



# SCI Special Interest Group Newsletter Fall 2011

## Letter from the Chair

Hello, Everyone!

It is with great excitement that I take over the reins of the SCI SIG this year! By way of introduction, my name is Karen Hutchinson. I am a former nominating committee member on the SCI SIG, and I currently hold a clinical faculty appointment in the Department of Physical Therapy and Athletic Training at Boston University. While I am working in academia, I am a clinician at heart and have worked in many different patient care settings over the years. Of all the positions I have held, clinical care has always been a main interest. I am grateful for the opportunity to serve again with SIG Leadership.



At this time, we sadly must say goodbye to our former SCI SIG Chair, **Jennifer Hastings, MSPT, PhD, NCS** who has been 'steadying the ship' for the past several years. Strong leaders are gifts, they make everyone around them better! Many thanks go out to Jennifer for lending her time and talents for the service of our section. We also bid farewell to **Pat Kitzman PhD, PT** as he rotates off his position as Nominating Committee Chair. Please also help me welcome at this time, two new additions to our SCI SIG Nominating Committee. **Lauren McCollough, PT, DPT**, a research clinician who joins us from the Shepherd Center, Atlanta, GA and **Twala Maresh, PT, DPT, NCS** who hails from the University of Central Arkansas. Welcome, everyone!

I have watched our section grow over the past several years and reach out to new members (we currently have greater than 500 SCI SIG members!). In addition, I am remarkably impressed by the quality and quantity of research that is generated by hardworking individuals who all share our passions...to improve the function and quality of life for persons with spinal cord injury. For all who generously share your time and knowledge with our members, we are truly grateful.

If you are new to our SIG this year or haven't checked out our website in a while, please take a moment to visit our SCI SIG webpage (<http://www.neuropt.org/go/special-interest-groups/spinal-cord-injury>). We have an extensive list of links that may be of great value to you and your patients. Everything ranging from support groups, wheelchair sports, adaptive equipment, and consumer guidelines, is there. Let us know if there are sites you use regularly not noted here that you think would be of value for all.

Our role here on the SCI SIG is to assess member needs, facilitate information transfer to members, and identify high quality educational programming. If there are topic areas that you would be interested in learning more about, whether that be by newsletter, online-videoconferencing, or actual CSM Programming, please let us know! We will do our best to identify folks to support our collective professional growth. We are also interested in hearing what you are doing in your programs, clinics or work environments. If you are implementing a new program, starting a new sabbatical, or beginning a new journal club in your hospital, we want to know and share the 'how to' strategies with our readers!

There are innovative things happening all over the country, we have a lot to learn from each other.

Also, there are a few exciting things to look out for on the horizon. A brochure entitled, "Physical Fitness in Spinal Cord Injury", spearheaded by Lisa Culver, PT, DPT, MBA is in the works and is nearing completion! The plan is to have a final draft by year end. This is great timing and will nicely complement the health promotion materials discussed in our newsletters this year. In addition, for all you educators out there, the Neurology Section of the APTA will soon be publishing its guidelines on entry-level versus advanced-practice content for Neurologic Physical Therapy. This is for all neurologic diagnoses, including SCI. This document is in final stages of the approval process with anticipated release date of early 2012 and should greatly help direct and support curriculum development in Neurologic Physical Therapy practice.

In this current newsletter and our Winter Edition, we will be exploring fitness and health promotion following SCI. We are featuring two experts on our health promotion series for these two newsletters. **Ashraf Gorgey, PT, PhD, FASCIM** from the Department of Veteran's Affairs VA and Virginia Commonwealth University, will talk with us about determining body composition after SCI. **Eileen Collins, RN, PhD**, also from the Department of Veteran's Affairs, will talk about determining caloric expenditure following SCI. We are grateful to both for their participation in these efforts! You also don't want to miss our 'Clinician's Corner' section. In this edition, we have a conversation about peer mentoring and its potential role in PT practice by **Marie Dorgan, DPT** from the Boston Medical Center. Please consider submitting something from your facility to the 'Clinician's Corner' for future newsletters!

