GERINOTES

SECTION ON GERIATRICS, AMERICAN PHYSICAL THERAPY ASSOCIATION

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WANTED: ARTICLES FOR GERINOTES

TOPICS: Anything related to older adults

CLINICIANS: Send me an article or an idea

STUDENTS AT ANY LEVEL: Send me papers you wrote for class

EDUCATORS: Send me student papers

Everyone loves to publish and it is easy!

Contact Melanie Sponholz, GeriNotes Editor
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PRESIDENT'S PERSPECTIVE: A TIME TO THANK MANY

John O. Barr, PT, PhD

I want use this occasion to formally thank the members of the Section on Geriatrics for allowing me to serve as President since 2006. Being associated with a dedicated, hardworking, and fun-loving team of board members, committee/taskforce chairs, editors, web/listserv masters, and liaisons to both the APTA and external organizations has afforded me truly wonderful opportunities for both personal and professional growth through service to our profession.

On 34 previous occasions, I've had to grapple with writer's block, make requests for deadline extensions, and face the ultimate disappointment of crafting essays not quite erudite or inspirational enough, nor as witty as those of Joel Stein in *TIME* magazine. This time, however, I simply want to acknowledge and extend my personal thanks to the cadre of Section colleagues who have especially made a difference in providing me with support and in advancing the Section during my tenure. These individuals include: **Alice Bell,** Vice President and point person on a range of challenging projects; **Anne Coffman Geers,** who prompted establishing an Executive Office independent of the APTA; **Bill Staples,** past Treasurer, who deftly managed good growth for our investments and stimulated donations to the Geriatric Fund of the Foundation for Physical Therapy to support aging-related research; **Cathy Ciolek,** our Delegate to the House, who has introduced a number of important initiatives over the years; **Ellen Strunk,** our go-to advisor on federal reimbursement matters and SIG liaison; **Greg Hartley,** our true utility player on the Board, who has championed geriatric clinical specialization and facilitated establishment of geriatric clinical residency programs; **Jill Heitzman,** who kept me from being an isolated Iowan on the Board, and has advanced high quality programming and policy in relation to the Combined Sections Meeting; **Marilyn Moffat, Dale Avers,** and **Karen Kemmis,** who collectively established our resource base related to exercise for older adults, culminating in the Certified Exercise Experts for Aging Adults program; **Ellen Miller** and **Bill Staples,** who were key organizers for our Exercise and Physical Activity in Aging Conference, held during the summer of 2010 at the University of Indianapolis; **Carol Schunk,** past editor of *GeriNotes*, who brought this practical publication to an award-winning level; Editor-in-Chief, **Michelle Lusardi,** and Associate Editors, **Dale Avers, Marybeth Brown,** and **Rita Wong,** for continuing to advance the quality and reputation of the *Journal of Geriatric Physical Therapy* and nudging us to an international caliber publisher; **Rita Wong,** as Chair of the Retooling for an Aging America Taskforce, which developed and disseminated our "Essential Competencies in the Care of Older Adults at the Completion of the Entry-level Physical Therapist Professional Program of Study;" **Lucy Jones,** Webmaster, who has advanced the functionality and usefulness of our Web site; **Evan Prost,** for his diligence in maintaining our listserv as meaningful open forum; and finally to **Tim Kauffman,** my initial and ongoing mentor on matters of importance in aging and geriatrics.

Certainly challenging times lay ahead for the Section on many fronts, and perhaps none greater than in relation to Association governance. Regardless of the governance format that our Association ultimately adopts, our Section (or its derivative organization) will always be THE advocate within our profession on issues related to optimal aging and high quality health for older adults. Based on past performance, I'm confident that our new President, Bill Staples, PT, DHS, GCS, will provide the leadership that will keep the Section on Geriatrics moving forward in the years to come.

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.*

Section on Geriatrics Seeks Two New Finance Committee Members

Responsibilities:

1. Review quarterly reports to gain understanding of the budget and point out major discrepancies.
2. Review draft budget provided by the SOG Office each fall. Formulate recommendations to the Board of Directors for how to make it a balanced budget. Participate in a Finance Committee Conference Call to formulate official recommendations to the Section Board of Directors.
3. Annually review the Investment Policy and recommend changes to the Treasurer.
4. Annually review budget and provide recommendation of support to the Foundation, if any.

Applicants must be a member of the Section on Geriatrics and maintain a working E-mail address in APTA/SOG's database. Finance Committee members report to the Treasurer who provides support throughout the term and is available to answer any questions.

Commitment: 3 year term, 6/2012-6/2015. Time estimate is 1-5 hours quarterly.

Interested applicants should send a letter of interest and qualifications to Karen Oshman, Section Executive at karen.oshman@geriatricspt.org by February 28, 2012.

EDITOR'S MESSAGE

Melanie Sponholz, MSPT, GCS

I can't believe we have already reached 2012! When thinking about what would make a good "Editor's Message" to kick off the new year, of course I thought of the New Years resolution theme. However, the more I thought about it, the less I wanted to talk about my resolutions (boring!), and the more I thought how interesting it would be to hear about the resolutions of all of the wonderful friends, colleagues, and contributors I have worked with all year. Below are the responses to my query for personal and professional resolutions for 2012. I hope they inspire you, as they did me. I wish you all a happy and prosperous year!

In 2012 (and beyond), I resolve to:

1. Avoid the use of the term "elderly."
2. Fight for reimbursement of high-quality physical therapy care for older adults in all settings.
3. Help educate physical therapy practitioners and third-party payors about physical therapists' and assistants' potential in improving the quality of life of aging adults.

Dale Avers

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We need to keep advocating on behalf of our patients, promoting our profession and the value we bring to our clients. We are about the 99%, and if we advocate for them, we hopefully will have more success with CMS, Congress, and the ever increasing scrutiny on what we do.

Staying the course, focusing on the patients' needs and not our own, will keep us around in the new healthcare system.

Ken Miller

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To stay actively involved with the SOG after retirement from office.

John Barr

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May we treat those around us as we would want to be treated.

Smile because it makes everyone feel better.

Be intent on seeing the best in those we work with and for.

Strive to enter each encounter desiring to encourage and uplift.

Be brave enough to share our souls with those whom we trust and admire.

And be ready at a moment's notice to extend our hand to heal, refresh, and listen.

Lucy Jones

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Resolutions:

1. That physical therapists are truly recognized as exercise experts across the life span;
2. That aerobic, strength, flexibility, balance/coordination/agility, gait, and postural exercises are inherent components of every physical therapist's practice;
3. That these exercises are prescribed for all disorders/diseases/conditions seen by physical therapists;
4. That exercises in every category are prescribed at appropriate intensities, so that each and every patient/client does not waste a minute of their time while under the guidance of their physical therapist;
5. That no age bias exists in physical therapist exercise prescriptions; and
6. That a physical therapist screen becomes a part of the Welcome to Medicare program.

The CEEAA Team, Marilyn Moffat, Karen Kemmis, Mark Richards, Bill Staples, Jill Heitzman, & Jill Hackney

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To maintain some level of balance in my life, keeping all spokes of the wheel intact; health, family, professional life, grad school, etc.

Susan Wenker

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Savor every moment with your loved ones, for it can all change in an instant.

Tamara Gravano

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To continue to educate and encourage both students and therapists in the importance of active participation in our professional association at both the state and national levels.

Karleen Cordeau

Personal: A year flies by so fast, and as I look back, I see that I tend to fill it with tasks on my to-do list. In 2012, I want to make it a priority to have more fun, to treat myself well, and to develop an attitude of gratitude for the blessings in my life.

Professional: I am very grateful for my profession and proud of the work we do; therefore, in 2012 I commit myself to expanding my community service efforts and increasing my advocacy for physical therapy and my patients. I resolve to help patients share their personal success stories with their Congressional representatives by providing all of the tools for advocacy, upon discharge.

Carole B. Lewis

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As incoming President of the Section, I resolve to do the best job I can for the members!

Bill Staples

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I would like to:

1. Eliminate age bias in speaking about, educating, and treating the aging adult.
2. Promote being more respectful in communicating with and about those with disabilities, using patient-first language at all times.
3. Educate communities about the communication/respect needs of those with various disabilities.

Jill Heitzman

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To learn to be so satisfied and happy with all I have and all that is around me that a bucket-list is just wretched excess

Andrew Guccione

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I resolve to give my wife and family more of the right attention, as my love for not only them, but more recently our old folks, has joyfully consumed my life. I reaffirm my commitment to my family, continuing to do the right thing, and always fighting the good fight.

Tim Fox

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To finish my PhD dissertation!

Rebecca Galloway

DOES TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION AFFECT THE COGNITION, MEMORY, OR BEHAVIOR OF PATIENTS WITH DEMENTIA?

Robert S. Shutes, PT
Advisor: Cheryl Anderson, PhD, PT

INTRODUCTION

Electrical stimulation in its many applications is a well-established therapeutic modality in widespread use for a number of medical conditions. Automated external defibrillators (AEDs) are used for the emergency treatment of cardiac arrest, and Deep Brain Stimulation can provide relief of Parkinson's symptoms. Orthopedic surgeons prescribe electrical stimulation for the treatment of non-union fractures. Transcutaneous electrical nerve stimulation (TENS) has a role in the rehabilitation of spinal cord injuries[1] and stroke,[2] and has been used successfully to treat phantom pain after amputation.[3] Transcutaneous electrical nerve stimulation has been shown to relieve the pain of childbirth[4] and headache.[5] Physical therapists commonly employ TENS for the treatment of pain and functional electrical stimulation for muscle re-education protocols. Transcutaneous electrical nerve stimulation has been used to stimulate peristalsis in cases of postoperative ileus. Micro-current Therapy has documented efficacy in wound healing, and Speech Therapists often use electrical stimulation for the treatment of dysphagia. This paper addresses another possible use for electrical stimulation, can transcutaneous electrical nerve stimulation improve the cognition, memory, or behavior of patients with dementia?

Alzheimer disease (AD) affects 5.5 million people in the United States, with the total projected to increase to roughly 15 million by 2050. The causes of Alzheimer disease are not altogether clear, but current science indicates there are multiple factors involved including protein abnormalities, synaptic failure, neurotransmitter depletion, mitochondrial dysfunction, axonal-transport deficits and oxidative stress. The disease is characterized by "a deterioration of memory and other cognitive domains that leads to death within 3 to 9 years after diagnosis."[6] The primary risk factor is age, although genetic predisposition is also a factor. There is no known cure for AD, and the few available treatments for early and mid-stage AD are aimed at slowing the progression of symptoms and ameliorating its devastating effects.

The cognitive losses associated with Alzheimer disease have an impact, not only on affected individuals, but on the caregivers, families, institutions, and ultimately, the society responsible for the care of the demented geriatric patient. Combined Medicare and Medicaid spending on Alzheimer disease were projected to increase by 54% and 80% respectively in the last decade, reaching $82.3 billion annually by 2010.

The direct and indirect costs to business when workers become caregivers for a relative with Alzheimers has been estimated at over $60 billion per year not counting the direct costs to caregivers of lost wages.[7] The prevalence of caregiver depression has been estimated at 43% and reflects the enormity of the emotional, psychological, and physical demands that result from caring for an Alzheimer patient at home.[8]

The statistics given above are compelling reasons why a review of the possible benefits of TENS is an important topic. Caregiver stress and depression are profound, as is the loss of independence and cognition for the individuals who suffer from Alzheimer related dementia. These issues make a critical review of this topic both timely and important.

