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Shoulder Impingement

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SHOULDER IMPINGEMENT

by

Jennifer Ramsay
Doctor of Physical Therapy
University of North Dakota, 2015

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy
School of Medicine and Health Sciences

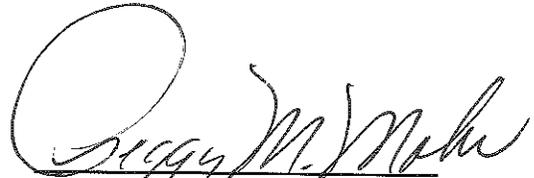
University of North Dakota

in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

Grand Forks, North Dakota
May, 2016

This Scholarly Project, submitted by Jennifer Ramsay in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.


(Graduate School Advisor)


(Chairperson, Physical Therapy)

PERMISSION

Title Shoulder Impingement

Department Physical Therapy

Degree Doctor of Physical Therapy

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Signature

A handwritten signature in black ink, appearing to read "J. May", written over a horizontal line.

Date

07/15/2015

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I would like to thank my clinical instructor for providing guidance while also challenging my knowledge of Physical Therapy. I would also like to thank Professor Peg Mohr for encouraging me to complete what seemed like a daunting task.

ABSTRACT

Background. Women who undergo mastectomy are almost 6 times more likely to experience shoulder restriction and impairment than patients who undergo breast-conserving surgery. Many women in the U.S. will develop invasive breast cancer over the course of their lives. The purpose of this case study is to review the rehabilitation plan for a patient with shoulder dysfunction and a history of surgical intervention for breast cancer.

Case Description. The patient was referred to physical therapy with complaints of pain in the right shoulder and anterior chest which increased with overhead movement. The patient's medical history included a skin graft to the right axilla, right sided lumpectomy, chemotherapy, radiation, and a unilateral right total mastectomy. Examination procedures resulted in reproduction of symptoms during palpation of the mastectomy site and during shoulder impingement tests.

Plan of Care. The interventions performed included scar mobilization, ultrasound, patient education, stretching, and shoulder girdle strengthening. After 8 physical therapy (PT) sessions, the patient reported decreased pain and was able to return to her previous level of function.

Reflection on Practice. This patient demonstrated that, with time and support from health care professionals, psychological acceptance of a diagnosis

was promoted. I could have also provided more information to the patient regarding psychological services and to the physician in regards to shoulder dysfunction diagnosis. It is recommended that education be provided to patients immediately after a mastectomy surgery in order to prevent shoulder dysfunction.

CHAPTER I

BACKGROUND AND PURPOSE

One in 8 women or 12% of all women in the United States will develop invasive breast cancer over the course of their lifetime. With 158.6 million women in the United States, approximately 19 million will develop breast cancer.¹ Many risk factors increase the likeliness of breast cancer including not having children, drinking alcohol regularly, receiving hormone replacement therapy, previous cancer diagnosed in one breast, and having their first menstrual cycle before the age of 12.²

With the knowledge of the BRCA 1 and BRCA 2 gene, more women are opting for double mastectomy surgery. Dragun and Huang³ observed 21,869 women with stage I-III breast cancer and concluded that 45.5% of these women chose to have mastectomy surgery.

There are several different types of breast cancer removal surgeries including a radical, modified radical, and total, which may be done unilaterally or bilaterally. A radical surgery involves removal of the entire breast, lymph nodes, and muscle while the modified does not remove muscle underneath of the breast tissue. A total mastectomy is the removal of the breast tissue while leaving the lymph nodes and muscle intact.¹

Although a shoulder dysfunction is not the main concern after a major surgery, a severe muscular imbalance may result. The shoulder can be thought

of like a scale, when one side of the body is altered, the other side will compensate by rotating the shoulder blade. After Crosbie and Dylke⁴ observed women's shoulder range of motion and functional abilities prior to and after breast cancer removal surgery, it was determined that there is a higher probability of a shoulder impairment on the same side of the breast cancer surgical site. Women who undergo mastectomy are therefore almost 6 times more likely to experience shoulder restriction and impairment than patients who undergo breast-conserving surgery. Shoulder girdle strengthening has been shown to prevent and alleviate shoulder impingement after breast cancer surgery.^{5, 6}

The purpose of this case report is to outline the rehabilitation program for a female patient and to review the influences of a radical, unilateral mastectomy surgery on her outcomes.

