American Physical Therapy Association / Neurology Section

Balance and Falls SIG

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Balance and Falls SIG Update

By Kris Legters, PT, DSc, NCS
Balance and Falls SIG Chair

Welcome to the first issue of the Neurology Section Balance and Falls SIG newsletter!

Because you are reading this, we obviously were successful in our efforts to establish this SIG!

How did we get here?

In the fall of 2005 there was a sense that there was a need for a distinct Balance and Falls SIG, independent of the Geriatric Section and the Vestibular SIG.

A blast email to the Neurology Section membership yielded 100 individuals who were supportive of this idea, with half of those members indicating a desire to help! Wow!

At CSM in San Diego a "strategic planning" meeting was held, with 25 members voicing their support for this distinct SIG.

Many ideas were shared including collaborative programming with several different SIGs (both in and outside of the Neurology and Geriatric Section), advocacy with the national Falls Free Coalition initiative, and shared research agendas in the area of balance and falls in neurologic disorders.

Following this meeting, a proposal to establish a Balance and Falls SIG was submitted and approved by the Executive Committee of the Neurology Section.

Where do we go from here?

The officers have been elected and have assumed their responsibilities for the SIG.

We are moving ahead with planning educational programming for CSM 2007 in Boston, Topic of the Month postings and the newsletter.

In coming months, you can anticipate we will get the web page up, work on a mission and vision statement, and goals for the SIG.

Involvement in the Falls Free Coalition also tops the agenda, so look for more information about this in the fall newsletter!

It was your voice that created this SIG, in addition to the "listening ears" of the Executive Committee.

Now, it is your voice that will take us in new directions. Please feel free to email us your thoughts and ideas. The SIG is here to meet your needs!

Bubbles, Balloons, and PVC

A Creative Approach to Balance Rehabilitation

By Cecelia Griffith, PT, DPT

A common complaint of many physical therapy patients is that their exercise programs are boring. In order to be effective, balance rehabilitation must engage the patient.

A good program is designed to motivate patients, help them to find ways to socially interact with their families, decrease fall anxiety, and simulate every day functional tasks.

Above all, it must be dynamic and fun!

A large pocket book is not needed to fund a good program. For example, here are 15 items we use regularly in our clinic that we purchased from the "dollar store" next door to our clinic:

- Jacks
- Marbles
- Plastic horseshoe set
- Ring Toss
- Jump ropes
- Hula hoops
- Bubbles
- Balloons
- Plastic balls
- Playing cards
- Flash cards
- Duct tape
- Clothesline rope
- Clothespins
- Laundry basket

These items can be used individually or in creative combinations.

For example, you can string a piece of clothesline rope across a doorway and have your patient stand on a rocker board while squatting to pick up a clothespin from a bucket on a chair and then standing to clip it on the rope.

Make the task more challenging by having them hold a 4-inch ball between their knees, or vary the height and/or direction they have to reach for the clothespins.

Have your patient stand on a mini-tramp or a foam cushion or some pillows and play catch or pop bubbles that are blown at them.

Many of our clients like to do these tasks at home with their grandchildren and comment that it makes doing their "homework" more fun. Other tasks include:

- Performing head turns to look at cards and name what is on them
- Stand on a foam cushion to toss horseshoes
- Use a hula hoop to facilitate hip circles
- Sort marbles and jacks out of a bowl while standing on a rocker board or other compliant surface

There are so many combinations! You can also find items at garage sales Use your imagination.

You will soon find that your patients are laughing more, balancing better, fearing less and everyone will come up with new ideas.

Hooked on Evidence for Balance and Fall-related Research

Have you recently looked at APTA's Hooked on Evidence for balance and fall-related research in the neurologically involved?

A recent look revealed the following:

- Cerebral Palsy and balance – 2 reviews
- Cerebral Palsy and falls – 0 reviews
- Multiple Sclerosis and balance – 4 reviews
- Multiple Sclerosis and falls – 0 reviews
- Parkinson's and balance – 1 review
- Parkinson's and falls – 0 reviews
- Stroke and balance – 19 reviews
- Stroke and falls – 5 reviews
- TBI and balance – 1 review
- TBI and falls – 0 reviews

If you are interested in being involved in a committee of the SIG, please email: legters001@gannon.edu.

Possible committee involvement includes: practice issues, research, newsletter and web page, Falls Free Coalition, programming, etc.

Research Abstracts

Compiled by Susan L. Whitney, PhD, PT, NCS, ATC

Altered timing of postural reflexes contributes to falling in persons with chronic stroke

By D.S Marigold and J.J. Eng
Exp Brain Res 18:1-10, 2006

The purpose of this study was to determine if postural responses were different between persons with chronic stroke who had reported falling versus those who had not fallen.

Timing and kinematics of movement were recorded during movement translations during standing.

Forty-four community living stroke survivors participated. The criteria for admission included: age > 50, one stroke at least 12 months prior to the start of the study, able to stand without an assistive device for at least 5 minutes, and that they could follow a 2 step command.

Persons who had significant other neurologic or musculoskeletal dysfunction were excluded from the study. Eleven persons had reported fall and 33 were non-fallers. All subjects were asked to "maintain an upright standing posture" while the floor was translated in either the forward or backward direction.

