Physical Therapy for the Client Pre/Post-Bariatric Surgery

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Washington University Program in Physical Therapy
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Overall Goal

- Physical Therapists to become agents of change helping to prevent and remedy the obesity epidemic
- The development of overweight in normal weight individuals
- The progression of obesity in those who are already overweight
- Weight regain in those who have lost weight
- Further worsening of an obesity-related condition
Objectives

- Understand the prevalence & implications for health & function;
- Discuss bariatric surgery and potential complications effecting the musculoskeletal system;
- Design appropriate screening, examination, and exercise interventions pre and post bariatric surgery;
- Identify mobility impairments, functional limitations and disabilities and methods to address interventions;
- Create strategies an educational materials to supplement a group exercise intervention and promote long term adherence to physically active lifestyles.

What is Obesity?

- Excessive accumulation of adipose tissue to an extent that health is impaired; BMI > 30 kg/m²
- Imbalance between caloric input & energy output

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Contributing Factors

- Contributing Factors
  - behavioral
  - environmental
  - physiological
  - social
  - cultural

- Examples
  - sedentary lifestyle
  - consumption of energy dense food
  - family/social gatherings surround food
  - women more obese & less active than men

Health Comorbidities: Adults

- Cardiovascular disease
  - HTN
  - Dyslipidemia
- Diabetes mellitus
- Obstructive sleep apnea
- Osteoarthritis
- Asthma
- Infertility

- Gallbladder disease
- Liver disease
- Metabolic syndrome
- Cerebrovascular accidents
- Venous Stasis
- GERD
- Incontinence
- Depression
Functional Impairments/Consequences

- Pain
- Dyspnea
- Strength deficits
- ROM deficits
- Balance deficits
- Coordination deficits
- Postural Aberrations
- Vital sign abnormalities
- Decreased Aerobic capacity
- Risk of falling
- Limited endurance
- Compromised hygiene
- Dependence in:
  - bed mobility
  - transfers
  - gait
  - stairs
  - ADL's

Patient Examination: Health History

- Health History
  - surgeries
  - orthopedic problems
  - Prior treatment for obesity
    - diet, exercise, surgery, behavioral counseling, etc.
    - current adaptive equipment
- Current comorbidities
- Current treatment regimens
  - Medications
  - Diet
  - Activity level
Patient Examination: Home Environment

- Self-Care Ability/Functional Limitations
  - toileting, grooming, housework, bed mobility, transfers, gait, work limitations, etc.
- Home set-up
  - shower/tub, toilet/commode, bed, current equipment
  - stairs (in & outside)
  - distances in home
- Help available/support system
- Occupation

Patient Examination: System’s Review

- Organ System Checklist
  - General health
  - Cardiovascular
  - Pulmonary
  - Endocrine
- Vital Signs
  - HR, BP, SpO2, RR
### Patient Examination: Exercise Intentions & Expectations

- Physical activity & attitude questionnaire
- Activity History
  - activity regularity?
  - RPE of activity?
  - perceived fitness level?
  - willingness to routinely exercise?
  - support?
  - expectations?

### Patient Examination: Objective Assessment

- BMI, Waist circumference
- Flexibility and ROM
  - Note ROM limitations due to excessive tissue
- Muscle strength and endurance
- Posture
- Pain
  - Individual joint assessments as needed
- Exercise capacity assessment
  - Maximal or sub-maximal**
Types of Exercise Tests: Mode

- **Treadmill/6MW**
  - **Advantages:** treadmill uses a familiar mode of exercise (walking) and uses large muscle mass resulting in less localized fatigue
  - **Disadvantages:** space, expensive equipment

- **Bicycle**
  - **Advantages:** less LE joint stress
  - **Disadvantages:** local muscle fatigue

- **Steps**
  - **Advantages:** shorter tests
  - **Disadvantages:** subject must maintain a steady pace (metronome) and local muscle fatigue

Patient Examination: Visual Inspection

- **Body Type**
  - Android vs Gynoid
  - Apple vs Pear

- **Skin**
  - discoloration
  - presence of lymphoedema
  - symmetry of extremities
  - atrophy
  - induration
  - wounds/ulcers
    - presence of infection