METHODS

PubMed and Medline searches were done on multiple dates in March-May, 2011. Key words used were: TENS, electrical stimulation, dementia, cognition, depression, and Alzheimers. Journal specific searches were also completed using these key words and other searches were conducted for additional articles by researchers who had published studies of interest. Articles accepted for review explicitly and specifically addressed the clinical question posed in the introduction. No articles were included for review that focused on applications of TENS that are already well-established therapeutic interventions. Physiological or foundational research studies that exclusively addressed the underlying mechanisms and causes of Alzheimer dementia were excluded. Sixteen articles of particular interest to this writer were found, and 5 of these were selected for review.

Critical Reviews

Scherder et al[9] conducted a study to address limitations of previous studies showing that TENS can result in improved cognitive and affective status in subjects with Alzheimer disease.[10,11] In the previous studies, TENS was administered in the presence of a physical therapist who engaged the subject in direct face-to-face conversation for the duration of the 30-minute treatment session. Because interaction with the therapist may have played a part in the positive outcomes that were reported, the purpose of the Scherder study was to rule out the interpersonal communication as the determining factor. "Isolated" TENS refers to treatments provided without the therapist present for the entire treatment session.

A total of 18 subjects between the ages of 78-92 (mean age 83.4) years were selected from 500 individuals living in a residential home for the elderly in Amsterdam, The Netherlands. All subjects met established Dutch criteria for a diagnosis of probable Alzheimer disease in a relatively early stage. Exclusion criteria were well defined and appropriate. Subjects were then randomly assigned to

an experimental or control group, and it was determined that the groups were well matched in ages and performance on a Dutch Cognitive Screening Test (CST).

A comprehensive test battery of 6 different neuropsychological assessments was used to measure varying aspects of memory. Affective behavior was measured with the BOP assessment (a standard factor-analyzed rating scale for the elderly) and a Behavior Inventory developed by the authors of this study to measure 12 affective traits (mood, anger, depression, fatigue, activity, elation, shyness, anxiety, conscience, etc.). Behavior was evaluated by a blinded group of 10 nurses trained to observe patient behaviors, and all scoring was by group consensus. Subjects and their families were also blinded to group allocation, as was the investigator who conducted the cognitive pre-/posttesting and follow-up testing 6 weeks after treatments had ceased.

Subjects were treated with Burst Mode TENS in an effort to simulate as many types of afferent nerve fibers as possible. Subjects were seated to receive 30 minutes of TENS applied dorsally with a two-electrode array spanning the spine at the T1-T5 level. Intensity triggered visible muscle twitches but was at pain free levels according to patient feedback. Subjects in the control group were informed that the treatment could not be felt but would begin when the TENS unit's green light began to flicker. The therapist left the room when "treatment" began, except for a few brief check-ups on the subject.

Pretreatment test results for the neuropsychological battery were normally distributed according to univariate and MANOVA analysis. ANCOVA results indicated significant treatment effects for visual memory, face recognition, and verbal fluency in the experimental group, whereas these measures all declined in the control group for both end-of-treatment and delayed test results. Treatment effects were still observed in the experimental group after 6 weeks with no treatment and were better than pretreatment levels. No improvements were seen in the control group, while verbal fluency declined in the same period.

The BOP scale assessment t tests revealed no significant pretreatment differences between the control and experimental groups. The ANCOVA results revealed a significant improvement in the "Need of Help" category in the experimental group, while the control group showed a decline; however, these gains in the experimental group did not remain after 6 weeks without treatment. No treatment effects were observed with any other BOP scale measures or with the individual measures or overall scores on the Behavior Inventory developed for this study.

The authors concluded that isolated TENS (provided without a therapist present) has a statistically significant therapeutic effect on verbal and nonverbal short-term memory, verbal fluency, and on subjects' independent participation in Activities of Daily Living but does not have a similarly beneficial influence on affective behavior. By comparison, it is worth noting that an earlier study did result in improved affective behavior when TENS was administered by a therapist who maintained face-to-face direct communication with the subject throughout the treatment session.[11]

Limitations identified by the authors include a relatively small sample size and the fact that the therapist administering the treatments was not blinded. On the other hand, therapists who administered treatment did not do any assessments of neuropsychological, affective, or behavioral status. This study was well conceived and conducted, and the authors' conclusions are worthy of serious consideration. Additional studies with a much larger sample size and refined methodologies are warranted.

Yi Guo et al[12] conducted a study to assess the effects of TENS applied to the face of subjects with mild or severe AD. Earlier studies have shown improvements in short and long term memory and verbal fluency when TENS was applied to the back of subjects with early stage AD. Somato-sensory peripheral nerve stimulation is known to stimulate the activity of the hippocampus and hypothalamus, both thought to have a key role in mediating the formation of memory. By applying TENS to an area of the body with greater cortical sensory representation than the dorsal thoracic area, the authors were investigating whether an alternate electrode placement site would improve memory formation by enhancing these effects via neuronal stimulation.

Subjects in the study were 14 elderly nursing home patients in Japan who were randomly selected from a nursing home population of 80 residents. Subjects' ages were from 57-95, with a mean age of 77.2 years. Cognitive function was then measured with the most widely used dementia scale in Japan, the revised Hasegawa Dementia Scale (HDS-R), which confirmed that all subjects met established criteria for a clinical diagnosis of probable dementia. A categorical description of mild or severe dementia was ascribed to each subject based on established thresholds, and assignment was then made to either a TENS or placebo group for each designated level of dementia. There were 3 subjects in each mild dementia group and 4 subjects in each severe dementia group. Subjects received 30 minutes of TENS or placebo treatment for 30 minutes every other day for 4 weeks, while the researchers spoke with the subjects face to face for the entire treatment session. An attempt was made to blind the subjects of this study, but therapists applying the TENS or placebo treatments were unavoidably aware of which option they were implementing.

In addition to assessment with the HDS-R, a nonverbal short-term memory test using 7 pictures (SMT-7) was administered. An assessment of the pupillary reflex to light reaction time, a physiological function affected by AD, was also carried out. All assessments were performed prior to and immediately following the 4-week course of treatment and once again 6 months later.

Statistical analyses included two factor ANOVAs for the cognitive evaluations and for 3 discrete parameters of the pupillary reflex to light test. Statistically significant changes were seen in the mild dementia TENS group for a number of cognitive functions immediately after treatment, but no cognitive gains remained 6 months later. There were no cognitive gains reported for either of the severe dementia groups, other than an immediate change in place orientation. Significant changes were seen for the pupillary reflex to light test in both TENS groups and the mild AD placebo group. The authors conclude that TENS applied to the face brings about statistically significant improvements in the cognitive abilities of individuals with mild

dementia and physiologically significant effects in both mild and severe cases.

While the authors do provide a plausible neuro-physiological model to explain these findings, there are serious limitations to this study that they acknowledge. First and foremost is the very small sample size and limited power of this study. They also state "communication between the therapist and subjects might have had some effect." This could explain why the mild AD placebo group showed gains in pupillary reflex times, since communication and interaction with another human being could be viewed as a type of multisensory stimulation, and subjects with mild dementia would be more able to engage in and benefit from verbal communication than subjects with severe dementia.

I conclude that although this study offers some tantalizing prospects for the treatment of Alzheimers, a much larger sample size would be needed to put much confidence in the results. In addition, and as has been seen with other studies, future research needed to rule out the effects of face-to-face communication with the therapist as the potentially therapeutic agent.

Luijpen et al[13] addressed the effects of TENS on individuals with Mild Cognitive Impairment, as opposed to those diagnosed with Alzheimer disease. Single Domain or "Amnestic" Mild Cognitive Impairment (MCI) is characterized by memory impairment without a concomitant decline in general cognition or the activities of daily life. Mild cognitive impairment patients with additional impairments, orientation for example, are categorized as having Multi-Domain MCI. It is known that individuals with Multi-Domain MCI suffer from deteriorating executive functions and are at greater risk of developing AD. Transcutaneous electrical nerve stimulation has previously been shown to have a positive effect on executive function and depression in patients with mild forgetfulness and AD. In this study, the authors wished to assess whether the application of TENS would have a beneficial effect on the mood and self-efficacy of elderly persons with MCI living in a residential home for the elderly.

It has been observed that the supportive environment of a residential home for the elderly can cause a decline in independent functioning for roughly one of 3 residents after just one year of institutionalization. Because traditional measures of independence include several activities of daily living not required in residential care facilities (ie, shopping, meal preparation, cleaning, etc.), an alternate measure called self-efficacy was employed to assess executive functioning.

Subjects in the study were 34 individuals with MCI between the ages of 76-98 years residing in a residential facility. The mean age was 88.06 years for the experimental group and 87.35 years for the control group. Differences in age, gender and level of education for the two groups were not significant; however, the groups differed significantly on mean scores, standard deviations and norms for results of testing with the Mini-Mental State Examination (MMSE). Subjects were screened with a battery of neuropsychological and cognitive tests to rule out diagnoses of probable AD. The screening procedure also included self-reports from subjects, assessments by nursing and medical staff, and reviews of subjects' medical records. Subjects accepted into the study then underwent additional neuropsychological testing to support the diagnosis of MCI.

Self-efficacy was measured using a Dutch version of the General Self-Efficacy Scale (ALCOS) to assess competence, perseverance and initiative; the Groninger Activity Restriction Scale (GARS), a mixed ADL/IADL scale; and the Philadelphia Geriatric Center Morale Scale (PGCMS). Depressive symptoms were measured with the Geriatric Depression Scale (GDS). The test-retest reliability and internal consistency of these assessment tools was discussed by the authors and appears adequate.

To activate A-Beta, A-Delta, and C fiber afferent nerves and stimulate the pre-frontal cortex, a Burst TENS modality was chosen. Electrodes were applied to the subject's back at the T1-T5 level and subjects were treated for 30 minutes, 5 days/week for 6 weeks. Stimulation intensity resulted in muscle twitches but was below the threshold of pain. An attempt was made to blind subjects by informing them that stimulation began when the green light flickered on the TENS unit, regardless of whether or not they perceived any sensation. It was not possible to blind the therapist(s) providing treatment. The authors did not report whether or not the therapist remained present with and/or communicated with the subject during treatment. Tests of self-efficacy and depression were administered 6 weeks prior to the study, just prior to the beginning of treatment, immediately following treatment, and 6 weeks after treatment ended, by an independent investigator who was blinded to group allocation.

Both pretreatment measurements were pooled within each group to improve discriminative power, and subsequent ANCOVA results indicated that MMSE scores did not have a significant effect on either self-efficacy or depression scores. When an ANCOVA showed a group effect for an outcome measure, post-hoc testing was done at a 0.05 significance level to analyze differences between the experimental and sham group.

Self-efficacy, as measured by the ALCOS, did not show statistically significant improvement in the treatment group, but a significant decline for this measure was seen in the placebo group. A similar result was seen with the GARS, showing no gain in self-efficacy for the experimental group while a decline was observed in the sham group. There were no significant changes in self-efficacy, either positive or negative, for either group when results of the PGCMS were analyzed. Analysis of the Geriatric Depression Scale results showed a significant increase in depression scores for the placebo group, and a nonsignificant decline took place with the experimental group. Overall, the declines in the placebo group were more significant than the gains in the experimental group. No power calculations were discussed by the authors.