CHAPTER II

CASE DESCRIPTION

The patient was a well-educated, Caucasian female in her sixties. She was married, has had several children, and relied on her husband for support. The patient was not employed but was extremely involved in a genealogy club, typing for six hours a day. The patient enjoyed hiking with her husband, traveling, painting, and participating with a photography club. She also supported her mother's health by driving her to medical appointments weekly.

The patient drank approximately two alcoholic beverages a week and had never smoked or used tobacco. She did not exercise regularly but instead performed housework. The medical history included a tonsil removal in 1950, skin graft of the right axilla in 1956, stage II breast cancer on the right side, and a lumpectomy in 2010 of three lymph nodes in the right axilla with chemotherapy and radiation. A modified radical unilateral mastectomy was performed to the right side in 2010 when Stage II breast cancer was discovered with another round of chemotherapy in 2011. She had a history of arthritis in the left knee with a total knee replacement in 2012.

She was referred to PT by her oncologist with orders to treat a rotator cuff tear after the patient's complaints of pain radiating from her right anterior chest into the right shoulder. The patient had noticed changes with her sleeping

positions over the last six months and she was required to sleep on her stomach to decrease right shoulder pain.

One month prior to seeking a referral for PT, the patient suffered from neuropathy in the right hand as a result of Arimidex side effects. Arimidex is often prescribed to inhibit breast cancer returning in post-menopausal women.⁷ The patient also complained of right hand weakness, increased pain in her shoulder while sitting with good posture and while elevating her arm. The patient stated that this pain has been present since 2011, approximately 6 months after the mastectomy surgery. The patient pursued medical attention when the pain increased so much that it could not be ignored.

At the initial evaluation, the patient performed all self-care activities with modifications including utilizing her left upper extremity for hair maintenance. The patient had stopped painting and lifting heavy objects due to pain. She continued to drive and be active in both the photography and genealogy club, requiring frequent breaks while typing due to pain.

The patient's medications included Cymbalta to eliminate upper extremity neuropathy or numbness in the hand. Throughout the plan of care, the PT continued to monitor for symptoms of neuropathy and side effects of Cymbalta; dizziness, drowsiness, and increased sweating.⁸

It is not within the Physical Therapy practice act to determine psychological well-being. However, the physical therapist noted the patient avoided looking at her surgical scars or discussing the surgical procedure. The

patient also admitted to feeling more self-conscious since the mastectomy surgery and not allowing her husband to see her scars.

Examination, Evaluation and Diagnosis

Cardiovascular and pulmonary review revealed normal physiological and anatomical status. Lymphedema has an increased risk of prevalence secondary to “infection, inflammation, obstruction, surgical removal of lymphatic structures, or chronic venous insufficiency”.⁹ It is therefore important to observe the skin by taking circumferential measurements and noting if the lymph nodes are tender. Measurements indicated no edema was evident in the upper extremities.

Prior to observing the patient’s skin, the patient voiced concerns about feeling self-conscious regarding her surgical scars. A gown and appropriate draping was applied to increase the patient’s comfort and maintain dignity. The patient had normal skin color, no tenderness over the lymph nodes, and increased scar formation over the mastectomy site, skin graft, and lumpectomy site in the right axilla. The surgical scar was fully healed and no infection or lymphedema was present.

From a lateral view, illustrated in Figure 1, the patient demonstrated an anteriorly positioned right shoulder compared to the left while sitting on the examination table. The patient otherwise demonstrated excellent posture with no abnormal curves in the lumbar or thoracic spine. The patient demonstrated a lower shoulder on the right side within normal limits as the right side is the dominant arm, as illustrated in Figure 2.

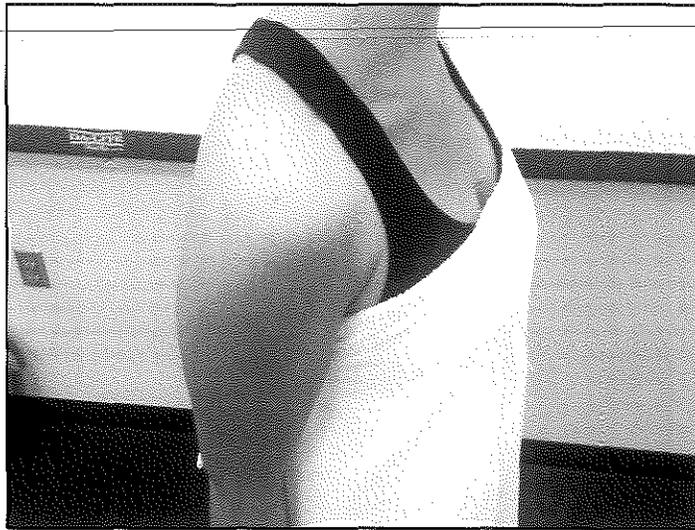


Fig. 1. The patient's right shoulder girdle is positioned anteriorly; the proper position of the glenohumeral joint for optimal movement is in conjunction with a vertical line that can be drawn from the patient's ear, through the shoulder joint, hip, knee, and ankle.



