Assessment and Management of the Obese or Overweight Patient with Spinal Cord Injury

CSM 2015
Indianapolis, IN
Feb. 4-7th, 2015

Kristy Prox, RD, LD, Shepherd Center, Atlanta, GA
Daniel Dale, PT, DPT, Shepherd Center, Atlanta, GA
Karen Hutchinson, PT, DPT, PhD, Boston University, Boston, MA
SueAnn Sisto, PT, MA, PhD, FACRM, Stony Brook University, NY

Objectives for this presentation

• Discuss the Impact of SCI on Primary and Secondary Health Conditions
• Identify Key Components of Exercise Prescription in SCI: frequency, intensity, duration
• Discuss key nutritional concerns, caloric requirements following SCI
• Generate Exercise Solutions for management of the overweight/obese patient with SCI throughout the continuum of care

Disclosure

• *The speakers in this symposium do not have anything to disclose regarding conflict of interest, or the appearance of a conflict of interest, that might bias the content of the presentation.

Session Outline

• Introduction: Prevalence Obesity/SCI Obesity (KH) (5 min)
• Secondary Conditions After SCI (muscle, bone, blood, heart, body composition) (SAS) (20 min)
• Exercise Prescription: Activities, Frequency, Intensity, duration; (KH) (20 min)
• Nutritional Insights: Acute Care to Home Care, Key dietary concerns; Psychological and physical impacts of injury on nutritional intake; Tube feedings when/why?; bariatric medical/surgical management; (KP) (20 min)
• Nursing Related Concerns: Skin Integrity & position changes; proper equipment; screening sleep apnea, diabetes, (DD) (10 min)
• Cases: Treatment Principles, equipment, & staffing considerations for Inpatient/outpatient care (DD) (40 min)
• Q and A (Full Panel) (15 min)

Obesity

• “A progressive disease of excess fat accumulation that has multiple organ-specific pathological consequences”.

Gorgey and Gater, 2007

Obesity Trends* Among U.S. Adults
BRFSS, 1990, 2000, 2010
(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)

http://www.cdc.gov/obesity/data/prevalence-maps.html
**INTRODUCTION**

**BMI-Based Weight Classification Categories**

- \(<18.5\, \text{kg/m}^2 = \text{underweight}\)**
- \(18.5\) to \(24.9\, \text{kg/m}^2 = \text{normal weight}\)
- \(25\) to \(29.9\, \text{kg/m}^2 = \text{overweight}\)
- \(>30\, \text{kg/m}^2 = \text{Obesity}\)
- \(30.00\) to \(34.99\, \text{kg/m}^2 = \text{Class I Obesity}\)
- \(35.00\) to \(39.00\, \text{kg/m}^2 = \text{Class II Severe Obesity}\)
- \(>40.00\, \text{kg/m}^2 = \text{Class III Morbid Obesity}\)

**Metric Conversions**

- 120 lbs = 54 kg
- 130 lbs = 58 kg
- 140 lbs = 63 kg
- 150 lbs = 68 kg
- 160 lbs = 72 kg
- 170 lbs = 77 kg
- 180 lbs = 81 kg
- 190 lbs = 86 kg
- 200 lbs = 90 kg
- 225 lbs = 102 kg
- 250 lbs = 113 kg
- 300 lbs = 136 kg
- 350 lbs = 158 kg
- 400 lbs = 181 kg

\[\text{BMI} = \frac{\text{Weight (kg)}}{\text{height (m)}^2}\]
Assessment and Management of the Obese or Overweight Patient with SCI

BMI and SCI

• BMI Does not take into account body composition changes after SCI and grossly underestimates obesity for person post injury
  (Gorgey, 2005, MacDonald, 2007, Laughton, 2009)

• SCI-Specific BMI Recommendations:
  - Adolescents aged 10-21: 19 kg/m² (MacDonald, 2007)
  - Adult with SCI: 22 kg/m² (Laughton, 2009)

Excess Weight/Fat Promotes Chronic Diseases

More likely to suffer from the following if obese vs normal weight after SCI

• Pressure Ulcers
• UTI's
• Spasticity
• HTN
• DM
• Obstructive Sleep Apnea
• Carpal Tunnel Syndrome
• Pulmonary Embolism
• Decreased Physical Independence
• Decreased Community Integration

Chen et al, 2011

SCI in Rehab

• Model Systems from 2006-2009
• N=1524
• 25% Obese at admission to rehab

• At D/C see Lower FIM Self-Care and Mobility Scores if Obese vs Normal weight after SCI for paraplegia-complete and incomplete; not different for tetraplegia
  — Stenson et al, APMR 2011

Rehab LOS and Obesity Stenson et al, 2011

• Mean LOS is longer for obese patients (5 to 10 days longer) for para and tetraplegia but with variability not statistically significant

