2014 Annual Breast Cancer Rehabilitation Healthcare Provider Event

A Manual Therapy and Exercise Approach to Breast Cancer Rehabilitation Course

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Sponsored By:
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A Manual Therapy and Exercise Approach to Breast Cancer Rehabilitation Course

Evaluation of the Shoulder: Special Considerations for Patients with Breast Cancer

Jill Binkley, PT, MSc, FAAOMPT, CLT

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Impact of Breast Cancer Treatment on Musculoskeletal System and Function
Musculoskeletal Issues

- Decreased Range of Motion
- Axillary Web Syndrome
- Pain
- Weakness
- Decreased Functional Abilities
- Soft Tissue Tightness and Radiation Fibrosis
- Fatigue
- CIPN
- Osteoporosis
Contributors to Physical Issues Faced by Women with Breast Cancer

- Surgery
  - Mastectomy/Breast Conserving Surgery (lumpectomy)
  - Axillary Lymph Node Dissection (ALND)
    - Number of nodes removed is important factor in short and long term morbidity
  - Breast Reconstruction, including Donor Sites
  - Drain Sites

- Radiation
  - Breast/Chest Wall
  - Axilla
Contributors to Physical Issues Faced by Women with Breast Cancer

- Chemotherapy
  - Fatigue
  - Port Site Pain
  - Joint and Muscle Pain
  - Weight Gain

- Aromatase Inhibitor Therapy
  - Arthralgias (joint pain)

- Quality of Recovery Advice
  - Women commonly advised to avoid exercise
  - Lack of information regarding maximizing recovery
  - Lack of understanding of role of rehabilitation in breast cancer
Examples of Incidence of these Physical Issues
Early Post-operatively and Long-term

• Early post-operatively upper body morbidity in 36% of women undergoing SNB, and 66% of women undergoing ALND (Langer, 2007; McNeeley, 2012)

• At 6 years 60% of women report 1 or more moderate or severe physical symptoms related to breast cancer treatment that were amenable to rehabilitation intervention (Schmitz, 2012)

• 20-30% of women develop lymphedema (estimate of incidence depends on length of follow up, measurement method, etc) Hayes, 2012
Decreased Shoulder ROM
Post Surgery +/- Radiation

• Many studies have reported significant loss of range of motion in the short term (2-3 months post mastectomy) (Gosselink et al, 2003; Reitman, 2003) and the long term (Levangie, 2009, 2010)

• At 1 year post-op,
  • Following mastectomy, up to 25% of women have a limited range of motion
  • Following lumpectomy, 15% of women have a limited range of motion (Karki et al, 2005; Blomqvist et al, 2004)

• Range of motion restriction greater for patients who:
  • Mastectomy versus lumpectomy (Gerber, 1992)
  • Received radiation (Blomqvist et al, 2004; Gerber, 1992)
  • Had more lymph nodes removed (Leidenius, 2005)
Post-Mastectomy Pain

Patient Reported Pain 1 Year Post Surgery (Karki et al, 2005) (Mastectomy / Lumpectomy)

- Neck/Shoulder Pain 42%/37%
- Upper Extremity Pain 26% / 15%
- Breast/Chest Wall Pain 28% / 20%

ALND versus SNB only

- Arm/shoulder pain reported by 21% of patients with SNB versus 50-60% of patients post ALND at average follow-up of 10 months (Barranger, 2005)
Incidence of Weakness Post Surgery

(Swisher et al, 2010)

- Self-Report Questionnaire
  - Average of 4 ½ years post-surgery
  - Average age of 53
- 96% indicated upper extremity problems
- 59% reported arm weakness
Incidence of Functional Limitations

• At 3 months, only about 1/3 of women after lumpectomy or mastectomy have returned to normal activities of daily living \( (Gosselink, 2003) \)

• At 1 year post-op about 50% of women continue to report difficulty lifting, carrying and sleeping \( (Karki, 2005) \)
Functional Restriction

Limitations in upper extremity function in breast cancer survivors are well documented and linked to a reduction in perceived ability to complete activities of daily living and lower health-related quality of life.

