GERINOTES

SECTION ON GERIATRICS, AMERICAN PHYSICAL THERAPY ASSOCIATION

IN THIS ISSUE:

CONTINUING EDUCATION MODULE

INSTRUCTIONS:

ARTICLES:

Continuing Education Module
Cardiovascular & Pulmonary

TABLE OF CONTENTS

Publication Title: *GeriNotes*

Statement of Frequency: Bi-monthly; January, March, May, July, September, and November

Authorized Organization's Name and Address: Orthopaedic Section, APTA, Inc.
For Section on Geriatrics, 2920 East Avenue South, Suite 200, La Crosse, WI 54601-7202

Newsletter Deadlines: January 28, March 28, May 28, July 28, September 28, November 28

Editorial Statement: *GeriNotes* is not a peer-reviewed journal. Opinions expressed by the authors are their own and do not necessarily reflect the views of the Section on Geriatrics, APTA. The Editor reserves the right to edit manuscripts as necessary for publication. Copyright 2008 by the Section on Geriatrics, APTA.
All advertisements that appear in or accompany *GeriNotes* are accepted on the basis of conformation to ethical physical therapy standards, but acceptance does not imply endorsement by the Section on Geriatrics, APTA.

CSM 2009
Preconference Courses: Section on Geriatrics
Clinical Residency 101: Getting Started and Doing It Well

SUNDAY, FEBRUARY 8, 2009,
12:00 PM–7:00 PM
6.0 Contact Hours

PRESENTERS:
Greg W. Hartley, PT, MS, GCS, Teresa L. Schuemann,PT, DPT, SCS, ATC, CSCS, Kim Nixon-Cave, PT, PhD, PCS

This workshop is ideal for individuals and organizations interested in developing a credentialed clinical residency. Learn about the process from individuals who have guided their clinical residency through a successful credentialing outcome and from representatives of APTA's Committee on Residency Credentialing. Innovative ways to address the credentialing criteria will be explored to make a clinical residency fit your unique situation.

Upon completion of this course, you will be able to:

- **Justify the rationale for a clinical residency that includes a discussion of the benefits and challenges.**
- **Assemble the necessary resources for the development of a clinical residency, including the development of unique** partnerships.
- **Market a clinical residency to administration and to potential residents.**
- **Formulate a budget and establish cost effectiveness of a clinical residency.**
- **Prepare an application for the credentialing process.**
- **Describe the mentoring process and its role in postprofessional education.**
- **Describe and list curricular components (clinical and didactic) in at least one specialty or sub-specialty area.**

Cosponsored by the following APTA sections: Acute Care, Federal Physical Therapy, and Women's Health.
Members of the Section on Geriatrics and all cosponsoring sections register at a discount.

PRESIDENT'S PERSPECTIVE: UPDATES ON SUMMER INITIATIVES

John O. Barr, PT, PhD

Despite a range of environmental challenges affecting many of us from around the country, this summer proved to be an unusually productive one for the Section on Geriatrics. I thus wanted to make a point updating you about some of our initiatives.

For years, the Section on Geriatrics has been known for its high quality continuing education programs presented at conferences, and also provided via home study and on-line formats. Thousands of hours each year are committed by our members who serve as authors, content experts, editors, meeting coordinators, and speakers. Given our best efforts, the Board of Directors has become concerned that all of this work might not be having much impact on most members. In an attempt to broaden your continuing education opportunities, in June the Board established the Home Study Taskforce to assess the feasibility of alternative and cost effective mechanisms for delivering our home study course series content. This Taskforce, comprised of Jason Hardage, PT, DScPT, NCS; Carol Schunk, PT, PsyD; and Greg Hartley, PT, MS, GCS deliberated over the summer. One outcome from this Taskforce is this special issue of *GeriNotes* that includes a continuing education component focused on Cardiovascular and Pulmonary Considerations with Aging Populations. The Taskforce will be evaluating member feedback about this new format as it considers yet other ways to expand on the delivery home study/distance education products.

Developed for implementation in 2009, is the Section's education and credentialing initiative for the "Certified Exercise Expert for Aging Adults" (CEEAA). Under the auspices of a committee co-chaired by Marilyn Moffat, PT, PhD, FAPTA and Karen Kemmis, PT, DPT, MS, the process to attain this credential by physical therapists and student physical therapists will take a minimum of a year, including formal didactic education, supervised/mentored skills development, and home-based reflection. Three courses, each 2 days long, will address 3 different and increasingly complex aspects of exercise design and delivery. The 3 courses will focus successively on: examination (tests & measures); exercise prescription and consensus guidelines; and barriers/motivation, medication and nutritional considerations, special populations, and complementary exercise. Although physical therapist assistants may attend these courses with a supervising physical therapist, they will not be eligible for certification. The first course will be presented on March 28-29, 2009. Participants will demonstrate expert clinical decision-making and skill in designing and applying an effective examination and exercise prescription, and in measuring the effectiveness of exercise for all aging adults that reflects current evidence. Further details concerning the course series and the certification process will soon be available in a descriptive brochure and online at our website www.geriatricspt.org.

In follow-up to my columns in the July and September issues of *GeriNotes,* the Board approved the formation of the Taskforce on Retooling for an Aging America. The purposes of this Taskforce are to: conduct an analysis of the Institute of Medicine's report *Retooling for an Aging America: Building the Health Care* Workforce*, released in April, 2008; determine specific implications for the SOG, APTA, and the Physical Therapy profession; formulate specific recommendations for the SOG and APTA; and to implement a plan of action to better respond to predicted workforce needs that will be emerging. Rita Wong, PT, EdD will chair this Taskforce, comprised of members Dale Avers, PT, DPT, GCS; Dennis Klima, PT, MS, GCS; and Mary Thompson, PT, PhD, GCS. These individuals will bring together their expertise in physical therapist and physical therapist assistant education, experiences in clinical practice working with older adults, familiarity with specialty certification, and commitment to providing more optimal health care for older Americans. It is hoped that preliminary outcomes from the deliberations of this group can be discussed at the Combined Sections Meeting, and be used to inform APTA's Physical Therapy and Society Summit (PASS) that will be convened in late February.

REFERENCE

1. *Retooling for an Aging America: Building the Health Care Workforce.* National Academies Press, 500 Fifth Street, NW, Lockbox 285, Washington, DC, 20055; (800-624-6242). An uncorrected proof copy is available at: http://www.nap.edu/catalog/12089.html Accessed on October 1, 2008.

Dr. Barr is a Professor in the Physical Therapy Department at St. Ambrose University, Davenport, IA. He also serves on the Editorial Board for the Journal of Geriatric Physical Therapy.

CLINICAL EDUCATION MODULE EDITOR'S MESSAGE

Carol Schunk, PT, PsyD

This special issue of GeriNotes is a first for the Section on Geriatrics. As part of the strategic plan to investigate and implement alternative Continuing Education (CE) opportunities for members, the issue is a CE module on Cardiovascular and Pulmonary (CVP). Those who choose to participate can read the five core articles, take the post-test and submit the form with a nominal payment for CE credits. The qualifications of the authors and the content of the articles are exceptional. Credit is given to the hard work of Guest Editor, Jennifer Ryan. Jennifer is extremely qualified in this clinical topic as a certified clinical specialist, professor of CVP at Northwestern University, and practicing clinician in ICU and outpatient settings.

Professional development is essential for clinical competency but it is often difficult to participate due to time, personal obligations, and financial constraints. As GeriNotes Editor, I am so pleased that we can offer a high quality but easy and inexpensive CE alternative to readers. My thanks to Jennifer and many others who assisted in construction of this issue. To readers, may you enjoy and learn!

GUEST EDITORIAL

Jennifer M. Ryan, PT, MS, DPT, CCS

Thank you for the opportunity to participate as Guest Editor for the Cardiovascular and Pulmonary focus issue of *GeriNotes*. It is so exciting that this issue is being presented as a continuing education module. The articles included are aimed to enhance a better understanding of the older patient's cardiovascular and pulmonary system. As a result of healthy aging, you will read that there are physiological changes that impact a person's activity tolerance which require specific adaptations to their exercise programs and that some of these changes can be reversed as a result of guided progressive exercise. Articles related to the incidence and impact of diseases like hypertension and heart failure are addressed since the two diseases grow more prevalent as a person ages and both impact a person's quality of life and activity tolerance. The role that exercise can play in the management of these diseases is explored as well as the antihypertensive pharmaceutical interventions that exist to help the therapist to better understand the impact these medications can have on a person's exercise capacity. Since many physical therapists will examine a patient who has a known or unknown cardiovascular and or pulmonary comorbidity, this information is vital. To summarize the depth and breadth of the information included in the articles and to make the information immediately useful to the clinician, the final two articles focus on functional measurement tools to measure your patient's progress and a case report. The case report goes through the clinical decision-making steps that should be employed in order to safely progress patients with respect to their cardiovascular and pulmonary system.

The expectation for this issue of *GeriNotes* is to increase the reader's awareness of the cardiovascular and pulmonary changes that occur with aging and common diseases. This focused issue of *GeriNotes* can be used as a resource to guide your further learning as we all strive for best practice and autonomous practice in keeping with Vision 2020.

Know Students who are interested in Geriatrics?
Nominate Them for a Student Membership Award!

Get students involved in the Section on Geriatrics, and have them paired with a mentor in the field! Anyone who is a Section on Geriatrics member or teaches geriatric content may nominate a student.

Simply submit the following information to geriatrics@apta.org by January 15,2009.

1. Full name of nominator, or APTA member number.
2. **Full name of student, or APTA member number.**
3. **Description of how student meets the criteria.**

To be eligible for this award, the nominee must:

- Be a member of APTA.
- Be enrolled full-time in an accredited educational PT or PTA program, residency, or fellowship.
- Be in good academic standing.
- Have demonstrated an interest in geriatrics as evidenced by special course/clinical work in the area of geriatrics, such as research projects, case studies, special presentations, volunteeirng, etc.

The final award winners will be drawn during the business meeting at the Combined Sections Meeting. There will be up to 5 PTA and 5 PT students selected to receive one year free membership to the section.

ESSENTIAL CARDIOVASCULAR AND PULMONARY CONSIDERATIONS WITH AGING POPULATIONS

A Section on Geriatrics Continuing Education Module

OVERVIEW

Therapists who work with older adults must be versed in cardiovascular and pulmonary (CVP) considerations specific to physical therapist examination and intervention. An awareness of the altered exercise response of patients with CVP pathology is vital because physical therapists so often work with patients who have CVP co-morbidities that they need to be mindful of in addition to the primary diagnosis. Specific to older populations, it becomes even more important because the incidence of CVP co-morbidities increases decade to decade along with the risk of complications due to them. Increasing your knowledge in this subject matter will improve the safety of patient intervention and examination, a prime goal of all physical therapists and assistants.

MODULE CHAPTERS

I. Physiological Changes in the Cardiovascular and Pulmonary System with Aging: Can They Be Reversed by Exercise? **by Frownfelter and Stackowicz**

II. Standardized Tests and Measurements You Can Use With Cardiovascular Patients **by Strunk**

III. Antihypertensive Medication Use with Aging Populations **by Ryan**

IV. The Safe Use of Resistance Training on Older Adults with Heart Failure **by Huber and Phillips**

V. My Older Patients Are Short of Breath during Treatment: Clinical Decisions that Can Guide Your Actions **by Cohen**

AUTHORS

See specific bibliographies following each chapter

Meryl Cohen, DPT, MS, CCS
Donna Frownfelter, DPT, MA, CCS, FACP, RRT
Gail M Huber, PT, PhD
Shane Phillips, PT, PhD
Jennifer Ryan, DPT, MS, CCS
Dawn Stackowiez, PT, MS, CCS
Ellen Strunk, PT, GCS

REFERENCE LIST

References can be found at the end of each chapter in the module.

OBJECTIVES:

The Reader will be able to:

1. **Describe the role exercise can serve to reverse or limit the changes in the cardiovascular and pulmonary system due to healthy aging.**
2. **Describe the exercise prescription parameters that need to be employed to limit the symptoms of heart failure.**
3. **Differentiate the pharmacodynamics of each antihypertensive medication**
4. **Explain the role the physical therapist can serve in proper dosing of antihypertensive medication.**
5. **Name 4 standardized tests that can be utilized in the documentation to support physical therapy services for CV/Pulmonary Pattern D: Impaired Aerobic Capacity/Endurance.**
6. **Demonstrate effective use of physical examination results in making important clinical decisions about symptomatic dyspnea.**

TARGET AUDIENCE

Physical Therapists and Physical Therapist Assistants

CONTACT HOURS/CONTINUING EDUCATION UNITS

Completion of the CE Module is equivalent to 4 contact hours which converts to .4 Continuing Education Units.

CONTINUING EDUCATION CERTIFICATE OF COMPLETION

A Continuing Education certificate will be provided to each participant after successful completion of the course requirements (post test and module evaluation) and payment of a processing fee. The Section on Geriatrics is a recognized component of the American Physical Therapy Association. The Section on Geriatrics has not applied to any state licensure agency for prior approval of this course. The module has all the components (content, objectives, qualified instructors, reference lists, and post test) which will allow participants to submit the certificate of completion to meet CE requirements in most chapters. Please seek individual approval for this course from the states of Texas, Ohio, Oklahoma, and Nevada.

Continuing Education Module

CLINICAL EDUCATION MODULE
HOW TO SUBMIT CEUS

To obtain CEUs for this continuing education module, after reading the module articles participants must complete the post-test on page 7, as well as the evaluation form on page 8. A processing fee of $15.00 for SOG members and $30.00 for nonmembers is required. To apply for CEUs send the post-test and the evaluation form to the Section on Geriatrics along with payment. Applications must be postmarked no later than March 1, 2009. Upon submission of materials and a passing score of 80% or higher on the post-test the Section will mail you a continuing education certificate for **.4** CEUs. Those with incomplete submissions will be notified via e-mail.

CERTIFIED EXERCISE EXPERT FOR AGING ADULTS (CEEAA)

The evidence for the benefits of an effective exercise program for the full spectrum of aging adults is overwhelming and the unique role of the physical therapist (PT) is unequivocal. Additional and intensive education is needed for PTs to incorporate evidence into practice in order to appropriately examine and to provide the quality of exercise that will provide optimal benefits for the aging adult. The Section on Geriatrics, in adopting the position that physical therapists should be THE exercise experts for aging adults, will be a leader in providing physical therapists with a mechanism to develop and demonstrate expertise in the design and delivery of effective exercise programs for aging adults.

Exercise Certification Series Course 1:
Introduction and Examination (Tests and Measures)

Exercise Certification Series Course 2:
Exercise Prescription, Consensus Guidelines

Exercise Certification Series Course 3:
Special Populations, Complementary Exercises, Motivation, Drug and Nutritional Considerations, Marketing

All PTs with the CEEAA credential will demonstrate expert clinical decision-making and skill in designing and applying an effective examination and exercise prescription and in measuring the effectiveness of exercise for all aging adults reflecting current evidence. The process to attain the credential of "Certified Exercise Expert for Aging Adults" is to complete a formal didactic education, supervised and mentored skills development, and home-based reflection and critical thinking. Three courses of 2 days each will address 3 different and increasingly complex aspects of exercise design and delivery. The 3 courses are designed to build on each other; however Courses 1 and 2 can be taken out of sequence.

There will be a home-based examination for Courses 1 and 2. A skills test for the content of the first 2 courses will be preformed on-site during Course 3. Following completion of all 3 courses, there will be a final, comprehensive, home-based examination. All home-based assessments must be completed within 6 weeks of taking the related course. A participant must achieve minimum criteria in both the skills and didactic assessments to progress to the next level. However, a person can elect to take a course without being tested.