Follow-Up MD Visits

• Model Systems 2006-2009; At least one office visit 1 yr post-injury
• N=1381 (possible 4,000)
• Underweight (7.5%)
• Normal Weight (39%)
• Overweight (31.4%)
• Obese (22.1%)
  — Chen et al, 2011

Odds of Re-hospitalization

• “Unplanned hospitalization in the past year”
• Odds of re-hospitalization 1.53 x higher if obese

• So even though statistically we don’t see shorter LOS; obese patients are discharged at a lower functional level and are more likely to be re-admitted than a non-obese patient with similar injury level

Chen et al, 2011
Obesity Estimates in SCI Population

- 43.9-66% persons with SCI are estimated overweight or obese
- This is using a conservative measure 25 kg/m²

• Currently, roughly 25% of newly injured are obese to begin with and we have 40-66% prevalence rate for obesity in the population...
• Obese persons suffer SCI and....
• Normal weight Persons suffer SCI then become obese
• Altered Body Composition is associated with a poor metabolic profile and contributes to many secondary conditions identified following SCI

Secondary Health Conditions (SHC) in SCI

Sue Ann Sisto, PT, MA, Ph.D., FACRM
Research Director, Division of Rehabilitation Sciences
Chair, Ph.D. in Health and Rehabilitation Sciences
School of Health Technology & Management
Research and Development Park
Stony Brook University

Objectives

Objectives
1. Defining terminology for Secondary Health Conditions
2. Review Chronic Secondary Conditions by System
3. Aging with a SCI

Terminology and Definition

- Jensen, MP et al., 2012 Secondary Health Conditions
- Greater emphasis since 1980 due to greater longevity in the disabled population
- Lack of consistency in the terminology
  - Secondary disabilities (Marge et al, 1988)-after onset of primary disability
  - Broad and included all health conditions

Terminology and Definition

- Houk and Thacker (1989)
  — Secondary complications
- Other terms
  — Co-morbid conditions
  — Co-morbidities
  — Medical complications
  — Associated conditions
Other terminology

**Terminology and Definition**
- Expansion of the IOM Report (1991) to included:
  - Disability related social and activity limitation
  - Associations between aging and duration of injury (DOI)
- Healthy people 2010 included:
  - Medical
  - Social
  - Emotional
  - Mental
  - Family
  - Community problems

---

2 Pathways for the Development of Secondary Conditions:
1. Primary—directly related to impairment such as spasticity
2. Secondary—indirectly related to condition such as inactivity leading to obesity and CVD
  - This is the focus of this symposium

---

Other terminology

- Clearly a need for common terminology with identifiable domains
- Secondary HEALTH Conditions
  - Includes domains:
    - Physical Health
    - Psychological Health
  - This definition does not diminish the importance of social and activity consequences to disability and health

---

IOM Report, 1991

- Key Findings in SCI Research
  1. Aging with a disability
    - Evidence of premature or accelerated aging in SCI compared to same age cohort in general population (Kemp and Mosqueda, 2004)
    - Systems of premature or accelerated aging (Hitiz et al., 2010; Spungen et al., 2003, Bauman et al. 2001)
      - Musculoskeletal
      - Endocrine
      - Cardiovascular

---

- Aging with a SCI and secondary health conditions
  - Groah et al. (2012) have developed a list of recommendations for future research on aging with SCI. Relative to this symposium, these include:
    - New knowledge on benefits of wellness strategies and exercise.
    - New knowledge on health care delivery systems that would improve care and reduce cost.

---

- Key Findings in SCI Research
  2. Frequency of SHC and DOI/Aging
    - Chronic pain
    - Osteoporosis (Jensen, et al. 2013; Giang et al., 2006; Bauman et al, 2001)
    - Pressure sores (Gelis et al., 2009)
    - Bladder and kidney dysfunction
Assessment and Management of the Obese or Overweight Patient with SCI

Classes of SHC

<table>
<thead>
<tr>
<th>Musculoskeletal</th>
<th>Endocrine</th>
<th>Cardiovascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoarthritis</td>
<td>Diabetes</td>
<td>Hyper-hypotension</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Dyslipidemia</td>
<td>Coronary artery disease</td>
</tr>
<tr>
<td>Obesity</td>
<td>Skin</td>
<td>Sleep disorder</td>
</tr>
</tbody>
</table>

Osteoporosis (Dolbow, et al. 2013)
- Rapidly accelerated bone loss of 20-50% bone loss within the first few years
- Greater loss in trabecular vs. cortical bone due to its high metabolism (DeBruin et al., 2000)
- Degree of BMD loss is related to activity
- Fracture rates estimated to be 5-34% in first 5 years (Jiang et al. 2006)
- 2x greater risk for fragility fractures esp. at distal femur and proximal tibia (Morse et al. 2009)
- Fracture threshold reported to be 70 mg/cm³ (distal tibia) to 110 mg/cm³ (distal femur) (Eser et al. 2006) yet still debated

