GeriNotes

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IN HONOR/MEMORIAM FUND

Each of us, as we pass through life, is supported, assisted and nurtured by others. There is no better way to make a lasting tribute to these individuals than by making a memorial or honorary contribution in the individual's name. The Academy of Geriatric Physical Therapy has established such a fund which supports geriatric research. Send contributions to:

The Academy of Geriatric Physical Therapy | 3510 East Washington Avenue | Madison, WI 53704

Also, when sending a contribution, please include the individual's name and any other person you would like notified about your contribution. If you are honoring someone, a letter will be sent to that person, and if you are memorializing someone, the surviving family will be notified of your contribution.

In the field of geriatric physical therapy, we receive many rewards from our patients, associates, and our mentors. A commemorative gift to the Academy of Geriatric Physical Therapy In Honor/Memoriam Fund is a wonderful expressive memorial.

PRESIDENT'S MESSAGE: WHO CALLS FOR MAJOR SHIFT IN VIEWS TOWARDS OLDER PEOPLE

William H. Staples, PT, DHS, DPT, GCS, CEEAA

First, the Gerontological Society of America (GSA) has announced that former Section President, Carole Lewis, PT, DPT, GCS GTC, MPA, MSG, PhD, FAPTA, has been awarded the Excellence in Rehabilitation of Aging Persons Award Lectureship. A big congratulation to her for her efforts to spread the word about rehabilitation for older adults! It is wonderful to see awards given from an interdisciplinary group. The GSA is the nation's largest interdisciplinary organization devoted to the field of aging. This distinguished honor is given annually to acknowledge outstanding contributions in the field of rehabilitation. The awardee's work may be in the areas of teaching or patient care, or publications that may include scholarly works, books, monographs, administrative directives, or public policy papers. The award presentation took place at GSA's 68th Annual Scientific Meeting, which was held in Orlando, Florida this past November. This conference is organized to foster interdisciplinary collaboration among researchers, educators, and practitioners who specialize in the study of the aging process. Visit www.geron.org/2015 for further details.

"The *World Report on Ageing and Health* outlines a framework for action to foster healthy ageing built around the new concept of functional ability. Making these investments will have valuable social and economic returns, both in terms of health and wellbeing of older people and in enabling their on-going participation in society."[1] The report can be found at http://www.who.int/ageing/events/world-report-2015-launch/en/ and was released September 30, 2015, at a briefing held at the United Nations Foundation headquarters.

This new report from the World Health Organization (WHO) calls for a dramatic shift in the way governments, societies, and health systems think about and approach a rapidly growing older population. The authors report that by 2050, the number of people who will be older than 60 years is set to double. The report also states that for the first time in history, most people can expect to live into their 60s and beyond. According to the Social Security Administration, in the United States the typical 65-year-old will live to age 83, one in 4 to age 90, and one in 10 to age 100.[2] The consequences of this increased older population for health care systems, for the work force, and for the budgets of countries will be profound. The new report summarizes the opportunities that accompany population aging, and also the many barriers and knowledge gaps that block these opportunities.

Among the current problems the report found were a one-size-fits-all approach to older people. There is a great diversity among older adults, and the notion that older age always implies functional disability, dependence, and increased cost is not true. Another of the report's implications is for health care professionals who need "to step beyond the idea that healthy aging is the absence of disease and to realize that what's more important for an older person is their functional ability that comprises both themselves and the environment they live in."[1] Physical therapists already are practicing this and hopefully not letting the negative aging by culture (ageism) precede what we do for our patients.

The 245-page report defines "healthy aging" as "the process of developing and maintaining the functional ability that enables well-being in older age."[1] To achieve that goal, detailed recommendations are provided for 4 "priority areas for action."[1] These 4 are: "aligning the health care systems for the older populations they now serve, developing improved systems of long-term care, creating age-friendly environments, and improving measurement and monitoring to ensure that the changes are having the intended beneficial effect."[1] The overall tone of the report is positive, asking that expenditures on older populations be viewed as "investments" rather than "costs." The report notes that an aging population may not be that expensive as has been assumed. This is because aging itself has been shown to contribute far less to the overall health care expenditures when compared to changes in health care-related technologies. And in fact, the report says that in some high-income countries, health care expenditures per person fall significantly after the age of 75, whereas expenditures for long-term care rise. However, increases in health care costs with age tend to be higher in the United States than in some other countries, such as the Netherlands, Japan, Korea, and Germany, where there are comprehensive systems (socialized medicine) already in place for long-term care.

The report states that there are 3 key approaches that are relevant for all stakeholders. These are to "combat ageism, enable autonomy, and support *Healthy Ageing* in all policies at all levels of government." I believe that most members of the Academy are already on board with these ideas.

In conclusion the report states that "the societal response to population age-

ing will require a transformation of health systems that moves away from disease-based curative models and towards the provision of older-person-centered and integrated care. It [change] will require the development, sometimes from nothing, of comprehensive systems of long-term care. And it will require a coordinated response from many other sectors and multiple levels of government.

It [systems] must be built on a fundamental shift in our understanding of ageing to one that takes account of the diversity of older populations and responds to the inequities that often underlie ageing. And it will need to draw on better ways of measuring and monitoring the health and functioning of older populations."

REFERENCES

1. World Health Organization. Launch of the World report n ageing and health. http://www.who.int/ageing/events/world-report-2015-launch/en/. Accessed October 3, 2015.
2. Social Security Administration. http://www.socialsecurity.gov. Accessed October 4, 2015.

Election Results

Candidates will take office at the Member's Meeting at CSM 2016

Treasurer—Kate Brewer

Directors—Myles Quiben and Susan Wenker

Nominating Committee—Anne Coffman

Full results can be found at *http://geriatricspt.org/news/index.cfm?#n1957*

EDITOR'S MESSAGE: MANAGING INFORMATION CAN DIFFER AS WE AGE

Meri Goehring, PT, PhD, GCS

I hope you enjoyed the November issue of *GeriNotes* with its focus on technology. Certainly, technology is a major force in our lives. But with our patients, we need to realize that use and understanding of technologies can be different with older adults than they are with other age groups. We should remember that use of technology is motivated by essential needs and tensions experienced by each individual. And, in older adults, these needs and tensions may differ.

Information overload is, for some, one of the biggest irritations in modern life. Older adults may have difficulty using and understanding technology and, therefore, may find information overload to be frustrating as well as irritating. However, we've always had technological advances, and some people always complain about new technologies. Finding ways to live with these new technologies and to make them work for older adults can be challenging.

One way to consider how we can help older adults to adjust to technology is to realize that older adults have better, more satisfying lives when they are socially active, cognitively stimulated, and challenged. We all want our lives to be cohesive and meaningful, but as we age, this becomes even more important as we reflect upon our past. Consider how technology can help us engage our patients in having more fulfilling lives. Use of social networking can be a way to begin to show older adults that technology can be fun to use and is worth investing in the time to learn.

Also, technology can help to encourage health behaviors. There are many applications that track exercise and weight, provide reminders about health activities and create a network of individuals who may share interest in health. But, somehow, technology and use of these applications has not been widely accepted. Perhaps this is because these applications center on the individual older adult and not on the individual as they participate in the community. Improving access to electronic information and providing training to older adults would be a good start.

Spend some time at the local library. There are vast numbers of individuals of all ages who do not have access to the Internet because of the cost or because it is unavailable. This is common in rural areas. Additionally, although there are classes for how to use technology, these are often cost prohibitive for older adults and may only be offered in more metropolitan areas. And, some individuals simply choose not to use the Internet often. It is simply too overwhelming and confusing.

In the world of physical therapy, we therapists are often bombarded by technology and we need to also realize that we are under a data deluge. There are lots of phrases that have been used to describe this phenomenon. Data asphyxiation, data smog, information fatigue syndrome, are a few. As we move to electronic data systems, we often try to write our notes as we work with older adults. We should be sensitive to the fact that some of these individuals would prefer to have our undivided attention. They may consider it rude to work on electronic devices while we are providing therapy services. It may be helpful to give patients a short explanation regarding the use of electronic documentation and that if they have any questions or concerns that they are welcome to speak at any time. It may be necessary, with certain patients, to wait until later to perform documentation. Also, as therapists, it is good to remember that our brains can only do one conscious thing at a time. Switching tasks can waste energy. Multitasking can lead to decreased performance and mistakes. Perhaps, when performing an examination on a complex patient, it may be necessary to avoid trying to document at the same time.

So, technology will continue to be a challenge for those of us who choose to work with older adults. As we struggle to incorporate use of technology in our work, it is important to remember that older adults may view technology quite differently. Technology, when used to serve the correct purposes, can be a wonderful tool for individuals of all ages.

Editor's Additional Note: You may notice that one of the articles in this issue exceeds the word count limit as was published in the author instructions in the November 2015 issue. This article was accepted long before the word count was established. For any future articles, the word count remains at or around 3500 words. Please contact me if you have any questions or concerns.

CAROLE B. LEWIS
RECEIVES PRESTIGIOUS AWARD FROM THE GERONTOLOGICAL SOCIETY OF AMERICA

Carole B. Lewis, a founding member of the Section on Geriatrics, received the Gerontological Society of America's Excellence in Rehabilitation of Aging Persons Award. In recognition of the award, she presented a very well-received talk entitled "38 Studies That Shaped Geriatric Rehabilitation".

Next year's award winner will be Walter R. Frontera, MD, PhD, of Vanderbilt University School of Medicine. Dr. Frontera is also the Editor-in-Chief of the *American Journal of Physical Medicine and Rehabilitation.* The Excellence in Rehabilitation of Aging Persons Award acknowledges someone for his or her outstanding and sustained contributions in the field of rehabilitation of aging persons. The award is given by the Health Sciences Section of the Gerontological Society of America (GSA).

This year's meeting was held in Orlando, Florida and attracted over 3,800 attendees. Approximately 20% of the members of the Gerontological Society are international. The next conference will be held in New Orleans, November 16-20, 2016. The theme of the conference will be "New Lens on Aging, Changing Attitudes, Expanding Possibilities."

The GSA is a multi-disciplinary organization involving biologists, healthcare providers, public policy makers, and members of the psychological and social sciences disciplines. Abstract submission deadline for the 2016 conference is March 15, 2016, and you do not have to be a GSA member to submit your research. Information can be obtained at the Gerontological Society of America's website www.geron.com. Also, the GSA will be represented at the Combined Sections meeting in Anaheim in 2016.

Additionally, the Gerontological Society of America will be hosting the World Congress of the International Association of Gerontology and Geriatrics July 20-23, 2017, in San Francisco.

Academy of Geriatric Physical Therapy members are encouraged to visit the website at www.iagg2017.org. Submission of abstracts is encouraged.

Left to right: Tim Kauffman, founder of the Rehabilitation Award; Carole B. Lewis Rehabilitation Award winner 2015; Desmond O'Neill from Dublin Ireland and Freeman Award winner (for a prominent physician in practice and research); and Walter Frontera, Rehabilitation Award winner 2016. Photo taken at the Gerontological Society Annual Conference, November 2015 in Orlando, FL.

