exercises were aimed at improving kinesthetic awareness for the complex motions of the Epley and Semont maneuvers.

In conclusion, the Semont maneuver may be indicated over the Epley maneuver to improve safe handling while achieving similar outcomes for canalithiasis when kyphotic changes and limited cervical ROM were noted.

References

1. Balatsouras DG, Koukoutsis G, Fassolis A, Moukos A, Apris A. Benign paroxysmal positional vertigo in the elderly: current insights. *Clin Interv Aging*. 2018; 13:2251-2266. doi: 10.2147/CIA.S144134
2. Piker EG, Jacobson GP. Self-report symptoms differ between younger and older dizzy patients. *Otology & Neurotology*. 2014;35(5):873-879. doi:10.1097/mao.0000000000000391.
3. Wetmore S, Eibling D, Raz Y, Hoffer M, Goebel J. Challenges/opportunities in managing the dizzy older adult. *Otolaryngology-Head and Neck Surgery*. 2010;143(2). doi:10.1016/j.otohns.2010.06.675.
4. OSullivan SB, Schmitz TJ, Fulk GD. *Physical rehabilitation*. Philadelphia: Davis; 2014.970-974
5. Bhattacharyya N, Gubbels SP, Schwartz SR, et al. Clinical practice guideline: benign paroxysmal positional vertigo (Update). *Otolaryngology-Head and Neck Surgery*. 2018; 156(3S):S1-S.47. doi:10.1177/0194599816689667
6. Alshahrani A, Johnson EG, Cordett TK. Vertebral artery testing and differential diagnosis in dizzy patients. *Physical Therapy and Rehabilitation*. 2014;1(1):3. doi:10.7243/2055-2386-1-3.
7. Kinne BL, Perla MJ, Weber DT. Semont maneuver vs. Epley maneuver for canalithiasis of the posterior semicircular canal: a systematic review. *Physical Therapy Reviews*. 2016;21(2):102-108. doi:10.1080/10833196.2016.1228511
8. Zhang X, Qian X, Lu L, et al. Effects of Semont maneuver on benign paroxysmal positional vertigo: a meta analysis. *ACTA Oto-Laryngologica*. 2017; 137(1):63-70



Horace Leung graduated from Stockton University in 2017 with his Doctorate in Physical Therapy. He minored in gerontology and holistic health during his undergraduate career. He currently works at FOX Rehabilitation as a practicing clinician and new graduate mentor. Horace is LSVT Certified and a 2020 graduate of the Fox Geriatric Residency in Physical Therapy.

Blueberries, Birds and Ms. Ramsey

by Gabrielle Scronce, PT, PhD

Editor's Note: As part of the ongoing Knowledge Translation project between GeriNotes, JGPT, and the SIGs, for each Journal Club there will be an accompanying clinical case commentary. This is intended to demystify the more formal statistics and format of a peer-reviewed article and translate key concepts into clinically usable information. This case commentary will be published in GeriNotes but may also be published in advance to coincide with the timing of Journal Club. The KT project is a work in progress. Give us your feedback! And join us 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.

Subjective Examination

Patient primary complaint: Ms. Ramsey is an 80-year-old woman referred to outpatient physical therapy for gait instability. Ms. Ramsey says she is very careful to keep from falling and that she avoids situations where she fears she could lose her balance. For example, she no longer plants a garden or picks blueberries in the summer. She feels most unstable when filling the many birdfeeders in her yard, but she denies having fallen in the past year.

Medical history: Ms. Ramsey's medical history includes bilateral knee osteoarthritis, hypothyroidism, and type II diabetes mellitus. She has age-related vision and hearing loss, which are corrected with glasses and hearing aids, respectively. Medications include: Acetaminophen 1300 mg up to 2x/day, Synthroid 112 mcg 1x/day, Metformin 1000 mg 2x/day.

Social: Ms. Ramsey lives in a single-story home with two steps and no railing to enter. The home has one bathroom with a tub/shower combination. There are no grab bars or durable medical equipment in the bathroom. Her partner died in 1992; she has lived alone since that time. She has no children, a sister and several nieces live near-by. A high school graduate, she did not attend college. She worked for her entire career in a furniture factory, starting as an upholsterer and retiring as a manager. Ms. Ramsey has always been "busy" around her home and at work, but she has "never had time" to participate in organized exercise. She does not use any assistive devices. She is able to drive to church, the grocery store, and to visit family.

Patient goals: Ms. Ramsey would like to feel more stable on her feet so that she can care for her yard more easily. She would also like to feel safer when walking into church, through the grocery store, and inside family members' homes.