THE UPCOMING COURSE DATES ARE:

MONTGOMERY, ALABAMA:
Course 1: March 28-29, 2009
Course 2: August 29-30, 2009
Course 3: October 17-18, 2009

SAN DIEGO, CA:
Course 1: July 18-19, 2009
Course 2: December 12-13, 2009
Course 3: CSM 2010

BOSTON, MASSACHUSETTS:
Course 1: Location and Dates in 2009 TBD
Course 2: Location and Dates in 2010 TBD
Course 3: Annual Conference 2010

FOR MORE INFORMATION PLEASE VISIT:
HTTP://WWW.GERIATRICSPT.ORG/

OR CONTACT THE SECTION OFFICE AT:
GERIATRICS@APTA.ORG

CARDIOVASCULAR AND PULMONARY CONTINUING EDUCATION UNIT POST TEST

INSTRUCTIONS : **To obtain CEUs for this continuing education unit, participants must read the articles and complete the post test as well as the evaluation form on the back of this page. See specific instructions for submission of the completed post test on next page. PLEASE CIRCLE THE CORRECT ANSWER FOR EACH QUESTION.**

1. Resistance training is appropriate for a patient with heart failure:

a. when the patient has auscultory findings of an S3 heart sound.
b. at an intensity that elicits an RPE of 15.
c. when they maintain a stable body weight.
d. because it causes ventricular remodeling.

2. Patients with compensated heart failure:

a. can tolerate vigorous physical activity.
b. have an increase in fluid volume.
c. often have signs or symptoms of fluid overload.
d. do not have changes in the renin-angiotensin -aldosterone system.

3. A goal of any antihypertensive medication is to:

a. reduce the myocardial oxygen demand and increase the supply.
b. increase the oxygen supply to the peripheral tissues.
c. reduce the myocardial tone and rate.
d. facilitate peripheral vasodilation.

4. The antihypertensive drug class that offers persons with hypertension the best protection from the risk of stroke or myocardial infarction is?

a. ACE inhibitors. b. diuretics.
c. beta blockers. d. angiotensin II receptor blockers.

5. You see a 75-year-old patient with a history of atherosclerosis, angina, and heart failure for exercise testing and prescription to improve endurance and strengthening. Your examination reveals the following results:

Observation: jugular venous distension and LE edema (+2)
Respiratory: no apparent SOB or dyspnea at rest
Auscultory findings: S3 heart sound; No murmurs
Work capacity: 7 METS
O2 saturation: 96% at rest and 91% during ambulation

Your exercise prescription may include which of the following:

a. Cycling at 80-90% max heart rate.
b. 60 minutes minimum of activity including circuit training for resistance exercise.
c. high resistance free weights (80% 1RM).
d. circuit weight training exercise at RPE 10-12.

6. **In prescribing an exercise program for a patient over 65 all of the following goals can be collectively addressed <u>except:</u>**

a. flexibility. b. balance.
c. strengthening. d. endurance.

7. Cardiovascular system changes in older patients that lead to a diminished ability to respond to changes in activity intensity are:

a. diminished baroreceptor response to adapt to pressure changes with activity and gravity.
b. accelerated cardiac conduction system.
c. increased maximal cardiac output.
d. increased peripheral vascular tone with position change.

8. Functional assessments differ from traditional measures because:

a. they target specific behaviors.
b. they address tasks a patient wishes to accomplish.
c. they address all the signs and symptoms the patient is complaining of.
d. they are specific to certain conditions.
e. A & B
f. B & D

9. Which of the following findings are most consistent with cardiogenic causes of dyspnea?

a. productive cough.
b. low oxygen saturation.
c. EKG detection of sinus rhythm.
d. bibasilar crackles.

10. If SBP drops during activity (inotropic incompetence), which compensatory physiologic response would most likely occur in order to maintain CO?

a. an increase in SV. b. a decrease in HR.
c. a decrease in SV. d. an increase in HR.

11. Narrowing of the arteries occurs with aging and atherosclerosis can result in:

a. decrease resistance to blood flow.
b. increase resistance to blood flow.
c. no change in resistance to blood flow.
d. change in the direction of blood flow.

12. An increase in the anterior-posterior diameter of the ribcage occurs with aging due to:

a. muscle weakness and osteoporosis.
b. less chest wall resistance and a decrease in the work of breathing.
c. loss of spine height and rib cage mobility.
d. an increase in elasticity and an increase in compliance of lung tissue.

13. The most accurate method of calculating target heart rate for exercise prescription is:

a. using the maximum heart rate formula.
b. using the heart rate reserve method.
c. factoring 50% of max HR.
d. factoring 60-80% of heart rate reserve method.

Continuing Education Module

CARDIOVASCULAR AND PULMONARY CE UNIT EVALUATION FORM

Please rate the following questions 1= strongly disagree 5= strongly agree

1.	The course material met the stated objectives	1	2	3	4	5
2.	The information will be useful in my practice	1	2	3	4	5
3.	The articles were well written and informative	1	2	3	4	5
4.	The authors were knowledgeable on this topic	1	2	3	4	5
5.	I am satisfied with this unit as a CE course	1	2	3	4	5
6.	I would like future CE courses in GeriNotes	1	2	3	4	5

Please offer any additional comments or suggestions for future topics below:

_____
_____
_____
_____

SUBMISSION FOR CONTINUING EDUCATION CREDITS

To obtain CEUs for these continuing education participants must complete the post test as well as the evaluation form on this page. Return page 7 and 8 with a processing fee of $15.00 for SOG members and $30.00 for non members. Submission must be postmarked no later than March 1, 2009. Upon submission of materials and a passing score of 80% or higher the Section will mail you a CEU certificate for .4 units. Those submitting incomplete material will be contacted via e-mail.

Name _____ **APTA Number** _____

Address _____

City _____ **State** _____ **Zip** _____

SOG member _____ **yes** _____ **no**

Professional designation ☐ **PT** ☐ **PTA**

E-Mail Address _____

Payment information ☐ **$15.00 for SOG members** ☐ **$30.00 for nonSOG members**

☐ **Check Enclosed**

Credit Card payment number _____

Expiration Date ____/_____

Signature _____

DEADLINE IS MARCH 1, 2009!

Mail to: **Section on Geriatrics**
1111 North Fairfax
Alexandria, VA 22314

PHYSIOLOGICAL CHANGES IN THE CARDIOVASCULAR AND PULMONARY SYSTEM WITH AGING: CAN THEY BE REVERSED BY EXERCISE?

Donna Frownfelter, PT, DPT, MA, CCS, RRT, FCCP; Dawn Stackowicz, PT, MS, CCS

Older Americans have exhibited the fastest growth rate in all subsets our population. Yet the expectation is that there will be even more rapid growth in the future when the Baby Boomers turn 65.[1] In the past, older Americans have been among the least physically active and have significantly higher expenditures for health care.[2] However, there has been a modest change in the Baby Boomers which shows a trend in more active lifestyles.[1] There is the hope that with more active lifestyles the cost of health care may decrease.[3] Ironically, this may also increase life span by preventing disease, thus rendering a different increase in costs due to the increased number of years of coverage.

Physical activity is considered a primary disease prevention measure for people of all ages.[4] Sedentary individuals, or those with physical inactivity, have a 2-fold greater decline in physical function compared to those who are physically active.[5] This enhances the physiological changes that occur naturally with aging. And as one becomes more inactive, there is less reserve energy and motivation to become active, further limiting baseline activity level. Physical activity can improve overall health and wellness, and combat a myriad of cardiovascular and pulmonary (CVP) disease processes. Hypertension (HTN), coronary artery disease (CAD), congestive heart failure (CHF), peripheral vascular disease (PVD), chronic obstructive pulmonary disease (COPD), the risk of myocardial infarction (MI), a cerebral vascular accident (CVA), or a pulmonary embolism (PE) or deep vein thrombosis (DVT) can all be decreased with physical activity and exercise.[4,5] There are countless other changes (anatomical, physiological, and functional) that are also affected by a lack of physical activity that should be considered, but are beyond the scope of this paper. This article will review the changes that occur in the CVP systems with aging, and will explain how the changes can affect physical therapy interventions.

CARDIOVASCULAR SYSTEM CHANGES WITH AGING

Structural, mechanical, and functional changes occur over time in the heart and the vessels. Hypertrophy of the myocardium itself, especially the left atria and ventricle, occur regardless of physical activity level with aging.[6-8] This can result in decreased left ventricular contraction and filling, which leads to a decrease in force and rate of blood pumped out to the body (disease example: left ventricle hypertrophy, CHF). With aging, the heart valves lose their elasticity and become calcified. This can result in a loose seal when the valve is closed (disease example: mitral valve regurgitation) or a decrease in diameter when the valve is open (disease example: aortic stenosis) which will restrict blood flow.[5,7,8]

The blood vessels (primarily, arteries) can narrow in diameter due to a decrease in elastin/increase in collagen fiber content, and from plaque build-up (disease example: atherosclerosis). The elastin-collagen content shift that occurs with aging and the increase in plaque build-up causes an increase in resistance to blood flow through the vessels. This can result in an increase in blood pressure and can limit oxygen rich blood flow to organs and tissue. The elastin-collagen content shift can also result in the vessels having a slower response time to changes in activity, and the ability to increase or decrease blood flow to meet the demands of the activity.[7,8]

Baroreceptors have a delayed response time with aging.[5-8] This can cause an increased risk for orthostatic hypotension to occur (1) after prolonged bed rest, (2) with fast position changes, and (3) with certain drug use (ie, beta-blockers, calcium channel blockers).[5] The pacemaker cells in the heart (sinoatrial node, atrioventricular node, bundle of His, bundle branches) have a decrease in frequency and regularity of cardiac conduction. This can cause altered ECG patterns and an altered heart contraction, which can result in hindered blood flow to the body and organs at rest, and more importantly, with physical activity and exercise [disease examples: atrial fibrillation, premature ventricular contractions (PVCs), 1st, 2nd, or 3rd degree heart blocks, bundle branch blocks (BBB)]. Decreased pacemaker cell frequency and conduction can also cause a decrease in response time to changes in position and activity levels.[5,8]

Cardiac output is the amount of blood discharged from the heart per minute. Cardiac output is calculated with the formula heart rate by stroke volume (CO = HR x SV). Resting CO stays the same with aging, but maximum CO can decrease by up to 30%.[5] A decrease in resting HR is one factor,[8] and a decrease in SV can occur due to the hypertrophied heart. This can cause the result in an overall decrease in CO during activity due to a combination of a decrease in HR, a decrease in SV from the hypertrophied left ventricle, and increase in vascular resistance.[7,8]

Table 1. Summary of Cardiovascular Changes

Structural, mechanical, functional	Response to Activity and Exercise
↑ Left ventricle hypertrophy	↓ blood flow to body
↑ Valve stiffness and stenosis	↓ or hindered blood flow to body
↓ Blood vessel diameter and stiffness	↑ resistance blood flow ↑ response time to activity peripherally
↓ Baroreceptors response	↑ risk orthostatic hypotension
↓ Pacemaker cells response	↓ or hindered blood flow to body ↑ response time to activity
↓ Cardiac Output	↓ blood flow to body

PULMONARY SYSTEM CHANGES

Structural, mechanical, and functional changes occur in the pulmonary system as well. There is an overall decrease in compliance and an increase in resistance in the rib cage and lung parenchyma with age.[7-9] Vertebral body and disc height decreases resulting in mild to severe thoracic kyphosis depending upon the individual. Costo-vertebral joints become stiff causing a decrease in ribcage expansion. To compensate for the loss of height in the spine and the decrease mobility of the ribcage, the thoracic cavity can increase in anterior-posterior diameter to accommodate for lung inflation (disease example: barrel chest, upper chest breather).[7-9] The muscles associated with breathing can become weak as the structural changes occur. This can also affect rib cage expansion. A decrease in muscle strength can increase the work of breathing and result in a less forceful cough needed for secretion expulsion (disease example: pneumonia, COPD).[9]

In the lungs, alveolar sacs and ducts increase in size resulting in dilation of air spaces (disease example: senile emphysema)[9] and a decrease in surface area for oxygen diffusion to occur. Small airways or bronchioles also have a shift in elastin-collagen content similar to blood vessels. More collagen replaces elastin causing a decrease in airway diameter and an increase in resistance to airflow. The elastin-collagen content shift also causes an increase in response time for dilation of airways for more demanding activities or exercise when more oxygen is needed.[7,8]

The thorax and lung tissue changes can cause an overall increase in the work of breathing due to the need to override the structural resistances. The body is unable to rely on normal lung expansion and increase in chest wall excursion with inhalation, which results in passive recoil of the rib cage and lung tissue with exhalation at rest and with low intensity activity.[7,8] This results in more energy needed to breathe at rest, but more importantly with increases in activity and with exercise as with each breath they need to overcome a greater amount of chest wall resistance.

In addition, lung volumes and capacities are affected with aging, too.[5,7,8] There is a decrease in forced expiratory volume (FEV) and forced expiratory volume in 1 second (FEV_1), and a shift occurs with lung capacities. Residual volume increases and expiratory volume decreases. This can result in anincrease of air trapping at the bases of the lungs and less oxygenation with respiration at rest and (especially) with activity. This becomes more pronounced with lung diseases (COPD) and decreases in physical activity.

ACTIVITY & EXERCISE RESPONSES

Now that we know the physiological changes that occur in the cardiovascular and pulmonary system, let us discuss how those changes can affect activity and exercise tolerance. In 1995, the Centers for Disease Control (CDC) issued a statement that the American College of Sports Medicine (ACSM) published: "Every US adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week."[10] Following this, there were concerns and discussions from the American Heart Association (AHA) and the ACSM which felt that the individuals personal health (ie, chronic conditions or impairments/functional limitations) should be taken into account when recommending activity.

In 1999, an expert interdisciplinary panel was brought together and supported by the International Life Sciences Institute. They read the literature and made recommendations for physical activity for older adults that addressed balance, aerobic activity, muscle strengthening, flexibility, and promotion of physical activity. The manuscript was then given to the AHA and the ASCM for review and approval. The panel gave recommendations for activity in individuals 65+ years of age with the components of the activity described. For balance impairments, "only exercise" was recommended. "Physical activity" was the term used to indicate other exercise programs and was the means to meet the general recommendations.[11] The ACSM and AHA made specific recommendations based on the review of the literature and the expert panel for the older adult (65+ years) and for adults 50-64 years who have chronic conditions that could significantly alter movement and exercise: "Regular physical activity, including aerobic activity and muscle-strengthening activity, is essential for healthy aging. This preventive recommendation specifies how older adults, by engaging in each recommended type of physical activity, can reduce the risk of chronic disease, premature mortality, functional limitations, and disability."[12]

Aerobic Activity

The recommendation is for moderate intensity physical activity for a minimum of 30 minutes on 5 days each week, or vigorous intensity for a minimum of 20 minutes 3 days a week. The level of intensity is according to the individuals' perception of effort. Using a 10 point scale, 0 being sitting and 10 all out effort, moderate intensity is considered a 5. Using the same scale, vigorous intensity would be a 7 or 8 and would produce large increases in HR and respiratory rates.

Using these guidelines as an example, the same activity of walking may be done slowly for one individual and

Table 2. Summary of Pulmonary Changes (based on above information)

Structural, mechanical, functional	Response to activity and exercise
Thoracic kyphosis, costo-vertebral joint stiffness → ↓ ribcage expansion	↓ lung expansion ↑ work of breathing
↓ respiratory muscle strength	↑work of breathing ↓ strength of cough
↓ surface area of lung tissue	↓ oxygenation of blood
↓ airway diameter and stiffness	↑ resistance air flow ↑ response time to activity
↓ lung compliance / ↑ lung stiffness	↑ work of breathing ↑ response time to activity
Altered lung volumes and capacities	↓ oxygenation of blood/air trapping

be considered moderate activity (a "5"). Walking may be done more quickly for others and only be considered a "2." These ratings of perception and abilities would be based on their current level of fitness/activity.

Muscle Strengthening Activities

The recommendation is to perform 8 to 10 exercises which use the major muscle groups on 2 or more nonconsecutive days per week. A resistance should be used that allows 10 to 15 repetitions. The perceived level of effort on the 10-point scale should be moderate to high. Progressive increases in weight training as tolerated are recommended. There was a strong recommendation that exercise above these levels be encouraged to provide additional health benefits if there is no condition that would make more activity a precaution. This may also help to prevent weight gain and achieve a good balance between diet and exercise.

Flexibility and Balance

Flexibility is necessary for all activities of daily living and being more active. The recommendation was for at least 2 days per week to perform activities that would help maintain or improve flexibility. Balance exercises are important to prevent the risk of falls in the elderly, especially individuals that may have problems in mobility or have had falls in the past.