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Postural Alignment Examples

Patient Examination: Functional Tests & Measures

- Transfers
- Sit to Stand
- Floor to Stand
- Gait
- Stair Climbing
- Balance
- Penny Retrieval
- Timed “UP & GO”
- Functional Reach
Patient Examination: General Transfers

- In and out of bed
- Up and down from the chair, toilet and/or floor
- In and out of the car
  - view or have patient verbally describe

Patient Examination: Sit to Stand

- Timed test
  - Repeat sit to stand 5 times
    - use 18”, 16”, 14” chair
  - Document use of UE’s, pain, time, RPE & vital signs
Patient Examination: Stair Climb

- timed one flight
- ability to complete 4 flights

  - document use of railings,
  - assistive device, method
  - (i.e. foot over foot), rests, etc..

Testing Balance

- Narrow Base
  - eyes open 10 sec.
  - eyes closed 10 sec.

- Romberg
  - eyes open 10 sec.
  - eyes closed 10 sec.

- Single Limb Stance
  - 30 seconds
Patient Examination: Sensation

- Presence of Neuropathy
  - Light touch/pressure loss?
  - Pain?
  - Hypersensitivity?
  - Does loss affect function?

Egress Test*

- Test 1: 3 reps of sit to stand
- Test 2: 3 steps of marching in place
- Test 3: Advance step and return each foot
- If during any part of the Egress test, the patient demonstrates difficulty or need for physical assistance beyond cues and/or guarding techniques, that patient is indicated for mechanical conveyance

* Michael Dionne, Choice Physical Therapy, Gainsville, GA
Patient Evaluation

• What are your clinical judgments(s) based on the data gathered during the patient/client examination?
  • impairments
  • functional limitations
  • disabilities
  • movement diagnosis
  • health/safety concerns for activity
  • equipment needed to increase function or limit disability

Prognosis

• To achieve goals regarding:
  • Fitness level
  • impairments
  • function
  • weight loss
  • adherence to Physical Therapy HEP
• Will be affected by intention and readiness to change
Why Physical Therapy in Managing Obesity

- Carefully Prescribed Exercise Counseling
  - Encourage sufficient physical activity to increase energy expenditure, reduce fat storage and adjust energy balance to create a caloric deficit
  - Monitor safety during performance of physical activity (i.e. cardiovascular and musculoskeletal)
  - Reduce functional impairments and disablement

The Acute Care Environment

- Mobilize the patient to prevent bedrest complications & promote independence
- Prevention of injuries to patient & healthcare workers
- Address equipment Needs
Transfer Techniques

- Continue with what the patient currently is doing
- Supine to long sitting to edge of bed
- Roll sidelying, push up with UE’s
  - (log or non-log rolling techniques)
- Roll prone, turn and push up once LE’s reach floor

Transfer Assist

- Patient placement
- Hand placement
- Gait belt placement
  - under pannus in abdominal fold
  - under axilla (especially if surgical incision)
- “Sling” technique
- Pillow use for knee
- Blocking strategy
**Hand Placement for Transfers**

Initial position

Final position

**Patient Examples**

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Alternate Hand Placement

Knee Blocking Position

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Use of “Sling” to Assist with Transfers

Front Therapist Position for use with “Sling”
Acute Care Therapy Scheduling

- Manpower issues
- Equipment issues
- 1 hour vs. 30 minute sessions

Bariatric Equipment

- Plastic boards
- Hover mat
- Air Pal
- Bed sling lift
- Overhead A-frame lift
- Wheelchairs  
  - reclining vs. standard
  - wide
- Bariatric  
  - walkers
  - beds
  - tilt table
  - bath bench
  - shower chair
  - commode
  - scales
Bariatric Equipment: Beds and Chairs

Transfer & Gait Equipment

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Bariatric Equipment:
Wheelchair/Scooters

Bed/Stretcher/Chairs

MC-600 Stretchair

Magnum II
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Bariatric Equipment:

- AirPal or Hovermat

Gait Techniques

- Control of patient
- Use of assistive device
- Do not block natural/adopted patient movement
  - excessive lateral sway
Prevention of Injuries

- Assess risk to patient and staff
  - higher the amount of physical assist needed the greater the risk
  - consider use of mechanical assist devices
    - Airpal, Hover Matt, Hoyer lift
  - Utilize safety equipment and techniques
    - gait belts
    - manual hand placement
    - use of others e.g., Egress Test
- Proper training/Education of all involved (caregivers and patient)

Identification of Risk
How? & Who?