The authors acknowledge "the absence of a statistically significant beneficial effect of TENS treatment on self-efficacy and mood in an MCI population." They further propose that the decline in the placebo group may have been due to a "nocebo" effect that is analogous to a placebo effect but exerts an effect in the negative direction instead. Although the authors offer a lengthy possible rationale for this effect, their discussion is entirely speculative and less than convincing. A discussion of the progressive nature of cognitive declines was in order, but was not offered as a possible explanation of

the results that were reported. In addition, while an argument was made that the differences in group composition were insignificant factors, due to lack of effects from MMSE differences per the ANCOVA results, this is a factor worthy of additional consideration and review. A larger study with more evenly matched groups should be considered when weighing the results of this research.

In this writer's opinion, even though no statistically significant positive benefit of TENS for an MCI population was demonstrated, it cannot be concluded there was no practical benefit derived, since there was clearly a difference seen between the end-status of the experimental group that suffered no decline and the control group that did. This is similar to the results reported for a trial of the drug Memantine (Namenda) for Alzheimer symptoms, in which the placebo group suffered significant cognitive deterioration while the experimental group maintained a nearly stable cognitive status.[14]

Van Dijk et al[15] designed a randomized clinical trial to investigate the effects of TENS on the behavior and cognition of subjects with AD who still live at home. Earlier studies conducted with nursing home residents diagnosed with AD showed positive effects on memory, verbal fluency, activities of daily living, affective behavior, and several measurable physiological responses, but most of these studies were limited by very small sample sizes. The authors wished to see if these effects were replicable in a different environment, with a larger sample size and with treatments provided by trained family members. A placebo-controlled, parallel group clinical trial was conducted to answer these questions.

Participants were men and women diagnosed with "probable Alzheimer disease" living at home, with a family member serving as the primary caregiver. Subjects were recruited from a University Hospital's Alzheimer Center and the community home care agency in Amsterdam, The Netherlands, according to clearly defined inclusion and exclusion criteria. A total of 68 subjects were included in the study and randomly assigned to either a placebo or verum TENS group, with treatment provided by a blinded family member for 30 minutes daily for 6 weeks. The family member was trained in TENS application by a non-blinded neuro-psychologist. Electrodes were placed lateral to the first thoracic vertebra with settings resulting in no sensation (placebo group) or painless but visible muscle twitches (verum group). The time of day for treatment was at the discretion of the caregiver and the AD subject, so as not to interfere with established daily routines. Subjects, caregivers, and test administrators were all blinded to group allocation.

The complete case method of statistical analysis presented was well conceived and thorough and is one of the major strengths of this study. Power calculations were not provided by the authors, but the sample size was considerably larger than any previous study. Group measures of cognitive, verbal, emotional, and ADL status were subject to independent t tests, for normally distributed data, and Mann-Whitney U tests, for categorical data. Square root or log transformations were employed for dependent variable data that were not normally distributed, and treatment effects were analyzed with ANOVAs using the transformed data and a significance level of 0.01. This study did not assess any purely physiological measures.

No treatment effects were reported in any of the factors investigated by this study. Emotional well-being, cognition, verbal fluency, and ADL status as reported by subjects and family caregivers, were not statistically different between the verum and placebo groups. Caregivers reported little difficulty using the TENS devices and low efficacy of treatment regardless of group assignment. The authors conclude that the larger sample size in this study may be interpreted as invalidating the results of earlier studies showing the beneficial effects of TENS in the treatment of AD; however, they observe that a lower mean level of cognitive function in the groups to begin with may have been a factor. The higher percentage of early onset AD subjects in this study may have skewed the results, since it is known that the level of effects with other modalities (including pharmacological agents) are dependent on severity of disease.

There are many limitations to the current study that should be noted. The particular choice of waveform is physiologically plausible, but given the nascent nature of our understanding of the effects of electrical stimulation on cognition it should not be viewed as necessarily optimal. Other waveforms should be explored to determine whether this plausibility equates to actual superiority. The locus of electrode placement dorsally, in an area of relatively low cortical sensory representation, should be reconsidered. It is known that memory formation is actually enhanced in the presence of stressful events and stimuli, and it could be argued that placing electrodes in an area of increased sensitivity and at levels near or at a noxious threshold should be studied. The decision to provide treatment once daily for 30 minutes is somewhat arbitrary and may be below the dosage needed to produce a statistically significant result. It may be that treatment for dementia could follow many clinicians' observation that TENS can be very useful when applied for extended periods of time, and that during the application, and for an indeterminate period after, there is benefit to be had in pain control. Perhaps dementia could be viewed as an analogous cognitive "pain" that would follow a similar pattern. While it may have been convenient to apply the TENS treatment without regard to time of day, and without consistency at individual or group levels, this could certainly have been a factor. "Sun downing" is a well-known cognitive phenomenon that is related to time of day and is thought to be affected by level of multisensory input and perhaps the physiological bio-rhythms associated with night and day. Consistency in time of application would have added credence to this study and perhaps have added to our insight into ways to address the growing national dilemma of providing care for elderly individuals with dementia.

Because of the profound impact of dementia on those who suffer from it and those who care for them (and the paucity of effective treatments at our disposal), there is a need for additional studies of the effects of TENS on the cognition, ADLs, verbal fluency, and emotional well being of dementia patients. Studies that address the limitations described above are in order.

Van Dijk et al[16] is built upon earlier research[17,18] revealing a positive effect of TENS on the rest-activity rhythm of Alzheimer disease patients. Abnormal sleep

patterns are a common symptom of Alzheimer disease and often a precipitating factor leading to institutionalization.[19] The findings of both this and the previous studies were important, but all were limited by small sample size. The authors of this research were attempting to replicate the results of earlier studies, but with a randomized, placebo-controlled, parallel group study using a much larger sample.

Subjects were men and women with a diagnosis of probable AD who were living at home with a family member as primary caregiver. Inclusion and exclusion decisions were based on normative diagnostic, pharmacologic, and medical status criteria. A total of 68 subjects were selected for the study and randomly assigned to either an experimental or sham group. No statistically significant differences were found between the groups based on post-hoc MANOVA results or chi-squared tests. In addition, each group was further divided into groups of individuals who were taking prescription acetylcholinesterase inhibitors (AchEI) and those who were not. This was done to assess the theoretically plausible interaction of these pharmacological agents and electrical stimulation on the cholinergic system involved in sleep and rest-activity rhythms.

Group allocation was randomized by a simple coin toss, and subjects were blinded by explanations of subjective effects that included the concept that treatments might be effective or non-effective regardless of what sensation was felt or not felt. Researchers who trained family members to apply the TENS treatments were not blinded, but subjects, family members, and test administrators were blinded to group allocation. Burst mode TENS parameters were set to optimize stimulation to the cortical and subcortical areas thought to be important in circadian rhythm modulation. Electrodes were applied to the back at the level of the first thoracic vertebra and intensity was set to produce muscle twitches below the threshold of pain as reported by subjects. Treatments of 30 minutes per day were given at whatever time of day was convenient for the subject and caregiver, and were provided 7 days per week for 6 weeks.

Rest-activity rhythm was assessed by actigraphy, using an "actiwatch" (Cambridge Neurotechnology Ltd, Cambridge, United Kingdom) worn on the dominant wrist to best measure optimal variability of motor movements. This methodology is considered a valid measure of rest-activity rhythms for both healthy and demented elderly.[20] The results of 4 days of actigraphy were analyzed based on guidelines developed by the American Association of Sleep Medicine.[21] Three nonparametric variables were assessed using pooled data (pretest and delayed test results). These variables were inter-daily stability (IS), intra-daily variability (IV), and relative amplitude (RA). Paired t-tests revealed no significant differences between pre- and delayed test results, and using pooled data, provided increased power for the repeated measures analysis of variance (ANOVA) employed to analyze the data. Post-hoc analyses of interaction effects between TENS and AchEI medications were also carried out.

Repeated-measures ANOVA results indicated significant effects for relative amplitude measures ($P < 0.001$) and "near significant" effects for the IS and IV measures in the experimental group, while a significant worsening ($P = 0.002$) for RA occurred in the placebo group. However, this worsening was temporary and was no longer evident 6 weeks after treatments ceased. Interaction effects related to AchEI medications accounted for 15% of the variance in results between the AchEi and non-AchEI groups, with the non-AchEI group experiencing a better outcome. The significant group effect on RA was attributed to the temporary worsening (perhaps due to a nocebo effect) in the placebo group, rather than an actual improvement in the experimental group. The results of this study are in harmony with similar findings of earlier studies,[18,22] lending credence to the trends and directions of the effects that were seen.

A limitation to this study is that there may have been a bias in the selection of non-AchEI users for inclusion in the study that occurred prior to random allocation into groups. An interesting question worthy of additional investigation is why the non-AchEI group benefited from TENS while the AchEI group did not, since the groups were evenly matched in other characteristics and demographics. The significant or near-significant treatment effects observed on the rest-activity rhythms of AD subjects lead the authors to conclude that electrical stimulation may be of benefit for AD patients, even though behavioral outcomes were not significantly affected based on subjects' self-reports or caregiver questionnaires.

A serious (and commonly seen) limitation of this study was methodology that allowed treatments to be given at whatever time was convenient for the participants. Given the fact that circadian rhythms are altogether about timing and biologically regulated schedules, it makes little theoretical sense to this writer to ignore the timing of the "dose." This seems as nonsensical as researching the effects of insulin on blood glucose levels by directing diabetic subjects to take a daily dose of insulin "whenever it is convenient," and then later searching for significant time related effects. In addition, there may be other measures that are clinically significant and would be more relevant than the subjective self-reports of demented individuals and questionnaires completed by fatigued caregivers who may or may not be objective observers or reporters of subject behavior. A more appropriate measure might be comprehensive assessments of the psychological well being of the caregivers, rather than simple measurements of subjects' motor activity. This writer concludes that the benefits of electrical stimulation seem physiologically plausible and potentially important, and that additional studies with improved methodologies and measures are indicated.

DISCUSSION

The purpose of this paper was to critically evaluate current research addressing whether TENS has a beneficial effect on the cognition, memory, or behavior of patients with dementia. No studies revealed any statistically significant affective benefits (for subjects) from TENS treatments. However, studies that assessed physiological parameters found significant effects on pupillary reflex times and rest-activity rhythms. These physiological changes did not necessarily result in clinically significant benefits. Two studies reported memory and behavioral effects, while verbal fluency was improved in one early study. Arriving at clear conclusions about the overall effects

of TENS for AD is complicated by the different methodologies and outcome measures that were employed in these different studies.

A number of common limitations and possible solutions that might point the way for further research are discussed here. Attempts to blind subjects and other participants were only partially successful and may be enhanced by alternate methods that involve more sophisticated technologies. One blinding option would be to provide diversionary audio, visual, or even tactile sensory distractions associated with the TENS device, such that "something" more noticeable than a small green light would be experienced by subjects. An actual TENS treatment could be embedded in a multisensory device/experience, with the actual treatment effects then being elucidated by later statistical analysis. Electrodes have typically been applied dorsally at upper thoracic levels, seemingly limiting the sensory component experienced by subjects due to the relatively low cortical representation of that body area. Since research into the potential cognitive benefits of TENS is not conclusive, it may also be premature to ascribe undue efficacy to any particular waveform. While eliciting a pain free muscle twitch may seem preferable on theoretical and physiologically plausible grounds, there is no research that unequivocally demonstrates the superiority of this approach. In addition, there seems to be a consensus approach for providing 30 minute treatment sessions, but this may have more to do with convenience than with the demonstrated advantage of 30 minutes over other treatment duration times.