Activity and Exercise Summary

When an elderly individual receives a physical therapy intervention, the activity prescription should be in addition to the exercise program. The person should be encouraged to be as physically active as they are able. The plan to increase physical activity should be gradual (ie, just start to do more than you are doing now, and then slowly continue to increase the activity and number of times that you are doing it). For example, when a person starts a walking program if they can only go 5 minutes, they can do that 6 times a day to get the 30 minutes accomplished. Then as they get to longer times walked, they can decrease the number of times they perform the activity. We need to understand that the individual with physical limitations or impairments will have a more difficult time with more activity, and need to support and encourage them as they strive to become more active.

MONITORING PHYSIOLOGICAL RESPONSE TO EXERCISE

Measuring perceived levels of exertion is a quick and easy way to measure intensity with activity. As mentioned above under Aerobic Activity, instructing individuals in the use of a 10-point scale of exertion, with 0 being sitting/resting and 10 all out activity, a 5 to 6 would constitute moderate activity, and an 8 to 9 would be more intense activity.

In addition, an individual can be taught how to take a heart rate and calculate a target heart rate range. As stated above, overall resting HR decreases with aging in sitting or standing; but in supine, HR stays the same.[8] The target heart rates in older adults may not be as effective when the maximum heart rate method is used compared to Karvonen's formula or Heart Rate Reserve method.[11] This is due to a ceiling effect that occurs when using the maximum heart rate formula of 220-age.

Let us use the example of a 75-year-old person with a resting heart rate of 94 bpm who desires to exercise at a 40% to 60% intensity. If the usual formula for resting heart rate was used (220-age) at 40% to 60% intensity, the maximum heart rate would be 58-87bpm (calculation: 220-75=145; 145 X 40% = 58 and 145 X 60 % = 87). The individual's resting heart rate range is already higher than the 40% to 60% intensity recommended.

With Karvonen's Formula or heart rate reserve (HRR) you take out the resting HR then add it back in at the end. The formula is [(HRmax - HRrest) x percent intensity] + HRrest. HRR range would be 114-124bpm at 40% to 60% intensity level activity (calculation: 220-75=145 → HRmax; 145 – 94 = 51; 51 X 40% = 20 and 51 X 60% = 30; 20 + 94 = 114 and 30 + 94 = 124). If performing at a 60% to 80% intensity, a HRR of 120-134 would be the target range.

Another consideration with exercise is that it takes longer to increase HR and SV in the elderly individual. There needs to be an extended warm up and cool down period. Often it will be noticed that HR will continue to rise after the activity is ended. Prior to exercise, it is suggested to do low level activity such as ankle pumps, upper extremity movements, slow bicycling without resistance, and/or other general low level activities. Ventilatory strategies can be used to encourage breathing with the given activity. The individual would be encouraged to do slow deep breathing and pursed lip breathing with the movement and activity. Taking trunk motion into account can also help. Performing trunk extension with inspiration and trunk flexion with exhalation can improve respiration and decrease the work of breathing during a warm up or cool down period.

CONCLUSION

Overall, the recommendation for exercise in the elderly is more focused on being active and encouraging a more active lifestyle than a specific exercise regimen. Regular adult aerobic activity is recommended at the 3 to 6 MET level or the 60% to 80% intensity level to obtain health and fitness goals. This requires a relatively aggressive effort for those with lower activity levels initially.[11] This may be impossible for some older individuals. In those cases, the recommendation is to slowly progress activity beginning where they are currently functioning. If they can only walk 5 minutes slowly, they can do it several times a day. As their tolerance increases, they can increase the distance and then decrease the number of times per day they walk. These individuals may benefit from a supervised exercise program where physiological monitoring is done to safely progress activity. The individual should then be taught how to self monitor and encouraged to progress the activity based on physiological response (HR) and the sense of perceived work on the 0 to 10 scale. All individuals also need to monitor and be aware of when changes occur. This allows for an increase or decrease in activity levels, or shows the need to seek medical help for deterioration of activity tolerance.

Older adults can improve levels of physical activity despite all the physiological changes that are occurring. For many people, encouraging a moderate but tolerable level of activity will result in attaining higher levels of activity. More intense activity may result in injury and lower adherence to continuing to be physically active.[11] So a gradual approach is generally most effective.

Ideally as a society we should focus early on with the recommendation of at least 30 minutes or more of moderate-intensity physical activity on most, preferably all days of the week, so that when we address activity in the elderly it is not a new concept but one that we have incorporated throughout our lifespan.

REFERENCES

1. Centers for Disease Control and Prevention. Prevalence of no leisure –time activity-35 States and the District of Columbia, 1988-2002. *MMWR.* 2004;53:82-86.
2. Centers for Disease Control and Prevention. Prevalence of physical activity, including lifestyle activities among adults-Unites States, 2000-2001. *MMWR.* 2003;52:764-769.
3. Martinez B, Crain A, Pronk N, O'Connor P, and Maciosek M. Changes in physical activity and short-term changes in health care charges: a prospective cohort study of older adults. *Prev. Med.* 2003;37:319-326.
4. Helfin MT. *Geriatric Health Maintenance.* Available at: www.uptodate.com version 16.2, January 22, 2008. Accessed on September 11, 2008.
5. Cafiero AC, Maritz AC. The impact of exercise on age-related physiological changes and pathological manifestations. *J Pharmacy Practice.* 2003;16:5-14.
6. Ferrari AU, Radaelli A, Centola M. Invited review: aging and the cardiovascular system. *J Appl Physiol.* 2003;95:2591-2597.
7. Protas EJ. The aging patient. In: Frownfelter D, Dean E. *Cardiovascular and Pulmonary Physical Therapy, Evidence and Practice.* 4th ed. Mosby; 2006.
8. Peel C, edited by Tecklin JS. Cardiopulmonary changes with aging. In: Irwin S, Tecklin JS, *Cardiopulmonary Physical Therapy, A Guide to Practice.* 4th ed. Mosby; 2004.
9. Sharma G, Goodwin J. Effect of aging on respiratory system physiology and immunology. *Clinical Intervention and Aging.* 2006;1:253-260.
10. Pate, R., Pratt M, Blair S, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Preventions and the American College of Sports Medicine. *JAMA.* 1995;273:402-407.
11. Franklin B, Whatey M, Howley E. *ACSM's Guidelines for Exercise Testing and Prescription.* 6th ed. City, state: Lippincott Williams & Wilkins; 2000:137-164.
12. Nelson ME, Rejeski WJ, Blair SN, et al. Physical Activity and Public Health in Older Adults: Recommendation from the American College of Sports Medicine and the American Heart Association, Medical Science in Sports & Exercise. *Med Sci Sports Exerc.* 2007;39:1435-1445.

St. Catherine's Rehabilitation Hospital and Villa Maria Nursing Center, Miami FL
Residency in Geriatric Physical Therapy
Do you want to specialize in geriatrics but don't know how to start?

Our residency in geriatric physical therapy is a unique opportunity for you to develop skills in a mentored environment The program is the first fully credentialed geriatric residency in PT in the United States. The year-long program offers therapists the ability to gain structured experiences in a variety of settings. Residents are mentored by expert faculty, including six board certified geriatric specialists. Additionally, residents take applicable courses on-site through our partnership with University of Miami. There is no tuition and residents earn a salary with benefits. Residency graduates will be prepared to sit for the GCS exam. For an application or further information, please visit our website at www.catholichealthservices.org Alternatively, you may write to: Residency Program Coordinator, Physical Therapy Department, St Catherine's Rehab Hospital, 1050 NE 125th St., North Miami, FL 33161 or call 305-891-8850 ext. 4283.

Applications are accepted year round.

APTA
American Physical Therapy Association

Donna Frownfelter is an Assistant Professor at Rosalind Franklin University of Medicine and Science, The College of Health Professions. She is also an Adjunct Clinical Instructor at Northwestern University in the Department of Physical Therapy and Human Movement Science. She has taught Cardiovascular and Pulmonary Physical Therapy for 30 years. She is on the Board of Directors at the Respiratory Health Association of Metropolitan Chicago and was appointed a Fellow of the American College of Chest Physicians. Dr. Frownfelter is co-author with Elizabeth Dean of a widely used textbook, Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice, 4th Edition, Mosby, 2006 and Co-editor with Marilyn Moffat of Cardiovascular and Pulmonary Essentials, Slack, C. 2007.

Dawn Stackowicz is a Physical Therapy Supervisor at Stroger Hospital of Cook County in Chicago, IL. Her area of interest and patient interactions are in critical and acute care with adults of all ages. She is also adjunct faculty at Governors State University's Physical Therapy Program where she teaches Exercise Physiology; has co-authored a chapter in Cardiovascular and Pulmonary Essentials, Slack, C. 2007; and is the APTA Cardiovascular and Pulmonary Section's Membership Chair.

STANDARDIZED TESTS & MEASURES YOU CAN USE WITH CARDIOVASCULAR PATIENTS

Ellen R. Strunk, PT, GCS

Every day, we are bombarded with news that negatively reflects on the practice of physical therapy. Reports of insufficient documentation, medically unnecessary services, and incorrect coding are found too often when reading Medicare and other payer's reports. All of these things added together might make some conclude there is not much value to physical therapy services in older adults with chronic conditions.

Examples of these reports: In June 2005 in its report to Congress on the health of Medicare, MedPAC stated there had been "little progress made in targeting outpatient therapy payments to beneficiaries' needs." They cited data to support an increase in services and acknowledged that some of the increase may have been due to factors such as growth in use of therapy services, direct-to-consumer advertising, shifts in the site of care, and adherence to clinical guidelines that call for more intensive treatment of chronic illness. They also concluded, however, that these factors were not likely the only reason for increased payments. MedPAC went on to question if the increase in therapy utilization corresponded with an increase in quality of care or if the overuse might have negatively affected the quality of care.[1] There is an OIG report to support this conclusion.[2] The OIG found that even under the restrictive therapy caps implemented in 1999, about 12% of physical therapy services provided to patients in a skilled nursing facility (SNF) were not medically necessary because the services furnished did not match the patient's conditions or the services provided did not match the treatment goals.

The Government Accounting Office (GAO) published a report in November 2005 that concluded while Medicare payments for outpatient therapy services were rising there was also an increase in the number of improper payments for outpatient therapy.[3]

In May 2007, the Office of Inspector General published *"Review of Rehabilitation Services at Skilled Nursing Facilities – Avante at Leesburg.[4]"* This report documented that one out of every five (20%) RUG payments to this skilled nursing facility in Florida were not medically necessary at the level billed by the SNF.

On August 29, 2007 CMS released the Home Health Prospective Payment System (HH PPS) Refinement & Rate Update for Calendar Year 2008. In this rule, CMS noted there had been an 11.75% increase in the case-mix of patients since the inception of the PPS system. They asserted that this was not due to an underlying change in the health status of Medicare home health patients, but was more likely due to suspect coding practices and abusive behavior, such as providing 10 to 12 therapy visits in order to achieve the highest case mix payment rate, not necessarily because they were medically necessary.[5]

In the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA), the Congress mandated that MedPAC study the feasibility and advisability of allowing Medicare beneficiaries "direct access" to outpatient physical therapy services. They sent their opinion in December 2004 to the Senate, advising against making any change to the physician certification requirement. One of the reasons they gave for their decision was the high incidence of medically unnecessary services.[6] They argued that physician oversight helped to insure that patients who could benefit from therapy were appropriately referred and recertified. MedPAC went on to provide other suggestions, however, that would also insure the provision of appropriate therapy services. The first was the need for evidence-based research. They pointed to the lack of evidence on when older patients might benefit from PT, what type of conditions would benefit the most, and how much PT is an effective amount. MedPAC acknowledged the American Physical Therapy Association's (APTA) initiatives to disseminate information about the effectiveness of physical therapy services. Hooked on Evidence was cited as an information repository for APTA members that summarize peer-reviewed literature on treatment effectiveness.

Are there articles in Hooked on Evidence supporting the efficacy of physical therapy for patients with cardiovascular conditions?

Yes! As of September 28, 2008, a search of the keyword 'cardiac' resulted in 85 reviews; a search of the keyword 'cardiac rehabilitation' resulted in 43 reviews; "hypertension' resulted in 17 reviews; 'six minute walk test' resulted in 4 reviews.

How can we better demonstrate the efficacy of physical therapy services to payers?

One way is through better documentation of services. In this author's opinion, the conclusions drawn by the reports mentioned earlier that a large percentage of physical therapy services are 'medically unnecessary' is simply not true. However, the truth is they had only the documentation in front of them from which to make that conclusion. Are physical therapists as a group excellent at documentation? Unfortunately not. Are physical therapists as a group successful at using functional outcome tools to measure the value of the service they provide? Unfortunately the answer to that question is no as well.

Did you know the Medicare Benefit Policy Manual specifically addresses the use of functional assessment tests in an evaluation for physical therapy services?

It is true. Chapter 15 of the Medicare Benefit Manual addresses documentation requirements for the evaluation for therapy services in section 220.3.C.[7] It states *"The initial evaluation, or the plan of care including an evaluation, should document the necessity for a course of therapy through objective findings… Utilize the guidelines of the American Physical Therapy Association…"* In the *Guide to Physical Therapist Practice*, there is a whole chapter (Chapter 2) dedicated to describing what type of tests and measures physical therapists use. Many of these are relevant

Table 1.

Test	Description	Equipment	Scoring Protocol	Norms
6MWT	• Originally developed as an alternative to treadmill testing and is a good test to use when ambulation distance improvement is a goal and endurance/activity tolerance is an issue. It can be used with a variety of patient populations (i.e. healthy, frail, Alzheimer's) since walking is a basic activity familiar to all. • Test-retest reliability: strong (0.95) • Validity: moderate correlation (0.5 – 0.6) to chair stands, tandem standing balance & gait speed. • Harada ND, Chiu V, & Stewart AL (1999). Mobility related function in older adults: Assessment with a six-minute walk test. Archives of Physical med & Rehab, 80, 837-841.	• Stopwatch • Tape measure • Track/loop walkway • Portable chair • Borg RPE • Stethoscope & BP cuff	• Monitor BP, HR & RPE before, during & after test • Patient walks for 6 minutes • Record the distance walked • If h/she can't walk for 6 min, the test is stopped & distance & time are recorded • Patient can take as many rest breaks as needed • Total distance walked is recorded	• Minimally clinical important difference (MCID) 50-70 m / 164-230 ft • Lusardi M (2003) Functional Performance in Community Living Older Adults. Journal of Geriatric Physical Therapy 26;3;14-22. 76 participants; mean age: 83 +/- 8 yrs; distances of 735 to 1,634 ft. Her results are divided into age groups 60-69, 70-79, 80-89 & 90-101 yo. • Steffen T (2002). Age and Gender Related test Performance in Community-Dwelling elderly People: 6MW Test, BBS, TUG, and Gait Speed. Physical Therapy, Vol 82, No. 2, Feb 2002. 96 participants; distances of 1,286 to 1,877 feet. His results are divided into age groups 60-69, 70-79, 80-89 yo.
	• The 6MWT can be used as a predictor of VO2 max by multiplying the distance (in meters) walked by 0.03; then add 3.98. (Cahalin LP (1996). The six minute walk test predicts peak oxygen uptake and survival in patients with advanced heart failure. Chest 110; 325-332) • Patients with 6 minute walk distances of < 300 meters (984 feet) have both a poorer short term and long term survival rate. (Bittner, V. (1993). Prediction of mortality and morbidity with a 6-minute walk test in patients with left ventricular dysfunction. JAMA 270; 1702-1707.)			
RPE	• A measure of the perceived exertion during exercise & other functional tasks	• Visual graph of Borg's RPE for the patient to refer to when grading exercise intensity	• Patient is asked to rate h/her perceived exertion on visual scale with values ranging from 6 to 20 during or immediately following activity.	• 6-7= very, very light • 8-9 = very light • 10-11 = fairly light • 12-13 = somewhat hard • 14-15 = hard • 16-17 = very hard • 18-20 = very, very hard • Borg G (1982) Psychophysical basis of perceived exertion. Med Sci Sports Exercise, 14(5), 377-381.
	• The ratings correspond to measures of heart rate maximum and VO2 maximum values which allows the therapist to evaluate the intensity of the program established for the patient • Generally RPE scores between 11 & 14 are within an appropriate range for elderly patients and indicates a moderate exercise intensity			
SST	• A measure of exercise tolerance, fitness for activity that is less intense than submaximal treadmill & bicycle ergometer testing • This test is effective test for aerobic capacity/endurance for patients who might be wheelchair-bound or have difficulty standing.	• Steps or bars measuring 6 inches, 12 inches & 18 inches off the floor • Stopwatch • Stethoscope & BP cuff	• The tester chooses one of 4 cardiovascular stages in which to start the patient – based on which will be the least taxing for the patient. • HR & BP are monitored initially & at 2 minutes • If the HR remains <75% (<60% for frail elderly) of age predicted max at 2 min, continue for additional 5 min • If the HR remains <75% (<60% for frail elderly) of age predicted max after 5 min, go to next stage	• No established norms • Progress can be measured by (1) advancement to the next stage or (2) improvement of vital signs within a stage • Smith & Gilligan. (1983). Physical activity for the older adults. Physician & Sportsmedicine, 11(8), 91-101.
	• The four stages of the test are correlated to MET levels • The test is stopped if the HRmax rises above parameters or BP is not responding appropriately			
SFT	• A battery of 6 task performance test items that were designed to assess the physiologic parameters associated with independent functioning – including aerobic endurance	• 30 second chair stand • Arm curl • 6-minute walk • 2-minute step in place (alternative to 6MWT) • Chair sit & reach • Back scratch • 8 foot up & go • Body mass index	• Some items allow for 1 practice trial, then score the next trial • Some items allow for 2 practice trials, then take the best of the next 2 performances	Found in: • Rikli R & Jones CJ. Functional Fitness Normative Scores for community-Residing Older Adults, Ages 60-94. Journal of Aging & Physical Activity. 1999, 7, 162-181. • Rikli R & Jones CJ. Senior Fitness Test Manual. 2001. http://www.exrx.net/Store/HK/ SeniorFitnessTestManual.html

to the focus of this *GeriNotes* issue, such as Aerobic Capacity/Endurance and Circulation measures, in addition to the more traditional measures of physical therapy.