OUTCOMES OF ENDURANCE TRAINING FOR A 76-YEAR-OLD MALE WITH HOSPITAL ACQUIRED PNEUMONIA AND ELEVATED TROPONIN LEVELS: A CASE REPORT

Kathryn M. Limberopoulos, SPT; Russ Carter, PT, EdD; Rebecca Wojcik, PT, EdD, GCS; Roberta K. OShea, PT, DPT, PhD

INTRODUCTION

Acute lower respiratory infections of the lungs, also known as pneumonia, are a primary source of morbidity and mortality in older adults.[1] Pneumonia can be classified into two main subcategories, such as community-acquired pneumonia or health care-associated pneumonia. Health care-associated pneumonia is transmitted during a hospitalization and differentiated into either ventilator-associated pneumonia or hospital-acquired pneumonia.[1] Hospital-acquired pneumonia incidence ranges from 5 to greater than 20 cases per 1000 hospital admissions.[2-4] Approximately one-third of cases of hospital-acquired pneumonia are ICU-acquired, with ventilator-associated pneumonia accounting for 90% of cases.[2] Nonventilator-associated pneumonia dramatically increases both the hospital length of stay and cost of care, and is associated with an overall mortality of 27% to 51%.[2,3]

Health care-acquired pneumonia has been shown to have a twice as long hospital stay, higher mortality rate, and a more severe comorbidity status in comparison to community-acquired pneumonia.[1] The mortality rate of hospital-acquired pneumonia is 6% to 9%, but varies from 3% to 17% depending on patient subgroups.[2] Cascini et al[1] found that in patients 65 and older, hospital-acquired pneumonia is seen in patients within 10 days of residing in a hospital. The highest prevalence of pneumonia was seen in males, ages 75-79, with long-term oxygen therapy the previous year, and had a diagnosis of chronic obstructive pulmonary disease (COPD) or respiratory failure.[1]

Common symptoms of hospital-acquired pneumonia include: changes in mental status or confusion, cough with pus-like phlegm, fever and chills, malaise, loss of appetite, nausea and vomiting, sharp chest pain, shortness of breath, decreased blood pressure, and high heart rate.[5] Patients that are more prone to contracting pneumonia in a hospital have one or more of the following characteristics: alcoholism, chest surgery or other major surgery, a weak immune system, chronic lung disease, breathe saliva or food into their lungs, or are older.[5] Current research that is available for hospital-acquired pneumonia involves prevention and medical treatment techniques. There is limited research on interventions to manage or rehabilitate patients with hospital-acquired pneumonia. The purpose of this case report is to describe the interventions that were implemented for a patient with hospital-acquired pneumonia with multiple co-morbidities.

Cardiac troponin levels are normally so low they cannot be detected with most blood tests.[6] The normal lab value for troponin varies among testing laboratories. However, a slight increase in the troponin level will often mean there has been some damage to the heart, and very high levels are a sign that a myocardial infarction has occurred.[6] Increased troponin levels may also be due to any of the following: abnormally fast heart beat, hypertension, pulmonary embolus, congestive heart failure, myocarditis, long-tern kidney disease, cardiomyopathy, trauma or injury to the heart, or prolonged exercise.[6]

Cardiac troponin testing is the biomarker gold standard for the diagnosis of acute myocardial infarction.[7] However, elevation of troponin may occur in acute coronary ischemia, such as chronic heart failure (CHF).[7] The cardinal symptoms of CHF include chronic fatigue, exercise intolerance, and shortness of breath.[8] Unfortunately, clinicians are challenged with the low participation and adherence to the exercise programs.[8] Exercise training programs for patients with CHF are safe and beneficial in improving exercise capacity, exercise duration, parameters of submaximal exercise performance, and improved quality of life.[8]

SUBJECT

The patient is a 76-year-old Caucasian male that was admitted to an acute care facility with complaints of dyspnea, cough, fatigue, and weakness. A chest x-ray was performed one week after his hospital admission secondary to worsening symptoms, which revealed moderate bibasilar infiltrates. The physician's medical summary noted an unclear etiology. The patient was transferred to the intensive care unit and an endotracheal intubation procedure was performed. Due to chest pain and elevated troponin levels, further testing was performed. The patient's troponin levels were 0.08ng/ml, which is indicative of cardiac ischemia. A cardiac catheter procedure showed a blockage of vessels to the heart, and as a result, a cardiac stent was implanted. The patient was in acute care for 3.5 weeks and in the intensive care unit for 11 days prior to admission into the subacute facility. The patient's admitting diagnosis to the subacute facility was hospital-acquired pneumonia and elevated troponin levels.

The patient's medical history included conditions of congestive heart failure, coronary artery disease, dyspnea, hypertension, type 2 diabetes, sleep apnea, and depression that made the management of his care more complicated. The patient's surgical history included a spinal fusion of lumbar vertebrae 3 and 4, and total hip arthroplasty. Upon subacute initial evaluation, the patient

presented with decreased strength, impaired sitting and standing balance, and difficulty with transfers and gait. The patient's medication list included the following: Metoprolol tartrate Pantoprazole, Prasugrel, Escitalopram, Bupropion, Insulin glargine, Insulin Human Lispro, Metformin Hcl, hydrocodone, and prednisone. The patient used a continuous positive airway pressure at night. Prior to hospitalization, the patient was independent in all self-care and lived with his wife who performed all other household activities. The patient lived in a two-story home with 12 stairs within the home with a handrail on the right side. The patient considered himself homebound and used a straight cane for community ambulation to medical appointments.

SYSTEMS REVIEW

A review of admission screenings of the patient noted typical neuromuscular and integumentary systems. However, the patient's musculoskeletal and cardiopulmonary systems showed atypical findings. Impairments were observed in gross strength, sitting and standing balance, bed mobility, transfers, gait and stairs, endurance, and dyspnea. Based on these findings, the appropriate tests and measures were selected.

TEST AND MEASURES

Range of Motion

Gross range of motion (ROM) measurements were evaluated at initial evaluation in sitting. Range of motion was categorized as the following: within functional limits (WFL), 75% of ROM, 50% of ROM, 25% of ROM, or < 25% of ROM. The patient's gross ROM was deemed WFL for bilateral hip flexion, hip external and internal rotation, knee flexion and extension, and ankle dorsiflexion and plantarflexion. Since ROM at the initial evaluation was WFL no follow-up measurements were performed.

Muscle Strength

Lower-extremity strength was measured with manual muscle testing at the initial examination and then again at week 5—the discharge session. The patient's lower extremity hip flexion, knee flexion and extension, and ankle plantarflexion and dorsiflexion were tested in sitting. The grade of the muscle strength was denoted on a 0 - 5 (±) scale according to Hislop et al.[9] The lower-extremity strength measurements are shown in Table 1.

Bed Mobility and Transfers

Bed mobility tasks included rolling side-to-side, supine-to-sit and sit-to-supine. Functional transfers included bed to/from wheelchair, wheelchair to/from mat table, and wheelchair to/from toilet. The physical therapist student objectively evaluated level of assistance required for bed mobility and transfers at initial evaluation, and weekly thereafter.

The patient's level of assistance was recorded using the following scale that was adapted from Fairchild: dependent (patient requires total physical assistance from one or more persons; special equipment or devices may be used), maximum assist (patient performs 25-49% of the activity), moderate assist (patient performs 50-74% of the activity), minimum assist (patient performs 75% or more of the activity), contact-guard assist (CGA: close contact with the patient with physical therapist hands on patient or safety belt), stand-by assist (SBA: verbal or tactile cues required and close enough to reach patient if needed), supervision (S: verbal cues may be required but no physical assist), modified independent (assistive device or extra time needed), or independent (no verbal or manual assistance needed; no assistive device or extra time needed).[10] A summary of the level of assistance needed for bed mobility and transfers is shown in Table 2.

Gait

Observational posture analysis was performed during ambulation throughout the duration of the treatment sessions. Data, which included the average distance ambulated, assistive device used, and level of assistance, was recorded at initial evaluation, and weekly thereafter. According to Bohannon et al[11] distance walked without stopping is an informative, reliable, and responsive measure of gait performance for patients undergoing subacute rehabilitation.

The grading scales for bed mobility, transfers, and gait regarding the level of assistance provided by the physical therapist and the patient are widely used tools among acute and subacute facilities. There has been little research on the psychometrics regarding the reliability and validity of bed mobility, transfers, and gait assistance grading scales. The assessment of the level of assistance required for the 3 tasks is very similar to one another. However, these scales are similar to the Functional Independence Measure, which is a reliable and valid tool that is used to determine the functional mobility and independence of a patient.[12]

Balance

Static and dynamic sitting and standing balance were objectively evalu-

Table 1. Results of Strength Testing

Date	ROM	MMT (left/right)									
		Hip Flx		Knee Flx		Knee Ext		PF		DF	
Initial	WFL	3+/5	4-/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
D/C	WFL	4/5	4/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5

Abbreviations: MMT, manual muscle test; ROM, range of motion; Flx, flexion; Ext, extension; PF, plantar flexion; DF, dorsiflexion; WFL, within functional limits; D/C, discharge

Table 2. Level of Assistance for Bed Mobility and Transfers

Date	Bed Mobility	Transfers
Initial Evaluation	Moderate assistance	Moderate assistance x2
Week 1 Progress Note	Moderate assistance	Moderate assistance
Week 2 Progress Note	CGA	Minimum assistance
Week 3 Progress Note	CGA	CGA
Week 4 Progress Note	SBA	SBA
Week 5 – Discharge Session	SBA/S	SBA/S

Abbreviations: CGA, contact-guard assist; SBA, stand-by assist; S, supervision

ated at initial evaluation, and weekly thereafter. Sitting balance was assessed with the patient seated with neither back support nor upper extremity support, and lower extremities touching the ground. Standing balance was assessed with no upper extremity support, but a rolling walker positioned in front of the patient for safety if loss of balance occurred.

Grades for the patient's sitting (static and dynamic) and standing (static and dynamic) balance were given using the following scale that was derived from the O'Sullivan et al[13] Functional Balance Grades: Good (maintains independently, maximum challenges), Good – (maintains independently, moderate challenge), Fair + (maintains independently, minimum challenges), Fair (maintains independently, unable to take challenges), Fair – (maintains balance with contact-guard assist), Poor + (maintains balance with minimum assistance), Poor (maintains balance with moderate assistance), Poor – (maintains balance with maximal assistance), Absent (unable to assume position). This grading scale is a commonly used tool among subacute facilities, however, studies analyzing the psychometrics regarding this grading scale have not been performed.