- High Risk Screening Program & subsequent pathway management for patients who are obese
- Implemented in hospital, SNF, and/or Nursing home to identify patients who are at high risk
  - Nursing or Therapy Services identify
    - increased patient BMI
    - prolonged history of bedrest
Additional Risk Factors & Useful Screening Information

- inability to lift extremities or head and trunk against gravity inability to roll, scoot, lift self in bed
- inability to physiologically tolerate position changes
  - orthostatic hypotension
- increased pain
- extreme anxiety or fear of movement

BARIATRIC GUIDELINES or PROCEDURE

- Identify patients at risk for injury
- PT evaluations
  - assess mobility
  - assess functional status
  - recommend transfers
- Obtain equipment for safe patient management
- Discharge planning
Facility Actions to Maximize Patient Independence

- Comprehensive team approach
- Staff training
- Equipment prescription and obtainment
  - rent/patient
  - facility purchase

Consequences of Facilities Unprepared for the Bariatric Patient

- Patient withdrawal from interaction with staff
  - anxiety
  - fear
  - depressed
  - misplaced anger on staff
- Staff fear self-injury
- Staff fear injury to patient
- Staff unintentionally avoid patient mobilization
- Prolonged discharge planning
**Exercise Prescription for All Environments**

- **Inpatient**
- **Acute Care**
- **Rehabilitation**
- **Extended Care Facilities**
- **Outpatient**

**Exercise Prescription**

- **Intensity?**
  - Low to moderate, my goal is RPE 13-15

- **Duration?**
  - 30-60 minutes /day, frequently use interval training to begin

- **Frequency?**
  - Daily (somewhat dependent on duration and intensity)

- **Mode?**
  - Determine with client, likes and musculoskeletal concerns

- **Consider Purpose and readiness**
Factors to Consider in Prescribing Intensity

- Level of fitness
- Medications
- Risk of cardiovascular and/or orthopedic injuries
- Likelihood of adherence/compliance
- Preferences
- Program objectives

Intensity Equivalents to RPE

<table>
<thead>
<tr>
<th>RPE Scale</th>
<th>Equivalent % HR&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Exercise Intensity % VO&lt;sub&gt;2max&lt;/sub&gt;</th>
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<tr>
<td>6</td>
<td>52-66</td>
<td>31-50</td>
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<tr>
<td>7</td>
<td>61-85</td>
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<td>76-85</td>
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<tr>
<td>9</td>
<td>92</td>
<td>85</td>
</tr>
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</table>

Figure 2L.1B The Borg scale (and accompanying estimates of relative exercise intensity) for rating the RPE during exercise. Modified from Borg GA. Psychological basis of physical exertion. Mod Sci Sports Exerc. (1982,44:37.)

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Example Prescription for Group Exercise Program

- 60 minute class session
  - 15 min. Balance/Control
  - 15 min. Strengthening
  - 20 min. Endurance
  - 10 min. Flexibility

- All modified by:
  - Group composition
  - Comorbidities, especially pain
  - Participant preference
  - Instructor Characteristics

Lymphedema Management

- Refer to therapist trained in lymphedema care
  - use of compression garments
  - use of massage
  - use of ROM exercise
The Surgical Patient:
“Brad”

- 52 y/o, BMI 62.8 kg/m²
- Co-morbidities: Type II Diabetes, SAS, HTN, PVD, Depression, Joint pain, DVT
- Marital Status: Single
- Occupation: Sedentary, desk work for the US government

Subjective Findings¹

- Previous attempted management of his obesity: Commercial Programs, Pharmacological Therapy, Counseling, Independent and Group exercise

- All functional activities were becoming more difficult, he fatigued quickly, becoming short of breath with minimal exertion

- Used a cane for ambulation and had one flight of stairs in his home

- Participated in a low intensity water aerobic class one time/week when he was not overly fatigued.
Subjective Findings