Section 220.3.C goes on to say, *"Documentation of the evaluation should list the conditions and complexities and, where it is not obvious, describe the impact of the conditions and complexities on the prognosis and/or the plan for treatment such that it is clear to the contractor who may review the record that the services planned are appropriate for the individual."* What better way to illustrate the need for physical therapy for patients with cardiovascular conditions than to use tests and measures that are specific to those conditions and have research to back up their appropriateness for these conditions? In this section, Medicare emphasizes the need for *"measurement instruments"* in the evaluation. While they recommend using one of 4 instruments (NOMS, OPTIMAL, AM-PAC, or FOTO), Medicare says (underlines added) that *"if results of one of the four instruments above is not recorded, the record shall contain instead the following information…functional assessment individual item and summary scores… from commercially available therapy outcomes instruments…or functional assessment scores…from tests and measurements validated in the professional literature that are appropriate for the condition/function being measured; or other measurable progress towards identified goals for functioning in the home environment at the conclusion of this therapy episode of care."* In fact the chapter provides an example of how to document to support illness severity or complexity. The example they use is for a patient with cardiac dysrhythmia: *"Cardiac dysrhythmia is not a condition for which a therapist would directly treat a patient, but in some patients such dysrhythmias may so directly and significantly affect the pace of progress in treatment for other conditions…Documentation should indicate how the progress was affected by the complexity. Or the severity of the patient's condition as reported on a functional measurement tool may be so great as to suggest extended treatment is anticipated."*

What are functional assessments and how do they differ from traditional physical therapy measures?

Functional assessments are different from traditional measures because they target specific behaviors and tasks a patient wishes to accomplish.[8] If you ask any physical therapist what the goal of rehabilitation is, almost all will answer it is to help patients achieve their highest level of function. However, many goals written by PTs focus more on signs and symptoms of the patient's condition, rather than how that whole person will function in his/her environment after discharge from therapy. Completing functional assessments provide a benchmark against which the patient's progress can be measured.

What tests and measures exist for patients with cardiac conditions? Are they easy to use in the skilled nursing and home health settings?

This author would answer "Yes" to both questions as I have had the opportunity to use some of them with patients.

Suggested tests and measures for patients with cardiac conditions (Cardiovascular/Pulmonary Pattern D: Impaired Aerobic Capacity/ Endurance associated with cardiovascular pump dysfunction or failure):

- **Six Minute Walk Test (6MWT)**
- **Rating of Perceived Exertion (RPE)**
- **Seated Step Test (SST)**
- **Senior Fitness Test (SFT)**

See Table 1.

Blood pressure (BP) and heart rate (HR) should always be monitored in patients within this Impairment Pattern. They provide justification for the skilled nature of the physical therapy treatment and insure the patient is challenged appropriately by the therapy activity; ie, not under-challenged and not over-challenged. Oxygen saturation is also beneficial to monitor if you have access to the equipment.

SUMMARY

Finding ways to effectively assess and document key physiologic parameters that support functional mobility in older adults can be challenging for physical therapists. However research over the last several years has yielded many new tools for the clinician. *It is now our responsibility to use them*. Documentation is so critical--not only to payment--but also to advocacy for our profession. With all the scrutiny being placed on the value of our services, we need to find ways every day--*in every note*--to illustrate the value of what it is we do to help older adults attain that quality of life they are seeking.

REFERENCES

1. Medicare: Little Progress Made in Targeting Outpatient Therapy Payments to Beneficiaries' Needs. MedPAC June 2005.
2. Office of the Inspector General, Department of Health and Human Services. 2001b. Physical, occupational, and speech therapy for Medicare nursing home patients: Medical necessity, cost, and documentation under the $1,500 caps. Washington, DC: OIG. Report no. OEI-09-99-00560 and Office of the Inspector General, op. cit., 2001a.
3. Medicare payments for outpatient therapy are still rising significantly, and increases in improper payments for outpatient therapy continue. GAO-06-59 November 10, 2005.
4. Review of Rehabilitation Services at Skilled Nursing Facilities – Avante at Leesburg. May 2007. A=06-06-00107.
5. CMS-1541-FC. Home Health Prospective Payment System Refinement & Rate Update for Calendar Year 2008. August 29, 2007.
6. MedPAC letter to the Honorable Richard B. Cheney, President of the Senate. December 30, 2004.
7. Medicare Benefit Manual, 100-2; Chapter 15-Covered Health & Other Medicare Services; Section 220.3 - Documentation Requirements for Therapy Services. Available at: http://www.cms.hhs.gov/manuals/Downloads/bp102c15.pdf. Accessed October 3, 2008.
8. Bottomley JM, Lewis CB. Geriatric Rehabilitation: A Clinical Approach. 2nd ed. Upper Saddle River, NJ: Prentice Hall; 2003:159.

Ellen Strunk is Managing Director for Restore Outpatient Services and Restore Staffing Solutions. She works in skilled nursing facilities, home health and assisted living facilities, and outpatient settings.

CALL FOR NOMINATIONS FOR SECTION ON GERIATRICS AWARDS NEW DEADLINE DECEMBER 1st

AWARDS

Clinical Educator Award
This award recognizes a physical therapist or physical therapist assistant for outstanding work as a clinical educator in the geriatric health care setting.

Clinical Excellence In Geriatrics Award
This award recognizes a physical therapist for outstanding clinical practice in geriatric health care settings. Any current member of the Section on Geriatrics may nominate a physical therapist who meets the award criteria.

Distinguished Educator Award
The intent of this award is to recognize a Section on Geriatrics member for excellence in teaching.

Joan Mills Award
This award, established in 1980 in honor of the Section on GeriatricsÕ first President, Joan M. Mills, is presented to a member who has given outstanding service to the Section.

Lynn Phillippi Advocacy for Older Adults Award
This award recognizes projects or programs in clinical practice, educational, or administrative settings which provide strong models of effective advocacy for older adults by challenging and changing ageism. A member of the Section on Geriatrics must nominate individuals or organizations whose advocacy for older adults meets the intent and criteria of the award.

Outstanding Physical Therapist Assistant Award
This award recognizes a physical therapist assistant who has significantly impacted physical therapy care in geriatric practice settings. To be eligible for this award, the nominee must be an advocate for older adults, a current member of the Section on Geriatrics, have been involved in clinical practice in geriatric settings for a minimum of 5 years, and demonstrate exemplary care and innovative teamwork in meeting the physical therapy needs of older adults.

Volunteers in Action Community Service Award
The intent of this award is to highlight the significant contributions in prevention and/or intervention for elders in typically underserved populations. This may include, but is not limited to work with elders who are homeless, who are homebound, live in very rural areas, live in poverty, or those of ethnic groups facing significant cultural barriers to necessary health care.

RESEARCH AWARDS

Adopt-A-Doc Award
The purpose of the Section on Geriatrics Adopt-A-Doc program is to provide support to doctoral students interested in pursuing faculty positions in physical therapy education.

Excellence in Geriatric Research Award
The individual nominated must be a physical therapist who has been the author (or co-author) of a paper dealing with clinical geriatric physical therapy research. This paper must have been published in a recognized journal (eg, *Physical Therapy*, *Journal of American Geriatric Society*, etc.) November 2002 and May 2004.

Fellowship for Geriatric Research
This Fellowship is intended to provide partial financial support to physical therapists pursuing research in geriatrics. The research may be conducted as part of either a formal post-entry level academic program or a mentorship with an established investigator. The Fellowship applicant must be a physical therapist who is a current member of the Section on Geriatrics.

Student Research Award
This award is intended to facilitate interest in geriatric research among entry-level physical therapy students. The award recognizes outstanding research-related activity completed by entry-level physical therapy students. A member of the Section on Geriatrics must nominate the entry-level student. The nominator will submit a letter of support which addresses the extent of the studentÕs involvement in the research process (during a period not to exceed more than 2 years of graduation from an entry-level program).

The Deadline for
ALL AWARDS NOMINATIONS IS EXTENDED
to DECEMBER, 1 2008.

We ask that all submissions be received electronically: no paper, please. For additional information on the criteria and selection process for section awards, please visit the Section on Geriatrics web site at www.geriatricspt.org or contact the office by email at geriatrics@apta.org or by phone at 800/999-2782 ext 3238.

See – www.geriatricspt.org – for Details.

ANTIHYPERTENSIVE MEDICATION USE WITH THE ELDERLY

Jennifer M Ryan, PT, MS, DPT, CCS

INTRODUCTION

As a function of the clinical decision making that occurs in response to the patient's physiological response during a physical therapist's examination and intervention the physical therapist serves many roles in a patient's recovery and wellness. Exercise prescription and progression in aging persons with acute and chronic diseases, like hypertension (HTN), are interventions that require a heightened awareness of the risks and benefits of that intervention in relation to the patient's past medical history, present medications and ongoing response to exercise. Rarely will a patient consult a physical therapist for management of their HTN, but often patients present with HTN as a comorbidity for which there are specific exercise considerations and medications taken that can alter a patient's response to exercise. This paper is intended to give the reader an enhanced knowledge of the common medication classifications used to manage HTN and how that can impact an aging patient's safety and exercise tolerance.

INCIDENCE OF HTN

Hypertension is classified by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure as, Stage I if their Systolic Blood Pressure (SBP) is 140-159 mmHg and Stage II if the SBP is ≥160 mmHg.[1]. Dependent upon the other risk factors that present they are classified as being at a higher or lower risk for complications due to either stage of HTN. According to the Centers of Disease Control (CDC) an estimated 30% of Americans have HTN, and 28% have prehypertension, 120-139/80-89 mmHg, for which many do not realize that they have the disease due to a lack of symptoms.[2] Because of the lack of symptoms HTN is often not diagnosed until the patient begins to develop deficits or have secondary vascular injuries like a cerebrovascular accident (CVA).[3]

Franklin et al[4] investigated the incidence of systolic HTN as persons age as part of the Framingham Heart Study, and found that the risk of isolated systolic HTN grows exponentially from the fourth to the eighth decade. Where in the fourth decade there is a 20% to 25% risk and in the eighth decade there is a 90% to 95% chance of isolated systolic HTN.[4] The potential for a person to have HTN-related limits to their exercise tolerance is important to be aware of for all persons, but especially for those at greater risk, the group of ≥60 years old.

Another critical finding to be aware of is that from the research of Weycker, et al.[5] Their results of a review of the electronic medical records of 10, 345 patients with Stage I and Stage II HTN who were on antihypertensive medication found that after 360 days of tracking, 37% of persons with Stage I HTN and 48% of persons with Stage II HTN were still not controlled to have a blood pressure of less than 140/90 mmHg.[5] The measurement of vital signs upon initial physical therapist examination and with progressive exercise intervention is critical to aid the physician in protection of a patient from negative sequelae from HTN.[5]

Though this article focus is on the prevalence and impact of antihypertensive medications in aging populations the complete understanding of our role as physical therapists with patients in this diagnostic category is not fully appreciated unless there is mention of vital sign monitoring. Vital sign monitoring is imperative during physical therapist examination and intervention for multiple reasons. One consideration specific to persons as they age is to know that your patient who is seeking your professional service post a total knee replacement, for example, is not asymptomatically hypertensive, knowing that HTN does not have specific symptoms and that the incidence of HTN grows from decade to decade. Another reason is to know that the medication that they are taking is working to protect them from risk of stroke and MI by keeping them in the normotensive range, less than 140/80 mmHg[5] at rest. And, lastly the reason most specific to our profession is to measure their vital signs to determine that the dose of the medication is appropriate to allow them a safe exercise response so that they can be able to participate in professionally prescribed exercise programs and perform ADL's safely. While we do not prescribe medications to patients, our input can greatly aid physicians in properly dosing medications when we communicate the blood pressure, heart rate and rhythm responses of the patient during guided exercise activities.

DRUG CLASSES

According to Grimes and Cohen[6] the ischemic risk of HTN is lessened when blood pressure management is achieved through either decreasing the myocardial oxygen demand or increasing myocardial oxygen supply, or both.[6] Myocardial oxygen demand is decreased with diuretics, beta blockers, angiotensin converting enzyme inhibitors (ACE Inhibitors), and angiotensin receptor blockers (ARB's) alone or in combinations. Increased myocardial oxygen supply is achieved with calcium channel blockers, blood thinners, thrombolytics, and nitrates.

Decreasing myocardial oxygen demand-Diuretics

There are 2 primary classes of diuretics that are used for patients with HTN. The mechanisms of action are different but the outcome is similar, they both limit sodium concentration in the body to decrease intravascular fluid volume which will alter the pressure within the system.