Fig. 2. Anterior view of the patient's right shoulder is lower relative to the left shoulder





The patient demonstrated decreased active left neck side bending and rotation towards the left due to tight musculature. She also reported increased pain during all active shoulder movements, 6/10 pain on a scale of 0 to 10 (0 = lowest), and passive shoulder movements, 3/10 pain, with utilization of the Visual Analog Scale.¹⁰

A neck pathology and neurological involvement was ruled out by the physical therapists prior to evaluating the shoulder. Although the patient complained of weakness and tingling in the right upper extremity, no sensory involvement was implicated during the physical exam; sensation testing and muscle testing indicated strong, innervated muscles and in-tact touch.

The patient's strength was equal and strong bilaterally in the upper extremities. Clinical manual muscle testing (MMT) resulted in a 4+/5 in all directions with the patient ending the procedure due to pain. Hand held dynamometer strength testing or grip strength of both extremities indicated normal strength in the right hand with increased strength in the right dominant hand greater than left. No evidence of a muscular tear was found which contradicted the referring physician's referral diagnosis of rotator cuff tear.

The special tests were chosen with the purpose of ruling out other dysfunctions in order to isolate a diagnosis. The Hawkins- Kennedy test and Neer test for shoulder impingement were included because the patient indicated pain at the superior and anterior portion of the shoulder joint during motion. Due

to the location of pain, the Speed's test for bicep tendon involvement was performed. A Jobe's test was included due to the patient complaining of increased pain with abduction. The patient tested positive to the Hawkins-Kennedy, Neer, Speed's, and Jobe's test. The combination of these specific tests is a strong indication of a shoulder impingement.¹¹

Upon palpation or touching of the mastectomy, port, skin graft, and lumpectomy areas on the patient's right side, the radiating pain symptoms were recreated. The patient demonstrated decreased pectoralis major and minor length, scalene length, and upper trapezius length on the right side as well as tenderness in the infraspinatus and teres major and minor.

The Upper Extremity Functional Index¹² was used to identify the patient's level of impairment while also providing a baseline for improvement goals. The questions in the functional index identified the patient's impairments at a score of 56/80, revealing limitations with instrumental activities such as lifting heavy objects and performing activities overhead.

After review of the special tests, shoulder mobility, and palpation of the surgical incision, it was determined that the changes in the patient's body structure and function were associated with scar tissue tightness from the mastectomy. These musculoskeletal changes have resulted in impingement symptoms in the anterior shoulder joint secondary to poor shoulder biomechanics. Intervention strategies were designed to decreased scar tissue and increase mobility to promote return to previous activity levels.

Prognosis and Plan of Care

After the initial examination, there was sufficient evidence that the patient would potentially benefit from physical therapy and the interventions would be within the physical therapy practice act. Consequently, no referring orders were deemed necessary as there is no evidence of a significant finding such as a muscular tear or bone fracture.

The patient's prognosis was good because she led a healthy lifestyle and was motivated to adhere with physical therapy programming. She had received physical therapy before and had increased knowledge about what was involved. The patient agreed to 45-minute treatment sessions, two times weekly for 8 weeks. The patient understood the physical therapy course of treatment included strength training, stretching, and scar mobilization. She also agreed to follow a home exercise program that could be modified to fit the patient's schedule and accessibility.

Until pain decreased, the patient was instructed to avoid repetitive overhead movement. She was extremely involved in her plan of care and was encouraged to communicate with the physical therapist regarding comfort.

The patient was encouraged to research breast cancer support groups such as the Pink Ink foundation. The patient was informed that research¹³ indicated that support groups were helpful with achieving acceptance and recovery. However, the patient declined, explaining that she was not interested.

The patient's goals included decreasing pain during overhead movements, recovering the ability to drive without pain, and sleeping without interruptions. The physical therapy goals were consistent with the patient goals including decreased pain and increased functional mobility.

Intervention

The patient's plan of care included stretching of the scar tissue and strengthening of the shoulder girdle in order to increase stability and decrease pain. The patient approved of all interventions following explanations from the PT. As seen in Table 1, the patient progressed each week as a result of adherence to the exercise program. Alterations were made to make the patient feel more comfortable.