And finally, we hope you like the new look of our newsletter! This is a work in progress. Our plan this year is to publish a fall, winter, and spring newsletter in this format. The focus of our winter newsletter will be preparation for the Combined Sections Meeting in February 2012 which is in Chicago, IL.

Again, welcome to our SCI SIG. Please take advantage of all the resources available to you, and let us know how we can help you to learn and grow in the field of Spinal Cord Injury. Until next time.....

Karen Hutchinson, PT, DPT, PhD  
SCI SIG Chair

### In this NewsLetter, To Read About:

**Determining Body composition after SCI;**

**See page 2**

**Peer Mentoring for Persons with New SCI;**

**See page 7**

**\*Determining Caloric Intake After SCI; Stay Tuned -See Winter 2012 Newsletter!**



# SCI Special Interest Group Newsletter Fall 2011, (pg2)

## Health Promotion Following SCI : Part I

By Karen Hutchinson, PT, DPT, PhD

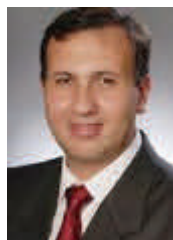
The Following is a transcribed communication with **Dr. Ashraf Gorgey, PT, PhD, FACS**M from the Department of Veterans Affairs and Virginia Commonwealth University, regarding the determination of body composition following SCI:

*Introduction:* Physical therapists primarily focus on maximizing functional independence after spinal cord injury. However, there are also 3 main health promotion challenges that should be addressed with patients with SCI at some point during rehabilitation: 1) maintaining a healthy weight, (How many of you have heard of the rather disparaging term ‘quad belly’?); 2) maintaining proper HR, BP and cholesterol levels thereby minimizing risk of developing metabolic syndrome, CVD, heart attack, or stroke; and 3) maintaining healthy skin and bones while minimizing the development of bed sores, osteoporosis, and fragility fractures. At this time we are writing to attempt to help the clinician establish “buy in” for post-PT exercise aimed at addressing maintaining a healthy weight. (Part II of this newsletter will be published Winter 2012 and will describe the process of determining caloric requirements...stay tuned!)

Maintaining a healthy weight and good body composition is critical to maintaining good health (Stenson, 2011; Chen, 2011). But what are the proper height/weight standards for someone who presents with a significant muscular paralysis? Do weight scales for able-bodied controls apply to persons with SCI? How many calories should this person be consuming per day in order to maintain their healthy weight? What other information do we need to know to make accurate decisions about health promotion behaviors?

**KH: Dr. Ashraf Gorgey has recently published several papers on assessing body composition following SCI (See citations below). He has kindly agreed to serve as one of our experts for this newsletter series on health promotion following SCI and to answer some questions based on his area of research.**

**Dr. Gorgey:** I would like to take the opportunity to thank you for inviting me to address such an important topic. Before I go into details, I would like to share with our readers the main adaptations in body composition following spinal cord injury (SCI). Immediately follow-



ing injury, a person with SCI loses a significant amount of weight, particularly due to significant loss of muscle mass and lean mass. For example, just six weeks post-injury, there is a significant loss in muscle size, up to 50% and 30% in individuals with complete and incomplete SCI, respectively. This continues up to six month post-SCI and may extend to one year. Following the first six months and when the injured individual becomes medically stable, the body weight starts to increase as result of reduction in physical activity and poor dietary habits such as reliance on high-fat diets (quick meals). The primary reason behind this adaptation is the reduction in resting energy expenditure, which represents about 65% of total energy expenditure. The reduction in energy expenditure results from the significant loss in lean mass occurring during the first 6 months post-SCI. The whole cycle results in energy imbalance between caloric intake and caloric expenditure, which further leads to an increase in adiposity (fat mass), obesity, and metabolic disorders. These adaptations in body composition lead to the development of dyslipidemia (abnormal lipid profile), insulin resistance, type 2 diabetes mellitus, and later on cardiovascular disease. Therefore, studying body composition adaptations in response to exercise and dietary interventions is of a health related significance to this population.