The thiazide diuretics are usually prescribed alone initially for patients with Stage I HTN while those with Stage II will often be prescribed a thiazide diuretic in combination with other

medications. The Systolic Hypertension in the Elderly Program (SHEP), found that the treatment of systolic HTN of 160 mmHg or greater and diastolic BP of 90 mmHg or less with diuretic therapy resulted in a 36% reduction in stroke, a 27% reduction in coronary heart disease and a 55% decrease in heart failure compared to placebos.[7] The pharmacodynamics of the thiazide diuretics, or how it changes the patient's physiological function, is that it affects the renal function at the distal convoluted tubule to cause increased volume of urine by inhibiting the Na+-Cl- symporter.[8] Because of this specific mechanism, the thiazide diuretics are not as effective with persons whose glomerular filtration rate (GFR) is <30mL/min. The GFR is a measure of renal function and is determined with the creatnine clearance test. A key consideration for physical therapists is that thiazide diuretics cause a greater loss of potassium into the urine than other diuretics, so the patient should be on supplemental potassium in order to safely protect them from hypokalemia-related muscle cramping and cardiac arrhythmias. [7]

The other common category of diuretic is the Loop diuretics for which the most common example is Lasix.[7] The pharmacodynamics of this category is an effect on the renal system at the distal tubule in the Loop of Henle which impedes the reabsorbtion of sodium and facilitates urine volume production. Because this drug classification is so dependent upon sufficient renal function, patients with impaired renal function do not gain the same benefit as those with healthy renal function. Also, like the thiazide diuretics, they require potassium supplementation to avoid hypokalemia.[7]

The frequency of serum ion level measuring was investigated in a cohort of patients over 75 years of age who were on diuretic therapy for at least one year to determine which populations were least often monitored for ion imbalances while receiving diuretic therapy.[9] Their rationale was stated, "Because the elderly are often treated by multiple-drug regimens, their iatrogenic risks are considerably raised." [9] These investigators found that in the over 10,000 patients who were studied 24.8% were not monitored. The patients who were female and had one prescriber of their diuretic who was a noncardiologist male over 50 years of age were most likely to fall into this 24.8%.[9]

This category of medications can put an aging patient at an increased risk of hypovolemia compared to a younger patient on the same medication due to baseline changes with age of decreased intravascular volume, and increased arterial stiffness with impaired vasoreactivity and increased effect of the medication[10] (See Frownfelter and Stackowicz article). Even when the dosage remains the same, an alteration in the patient's diet or a polypharmacy-related effect may lead to hypovolemia and subsequent orthostatic hypotension, dizziness with position change, and an increased risk of falling. Awareness of your patient's symptoms, correlated with the signs of HR and BP during activity can increase the safety of the patient greatly. There is much evidence to support blood pressure management in aging populations to reduce the risk of stroke, myocardial infarction, cognitive impairment and heart failure[8,10] but until these benefits are weighed out with the risks of limiting blood pressure it is important that frequent monitoring of the blood pressure management and the subsequent side effects of the medications happens at all levels of care.[10]

Decreasing Myocardial Oxygen Demand-Beta Blockers

Long thought to be the best first line medication to manage HTN beta blockers are now being found to have equivocal and sometimes deleterious effects on patients when used alone[11] when the results of many studies are re-reviewed. In that same article survey results were cited regarding physicians' perceptions of the role beta blockers serve to reduce the risk of stroke and mortality due to HTN, in both questions the majority thought beta blockers to offer patients the best results[11]. Beta blockers are still demonstrated to have a cadioprotective effect on patients with heart failure (HF) and are recommended for most cases of HF.[11]

Beta blockers are named such because they block the sympathetic, or adrenergic, receptors in the heart (beta-1) and bronchiolar smooth muscle (beta-2). The medications to control hypertension are usually focused on the beta-1 selective mechanism to avoid bronchiolar constriction and negative pulmonary responses while trying to control HTN.[12] When the beta-1 selective receptors are inhibited the myocardium decreases its tone and the heart rate is slowed. Together these decrease the systolic blood pressure by limiting the HR and contractility of the heart. This will lessen a person's HR and blood pressure response to exercise as well. The dose of the medication should be determined partly on the input of the physical therapist who conveys the signs of HR and BP change with activity in relation to the symptoms and activity tolerance demonstrated by the patient. If a patient is still acutely ill their physician may still be determining the appropriate dose and they will need to know if any changes in their dosing have a negative or positive impact on their activity tolerance.

One caveat to consider with patients who are taking beta blockers is to be mindful that some of the signs and symptoms that a person demonstrates are driven by the sympathetic nervous system. Because adrenergic (catecholamine-mediated) receptors are blocked with beta-1 and or 2 selective medications the neurogenic symptoms of hypoglycemia can be masked, specifically: tremor, palpitations, and anxiety.

Decreasing Myocardial Oxygen Demand -ACE Inhibitors

According to Ciccone's textbook of Pharmacology in Rehabilitation[12] the Angiotensin Converting Enzyme Inhibitors (ACE Inhibitors) work to limit the amount of Angiotensin II in the circulating blood due to its vasoconstrictive nature. The Renin Angiotensin Aldosterone System (RAAS) (See Huber and Phillips article) is dependent upon sufficient renal function to produce renin so that it can react with angiotensinogen which is a product of the liver. The result of this interaction is Angiotensin I. When Angiotensin I it interacts with the appropriately named Angiotensin Converting Enzyme in the vessels, primarily in the lungs, Angiotensin II is produced. The result is significant vasoconstriction and an increase in the afterload of the heart. See Huber and Philip's article regarding the physiologic responses that result from levels of Angiotensin II in the system and how these are deleterious to patients with HTN.

When ACE Inhibitors are used the patient's blood pressure is lessened by reducing the peripheral vascular resistance due to the systemic vasodilation. In the younger patient there is a risk of a reflex tachycardia because of the baroreceptor response to correct the drop in blood pressure but in an aging patient this is less likely due to the diminished response of the baroreceptors with aging[12] (See Frownfelter and Stackowicz). The concern lies in that they may be at a greater risk of dizziness and postural hypotension if the dose is too aggressive because of that dampened mechanism. The CVP system when fully dilated has a much greater capacity than the amount of blood in the system at anyone time, hence the reason for blood shunting with activity and the venous role as capacitance vessels.[6] When those mechanisms are hindered there is reason to cautiously alter the system with a medication and even greater reason to monitor the patient through progressions of activity intensity.

Decreasing Myocardial Oxygen Demand -ARB's

The most common complaint of patients in relation to their ACE Inhibitor is that they often present with an irritating cough. While this is not known to be detrimental and may be linked to the fact that Angiotensin II is found in larger concentrations in some areas of the body more than others, one if which is the lungs, it leads patients to want to stop taking their medication.[12] Rather than revert to the beta blockers that are being found to have so few benefits compared to risks, Angiotensin II Receptor Blockers (ARB's) can offer a patient the same HTN management and neuroprotective effect of an ACE Inhibitor without the nagging cough. Their mechanism of action is in the step just after ACE Inhibitors. The ARB's effect is to limit the Angiotensin II binding to sites endovascularly and in the tissues. This not only prohibits the development of endovascular hypertrophy but it also limits the build up of sodium and fluid retention as in the ACE Inhibitors.[10,12]

Pedelty and Gorelick speak to the potentially neuroprotective effects of managing HTN through the RAAS. "Overall, available evidence demonstrates a strong protective effect for blood pressure lowering on the risk for stroke and associated cognitive impairment in the elderly." [10]

Decreasing Myocardial Oxygen Demand -Nitrates

Usually used in higher concentrations with critical HTN or to manage angina, the nitrates are a class of drug that limits myocardial oxygen consumption (MVO_2) by decreasing the afterload of the heart with peripheral vasodilation. This is often done aggressively for the sake of lowering blood pressure rapidly, but sometimes it is to manage angina.[12] According to Ciccone this rapid drop in PVR can cause similar changes to the ACE Inhibitors when they create peripheral vasodilation.[12] As patients age they do lose some of their ability to shunt blood rapidly to adapt to changes in position and activity intensity hence a reason to monitor their response before they demonstrate critical symptoms.

Decreasing Myocardial Oxygen Demand -Calcium Channel Blockers

The anatomy and physiology of the myocardium is unique from other muscles in that it has reserves of calcium available for depolarization contractions in the T Tubules.[12] The function of calcium is to initiate contraction in vascular smooth muscle similarly to skeletal muscle. The blockage of any of these receptors will result in decreased afterload, but can sometimes cause lower extremity (LE) edema as a negative side effect.[12] In comparison to drug regimens of combined beta blockers and diuretic therapy there was not a significant difference in the total mortality or the sum of major cardiac events.[13]

Increasing Myocardial Oxygen Supply-Thrombolytics

When a blood clot forms in an artery it creates a critical need to remove it before the tissue that it perfuses grows necrotic. This is most often seen in cases of acute coronary syndromes and neurovascular compromise. In cases of acute coronary syndrome the risk to the myocardium is critical and immediate intraarterial dissolution of the clot is necessary. These are not a class of medication that is part of non-critical antihypertensive management.

Blood Thinners (Anticoagulants and Antiplatelets)

Warfarin, coumadin, is rarely used in the management of HTN unless there are other risk factors that predispose a person to blood clot formation. The risks included with coumadin are too great for the benefit accrued. Patients are often put on a low dose aspirin, 81 mg is the most common over the counter dosage used to provide protection from endovascular clot formation due to its antiplatelet function as well as limit the viscosity of blood in persons whose vessel lumen is diminished.

CONCLUSION

Repeated studies demonstrate that many patients who have HTN are not well controlled for multiple reasons. Van Wijk, et al, found this true in 3 countries over a 6-month period of time in almost one quarter of patients surveyed.[14] Sometimes the side effects of the medications are too profound for the patient to tolerate and the lack of symptoms with the disease make it difficult for them to appreciate. The dosing of antihypertensive medications is often based upon a patient's blood pressure and heart rate measures while at rest. If the patient's vital sign responses to activity were used to prescribe their medication the physician would most likely make a choice of class, dose and frequency and yield better results in terms of maximizing their functional outcome and safety. That is a role we can serve our patients and facilitate collaboration amongst ourselves and other practitioners. When we consider the multiple physiological changes noted with age, the age-related changes in pharmacodynamics and pharmacokinetics and the increased incidence of asymptomatic isolated HTN as a person ages need for all healthcare professionals to diligently monitor vital signs is vital. To be well aware of the possible changes due to medication use, both beneficial and deleterious, is imperative in the management of patients as they progress through exercise challenges.

REFERENCES

1. Chobanian AV. Isolated systolic hypertension in the elderly. *N Engl J Med.* 2007;357:789-796.
2. Center for Disease Control & Prevention. Available at: http://www.cdc.gov/bloodpressure/. Accessed October 16, 2008.

3. Chobanian AV, Bakris GL, Black HR, et al. The seventh report of the Joint National Committee on Prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. *JAMA.* 2003;289:2560-2572
4. Franklin SS, Gustin W, Wong ND, et al. Hemodynamic patterns of age-related changes in blood pressure: the Framingham Heart Study. *Circulation.* 1997;96:308-15.
5. Weycker D, Edelsburg J, Cincze G, Levy DG, Kartashov A, Oster G. Blood pressure control in patients initiating antihypertensive therapy. *Ann Pharmacother.* 2008;42:169-176.
6. Grimes K, Cohen M. In: Hillegass EA, Sadowsky HS. *Essentials of Cardiopulmonary Physical Therapy*. 2nd ed. Philadelphia, Pa: W.B. Saunders Company; 2001.
7. Wang DJ, Gottlieb S. Diuretics: still the mainstay of treatment. *Crit Care Med.* 2008;36:S89-S94.
8. Morgan DB, Davidson C. Hypokalemia and diuretics: An analysis of publications. *BMJ.* 1980;280:905-908.
9: Gérardin-Marais M, Victorri-Vigneau C, Allain-Veyrac G, et al. Diuretic drug therapy monitoring in the elderly: a cohort study. *Eur J Clin Pharmacol*. 2008;64:433-437.
10 Pedelty L, Gorelick PB. Management of hypertension and cerebrovascular disease in the elderly. *Am J Med*. 2008;121(8A):S23-S31.
11. Banglore S, Messerli FH, Kostis JB, Pepine CJ. Cardiovascular protection using beta blockers: a critical review of the evidence. *JACC*. 2007;50: 563-572.
12. Ciccone CD. *Pharmacology in Rehabilitation.* 4th ed. Philadelphia, Pa: F.A. Davis Company; 2007.
13. Hannsson L, Hedner T. Lund-Johanse P, et al. Ransomised trial of effects of calcium antagonists compared with diuretics and beta blockers on cardiovascular morbidity and mortality in hypertension: the Nordic Dilitiazem (NORDIL) study. *Lancet*. 2000; 356:359-365.
14. van Wijk BLG, Shrank WH, Klungel OH, Schneeweiss S, Brookhart MA, Avorn J. . A cross-national study of the persistence of antihypertensive medication use in the elderly. *J Hypertension*. 2008; 26: 145-153.

Jennifer M. Ryan is an educator of cardiovascular and pulmonary physical therapy at Governors State University and the Department of Physical Therapy and Human Movement Science at Northwestern University. She works clinically in both inpatient and outpatient settings and teaches continuing education programs and activity tolerance in relation to lab values.

American Physical Therapy Association

CSM 2009
Preconference Course: Section on Geriatrics

Medical Malpractice Claims:
From Beginning Through Trial
Monday, February 9, 2009, 8:00 am–4:30 pm
7.5 Contact Hours

Presenter: *Sheila K. Nicholson, Esq, PT, JD, MBA*

This course will provide participants an overview of the primary causes of actions against physical therapists and physical therapist assistants, with an emphasis on medical malpractice claims. The key issues involved in documentation of these claims will be discussed, including examples from actual cases. The participants will then receive an overview of the legal system and how a claim progresses through its cycle. The program will culminate with a mock trial that utilizes the information discussed during the session and each participant will have the opportunity to deliberate as a juror and render a verdict.

Upon completion of this course, you will be able to:

- Identify and summarize three types of lawsuits filed against PTs/PTAs.
- Identify and summarize the elements in a cause-of-action claim for medical malpractice.
- Identify at least five key documentation issues inherent to physical therapy medical malpractice claims.
- Identify key components in the litigation process.
- Identify key components of a trial involving physical therapy medical malpractice.

Cosponsored by the following APTA sections: Acute Care and Federal Physical Therapy. Members of the Section on Geriatrics and all cosponsoring sections register at a discount.

Course space is limited—Visit www.apta.org and click events to register today!

THE SAFE USE OF RESISTANCE TRAINING FOR OLDER ADULTS WITH HEART FAILURE

Gail M. Huber, PT, PhD; Shane A. Phillips, PT, PhD

INTRODUCTION

In any area of geriatric practice, physical therapists will encounter patients with a history of heart failure (HF). From the patient admitted to the ICU for an acute episode of heart failure, to the patient with chronic stable heart failure at home, effective physical therapy intervention will improve function and quality of life in this population.

Heart failure is a complex syndrome and in most instances a progressive disorder with a prevalence of 4 to 5 million people in the US.[1] In most cases, HF results from ventricular dysfunction, whereby the ventricle does not fill adequately and/or pump adequately thereby limiting cardiac output.[2] This dysfunction results in characteristic symptoms (dyspnea and fatigue) and signs (edema and pulmonary rales). The incidence and prevalence of HF has been on a precipitous incline the past 3 decades and disproportionately affects the elderly making it the most common diagnosis for hospital admission in the Medicare population.[1,3,4] With population trends that emphasize growth in the segment of the population over age 65 and medical management that extends life after cardiac events, physical therapists will likely treat larger proportions of patients with HF.

Fortunately, this growing population can benefit from physical therapy intervention as we have the skills to identify patients in need of referral for their changing heart failure status. Coupled with expertise in safe and effective exercise prescription and tools to help these patients adopt optimal lifestyle behaviors, physical therapists will likely play an extensive role in optimizing health in patients with HF. Therefore, the purpose of this paper is to review the pathophysiology of heart failure, discuss specific examination skills for this population, and provide evidence for the use of resistance training (RT).

PATHOPHYSIOLOGY

In physiologic terms, heart failure is a syndrome characterized by elevated cardiac filling pressure and/or inadequate peripheral oxygen delivery, at rest or during stress, caused by cardiac dysfunction. Neurohormonal activation reinforces remodeling and is the "driving force behind the syndrome of systolic heart failure."[13] If untreated, heart failure may progress. The severity of clinical symptoms varies and may not correlate with changes in underlying cardiac function. However, HF is the endpoint of a variety of cardiac diseases such that patients with mild ventricular dysfunction and ejection fractions (EF) in the range of 40% to 50% may have symptoms only during heavy exertion. On the other end of the spectrum, patients with severe dysfunction (EF < 30%) may be symptomatic at rest.

There are multiple conditions that may precipitate heart failure including cardiomyopathies, myocarditis, coronary artery disease, myocardial infarction, heart valve disease, congenital heart defects, pericarditis, hypertension (systemic and pulmonary), aortic coarctation, and anemia. However, the aging heart may also predispose older adults to HF[5] making acute heart failure the most common discharge diagnosis in patients older than 65. For example, increased stiffness of the coronary circulation and the left ventricle results in increased afterload and decreased diastolic ventricular filling.[6] Older patients tend to experience more diastolic failure with preservation of systolic function.[7] Other changes in the aging heart include reduced sinus node function, decreased response to beta-adrenergic stimulation, and impaired endothelial function.[6] Although heart failure is progressive and often fatal, patients can be stabilized and cardiac dysfunction may improve.[8] While acute heart failure is a very common diagnosis in older patients, acute symptoms can occur gradually or have a rapid onset and the pathophysiology of acute heart failure is different depending on if the heart failure is new onset or the result of decompensated chronic heart failure (see below).

Compensated Heart Failure

As the heart begins to fail as a pump, compensatory mechanisms come into play that are, at first, able to maintain an adequate cardiac output. These compensations include: (1) renal salt and water retention that increases intravascular volume and helps maintain stroke volume via the Frank-Starling mechanism, (2) increased sympathetic nervous system (SNS) activity that increases cardiac output, and (3) myocardial hypertrophy. These compensatory mechanisms allow patients to remain symptom free and tolerate moderate levels of activity, such that ventricular dysfunction, in its early stages, may go unnoticed.