During the first week, the patient performed scapular depression and retraction while seated, 2 sets of 10 repetitions daily. Stretching was to be held for 30 seconds, 2 times daily, and self scar mobilization for 15 minutes. During PT, scar mobility was performed to the mastectomy, lumpectomy, and skin graft site and the patient was instructed on performing the procedures herself. The patient had difficulty performing self scar mobilization, often stating disgust, but complied with modifications such as draping at home or performing the mobilizations after a relaxing shower or bath.

Table 1.

Interventions and progression of plan of care

	Strengthen	Stretch	Modalities	Home Exercise Program
Week 1	Isometric rhomboid latissimus dorsi contraction	Pectoralis major and minor, upper trapezius standing position	ASTYM, ultrasound, scar mobilization, manual shoulder and neck range of motion, PRRT	Self scar mobilization after showering, strengthening and stretching exercises
Week 2	2 lbs resisted scaption flexion, and external rotation; 4 lbs internal rotation; green theraband exercises	Pectoralis major and minor, upper trapezius supine position as per patient's preference	Manual scar mobilization, Ultrasound, shoulder and neck range of motion, shoulder distraction, PRRT	Self scar mobilization after heating up the area, strengthening and stretching exercises
Week 3	Increased week two exercise repetitions; progressed green theraband exercises	Continued at home stretching, focusing on pectoralis minor stretch	Manual scar mobilization, Ultrasound, Kinesio Tape application	Strengthening and stretching exercises
Week 4	Increase all exercises by 1 pound; incorporated functional wall reach activities, proprioceptive activities	Continued at home stretching program	Manual scar mobilization, Ultrasound	Strengthening and stretching exercises

Ultrasound was utilized on the upper trapezius to loosen isolated muscular tightness. Augmented soft tissue mobilization (ASTYM) was applied to the shoulder girdle, bicep tendon, and internal and external rotators to loosen muscular restrictions, and break up scar tissue. General primal reflex release technique (PRRT) was applied during the first four PT visits for pain management. This type of modality was used to alleviate pain by instructing the patient to perform several reflexes which, theoretically, would override the nervous system to relieve the pain symptoms.

During the second week, the patient was progressed to resistive strengthening exercises, 10 repetitions, 2 times daily, 5 days a week. Scar mobility interventions increased during PT visits because the patient communicated difficulty observing and applying similar pressure at home. ASTYM was discontinued due to pain and the PT modified the program by performing increased manual scar mobilization. The patient responded well to ultrasound which was applied to restricting muscles for 8 minutes with settings of 1MHz and 1W/cm².

During the third and fourth week, the patient progressed by increasing repetitions of all resistive exercises to 15. Weight was also increased by 1 pound for all exercises. Kinesio tape was applied to the glenohumeral joint to apply a stretch and allow proprioceptive input. Research documents¹⁴ that Kinesio tape, combined with exercise, results in better functional outcomes for mobility and ROM by the 5th and 12th PT application.

Exercises with medium resistance green theraband were increased in the 3rd and 4th week. These activities included standing lateral pull downs, placing the theraband in the door to complete standing rows, performed 10 times, 2 repetitions, 5 days a week.

Outcomes

The patient received 8 physical therapy sessions before being discharged. She stated that she enjoyed physical therapy and was able to return to all activities including painting overhead for more than 2 hours, photograph outdoors, drive, and sleep throughout the night. The patient performed another Upper Extremity Functional Index at the time of discharge with a resulting score of 80/80, compared to the initial 56/80. This was a clinically significant difference as it was an increase of 9 points.¹² Chesworth and Hamilton¹⁵ concluded that the Upper Extremity Functional Index has high reliability and validity as a result of consistent test and retest scores. Consequently, it may be concluded that the Upper Extremity Functional Index accurately measured the patient's abilities.

The patient never sought the assistance of support groups and did not want to hear or discuss the positive aspects of those programs. However, the patient self-reported feeling more comfortable with health professionals as a result of participating with physical therapy.

CHAPTER III

DISCUSSION

When providing intervention for patients who have breast cancer, the focus is on the cancer itself; how to eliminate it and how to prevent it from coming back. Everts and Jensen¹⁶ reviewed breast cancer literature and concluded that women should receive more education and referrals from their oncologist in order to achieve increased quality of life. Psychological changes are extremely common for women after breast cancer surgery.¹⁷ However, with breast cancer rehabilitation, there may be a lack of follow-up interventions to promote psychological and physical health for patients who have undergone surgery.