Obesity and/or Reduced Lean Mass
- BMI and DEXA were compared on lean and fat mass in 19 SCI and 19 able bodied individuals (Jones, L et al., Arch PM&R, 2003)
  - BMI was reported to underestimate fat mass in SCI
despite lack of an obese appearance, individuals with SCI carried a large amount of body fat compared to controls with the same BMI.
- BMI is significantly related to FM after controlling for neurological level of injury (NLOI) in low paraplegia (T8-12)
- Reduced BMI is a result of reduced LM (Dionysiotis et al. 2009) but reduced BMC is independent of NLOI

Metabolic Syndrome
- Sometimes called: Terrible triad
- Deadly quartet
- Syndrome X
- Group of clinical findings that predispose individuals to the development of cardiovascular disease, stroke and diabetes

PATHOPHYSIOLOGY
- Etiology of Metabolic Syndrome is multifactorial
  - Atrophy of lean tissue
  - Increased total body fat
  - Sedentary lifestyle
  - Inflammatory component: association with elevated C-reactive protein
Factors that may related to CVD include:
  • disorders of carbohydrate metabolism
  • dyslipidemia
  • adverse body composition
  • abnormal autonomic function
  • reduced physical activity

PATHOPHYSIOLOGY
  • Final Common Pathway
    – Denervation causes loss of contractility leading to impaired insulin-mediated glucose disposal
    – Higher serum glucose
      • Increased circulating glucose causes
        – microvascular endothelial damage
        – Hypertension
        – Heart disease
        – Stroke

DIAGNOSIS
  • NCEP-ATP III Criteria (3 of 5)
    – Blood pressure >130/85
    – Waist circumference >40 in.-men; 35 in.-women
    – Fasting glucose >100
    – Triglycerides >150
    – HDL <40-men; 50-women
  SCI modifications
    – Hypertension/hypotension
    – BMI >25
    – Fasting glucose >100
    – Triglycerides >150
    – HDL <40-men; 50-women

TREATMENT
  • Early pharmacologic intervention
    – Oral hypoglycemic agents
    – Aggressive blood pressure management
    – Elevation of HDL
    – Agents to lower triglycerides

WHEN?
  • Early
    – Metformin started when post-prandial glucose >140 prevents progression to DM in 1/3-1/2 of patients
    – Fasting blood glucose is ~20% less sensitive than oral glucose tolerance test in detecting DM
Assessment and Management of the Obese or Overweight Patient with SCI

Exercise Prescription Outline

- Introduction
- Components of Exercise
- Strength Adaptation
- Cardiovascular Adaptation
- Body Composition Adaptation

Exercise Prescription

Physical Therapy vs. Leisure Time Physical Activity vs. Exercise /Sport

- Physical Therapy... focus on function
- Exercise (Sport) ...planned, fitness goals

"some type of structured activity that is done on a regular basis such as walking, standing, weight lifting, aerobics, resistance training, or riding a stationary bike (arm or leg)"  Rimmer, 2013

- LTPA.....not as rigid criteria, i.e. with goals  Pelletier et al (2012)

Why Exercise Post SCI?

- Risk Factor Modification
- Weight Management
- Lipid Control
- Glucose Control
- CV Adaptation
- Control Low Grade Inflammation
- *Social Participation
- *Emotional/Mental Health


Rimmer et al , JNPT 2013

Figure 1. Conceptual model for getting beyond the plateau post rehabilitation. LOS indicates length of stay; rehab, rehabilitation. From Rimmer. 24
Assessment and Management of the Obese or Overweight Patient with SCI

Fitness Components

- Muscular Fitness (Strength/Endurance)
- Cardiovascular fitness
- Flexibility
- Body Composition

Muscle Strength Assessment

Single or Multi-joint

- 1 RM or Submax
- Functional Movements
  - Modified push-ups
  - Modified pull-ups
  - Supine to sit
  - Seated depression
  - POE press-up

Concept of Overload

- * Work all available muscle Groups
  - At least 2 x/wk for life!
- 40-80% of 1 RM
- Consider Circuit Training Programs

Muscle Strength Assessment

Single or Multi-joint

- Isokinetics
- Isometrics
- Free Weights
- Theraband
- MMT
- Functional Movements
- Modified push-ups
- Modified pull-ups
- Supine to sit
- Seated depression
- POE press-up

Adaptive Equipment

- Arm bike
- Leg bike (SCI)
- Wheelchair propulsion (DVG, TM)
- FES
- Walking DVG and TM
- Incremental Multi-stage
- 3 min stages
- Workload 300kpm; 100kpm increase per stage