It is not unreasonable to view dementia as a type of cognitive "pain" that is analogous to physical pain in some respects. We do not generally expect other physiologically based conditions to show an enduring response after the application of a chosen therapeutic modality, whether it be a physical or pharmacological agent. In fact, we recognize that a great many conditions are only successfully managed while an intervention is actively being provided or is present at therapeutic titrations. Hence, we do not offer anti-hypertensive medication and then search for a delayed response, but instead look for a response while the dosage is still present in the body. The same logic prevails with the use of oxygen for cardiopulmonary conditions, insulin for diabetes, and narcotic or non-narcotic analgesics for pain. Perhaps the most sensible approach would be to provide TENS for 12 to 16 hours daily, which is sometimes the case when TENS is used for physical pain. It makes good theoretical and clinical sense, based on these precedents, to research the effects of TENS while treatment is actively being provided. It may be that beneficial effects are most notably present concurrent with treatment rather than afterwards.

One of the more glaring limitations of most studies, at least in this writer's view, is the commonly accepted practice in this type of research to have the TENS treatments given at whatever time of day is least disruptive to subjects' and caregivers' schedules. It is well known that there are many important biological and physiological functions that follow well-defined cyclical patterns, including core temperature, basal metabolic rate, level of alertness, and blood pressure to name just a few. Diabetics know that the timing of insulin injections is a critically important issue, and clinicians realize that individuals in pain are benefited most by medication schedules that are closely adhered to. Because rest-activity rhythms and levels of alertness/cognition are especially fragile in dementia ("sun-downing" for example), leaving the timing of TENS treatment as an uncontrolled variable seems theoretically ill advised.

While many of the measures used in these studies do appear to have face validity, it is not necessarily the case that the best measures for detecting treatments effects from TENS have actually been used. Caregiver stress is one factor in particular that stands out as a possible candidate for selection as an important dependent variable. Studies that measure the impact of TENS on the emotional, physical, and psychological well-being of primary caregivers would be valuable, since caregiver stress, burnout, and depression are important factors and predictors of institutionalization.

CONCLUSION

The cognitive deterioration commonly seen in Alzheimer dementia comes with calamitous personal consequences for those who suffer from its effects directly, as well as serious negative effects on caregivers and society as a whole. The emotional, financial, psychological, and relational costs are large and are growing at an alarming rate as our national demographic tends toward increased longevity. At this time pharmacology is of limited benefit, there are few treatments available, and no known cure. There are some indications that transcutaneous electrical nerve stimulation may have the potential to be of significant therapeutic benefit, but much research remains to be done if this is to be established. Because of the prevalence and profound consequences of dementia, it is hoped that additional studies addressing the limitations and suggestions offered herein might be conducted.

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TYPE II DIABETES MELLITUS: EXERCISE PRESCRIPTION AND IMPLICATIONS FOR PHYSICAL THERAPY

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Diabetes mellitus (DM) is a chronic metabolic syndrome with wide-ranging effects on multiple body systems that have significant clinical implications for physical therapists (PTs) practicing across a spectrum of care, primary to tertiary, and in a wide variety of settings (acute care, rehab, home care, wound care, outpatient, pediatrics). Attention to DM is critical as it has been identified as the 7th leading cause of death in the US, causing a loss of life expectancy for diabetics of up to 15 years and a 2 to 4 fold increase in risk for heart failure.[1] The incidence of DM has been on the rise domestically and worldwide and is alarming. According to the 2011 National Diabetes Fact Sheet, there are an estimated 25.8 million children or adults with diabetes in the US, or 8.3% of the total population.[2] Of that number, approximately 90% to 95% have Type 2 DM (T2D). Adults with T2D will be the focus of this paper.[2] Other names used in the past for this condition are adult-onset DM and non-insulin dependent DM (NIDDM).

Healthy People 2020 (HP2020), the U.S. Department of Health and Human Services' 10-year goals and objectives for health promotion and disease prevention, identifies the following goal related to DM, which embraces outcomes of significant interest to all PTs: "reduce the disease and economic burden of DM and improve the quality of life for all persons who have, or are at risk for, DM."[1] A key tool for physical therapists in achieving this goal is the modality of exercise. According to Goodman and Fuller, "an overwhelming body of evidence now exists that acute muscle contractile activity and chronic exercise improve muscle glucose transport and whole body glucose homeostasis in the person with T2D." Furthermore, "exercise and physical activity have been shown to independently reduce the risk of total and cardiovascular mortality of adults with T2D."[3]

In the profession of physical therapy, a multitude of patients have T2D, varying from individuals with a "simple" co-morbidity to those with amputation, wounds or stroke that may be the sequelae of this condition. The breadth of this disease leads us to focus on the adult T2D population for the purposes of this paper. The pathophysiology of DM will briefly be addressed as it relates to exercise testing and prescription for these patients, as well as, contraindications.

PATHOPHYSIOLOGY

Fundamentally, DM must be understood as a chronic, systemic and metabolic disorder.[3,4] It is a condition that is managed, not cured, affects multiple body systems, and involves not only fluctuating blood glucose (BG) levels (whether classic hyperglycemia or reactive hypoglycemia) but also disruption of carbohydrate, fat and protein metabolism. These considerations all have direct impact on the physical therapists' use of exercise testing and prescription in treating patients with T2D.

Type 2 diabetes has a much greater incidence, comprising >90% of total DM patients. It involves a pathogenesis of combined muscle cell resistance to insulin action, known as insulin resistance, as well as an inadequate insulin secretory response, also known as insulin sensitivity.[3,5] The end result is that the normal uptake of BG by the liver, skeletal muscle or fat cells for fuel storage following a meal does not occur, leading to accumulated BG that is then exacerbated when the liver responds by releasing excess glucose into the general circulation. A hyperglycemic state is thus created.

It is at this point (insulin resistance and sensitivity) that the documented benefits of exercise can be seen. A 12 to 72 hour increase in insulin sensitivity following exercise allows the utilization of available BG and decreases the hyperglycemic state. Acute skeletal muscle contractile activity also decreases insulin resistance at the cellular level and thereby promotes glucose homeostasis. Increased carbohydrate metabolism and high-density lipoprotein (HDL) levels, maintenance of optimal body weight, and decreasing triglycerides, blood pressure, stress, and tension have also been documented effects of regular exercise.[3]

EXERCISE TESTING RECOMMENDATIONS

There are a myriad of tests that can be employed to assess cardiovascular and muscle endurance in people with T2D. This matches the spectrum of patients that may be seen by PTs. For example, a patient may be seen for low back pain but have diet-controlled T2D as a co-morbidity (secondary care), or a patient with T2D following an amputation would require tertiary care. This great variability in presentation requires a diverse approach to exercise testing and, subsequently, exercise prescription.

When assessing muscular endurance, ie, 30 to 90 second durations, various standardized exercise tests may be employed, or a test may be modified to meet the needs of the patient. The American College of Sports Medicine (ACSM) describes the Push-up, Curl-up (Crunch), and YMCA Bench Press tests for evaluating muscular endurance.[6] These may be difficult to perform in individuals with T2D secondary to obesity or deconditioning. Thus, two other tests are recommended: the 30 second Sit to Stand test (30s STS)[7-9] and the Arm-Curl test.[7,8] These tests allow easy comparison of patient performance to normative data based on age and gender, and the latter two tests appropriately meet

the needs of the diversity of adults with T2D. Specific directions and normative data for the 30-second STS and Arm-Curl tests can be found in Appendix A.

Jones and colleagues introduced the 30-second STS to assess lower body strength in community-dwelling older adults. The number of sit-to-stand transfers without arm use are measured in a 30-second period. Test-retest reliability in community-dwelling older adults has been demonstrated. In addition to comparison to age-matched norms, this test is predictive of falls (if ≤ 14.5 reps, sensitivity = .88, specificity = .70).[7-10] This test can be modified to allow use of arms, but documentation and the assessment of the patient's performance should reflect this modification, and results cannot be compared to normative data.

A similar test that may be employed with patients who have compromised lower extremity use is the Arm-Curl test. This test requires only the use of a straight chair and dumbbells; the patient performs as many arm curls as possible with an 8- or 5-pound dumbbell in 30 seconds. Normative data is available for comparison.[7,8]

As with muscular endurance tests, there are a multitude and variety of tests which assess the aerobic metabolic pathways. These range from maximal to submaximal graded exercise tests (GXT) on a treadmill, bike, or upper body ergometer (UBE), to the 6-minute walk test (6MWT), to bench stepping, to seated step tests, to performance tests. Standard protocols are described in many resources.[6,11-15] It should be noted that performance tests, as described by Noonan and Dean, measure "responses to standardized physical activities that are typically encountered in everyday life." When seeing the medically compromised patient with limited work capacity, 10-meter gait speed or patient- specific performance tests may be indicated.[15,16]

By incorporating the Duke Activity Status Index (DASI) prior to testing, the appropriate exercise test may be selected. The DASI, developed by Hlatky et al, is a 12-item self-report questionnaire that queries physical work capacity to estimate peak metabolic equivalents (METs).[17] It ranges in level of queried items from "can you walk indoors, such as around your house," (item 1) to "can you participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing" (item 12).[23] It has been shown to be a valid measurement of functional capacity and can be used to predict peak volume oxygen (VO2).[13,17-23] This tool is readily available, and can be found at http://orionoutcomes.com/outcomes/cvpr/outcomes_program_manual/Outcomes_Program_Manual.pdf.[23]

Weltman and colleagues report that the treadmill and bicycle ergometer tests are the most commonly used in adults with T2D.[24] The specific guidelines for performing these standardized tests are described in several resources.[6,11,,13,15] The Bruce protocol appears to be used most frequently in research, but the Naughton treadmill test may better meet the needs of lower level patients because of the small 1 MET staged increments. Those individuals with T2D who have significant lower extremity dysfunction should perform a seated test, such as the arm cycle ergometer, or seated step test developed by Smith and Gilligan.[6,25] The seated step test is a 4-stage, graded low-level test; the 4 stages correlate to metabolic equivalents of 2.3 to 3.9 METS.[25-27] The test begins with the subject alternately lifting their leg to a specified step height. This older and less commonly used test appears most appropriate for the low level patient; specific instructions on test performance can be found in Appendix B.

EXERCISE TESTING CONTRAINDICATIONS AND PRECAUTIONS

Prior to exercise testing, the ACSM recommends risk stratification.[6] It should be noted that uncontrolled metabolic disease, which includes DM, is a relative risk factor in the contraindications to exercise testing as described by ACSM.[6] Multiple systems of the body can also be affected by T2D; thus, each of these potential complications must be screened prior to exercise testing and prescription, and individuals with T2D should undergo a thorough medical exam including baseline studies to evaluate BG levels. Recent disease management recommendations also call for glycosolated hemoglobin (A1C) testing several times per year. This test reflects general glycemic control over several months; there is a reduced risk of microvascular and neuropathic complications with levels ≤ 7%.[28] An A1C level above 7% suggest poor glycemic control and may have implications for exercise prescription.