Decompensated Heart Failure

As poor cardiac output persists, the effectiveness of the physiological compensations may no longer exist. In this case, stroke volume (cardiac output) decreases further, there is a persistent increase in afterload (caused by elevated SNS activity), and an increased preload (overfilling of the ventricles). Excessive and uncontrolled volume retention leads to peripheral and pulmonary edema. Patients are overwhelmed with symptoms in this state of decompensation and usually require hospitalization as onset of acute heart failure is characterized by excessive sympathetic stimulation resulting in anxiety, tachycardia, and dyspnea.[9]

NEURAL AND HORMONAL ADAPTATIONS DURING HF

Neuroendocrine activation plays a major role in the pathogenesis of heart failure. Several different neuroendocrine systems, such as the renin-angiotensin-aldosterone system, the sympathetic nervous system, and the arginine vasopressin (AVP) system are activated in response to a decrease in cardiac output. Vasoactive neurohormones, such as renin, angiotensin II, norepinephrine,

and AVP are secreted and are responsible for the constellation of signs and symptoms associated with systolic heart failure. Initially neuroendocrine activation compensates for the hemodynamic and myocardial changes that occur in systolic heart failure. Over time these compensatory mechanisms negatively impact the cardiovascular, renal, and other organ systems. Consequently, systolic heart failure is a complex cascade of neuroendocrine events paired with hemodynamic changes.[10]

The Renin-angiotension-aldosterone System

Neurohormones released by the renin-angiotensin-aldosterone system are renin, angiotensin II, and aldosterone. Renin and angiotensin II cause the vasoconstriction that is characteristic of heart failure. Aldosterone activation mediates water and sodium retention and myocardial fibrosis or stiffness. Vasoconstriction, water and sodium retention, and fibrosis lead to fluid retention, weight gain, increased dyspnea, edema, and orthopnea. These are the signs and symptoms of decompensated heart failure, which often lead to hospitalization.

Sympathetic Nervous System

The sympathetic nervous system reinforces the renin-angiotensin-aldosterone activation and cardiac remodeling.[11] Sympathetic stimulation causes vasoconstriction and hyperglycemia. Beta-adrenergic blocking agents are used to attenuate sympathetic stimulation and remodeling. These blocking agents are given in combination with angiotensin converting enzyme inhibitors, angiotensin receptor blocking agents, aldosterone antagonists, and diuretics[12] such as furosemide and metolazone.

PHYSICAL THERAPY EXAMINATION OF THE OLDER PATIENT WITH HEART FAILURE

The initial examination of a patient with a history of HF should help the therapist determine if the patient is in a stable condition to participate in exercise that will provide health benefits. One of the primary goals of this exam is to identify signs and symptoms that indicate decompensation. The clinical consequences of ventricular dysfunction result from the ventricle's inability to function well as a pump. Ventricular dysfunction can result in signs and symptoms of cardiac origin (eg, muscle fatigue, mental confusion, muscle wasting, and decreased exercise tolerance) and those of a pulmonary origin (eg, dyspnea on exertion, orthopnea, pulmonary edema). Therefore examination for the presence of fluid retention, pulmonary edema, and exercise intolerance is necessary to screen for decompensation at the initial examination as well as during treatment as a means to monitor tolerance to the exercise program. The next section reviews the tests and measures that may be used.

Interview

The interview should include questions about shortness of breath with activity or at night (Table 1), current medications, and current lifestyle behaviors, eg, exercise, diet, smoking, and substance use. It is highly recommended that patients be medically stable with their heart failure well controlled prior to beginning resistance training.[13] Discussion of current activity level can help the physical therapist determine if there are decreases in usual activity due to the patient's HF. Questions about diet, smoking, and alcohol consumption will help the practitioner understand how well the patient is following lifestyle recommendations to manage their disease.

Sudden Weight Gain

A body weight diary is an important tool for the assessment of fluid volume status in HF. Since the body retains fluid in heart failure changes in body weight of > 2 pounds or more over a week may be indicative of worsening cardiac function and/or poor pharmacological compliance.[14] It is important for weight measurements to be made at the same time of day on the same scale with similar clothing to avoid physiologic variability.

Sleep disturbance due to SOB

Orthopnea is uncomfortable breathing in the recumbent position that is relieved in the erect sitting or standing position and is a symptom of fluid retention in heart failure. The severity of HF may be associated with the number of pillows required for comfortable breathing at night (eg, 4-pillow orthopnea indicates poorer ventricular function than 2-pillow orthopnea).

Paroxysmal Nocturnal Dyspnea is sudden episode of shortness of breath that occurs when the patient assumes a recumbent position. The episode usually results in an awakening from sleep with a feeling of suffocation and is another symptom of poor ventricular function related to orthopnea.

Table 1. Examination of the Older Adult with HF

Tests & Measures	Criteria for decompensation or exercise intolerance
Interview: Weight gain	> 2 lb weight gain
Orthopnea	Increase in number of pillows used for sleeping
Paroxysmal Nocturnal dyspnea	Waking from sleep with SOB
JVD distension	Observation of JVD distension when HOB is at 45°
Auscultation: Lung	Onset of crackles or increase in level heard in lung fields
Heart	Onset or increase in intensity of S3
Peripheral edema	1+ Barely perceptible depression (pit) 2+ Easily identified depression (EID) skin rebounds to original contour <15 sec. 3+ EID, skin rebounds to original contour 15-30 sec. 4+ EID, skin rebounds > 30 sec.
Vital Signs	HR rest > 100 BP rest systolic > 160 mmHg; diastolic > 100 mmHg S_pO_2 < 90% or decrease of ≥ 5%
6 minute walk test	> 300 m

Inspection

Jugular vein distension (JVD) and peripheral edema are both signs of ventricular dysfunction. Along with pulmonary congestion, they are caused by backup of blood "upstream" from the failing ventricle. Jugular vein distension is assessed with the head and neck elevated 45°. Normally jugular veins are empty when the patient is in this position but are clearly visible with ventricular dysfunction.

Peripheral edema

Peripheral lower extremity edema may be present in patients with stable HF, so assessing edema formation as it changes with other symptoms is critical. Evaluation of pitting edema is typically done by palpation, with the therapist applying pressure for at least 10 seconds to the lower leg, distal to proximal, and observing the depth of pitting and the length of time the pit reduces. It is evaluated from 1+ to 4+ (See Table 1).

Vital Signs

The importance of measuring vital signs in this population cannot be over emphasized. Heart rate (HR), blood pressure (BP), and respiratory rate (RR) are essential techniques for monitoring physiological status of your patient with HF and should be taken at every exercise session. If a pulse oximetry unit is available, oxygen saturation should be monitored. Upper limits for HR > 100 and BP systolic > 160 or diastolic >100 suggest that the patient is not hemodynamically stable for exercise.[13,15] Systolic blood pressure responses higher than 210 mmHg or a fall of more than 20 mmHg should be considered abnormal and exercise should be terminated. Resting SpO2 should be > 90% at rest. Desaturation during exercise to < 90% or a decrease of ≥ 5% is a reason for termination of exercise and for contacting the physician. Vital signs should return to baseline values within 3 to 5 minutes of completing exercise.

Conversely, if the patient has lost fluid volume due to medication or other reasons, they may demonstrate orthostatic hypotension. Orthostatic hypotension is defined as a decrement > 20 mmHg in the systolic blood pressure or a diastolic drop > 10mm, within 3 minutes of standing. This is often accompanied by a compensatory increase in heart rate.[16]

Auscultation

Auscultory findings will provide the therapist important clues as to the stability of the patient. Auscultation of lung sounds is performed to identify presence of crackles. Crackles that do not clear with cough and change position due to effects of gravity (positional) represent fluid in the lungs, generated by increased pressure in the pulmonary vasculature of cardiac origin. Crackles of pulmonary origin clear with cough and do not change position when the patient changes posture. Auscultation of heart sounds identifies the presence of an abnormal S3 heart sound. The S3 is a sound due to rapid filling of the ventricle due to increased atrial pressures. Reassessment of heart and lung sounds immediately after exercise provides quick identification of those patients with poor tolerance to the prescribed exercise intensity. Poor tolerance is indicated by new onset of crackles or increased level heard in the lung field. A new onset of S3 or increase in intensity from rest would also indicate an abnormal response to exercise.

Exercise tolerance

Clinical monitoring of exercise tolerance (functional capacity) can be done using the 6 minute walk test (6MWT). The 6MWT is a valid and reliable test for patients with HF as a submaximal exercise test.[17] This test can be done in most settings, although a long (> 20 meter) clutter free distance is preferred.[18] Patients are instructed to walk as quickly as comfortably possible, over a measured distance, with chairs available for rest. The patient may take as many rests as needed. The therapist should evaluate vital sign responses, record the distance walked in 6 minutes, and the number of rests. Distances less than 300 m have been associated with increased risk for hospitalization and death.[19,20]

Additional monitoring

Monitoring during training is essential for the assessment of responses to exercise, particularly when the exercise prescription is progressed. In addition to vital signs and auscultation, monitoring of the level of dyspnea, as well as clinical signs and symptoms will inform the clinician as to how well the patient is tolerating exercise. Measurement of dyspnea using a valid and reliable dyspnea scale, eg, Borg Scale, Ventilatory Response index (VRI), or Dyspnea Index (DI) provides additional information about exercise tolerance. The level of exertion should be fairly light to somewhat hard, which on the Borg Scale is measured as 11-14.[21] If patients respond to the exercise session with symptoms of dizziness, excessive SOB, chest pain, or irregular heart rhythm, the exercise should be terminated and the physician contacted before exercise is resumed.[21]

RESISTANCE TRAINING (RT) FOR HF

Not until the 1990s was any type of exercise considered an appropriate intervention for those diagnosed with HF.[22,23] Since then a body of research has developed demonstrating the benefits of aerobic exercise training. Current ACC/AHA Practice Guidelines for HF include regular exercise for those at risk for HF as well as those with current or prior symptoms of HF.[2] Adoption of RT for the HF population was slow due to concerns for patient safety. However, available research has determined that RT in those with stable chronic heart failure is not only beneficial, but holds little to no risk. Therefore, the inclusion of resistance training to the exercise program of patient's with HF has been recommended by the AHA.[15]

Clinicians' concern about resistance training in patients with HF was that the rapid elevation in blood pressure during resistance exercise could increase ventricular remodeling, myocardial ischemia, or afterload. However, research has supported the use of resistance training in HF. For example, hemodynamic responses (HR and BP) were found to be much lower during performance of a 1-Rep Max (RM) of the quadriceps and biceps than during a symptom-limited graded exercise test.[24] These authors and others also reported that completing RT sets of 20%, up to 70% 1 RM with 10 to 15 reps caused no significant change in a variety of cardiac performance measures including: ejection fraction, ventricular size by volume or diameter, wall thickness etc.[24,25] A recent meta-analysis of exercise training in patients with HF found no significant heart remodeling due to resistance training.[23]

The exercise prescription for RT in patients with heart failure does not differ significantly from that recommended

for other older adults except for an increased level of monitoring (see Table 2 for details).[15] Initial sessions are of low intensity (RPE 9-10) to allow muscles and connective tissue to adapt to the stress. A 10-minute warm-up of flexibility and/or low intensity aerobic exercise prepares the patient for the exercise session. Patients should be instructed against breath-holding (valsalva) during exercise. Alternating upper extremity exercises with lower extremity exercises provides for periodic changes in cardiac demand due to the varied size of the working muscle mass. Circuit training sessions with 1 set of 10 to 15 reps (8 to 10 exercises) with RPE at 12 to 13 will help to focus the session on the major muscle groups. Estimates of 1RM can be made with 6RM testing to avoid overexertion with 1RM testing in deconditioned patients.[26] Recent studies in patients with coronary artery disease suggest that 1 set of resistance exercise was similar to performing 3 sets for improving exercise capacity and strength suggesting that physiological gains can be significant using a 1 set prescription.[27] Rest periods that are twice as long as the work period are recommended. Additional modifications can include: performance of unilateral exercise vs. bilateral to reduce overall exercise demand and progression in the number of exercises performed. Progression in intensity should only occur when the patient can perform the maximum range of reps and the increased intensity should then start at the lower range of reps.

CONCLUSIONS

Resistance training is an important intervention for the maintenance of function for all older adults. Those with heart failure are at greater risk for functional decline due to the muscle myopathy resulting from chronic HF. Most research has demonstrated that appropriate RT is safe and effective for this large and growing population of older adults, although these patients require additional monitoring

Physical therapists must acknowledge the importance of RT for improving the patient's ability to manage their heart disease and incorporate RT into the treatment plan when appropriate. In addition physical therapists can provide patients the education and feedback that will improve their self-efficacy for exercise, thus helping them incorporate exercise into their lifestyle. Regular resistance training will help the older adult to optimally function with their heart failure.

Table 2. Exercise Prescription for Resistance Training in Older Adults with HF

Mode	Dynamic resistance, circuit weight training, 8-10 muscle groups avoid isometric
1-RM*	Used to determine intensity, safe to do, but can also use estimating equations to determine.
Intensity	Start at 40-50% of 1RM Can progress to 80% based on patient tolerance RPE=11-13 Borg scale
Sets	Start with a single set
Reps	10-15
Rate	3sec concentric: 3 sec eccentric
Work: rest ratio	1:2 between sets
Frequency	2-3 times per week

* 1 RM is defined as weight that can be lifted no more than one time through full ROM with acceptable form. Modified from Volaklis et al,[13] ACSM,[21] Meyer et al,[22] and Williams et al[15] 2007.

REFERENCES

1. CDC, Heart Failure Fact Sheet. Division for Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion. 2008.
2. Hunt SA, Abraham WT, Chin MH, et al. ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure): developed in collaboration with the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: endorsed by the Heart Rhythm Society. *Circulation.* 2005;112:e154-e235.
3. Nieminen MS, Harjola VP. Definition and epidemiology of acute heart failure syndromes. *Am J Cardiol.* 2005;96:5G-10G.
4. Barker WH, Mullooly JP, Getchell W. Changing incidence and survival for heart failure in a well-defined older population, 1970-1974 and 1990-1994. *Circulation.* 2004;113:799-805.
5. Imazio M, Cotroneo A, Gaschino G, et al. Management of heart failure in elderly people. *Int J Clin Pract.* 2008;62:270-280.
6. Thomas S, Rich MW. Epidemiology, pathophysiology, and prognosis of heart failure in the elderly. *Clin Geriatr Med.* 2007;23:1-10.
7. McDonald K. Diastolic heart failure in the elderly: underlying mechanisms and clinical relevance. *Int J Cardiol.* 2008;125:197-202.
8. Heart Failure Society of America. Executive Summary: HFSA 2006 Comprehensive Heart Failure Practice Guidelines. *J Cardiac Failure.* 2006;12:10-38.
9. Millane T, Jackson G, Gibbs CR, Lip GY. ABC of heart failure. Acute and chronic management strategies. *BMJ.* 2000;320:559-562.
10. Francis GS. Pathophysiology of chronic heart failure. *Am J Med.* 2001;110 Suppl 7A:37S-46S.
11. Francis GS, Chu C. Post-infarction myocardial remodeling: why does it happen? *Eur Heart J.* 1995; Suppl N:31-6.
12. Kaye DM, Krum H. Drug discovery for heart failure: a new era or the end of the pipeline? *Nat Rev Drug Discov.* 2007;6:127-139.
13. Volaklis KA, Tokmakidis SP. Resistance exercise training in patients with heart failure. *Sports Med.* 2005;35:1085-1103.

14. Chaudhry SI, Wang Y, Concato J, Gill TM, Krumholz HM. Patterns of weight change preceding hospitalization for heart failure. *Circulation.* 2007;116:1549-1554.

15. Williams MA, Haskell WL, Ades PA, et al. Resistance exercise in individuals with and without cardiovascular disease: 2007 update: a scientific statement from the American Heart Association Council on Clinical Cardiology and Council on Nutrition, Physical Activity, and Metabolism. *Circulation.* 2007;116:572-584.

16. Pickering TG, Hall JE, Appel LJ, et al. Recommendations for blood pressure measurement in humans and experimental animals: part 1: blood pressure measurement in humans: a statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. *Circulation.* 2005;111:697-716.