Cardiorespiratory Assessment

- 12 lead EKG monitoring
- Incremental Multi-stage
- Workload 300kpm; 100kpm increase per stage

Image from Sisto, et al, 2012


*Sisto and Evans, 2014

Nash, 2009
Lewis et al, 2007
Hol et al, 2007
Nash, 2009

ASCM Guidelines
Heyward et al, 2012

Property of Dale, Hutchinson, Prox, Sisto
Not to be copied without permission
Assessment and Management of the Obese or Overweight Patient with SCI

AT for Stationary Bikes

Functional Electrical Stimulation (FES)

Identifying Appropriate Exercise Intensity

- **Challenges with SCI EX:**
- HR may not be an adequate reflection of intensity
- Age-Adjusted HR Max
  \[ \text{THR} = [(\text{Max HR} - \text{Resting HR}) \times (40 \text{ to } 80\%)] + \text{RHR} \]
  What is wrong with the Karvonen formula?
- Borg RPE
- Physiologic Cost Index

CV Adaptations with Exercise in SCI

- BSSTT, SCI C-C1, n=8; Vigorous Ex: 70-100% HR at VO2 max; 50 min 3 x/wk
- AIS C & D: n=8, Lokomat training; 30 min, 5x per wk x6wk;
  \[ \text{Systolic/Diastolic LV fcn and Ejection Fraction} \]
- Pole Ergometer training; 70-100% of peak heart rate
  N=13; Paraplegia complete, N=13; T4-L2, 50 min 3x/wk x 10wk;

Termination of Exercise Testing or Training in SCI

- Excess fatigue or request to stop; poor coloring
- Moderate to severe angina
- Abnormal rise in BP; BP reaches injury or age-expected max
- Drop SBP by 10mmHg (from baseline) or failure to increase with increase workload
- HR doesn’t increase with increased workload
- Can’t maintain pedal frequency or intensity of activity
- C/O light-headedness/dizziness; observe ataxia, near syncope
- EEG: ST segment Elevation >1 mm or Depression > 2 mm or downsloping
- O2 Saturation below 90%

- Don’t Test/Train IF: unstable angina; uncontrolled tachy or brady arrhythmia; acute infections; uncontrolled DM; Autonomic Dysreflexia; Medication Contraindication

[See Heyward, 2002; ACSM 2010; PFSP 2012]
The “Talk Test”

- Determining Intensity of Ex
- Light Intensity- Can Sing
- Mod Intensity- Can Talk Comfortably
- Vigorous Intensity- Too Out Of Breath To Talk

Lewis, 2007

Exercise Risks in SCI

- Autonomic Dysreflexia
- Overuse injury
- Fracture
- Temp Regulation
- Skin
- Hypotension During/After Ex
- Post Ex Hypoglycemia

Jacobs et al, 2004; Nash, 2009

Body Composition Modification

- Inconclusive Evidence to impact Body Comp with Ex alone following SCI
  Hicks et al, 2011 and Martin Ginis et al, 2011

- Waist/Calf Circumference
- Dxa, CT, BIA - Eriks-Hoogland et al, 2011

Body Composition (cont’d)

- D’Oliviera, et al, 2014
  C5-7; Active vs Inactive
  150min/wk x 3 months min DEXA; Lower total and regional FFM in Active group

- Tanhoffer, et al, 2013
  Chronic SCI; all levels; those who exercise at least
  150min/wk better BMI, but still high (28kg/m²)

Waist/Circumference: measure
"at minimal waist after normal expiration"
Supine and/or sitting

Physical Activity Guidelines

- AHA Guidelines 2014: 150 min at least moderate intensity every wk, not < 10 min blocks; Plus Strengthening 2x/wk

- AGREE Protocol: New SCI-Specific Guidelines 2 x 20min (40 min total) moderately vigorous LTPA /wk; expected impact on muscle strength/CV fxn, not body composition
  Martin Ginis et al, 2013; Pelletier et al, 2014

Assessment of SCI Specific Guidelines

- 20 min mod/vigorous aerobic activity 2x/wk and 3 sets of 10 reps at 50-70% of 1RM
- For 16 wks
- N=23 C1-T11
  11- 38% increase in strength
  Increased V0₂ peak 10%
  No Significant change: Blood Lipids; BP; HR; HbA1c

- Pelletier et al, 2014
Common Barrier to Exercise

STRONGLY ASSOC WITH NON-EX
• EX MAKES CONDITION WORSE
• Too lazy to exercise
• Exercise is too difficult
• Don’t know what to do
• Not interested

Most Effective Interventions
• Enhance self-perceptions about exercise
• Develop internal motivation to exercise
• Increases knowledge of where and how to exercise
• Minimizes program and transportation costs

(Online SCI Survey Cowan and Anderson, 2013)