The ACSM and the American Diabetic Association (ADA) have put together a comprehensive, evidence-based joint statement for exercise and T2D.[5] According to these standards, "exercise stress testing is advised primarily for sedentary individuals with diabetes who want to undertake activity more intense than brisk walking," but there is no evidence suggesting that electrocardiography (ECG) stress testing is necessary prior to walking.[5] The American Physical Therapy Association (APTA), ACSM, and ADA all recommend ECG stress testing on individuals:

- Greater than age 40 with or without cardiovascular disease risk factors other than diabetes
- Greater than age 30 with at least one of the following: T2D > 10 years, hypertension, cigarette smoking, dyslipidemia, proliferative or preproliferative retinopathy or nephropathy
- With known or suspected coronary artery disease, cerebrovascular disease and/or peripheral neuropathy
- With autonomic neuropathy
- With advanced nephropathy with renal failure[5,29]

These recommendations limit the type of test that most physical therapists can perform outside an inpatient facility or cardiac rehab where ECG monitoring is available. If ECG monitoring is not available, a low level exercise program can be initiated, equivalent to a brisk walk, as long as the individual does not show signs of intolerance and heart rate does not exceed 20 beats above standing heart rate.[29] There is some controversy regarding asymptomatic individuals with low risk of developing coronary artery disease; evidence suggests they do not require ECG testing.[5]

Curtis and colleagues and the ACSM describe abnormal responses to exercise testing. Specifically, slowed heart rate recovery of < 22 beats/min at 2 minutes after exercise cessation (supine position) is considered an abnormal hemodynamic response. Normally, with exercise there is an increase in heart rate that quickly returns to baseline. When the recovery is slowed, ie, less than 22 beats/min

within 2 minutes of exercise cessation as measured in the supine position, it is considered an abnormal response. Research by Curtis et al looking at 5,783 overweight and obese adults with T2D showed exercise-induced abnormalities in 22.5% of the subjects. Twelve percent demonstrated impaired exercise; this was defined as an inability to attain a workload of at least 5 METS. On EKG, ST segment depression of at least 1.0 mm occurred in 7.6% of the participants; angina occurred in 1.1%; arrhythmias in 0.7%.[12] These findings should be kept in mind when performing exercise testing or training on overweight and obese adults with T2D.

Exercise testing must also follow the general recommendations of when and how to exercise with T2D. Additional information regarding contraindications and precautions pertaining to implementation of the exercise testing will be fully delineated in the exercise intervention section of this paper.

EXERCISE PRESCRIPTION AND PROGRESSION RECOMMENDATIONS

Weltman et al clearly states, "exercise along with diet and medication has long been the cornerstone in the management of diabetes."[24] A consensus statement by the ADA stresses that exercise has both an aerobic and resistance training component.[28] Based on a review of the literature, there is variability in the exercise prescription and progression. Refer to Appendix C for an overview of various resources and the recommended exercise prescription and progression for individuals with T2D.

A synopsis of resources on aerobic exercise recommends an accumulated minimum of 150 minutes of exercise/week, with a minimum of 10 minutes of exercise in each bout 3-5 days/week. There should not be more than two days of consecutive inactivity in a week. Great variability exists on the intensity of exercise, depending on the formulary, ie, VO_2max, VO_2Reserve, maximum heart rate, and rating of perceived exertion (RPE). For ease in educating the patient, an RPE of 12-16 using the original Borg scale should be maintained with exercise. On the Borg scale, 13 corresponds to "somewhat hard," and 15 corresponds to "hard (heavy)" descriptors. Progression is best described as gradual with duration, increased up to 20 to 30 minutes prior to an intensity increase.[5,6,24,28,29]

In regard to the exercise prescription for muscle strengthening, exercising a muscle group two nonconsecutive days per week is most commonly recommended. Variability also exists regarding intensity, with recommendations ranging from 50% to 80% of a 1 Repetition Maximum (RM) and 2-4 sets performed of each exercise. Ideally, 8 to 10 major muscle groups are exercised, with 8 to 12 repetitions performed for each exercise. Progression should occur gradually to avoid the risk of injury. When 12 repetitions can easily be performed for each set, the resistance should be increased.[5,6,24,28,29]

Although the above is recommended, it should be stressed that the exercise program must meet the specific needs and interests of the patient and should be based on exercise testing. An ideal exercise program encompasses both cardiorespiratory and resistance training components. Research has shown that such a blended program is effective in preventing the deleterious side effects of T2D, and that progressive resistance exercise is more effective than aerobic exercise in enhancing insulin sensitivity.[5,24,28] All aerobic exercise should be preceded by a warm-up, incorporate stretching, and end with a cool-down phase.[6,24]

The authors advise slow progression for the advancement of both aerobic and resistance training to prevent injury and secondary problems. As the adult with T2D becomes more fit, there is an anticipated decrease in resting heart rate (RHR), increase in stroke volume, and greater arterial-venous oxygenation difference, resulting in a greater exercise capacity. It is recommended that the adult with T2D recalculate their RHR, maximum heart rate (MHR), and/or heart rate reserve (HRR) routinely to determine exercise intensity.

EXERCISE PRESCRIPTION CONTRAINDICATIONS, PRECAUTIONS, AND CONSIDERATIONS

There are complications associated with T2D that need to be screened for and taken into consideration prior to implementing testing or exercise prescription as mentioned above. These complications can be broken down into two broad categories: macrovascular and microvascular. Macrovascular complications include coronary artery disease, cerebrovascular disease, or peripheral vascular disease. When these complications are present, the contraindications and precautions associated with those diseases should be followed. Microvascular complications include retinopathy, nephropathy, peripheral neuropathy, and autonomic neuropathy. These primarily have precautions for the type of test and exercise performed. High intensity exercise and testing is contraindicated for individuals with active retinopathy and nephropathy, because the resulting increase in blood pressure can cause hemorrhaging of the vessels in the eye (with retinal detachment) and further damage in the kidney.[4] There is no evidence, however, suggesting that moderate exercise will exacerbate renal complications.[5] This is not reported in retinopathies. It should be noted nephropathy is in the same category of microvascular complications as retinopathy, peripheral neuropathy, and autonomonic neuropathy. Thus, moderate exercise may be problematic, although this is not reported in the literature. Autonomic neuropathy can cause impaired BP (ie, orthostatic hypotension) and HR response, and increases risk for cardiovascular disease and silent myocardial infarction. Individuals with autonomic neuropathy need to undergo a cardiac evaluation prior to high intensity exercise. Peripheral neuropathy is one of the most common complications leading to impaired sensation of the hands/feet and potential skin breakdown and infection. Less common is the development of a Charcot joint due to impaired proprioceptive sensation causing damage to the joint. These sequelae require the physical therapist to provide a thorough sensory evaluation, recommendations for proper shoe wear, and instruction in self inspection, foot care, and joint protection. With proper shoe wear, and in the absence of any skin breakdown, there is no evidence that moderate intensity walking will increase risk of developing foot ulcer or re-ulceration in adults with T2D and peripheral neuropathy.[5]

There are specific recommendations for exercising with T2D that pertain to BG values, exercise timing, and precautions regarding medications. Safe exercise BG levels should be within

100-300 mg/dL. The standard recommendation is to avoid exercise if above 300 mg/dL with ketosis.[5,29] Unlike patients with Type 1 diabetes, adults with T2D do not generally have a complete insulin deficiency. As a result, individuals with T2D do not necessarily need to postpone exercises even if BG levels are above 300 mg/dL, if they are without ketosis. Clinically, therapists may look for the fruity breath, dry mouth, nausea, and flushed appearance associated with ketosis, but the reliability of this is unknown. If there is concern over ketosis, it is recommended that the patient examine their urine via a dip stick. Patients must keep hydrated and feel well, as the BG levels will decrease with aerobic activity.[5] Carbohydrates must be ingested, and exercise may need to be delayed, if BG levels are below 100 mg/dL.[5,29] If, however, there is any lethargy or change in the individuals' mental status, exercise should stop and he/she should be assessed. Please refer to Appendix D for relative contraindications requiring closer monitoring based on BG.[3,29]

The timing of exercise intervention is important. Exercise is best in the morning, and should not occur in extremes of heat, within two hours of going to bed (to avoid nocturnal hypoglycemia), or when insulin levels peak.[3] It is important for the therapist to know how the T2D patient controls their BG, since this will affect exercise. Individuals with diet-controlled T2D are less likely to have hypoglycemia with exercise compared to those using insulin or secretagogues (oral medications).[3,4,5] It is recommended the latter supplement with carbohydrates during and within 30 minutes after exercise and higher intensity activity to avoid delayed-onset hypoglycemia.[5] Those on short acting insulin or secretagogues may need to adjust their doses and monitor BG levels, since both exercise and insulin increase glucose uptake. When on insulin, exercise of the injected muscle should be avoided for at least one hour.[3,4] Beta blockers and diuretics are two types of medications that are commonly taken by diabetics with co-morbidities that have a significant effect on response to exercise. Beta-blockers will reduce maximum heart rate and maximum exercise capacity. Diuretics will decrease blood volume so that dehydration and electrolyte imbalance may be of concern.[4]

It is important for the PT to know the client's medical history prior to exercise testing and prescription. Co-morbidities do not necessarily preclude exercise prescription, but do influence it. The ADA recommendation for high risk individuals with T2D is to start with short periods of low intensity exercise and increase intensity and duration gradually.[28] It is essential to know the client's level of BG control, monitor and/or modify it appropriately, and if there is any question, stop and evaluate the client. More importantly, client/patient education is paramount so he/she can care for and monitor his or herself effectively.

CONCLUSION

In summary, exercise coupled with diet and medication can minimize the deleterious consequences of T2D progression.[24] This paper did not address the issue of exercise testing and prescription for pre-diabetes or what is known as the metabolic syndrome, but this is an appropriate extension of the scope of practice for PTs in the era of direct access. Therapists, in their role as exercise specialists, need to conduct additional research to evaluate exercise prescription and progression, because there are conflicting recommendations. In addition, the continued development of simple and validated functional tests and interventions, like the 30-Second Sit-to-Stand, will assist PTs in their evaluation of and care for the broad spectrum of patients with T2D.

For additional information, the reader is referred to two key documents, the ADA Standards of Medical Care in Diabetes – Joint Position Statement 2011, and the ACSM/ADA Joint Position Statement 2010. These resources provide the busy clinician with the latest concise and evidenced-based thinking on this important topic.

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Tracy Partridge is a clinical physical therapist with over 25 years of practice. She works primarily in the area of geriatric physical therapy and home health for various practices in the Pittsburgh area. She serves as an expert clinical evaluator at Slippery Rock University where she works one on one with students in geriatrics and neuromuscular physical therapy. Tracy completed her entry-level degree at the University of Pittsburgh and her transitional doctor of physical therapy from Chatham University.

Barbara Billek-Sawhney has over 29 years of clinical practice as a physical therapist in various practice settings with an emphasis on adult rehabilitation and geriatrics. She is an Associate Professor at Slippery Rock University, Slippery Rock, PA. She is employed clinically at Butler Memorial Hospital, Butler, Pennsylvania and Harmarville Rehabilitation Hospital, Harmarville, PA. She has done research previously on outcome effectiveness in education, balance measurements in the elderly, compliance, literacy, and tragus to wall measurements.