Tinetti Balance Assessment

The Tinetti balance assessment is a functional measure that is used to evaluate a patient's static posture, dynamic balance, and gait. This tool is used as both a predictive and preventative fall risk measure in older adults. The Tinetti balance assessment is a performance oriented mobility assessment with 9 balance items and 7 gait items that are scored on a 0 to 3-point scale.[14] The balance items included the following: sitting balance, ability to ascend/descend from a chair, immediate standing balance, standing balance (eyes open and eyes closed), standing balance with a nudge to the sternum, and turning 360°.[14] The gait items included the following: initiation of gait, step length, foot clearance, step symmetry and continuity, deviated path, trunk sway, and base of support.[14] The balance score is scored out of a possible 16 points, and the gait score is scored out of a possible 12 points for a total score of 28 combined points. A score of greater than 19 points indicated a "high fall risk," 19-23 points indicated a "medium fall risk," and 24-28 points indicated a "low fall risk."[14]

The Tinetti balance assessment is the most suitable performance measure to evaluate the balance of community-dwelling older adults in comparison to the Timed Up and Go test, One-Leg Stand test, and Functional Reach test.[15] Criterion validity for the Tinetti was (r = 0.81), in comparison to Timed Up and Go (r = -0.55) and Functional Reach (r = 0.48).[15] Inter-rater and test-retest reliability has an excellent Intra-class Correlation Coefficient (ICC=.74-.93) for older adults.[16-18] It has a poor ceiling effect (21.25) for the gait portion of the assessment.[16] Intra-rater reliability was considered excellent, including 38.8% for patients that had a stroke and 24.9% for patient's with Parkinson's disease (ICC-0.84).[17] It has excellent sensitivity (93%) to identify fallers.[18] Many items on the Tinetti are difficult to assess on a 2- to 3-point scale and it has poor specificity (only 11% of non-fallers were indentified).[18]

30-second Sit-to-Stand

The 30-second sit-to-stand test is a functional measure of lower extremity strength in older adults. The patient is instructed to complete as many sit-to-stand transitions safely within a 30-second timeframe. Demonstration of the task was provided along with return demonstration by the patient prior to the administration of the test. The height of the hard armless chair was approximately 18 inches. The patient was instructed to sit in the middle of the chair with an upright posture and his feet flat on the floor. On "Go," the patient rose to a full standing position and then down again. The test was modified so that the patient could use bilateral upper extremities to perform the sit-to-stand transition.

Jones and Rikli[19] performed a study of community-dwelling elderly and found that males ages 70-79 years old should be able to complete 12.9 sit-to-stand transitions with a standard deviation of 3.0. Test-retest reliability was excellent (r=0.89) with a confidence interval of 0.79-0.93.[19] Inter-rater reliability is excellent (r = 0.95) with a confidence interval=0.84-0.97).[19] The 30-second sit-to-stand has 0% floor effects.[19] Excellent criterion validity was seen with the chair stand test compared to weight adjusted performance for all participants: r = 0.77, with a 95% CI = 0.64-0.85.[19] Gill et al performed a study of individuals with osteoarthritis awaiting a joint replacement of the hip or knee and found excellent construct validity in correlation to the 50 feet walk test: ICC = -0.64 (95% CI = -0.75 to -0.49).[20]

SUMMARY OF INITIAL EXAMINATION FINDINGS

According to the *Guide to Physical Therapist Practice*,[21] de-conditioning as a result of hospital-acquired pneumonia is within the scope of practice for physical therapy. At the time of the initial examination, several impairments were identified regarding the patient's strength, endurance, balance, and dyspnea. Manual muscle testing revealed strength impairments in both lower extremities. Assessments of bed mobility, transfers, balance, and gait showed high level of assistance required from the physical therapists and nursing staff.

DIAGNOSIS & PROGNOSIS

According to the *Guide to Physical Therapist Practice,*[21] the appropriate practice pattern for this patient is Cardiovascular/Pulmonary 6F: Impaired Ventilation and Respiration/Gas Exchange Associated with Respiratory Failure. Upon initial physical examination, the patient presented with decreased bilateral lower extremity strength, impaired sitting and standing balance, assistance required for bed mobility and transfers, difficulty with stairs and gait, decreased endurance, and dyspnea. These impairments limited the patient's function to perform self-care and ambulation, thus further preventing safe discharge to home. The patient's prognosis was considered good secondary to high motivation to return to his personal home and strong social support from his wife and children.

PLAN OF CARE/GOALS

A patient-specific physical therapy intervention program incorporating patient goals was created to improve bilateral lower extremity strength, sitting and standing balance, assistance required for bed mobility and transfers, gait, ability to ascend/descend stairs, endurance, and to facilitate independent management of dyspnea. Interventions were performed for 60 minutes, 5 to 6 days per week in a subacute facility for 4.5 weeks. The

patient attended 24 therapy sessions, missing one session due to a scheduled doctor's appointment outside the facility. The interventions performed on a daily basis are summarized in Table 3. In addition to nursing and physical therapy services, the patient also received occupational therapy 5 to 6 sessions per week. Home Heath physical therapy was arranged to occur following the patient's self-discharge from the subacute facility. The patient left the subacute facility prior to the physician's written discharge.

Patient Education

Patient education was performed periodically throughout the treatment sessions with an emphasis on pursed lip breathing. Pursed lip breathing is a breathing strategy that is used to reduce dynamic hyperinflation and improve exercise tolerance, breathing patterns, and arterial oxygenation at submaximal intensity exercise.[22] Pursed lip breathing is indicated for patients with dyspnea at rest and with exertion.

Patient education was also provided regarding how to safely transfer from the bed or chair to the wheelchair, and the wheelchair to the toilet or mat table. Verbal cues provided included safety precautions to engage locking of wheelchair brakes and reach back with both hands to stabilize himself on the arms of the chair prior to sitting.

Table 3. Interventions Provided through Course of Treatment

Day	Intervention Number					
	1.	2.	3.	4.	5.	6.
1	x	x	x			
2	---	---	---	---	---	---
3	x	x	x		x	
4	x	x	x		x	
5		x	x			x
6	x				x	x
7	x		x		x	x
8	x		x		x	x
9	x		x		x	
10		x	x		x	x
11		x	x		x	x
12		x	x		x	x
13	x		x		x	x
14	x	x	x		x	x
15		x	x			
16	x	x	x			x
17	x	x	x	x		
18			x			
19	x	x	x	x		
20	x		x		x	
21		x	x		x	x
22	x	x	x	x		
23	x	x	x	x		
24		x	x		x	
D/C	x	x				(HEP)

(--- = patient unable to attend therapy session)
1=Patient education 2=Nustep™
3=Gait training 4=Stair training
5=Neuromuscular re-education 6=Therapeutic exercise
Abbreviations: D/C, discharge; HEP, home exercise program

NuStep™

The NuStep™ is well tolerated by patients with congestive heart failure and common co-morbidities such as back pain, balance difficulties, and lower extremity weakness.[23] The patient used the NuStep™ recumbent machine for both lower extremity strength and endurance training. The patient completed 15 minutes of aerobic exercise on the NuStep™ 5 to 6 times per week. During week 1, the patient exercised on the NuStep™ at resistance level 3 and required a rest break every 5 minutes secondary to feeling fatigued. At weeks 2 through 4 the patient exercised at resistance level 4. Lastly, at week 5 the patient tolerated 20 minutes at resistance level 4.

Gait Training

The patient's progression of distance ambulated is outlined in Figure 1. During weeks 1 through 3, the patient used a rolling walker for ambulation. During week 4, a 4-wheeled rolling walker was introduced following the administration of the Tinetti balance assessment, and the patient being categorized as a "low fall risk."

Patient education was provided on how to use a rolling walker with a 4-point ambulation pattern as described in Fairchild.[10] Verbal cues provided included "step with one foot past the other" to increase step length and "look up and straight ahead" for posture corrections. During week 4, the patient was introduced to a 4-wheeled rolling walker with a safety seat. Use of the safety seat for rest breaks was instructed to the patient when feelings of dyspnea or fatigue occur during ambulation.

Stair Training

At week 4, stair training was initiated with a set of 4 steps in the physical therapy gym. Initially, the patient required bilateral use of both handrails in order to ascend and descend the stairs with a step-to pattern and required CGA from the physical therapist. By day 3 of stair training, the patient was able to ascend and descend with a single handrail. However, secondary to the patient's fear of falling, he used a side-step pattern using a single handrail on the right side with bilateral upper extremity support. The patient was instructed to ascend the steps leading with the left foot and to descend leading with the right foot,

since the handrail at his home is on the right side of the staircase.

Neuromuscular Re-education

Balance training was performed on both noncompliant and compliant surfaces, which included an Airex® balance pad. Activities performed on noncompliant surfaces with no upper extremity support included single-leg stance, eyes open vs. eyes closed, and high coordination ball catch and toss. Activities performed on compliant surfaces with no upper extremity support included eyes open vs. eyes closed, controlled marching, and tapping a balloon back and forth with a physical therapy technician.

Therapeutic Exercises

The patient performed open kinetic chain exercises in seated and standing positions. The seated exercises included ankle pumps, knee extension, and knee flexion. The standing exercises included toe and heel rises, alternating marching, hip abduction and adduction, and hip extension activities. The patient also performed close kinetic chain exercises (ie, mini squats). All standing exercises were performed with bilateral upper extremity support at the parallel bars. As endurance training was the specific goal for therapeutic exercises, no ankle weights or resistance bands were used.

OUTCOMES

The patient attended 24 of the 25 planned physical therapy sessions. The plan of care entailed one-on-one sessions with a student physical therapist. The Tinetti Balance Assessment was administered to assess the patient's standing balance and mobility while ambulating with a 4-wheeled rolling walker within his private room in the subacute facility. Results of the Tinetti yielded a score of 24/28 at week 3, and a score of 25/28 at week 5. A summary of sitting (static and dynamic) and standing (static and dynamic) balance is shown in Table 4.

At initial evaluation, the patient ambulated 10 feet using a rolling walker with moderate assistance from the physical therapist. By the end of week 1, the patient ambulated 40 feet using a rolling walker with moderate assistance. By weeks 2 and 3, the patient ambulated 50 feet using a rolling walker with minimum CGA from the physical therapist. At week 4, the patient ambulated 125 feet using a 4-wheeled rolling walker and by week 5 the patient ambulated 145 feet using a 4-wheeled rolling walker with stand by assistance from the physical therapist. Distance ambulated by the patient throughout the duration of the treatment session is shown in Figure 1.

During week 5, the patient was able to ascend and descend 9 steps in one of the stairwells in the facility with a side-step pattern using a single handrail with SBA from the physical therapist. The patient's hip flexion strength increased by a half grade from the initial evaluation to the discharge date. Lower extremity strength was functionally measured using the 30-second sit-to-stand test that was assessed when the patient was able to safely perform a sit-to-stand transition with CGA/SBA. At week 2, the patient was able to perform 6 successful sit-to-stand transitions and 9 transitions at week 3.

The patient was admitted to the facility on 2-3 liters of continuous oxygen via nasal cannula and wanted to return home without supplemental oxygen. Nursing approval was required to initiate weaning of supplemental oxygen with close monitoring of oxygen saturation levels (>90% SPO_2) during therapeutic activities, therapeutic exercises, and gait and stair training. Oxygen saturation values were recorded throughout the sessions using a finger pulse oximeter. At week 3, the patient was weaned from 2 liters to 1 liter of oxygen during daily therapy sessions with close monitoring of oxygen saturation levels. At week 4, the patient was weaned from 1 liter of oxygen to room air during therapy sessions. The patient's oxygen saturation levels upon exertion remained above 90% SPO_2, which allowed for a safe discharge home without supplemental oxygen.