Weakness and Type of Breast Reconstruction

Two Studies Followed Women For 2 Years Following Reconstruction
(Included TRAM and Implant Reconstructions)

- Trunk Weakness
  - Significantly lower strength in women after TRAM reconstruction

- Other Musculoskeletal Issues:
  - Pain: Back Pain (26%); Abdominal Pain (16%); Breast Pain (12%)
  - Abdominal Tightness: 42% (more prevalent post TRAM)

(Roth et al, 2007; Alderman et al, 2007)
Physical Well-Being: Chest & Upper Body

Mastectomy alone
N = 93

Autologous Tissue
N = 74

Tissue Expander - Implant
N = 141

*p = 0.002

<table>
<thead>
<tr>
<th></th>
<th>Pedicled (n=183)</th>
<th>Free (n=63)</th>
<th>DIEP (n=24)</th>
<th>ANOVA p-value</th>
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<tbody>
<tr>
<td>Tightness</td>
<td>2.34</td>
<td>2.14</td>
<td>1.67</td>
<td>p=0.03</td>
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<tr>
<td>Discomfort</td>
<td>2.11</td>
<td>1.72</td>
<td>1.58</td>
<td>p=0.03</td>
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<tr>
<td>Weakness -</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Difficulty sitting up</td>
<td>2.11</td>
<td>1.76</td>
<td>1.42</td>
<td>p=0.006</td>
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<tr>
<td>Weakness -</td>
<td></td>
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<td></td>
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<tr>
<td>Difficulty with activities</td>
<td>2.37</td>
<td>1.87</td>
<td>1.62</td>
<td>p=0.002</td>
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BREAST-Q Field-test

Courtesy Pusic et al, 2013
Postural Considerations
Post-Op Guarding in Protraction Related to Expander or Implant

- Forward Head Posture
- Protracted Shoulders
- Tight Pectoral Muscles
- Weak Scapular Musculature
- Tightness/Pain/Spasm Subscapularis

Radiation Tightness and Fibrosis

Tight Pectoral Muscle Related to Expander or Implant

May lead to impingement syndrome, adhesive capsulitis and other dysfunction.
Articular Considerations
Supraspinatus muscle

Clavicle

Bursa

Acromion

Rotator cuff tendons

Subscapularis muscle

Humerus

Scapula

Shoulder (Front View)

Supraspinatus muscle

Infraspinatus muscle

Teres minor muscle

Scapula

Humerus

Clavicle

Shoulder (Back View)

Fig 1
Glenohumeral Articulation: ROM

- Head of humerus glides inferior and anterior in elevation, rolls superior
- Full elevation of UE requires ER to prevent impingement of greater tuberosity of the humerus against acromion
### Scapulohumeral Rhythm

<table>
<thead>
<tr>
<th>Amount of Abduction</th>
<th>Scapular Mobility</th>
<th>Clavicular Mobility</th>
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<tbody>
<tr>
<td>First 30°</td>
<td>Setting phase</td>
<td>12 – 15° elevation</td>
</tr>
<tr>
<td></td>
<td>- slight rotation in some</td>
<td>No rotation</td>
</tr>
<tr>
<td></td>
<td>- elevation is faulty</td>
<td></td>
</tr>
<tr>
<td>30 – 60° Elevation</td>
<td>2:1 ratio of scapulo-humeral movement</td>
<td>30° elevation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Still no rotation</td>
</tr>
<tr>
<td>90 – 180° Elevation</td>
<td>2:1 ratio of scapulo-humeral movement continues</td>
<td>30 – 60° elevation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50° posterior rotation on long axis</td>
</tr>
</tbody>
</table>
Antero- Lateral View Right SC Joint

Sellar Surface / Saddle Joint with Articular Disc

Convex clavicle on Concave sternum—Frontal plane

Clavicle glides inferiorly and rolls superiorly on sternum in shoulder elevation

Concave clavicle on Convex sternum—Transverse plane

Clavicle glides and rolls posteriorly in retraction
Convex/Concave Rule – S-C Joint

Shoulder Elevation:
• Convex Clavicle on Concave Sternum
• Roll and Slide in Opposite Directions
• Roll superior and slides inferior

Shoulder Retraction:
• Concave Clavicle on Convex Sternum
• Roll and Slide in Same Direction
• Roll and Slide Posterior

Coronal Plane – A-P Axis @ CCL

45° Elevation & 15° Depression

Superior view
Sternoclavicular Joint Motion: Posterior & Anterior Rotation

- Rotation of the clavicle about a longitudinal axis
- Posterior rotation coupled with scapular upward rotation (after 30° of elevation of the outer clavicle)
- Max. rotation 30° - 55°
- No anterior rotation from anatomical neutral
Don’t Forget the Ribs!
Soft Tissue Considerations
Soft Tissue Assessment

- Visual inspection ➔ Palpation
- Skin condition
- Scar location and condition
- Axilla
- Cording / Upper limb tension test
- Muscles of the neck, shoulder, chest wall
- Reconstruction specific assessment
Skin Condition

- Healing status of surgical incisions
- Erythema – especially with radiation therapy
- Bruising / Hematoma / Seroma
- Fluid wave
- Infection
- Necrosis
- Dryness
- Shiny appearance
- Hypersensitivity
Scar Assessment

- **Location:**
  - Mastectomy / lumpectomy site
  - ALND site
  - Drains
  - Donor sites (reconstruction)
  - Port site (chemo)