James Partridge is an experienced clinician with almost 30 years of physical therapy practice in a variety of settings. He is currently practicing outpatient and aquatic physical therapy for Allegheny Chesapeake Physical Therapy in Pittsburgh PA. He received his bachelor's entry level and advanced master's degree in physical therapy from the University of Pittsburgh, then recently completed a transitional doctor of physical therapy from Chatham University in Pittsburgh. Jim has special interests in ergonomics and work injury prevention and enjoys teaching a monthly clinical "back school."

Appendix A. Muscular Endurance Tests

30-second sit to stand test[8]

Equipment: Straight back chair without arms, ~17" seat height, positioned against wall
Stopwatch

Test: Patient sitting in chair, arms crossed over chest
Task demonstrated and patient instructed to rise fully to stand and return back to a full seated position, as many times as possible, in a 30 s period, on the command "go."
The patient is permitted a trial of 1 to 2 repetitions.
The test is performed and the number of repetitions are counted. If patient is more than half way up at the end of 30 s, a full stand is counted.

Adaptations If Hands Required:
Denote use of hand and cannot compare scores with age-related normative values.

Scoring 30s SST:

Sex	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85-89 years	90-94 years
Male	14-19	12-18	12-17	11-17	10-15	8-14	7-12
Female	12-17	11-16	10-15	10-15	9-14	8-13	4-11

30-second arm curl test[7]

Equipment: Straight back chair without arms, ~17" seat height
Dumbbells: 8# for men, 5# for women
Stopwatch

Test: Patient sitting in chair, weight placed in dominant hand, non-dominant used if dominant hand compromised. Task demonstrated and patient instructed to start with arm at side, elbow extended, wrist in neutral, arm perpendicular to floor, and to flex elbow and supinate forearm as many times as possible, in a 30 s period, on the command "go."
The patient is permitted a trial of 1 to 2 repetitions.
The test is performed and the number of repetitions are counted. If patient is more than half way flexed at the end of 30 s, a full curl is counted.
If necessary, the therapist may stabilize upper arm from moving.

Adaptations If Hands Required:
Cuff weight with Velcro, lighter weight. For comparison to normative values must follow standard test protocol.

Scoring Arm-Curl Test:

Sex	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85-89 years	90-94 years
Male	16-22	15-21	14-21	13-19	13-19	11-17	10-14
Female	13-19	12-18	12-17	11-17	10-16	10-15	8-13

Appendix B. The Seated Step Test[11,25,26,27]

Equipment: Straight back chair, positioned against wall
Stopwatch
Bench, bar, or stool 6" high, 12" high, and 18" high
Metronome set at 60/minute

Test: Patient sitting in chair, gather baseline information including vitals, determine target heart rate.
Task demonstrated and patient instructed to alternately place heel of feet on edge of bench or stool.
On the first beat, the subject touches the front edge of the step with the arch of one foot, on the second she returns her foot to the floor, alternating feet.
Repeat monitoring vitals at 2 minutes in each stage prior to progression to next stage.
Progress from Stage 1 to Stage 2 and so on using percentage of age predicted maximum for cessation of test or other criteria as described in ACSM, 2010.
Attain vitals at each stage, at termination of activity, and for recovery. In the original protocol, each stage is 5 minutes in duration. Subsequent publications report 3 minute stages.

Stage 1: 6" height 2.3 METs (equates to 2.3 mph walking)
Stage 2: 12" height 2.9 METs (2.9 mph walking)
Stage 3: 18" height 3.5 METs (3.5 mph walking)
Stage 4: 18" height plus alternating raising of arms to 90 degrees shoulder elevation 3.9 METS (3.9 mph walking)

Name _____ Height _____ Age_____ Weight____

Medications _____

_____

_____

Resting Vitals Sitting HR _____ BP_____ SAO2_____

Maximal Predicted HR 220- AGE = _____ +/- 14 bpm

Target HR _____ (% predicted ____)

Stage	METS	HR	BP	SAO2	EKG Changes	RPE	Comments
1 -6" step	2.3						
2 - 12"	2.9						
3 - 18"	3.5						
4 18"/c UE	3.9						
Immediately post							
Recovery 1 min							
Recovery 2 min							
Recovery 3 min							

Total Time_____ Achieved HR_____ Predicted HR %_____

Reason for stopping the test:_____

Time required for recovery to resting levels:_____

Comments _____

_____

_____

Appendix C. Exercise Prescription and Progression[5,6,24,28,29]

AEROBIC EXERCISE **Common features from references cited are in *italicized* font.**				
Source	Frequency	Intensity	Duration	Progression
ACSM Guidelines, 2010[6]	· *3-7 days/week* · *No >2 consecutive days of inactivity*	· 50-80% VO_2R or HRR · *RPE 12-16* (6-20 scale) · If goal cardiovascular fitness emphasize vigorous intensity · If goal weight loss emphasize moderate intensity exercise	· 20-60 mins/day · *150 min/week* · *Each bout a minimum 10 mins*	· *Initially increase exercise duration*, i.e., minutes/session for exercise · Increase duration by 5-10 mins/session every 1-2 weeks for first 4-6 weeks · After ~1 month of regular exercise gradually increase exercise frequency, intensity, and/or time · Avoid large increases to avoid injury
Joint Position Statement, ACSM & ADA, 2010[5]	· *Minimum 3 days/week* · *No >2 days between sessions*	· At least moderate intensity · 40-60% of VO_2max	· *Minimum of 150 mins/wk* · *Each bout a minimum of 10 mins*	· No prior research has compared rates of progression · *Recommend gradual progression to minimize risk of injury*
ADA Standards, 2011[27]	· Follow physical activity guidelines for general population	· 50-70% MHR	· Minimum of *150 mins/wk of moderate intensity activity or 75 mins of vigorous activity*	· *Increase intensity and duration slowly*
Weltman, 2009[23]	· 3-5 days/week	· 40/50 to 85% Vo_2R or HRR · or · 64/70% to 94% MHR · *RPE 12-16* (6-20 scale)	· *150 mins/wk of moderate intensity* · *75 mins/wk of vigorous intensity* · *Each bout a minimum of 10 mins*	· Varies by goals, functional capacity, and medical status · *Gradually increase intensity*
APTA Pamphlet, 2007[28]	· 4-7 days/week or every other day	· Karvonen's formula at 40-70%	· 20-30 mins with additional 5-10 min warm-up and cool down	· Not specified

RESISTANCE EXERCISE **Common features from references cited are in *italicized* font.**				
ACSM Guidelines, 2010[6]	· *2-3 days/week* · *48 hrs separating on non-consecutive days unless opposite muscle groups*	· 2-3 sets · 60-80% 1 RM	· *8-10 exercises of major muscle groups* · *8-12 repetitions of each exercise*	· *Progressively overload* · *If can easily perform >12 repetitions gradually increase resistance* so that no more than 12 repetitions can be performed without significant muscle fatigue or difficulty completing the last repetition of the set
Joint Position Statement, ACSM & ADA, 2010[5]	· *At least 2 days/week* · *Ideally 3 days/week* · *On non-consecutive days*	· 50-80% RM · 1 set minimum · Optimal 3-4 sets	· 5-10 exercises of major muscle groups · 10-15 repetitions	· *Progress slowly* · *Increases resistance only when the number of repetitions/set can consistently be exceeded* · Progression goal for 6 months to 3 times/week and 3 sets of 8-10 repetitions at 75-80% 1 RM on 8-10 exercise
ADA Standards, 2011[27]	· 3 days/week		· All major muscle groups	· Increase intensity and duration slowly
Weltman, 2009[23]	· *2-3 non-consecutive days/week*	· 80% 1 RM	· *8-10 exercises* · *8-12 repetitions* (range 3-20)	· Not specified
APTA Pamphlet, 2007[28]	· 2-3 days/week	· 8-10 repetition max weight	· *8-10 major muscle groups*	· Begin with 1 set, progress to 3 sets

Appendix D. Relative Contraindications Requiring Closer Monitoring Based on Blood Glucose Levels[3,29]

Blood Glucose Level	What to do	Comments
< 70 mg*dL	Exercise should not be initiated	Immediately provide carbohydrates (fruit juice, hard candy, glucose tablet or gel), recheck BG, hospitalize if symptoms increase.
70-100 mg*dL	Snack	15 g carbohydrate every hour of mild- moderately intense activity. 25-50g with moderate or greater intensity. Hydrate.
100-300 mg*dL	Proceed with exercise program	Strenuous activity or activity of long duration (1-2 hours) requires increased carbohydrate intake. Hydrate well.
>300 mg*dL and on oral meds	Trial of activity 10-15 minutes and recheck	If BG rises, stop activity If BG drops, continue checking every 10-15 minutes.
>300 mg*dL and on insulin	Check for ketosis (urine dipstick or glucometer that measures ketosis)	If (+) ketones, avoid activity If (-) ketones, participate with close BG monitoring every 10-15.

CSM 2012 SECTION ON GERIATRICS PROGRAMMING

THURSDAY, FEB 9

6:30AM Welcome to CSM and Celebration of newly certified/recertified GCS

8AM PLATFORMS

8AM ***No Crashing, No Burning : Improving function and managing pain in clients with neuropathy***

Speakers: Brady Whetten, DPT, Mike Studer, PT, MS, NCS, CEEAA

10:30 AM ***Walking Speed: A Vital Sign and Even More…***

Speakers: Michelle Lusardi, PT, DPT, PhD, Kevin Chui, PT, PhD, GCS, Kay Wing, PT, PhD, Jennifer Stevens-Lapsley, MPT, PhD, Doug Bidelspach, MPT, Stacy Fritz, PT, PhD, Kathryn Brewer, PT, MEd, GCS

3:30PM ***Physical Therapy for Boomers: Is the Academy Preparing and Motivating Students for Working with Older Adults?***

Speakers: Debbie Ingram, Corrie Odom, John Barr, Rita Wong, Jody Gandy, Mike Reams, Nate Thomas

6:30PM Balance and Falls SIG Meeting/Reception

6:30PM CEEAA Meeting/Reception: All CEEA participants are encouraged to attend

7:30PM Board of Directors Meeting #1

FRIDAY, FEB 10

6:30AM Bone Health SIG Meeting

8:00AM ***Design and Implementation of a Large, System-wide Osteoporosis and Bone Health Rehabilitation Program***

Speakers: Michelle Hribar, PT, Maribeth Gibbon, PT, Mark Lundlad, PT, DPT, MPH, OCS, Cer. MDT, CSCS, Jennifer Ochi, PT, MPT, Cert MDT, ATC, Mary Saloka Morrison PT, MHS, DSc, PT

8:00AM Platforms

10:30AM ***There is an App for that: Use of Technology in Geriatric Physical Therapy Practice***

Speakers: Marissa, S. Furka, PT, DPT, GCS, Melanie Desumman, MSPT

3:30PM ***Autonomous Practice in Physical Therapy, What does This Mean to Me?***

Speakers: Jennifer Blackwood, MPT, GCS, Greg Hartley, Jason Hardage, PT, DScPT, GCS, NCS, Tamara Gravano, PT, DPT, GCS, Joe Libera, PT, DPT, MPH, GCS, Jill Heitzman, PT, DPT, GCS, CWS, CEEAA, FACCWS, Kenneth Miller, PT, DPT and Stacey L. Zeigler, PT, DPT, GCS, CEEAA