DISCUSSION

The described case study is a unique case related to physical therapy interventions for an older adult that had an extensive hospital stay secondary to hos-

Table 4. Balance Grades

Date	Balance			
	Static Sitting	Dynamic Sitting	Static Standing	Dynamic Standing
Initial Evaluation	Fair	Fair	Poor	Poor
Week 1 Progress	Fair	Fair	Poor	Poor
Week 2 Progress	Fair +	Fair +	Poor +	Poor +
Week 3 Progress	Good	Good	Fair -	Fair - / Poor +
Week 4 Progress	Good -	Good -	Fair +	Fair
Week 5 Discharge	Good -	Good -	Fair +	Fair

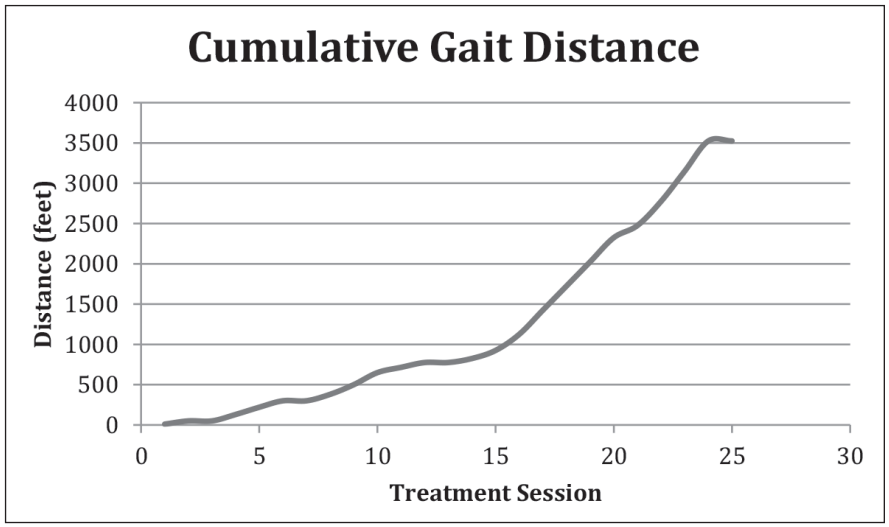

Figure 1. Cumulative distance ambulated.

pital-acquired pneumonia. Ambulation distance dramatically increased when comparing weeks 1 through 3 to weeks 4 and 5, which may have been associated with a 4-wheeled rolling walker being introduced. At week 3, the patient ambulated approximately 50 feet with a rolling walker compared to week 4 when the patient ambulated approximately 25 feet with a 4-wheeled rolling walker. Foley and Prax found that using a standard walker resulted in higher VO_2 and lower ambulation speeds compared to a rolling walker.[24] Additionally, use of a standard walker versus a rolling walker results in higher rate of perceived exertion, higher heart rates, and higher blood pressures.[24] Foley and Prax also found an increase by 104% increase in relative VO_2 using a standard walker compared to a rolling walker.[24] Where there has been no research comparing a 4-wheeled rolling walker to a rolling walker, it can be logically assumed that is requires less energy expenditure and allows for increased walking speeds and an increased ambulation distance.

The use of supplemental oxygen during exercise training may allow for higher training intensities, but long-term effects are unknown.[25] Research does not support continuous long-term oxygen therapy to improve dyspnea in COPD with severe hypoxaemia.[25] For patients without severe resting hypoxemia, ambulatory oxygen, provided for use during exertion, confers no benefits upon dyspnea.[25] Further, there is no evidence to support the use of supplemental oxygen for alleviation of dyspnea at rest, before or after exertion.[25]

The patient was admitted to the subacute facility on 2-3 liters of continuous supplemental oxygen. At week 3, the patient weaned from 2 liters to 1 liter of oxygen, and by week 4, the patient was completely weaned off of oxygen. At week 4, the patient started to use a 4-wheeled walker which as previously stated, requires less energy expenditure and could have played a role in decreased supplemental oxygen use.

This study had two limitations. First, the medical records regarding the patient's acute hospitalization prior to the subacute facility were not readily available. Second, the nursing reports of the timing of medications and doses were not available for review.

The lack of standardized procedures for determining the level of assistance required for bed mobility, transfers, and gait grading scales weakens the data's validity and reliability. Strengths of the data collected throughout this study include the inter- and intra-rater reliability, the test-retest reliability, and sensitivity of the Tinetti balance assessment. Another strength of the study is the data collected from the 30-second sit-to-stand test, which had excellent test-retest reliability, inter-rater reliability, criterion validity, and construct validity.

In conclusion, this case report demonstrated that it is possible to improve the functional independence in male older adults with complex medical issues, which have had a diagnosis of hospital-acquired pneumonia following 3.5 weeks in acute care and 11 days in the intensive care unit. Physical therapy interventions within a subacute setting may have had an impact on the improvement of the patient's functional independence at discharge. This case study could have incorporated additional interventions and standardized tests to evaluate the patient's quality of life and dyspnea level throughout therapy. Additional interventions pertaining to the occupational therapy sessions and its impact on functional independence could have been implemented. Additional tests would include the SF-36 survey and the San Diego Shortness of Breath Questionnaire. As previously stated there has been no research comparing a 4-wheeled rolling walker to a rolling walker, and that it can be logically assumed that it requires less energy expenditure and allows for increased walking speeds and an increased ambulation distance. Future research should focus on comparing the energy expenditure of using a rolling walker versus a 4-wheeled walker.

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CONGRATULATIONS
2015 NEW CEEAA GRADUATES

Once again we would like to congratulate our new Certified Exercise Experts for Aging Adults. We are pleased to announce 3 more classes have been completed. This brings us to a total of 18 graduating classes. We want to thank the 2015 host sites—Franklin Pierce in Manchester, New Hampshire, St Louis University in St. Louis, MO, and Saddleback Memorial Medical Center in Laguna Hills, California.

The CEEAA course was originally developed by the SOG Exercise Task Force that was appointed by the Board of Directors in 2004 as a result of a member driven motion. This original Task Force spent countless hours and contributed and developed course materials and intellectual knowledge for the development of this course. We thank them for all they donated to this process.

The CEEAA course series could not be achieved with the countless hours of the faculty (both past and new) who not only teach the course at the various locations, but also have developed and contributed materials, time, and labor to continually update, modify the course based on location and course needs, and make sure this is the most evidence-based course the Academy can present. We thank them for their unending energy and time devoted to this process.

The CEEAA continues to be a course of the Academy of Geriatrics that is offered at 3 to 4 locations every year. We are proud of all the graduates who are changing lives. The Academy is currently in the process of developing more courses on specific topics, an advanced CEEAA course, and courses for the PTA. We are here to help YOU advance practice.

Congratulations again to the 2015 graduates as well as all past graduates since the course began in 2009. You are making a difference. Go to the Academy website to sign up for the 2016 courses. Classes fill quickly. Scheduled for 2016 include Pennsylvania, Florida, and Texas.

Franklin Pierce in Manchester, New Hampshire

St Louis University in St. Louis, Missouri

Saddleback Memorial Medical Center in Laguna Hills, California

MEMBERS TO VOTE ON BYLAW AMENDMENTS AT CSM

Karen Curran, CAE; Executive Director

At the Annual Member's Meeting to be held on February 18th at CSM in Anaheim, CA, Academy members will be asked to vote on proposed bylaw changes. The proposed changes are to allow PTAs a full vote for all matters of the Academy and to raise PT dues by $10 effective in 2017.

Currently, PTAs receive a ½ vote when they vote in section matters. Earlier this year, the APTA House of Delegates voted to allow the Sections to decide how the PTA vote is counted. The AGPT Board of Directors voted unanimously in September to support PTAs in obtaining a full vote at the Section level.

The Academy Board of Directors voted to increase PT dues in 2017, which is the first dues increase since 1999. As a result, PT members will notice a small increase of $10 in their annual membership dues. PTA, student, life member, and other categories remain unchanged. The Board of Directors has worked effectively to control costs and limit expenditures; however the costs for the Academy continue to increase.

Member dues support the many benefits of membership in the Academy, including:

- *Journal of Geriatric Physical Therapy* and *GeriNotes;*
- Listserv - geriatricspt-subscribe@yahoogroups.com;
- Free membership in five Special Interest Groups (Balance and Falls; Health, Promotion and Wellness; Bone Health; Cognitive and Mental Health; and Residency/Fellowship);
- An ongoing generous contribution to the Foundation of Physical Therapy "Center of Excellence Campaign" that will benefit our members, healthcare system, and the public.

Our dues remain competitive and allow the Academy to continue to provide great value to our members.

Bylaws may be amended at the Annual meeting of the Academy by a two thirds (2/3) vote of members present and voting, providing that notice of the proposed amendments has been given to the Academy membership at least thirty (30) days in advance of the meeting at which the amendments are to be considered. The new language is shown below in bolded underline.

BYLAWS OF THE ACADEMY OF GERIATRIC PHYSICAL THERAPY

ARTICLE IV: MEMBERSHIP

Section 1: Categories and Qualifications of Members

The Academy membership categories and qualifications for Physical Therapist, Retired Physical Therapist, Life Physical Therapist, Student Physical Therapist, Physical Therapist Assistant, Retired Physical Therapist Assistant, Life Physical Therapist Assistant, and Student Physical Therapist Assistant shall be the same as those of the Association.

Section 2: Rights and Privileges of Members

The rights and privileges of the Academy members shall be identical to those established in the Associations bylaws for the various categories of membership **with the exception of voting. To vote: Physical Therapist, Retired Physical Therapist, and Life Physical Therapist, Physical Therapist Assistant, Retired Physical Therapist Assistant and Life Physical Therapist Assistant, one vote.**

ARTICLE XI: FINANCE

Section 3: Dues

A. The dues for each membership category shall be:

1. Physical Therapist member:	~~$45~~ **$55**
2. Physical Therapist—Post Professional Student	$15
3. Physical Therapist Assistant member:	$35
4. Life Physical Therapist member:	$15
5. Life Physical Therapist Assistant:	$15
6. Student Physical Therapist:	$15
7. Student Physical Therapist Assistant member:	$15
8. Retired Physical Therapist:	$15
9. Retired Physical Therapist Assistant:	$15

We hope to see you in Anaheim CSM 2016 where at the Member's Meeting, we will also provide an update on Academy activities, thank our outgoing leaders, welcome our newly elected officers, and celebrate our award winners! The Member's Meeting will take place on Thursday, February 18 beginning at 6:30 p.m. and is tentatively scheduled at the Marriott Marquis Ballroom Northeast (verify the room onsite). Please consider volunteering at the Academy booth – all volunteers are entered into a drawing to win a free membership and it's a great way to meet and share information your fellow members. Visit http://geriatricspt.org/events/csm/2016/index.cfm for more details.