With the increased prevalence and knowledge of shoulder pathologies after breast cancer surgery, Galantino⁵ and Hayes⁶ suggested that measures be mandated including early shoulder mobility, stretching, and a shoulder strengthening program to alleviate and prevent shoulder impairments. Exercises to increase mobility of the latissimus dorsi, rhomboids, lower trapezius and rotator cuff muscles are supported by research^{4,5,6,9} and result in improved biomechanics around the shoulder. A combination of stretching, strengthening, range of motion, and functional assessment tools have been used to determine full recovery.

Springer et al¹⁸ monitored 94 women, with recently diagnosed stages I-III breast cancer, who received PT education and exercises prior to unilateral breast cancer surgery. The researchers measured shoulder function with tools including ROM, MMT, and functional questionnaires prior to surgery as well as 1 month, 3-6 month, and 12 months afterwards. The authors concluded that the women who performed exercises recovered more quickly, achieving full shoulder range of motion at 3 months after surgery, while also returning to normal functional mobility by 12 months post op.

Shimozuma et al¹⁸ found that patients with all different types of breast cancer surgery experienced the similar changes in quality of life. This means that women who have a radical versus a modified mastectomy will both report similar decreases in quality of life. A correlation was also drawn between women reporting poor body image and mood disturbance with lower quality of life scores. Women who tend to have a negative body image may also tend to show signs of increased depressed symptoms.

Physical activity after breast cancer surgery has shown to result in positive physical and mental health.^{19,20} Branstrom et al¹⁶ studied women who reported physical activity levels after breast cancer surgery as low, medium or high. The authors found a 34% decrease in breast cancer mortality, 41% decreased risk of all-cause mortality, and 24% decreased risk of disease recurrence¹² with physical activity at the medium or high levels. Physical activity was important for mortality as well as for psychological health as those that were less physically active reported increased symptoms of depression. In addition, the authors reported

peak anxiety, pain, and depression levels were at 24 months post breast cancer surgery for individuals considered at a low activity level.

Hormes et al²¹ found a correlation between decreased physical activity in women after breast cancer and increased impairment in overall health, appearance, and sexual health. It was concluded that women who were more active and exercised after breast cancer surgery were more likely to have positive psychological and physical outcomes.

The evidence reference above indicates that intervention for both physical and mental well-being would be appropriate following surgical intervention for breast cancer. Intervention methods may include a variety of physical activities, and psychological interventions. The provision of an inter-professional plan of care would be beneficial.

Reflective Practice

The patient in this case study reported feeling more self-conscious since the mastectomy surgery and would not let her husband observe the surgical site. According to research,^{20,21} negative body image and symptoms of depression tend to increase after breast cancer surgery. Although the patient's shoulder pathology resolved following stretching, strength training, and scar mobilization, the psychological symptoms were present four years after surgical intervention.

Upon reflecting on the patient's status and plan of care, I would have encouraged the patient more vigilantly to find a support group or psychological

assistance. This patient demonstrated abnormal behaviors that should have been addressed by a psychologist.

It is also unclear whether the patient's post-mastectomy and scar formation were the implicating forces resulting in the patient's limitations or if the patient's daily activities has contributed to her diagnosis of shoulder impingement. I assumed the shoulder impingement diagnosis was due to the mastectomy surgery. In the future, I will ask more questions regarding the patient's onset of symptoms or changes in routine to rule out additional etiologies. Subsequently, I could have provided interventions such as therapeutic exercise rather than immediately focusing on scar mobilization.

According to the DSM 5,²² major depressive disorder and depressive episodes are diagnosed based on a list of symptoms and changes in behavior. This patient demonstrated denial, changes in sleep, depressed mood, and reduced self-esteem. In order to meet the diagnosis criteria, at least five symptoms must be present. However, the DSM also indicates that medical illness or episodes of high stress can induce temporary depressive thoughts. The patient was required to perform self-care for her mother more recently which may have also produced stress contributing to these symptoms.

According to the patient, the physician that referred the patient with a diagnosis of a rotator cuff tear did not perform a physical examination or imaging of the patient's shoulder. I did not contact the physician regarding the diagnosis; I should have reached out to him or her, writing a letter or email stating the physical findings regarding the patient's diagnosis. I could also have provided educational

materials provided regarding the increased prevalence of shoulder dysfunction after breast cancer surgery. This could have led to more focused patient education, increased compliance of early shoulder mobility, and improved quality of life. In the future, I will be more direct with both referring physicians and patients in an effort to prevent further shoulder pathologies and increase the patient's quality of life.

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