**KH: Let’s first start by talking about how we best measure body composition of a non-ambulatory patient in the clinic. For example, the basic strategy of determining body weight involves positioning a patient in a wheelchair on a wheelchair scale. Then the patient transfers off the wheelchair to another surface, and the wheelchair is weighed alone. The difference between those two measures would represent the patient’s weight. Next, with the patient in a supine position, a non-stretching tape measure is used to determine height (in meters). Body mass index is weight (kg) divided by height (m) squared (Kg/m<sup>2</sup>).**



[www.sacbee.com](http://www.sacbee.com)

**Dr. Gorgey:** Currently, there is no standardized or accurate method of measuring body composition. In the clinic, as well as in epidemiological studies, clinicians and researchers rely heavily on using the body mass index (BMI). The BMI criteria are that an index above 30 kg/m<sup>2</sup> indicates obesity, 25 kg/m<sup>2</sup> is overweight, 18-25 kg/m<sup>2</sup> is normal weight.



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However, BMI underestimates the fat percentage that a person with SCI has in his/her body. For example, if we have a body builder with a BMI  $> 30 \text{ kg/m}^2$  but whole body percentage fat mass less than 10%, does this mean that he is obese? Of course it does not. This is the exact problem that at least 50% of individuals with SCI experience when using the BMI equation. The BMI may be less than  $25 \text{ kg/m}^2$ ; however, body fat mass is closer to 40%.

Another problem with using BMI is the failure to identify regional obesity and primarily central obesity. For example, two people can have the same BMI or percentages of fat mass; however, one person could have a waist circumference greater than 100 cm or 40 inches. This person will be more susceptible to metabolic disorders. Unfortunately, BMI cannot differentiate between these two individuals.

**KH: Do you feel that determining BMI is useful for the PT following SCI? Basically, are these categories valid for people with SCI? If not, what ranges/scales should we use to determine if our patients are at a healthy or unhealthy weight class?**

**Dr. Gorgey:** Based on the available evidence, relying on BMI may not be a useful method in rehabilitation post-SCI. The existing categories are primarily established for individuals with intact nervous systems, but studies in SCI suggest that BMI cannot be applied to this specific population. Research groups in Canada and the Bronx VA Hospital have recommended the use of a lower BMI,  $22.5 \text{ kg/m}^2$ , criteria to establish those who are at risk of developing obesity after SCI. However, research work is still proceeding trying to establish the BMI criteria for classifying those with healthy and unhealthy weight after SCI.

**KH: Is underwater weighing still the gold standard for measuring body composition, or has CT/MR scanning or bioelectric impedance taken over as being considered more accurate? Briefly, what should you consider as strengths and/or weaknesses of each technique when reading papers that use these various measures?**

**Dr. Gorgey:** These are all important techniques and our research group is fortunate to be involved in research

activities using all these techniques. However, each of these techniques has its pros and cons. Before I progress, I would like to mention that the underwater weighing technique is just one method that we use to calculate the 4-compartment model. The body can be divided into two-compartment (fat mass and fat-free mass), three compartment (fat mass, fat-free mass, and bone mass), or 4-compartment (fat mass, fat-free mass, bone mass, and total body water) models. The underwater weighing technique is primarily used to calculate body density and later helps to determine percentage fat mass. This technique again requires specific training, and individuals with SCI need to be accompanied by one or more staff members in the pool during the actual technique to ensure safety- especially for those with high levels of injury.

The problem of this technique is that it provides general information on whole body fat mass and tends to indicate less, if any, information about regional adiposity. Bioelectrical impedance is also a convenient tool but only provides information about whole body fat mass. However, our group is in the process of validating BIA measurements for regional adiposity. We now understand that studying adaptations in regional adiposity is crucial for this population. Therefore, reliance on magnetic resonance imaging (MRI) is very helpful and provides extensive information. However, MRI is costly, requires training for image collection and analysis, and the analysis procedure is time consuming.