Objective Examination

- **Cognitive screen:** 27/30 on the Montreal Cognitive Assessment
- **Balance Confidence:** 55.6% on the Activities-Specific Balance Confidence Scale
- **Vital signs at rest:** HR 73 bpm, BP 127/82, RR 14 breaths/min

- **Pain:** 0/10 pain at rest, 4/10 pain in bilateral knees with all functional mobility
- **Posture:** Thoracic kyphosis and forward head posture in sitting and standing. Genu valgus bilaterally in standing.
- **Flexibility:** Ms. Ramsey has mild tightness in hamstring and gastrocnemius muscles bilaterally.
- **Strength:** 3-/5 bilateral hip extensors, 3/5 bilateral hip abductors and plantar flexors, 3+/5 and "achy" bilateral quadriceps, and 4/5 bilateral dorsiflexors
- **Gait:** Ms. Ramsey walks with a shortened step length and minimal hip extension bilaterally with self-selected gait speed 0.9 m/s.
- **Five Times Sit-to-Stand Test:** 30.0 seconds
- **Timed Up and Go Test:** 12.5 seconds
- **Dynamic Gait Index:** 14 (out of 24)
- **Four-Stage Balance Test:** 24) Feet together = 10.0 seconds; Semi-tandem = 10.0 seconds; Tandem = 6.8 seconds; Single-limb stance = 1.0 seconds

Assessment: Ms. Ramsey presents with pain, lower extremity muscle weakness, decreased flexibility, gait instability, impaired balance, decreased balance confidence, and activity restriction, all of which place her at increased risk for falls. Ms. Ramsey would benefit from skilled physical therapy for balance rehabilitation and to prescribe and progress an exercise program for balance, strength, flexibility, and gait to increase her safety with participation in household and community activities.

Plan: Ms. Ramsey will attend outpatient PT twice a week for 8 weeks prior to reassessment. Treatment will focus on balance, stepping, and walking activities in the clinic as well as instruction and prescription of home exercises for balance, strengthening, and flexibility.

Long Term Goals (8 weeks)

1. Ms. Ramsey will demonstrate improved functional lower extremity strength based on performance of Five Times Sit-to-Stand test in < 25 seconds **based on MCID of 2.3 seconds (Meretta, 2006).**
2. Ms. Ramsey will demonstrate improved dynamic balance and decreased risk for falls based on performance of Timed Up and Go test in < 12 seconds **based on MCID of 1.4 seconds (Wright, 2011) and cut off of 12 seconds for increased falls risk (Lusardi, 2017).**

3. Ms. Ramsey will demonstrate improved dynamic balance and decreased risk for falls based on score of at least 20 on Dynamic Gait Index **based on cut-off of 19/24 for increased falls risk (Lusardi, 2017).**
4. Ms. Ramsey will demonstrate improved static balance and decreased risk for falls based on ability to maintain tandem stance position for at least 10.0 seconds and single-limb stance position for at least 6.5 seconds **based on cut-off of 6.5 seconds on SLS for increased falls risk (Lusardi, 2017).**
5. Ms. Ramsey will be able to fill her birdfeeders in her yard safely.
6. Ms. Ramsey will be able to pick blueberries safely and using appropriate ergonomics.

In the clinic, activities will be designed to mimic the task that Ms. Ramsey has been avoiding but would like to resume. For example, we will begin with stepping in supported standing and progress to stepping with variations in speed, duration, height, and distance without support. Eventually, this activity will require Ms. Ramsey to perform the types of movements necessary for maintaining her balance while completing yard work, gardening, picking blueberries, and filling her bird feeders.

Ms. Ramsey's home exercise program will consist of exercises she can perform safely at home following instruction and practice in the clinic. Such exercises may include static and dynamic balance exercises such as tandem stance, single-limb stance, tandem walking, and figure-eight walking along with strengthening exercises such as standing heel raises, standing hip abduction, and repeated chair stands.

Ms. Ramsey will also be referred for community programs to increase physical activity and reduce risk for falls. Based on her enjoyment of social activities and limited experience with traditional forms of exercise, Ms. Ramsey is likely to prefer exercising in a group. Based on discharge goals, Ms. Ramsey will benefit most from an exercise program like Tai Chi, which is primarily performed in standing and provides a sufficient balance challenge. If there is limited availability of group and community-based programs within a comfortable driving distance for Ms. Ramsey, she may need to be connected with resources and transportation provided through her Area Agency on Aging.