17. Kervio G, Ville NS, Leclercq C, Daubert JC, Carre F. Intensity and daily reliability of the six-minute walk test in moderate chronic heart failure patients. *Arch Phys Med Rehabil.* 2004;85:1513-1518.

18. ATS statement: guidelines for the six-minute walk test. *Am J Critical Care Med.* 2002;166:111-117.

19. Cahalin LP, Mathier MA, Semigran MJ, Dec GW, DiSalvo TG. The six-minute walk test predicts peak oxygen uptake and survival in patients with advanced heart failure. *Chest.* 1996;110:325-332.

20. Shah MR, Hasselblad V, Gheorghiade M, et al. Prognostic usefulness of the six-minute walk in patients with advanced congestive heart failure secondary to ischemic or nonischemic cardiomyopathy. *Am J Cardiol.* 2001;88:987-993.

21. *American College of Sports Medicine: Guidelines for Exercise Testing and Prescription.* 7th ed. Philadelphia, Pa: Williams and Wilkins; 2005.

22. Meyer K. Resistance exercise in chronic heart failure--landmark studies and implications for practice. *Clin Invest Med.* 2006;29:166-169.

23. Haykowsky MJ, Liang Y, Pechter D, Jones LW, McAlister FA, Clark AM. A meta-analysis of the effect of exercise training on left ventricular remodeling in heart failure patients: the benefit depends on the type of training performed. *J Am Coll Cardiol.* 2007;49:2329-2336.

24. Werber-Zion G, Goldhammer E, Shaar A, Pollock ML. Left ventricular function during strength testing and resistance exercise in patients with left ventricular dysfunction. *J Cardiopulm Rehabil.* 2004;24:100-109.

25. Karlsdottir AE, Foster C, Porcari JP, Palmer-McLean K, White-Kube R, Backes RC. Hemodynamic responses during aerobic and resistance exercise. *J Cardiopulm Rehabil.* 2002;22:170-177.

26. Kraemer WJ, Fry AC. *Strength Testing: Development and Evaluation of Methodology. Physiological Assessment of Human Fitness*. Champaign, Ill: Human Kinetics; 1995:115-138.

27. Marzolini S, Oh PI, Thomas SG, Goodman JM. Aerobic and Resistance Training in Coronary Disease: Single versus Multiple Sets. *Med Sci Sports Exerc.* 2008;40:1557-1564.

Gail Huber, PT, PhD is an Assistant Professor of Physical Therapy in the Department of Physical Therapy and Human Sciences at Northwestern University. In addition to training physical therapists, her research interests include physical activity for older adults, particularly those with arthritis and how physical activity affects function and reduces disability.

Shane Phillips is an assistant professor in the Department of Physical Therapy and adjunct assistant professor in the Department of Medicine at the University of Illinois at Chicago. He is Director of the Vascular Biology Laboratory in the College of Applied Health Sciences where he studies the acute and chronic effects of resistance and aerobic exercise on blood vessel function. His laboratory is funded by the National Institute of Health, the UIC Center for Clinical and Translational Research, and the American College of Sports Medicine. He can be reached at shanep@uic.edu.

Budget Available for Member Review

Starting November 14, 2008, the draft Section on Geriatrics 2009 budget will be posted on the Web site for member review. We welcome member comments through November 30. The Section Board of Directors will meet via conference call in early December to review and approve the 2008 budget, and will take all member feedback into consideration.

Thank you for your Section on Geriatrics membership!

Visit www.geriatricspt.org to view the draft budget.

MY OLDER PATIENT IS SHORT OF BREATH DURING TREATMENT: CLINICAL DECISIONS THAT GUIDE YOUR ACTIONS

Meryl Cohen, DPT, MS, CCS

Clinicians are continually making decisions related to patient care. Some decisions are made in advance of treatment by developing a treatment plan and program. However many decisions cannot be made until a patients' response to an intervention is observed. Patient responses are sometimes reported nonspecifically as "tolerance" or "intolerance" to treatment. Often times responses are appropriately reported with a more complete description of "intolerance" as the presence of specific symptoms and symptom-related objective findings. Common symptoms reported as a result of cardiovascular and pulmonary pathology include chest pain, shortness of breath (SOB), fatigue, palpitations, lightheadedness and syncope, cough, leg pain, and leg edema. Patients may complain of one or combinations of these symptoms. Occasionally, older individuals believe it is "normal" to experience these symptoms with aging. Certainly, age-related changes in the cardiovascular and pulmonary systems do exist without evidence of disease and can influence the onset of a number of these symptoms. (See the Frownfelter and Stackowicz article in this issue.) However, the results of physical examination, objective measures, and diagnostic tests can help differentiate the presence of disease *versus* disuse *versus* age-related system changes. The purpose of this report is to demonstrate the decision-making process clinicians quickly go through when their "*older patient is short of breath* ***during*** *treatment.*" The reader will be presented with a very brief patient history and treatment scenario, and several common causes of this patient's SOB will be identified.

Upon recognition of the symptom of SOB in this scenario, the clinician needs to decide which *physical examinations and measurements are appropriate*, and *what actions* (to continue or discontinue treatment) *are needed*. By clustering findings from the physical examination (Table 1) and noting changes from baseline (resting), the reader will recognize how clinicians are guided into action. Because SOB can indicate a medical emergency, clinical decisions may include emergency actions.

Table 1. Physical Examinations Useful in JR's Cardiovascular and Pulmonary Assessment

Heart rate (HR)
Heart rhythm
Blood pressure (BP)
Respiratory rate (RR)
Oxygen saturation (SaO_2)
Dyspnea (ventilatory) index (DI)
Lung auscultation
Cardiac auscultation
Cough

CASE

Past medical history: This patient (JR) is an 82-year-old obese (body mass index is 34) female with a 10-year history of non-insulin dependent diabetes mellitus (NIDDM). JR smoked one pack of cigarettes per day for 40 years and quit smoking 10 years ago. In addition, JR suffered an anterior wall myocardial infarction 4 years ago.

History of current complaint: JR had an elective total hip replacement (THR) 2 days ago for painful osteoarthritis. JR has progressed to weight-bearing as tolerated ambulation with a rolling walker. She has just walked 45 feet with contact guard, and asks to rest because she is SOB. Her ventilatory response index is 3 (described below) and respiratory rate is 26.

What is causing JR's SOB? What actions should you take? What physical examinations should you perform? Is this a medical emergency?

Most clinicians would agree that ambulation should be stopped and JR allowed to rest. Some clinicians might decide to take a "wait and see" approach, that is, if JR's SOB resolves with rest, then the symptom was most likely a "normal response to activity" or due to "deconditioning" or "anxiety" or "pain." Similarly, if JR was observed to be in extreme respiratory distress, clinicians would respond by following standardized emergency procedures.

But what if this SOB was an "*anginal equivalent*" given that JR has a 10-year history of NIDDM and has coronary artery disease (CAD); we know that individuals with DM and CAD often do not demonstrate a typical angina pattern of pain and their angina presents as SOB.[1] Or, what if this SOB was due to the onset of new *congestive heart failure* (CHF); we know that CHF is the number one hospital discharge diagnosis in individuals older than 65, and that JR has a history of an MI, and that SOB is a presenting symptom of CHF.[2] What if JR's SOB is due to *atelectasis* from shallow breathing due to her obesity, and anesthesia during surgery; we know that age-related changes in the lungs predispose older individuals to reduced movement of the musculoskeletal pump (bony thorax) and can increase JR's risk of pulmonary infiltrate and pneumonia.[3] JR has a long history of cigarette smoking which increases her risk of *chronic obstructive pulmonary disease* (COPD); we know that age-related changes in the lungs can include increased thickening of the lung mucus layer and a decrease in alveolar surface area and both changes are potentiated by parenchymal changes from COPD.[3] Table 2 lists a number of common conditions that could be responsible for JR's complaint of SOB at this time.

Are there any cardiovascular or pulmonary measurements that should be performed prior to walking with JR that could help clinicians anticipate JR's limited endurance? And are these measures ones that could easily be repeated when JR experiences her SOB? Change in these measurements can help the clinician decide:

- **The specific cause of JR's SOB**
- **What action needs to be taken by the therapist**
- **How to help prevent further morbidity for JR**

Table 2. Possible Causes of JR's SOB

Normal response to exertion
Deconditioned
Anxiety
Dehydration
Anemia
Pulmonary:
- **Atelectasis**
- **Restrictive Lung Disease due to obesity**
- **Restrictive Lung Disease due to posture**
- **COPD due to aging**
- **COPD due to history of cigarette smoking**
- **Pulmonary embolism**
- **Pneumonia**

Cardiac:
- **Angina**
- **Arrhythmia**
- **CHF**

Pain:
- **Hip**
- **Other**

The paragraphs that follow are intended to demonstrate:

- **How clinicians use the results of their physical examination in order to make quick and important clinical decisions.**
- **The significance of performing baseline (resting) measurements; if you have these measurements at baseline then determination of the etiology of JR's SOB is facilitated.**

MEASURES USEFUL IN THE ASSESSMENT OF JR'S SOB

Heart Rate

A normal heart rate (HR) response to exertion would be one that increases from a normal baseline. Excessive increase from a normal resting rate can indicate that JR is deconditioned. A rapid resting HR can indicate an increase in the underlying systemic metabolic rate and might also include deconditioning, as well as dehydration or anemia. Older individuals are often dehydrated, and anemia would be a common finding after orthopedic surgery. Knowing JR's baseline hemoglobin and hematocrit might help the therapist identify a cause of a rapid HR response to activity (See Table 3). A decrease in HR from baseline (chronotropic incompetence) is a red flag as it can indicate an inability of the heart to respond to the increased demand of ambulation. This would warrant medical attention. Finally, a low resting HR and/or blunted HR response to activity may reflect the effect of medication. (Pharmacologic responses to exertion will not be addressed in this article; please refer to Schaning D. Pharmacology Case Report: Total Joint Replacement. *GeriNotes.* 2008;15(2):19-22). Any of these abnormal HR responses to activity place excessive stress on the cardiovascular and pulmonary systems and can be responsible for JR's SOB.

Table 3. Special Tests to Help Identify the Cause of JR's SOB

Electrocardiogram (EKG)

Pulmonary function tests (PFT):
- Vital capacity (VC)
- Forced expiratory volume in one second (FEV1)

Chest x-ray
Hemoglobin and Hematocrit
Temperature
Ultrasound and Doppler studies
Ventilation Perfusion scan

Heart Rhythm

Palpation of a peripheral pulse (or auscultation of the apical pulse) can provide important information unrelated to HR. Every palpated heart beat reflects the stroke volume (SV) ejected in each cardiac contraction. In normal sinus rhythm (NSR), each heartbeat contains volume that results from both passive filling of the ventricle (first 75% of end-diastolic volume) plus the volume that results from atrial contraction into the ventricles (25% of end-diastolic volume). It is the ejection of this total volume that we are able to palpate in the periphery. When the rhythm of the palpated pulse becomes irregular (either with a pattern to the irregularity, or completely irregular), an arrhythmia has occurred. When an arrhythmia occurs, the SV becomes "compromised" or reduced. A cardiac contraction that pumps less than the normal amount of volume may not be palpable; hence the apparent "pause," "skip," or "absence" of a palpable beat. The more times in a minute that an arrhythmia occurs, the lower the cardiac output (remembering that HR x SV = cardiac output).[5] Age-related changes in cardiac myocytes, as well as her known CAD, put JR at increased risk of arrhythmias and consequent reduced SV and cardiac output.[4] Any reduction in cardiac output stresses the oxygen delivery system and can be responsible for JR's SOB. By palpating JR's heart rhythm at rest, the clinician is able to recognize any rhythm change at the moment JR complains of SOB. The onset of a new and/or the increase in frequency of arrhythmias with activity would warrant medical attention. The availability of rhythm strip monitoring with an EKG would provide more detailed information regarding the nature and severity of the arrhythmia (see Table 3). The ability to document arrhythmias during activity can be an invaluable adjunct to JR's medical management and potential reduction in further morbidity and mortality.

BLOOD PRESSURE

Systolic blood pressure (SBP)

A normal SBP response to exertion would be an increase from a normal resting SBP. In the absence of specific anti-hypertensive medications, a flat or blunted SBP response to exertion (inotropic incompetence) is a red flag. It can indicate an inability (or failure) of the heart to contract and pump effectively in response to the increased demand of exertion, which in JR's case, is the effort of ambulation. This would warrant medical attention. The inability of the heart to generate an adequate blood pressure causes a reduction in SV. This consequently places a stress on the oxygen delivery system and can be responsible for JR's SOB. In addition, inotropic incompetence is often accompanied by an increase in HR as the body attempts to "compensate" for the reduced SV in order to maintain cardiac output (remembering that HR x SV = cardiac output). However, older individuals may have delayed reactivity in this baroreceptor-mediated compensatory reflex.[6] Without this compensatory increase in HR in the setting of a blunted SBP response to exertion, heart failure is likely. Findings on physical

examination that are consistent with the onset of CHF (a common cause of SOB in the older individual) are bibasilar crackles (rales) found during pulmonary auscultation and an S3 found during cardiac auscultation.[7] (See auscultation discussion below.) If basic heart and/or lung auscultation were performed just prior to ambulation with JR, then auscultatory changes found upon JR's complaint of SOB might help guide her medical (pharmacologic) management and reduce subsequent morbidity.

A low resting SBP with a fast resting HR can indicate dehydration, hypovolemia, or even anemia, all of which are common findings in older individuals, and are particularly common after orthopedic surgery. As noted earlier, these conditions can stress the oxygen delivery system and cause JR to become SOB.

Respiratory Rate

Respiratory rate (RR) typically increases with exertion. Healthy adults have a large respiratory reserve hence the lungs are rarely responsible as a limitation to exertion. However, respiratory reserves decrease as we age. In addition to age-related changes in the lungs and bony thorax, there are several reasons specific to JR that can account for her decrease in pulmonary reserves (see Table 2). In order for JR to maintain her minute ventilation (VE) in the presence of any of these conditions, she will need to increase her RR since her tidal volume will be limited by the pulmonary condition. (Remember that RR times tidal volume = VE). An excessive increase in RR would result in an increased work of breathing (WOB) and consequent fatigue.

In addition to counting the number of breaths per minute (RR), quantification of the degree of SOB can be made with the ventilatory response index, VRI (also known as the dyspnea index).[8] It was noted that when JR complained of SOB and needed to rest her VRI was 3. This means that she needed more than 3 breaths to count to 15. With normal respirations and no perception of SOB, an individual should be able to count to 15 in one breath. Consistent and objective documentation of her degree of SOB at rest and with exertion can help physicians monitor the effectiveness of JR's medical management.

Oxygen saturation (SaO_2)

Oxygen saturation reflects the ability of the lungs to effectively move oxygen from the air into the blood. With exertion, tissue demand for oxygen increases. With adequate lung function, SaO_2 remains normal with exertion as the increased demand for oxygen is accommodated by the typically large reserve in pulmonary function. However, JR's recent anesthesia, history of smoking, and age-related changes in gas exchange units can cause a reduction in SaO_2 as she exerts herself during ambulation. Pulmonary function tests (PFT) can add insights regarding the presence, nature, and severity of JR's pulmonary impairments.

An additional cause of a reduced SaO_2 response to exertion that could be responsible for JR's SOB includes a pulmonary embolism (PE). Deep vein thrombosis (DVT) and PE are common occurrences after orthopedic surgery. The presence of new calf pain and redness, dehydration (a common finding in older individuals), a drop in SaO_2, and new onset of chest pain with SOB, could indicate a DVT with PE.[9] Special tests used to confirm a DVT and PE include Doppler studies and ventilation perfusion scans.

Cough

Although there is no mention in the case history of a cough, assessment of JR's ability to cough effectively would be appropriate since secretion retention is common in older individuals. JR is at high risk for secretion retention given her history of cigarette smoking, obesity, anesthesia, and the age-related changes that occur in the lung and musculoskeletal pump. Secretion retention obstructs adequate gas exchange and causes an excessive increase in RR. Recognition of an inadequate cough prior to ambulation can forewarn the clinician that JR would be likely to become SOB with activity.