Testing consisted of 20 trials, each separated by a rest of 15-30 seconds. All subjects were a body harness to prevent a fall during testing.

Electromyographic data were recorded at the anterior tibialis, gastrocnemius, the rectus femoris and the biceps femoris.

Onset latencies, the timing between the distal and the proximal muscles, and joint angles were compared between those who reported falls and those who had no reported falls.

Forward translations resulted in a greater number of falls during the translations.

Twenty five percent of the subjects fell at least once to a forward translation, whereas only 7 percent fell during a backwards translation.

There were 3.7 fall/person in the fall group to the forward translation.

The Berg Balance Scale and the Timed Up and Go scores were statistically more impaired in the faller group than the stroke survivors who reported no falls.

The reported falling group had significantly slower onset latencies distally at the tibialis anterior muscle on the involved side.

The rectus femoris was also slower compared to the non-falling group in both lower extremities. The timing between the distal and proximal muscles was slower in both the paretic and nonparetic limbs in the falling group.

Joint kinematics was also different between groups with greater trunk velocities at the end of the translation for the falling group. Overall, the falling group had disrupted timing of postural responses and a change in intralimb coordination.

There was wide variability in the subjects based on the location and type of stroke. The trials were also randomized (forward or backward) for 10 trials, but some adaptation may have occurred during the testing.

Overall, this paper suggests impairments in the timing and coordination of the musculature of the lower extremities in stroke survivors may make stroke survivors more susceptible to fall incidents.

The authors suggest that physical therapy intervention in persons who after stroke should include rapid movements and perturbation training in order to enhance onset latencies and lower extremity muscle coordination.

Do static or dynamic AFOs improve balance?

By Cattaneo, Marazzini, Cripps, and Cardini
Clinical Rehabil. 16:894-899, 2002.

The purpose of this study was to determine if the use of an AFO (one rigid and one that permitted plantar flexion) enhanced static and dynamic postural control in persons living with

multiple sclerosis (MS). Eighteen persons living with MS participated.

Criteria for selection included that they could walk "20 m indoors and outdoors with a cane or walker", and that they had decreases in strength that were not severe. Exclusionary criteria included that they could not already be using an AFO. Four subjects could not wear the AFO and the remaining 14 people were tested. The participants consisted of 8 women and 6 men [Age (mean 37 years) and onset (13 years)].

Participants were asked to walk with the prefabricated AFOs with no ankle movement and also with custom fitted AFOs that permitted 20° of plantar flexion. Both AFOs permitted direct contact of the toes on the floor. Shoes were not worn during testing and the AFOs were affixed with rubber to help enhance gripping and to prevent sliding on the floor during testing.

Outcome measures included two tests each of static and dynamic balance. The Pedrio Test and the timed walking test were included as were the CranioCoropGraphy and Equiscale for static balance testing. The CranioCoropGraphy test provides information about the position and movement of the head and trunk. The Equiscale test is an ordinal scale developed to assess postural control in persons with MS, with 16 as the optimal score.

Walking time over 5, 10, and 20 meters was recorded for the three conditions. The Pedrio Test consisted of having subjects walk inside a path of 1.2 m that narrows to 0.22 m. The location where persons stepped outside of the border was recorded three times for the three conditions.

Subjects had enhanced static balance with both the rigid and custom made AFOs. Dynamic postural control was worse with the static AFOs. With the Equiscale tool, there was a difference between barefoot and dynamic AFOs. Patients walked fastest in barefeet compared to walking with either AFO. Walking with the flexible AFO was faster than walking with the fixed AFO.

Although no shoes were worn during this study, it presents some interesting findings. One must carefully assess whether the use of an AFO will enhance gait function. There may be differential affects of an AFO on static and dynamic postural control.

Falls in individuals with incomplete spinal cord injury

By S.S. Brotherton, J.S. Krause and P.J. Nietert
Spinal Cord 2:1-4, 2006

Persons in the southeastern United States living with an incomplete spinal cord injury (SCI) were mailed a survey to attempt to determine falls rates, circumstances, and the consequences of falls. Criteria to receive the survey included: a traumatic, incomplete spinal cord injury, at least one year post SCI, ability to walk independently 10m with or without an assistive device, and over the age of 18. Two hundred twenty one subjects met the criteria and 119 returned the survey for a response rate of 54 percent.

The investigators developed the survey from existing survey batteries and added additional questions that required subjects to choose from various alternatives. Mean age was 52 years with 69 percent men of which 74 percent were Caucasian. Over half were married and over half had completed a least some college.

Mean time since SCI was 14 years and over 50 percent had sustained their SCI from a car accident. Over 75 percent of the participants had full movement of their hand and upper extremities, with 47 percent injured in the cervical region, 36 percent thoracic, and 17 percent in the lumbar region.

Seventy five percent of the subjects had fallen at least once within the last year. Most falls occurred in the home during the afternoon or evening. Eighteen percent of falls resulted in a fracture and 45 percent of the persons living with an incomplete SCI reported that falls restricted their ability to move about in their communities.

Falls appear to affect life choices in persons living with incomplete SCI and their prevalence is highly reported (75 percent). Rehab strategies to reduce the risk of falling in persons with SCI should be considered when developing an intervention program.