Gabrielle Scronce is a physical therapist who recently received her PhD in Human Movement Science from the University of North Carolina at Chapel Hill. Her clinical and research interests focus on community-based interventions to reduce falls and improve mobility among older adults.



Take a Stand! Measurement Tools for Chair Rise

by Carole Lewis, PT, DPT, PhD, FAPTA and Linda McAllister, PT, DPT

Standing up from a seated position is one of the most essential parts of daily mobility in older adults. When an individual has difficulty with sit-stand, it significantly impacts his or her ability to live independently. Sit-to-stand is frequently addressed in rehabilitation programs, and it's critical to know how to measure it accurately and effectively.

There are several variations of sit-to-stand tests. Repetition-constant tests (timing a fixed number of repetitions) and time-constant tests (counting repetitions in a fixed time) are common genres.¹ We will review the most applicable tests for the older adult population.

The five repetition sit-to-stand test (FRSST), a repetition-constant protocol, is a widely implemented tool.¹ It has been shown to be a reliable measure for older adults,² neurologic patients including people with stroke³ and Parkinson's Disease,⁴ and people with osteoarthritis.⁵ Intraclass correlation coefficients (ICC)s have been reported ranging from 0.64 to 0.96, with an average of 0.81 in a variety of adult populations.² The FRSST has identified increased risk of recurrent falls in community dwelling older persons.⁶ studies have demonstrated that the FRSST correlates with knee extension strength⁷ and with static and dynamic balance measures in older adults (timed-up-and-Go, functional reach test).⁸ In patients with stroke, the FRSST has demonstrated correlation with Berg Balance scale scores.¹ Correlation has also been

demonstrated with gait speed in community dwelling older adults,⁹ as well as utility in detecting balance disorders.¹⁰

Time-constant sit-to-stand tests such as the 30-second chair stand test (30s-CST) decrease the floor effect for those who cannot complete the required repetitions of the FRSST.¹¹ The 30s-CST has been shown to be reliable in community dwelling elderly,¹¹ patients with hip and knee osteoarthritis,¹² and patients post- total hip replacement.¹³ Moderate correlation has been demonstrated between the 30s-CST and leg press performance in community -dwelling adults.¹

While they are great for higher-functioning participants, the FRSST and the 30s-CST have decreased practicality for lower-functioning older adult populations. Both tests exclude patients who must use hand support to stand. Studies of these tests in patients in home care, acute settings and long term care have shown percentages ranging from 46-81% of patients who could not be scored for this reason.¹³⁻¹⁵

A modified 30-second sit-to-stand protocol (m30STS) which allows participants to push off from arm rests has been recently introduced and studied.¹⁶ This test demonstrated good test-retest reliability (ICC = 0.84),¹⁶ good inter-rater reliability (ICC = 0.737) and excellent intra-rater test retest reliability (ICC=0.98).¹⁷ Another recent study of the m30STS demonstrated the ability to significantly

account for fall risk in one year (falls versus no falls); increased sit-stands were associated with fewer falls.¹⁸ Moderate correlation has been demonstrated between the m30STS the timed-up-and-go (TUG) test,¹⁶ the Berg Balance Scale and the Modified Barthel Index. Minimal Detectable Change has been calculated to be 0.70 , meaning that a change of one repetition in the test score represents a change beyond testing error.¹⁸

Many therapists already modify sit-to-stand tests and allow their patients to use hand support. A recent study standardized the testing method. This protocol should be used if a patient requires hand support in order to rise:

- Use a standard height (approximately 18 inch) chair with arm rests, stabilized.
- The participant should scoot to the edge of the chair with their hands on the arm rests, ready to stand up.
- At the command “go”, the participant should rise to stand, and complete as many sit to stands as possible in 30 seconds.
- The participant must let go of the arm rests and bring their hands to the midline of the body each time they stand upright.
- The participant may not lean back on the chair with their legs for support.
- The participant must sit down fully between each stand.
- No use of a walker or other hand support is allowed.
- If a participant stands at least halfway at the end of the 30 seconds, the repetition is counted.
- One to two practice repetitions should be completed first to establish correct form.¹⁸

Use of the traditional sit-to-stand assessments as well as the modified version gives us plenty of options to objectively assess this important function. If your work setting is not currently standardizing the measurement of sit-to-stand, consider sharing this information.