3:30PM ***Student Forum: Old Doesn't Have to Be Old! Physical Therapy for Older Adults***

Speaker: Becky Olson-Kellog

3:30PM ***videnced-based Health Promotion, Community Collaboration and Physical Therapy: Innovative Partnerships to Maximize Client Outcomes***

Speakers: Lori Schrodt, Tiffany E. Shubert, Margaret Kaniewski, Priti Shah, PT, MPH, Terry Shea

6:30 PM Members Meeting/Reception Followed by Awards Celebration

SATURDAY, FEB 11

6:30 AM Health and Wellness SIG Meeting

6:30AM Board of Directors Meeting #2

8:00AM ***Polypharmacy in the Geriatric Client: What does it mean to my Clinical Practice?***

Speakers: Suzanne L. Tinsley PT, PhD, NCS, Marie Vazquez-Morgan

10:30 AM ***Exercise Adherence in Older Adults: Why Don't My Patients Do their Exercises and Can I Improve This?***

Speakers: Anne Shumway-Cook, PT, PhD, FAPTA, Patricia Noritake Matsuda, PT, PhD, DPT, Jaynie Bjornaraa

3:30PM ***Resistant Training Across the Lifespan***

Speakers: Terry Grindstaff, Avery Faigenbaum

INTERNATIONAL PHYSICAL THERAPISTS WORKING WITH OLDER PEOPLE

Jennifer M. Bottomley, PT, MS, PhD
President, IPTOP

What is the International Physical Therapists Working with Older People (IPTOP)? It is the special interest subgroup within the World Confederation of Physical Therapy that represents physical therapists working with older people. Just as the Section on Geriatrics was created to enhance the collaborative efforts of physical therapists working in geriatrics to enrich our practice in the United States, IPTOP is the representative "section" within WCPT promoting evidence-based practice of geriatric physical therapy globally.

The primary purpose of physical therapists working with older people is to maintain and/or restore function, activity, and independence. This requires a client/patient-centered, collaborative, interprofessional approach to a wide range of conditions affecting older people. The IPTOP represents national special interest groups of physical therapists working in geriatrics. The efforts of the association have been directed towards enabling national organizations and their individual members to work with older people through research, evidence-based practice, clinical specialization, and collaborative practice with other disciplines and caregivers. The mission of IPTOP is to be the international resource for physical therapists working with older people.

- to foster collaboration between physical therapists working with older people worldwide,
- to encourage high standards of physical therapy practice in geriatrics,
- to advance practice internationally by communication and exchange of information,
- to encourage scientific research and promote opportunities for the spread of knowledge of new developments in the field, and
- to assist WCPT member organizations in the formation and development of recognized groups working with older people.

The concept of a special interest group in geriatrics originated at an international course in Malta in 1993, and was further developed at WCPT Washington in 1995. At WCPT Yokohama in 1999, a steering committee and organizational group were formed. The Foundation Meeting was held in Birmingham, UK in 2002, and at WCPT Barcelona 2003, IPTOP was accepted as a WCPT subgroup. General meetings have been held in: Barcelona (2003), Dublin (2004), Melbourne (2005), Istanbul (2006), WCPT Vancouver (2007), Ankara (2009), and WCPT Amsterdam (2011). The next meeting will be in Boston, in 2013. Membership currently includes 17 countries, representing approximately 12,500 physical therapists working in geriatric physical therapy worldwide. The efforts of IPTOP are directed towards member associations and their individual members working with older people through excellence, research, practice, and clinical specialization.

Section on Geriatrics Member – Elected President of IPTOP

During the June WCPT meeting in Amsterdam, Jennifer M. Bottomley, PhD, MS, PT, was elected as President to IPTOP. Her term is from 2011 – 2015. See the link to the IPTOP newletters for more details on the meetings in Amsterdam in June 2011.

Section on Geriatrics Member – Elected Treasurer of IPTOP

During the June WCPT meeting in Amsterdam, Nancy Prickett, MS, PT, was re-elected as IPTOP Treasurer. Her term is from 2011 – 2015. Nancy was one of the founding members of IPTOP and has served as IPTOP's Treasurer since its inception. She left office briefly after the elections in Vancouver, but was re-enlisted to help salvage a struggling treasury and managed to work her magic and re-establish a healthy financial state once again. It is no easy task managing moneys from 17 member countries with different currency and exchange rates.

Section on Geriatric Liaison

The IPTOP is pleased to welcome Teresa M. Steffen, PhD, PT, as the US liaison from the Section on Geriatrics to IPTOP. Her role is to gather and share resources and information between the IPTOP and SOG. The goal is to advance, establish, and nurture principles and practices of geriatric rehabilitation worldwide. The role of each country representative is:

- to distribute IPTOP information to members within their country,
- to exchange information related to IPTOP business and geriatric physical therapy,
- to provide links and access to other countries' information and resources,
- to discuss clinical issues and sharing of projects,
- to provide IPTOP with Web site information and registration/contact information for conferences organized within their country,
- to make efforts to find new member countries,
- to send details of any changes in contact information for their country's representatives to the Secretary in a timely manner.

Executive Board of IPTOP

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Website & Newsletter

IPTOP has a web page within the WCPT Web site. It can be accessed directly through http://www.iptop.wcpt.org or via the WCPT Web site www.wcpt.org. Each officer (eg, chair@iptop.wcpt.org) and each member organization representative (.g, germany@iptop.wcpt.org) has an IPTOP address, with mail automatically redirected to personal e-mails. These are all listed on the front page of the site. IPTOP's Web page has 5 sections: Contact details, About IPTOP (our leaflet), Newsletters (current and past), Meeting notes, and Conferences. The Web site has links to member country Web sites and wonderful resources to advance physical therapy for older adults, with links to sites that encourage physical activity and health promotion. We encourage members to visit the IPTOP *and* WCPT websites.

The IPTOP Newsletter is accessible via the subgroup Web site: www.iptop.org. It provides updates on IPTOP and WCPT activities, as well on member country initiatives, resources, research, and network capabilities. It is sent directly to special interest groups as they become known. The newsletter is published on the website every six months and distributed to member countries via the country liaison. A summary is published in WCPT news as well.

Country and regional contributions to the Newsletter are a vital communication and information link between member countries. It would be wonderful if the SOG could contribute at least one clinically based article to the Newsletter each year. In addition, contributions from SOG members for a "Main Feature" of "Clinical Feature" are very welcome (see newsletter for details). Send contributions to editor@iptop.wcpt.org.

Mark Your Calendars

GeriNotes: IPTOP member countries are currently organizing and working towards a special *GeriNotes* issue with an international focus. Our goal is the spring of 2012. If you or colleague would like to contribute to this focused issue – please contact president@iptop.wcpt.org or jbottoml@comcast.net, the issue editor. Deadline for submissions will be March 15, 2012.

IPTOP Conference: IPTOP is in the process of organizing and orchestrating an international course in geriatrics with a focus on health promotion and successful aging. The targeted date being considered is May 2013, in Boston, Massachusetts – USA. The specifics will be announced as soon as things are firmed up with our hosting hospital(s) and university. So, mark your calendars for May 2013 and we'll get more information to SOG/APTA members soon!

CERTIFIED EXERCISE EXPERTS FOR AGING ADULTS CLASS OF 2011

Danille Parker, PT, DPT, GCS, CEEAA

The SOG Certified Experts for Aging Adults (CEEAA) program continues to be a huge success. Since 2009, over 420 therapists have successfully completed the 3-course series, including the written and practical examinations to proudly use CEEAA after their name. The SOG would like to congratulate the following individuals who have completed series in 2011.

Iowa Graduates

Thank you to the Physical Therapy Program at Des Moines University, Des Moines, Iowa

Bradley Abrams, PT, DPT
Victor Aguilar, DPT, OCS
Teresa Bachman, PT
Julie Buckley, PT
Sheila Bernier, PT
Yi-Po Chiu, PT, PhD
Rene Crumley, PT, DPT, NCS
Raquel Currah, PT
Eric Dettweiler, PT
Carol Dietrich, PT
Lori Eisenbach, SPT
Meredith Franklin, PT, MPT
Rebecca Galloway, PT, MPT, GCS
Lee Galvan, PT
Denise Gobert, PT, PhD
Jason Hardage, PT, DScPT, GCS, NCS
Rhianna Hughes, PT, DPT
Michelle Jacelon, PT
Gary Jones, DPT
Kathy Kappelle, PT
Patricia Kissko, PT
Thomas Knoebel, PT
Joshua Lee, PT
Phillip Magee, PT
Rodolfo Marin, PT
Cheryl Miller, PT
Ann Newstead, PT, PhD, GCS, NCS
Teresa Olivas, PT, MPT, CertMDT
Rebecca Parnell, PT, GSC, MS
Dolores Poynor, PT
Myla Quiben, PT, PhD, DPT, GCS, NCS
Heather Robertson, PT
Laura Robinson, PT
Daniel Rodriguez, PT
Gillian Sadhi, PT, DPT
Pamela Scarborough, PT, MS, CDE, CWS
Robyn Scott, PT
Patricia Scott, PT
Carrie Sloan, PT
Alyssa Thrush, PT
Martha Ulcak, PT
Troy Vannucci, PT
Claudia Vickers, PT
Kathryn Wolters, PT
Tien-Ning Yang, PT
Karen Young, PT
Kimberly Zumwalt, PT

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Texas Graduates

Thank you to the Department of Physical Therapy at Texas State University-San Marcos, Texas

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Sarah Blomenkamp, PT
Kathy Braaten, PT
Amy Brensel, PT
Linda Coats, PT
Shannon Cullagh, MSPT
Ann Decker, PT, MSA, GCS
Jake DeNell, PT, OCS
Rachel Ehlert, PT, MPT, GSC
Erica Eichhof, PT
Brenda Gawrych, PT
Vicki Gines, PT
Karon Goggins, PT, DPT
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Laurie Harrison, PT
Cynthia Hauber, PT, DPT
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Susan Jackson, PT
Carissa Janssen, PT
Ron Jensen, PT
Kari Jensen, PT
Amy Johnson, PT
Michael Kett, PT
Jane Killough, PT, GCS
Jennifer Kolesar-Springhetti, PT, DPT, CCCE
Kelli Konzen, PT
Kimberly Kudron, PT
Annette LeTourneau, PT
Carleen Lindsey, PT, MSc, GCS
Tamara Long, PT
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Bridget Webb, PT
Bruce Wessman, PT
Holly Wilkinson, PT, MPT, OCS

Therapists with the CEEAA credential demonstrate expert clinical decision-making skills in designing and applying an effective examination and exercise prescription, as well as measuring the effectiveness of the prescription and reflecting the current evidence of exercise for all aging adults. Some of the top reasons, as stated by graduates, to obtain your CEEAA certification are to:

- Learn and practice tests and measures with strong psychometric properties that scientifically measure outcomes in the areas of aerobic capacity, anthropometric characteristics, attention and cognition, gait and locomotion, balance, motor function, muscle performance, posture, range of motion, sensory integrity, and vestibular.
- Be more likely to use functional tests and measures routinely in your practice.
- Expand your understanding of intensity, duration, frequency, and mode for exercise prescription based on science so that you know how to challenge your patients/clients to preclude them from sliding down the slippery slope of aging.
- Learn how to determine appropriate and safe intensity for all categories of exercise for your patients/clients regardless of diagnosis and practice setting.
- Practice and learn how to teach hundreds of different aerobic conditioning/endurance, balance, body mechanics and postural stabilization, flexibility, gait and locomotion, and muscle performance training exercises that can be modified for any aging adult.
- Get back to the fundamentals of physical therapist practice with exercise.
- Have the latest evidence for how