**KH: Most PT clinics do not have access to underwater weighing or expensive scanning to determine body composition, so what is the next best thing? Skin fold calipers can assess subcutaneous fat. Should this be done, and where should skin fold testing be done? Should it be done on non-paralyzed muscle and compared to able-bodied controls?**



<http://t1.gstatic.com/images?>

**Or should it be done on all standard muscles of the body irrespective of denervation? Do you think it is accurate to assess subcutaneous fat on paralyzed limbs using the skin fold calipers? Why, or why not?**



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**Dr. Gorgey:** This is an important question, and I am going to respond to each component separately. The ultimate goal of our research investigations is to provide clinicians with accurate and inexpensive tools to evaluate body composition in this population. Despite using sophisticated tools in our research, we have still been using others techniques similar to skin fold, waist circumference, and BMI measurements. The goal is to develop prediction equations using the outcomes from the sophisticated tools (MRI, underwater, DXA, etc.), so clinicians can plug in the outcomes of the conventional measurements and simply determine the percentage fat mass.

The skin-fold measurements using a caliper is performed in individuals with SCI using the nine-site measurements. This means we have to measure nine anatomical sites (i.e., chest, biceps, triceps, subscapular, mid-axillary, supra-iliac, abdominal, thigh, and calf) to determine subcutaneous thickness (see ACSM reference). This technique requires skills in pinching the skin and the underlying subcutaneous adipose tissue while simultaneously performing the measurements using a caliper. On each site, we have been repeating three measurements, and the values have to be within 1-3 mm. We also make all the measurements on the right side of the body. Reliability of this measurement has been established in able-bodied population, but it is still questionable after SCI. We have preliminary data that indicate that the error could exceed 20% when using the skin fold measurements. However, I would highly encourage clinicians to consider using this measurement as training improves accuracy and tends to reduce the error incorporated with the measurements.



[http://www.fitnesszone.com/Merchant2/graphics/00000001/man\\_back.jpg](http://www.fitnesszone.com/Merchant2/graphics/00000001/man_back.jpg)

**(See: ACSM Guidelines for Exercise Testing and Prescription, 7th Edition, ISBN: 0-7817-4506-3, 2006, pg 60-62, for Skin Fold Caliper Testing procedures.)**

**KH: The presence of abdominal obesity has been linked to the risk of developing metabolic syndrome and has been well documented in able-bodied populations. Can you talk about the serious nature of these results? What is the interpretation of a high ratio of Visceral Adipose Tissue (VAT; belly fat) to Subcutaneous Adipose Tissue (VAT/SAT)? Who is most at risk from a high ratio; males/females, those with tetraplegia/ paraplegia?**

**Dr. Gorgey:** As mentioned previously, our research group is interested in studying regional body composition after SCI. An independent cardiovascular risk factor is increasing accumulation of visceral adipose tissue (VAT), this has been well studied in different clinical populations but not in SCI. Because we have evidence to support that this group is at higher risk of cardiovascular and metabolic disorders, we have studied the relationships between VAT and factors that lead to insulin resistance, glucose intolerance, and lipid abnormalities.

Normally, fatty acids would be stored in adipose tissue, such as subcutaneous adipose tissue with a small % of fat stored in muscle, liver, or surrounding internal organs. However, if this percentage of fat accumulation continues to increase in the non-adipose accumulation sites, it could lead to serious health consequences. This is exactly what happens in VAT where adipose tissue starts to be stored and surrounds internal or visceral organs with access to portal circulation and causes serious consequences as a result of increasing LDL-C and triglyceride release. We have also shown that when the ratio of VAT to subcutaneous adipose tissue (SAT) increases greater than 0.4, the metabolic profile is affected. Trunk SAT is associated with a healthy metabolic profile (i.e., storing fat as SAT is better than storing it as VAT).

**KH: Is there a clinical corollary to those scan-produced measures for VAT and SAT? For example, is there value in determining the ratio of waist circumference /thigh circumference or the ratio of waist circumference to extremity skinfold caliper testing? Can you determine clinically (without scanning) how much of the waist measurement is visceral adipose tissue versus subcutaneous adipose tissue?**



**Dr. Gorgey:** At this point, we are still working on this to provide an estimate for VAT and SAT through using the clinically acceptable methods such as waist circumference and skinfold caliper testing. Another advantage of using MRI over other body composition techniques is the capability of differentiating between VAT and SAT. This is difficult to do with regular anthropometric tools. Work is still in progress; however, our group has been trying to establish the relationships between all anthropometric variables and MRI outcomes. We are interested in waist circumference index, which is the circumference divided by height squared, as well as waist to hip ratio. Both indexes have been shown to be valid ways of predicting those with increased VAT.