- **Restrictions**
  - Depth
  - Direction
Assessing the Axilla

- Lymph Nodes
- Anterior Wall – pectoralis major
- Posterior Wall – latissimus dorsi
- Medial Wall – ribs & serratus anterior (latissimus flap)
- Lateral Wall – bicipital groove, brachial artery, nerves and lymphatic vessels, ? cording
Axillary Cording (AWS)

- "Painful, palpable cords in axilla, across front of elbow and sometimes into forearm"
- Upper Limb Tension Test (GH elevation, elbow extension, wrist extension)
- Other location of cords
  - Beneath breasts
  - Trunk
  - Lateral chest wall
Muscles of the neck, shoulder and chest wall

Examine: Normal length / Signs of tenderness, hypertrophy, spasm

- Upper trapezius / levator / rhomboids
- Latissimus dorsi
- Sternocleidomastoids
- Rotator cuff muscles
- Pectoralis major – include origins along sternum and rib cage
- Pectoralis minor – origin: ribs 3, 4, 5 / insertion: coracoid process of the scapula
Tight Pec Major and Minor Very Common
Serratus Anterior: Weakness from Disuse or Damage to Long Thoracic Nerve
Subscapularis: Overlooked and Undertreated

Tightness, Pain, Spasm of Subscapularis is Common
Tightness Surgical Incision

Decreased Extensibility of Pectoral Muscle

Axillary Cording

Decreased Extensibility and Pain Subscapularis and Latissimus Muscle

Tightness Surgical Incision
Lymphedema  Abnormal Scapulo-humeral Rhythm
Reconstruction Specific Considerations
Reconstruction Specific Assessments

- **Latissimus Flap**
  - Assess passive mobility of the scapula

- **Expanders / Implants**
  - Assess mobility of the breast mound
  - Encapsulation
  - Edges of expanders

- **TRAM Flap**
  - Uniform softness / Fat necrosis
  - Abdominal concerns - tightness, hernia, umbilicus
Clinical Case
Pre-Operative Assessment

Karen is a 42 year old woman who has breast cancer on the left side and is referred to physical therapy 1 week prior to bilateral mastectomies with latissimus flap/expander reconstruction.

Social:
- Works part time in retail sales
- Married with 2 children, ages 4 and 6
- Exercise is sporadic

Baseline Measures and Education:
- Strength
- ROM
- Bilateral limb volume measurement
- Weight 150 lbs; Height 5’6”; BMI 24.2 (normal)
- Education regarding post-operative function expectations, upper extremity range of motion exercise and return for rehab evaluation
Early Post-Operative Assessment

Karen returns 3 weeks post-op with shoulder, upper extremity and chest wall pain.

Breast cancer surgical findings and treatment plan:

- 3 weeks post latissimus flap/expander reconstruction; ALND with 8 nodes removed, 4 positive
- Tumor was hormone receptor positive, Her2neu negative, Stage II
- To start chemotherapy (4 rounds of adriamycin/cytoxin and 4 rounds of taxotere) in 1 week
- Radiation to follow

Current Concerns:

- Significant pain in axilla and into upper arm, anterior aspect of elbow
- Difficulty doing hair, reaching high cabinets, dressing, sleeping
- Concerned about lymphedema risk
<table>
<thead>
<tr>
<th>Test</th>
<th>Right</th>
<th>Left</th>
</tr>
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<tbody>
<tr>
<td>Shoulder Flexion</td>
<td>145°</td>
<td>122°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pain at end range, tight pecs</td>
</tr>
<tr>
<td>Shoulder Abduction</td>
<td>152°</td>
<td>105°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pain at end range into upper extremity to elbow, visible axillary cording.</td>
</tr>
<tr>
<td>Hand Behind Back (Ext/IR/Add)</td>
<td>To L1 level</td>
<td>To Left PSIS</td>
</tr>
</tbody>
</table>
Additional Evaluation

• Posture:
  • Forward Head Posture, Protruded Shoulders

• Soft Tissue Palpation
  • Decreased tissue mobility and tenderness lateral chest wall
  • Palpable and painful axillary cording
  • Tight pectoral muscles bilaterally
Pain and Functional Status Measures

- Pain 6/10

- Patient-Specific Functional Scale (Normal function = 10/10)
  - Doing Hair 3/10
  - Reaching high cabinets 2/10
  - Dressing 3/10

- Upper Extremity Functional Index (UEFI) (Normal function = 80/80)
  - 46/80

- FACT-B – indicates significant physical, functional and emotional concerns *(Brady et al, 1997)*
What is Your Plan of Care?

Consider:

- Short and Long Term Goals
- Initial 1-2 Treatments, week 2-3 and week 3-8
- Work in Groups of 4 to plan your approach to care