AHA Exercise Recommendations 2014
For Overall Cardiovascular Health:
• ≥ 30 minutes of moderate-intensity aerobic activity
  • at least 5 days per week for a total of 150min/wk
OR
• ≥ 25 minutes of vigorous aerobic activity
  • at least 3 days per week for a total of 75 minutes
** or combo moderate- and vigorous-intensity**
AND
• Moderate- to high-intensity muscle-strengthening
  * activity at least 2 days per week
For Lowering Blood Pressure and Cholesterol
An average 40 minutes of moderate- to vigorous-intensity aerobic activity 3 or 4 times per week

Circuit Training
Aerobic & Anaerobic Activity

www.apta.org/pfsp

APTA Guidelines –PFSP SCI

[Image]

2 x 30 min strength training per wk
3x 30 aerobic training per wk
≥ 150 min/wk moderately vigorous exercise

SCI ACTION CANADA

[Image]

Fit for Life; Fit for Sport

Variables to manipulate as part of training:

Frequency: Train more often
Intensity: Move Faster/harder/With more load/ or with less rest
Duration: More sets/more reps/go farther/go for longer

www.lboro.ac.uk
Management of the Obese or Overweight Client with Spinal Cord Injury

Kristy Prox, RD, LD
CSM 2015

Objectives

- Why nutrition is important
- Nutrition assessment & monitoring
- Medical Nutrition Therapy for acute care/rehab
- Nutrition implications when transitioning home
- Estimated energy & key nutrient needs
- Medical Nutrition Therapy for specific conditions
- Nutrition recommendations & potential treatments

Why is Nutrition Important?

- Body Weight & Composition
- Prevention and Management of Comorbidities
- Pressure Sore Prevention & Healing
- Improve Functional Abilities/Energy Levels
- Bowel Management
- Quality of Life

Nutrition Assessment and Monitoring

* May differ from acute care to rehabilitation/community setting

- Food and Nutrition-related History: dietary intake, nutrition knowledge, food beliefs & attitudes, body image, food accessibility
- Anthropometrics: weight and weight history
- Biochemical and Medical Tests/Procedures: Swallow study, metabolic study (indirect calorimetry), lipid profile, hemoglobin A1c & fasting blood glucose, prealbumin
- Nutrition-focused Physical Findings: integumentary & gastrointestinal systems
- Client History: PMH

Medical Nutrition Therapy in Acute Care/Rehab

- What if oral intake is inadequate or pt is NPO?
  - Calorie Counts
  - Nutrition Supplements
  - Enteral Nutrition/Tube Feeding
  - Parenteral Nutrition
- Diet education for weight control, bowels, and comorbidities

• “The FIT Minute”
• The Fitbit
• Exploit Social Gaming
• NCHPAD- Workout-Tracker
• Must incorporate both Diet and Exercise for health and fitness benefits
Nutrition Implications with Transition from Acute Care to Home

- Change in energy expenditure
  - Muscle atrophy
  - Decreased physical activity
- Psychological & Physical Impacts
  - MANY ADL & lifestyle Changes
  - Food availability
  - Economic status
  - Mental health

Estimated Energy Expenditure

Total Energy Expenditure = Basal Metabolic Rate/Resting Energy Expenditure + Thermic Effect of Food + Physical Activity

With SCI, often decrease calories by 10-25% over time

Methods to determine Energy Expenditure:

- Indirect Calorimetry (gold standard)
- Energy Expenditure Prediction Equations

*During acute phase
  - Calories per kilogram
    - 22.7 kcal/kg for tetraplegia
    - 27.9 kcal/kg for paraplegia

*During rehabilitation phase
  - 22.7 kcal/kg for tetraplegia
  - 27.9 kcal/kg for paraplegia

IBW Adjustment for SCI

- Ideal Body Weight calculated by the HAMWI equation
  - IBW Male in Lbs = 105 + (inches over 60” x 6)
  - IBW Female in Lbs = 100 +/- (inches over/under 60” x 5)
  - Use +/-10% to make IBW range
- IBW adjusted for SCI
  - Paraplegia decrease by 5-10%
  - Tetraplegia decrease by 10-15%

Macronutrients

- Carbohydrate: 45-65% of calories
  - whole grains, fruits, vegetables, low fat dairy, beans
- Fat: 10 – 30% of calories
  - Oils, nuts, avocado, fat in fish
- Protein: 10-25% of calories
  - Lean/low fat animal proteins, low fat dairy, beans, soy/tofu
    - Acute Phase SCI Non-obese: up to 1.3 gms/kg
    - Rehabilitation Phase SCI Non-obese: up to 0.8 gms/kg
- Hydration: 1 ml/calorie + 500ml with minimum 1.5 L or 30-40ml/kg
  - Non-caffeinated, nonalcoholic fluids