ARE YOUR ATHLETES SAFE? THE SENIOR ATHLETE FITNESS EXAM (SAFE)

Becca Jordre, PT, DPT, GCS, CEEAA, Cert MDT

Every year adults aged 50 and over gather in 49 different states to compete in their state Senior Games activities. They compete in a variety of sports including triathlon, tennis, basketball, track & field, and race-walking. They also have competition in the more leisurely sports of shuffleboard, golf, and horseshoes though most athletes compete in more than one event (Figure 1). Many are trying to qualify for "Nationals"—the National Senior Games Association's (NSGA) biennial competition. The NSGA, a component of the United States Olympic Committee, has a stated goal of "promoting healthy and active lifestyles for athletes aged 50 and over."[1] This goal is wonderfully compatible with the mission of The Academy of Geriatric Physical Therapy to "…advocate for optimal aging"[2] and complements the American Physical Therapy Association's "Fit After 50" campaign.[3]

DEVELOPMENT OF *SAFE*, A FITNESS SCREEN FOR SENIOR ATHLETES

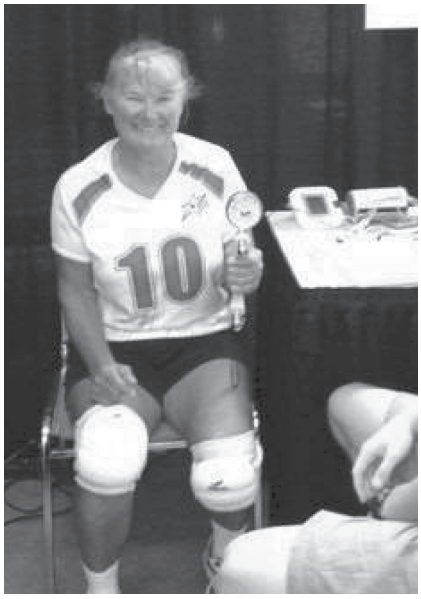
Our South Dakota (SD) Physical Therapy Association started looking for ways to be involved in the SD Senior Games events in 2009 as a public relations (PR) initiative. As a member of the PR Committee actively studying for my Geriatric Clinical Specialist (GCS) certification, I volunteered to develop a fitness screen for the event. With the help of several Doctor of Physical Therapy (DPT) students, I set up a tent near the softball fields at our state games, ready to screen "seniors." But, the seniors never arrived. Instead, large groups of tan, hurried, and very fit adults showed up, they played ball and left. No one wanted to participate in our screen for "older adults."

The following year I decided to give it another try. This time I chose challenging tests and brought incentives. We set up the screen near a walkway to the track where athletes lingered to wait for their events and results. Finally, athletes began to show interest. Some stopped hoping our treatment table was for massage, others because they had a question, and some, just to get a free water bottle. However, as soon as we had a few athletes in a single leg stance on foam, we drew real attention. We quickly became another "event." Athletes not only wanted to try our screen but they wanted to do it better than average, better than their neighbor, better than their first attempt, AND they wanted to know how to improve their score. We screened 30 athletes in 4 hours and received sincere thanks from so many who were happy to learn more about their physical health.

Since that time, the screen has been further refined, now referred to as the Senior Athlete Fitness Exam (SAFE). The SAFE is challenging enough to keep the best athletes on their toes without excluding those who have limitations. It includes standard measures that screen 4 basic areas: (1) Cardiovascular Health, (2) Strength, (3) Flexibility/Posture, and (4) Balance/Mobility. Athletes provide a

Sport	Events
Archery	Compound Finger/Compound Release/Recurve/Barebow Compound Finger/Barebow Recurve
Badminton	Singles/Doubles/Mixed Doubles
Basketball	Team
Bowling	Singles/Doubles/Mixed Doubles
Cycling	5K/10K (Time Trials) 20K/40K (Road Races)
Golf	54-hole Scratch Play
Horseshoes	Singles
Pickleball	Single/Doubles/Mixed Doubles
Race Walk	1500M/ 5K
Racquetball	Singles/Doubles/Mixed Doubles
Road Race	5K/ 10K
Shuffleboard	Singles/Doubles
Softball	Team
Swimming	Backstroke 50, 100, 200-Y Breaststroke 50, 100, 200-Y Butterfly 50, 100-Y Freestyle 50, 100, 200, 500-Y Individual Medley 100, 200-Y
Table Tennis	Singles/Doubles/Mixed Doubles
Tennis	Singles/Doubles/Mixed Doubles
Track & Field	50, 100, 200, 400, 800, 1500M Discus, Hammer, High Jump, Javelin, Long Jump, Pole Vault, Shot Put, Triple Jump
Triathlon	400M Swim, 20K Cycle, 5K Run
Volleyball	Team

Figure 1. National Senior Games Association competitive events.



Ian Kopriva, a DPT student from the University of North Dakota tests the grip strength of a senior volleyball player.

basic health history and, combined with their results, we are able to provide them with a meaningful amount of health and injury prevention education. Some athletes are encouraged to keep up just what they are doing. Others are guided to make minor adjustments or find a physical therapist or physician in their area depending upon their identified risks.

EXPANDING *SAFE* NATIONALLY

In 2011, we were able to expand the SAFE to the NSGA summer competition where more than 10,000 qualifying senior athletes gathered to compete. This has allowed us to screen more than 1,000 athletes and continue to promote physical therapy, wellness, competition, and injury prevention as we learn more about successful aging.

EXPANDING *SAFE* TO OTHER STATES

This past year, I began efforts to expand the SAFE to other state Senior Games events. With strong support from local physical therapists (PTs), we were able to offer the SAFE in Massachusetts, Illinois, New Mexico, Oregon, Minnesota, Florida, and South Dakota. Some states were led by individuals PTs, some via their state physical therapy association, and others through a DPT or geriatric residency program.

Service to Senior Athletes

The SAFE benefits to senior athletes is clear. Their competitions typically draws very little attention from the local medical community. And while athletes work hard to be faster, stronger, and more competitive in their event, their SAFE results often reveal some area of limitation. Attention to these results can help them enhance their performance or prevent potential injuries.

Eva Norman, PT, DPT, CEEAA, tests an athlete's balance at the Minnesota Senior Games.

Olivia Pare, SPT, a DPT student from Springfield College who helped with the SAFE last summer noted, "I think this really challenged some of the athletes. While they are much more active than a majority of their peers, I think some of them were genuinely surprised at how challenging the balance tests were, and it gave them a new area to work on personally as they maintain their health." Geriatric resident, Cheyenne Chrzanowski, PT, DPT, participated in the SAFE at the Florida Senior Games and commented on the unique information the senior athletes receive from the SAFE, "This allowed seniors to obtain different feedback on their current health that they may not typically receive and allowed us to provide suggestions for health promotion." Each year, athletes return to the SAFE in South Dakota to tell us about how they started stretching or added a yoga routine or balance class to their workout. They focus on the things they can improve upon and they stick to it in a determined way.

SERVICE-LEARNING

The DPT students have been involved in the SAFE since its inception. The one-on-one interaction involving functional tests, communication, and education provides an ideal environment for service-learning.

Kimberly Nowakowski, PT, DPT, MS, GCS, CEEAA, an Assistant Professor in the Physical Therapy Department at Springfield College in Massachusetts supervised 9 DPT students who volunteered from her program. Nowakowski stated, "It is a great opportunity for me, as a GCS, to expose my students to the heterogeneity of the older adult population. They return to class having a different perspective of the older adult population as a whole, and are often surprised at the level of function and competitiveness that they have seen." Rachel Farnham, SPT, one of Dr. Nowakowski's students commented, "You go into the situation thinking that you are going to help the other person, but they really help you."

Greg Hartley PT, DPT, GCS, CEEAA, Program Director of St. Catherine's Geriatric PT Residency in Miami, Florida used the SAFE as an opportunity to demonstrate successful aging to his residents. "An activity like this is a wonderful way for students and residents to interact with high level, successful aging adults. The screening activities serve to enlighten students, residents, and therapists alike about high-level, healthy aging adults, which is often difficult (or absent) in many health care settings."

Yet, the service learning component of this activity did not stop with the students involved. It readily inspired PTs committed to lifelong learning. Physical therapist, Eva Norman, PT, DPT, CEEAA, helped with the SAFE in Min-

University of South Dakota DPT student, Jessica Hill measures an athlete's shoulder flexion at the SD State Games.

nesota this summer. "This experience confirmed for me that age has no factor. A senior can build muscle, improve balance, aerobic capacity, and power in an extraordinaire way, even in their 80s!" Mike Studer, PT, MHS, NCS, CEEAA, CWT, CSST, offered the SAFE in his home state of Oregon. "This was an excellent experience helping me to be efficient in medical screening and communication." And, he added, "SO MUCH FUN!"

INSPIRATION

Throughout the screening process several of us ran into "favorite" athletes. My favorite was a female tennis player in her 60s. I asked her how much time she spent each week exercising. She reported that she plays tennis 2 to 3 hours almost every day and then asked, "Does that count?"

Greg Hartley screened an 83-year-old athlete who had a slightly elevated heart rate, "When I asked him if that was his normal resting heart rate, he informed me that he'd just finished running a 10K and continued his run to the venue for the games." One of Greg's residents, Cheyenne, screened a 70-year-old female sprinter who didn't begin running until she was in her 60s, "She expressed that running is now her passion. You're never too old to find what is best for you."

Jane Killgough, PT, DPT, MS, GCS, CEEAA, was able cheer on her sister, a senior athlete, as she helped with the SAFE. "At the meet in the Twin Cities, she participated with a torn ACL and qualified for the national games in 3 events. She has since had reconstruction surgery and has blown away her physician and physical therapist with her recovery. She is currently jumping on and off 20-inch boxes as she trains for nationals."

From left to right: Jacob Dorman, PT, DPT (currect resident); Cheyenne Chrzanowski, PT, DPT (current resident); Gemma Longfellow, PT, MSPT, GCS (program faculty); Debra Frisch, PT, DPT (current resident); Greg Hartley, PT, DPT, GCS, CEEAA (residency director).

Springfield College SAFE screeners (left to right): Beth Hayden DPT'14, Nicole Simmonds DPT'13, Springfield College Assistant Professor Kim Nowakowski '91, Rachel Farnham DPT'15, Mary Monahan DPT'16, Aimee Chevalier DPT'16, Olivia Pare DPT'16, Erin Carpenter DPT'16, Kayla Sokol DPT'15, and Becca Jordre.

WHAT HAVE WE LEARNED?

Analyzing the SAFE results from nationals, we have been able to learn more about the immense benefits of staying active.[4-8] We've generally found the senior athletes to be faster,[4] stronger,[5] and more balanced[7] than their community-dwelling peers. Even those who compete in the less intense events of horseshoes or shuffleboard show above-average physical function.[4] According to their physical performance numbers, these athletes should live longer with less mobility disability than their peers. That, we expected. However, we have also found that they still have cancer, heart disease, obesity, tight tissue, and fall risks. Approximately 10% of this population reported a fall in the past year.[7] Thus, even with better health, this population can use our professional guidance in order to maintain and improve their physical condition as well as prevent injuries. In fact, helping this population may be one of our more efficient efforts as the motivation and follow-through of this competitive group is exceptional.

FUTURE GOALS

Since my first experience in 2009, I can honestly say I have not had a negative experience when offering the SAFE to senior athletes. I am dedicated to learning more about this population and helping them connect with physical

therapists that can assist them in maintaining their best physical function. I am inspired by the athletes but also the therapists and students who consistently demonstrate such passion when working with this population.

The SAFE provides an opportunity for all therapists to get involved with the Senior Games movement, promote their profession, learn, and become inspired. It is my hope that we can expand the SAFE to additional states and create a more consistent relationship between the Senior Games and physical therapists across the country.

As Olivia Pare, SPT, so eloquently stated, "The senior games is what being a physical therapist is all about—maintaining function throughout one's lifespan."

If you are interested in getting involved with the SAFE at your state level, please contact Becca Jordre at becca.jordre@usd.edu.