- Right knee pain - 8/10
- Low back pain - 5/10
- Pain was worse with weight bearing activities and he was unable to stand or walk for long periods of time
- Goals were to improve his “strength, endurance and overall performance with functional activities”

SF-36 Scores by Domain* and Male Age Matched

*PF=Physical Functioning, Role-P=Role Physical, Pain=Bodily Pain, GH=General Health, Vitality=Vitality, SF=Social Functioning, Role-E=Role Emotional, MH=Mental Health

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Objective Examination

- **Appearance:**
  - Centralized (Android) obesity pattern
  - Dermatitis (Eczema)
  - Sway Back posture
  - Knee genu valgus
  - Ankle pronation
  - Forward Head
  - UE MR
  - Shoulder asymmetry

Motor and Sensory Function

- **Sensation:** diminished to light touch - distal LE’s

- **ROM:** limited (B) hip and knee flexion due to excessive tissue accumulation

- **MMT:** deficits noted in shoulder flexion/extension, abdominals, LE muscle groups
  - proximal > distal
### Functional Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed Mobility/Transfers</td>
<td>(I)/UE's</td>
</tr>
<tr>
<td>ADL's</td>
<td>Modified (I)/UE's*</td>
</tr>
<tr>
<td>Half Kneel to Stand</td>
<td>(I)/UE's</td>
</tr>
<tr>
<td>Sit to Stand</td>
<td>(I)/UE's unable to complete</td>
</tr>
<tr>
<td>Gait</td>
<td>Modified (I)/cane</td>
</tr>
<tr>
<td>* Long handled scrub brush and hand held shower</td>
<td></td>
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</tbody>
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### Postural Control

- **Sitting**: Able to maintain upright posture with maximal perturbations
- **Standing**:
  - Narrow Base
    - eyes open: 10 seconds
    - eyes closed: 10 seconds
  - Tandem Stance
    - eyes open: 8.2 seconds
    - eyes closed: Unable
  - Single Limb Stance: <2 seconds
Endurance: 6 Minute Walk

- Patient completed 805 feet (2 MET) with one stop

- Vital Signs
  - HR: 92 bpm 140 108
  - BP: 142/90 mmHg 170/100 160/96
  - Rhythm: regular
  - RPE: 15

- Patient complaints: SOB, LBP, LE knee and ankle pain
- Noted: (B) gluteus medius limp

- Response Inc. HR and BP response for workload

Primary Intervention

- Graduated exercise program*
  - Duration:
    - 5-10' activity/exercise
  - Frequency:
    - 2-3 times/day
  - Intensity: light to moderate
    - 50-69% of age adjusted HR (84-118 bpm)
  - Increase each session time by 2-4'/week
  - Goal: 15-20' sessions on most days of the week prior to bariatric surgery

- * New CDC/ACSM guidelines
Initial Intervention

- Address musculoskeletal pain
  - may require additional visits
- Exercise program
  - strength
  - ROM
  - endurance
  - balance
  - coordination
- Modes:
  - group Exercise
  - individual appointments
  - home exercise
  - Land &/or Water
  - Use of journal
  - Follow-up visits

Additional Initial Intervention

- Education for Post-Operative Mobility
  - log rolling
  - cough pillow
  - bed mobility
  - monitoring HR, RPE
  - diaphragmatic breathing/IS
  - posture
  - ambulation
- Identify bariatric equipment needs
Why Physical Therapy in Managing Obesity: Surgical Implications

- Minimize potential post-operative risks
  - pneumonia
  - deep vein thrombosis → pulmonary embolus
  - pressure ulcer development
  - deconditioning effects of bedrest

- Avoid potential loss of muscle mass during rapid weight loss

Post-Surgical Inpatient Care Transitioning into Outpatient

- Evaluation to determine functional ability
  - bed mobility
  - transfers
  - ambulation
  - self care
  - endurance
  - coughing and breathing pattern
    - depth
    - effectiveness of cough

- Intervention to facilitate and progress activity
  - therapeutic ex.
  - deep breathing ex.
  - coughing ex.