Choose a Healthy Balanced Diet
Fiber and Bowel Management

- 15 - 30 gm fiber/day with adequate hydration
- Make gradual changes to fiber intake
- Include both soluble & insoluble fiber

Foods more likely to result in an involuntary BM:
- Fried/Greasy Foods
- Spicy Foods
- High Sugar foods/beverages
- Caffeinated/Alcoholic Beverages
- Lactose if lactose intolerant

Pressure Ulcers

*Nutrition needs will depend on stage & number of wounds if underweight or overweight/obese

- Adequate Energy
- Adequate Protein
- Adequate Fluids
- Vitamin A, C, Zinc
- Arginine, Glutamine, HMB

Dyslipidemia and Cardiovascular Disease

- Dietary Recommendations:
  - Include omega 3 and unsaturated fats
  - Limit saturated & trans fats and dietary cholesterol
  - Limit sodium depending on blood pressure
  - Healthful weight loss
- Lifestyle Recommendations:
  - Increase physical activity
  - Smoking cessation
  - Appropriate medical monitoring

Diabetes Mellitus

- Dietary Recommendations:
  - Include fruits, vegetables, whole grains, fat-free/low fat dairy as carbohydrate sources
  - Limit concentrated sweets, sugar & sugary drinks
  - Eat at least 3 regularly scheduled meals
- Lifestyle Recommendations:
  - Physical activity
  - Healthful weight loss
  - Medical monitoring

Weight Management Tips

- Eat regularly scheduled healthy, balanced meals & snacks
- Focus on incorporating healthy foods, rather than emphasizing restriction
- Prepare foods with less fat & sauces
- Avoid added concentrated sweets & sugary drinks
- Monitor portion sizes
- Eat slowly & mindfully
- Elicit & utilize support

Key Components for Healthful Weight Loss in SCI Population

- Successful weight loss without compromising lean body mass & overall health was achieved in study of 16 overweight/obese SCI patients over 24 wks
  - Attended 12 weekly classes covering Nutrition, Exercise, & Behavior Modification, decreased caloric intake by approx 2200kcal/d
  - Beginning at week 6 started 30-min exercise sessions designed for home based activities
  - Psychologists consulted for stress management, relaxation & behavior change techniques
- Participants lost average of 3.8% of body weight at 12 wks, and 3% at 24 wks with preservation of lean body mass, albumin, and hemoglobin

Nutrition Recommendations and Potential Treatments

- Multidisciplinary approach
- Set achievable, patient generated goals
- Focus on overall health, not just weight
- Use credible nutrition resources
  - www.Choosemyplate.gov
- Utilize support and learn from National Weight Control Registry
- Take advantage of health/nutrition apps/technology
- Medical nutrition weight loss or bariatric surgery

Management of the Obese or Overweight Client with Spinal Cord Injury: A Case Series

Daniel Dale, PT, DPT
Shepherd Center Day Program
Atlanta, GA

Objectives

- Address Nursing/Staffing Related Concerns
- Address Skin Integrity Concerns
- Address Issues with Bed and Wheelchair Positioning
- Examine Therapy Modifications Useful for Managing the Bariatric Client with SCI in Inpatient, Outpatient, and Home Health Settings

Nursing Concerns for the Bariatric Client with SCI

- Full team assessment (PT/OT/nurse/tech) of all folds/skin areas at admission and weekly. Be mindful of difficulty in visualizing problem areas on darker skin.
- Screen for sleep apnea.
- Screen for diabetes with A1C.
- Check pre-albumin for to screen for malnutrition.
- Order bariatric support surface – use powered mattress if patient has several high-risk factors.
- Order bariatric repositioning system – overhead lift vs Ergo-Nurse vs 4 person turn teams – safest not only for patient, but for staff as well to avoid injury.

High Risk Patient Factors for Pressure Ulcer Development

- IBW <80%
- Weight over 300# or Ideal Body Weight (IBW) >170%
- Quadriplegic/immobility
- On or weaning from ventilator or untreated/undiagnosed sleep apnea
- Prealbumin below 15 - poor nutrition, whether acute or prior to injury
- Tube feedings with HOB >30deg >30minutes at a time
- Non-compliance & behavioral issues
- Uncontrolled moisture problems such as urine leakage, sweating episodes, panniculor creases
- Co-morbidities: Diabetes, PVOD, pilonidal cysts, steroid therapy
- Frequent or prolonged low blood pressure episodes
- Pain issues interfering with positioning
- Postural issues (leaning/scoliosis)
- Prolonged bedrest

Hospital Controlled Issues Contributing to Skin Integrity Concerns in the Bariatric Patient