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CONSERVATIVE MANAGEMENT INCLUDING ECCENTRIC STRENGTHENING EXERCISE FOR A GERIATRIC PATIENT TO AVERT ROTATOR CUFF SURGERY: A CASE REPORT

Jonathan Williams, DPT, MBA; Debra L Gray, PT, DHSc, DPT, MEd

INTRODUCTION

Approximately half of community dwelling older adults report daily pain, commonly associated with the musculoskeletal system with knee pain followed by shoulder pain being the most common painful joints.[1,2] Shoulder pain of 3 or more months duration was reported by 31% of the participants in a study of older predominantly male veterans.[3] This pain often leads to dysfunction in mobility, hinders functional independence and participation in social activities, and adversely affects quality of life.[4,5] The prevalence of rotator cuff tendinopathy with accompanying tears increases with age and occurs in 50% of persons over the age of 70.[1] Debate continues over whether or not geriatric patients should undergo rotator cuff surgery or be treated with conservative management when presenting with rotator cuff tendinopathy and partial tears.[6]

Surgical repair of rotator cuff tendinopathy with small or medium sized tears is commonly reported in the literature.[3,5] However, numerous studies describe the limitations of rotator cuff repair for the geriatric population. For example, according to Borgmastars et al,[5] high rates of re-rupture follow rotator cuff surgery in elderly patients. Similarly, Merollaet al[7] describe comparable results, reporting controversial clinical outcomes of surgical treatment because of the high percentage of recurrent tears in this population. Furthermore, Brown et al[8] tested tendon-to-bone healing in older rats after rotator cuff repair and concluded that, despite advances in technology, the ageing process negatively influences this type of healing after rotator cuff repair. Moreover, pain relief with rotator cuff repair is less than permanent.[5] In addition, surgery may not lead to any difference in long-term pain outcome compared with an administered exercise program.[4]

Physical therapy provides a conservative alternative to surgery. Impaired joint mobility is a common condition treated by physical therapists who work with older adults. Manual therapy, therapeutic exercise, and patient education are primary interventions for older adults with joint mobility impairments. Research suggests that targeted stretching and strengthening exercise can improve joint mobility in older adults.[9]

Eccentric loading of a tendon in a patient with tendinopathy provides both pain relief and functional improvements.[10] It is also effective in managing a host of common muscle and tendon conditions. More specifically, positive changes in tendon tissue structure and mechanical properties have been documented as a result of eccentric training.[3] For example, Shalabi et al[11] studied patients with chronic Achilles tendinopathy before and after eccentric training and reported decreased tendon volume that correlated with improved clinical outcomes.

In this case, a geriatric patient was recommended to undergo surgery to treat tendinopathy with a partial tear of the rotator cuff. Prior to planned surgery, the patient was referred to physical therapy to reduce his pain and improve movement and function of the right shoulder. The purpose of this case presentation is to describe the outcomes of conservative physical therapy management of this patient's condition with an emphasis on eccentric exercise to strengthen the involved shoulder musculature.

CASE DESCRIPTION

Patient History

The patient was a 75-year-old right hand dominant man who slipped on ice and fell on his right shoulder resulting in bruising and pain. After a month, he still had pain and was unable to lift anything over his head or to reach behind his back with his right arm. He then saw an orthopedic surgeon, who, after radiological analysis, determined that the patient had a small rotator cuff tear and pre-existing osteoarthritis in his right shoulder. He was treated with a cortisone injection that relieved his pain for only a few days. The patient was then referred for outpatient physical therapy for a month of conservative management of pain and limited motion prior to surgery.

Examination and Evaluation

The initial physical therapy examination included obtaining the patient's history and performing a systems review. The patient had co-morbidities of hypertension and asthma; however, he presented within normative ranges for blood pressure, heart rate, and oxygen saturation via finger pulse oximeter. The integumentary system was intact, with no visible signs of scars or bruising. A musculoskeletal screening revealed impaired strength and range of motion of the right shoulder as compared with those of the normal left shoulder. The neuromuscular system was not impaired as the patient was able to exhibit normal balance and was independent with all movement transitions and ambulation. Moreover, the patient exhibited normal orientation to person, place, and time, and his ability to communicate and make his needs known were normally presented.

Tests and measures with high reliability and validity standards were selected for further examination of the right shoulder. Using the numeric pain rating scale, the patient reported right shoulder pain of 5/10 with activity and 2/10 at rest (0 being no pain, 10 being worst possible pain).[12]

To determine the patient's bilateral shoulder active and passive ranges of motion (ROM), goniometric measurements were taken.[13] The left shoulder was determined to be within normal range for all shoulder motions. In contrast, the right shoulder ROM was limited as noted in Table 1. Shoulder strength was assessed following Kendall's manual muscle testing protocol.[14] Manual assessment of strength greater than 3 (fair) is subjec-

tive, however intra-rater reliability is good.[15] Left shoulder strength was determined to be 5/5 and painfree. Right shoulder strength grades are provided in Table 1.

The ability for the patient to functionally use his right upper extremity was assessed with the Disabilities of the Arm, Shoulder, and Hand (DASH) outcome measure. This outcome measure was determined to be valid, as well as having high test-retest reliability, by Beaton et al in a study measuring disability of the different regions of the upper extremities.[16] The patient's initial DASH score was 27.60. Hunsaker[17] reported the general population would score 10.1 on the DASH with a standard deviation of 14.68.

Based on the International Classification of Function (ICF) model, the examination data indicated primary impairments as a result of the fall on the right shoulder being decreased right shoulder active and passive ROM, deficits in right shoulder strength, and pain at rest with increased pain during activities involving the shoulder joint. As a result of these impairments, the patient presented with decreased right shoulder functional mobility and limitations in activities that involved use of the right shoulder. Specifically, the patient was no longer able to go fishing with his son because of his inability to cast the fishing line, which required him to raise his right shoulder over his head while simultaneously laterally cocking his arm. Furthermore, the patient reported difficulty in donning and doffing jackets when going outside and an inability to put on a life vest for sailing on his boat, principally because of pain when reaching behind his back. From the findings gathered through examination, the physical therapy diagnosis for this patient was determined to be impaired joint mobility, motor function, muscle performance, and ROM associated with connective tissue dysfunction of the right shoulder.[18]

Drawing from the results of the patient's presentation, along with the examination data and subsequent evaluation and interpretation thereafter, 2-week and 4-week impairment goals were established (see Table 2). The expected outcome was for the patient to return to prior level of function of the right upper extremity without pain. The intervention plan consisted of modalities for pain control, manual therapy (joint mobilization and stretching) to increase range of motion, and therapeutic exercise with emphasis on eccentric strengthening of the right shoulder musculature. With compliance with the plan of care, the patient's prognosis was good.

INTERVENTIONS

The patient received out-patient physical therapy 3 times per week for 4 weeks. Physical therapy sessions began with application of moist heat to the right shoulder for pain control and to decrease joint stiffness[19] followed by manual therapy techniques of right glenohumeral joint mobilization (lateral distraction, inferior, anterior and posterior glides)[20] and manual passive stretch (shoulder flexion, abduction, external rotation, and internal rotation). The manual techniques were followed by therapeutic exercise.

The emphasis of the therapeutic exercise program was eccentric strengthening of the right shoulder muscles. The intensity of exercise was submaximal due to the recent shoulder injury. Using mechanical resistance, the intensity was set to allow smooth movement through the available range of motion without increasing pain.[20] The initial intensity was approximately 30% to 40% of the one repetition maximum (1RM) with weekly increases of 5% to 10% based on patient progress. The strengthening program consisted of 2 sets of 10 repetitions of prone rows and sidelying external rotation with hand weights, internal/external rotation and upper extremity diagonal patterns with elastic resistance band in standing, and scaption with hand weights in standing. The patient was instructed to slowly return to the starting position during each exercise to enhance eccentric muscle contractions. Continuous monitoring was conducted to ensure safe and optimal exercise performance. In particular, the patient was given verbal cues to eliminate breath holding and to ensure no Valsalva effect when performing the strengthening exercises. Moreover, tactile cues were given intermittently to the patient in order to slow down exercise movements and to optimize eccentric loading of rotator cuff muscles.

Each therapy session ended with application of cryotherapy and interferential current electrical stimulation to the right shoulder to reduce post-exercise soreness and inflammation.[19]

The patient was educated in basic anatomy of the shoulder girdle and the conditions of rotator cuff tears and tendinopathy. He was also given a home exercise program (HEP) of self-stretching and ROM exercises for the right shoulder: stretching into internal and external rotation with a strap to assist, wand exercises for flexion and external rotation in supine, and finger wall-climbing.[20] Right shoulder strengthening was included in the HEP with the patient performing upper extremity diagonals with elastic resistance band and again emphasizing the eccentric component of each exercise. The patient demonstrated the exercises correctly and reported following the HEP as prescribed.

Table 1. Right Shoulder Range of Motion and Strength Measures

Right Shoulder Motion	Active/Passive Range of Motion in Degrees	Strength Grade out of 5
Flexion	165/175	3+
Abduction	160/170	3+
Internal Rotation	60/70	3+
External Rotation	35/45	4

Table 2. Goals and Expected Outcomes

Right Shoulder	2 Week Goal	4 Week Goal	Expected Outcome
Pain	3/10	0/10	Pain free mobility
Active Range of Motion	Flexion 170 Abduction 170 External Rotation 60 Internal Rotation 65	Flexion 180 Abduction 180 External Rotation 90 Internal Rotation 70	Return to prior level of activity and participation
Strength	4/5	5/5	
DASH Score	<20.00	<10.00	

The patient's progress was reassessed twice with the same standard outcome measures. Table 3 demonstrates the patient's progress at 2 weeks and 4 weeks.

As the patient progressed with decreased pain and increased ROM and strength of the right shoulder, simulated casting of a fishing line was initiated, first without resistance, then adding weights, and finally progressing to practice with the patient's fishing rod in the clinic parking lot. The fishing simulation also increased from 5 to 15 reps as pain decreased and as strength and ROM improved.

OUTCOMES

At the end of 4 weeks, the patient had met all goals and expected outcomes. The DASH score decreased nearly 26 points, well exceeding the minimal clinically important difference (MCID) of 10 points.[21,22] The patient had returned to his prior level of function with the ability to raise his right arm above his head and reach behind his back without pain. Moreover, the patient reported no difficulties with dressing, and he was able to return to fishing with his son. The patient was very pleased that surgery was no longer necessary.

DISCUSSION

This case report explored the effectiveness of a conservative approach to rotator cuff tendinopathy and tear in an older patient. Interventions of modalities to reduce pain, manual therapy to increase ROM, and therapeutic exercise with an emphasis on eccentric contractions to strengthen the shoulder musculature were effective to return the patient to prior level of function and participation in a favorite activity. The findings of this report support physical therapy as an alternative to surgery for the geriatric population with small rotator cuff tears and tendinopathy. While the patient was originally referred to physical therapy for preoperative management of pain and limited motion, this patient was able to avoid surgery altogether.