References

1. Bohannon, RW. Measurement of Sit-to-Stand Among Older Adults. *Top Geriatr Rehabil.* Jan-Mar 2012;28(1): 11-16
2. Bohannon RW. Test-retest reliability of the five-repetition sit-to-stand test: a systematic review of the literature involving adults. *J Strength Cond Res.* 2011 Nov;25(11):3205-7
3. Mong Y, Teo TW, Shamay S. 5-repetition sit-to-stand test in subjects with chronic stroke: reliability and validity. *Arch Phys Med Rehabil.* 2010 Mar; 91(3): 407-413
4. Duncan RP, Leddy AL, Earhart GM. Five times sit-to-stand test performance in Parkinson's Disease. *Arch Phys Med Rehabil.* 2011 Sept; 92(9); 1421-1436
5. Lin YC, Davey RC, Cochrane T. Tests for physical function of the elderly with knee and hip osteoarthritis. *Scand J Med Sci Sports.* 2001 Oct; 11(5) 280-6.
6. Buatois S, Perret-Guillaume C, Gueguen R, et al. A simple clinical scale to stratify risk of recurrent falls in community-dwelling adults aged 65 years and older. *Phys Ther.* 2010 Apr; 90(4): 550-60
7. Bohannon, RW. Sit-to-stand test: performance and determinants across the age-span. *Isokinet Exerc Sci.* 2010; 18(4): 235-240
8. Goldberg A, Chavis M, Watkins J, Wilson T. The five-times-sit-to-stand test: validity, reliability, and detectable change in older females. *Aging Clin Exp Res.* 2012 Aug;24(4):339-44
9. Schaubert KL, Bohannon RW. Reliability and validity of three strength measures obtained from community-dwelling elderly

- persons. *J Strength Cond Res.* 2005 Aug; 19(3): 717-20
10. Whitney, SL, Wrisely DM, Marchetti GF, et al. Clinical measurement of sit-to-stand performance in people with balance disorders: validity of data for the five-times-sit-to-stand test. *Phys Ther.* 2005 Oct; 85(10): 1034-1045.
11. Jones CJ, Rikli RE. A 30-chair stand test as a measure of lower body strength in community-residing older adults. *Res Q Exerc Sport.* 1999; 70: 113-119.
12. Dobson F, Hinman RS, Hall M, et al. Measurement properties of performance-based measures to assess physical function in hip and knee osteoarthritis: a systematic review. *Osteoarthritis Cartilage.* 2012 Dec; 20(12): 1548-62.
13. Bohannon, RW. Five-repetition sit-to-stand test: usefulness for older patients in a home-care setting. *Percept Mot Skills.* 2011; 112(3): 803-806.
14. Bodilson AC, Juul-Larsen HG, Peterson J, et al. Feasibility and inter-rater reliability of physical performance measures in acutely admitted older medical patients. *PLoS ONE.* 2015 Feb. 10(2): e0118248. Doi: 10.1371/journal.pone.0118248.
15. Kristensen MT, Jakobsen TL, Nielson JW, et al. Cumulated ambulation score to evaluate mobility is feasible in geriatric patients and in patients with hip fracture. *Dan Med J.* 2012 Jul; 59(7): A4464
16. Le Berre M, Apap D, Babcock J, et al. The Psychometric Properties of a Modified Sit-to-Stand Test with Use of the Upper Extremities in Institutionalized Older Adults. *Percept Mot Skills.* 2016;123(1):138-152
17. McAllister LS, Palombaro KM. Modified 30-second Sit-to-stand test: Reliability and Validity in Older Adults Unable to Complete Traditional Sit-to-Stand Testing. *J Geriatr Phys Ther.* 2019 Feb 21. doi: 10.1519/JPT.0000000000000227. [Epub ahead of print.
18. Applebaum EV, Breton D, Feng ZW, et al. Modified 30-second Sit to stand test predicts falls in a cohort of institutionalized older veterans. *PLoS ONE.* 2017 May;12(5):e0176946



Carole Lewis, PT, DPT, GCS, GTCCS, MPA, MSG, PhD, FSOAE, FAPTA, is the president of and faculty for GREAT Seminars and Books and Great Seminars Online (www.greatseminarsandbooks.com and www.greatseminarsonline.com). She has her own private practice in Washington DC. She is editor-in-chief of Topics in Geriatric Rehabilitation and an adjunct professor in George Washington University's College of Medicine.



Linda McAllister, PT, DPT, GCS, GTCCS, CEAGN is a board-certified Geriatric Specialist and lecturer with Great Seminars and Books. She currently practices in home health with EvergreenHealth in Kirkland, WA. She is an adjunct faculty member of Arcadia University and serves as coordinator for the Geriatric Training Certification with the Geriatric Rehabilitation Education Institute.