- Difficulties maneuvering/transfering/positioning... No heroics!
- Bed/mattress too small (difficult &/or incomplete positioning).
- Bed/mattress too wide (difficult caregiving, mattress more likely to bottom out).
- Support surface failures (bottoming out, over-inflated, unplugged, shearing during alternation phase).
- Be mindful of size limitations on wheelchair cushions. For example–Jay 2 rated only to ~250. Two options we use: Jay 3 (rated to 500 lbs) or Roho HP cushions (there is no weight limit on a Roho - size determined only)
- Tilting spaces chairs have to be rated for their weight in order to use the tilt.
- Poorly fitting hoysler slings (too big or too small)
Nursing Interventions for Moisture Issues

- Twice daily skin assessment by nursing: Visualization & palpation of sacral & ischial areas at least Q shift.
- If needed for excessive sweating, blow fans towards the buttocks region.
- Thoroughly dry skin after bathing. Natural fabrics/cotton/wicking fabrics best.
- Avoid (at least excessive) powders. Cornstarch based, not talcum. Avoid caking/irritation.
- Keep fluffed gauze in all folds (change to calcium alginate if skin disrupted).
- Use antifungal products prn.

How does this affect OUR patients?

- Wheelchair Consideration (Power vs. Manual)
- Manual Wheelchair Setup/Propulsion Techniques
- Size of equipment ordered for home use.
- Rating wheelchair and support surface to client’s weight.
- Choice of Exercise Modality (BWSST vs. FES vs. UE resistance/aerobic exercise)
- Energy Cost of ADLs/leisure activities
- Long-term health complications if no home exercise program.

Energy Expenditure during ADL’s IN SCI

- Collins et. al, 2009
- In able-bodied: 1 MET=3.5 ml/kg*min
- In SCI: 1 MET=2.7 ml/kg*min
- Example: – C7 Complete vs. T10 Complete

Recommendations for Bed Mobility

- Lower HOB prior to moving patient.
- Work in turn teams with at least 2 staff for positioning in bed and in/out of w/c.
- Use bariatric repositioning sling for turns and positioning (overhead lift). Also investigating the use of the Prevalon turning system.
- Monitor specialty mattress carefully for best function.
- Use smaller bed frame and mattress as patient looses weight.
- Use stepstool bedside to help with reaching across larger bed.

Recommendations for Seating

- Seating clinic for pressure mapping.
- Avoid reclining chairs.
- Sitting time started at 3 hours with every 20 min weight shifts, increase slowly w/ frequent skin checks. Restart sitting progression if cushion is changed.
- Readjust patient if leaning or sliding forward (use Hoyer lift).
- Use smaller wheelchair and cushion (especially if a Jay/gel type) as patient looses weight.
- Educate patient on potential issues with equipment, especially with weight loss/gain in mind and re: doorway width issues.

Weight Capacities

<table>
<thead>
<tr>
<th>Weight</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Jay 2, J2 Deep Contour; Stimulite (up to 16” wide)</td>
</tr>
<tr>
<td>300</td>
<td>Jay Fusion, Jay Ion, Jay Union (up to 20” wide); Matrix-Vi;</td>
</tr>
<tr>
<td>350</td>
<td>Synergy Solution 1; Stimulite: (17” and above)</td>
</tr>
<tr>
<td>500</td>
<td>Jay Fusion, Jay Ion, Jay Union (21-24”)</td>
</tr>
<tr>
<td>600</td>
<td>Matrix VI HD (21-30” wide)</td>
</tr>
<tr>
<td>650</td>
<td>Stimulite HD (20-30”wide)</td>
</tr>
<tr>
<td>Variable</td>
<td>Varilite depends on size. Ex: 16 x 16: 500 lbs up to 24 x 20: 750 lbs</td>
</tr>
<tr>
<td>No Limit</td>
<td>ROHO- if properly sized</td>
</tr>
</tbody>
</table>
Inpatient Case Study (Incomplete Injury--ICU to Outpatient)

- 38 y/o male
- 6'5", 478lbs
- Status post MVC rollover resulting in C3-4 central cord injury.
- Transferred to Shepherd ICU 3 weeks post injury.
- C-collar and open airway with filter
- Neurogenic dysaesthesia throughout his body.
- Pain in all extremity joints at end ranges, particularly in his hips and shoulders.
- No functional movement with only trace contractions in bilateral biceps, triceps and left hip adductor.
- Poor arousal

Immediate Problems

- Referral said 6'5" 401lb, admission 478lb
- Evaluation: Limb adipose limited MMT and poor arousal interfered with performing the ASIA evaluation.
- Early Mobilization: Limbs weighed too much for one person to perform PROM
- Neurogenic dysaesthetic pain in limbs
- Positioning in the bed (moving, maintaining positioning, padding and comfort)
- Getting OOB and properly positioned in the wheelchair
- Fitting the wheelchair