Eccentric strengthening may prevent injury from traumatic insults and other aggravating factors that may contribute to tendinopathy. In a study of the role of eccentric intervention implementation, Lorenz and Reiman[23] found eccentric strengthening can assist in the effective treatment of tendinopathies, as well as in preventing muscle strains. A review of several evidenced-based studies of conservative management approaches for treating tendinopathy found that eccentric exercises provide excellent clinical results for both athletic and sedentary patients.[10] In addition, the reviewers found that clinical findings with that approach provided patients with positive effects for pain relief and functional improvement, and they suggested that the first-line treatment of tendinopathy should be represented by a physical therapy-based program of eccentric exercises.[10]

In a study conducted by Meroilla et al[7] for the conservative management of rotator cuff tears, the authors set out to determine a prognostic score for subjects who can benefit from conservative treatment instead of surgical intervention. They cited the high percentage of recurrent tears after surgical intervention. The study followed 60 individuals with rotator cuff tears (determined by magnetic resonance imaging) with a mean age of 52 years. Groups were divided into a conservative treatment group with interventions of shoulder strengthening, joint mobilizations, and stretching activities, and a surgical treatment group with participants post rotator cuff surgery and no conservative management. The study found that the conservative group reported continued satisfaction, pain improvement, and an acceptable quality of life at follow-up. The surgical group was found to have better rehabilitation outcomes with partial rotator cuff tears; however, less favorable outcomes occurred with those who had full thickness tendon tears. Moreover, the prognostic factors found in this study indicated that age is a crucial parameter in decision making for surgery, and poorer results were found in patients who were 63 years and older. The study concluded that a conservative approach to the treatment of rotator cuff tears, especially in the older population who continue to have a higher rate of recurrence, may be more appropriate.[7] A study by Cozzolinio et al[24] reported on the outcome of a single-tendon rotator cuff repair in patients older than 65 years and found that isolated supraspinatus tendon repairs have high healing potential and yield good clinical results if the repairs heal. However, the author acknowledges the high failure rate of repairs in this population as well.

Whether or not the patient in this case report will maintain the outcomes achieved during this course of physical therapy is unknown. However, surgical repair of a torn rotator cuff does not guarantee long-term results. In a retrospective study of 75 patients with a mean age of 52 years who underwent rotator cuff repair and were followed for 16 years after surgery, only 37% of the patients reported persistent relief of pain; the remaining 73% did not have lasting pain relief.[7] The study found that there are relatively high functional scores after primary rotator cuff repair or reconstruction; however, the function achieved postoperatively was lost as ROM and strength decreased to less than preoperative levels.[7] A study by Borgmastars et al[5] concluded that patients should be warned to expect less than permanent relief. In addition, the study also reported that geriatric rotator cuff rupture is due to degeneration and is the major cause of re-rupture after surgical repair, showing a correlation between poorer outcomes and age for geriatric patients undergoing rotator cuff repair.[5]

A limitation of this case report is the lack of sufficient evidence on the effects of eccentric strengthening specifically for the geriatric patient population with tendinopathy. Further research should investigate the effects of eccentric exercise in the geriatric population and

Table 3. Interval Assessment of Patient's Progress

Right Shoulder	2 Weeks	4 Weeks
Pain	3/10	0/10
Active Range of Motion	Flexion 170 Abduction 170 External Rotation 60 Internal Rotation 65	Flexion 180 Abduction 180 External Rotation 90 Internal Rotation 80
Strength	Flexors 4-/5 Abductors 4-/5 External Rotation 4/5 Internal Rotation 4-/5	Flexors 5/5 Abductors 4+/5 External Rotation 4+/5 Internal Rotation 4+/5
DASH Score	15.00	1.70

the long-term results of conservative management of rotator cuff tears and tendinopathy in older adults. Randomized control trials could be developed to compare the results of different interventions including varying forms of exercise. Longitudinal studies could determine the long-term results of conservative management of musculoskeletal conditions to maintain function in geriatric patients.

CONCLUSION

This case report supports physical therapy as an alternative to surgery in an older adult with rotator cuff tear and tendinopathy. Eccentric strengthening of rotator cuff musculature for partial tears and/or tendinopathies in the geriatric population should be considered as a means of primary intervention. The patient in this case was to undergo rotator cuff surgery after conservative management of pain was concluded. During the patient's rehabilitation course in the outpatient clinic, pain was eliminated, strength gains were realized, and shoulder mobility was restored. More importantly, the patient had regained the ability to participate in activities that were not previously possible and surgery was avoided. A conservative management approach including eccentric muscle strengthening may be a means to restore function and deter surgery for small rotator cuff tears and tendinopathy in the geriatric population.

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TAKE A STAND TO PREVENT FALLS

Mariana Wingood, DPT, PT, GCS, CEEAA; Maggie Holt, PT, CEEAA

INTRODUCTION

"Take a Stand to Prevent Falls" was the theme of this year's National Fall Prevention Day. This event, developed by the National Council on Aging, originated in 2008 with the purpose of uniting health care professionals, older adults, caregivers, and family members to raise awareness of fall prevention. Since then, it has grown substantially. In 2014, 48 out of 50 states have participated![1]

Vermont's National Fall Prevention Day

Vermont APTA started participating in the national event in 2012. Our events, called "Stay Steady Vermont" consist of an interactive educational PowerPoint followed by individual fall risk screens. The PowerPoint includes education on body systems that interact for balance, normal aging, benefits of physical activity, fall risks, and action steps. The presentation is updated on a yearly basis with new information and resources. Individual risk screens use the Centers for Disease Control and Prevention (CDC) Stopping Elderly Accidents, Death and Injury (STEADI) toolkit. The toolkit was created to help primary care physicians use the American Geriatrics Society/British Geriatrics Society guidelines for fall prevention in older adults. Performance measures used in the STEADI are the Timed up and Go, 30-second chair stand, and 4-stage balance test.[2]

2015 Event

Each year we set goals for the next year. For 2015, goals were to have more sites, to have an event in every county, to do at least 300 screens, and to increase the number of volunteer clinicians.

1. Developing sites across the state was an intensive effort. We split up the counties in the state and created an excel spreadsheet with many contacts:
   - local physical therapy practices and hospitals found on Google,
   - possible sites (including senior centers, meal places, assisted living situations, hospitals, and malls), and
   - agencies on aging and housing program coordinators.

   We contacted them through several phone calls and e-mails asking for their participation or recommendations of sites/clinicians they may know who would be interested in this event. Most of the sites and participants who were part of the 2014 event were excited to participate in National Fall Prevention Week in 2015. The majority of our focus was on the remote counties that had no previous involvement. This would ensure that we are able to reach a larger number of older adults as well as reach out to the more rural areas. Through persistent phone calls and e-mails, we were successful in having sites in most counties, but have 4 more to get to next year.

2. Recruiting volunteer clinicians was also intensive. We began with a blast e-mail to all Vermont APTA members in the late spring. Near the same time, we presented an interactive videoconference throughout the state. The course was presented by Maggie Holt, PT, CEEAA, and Mariana Wingood, DPT, PT, GC,S CEEAA, and provided clinicians with background information about falls, the CDC's STEADI toolkit and performance measures, evidence-based fall prevention programs (including Otago, Mind over Matter, Tai Chi, and Strong Bones), and the structure of our local Stay Steady Vermont events. For clinicians who were not able to attend and wanted to participate in National Fall Prevention Day, we created a YouTube video of the videoconference, and a post-test to assure that volunteer clinicians would have enough background knowledge to sufficiently educate the public.

3. Once we finished recruiting, we began an additional excel spreadsheet that paired clinicians with sites. The goal is always to have 3 therapists, including 1 clinical lead that would be in charge of the details regarding the technology required/available, the schedule of events, handouts, and the screening process. This chart was completed several months before the event, to ensure that all problems were solved. The co-coordinators maintained continuous communication and met monthly to work through any problems that had come up. Throughout the coordination of events, recruitment continued for sites that has less than 3 clinicians. Several sites did not have a projector and through local resources, including the University of Vermont and Central Vermont Hospital, we were able to ensure that all sites could present the PowerPoint.

Most sites presented the PowerPoint while participants ate their lunch and the screening was done afterwards. Some sites were able to have Occupational Therapists perform home safety screens and provide education about safety at home. Increased collaboration will be an area of concentration for next year, with the goal of including other professionals who have information to add to fall prevention, such as primary care providers, pharmacists, optometrists, and durable medical equipment providers. See Figure 1 for more information regarding the number of participants and volunteers.

Next Year

To improve next year's event, we created a survey and received feedback from each site. Feedback we received from the participants included,

	2014	2015	2016 Goal
Events	15	23	25
Screens Completed	231	278	300
Clinicians	30	43	50

Figure 1. Stay steady event by the numbers.

- "It's nice to know my exercise program seems to be paying off."
- "I thought that, if I used a cane, I'd get weaker because I'd depend on it."
- "I didn't know that walking counted as exercise."
- "I'll get back to those exercises my PT gave me."

Feedback we received from the clinicians included,

- "I enjoy getting out in the community promoting wellness."
- "Most of our screens were with 90+year olds and they were all inspirational!!! Most of them did great on the strength sit to stand!"
- "It was a lot of fun and we told everyone there to come again next year to compare their results."

Feedback we received from the site-coordinators included,

- "Now that we know how it goes, we will try to recruit PTs and hold this event in some of our other sites."
- "It was greatly appreciated by the folks here."
- "The response was very positive... anticipating holding a larger, public discussion and presentation at a later date so that more people from the communities we serve can attend."

Some areas of improvements for next year include,

- Matching the number of volunteer clinicians to the projected attendance at the event.
- Decreasing technical problems.
- Tweaking the PowerPoint to fit individual clinician's styles.
- Creating a reference list of exercise programs in the area.
- Increasing interdisciplinary coordination.

With these areas of improvements in mind, we have begun planning next year's events. We are hoping to increase number of events, participants, types of health providers, and clinicians. We also hope to increase the number of regional co-coordinators for Stay Steady Vermont.

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Maggie Holt has been a PT since 1984 and loves it more every day. She works in the acute and home care settings in Vermont and loves to share what she knows with her community, especially if she can do it before they are in the hospital setting. She can be reached at mholt122@gmail.com.

AN OVERVIEW OF HIV AND OLDER ADULTS (Part 1 of 2)

Carlo Mabilog, PT, DPT, MBA, MSHS, MS, CSCS

INTRODUCTION

Advancements in science and medicine have driven improvements in the accuracy of screening and testing for human immunodeficiency virus (HIV) and the initiation of modern and effective therapies for infected individuals. Data for HIV infected individuals have been collected and synthesized in numerous studies. However, studies for older adults with HIV have been limited. Human immunodeficiency virus is no longer considered a death sentence; rather, it is considered a chronic condition that may be controlled with established therapies such as medications and lifestyle changes, similar to heart and metabolic diseases. According to Nakagawa, May, and Phillips, individuals with a timely diagnosis, access to appropriate care, and adherence to lifelong therapies can expect a life expectancy similar to that of HIV-negative individuals.[1]

The first part of this series aims to provide rehabilitation professionals an overview of HIV, including history and transmission, facts and figures of older adults with HIV, screening/testing and diagnosis, treatments/interventions, and recommendations for prevention. The second part will look into the interactions and comorbidities of HIV and aging, and a review of evidence-based exercise recommendations for older adults with HIV.

HISTORY AND TRANSMISSION

Human immunodeficiency virus is believed to have originated in non-human primates in sub-Saharan Africa and transferred to humans early in the twentieth century. The discovery of HIV was claimed by French scientist, Luc Montagnier in 1983 and American researcher, Robert Gallo in 1984. Both HIV-1 and HIV-2 infect humans. The HIV-1 is transmitted more frequently than HIV-2 in humans.[2] Human immunodeficiency virus is found in blood, semen, vaginal fluids, breast milk, other body fluids such as cerebrospinal fluid, fluid in bone joints, and fluid surrounding the unborn baby. The most common transmission modes of HIV involve unprotected sexual intercourse including vaginal, anal, or oral with a person; sharing needles with a drug user; during pregnancy, birth, or breast-feeding; and getting a blood transfusion from a person with HIV. Casual contact does not transmit HIV such as shaking hands or hugging a person; using a public telephone; drinking from a fountain; using the same restroom swimming pool, or hot tub; sharing a drink; being coughed at or sneezed on; or being bit by an insect.