Florida Graduates

Thank you to the Physical Therapy Department, Nova Southeastern University, Fort Lauderdale, FL

Catharine Abernatha-Neally, PT, BS, GCS
Marcus Allen, PT
Suzanne Arroliga, PT
Danielle Beveridge, PT
Kristin Beyerl, PT
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Lisa Chase, PT, PhD
Carol Coutant, PT
Dana Crone, PT
Staci Cummins, PT
Patricia Deotte, PT, DPT, GCS
Dieu Dinh, PT
Jonathan Donley, PT, DPT, MEd, ATC
Luanne Dourney, PT
Lori Faiers, PT
Carrie Foeller, PT, DScPT
Pauline Franko, PT
Nelly Galindo-Pita, PT
Carol Glasscock, PT
Monica Golder, PT
Carlee Good, PT
Edwin Groll, PT
Kathleen Henahan, PT
Theresa Hendricks, PT
Katherine Hudson, DPT
Janice Hulme, PT, DHSc
Nicole Johnson, PT
Karen Lagares, PT, GCS
Mary Lake, PT
Karl Lange, PT
Samuel Lawson, PT, MS, OCS
Joseph Libera, PT, DPT, MPH, GCS
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Jane Schroeder, PT, MA
Charles Shapiro, PT
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Debra Stern, PT, MSM, DBA
Patricia Thompson, PT, MS, GCS
Melissa Tovin, PT
Michael Verdon, PT
Mary Vollman, PT
Kerry Walsh, PT
Melanie Weller, PT, MPT, OCS, ATC
Anne Wilkin, PT

CLASS OF 2011

and why exercise helps with many conditions, including: cancer, cardiovascular, endocrine, musculoskeletal, neuromuscular, mental deterioration, obesity, pulmonary, and renal diseases, disorders, and conditions.

- Have experience with performing Yoga, Tai Chi, and Pilates exercises and postures to expand your intervention options.
- Develop an understanding of the interaction of medications with exercise performance.
- Have the knowledge and the assurance that physical therapists are the professionals, who are key in improving the health and fitness of our aging population.

The process to attain the CEEAA is to complete formal didactic education, and to participate in supervised and mentored skills development, home-based reflection, and critical thinking. Three two-day courses 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.

We have had ***sold out*** crowds for each course held, so don't wait to sign up! We look forward to seeing you at any of the 2012 or 2013 scheduled series!

If you are a site interested in hosting this series, please contact Danille Parker, chair of the Regional Course Committee at Danille.parker@marquette.edu or 414-288-3179.

ST. CATHERINE'S REHABILITATION HOSPITAL & VILLA MARIA NURSING CENTER GERIATRIC RESIDENCY

Program Director: Greg Hartley, PT, DPT, GCS

The Geriatric Residency Program at St. Catherine's Rehabilitation Hospital & Villa Maria Nursing Center was established in 2003 and accredited by the APTA's American Board of Physical Therapy Residency and Fellowship Education in 2004 (re-credentialed in 2009). Nationwide, it was the first geriatric residency program credentialed by the APTA. It was also the first residency program of any specialty area in Florida. Thus far, 100% of the program's graduates have passed the GCS exam on first attempt. Graduates have also gone on to become academic faculty (entry-level PT programs as well as other post-graduate residency programs), contributors to textbooks, speakers at national and international conferences, and published authors in numerous peer-reviewed journals.

The mission of the St. Catherine's Rehabilitation Hospital & Villa Maria Nursing Center Geriatric Residency is: Preparation of trainees for independent advanced practice in geriatric physical therapy and as clinical specialists, in an integrated environment of clinical excellence and educational effort, by a team of professionals who are committed and knowledgeable in gerontology and geriatric physical therapy and who are role models in the professional biopsychosocial care of the elderly. Graduates express their education through excellence in evidence-based practice and teaching of clinical skills, and continue to expand the body of knowledge in geriatric physical therapy by participating in clinical research, and make a lasting contribution to their local and professional community.

The goals of the residency program are to educate physical therapists to:

1. Meet the needs of society by becoming advanced practitioners of geriatric physical therapy.
2. Become critical consumers of the relevant scientific literature who, by virtue of critically assessing the literature, incorporate appropriate new techniques and knowledge into practice.
3. Contribute to the body of knowledge in geriatric physical therapy by participating in clinical research.
4. Become competent instructors of geriatric physical therapy practice.
5. Become consultants, advocates, and ambassadors to the public and medical communities for the profession of physical therapy.
6. Exhibit the highest standards of professionalism.

The program accepts 3 residents per year. Residents rotate through inpatient rehabilitation hospital, skilled nursing, and outpatient environments, spending 4 months in each primary area for a total of 12 months. For more information, please visit http://www.catholichealthservices.org/rehabilitation-hospitals/catholic-health-services.aspx?nd=165.

WHAT HAS THE RESIDENCY DONE FOR ME?

Gemma Longfellow, PT, MSPT, GCS

For as long as I can remember, I have always wanted to be a Physical Therapist. Physical therapy appealed to me, because it gave me the opportunity to help patients in every step of their recovery. It provided me with the opportunity to touch people's lives in a way that other health professionals couldn't. Physical therapists have the unique ability to develop a close relationship with patients and family members. We help people get back on their feet, ease their pain, and give them a better quality of life during life altering moments. Along with these unique opportunities, however, comes great responsibility. I knew that once I became a PT I would dedicate my career to serving my patients, and it would be my personal responsibility to ensure that I had the tools to best serve my patients. I knew that graduating PT school was not the end, but merely the beginning of my lifelong learning process. My decision to do a residency program accelerated my learning process and professional development as a young therapist.

The Geriatric Residency Program at St. Catherine's Rehabilitation Hospital provided me with a unique opportunity to fine tune my critical thinking skills. It created the perfect learning environment to allow me to become a specialist in the geriatric field. It gave me a structured academic and clinical program that helped me prepare and successfully pass the specialty exam. Within a year and a half of graduating from PT school, I earned my GCS. The residency program accelerated my career development. The initials GCS after my name was a symbol of personal accomplishment. It was the reward that I earned after an intensive and rigorous year. It gave me the knowledge, confidence, and leadership skills that I now possess.

The mentoring I received during the residency program was a pivotal part of my learning process. Having an exceptional mentor gave me a broader knowledge base and a colleague to guide me through challenging cases and stimulate my learning through analytical questioning and suggestions. Mentoring was the primary reason I decided to do the residency program. As a young therapist, I was very excited to start my career, but I recognized the need to have a stable support system as well. I wanted to join a team that would nurture me to achieve my full potential as a therapist.

After the residency, I was given the special opportunity to be a mentor myself. Being a mentor is very rewarding, because I am able to witness the personal and professional growth of my residents. It gives me the chance to give back to my institution by sharing my knowledge and support. As a mentor, I am compelled to continue to challenge myself to ensure that my residents are given a good learning experience, are exposed to the most current evidence, and are well prepared to sit through the geriatric specialty exam. It is gratifying to be a part of their success and see them develop into their full potential. I am very proud to see that our previous residents have now become leaders in their field and active in the geriatric community. It gives me pleasure that our residency program's goal to create leaders in our geriatric physical therapy community is transpiring.

The residency program has opened multiple doors of opportunities for me. The rigorous year-long training I received helped me develop leadership and organizational skills that have become very valuable to me as a Senior Therapist. It helped accelerate my physical therapy career and exposed me to teaching and research opportunities at a very early time in my career. I have only been practicing for 6 years but I feel that my career has grown three fold. The residency program also gave me a network of very skilled and successful physical therapists as my support system. It placed me in a facility that constantly gives me an opportunity to grow, by opening doors for teaching, treating in specialty clinics, and conducting research. It is the perfect breeding ground for therapists who have a thirst for life-long learning.

I am very thankful for the experience and opportunities that I gained through the residency. I hope that residency programs continue to develop in our physical therapy community to move our profession to excellence.

Celebrate with Us!

Come celebrate with us to congratulate the newly certified (and recertified) GCS and welcome newcomers to CSM.

A presentation that will help you demonstrate continuing competency while advancing your profession will also be presented. Come meet the Section leaders and other members of the Section on Geriatrics--a Section that will move you forward"

Newly Certified GCS, Recertified GCS and First Time Attendee are invited to the Annual GSC Breakfast!

The GCS Breakfast will be on-Thursday, February 9, 2012 from 6:30am-8am!

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

Section on Geriatrics, APTA

CSM 2012 Preconference Courses

Course space is LIMITED! Visit www.apta.org/CSM/registration today!

Members of the Section on Geriatrics and all cosponsoring sections register at the Section Member price.

Clinical Residency 101: Getting Started and Doing It Well

Tuesday, February 7, 2012, 8:00 am – 5:30 pm

.75 CEUs offered upon successful completion of the post-session quiz

Price: Section Member – $255 Non-Member – $355

Presenters: Greg Hartley, PT, DPT, GCS, Teresa Schuemann, PT, DPT, SCS, ATC, CSCS and Scott Straker, PT, MS, SCS

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, participants 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

Cosponsored by the following APTA sections: **Education, Clinical Electrophysiology and Wound Management, Neurology, Pediatrics, Sports and Women's Health**

Writing Case Reports: Tips and Guidelines When Getting Started

Wednesday, February 8, 2012, 8:00 am – 5:30 pm

.75 CEUs offered upon successful completion of the post-session quiz

Price: Section Member – $255 Non-Member – $355

Presenters: Dale Avers, PT, DPT, PhD and Michelle Lusardi, PT, DPT, PhD

A well written case report shares unique experiences, associated clinical reasoning and clinical interventions to patient care management. This interactive workshop provides an exploration of the components of an effective case report, and discussion about what case reports add to the body of knowledge in physical therapy practice. We will compare/ contrast published well prepared and poorly prepared case reports in preparation for outlining a potential case report based on participants' clinical experiences. During small group work, participants will collaborate on developing one or more of the components of a case report, based on Journal of Geriatric Physical Therapy guidelines for authors, mentored by Editors and reviewers from the Journal. Participants should come prepared with resources and information they anticipate would be included in a case report (laptop computers recommended). Participants will share their work for discussion and peer review from participants and facilitators as the final activity of the session.

Upon completion, participants will be able to:

- Write a purpose statement for a case report
- Integrate the key information to be included in a case report
- Critically evaluate structure and quality of published case reports
- Develop a plan to find and use evidence from the clinical research literature to support a developing case report
    - Prepare a detailed outline of a case report that would eventually be submitted for publication
    - Provide constructive criticism to case report outlines written by peers during the workshop

Cosponsored by the following APTA sections: **Aquatic, Education, Neurology, Pediatrics, Sports and Women's Health**

Online Registration Opens October 1, 2011 – a Quick and Easy Way to Register!

www.apta.org/CSM/registration

Or Call 877/585-6003

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For age is opportunity, no less than youth itself,

though in another dress, and as the evening twilight fades away, the sky is filled with stars, invisible by day.

- Henry Wadsworth Longfellow

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