Inpatient Case Study

Premorbid
- Morbidly Obese.
- Suspected sleep apnea.
- Dx of rocky mountain spotted fever past spring, tx'd with no complications.
Presented with:
- Decreased arousal
- Open airway requiring O2
- Buttock skin issues
- Dysaesthetic pain in limbs
- Tightness in his trunk and limbs with pain

The Hospital Bed

Moving the Patient In Bed

Sidelying In Bed
Assessment and Management of the Obese or Overweight Patient with SCI

Padding and Positioning

Hoyering OOB

Hoyering OOB

The Wheelchair

Footplates

Equipment Modification—LE Compression
Due to size/weight /trach/pain we were unable to use current activity based therapies and other traditional therapies such as, vibration (hand held or wave table), Lokomat, body-weight supported treadmill, FES bike, Bioness, e-stim, tilt table, Moveo, standing frame, Swedish sling, and mobile arm support.
Assessment and Management of the Obese or Overweight Patient with SCI

Equipment Modification

Proning Progression—1st Time

Proning Progression—UE Weightbearing

Proning Progression—UE Weightbearing

Proning Progression—UE Weightbearing

Proning Progression—LE Exercise
Assessment and Management of the Obese or Overweight Patient with SCI

Proning Progression—LE Exercise

Proning Progression—Electrical Stimulation

UE Exercise—Mobile Arm Support

Inpatient Sit-Stand Training
- VIDEO (0:55)

Bariatric Surgery: Gastric Sleeve
- 1st time in Day Program (2011), client weighed 330 lbs. on diet alone.
- In May 2013, client underwent gastric sleeve surgery.
- Client was approximately 370 pounds prior to surgery.
- Upon return to Day Program, client’s weight was below 290 lbs., allowing him to get on the Lokomat.
- Following gastric sleeve surgery, client had some nausea and vomiting and noted the amount of water he had to drink was large.

Day Program Sit-Stand
- VIDEO (0:40)
What have we learned?

- Big patients require bigger equipment, or adaptations to existing equipment.
- Lots of folds and thick areas of adipose greatly contribute to skin problems and difficulty getting on equipment/facilitating certain muscles.
- You can’t do it alone... Add extra staff for all tasks & use appropriate equipment.
- It’s a challenge to maintain intact skin when you combine obesity with other high risk factors.
- You cannot expect your patient to lose 50# in order to fit on the equipment as an inpatient! A comprehensive home exercise program and dietary/nutrition counseling is a necessity!
Outpatient Case Study

- 25 y/o male involved in MVA on 5/26/13
- T7 ASIA C
- RUE amputation at shoulder due to degloving during accident and subsequent infection
- Multiple skin issues including R ischial flap which was currently failing and R lateral knee wound due to improperly fitting wheelchair
- Smoker
- Admission weight of approximately 420 pounds

Outpatient Gait Training

- Video (0:58)

Outpatient Gait Training

- Video (0:44)

Outpatient—Cardiovascular/Strength Equipment Modifications

- VIDEO (0:26)

Outpatient—Cardiovascular Exercise

- Video (0:39)

Outpatient---Tall Kneeling for Posture/Abdominal Strengthening

- Video (0:34)
Outpatient---Tall Kneeling for Posture/Abdominal Strengthening
• Video (0:38)

OP Case Study--Unweighting Strategies
Video (0:30)

OP Case Study—Core Strength
Video (0:31)

Overall Case Study--Testimonial
VIDEO
References-Celia Suber & Kristy Prox


References-Hutchinson


**References- Dale**

Baugh, Nancy; Wounds in Surgical Patients Who are Obese; AJN;June 2007; Vol. 107; 40-51.

Blackett, Anne et al; Caring for Persons w/ Bariatric Health Care Issues; JWOCN; Mar/Apr2011; pp 133-138.


Fife, Caroline et al; A patient-centered Approach to Treatment of Morbid Obesity and Lower Extremity Complications: An Overview and Case Studies; OWM; 2008 Jan;54 [1]; 20-32.


Gallager, Susan et al; Criteria-Based Protocols and the Obese Patient: Preplanning Care for a High Risk population; OWM; 2004 May; 450[9]:32-4.

Gallager, Susan et al; Challenges of Ostomy Care and Obesity;OWM; 2004 Sept; 50[9]; 38-40.

Gallager, Susan; Preplanning w/ Protocols for Skin and Wound Care in Obese Patients; Advances in Skin and Woundcare; Vol. 17, no. 8; 436- 441.


Mathison, Charles; Skin and Wound Care Challenges in the Hospitalized Morbidly Obese Patient; JWOCN Vol 30, No 2;78-84.


Wright, Kathleen; Meeting Bariatric Patient Care needs; JWOCN; Nov/Dec 2005; 402-406.