**KH: In your papers, you used waist circumference as a clinical measure of abdominal obesity. Your measurements were taken in sitting. Others have compared waist circumference measures taken in standing to supine (Wanninge, et al, 2010). What do you need to think about when selecting the proper position for measuring abdominal obesity, particularly for non-ambulatory patients?**

**Dr. Gorgey:** It is obvious we cannot do waist circumference in standing in this population, so either sitting or lying. In my studies, we have done it in sitting position; however, this was considered a limitation, and both sitting and supine lying positions should be included in future studies. Moreover, we have been doing waist (narrowest portion of the trunk), abdominal (widest portion or close to the umbilicus), hip (surrounding the two greater trochanters of both hips) circumferences in our recent studies. Positioning may be important, considering the effects of gravity, paralytic muscles, and other postural changes that commonly occur in people who use wheelchairs for mobility.

**KH: You describe how an increase in body fat mass associated with SCI can be associated with an abnormal metabolic profile (impaired glucose tolerance, hyperinsulinemia, dyslipidemia –incr triglycerides, incr LDL-C; and decr in HDL-C.) However, you note that where the fat deposition occurs may be just as important as how much fat deposition exists. As previously described, it appears that abdominal obesity is the major clinical criteria for risk of**

**developing metabolic syndrome. Is it known? Do different kinds of training influence fat deposition location? For example, would strength training necessarily decrease intramuscular fat of non-paralyzed muscles, concomitantly decreasing subcutaneous fat, or perhaps does aerobic exercise differentially decrease visceral versus trunk subcutaneous fat deposition? Basically, what is the best type of exercise for someone with SCI to do to avoid the development of visceral adiposity?!**

**Dr. Gorgey:** It is clear based on my earlier responses that regional adiposity is an important determining factor for metabolic profiles. We have recently shown that 12 weeks of electrical stimulation resistance training of lower extremity muscles has resulted in increase in muscle size, as well as decrease in percentage intramuscular fat of the paralyzed muscles and visceral adipose tissue accumulation. However, there were no changes in subcutaneous adipose tissue in either thigh or trunk. The trial will be published in the Medicine & Science in Sports and Exercise Journal. The effects of aerobic training on different adipose tissue distribution has yet to be investigated in this population.

**KH: It was interesting for me to read that an increase in spasticity leads to an increase in % Fat Free Mass and may help manage triglycerides in persons with SCI. We often teach patients who experience a leg spasm to put weight on it so it will stop, but your work suggests we should just let it continue, providing there are no safety issues to consider. Do patients with complete injuries below T11 (likely low spasticity) tend to show more elevated markers (higher LDL-C, triglycerides, etc.) compared to the people with higher-level injuries who experience more spasticity?**

**Dr. Gorgey:** During my PhD work, I was assigned to a project of analyzing magnetic resonance imaging and realized that there is a difference in muscle size between those with spastic and non-spastic muscles (below T11). The observation was later published in the Journal of Spinal Cord. When I started my postdoctoral fellowship training at University of Michigan, one of the main research focuses pertained to finding what factors influence (positively or negatively) body composition and metabolic profiles in men with SCI.



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I just thought to expand my previous observation and determine if spasticity could influence body composition and metabolic profiles. The findings showed that spasticity has positive association with body composition (more lean mass and less fat mass) and indirectly influences metabolic profile through preservation of lean mass. I would like to say that none of these studies was able to prove causality; however, the findings are important for clinicians who seek primarily to inhibit spasticity by extensive medications. While we totally acknowledge the negative effects of spasticity on range of motion, activities of daily living, etc., clinicians should be aware that periodical tension as result of spasticity could help to maintain muscle mass, prevent deterioration, and prevent changes in body composition after SCI.