FACTS ON OLDER ADULTS WITH HIV

According to the Centers for Disease Control and Prevention, of the estimated 1.1 million people living with HIV infection in the United States in 2010, individuals aged 55 and older accounted for almost one-fifth or 19% (217,000) of those infected individuals.[3] Out of the estimated number of 47,500 of newly diagnosed HIV infected individuals in 2010, 2,500 were Americans aged 55 and older. The demographic included 36% white men, 4% white women, 24% black men, 15% black women, 12% Hispanic men, and 4% Hispanic women. In 2010, there was an estimated 19,343 deaths among individuals with HIV, 53% were aged 50 and older. Human immunodeficiency virus was considered the 10th leading cause of death among men and women aged 50-54.

From a global viewpoint, in 2013 the United Nations reported that 35 million individuals are living with HIV.[4] Seventy-eight million have been infected since the epidemic and 39 million have died from AIDS-related illnesses. There is an estimated 3.6 million individuals aged 50 years and older living with HIV.[5] Three factors explain the "aging" of the HIV epidemic: the success of antiretroviral therapy (ART), decreasing HIV incidence among younger adults shifting the burden to older ages, and older adults exhibiting similar risky behaviors found among younger people that often gets overlooked or unmeasured.

Screening/Testing and Diagnosis

Antibody tests are considered the most common type of testing by examining HIV antibodies (proteins) circulating in the body.[6] The enzyme immunoassay test uses blood, oral fluid, or urine to detect HIV antibodies. Results for this test can take up to two weeks. Another antibody test is the rapid HIV antibody test that also uses blood, oral fluid, or urine. The results can take 10 to 20 minutes. If the result of either test comes out positive, a confirmatory test must be done. This is called the Western Blot Test. The results of this test may take up to two weeks.

Antigen and RNA tests, on the other hand, detect HIV directly and can be used to diagnose HIV infection earlier (1-3 weeks post-exposure). An example of this test is the polymerase chain reaction test that detects the genetic material of HIV itself. These tests require a blood sample and are generally more expensive.

Other HIV tests include the Home Access HIV-1 Test System and the OraQuick In-Home HIV Test, both approved for consumer, non-clinical use by the Food and Drug Administration (FDA).

It is important to take into consideration the "window period" to determine the success of HIV testing. This is the length of time for HIV to become detectable by any of the diagnostic tests.[7] If an individual has been exposed to HIV, it can take up to approximately 3 months for antibodies to be detected. Therefore, a recent exposure may not provide an accurate result for an indi-

vidual testing for HIV within the window period. Retesting is recommended 3 months after a potential exposure. The United States Preventive Services Task Force recommends screening for HIV infection for individuals aged 15 to 65 years and younger adolescents and older adults who are at an increased risk.[8] Pregnant women are also recommended for screening including those who present in labor who are untested and whose HIV status is unknown.

Ellman et al characterized older adults as the "forgotten population" from their retrospective study of newly diagnosed HIV individuals.[9] The study concluded that a very high proportion of individuals aged 50 and older are diagnosed with HIV at an advanced stage of the disease; significantly later compared to younger individuals. A late diagnosis of HIV leads to delayed treatment and initiation of ART resulting in difficulties of restoring CD4 cell count. The reasons for late diagnosis include: failure of medical providers to elicit a history of sexual risk behaviors, failure to even suggest HIV screening, flawed self-reported perception of risky behaviors by older adults, and inability of medical providers to recognize clinical signs of HIV/AIDS.

Definitions/Stages of HIV and AIDS

Human immunodeficiency virus leads to Acquired Immunodeficiency Syndrome (AIDS). Human immunodeficiency virus specifically attacks the CD4 cells (T-cells) of the immune system.[10] Once a significant amount of T-cells have been destroyed by the HIV, the body is unable to effectively fight infection and other diseases which then leads to AIDS.

Acute infection occurs within 2 to 4 weeks post-HIV exposure. Symptoms include a natural response to infection such as "feeling sick" with flu-like symptoms (fever, sore throat, rash, enlarged lymph nodes). This is called primary HIV infection or acute retroviral syndrome. During this acute stage, HIV is produced in large amounts by attacking the CD4 cells, making copies of itself, and destroying the CD4 cells in the process. Human immunodeficiency virus transmission during this stage is highest due to the rapid rise in HIV in circulating blood. At some point, the body begins to stabilize and the CD4 count will increase slightly but will not return to normal, pre-infection levels. It is important to take note that not all individuals experience symptoms. Some individuals remain asymptomatic for many years.

Clinical latency (inactivity/dormancy) is the stage where HIV infection is considered chronic and individuals are asymptomatic. However, HIV is still active and infectious. Individuals on effective ART live longer for several decades. On the other hand, individuals who do not seek appropriate care or are not adherent to ART, may rapidly decline and greatly increase mortality due to an increase in viral load and significant drop in CD4 count.

AIDS is the stage where an individual's CD4 cell count falls below 200 cells per cubic millimeter of blood. It is this stage where the immune system is severely damaged and opportunistic infections arise. A diagnosis of AIDS can also be made if an individual develops one or more opportunistic illnesses regardless of CD4 count. Some opportunistic infections and diseases include tuberculosis, bacterial pneumonia, septicemia, toxoplasmosis, candidiasis, herpes simplex, herpes zoster, Kaposi's sarcoma, lymphoma, and squamous cell carcinoma, etc.

TREATMENTS/INTERVENTIONS

Currently, there is no cure for HIV. Treatment options, such as ART, improve HIV-infected individuals' life expectancy. The most recent publication, "Guidelines for the Use of Antiretroviral Agents in HIV-1 Infected Adults and Adolescents" was developed by the Department of Health and Human Services Panel.[11]

The recommendations are:

- antiretroviral therapy is recommended for all HIV-infected individuals to reduce the risk of disease progression,
- antiretroviral therapy is recommended for HIV-infected individuals for the prevention of transmission of HIV, and
- patients who start ART should commit to treatment adherence and understand the risks and benefits of ART.

Key considerations when caring for older HIV-infected patients:[12]

- antiretroviral therapy is recommended for patients > 50 years of age regardless of CD4 count,
- antiretroviral therapy -associated adverse events may occur more frequently in older HIV-infected adults,
- increased drug interactions and other medications commonly prescribed should be regularly assessed,
- human immunodeficiency specialists and primary care physicians should work close together to optimize medical care of older HIV-infected adults with complex comorbidities, and
- counseling to prevent secondary transmission of HIV remains important.

Azidothymidine (AZT), also called Zidovudine, became the first approved drug to treat HIV. It is currently being marketed under the brand name, Retrovir. Since its approval by the FDA back in 1987, approximately 30 drugs have been approved and even more are under investigation.[13] Antiretroviral therapy or highly active antiretroviral therapy is a "cocktail" of medications. These drugs attack HIV at different points in its life cycle. Taking a single drug will not be effective in "stopping" HIV. Therefore, the key to effectively control viral load and improve CD4 count is to find the right combination of drugs from the different "classes" of HIV medications. Antiretroviral medications are classified into:

- Nucleoside/Nucleotide Reverse Transcriptase Inhibitors
  - These drugs block the ability of HIV to use the enzyme, reverse transcriptase, to build new genetic material that the virus needs to make copies of itself. These drugs are also called "nukes."
    - Drugs: Ziagen, Videx, Emtriva, Epivir, Zerit, Viread, Retrovir

- Non-Nucleoside Reverse Transcriptase Inhibitors
  - These drugs act on the enzyme, reverse transcriptase, directly to prevent it from functioning correctly. These drugs are also called "non-nukes."
    - Drugs: Rescriptor, Sustiva, Intelence, Viramune, Edurant

- Protease Inhibitors
  - Protease is an enzyme needed by HIV to "cut" strands of its genetic material in order to create

more copies of itself. These drugs block the enzyme and prevent the strands from being synthesized to functional pieces.
    - Drugs: Reyataz, Prezista, Lexiva, Crixivan, Viracept, Norvir, Invirase, Aptivus

- Entry/Fusion Inhibitors
    - These drugs block the entry of HIV at the receptor sites of either the HIV or CD4 cells and prevent HIV from successfully attaching to healthy cells.
        - Drugs: Fuzeon, Selzentry

- Integrase Inhibitors
    - Integrase is an enzyme needed by HIV to integrate its own genetic material with the CD4 cells' own genetic material. These drugs block the enzyme and prevent replication and making new viruses.
        - Drugs: Tivicay, Vitekta, Isentress
- Fixed-Dose Combinations
    - These are antiretroviral medications made up of 2 or more medications from one or more of the above different classes. Fixed-dose combinations are combined into a single pill promoting better adherence due to convenience, avoiding confusion, and lowering patient costs to drug co-pays.
        - Drugs: Epzicom, Triumeq, Trizivir, Atripla, Stribild, Complera, Truvada, Combivir, Kaletra

It is important to consider that each patient is unique to any given drug combination and the success of ART will be dictated by several factors such as drug resistance, drug-to-drug interactions, cost of medications, adherence to regimen, reported side effects, and positive changes to CD4 count and decreased viral load. The ultimate goal of ART is to find the right kind of combination drugs that will be powerful enough to suppress HIV without causing too many side effects.[14] The short-term side effects of ART include: anemia, diarrhea, dizziness, fatigue, headaches, nausea, vomiting, pain and nerve problems, and rash. Long-term side effects include lipodystrophy, insulin resistance, lipid abnormalities, decrease in bone density, and lactic acidosis.

Prevention

Practicing the following recommendations can prevent the spread of HIV infection:[15]

- Know your status. Suggest testing as part of your annual physical examination with your primary care physician. Free testing can also be done anonymously at various testing centers across the country. For more information, visit http://www.aids.gov. An early diagnosis offers early access to treatment choices and allows for better outcomes.
- Know your partner's HIV status and discuss ways to lower the risk of HIV infection.
- Use protection such as condoms for vaginal, anal, or oral intercourse.
- Limit your number of sexual partners. Testing for HIV and sexually transmitted infections should be done more regularly for individuals with multiple sexual partners.
- Use sterile drug injection equipment and never share equipment with others.
- If you are at a higher risk for infection, talk to an infectious disease specialist about pre-exposure prophylaxis, which significantly reduces risk.
- For health care providers exposed to HIV after a single-high risk event, post-exposure prophylaxis (PEP) must occur as soon as possible, no more than 3 days after exposure to HIV.[16]

CONCLUSION

As health care providers, it is crucial to be educated on HIV and its treatment options due to the alarming growth of infected individuals who seek interventions to maintain, improve, or enhance overall health. It is a shared responsibility between the patient and the health care interdisciplinary team to be well-informed and supportive towards improving overall quality of life. This article provided an overview of HIV, including history and transmission, facts and figures of older adults with HIV, screening/testing and diagnosis, and the importance of ART as the recommended intervention to stabilize HIV for all individuals including older adults. The next article (which will be made available in the next issue of *GeriNotes*) will focus on the interactions and comorbidities of HIV and aging, and a review of evidence-based exercise recommendations for older adults with HIV.

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