Lung auscultation

By conducting a baseline screen of pulmonary breath sounds of all lung segments prior to treatment, the clinician can identify the presence or absence of hypoventilated lung tissue.[10] Due to her obesity, recent anesthesia, history of cigarette smoking, and age-related changes in the lungs, JR is at increased risk of atelectasis and/or secretion retention. Both conditions could be detected with lung auscultation and both could be responsible for JR's complaint of SOB. A chest xray would confirm these treatable causes of SOB and would help guide JR's therapeutic program and medical management. The presence of a productive cough could indicate the need for airway clearance techniques prior to activity in order to optimize gas exchange and JR's endurance. Special tests, including sputum culture and body temperature can help identify the presence of pulmonary infection and inflammation, and guide medical management in reducing additional morbidity.

Another auscultatory finding, bibasilar crackles (rales), can indicate left heart failure. When these adventitious sounds are found in an individual prior to exertion, the clinician can anticipate a worsening of pulmonary congestion as activity progresses. JR would be certain to experience SOB in this situation as fluid in the alveoli impairs adequate gas exchange. JR's history of an MI and age-related changes in cardiac myocytes increase her risk of left heart failure and could provide an explanation for her SOB.

Cardiac auscultation

Although cardiac auscultation is a difficult skill to learn, with practice, clinicians can not only recognize the presence of an abnormal heart sound, but can identify the structural abnormality responsible for the finding. The presence of a third heart sound (S3) in an older individual is associated with CHF (remember SOB is a common symptom of CHF and could be a cause of JR's SOB). An S3 is produced during early ventricular filling when blood volume enters a noncompliant (stiff) ventricle.[11] Age-related changes in cardiac myocytes and JR's scarred ventricular wall from her previous MI contribute to the strong possibility of decreased left ventricular compliance. If the clinician detects an S3 during a baseline cardiac auscultation screen, he/she could be better prepared to respond to JR's complaint of SOB with exertion. Similarly, if resting heart sounds were normal, but the exertion associated with ambulation generated a new S3 when JR complains of SOB, medical attention would be warranted. We know that the presence of an S3 in patients with heart failure is associated with increased morbidity and progression of heart failure.[12.]

CLINICIAN ACTIONS IN RESPONSE TO JR'S SOB

As discussed earlier, most clinicians would allow JR to stop activity and rest when she complained of SOB. By monitoring HR and rhythm, BP, RR, SaO_2, cough, heart sounds, and lung sounds just prior to ambulation and then again at the onset of JR's symptom of SOB, the clinician is able to determine the likely cause of her SOB.[13,14] Thus, an understanding of the etiology of JR's SOB can guide clinical decision making and subsequent action (and treatment). These would include:

- **Encouraging JR to take frequent rest periods (in the case of deconditioning)**
- **Stressing chest physical therapy techniques (breathing and postural exercises, airway clearance techniques, incentive spirometry, relaxation)**
- **Referring JR back to the physician for additional diagnostic evaluation and medical management (in the case of dehydration, anemia, atelectasis, pneumonia, angina, arrhythmia, CHF)**
- **Requesting emergent attention to JR's symptom (in the case of PE).**

CONCLUSION

Clinicians have the training and skills to be *pro*active as well as *re*active to symptoms generated by impairments in the cardiovascular and pulmonary systems. Age-related changes in the heart, lungs, and blood vessels increase patient vulnerability when these systems are stressed. With a more comprehensive baseline screen, clinicians can be better prepared to react to abnormal responses in the oxygen delivery system. This level of preparation can lead clinicians to make more effective decisions at the onset of a cardiovascular or pulmonary symptom. A more clinically sound rationale for clinician actions, rather than a "wait and see" approach to symptom resolution can contribute to reduction in significant patient morbidity and mortality. The opportunity to improve patient function while minimizing morbidity should be the goal of every patient and clinician interaction.

REFERENCES

1. Cassady SL. Cardiovascular Pathophysiology. In: DeTurk WE, Cahalin LP. *Cardiovascular and Pulmonary Physical Therapy*. New York, NY. McGraw-Hill; 2004.
2. Wenger NK, Scheidt S, Weber M. *The Elderly in Cardiac Rehabilitation. Am J Geriatric Cardiol.* 1999;8(2):60-__.
3. Cohen MI. Pulmonary Considerations in the Older Patient. In: Kauffman TL, Barr JO, Moran ML, eds. *Geriatric Rehabilitation Manual. 2nd ed.* New York, NY: Churchill Livingstone; 2007.
4. Cohen MI. Cardiac Considerations in the Older Patient. In: Kauffman TL, Barr JO, Moran ML, eds. *Geriatric Rehabilitation Manual.* 2nd ed. New York, NY. Churchill Livingstone; 2007.
5. Irwin S, Tecklin JS, eds. *Cardiopulmonary Physical Therapy: A Guide to Practice.* 4th ed. St. Louis, MO: Mosby; 2004:332-333.
6. Von Neida K. Effects of Aging on Vascular Function. In: Kauffman TL, Barr JO, Moran ML, eds. *Geriatric Rehabilitation Manual.* 2nd ed. New York, NY: Churchill Livingstone; 2007.
7. Grimes K. Heart Disease. In: O'Sullivan SB, Schmitz TJ. *Physical Rehabilitation.* 5th ed. Philadelphia, Pa: FA Davis Company; 2007.
8. Watchie J. *Cardiopulmonary Physical Therapy: A Clinical Manual.* Philadelphia, Pa: WB Saunders; 1995:192.
9. Goldhaber SZ. Recognition and Management of Patients with Pulmonary Embolism, Deep Venous Thrombosis, and Cor Pulmonale. In: Goldman L, Braunwald E. *Primary Cardiology*. Philadelphia, Pa: WB Saunders Company; 1998.
10. Dean E. Individuals with Acute Medical Conditions. In: Frownfelter D, Dean E. *Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice.* 4th ed. St. Louis, Mo: Mosby Elsevier; 2006.
11. Cohen M, Hoskins-Michel T. *Cardiopulmonary Symptoms in Physical Therapy Practice.* New York, NY: Churchill Livingstone; 1988:62-63.
12. Drazner MH, Rame JE, Stevenson LW, et al. Prognostic importance of elevated jugular venous pressure and a third heart sound in patients with heart failure. *N Engl J Med.* 2001;345:574-581.
13. Eason J. *Cardiopulmonary Assessment. Cardiopulm Phys Ther J.* 1999;10(2):135-142.
14. Frownfelter D, Ryan J. *Dyspnea: measurement and evaluation. Cardiopulm Phys Ther J.* 2000;11(1):7-15.

Meryl Cohen is a Board Certified Cardiopulmonary Clinical Specialist (1985, recertified in 1996 and 2006). She is an assistant professor at the University Of Miami Miller School Of Medicine, Department of Physical Therapy in Miami, Florida. She can be reached at mcohen@miami.edu.

The Section on Geriatrics would like to invite all:

Newly Certified GCS', Recertified GCS' & First Time Attendees

to the

Annual GSC Breakfast!

The GCS Breakfast will be on **Tuesday, February 10, 2009 7am-8am!**

All members are welcome to celebrate and welcome these new GCS and first time attendees to CSM.

COMBINED SECTION MEETING 2009
SECTION ON GERIATRIC PROGRAMMING

– Jill Heitzman, PT, DPT, GCS, FCCWS –
SOG Program Chair

CSM 2009 promises to be another great event you will not want to miss. Between the outstanding programs and the fun social interactions, you can be sure to find someone to mentor you or that you can mentor to bring greater professionalism and PT interventions to our ever growing field of geriatric physical therapy. You will be able to go back into your clinic or academic setting with new knowledge to share with others. Join us in Las Vegas. Remember that CSM 2009 opening ceremonies are on Monday, February 9th and the conference ends on Thursday, February 12th. The Section Preconference courses will be Sunday and Monday, February 8th and 9th. Below are details on the Section activities, social and educational sessions. **SEE YOU THERE!**

CSM 2009 PROGRAM SCHEDULE

Sunday — 2/8

Preconference:
Clinical Residency 101 **12noon-7:00PM**

Monday— 2/9

Preconference:Advanced Mentoring

Preconference:Medical Malpractice: From Beginning to Trial (discuss and mock trials)

Tuesday— 2/10

7:00-8:00AM - GCS and Newcomers Breakfast: Every member is invited to join us to congratulate the newly certified/recertified GCS and welcome first time CSM attendees.

10:30AM-12:15PM - Update on Normal Pressure Hydrocephalus: Medical and Therapeutic Interventions

12:30-2:15PM - Clinical Exam and Evidence-based Interventions to Improve Gait in Older Adults

2:30-4:30PM - Maximizing Skill Development in Cognitively Impaired Patients

6:30-7:00PM - Balance and Falls SIG meeting: All members are welcome, then stick around for the Balance/Falls programming to follow:

7:00-9:00PM – Paying Attention: Making Choices/ The Role of Cognition in Falls Prevention

Wednesday— 2/11

7:00-8:00AM - Osteoporosis SIG meeting: All members are welcome, then stick around for the Osteoporosis Programming to follow:

8:00-11:00AM - Skeletal Effects of Exercise/Mechanical Loading Across the Lifespan

Wednesday— 2/11 ...cont.

8:00-11:00AM - Platform Presentations: Hear About the Latest Research in Geriatric PT

1:00-3:45PM - Cultural Considerations for PT Interventions for Postpolio/Post Stroke in US and Developing Countries

1:00-3:45PM - Student Forum: Working with Older Adults can be Fun: This is a great opportunity for students to meet our Section leaders, learn about the various practice settings for the Geriatric PT, and win prizes.

4:00-5:30PM - How Does this Study Apply to MY Patients?

4:00-5:30PM - Continence and Active Aging; They Can Coexist

5:30-9:00PM Members Meeting/Awards Ceremony and Celebration: All members welcome.

Thursday— 2/12

7:00-8:00AM Health and Wellness SIG Meeting: All members are welcome, then stick around for the Health and Wellness programming to follow:

8-11:00 AM The Role of Physical Therapists in Evidence-based Health Promotion: The NCOA-Funded Chronic Disease Self Mgt Program

8:00-11:00AM Platform Presentations: Hear About the Latest Research in Geriatric PT

1:00-2:45 FUNctional Evidence: New Approaches to Functional Therapy

3:00-4:45 Alzheimer's Disease and Exercise: Evidence and Anecdotes

3:00-4:45 Physical Therapy Management of Nutritional Deficits in the Older Adult

Section on Geriatrics Directory

EDITORIAL BOARD

Carol Schunk, PT, PsyD, Editor
19625 Sunshine Way
Bend, OR 97702
carolschunk@earthlink.net

Patrice Antony
Orlando, FL

Kathy Brewer
Phoenix, AZ

Helen Cornely
Miami, FL

Nora Francis
Chicago, IL

Meri Goehring
Dekalb, IL

Neva Greenwald
Jackson, MS

Jill Heitzman
Ames, IA

Sandy Levi
Deerfield, IL

Bill Staples
Carmel, IN

BOARD OF DIRECTORS

Jill Heitzman
Auburn, AL

Greg Hartley
Miami, FL

Alice Bell
Agawam, MA

Ellen Strunk
Birmingham, AL

Delegate
Cathy Ciolek
Wilmington, DE

EXECUTIVE OFFICERS

President
John O. Barr
Davenport, IA

Vice President
Anne Coffman
New Berlin, WI

Secretary
Rubye Kendrick
Tyler, TX

Treasurer
Bill Staples
Carmel, IN

COMMITTEE CHAIRS

Awards
Sara Knox
Pickerington, OH

Bylaws
Pam Duffy
Adel, IA

Advanced Clinical Practice
Greg Hartley
Miami, FL

Education Coordinator
Alice Bell
Agawam, MA

Program (CSM & Annual Conference)
Jill Heitzman
Auburn, AL

PTA Advocate
Jean Reynolds
Maitland, FL

Home Study Course Editor
Susan Wenker
Stoughton, WI

Regional Courses
Missy Criss
Pittsburgh, PA

ACEE Co-Chairs
Marilyn Moffat
Locust Valley, NY

Karen Kemmis
Syracuse, NY

Journal of Geriatric Physical Therapy
Michelle Lusardi, Editor
Middletown, CT

Public Relations
Kerri Bednarcik
Yardley, PA

Listserv
Cathy Cidek
Wilmington, DE

Finance
Bill Staples
Carmel, IN

Membership Chair
Leon Bradway
Edgewater, MD

Cultural Diversity
Tsega Andemciael Mehreteab
Piscataway, NJ

Nominating Committee
Judith C. Canfield
Red Lodge, MT

Reimbursement/ Legislation
Ellen Strunk
Birmingham, AL

Research
Jessie VanSwearingen
Pittsburgh, PA

Web Site
Lucy Jones
Blackwood, NJ

ADVERTISING

Malisa Minetree
W 317/815-4688
FAX 317/582-0607
sweepingads@indy.rr.com

LIAISONS

APTA Board Liaison
Bill Bardy
Conway, AZ

IPTOP Liaison
Neva Greenwald
Jackson, MS

SPECIAL INTEREST GROUPS

Health Promotion & Wellness SIG
Priscilla Raasch-Mason
Raleigh, NC

Osteoporosis SIG
Carleen Lindsey
New Hartford, CT

Balance & Falls SIG
Judy Daniel
Rochester, NY

SECTION ON GERIATRICS APTA

Section Executive
Andrea Saevoon
Section on Geriatrics
1111 North Fairfax
Alexandria, VA 22314
W 800/999-2782 ext. 3238
FAX 703/706-8575
andreasaevoon@apta.org

SOG Website
http://www.geriatricspt.org

Geriatric Physical Therapy Listserv
Join at http:/groups.yahoo.com/group/geriatricspt and click 'Subscribe.' When you receive an email confirming your subscription, you have full access to member areas of the site.

PUBLISHER OF GERINOTES & JOURNAL OF GERIATRIC PHYSICAL THERAPY

Sharon Klinski
2920 East Avenue South, Ste 200
La Crosse, WI 54601-7202
W 800/444-3982 x 202
FAX 608/788-3965
sklinski@orthopt.org

If Wrinkles must be written on your brows,
let them not be written upon the heart.

The spirit should never grow old.

– James A. Garfield

CSM 2009
Preconference Courses: Section on Geriatrics
Mentoring the Clinician Beyond Entry-Level: Skills, Knowledge, and Behaviors for Successful Residency and Fellowship Mentoring

MONDAY, FEBRUARY 9, 2009,
8:00 AM–4:30 PM
7.5 Contact Hours

PRESENTERS:
Carol Jo Tichenor, PT, Ivan Matsui, PT, FAAOMP
Gail M. Jensen, PT, PhD, Didi Matthews, PT, DPT, NCS

Professional competence goes well beyond technical skills. Competence builds upon a foundation of clinical skills, scientific knowledge, and moral development. Mentorship is a critical element in the formation of a professional. This course will provide the participants with in-depth instruction in the skills necessary for residency and fellowship mentoring and an opportunity to apply those skills in interactive problem-solving situations.

Cosponsored by the following APTA sections: Acute Care, Federal Physical Therapy, and Women's Health. Members of the Section on Geriatrics and all cosponsoring sections register at a discount.

This 7.5-hour course is directed toward academic and clinical educators who are currently teaching in or considering developing residency and fellowship programs. The course will guide individuals in how to design, implement, and evaluate mentoring experiences in postgraduate residencies and fellowships. Topics will include: characteristics of a good mentor and how mentoring differs from traditional teaching, how to structure productive mentoring sessions to facilitate clinical reasoning, strategies for planning remediation sessions, methods for facilitating communication between faculty members and between faculty and residents, and assessment of the effectiveness of mentoring experiences.

Upon completion of this course, you will be able to:

- **Compare and contrast the characteristics of a good mentor and relate to one's own clinical teaching experience.**
- **Analyze and structure mentoring experiences to facilitate reflective thinking and enhance clinician growth.**
- **Guide the resident in implementing strategies for change.**
- **Design activities for developing and evaluating mentoring skills for new and experienced faculty members.**

Section on Geriatrics - APTA
GERINOTES
2920 East Avenue South, Suite 200
La Crosse, WI 54601-7202

APTA
American Physical Therapy Association
The Science of Healing. The Art of Caring.

Non-Profit Org.
U.S. Postage
PAID
Permit No. 149
La Crosse, WI