**Gorgey**, et al, Relationship of Spasticity to Soft Tissue Body Composition and Metabolic Profile in Persons with Chronic Motor Complete SCI. *JSCM*, 2010; 33(1):6-15. **Gorgey**, et al, Influence of Motor Complete SCI on Visceral and Subcutaneous Adipose Tissue on MRI. *JSCM*, 2011; 34(1):99-109 **Gorgey**, et al, Regional and Relative Adiposity in Relation to Carbohydrate and Lipid Metabolism in Men with SCI. *Appl Physiol Nutr Metab*, 2011; 36:107-114 **Stenson**, et al, Obesity and Inpatient Outcomes for Patients with Traumatic SCI. *Arch PhysMed Rehabil*, 2011; 92:384-90. **Chen**, et al, Weight Matters: Physical and Psychosocial Well Being of Persons with SCI in Relation to BMI;2011;92:391-8.

## Clinician's Corner:

### Peer Mentors as a PT Resource for People with New SCI

By Marie Davis, DPT, Boston Medical Center,

In the blink of an eye, their whole life changes.

One minute they were just driving their car, or diving into the ocean, or walking to the corner store, and suddenly they are paralyzed. The physical, emotional, and psychological adjustments that people with newly acquired spinal cord injuries must face from the first day of their injury, and everyday thereafter, is overwhelming. As a rehabilitation team, it is our job and responsibility to do everything possible to help these patients adjust and prepare for their futures. We are trained in the medical and psychological aspects of the injury, but we don't have the firsthand knowledge of actually experiencing it. Thus, we turn to others for that knowledge and expertise.

Multiple research studies have validated that a peer mentoring program for people with newly acquired spinal cord injuries is beneficial. Peer mentors can help improve a newly injured per-

son's self-efficacy, as well as potentially decrease the occurrence of future medical complications, such as urinary tract infections<sup>1</sup>. Peer mentors are able to provide a unique combination of support, empathy, and understanding, thus facilitating adjustment after a spinal cord injury<sup>2</sup>. There is no doubt that peer mentors are the true experts in regard to living with a spinal cord injury and are an important addition to any rehabilitation team that works with people with spinal cord injuries. Most rehabilitation facilities that specialize in spinal cord injury have some form of a peer mentoring program, whether it be evening group sessions, one-on-one counseling, or follow-up phone calls.

As physical therapists, we strive to educate our patients in all aspects of spinal cord injury and help them to develop safe and successful techniques to complete all aspects of their mobility, whether it is getting in or out of bed, propelling a wheelchair, or just maintaining their sitting balance. Frequently, we demonstrate multiple techniques, emphasizing appropriate body mechanics, hand placement and sequencing. But, how often do we cheat? We make a slide-board transfer look so easy, but a new patient with a C7 injury does not have those trunk muscles that are stabilizing us. When we demonstrate a floor transfer, how many times do we (secretly) use our leg strength to help us get up, but then we expect our patients to try to perform the same task without use of their legs? Every task we demonstrate is not necessarily an accurate depiction of how these newly injured patients can or will perform them.

One approach that can be incredibly useful, in addition to the private conversations between the mentors and mentees, is to have the peer mentors attend a few physical therapy sessions. During these PT sessions, the mentor can demonstrate how he performs certain mobility tasks, ranging from a basic transfer to a floor transfer or even going up stairs in a wheelchair. The mentor can also critique the patient on his technique, as the therapist is helping him.

Typically, most peer mentor instruction manuals will stress the importance of matching mentors with mentees based on age, gender, or other demographic information. But when it comes to demonstrating mobility techniques, it is more important to have a mentor with a similar injury level as the patient. This way, what looks like and feels like an impossible feat, suddenly becomes achievable in the eyes of the patient.

(See NSCIA website for Information on Developing Peer Mentoring Programs; [www.spinalcord.org](http://www.spinalcord.org), Resource Ctr./ Support Groups/ Peer)1. **Ljungberg, I., Kroll, T., Libin, A., Gordon, S.** (2011). Using peer mentoring for people with spinal cord injury to enhance self-efficacy beliefs and prevent medical complications. *Journal of Clinical Nursing*, 20(3-4), 351-358. 2. **Veith, E.M., Sherman, J.E., Pellino, T.A., Yasui, N.Y.** (2006). Qualitative Analysis of the Peer-Mentoring Relationship Among Individuals With Spinal Cord Injury. *Rehabilitation Psychology*, 51 (4), 289-298.