- HEP: exercise prescription
  - Intensity, duration, frequency

- Note: no lifting > 10 lbs for 6 weeks, no val salva maneuvers
Surgical Candidate: Outpatient Care

- Frequency
  - Ideally follow patients through routine clinic visits or through phone conversations and PRN visits to progress activity, add resistive training at 6 weeks and manage pain syndromes
- Goals
  - Resume and expand activity
  - Promote correct movement
  - Lifestyle modification

Management of Obesity

Alternative Interventions
Weight Loss Options?

- Conventional Methods
  - Diet
  - Exercise
  - Behavior Modification
  - Anti-Obesity Drugs

- Surgical Therapy
  - Weight Loss Surgery

  • 95% to 98% failure rates of sustained weight loss in obese population at 5 years
  • 100% failure of sustained weight loss for the morbidly obese population
  • 50% success rate at 16 years

Eliosoff 1997
Dietel 1999
ASBS 2000

Movement: Promoting Physical Activity and Exercise

- A primary care obligation
  - Congruent with goals of Healthy People 2010 to increase the activity level of adults and adolescents who exercise regularly

- A physical therapy opportunity
  - Consistent with scope of work in rehabilitation and prevention outlined in the Guide to Physical Therapist Practice (2001)
The Evidence for Movement

- Effective in weight control if incorporated into lifestyle
- Compromised by attitudes toward feasibility of exercise and physical activity
- Complicated by challenges in measurement
- Affected by individual differences in tissue distribution and physiology
- Influenced by short follow-up and recidivism rates
- Compromised by difficulty quantifying exertion during recreational activities

Behavioral Management Strategies

- Use of Contracts
- Goal establishment
- Reward system
- Create situations where success can be achieved
  - small reachable and measurable goals
Who Qualifies for Gastric Bypass?

- 1991 NIH Consensus Development Conference Criteria:
  - 1) 100lbs. Over Ideal Weight
    - BMI $\geq 40$ or $\geq 35$ w/co-morbidities
  - 2) Voluntary Weight Loss Failed
  - 3) A patient that is medically and psychologically stable, cooperative, able to tolerate surgery, and is well informed.

Who Is a Surgical Candidate?

- Meets NIH criteria
- No endocrine cause of obesity
- Acceptable operative risk
- Understands surgery and risks
- Absence of drug or alcohol problem
- Dedicated to lifestyle change and follow-up
- No uncontrolled psychological conditions Consensus after bariatric team evaluation:
  - psychologist/behaviorist
  - surgeon
  - dietician
  - physical therapist
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### Why Surgery?

- Improvement in Health Conditions
- Sustainable Weight Loss
- Reduction of Life-Threatening Risk Factors
- Improving Activities of Daily Living
- Improvement of Self-Esteem
- Achieving One’s Own Perception of “Normal”
- Multiple weight loss attempts have failed

### Possible Complications

- Gastric Leaks
- Bleeding
- Development of a Fistula
- Obstruction
- Pulmonary Complications
- Infection
- Hernias
- Strictures
- Stomal Ulcers
- Ventral Hernia
- Anemia & B12 Deficiency
- Gallstones
- Wound Herniation
- Bowel Obstruction
- Death
Bariatric Surgery: Options

- Malabsorption
  - biliopancreatic diversion ± duodenal switch
  - Jejunoileal bypass (small intestine)

- Restriction
  - vertical banded gastroplasty
  - adjustable gastric banding

- Hybrid of restriction and malabsorption
  - Roux-en-Y gastric bypass

- Gastric Stimulators

The Evidence for Surgery

- Risk of mortality is lower than controls (and generally occurs in first six months)
- Generally effective in losing ≥ 100 lbs. of excess weight
- > 80% of patients maintain a 50% excess weight loss at 16 years
- Carries risk of nutritional deficiencies and potential for conditions as berri berri
- Mortality rates are generally < 2%
Medical Co-Morbidities Resolved

- Type 2 Diabetes 95%
- Hypertension 92%
- Cardiac Function 95% improvement
- Osteoarthritis 82%
- Sleep Apnea 75%
- GERD 98%
- Hypercholesterolemia 97%
- Stress Incontinence 87%


Bariatric Surgery Incisions

Laparoscopic
Open

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According to the NIH...

- “Surgery is the most effective option in achieving sustained weight loss in the morbidly obese patient population.” However... Surgery alone will not guarantee success. Work and long-term commitment are required by patients.