



# Clinical Case Report Competition

West Coast College of Massage Therapy,  
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First Place Winner

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The efficacy of breast massage on the body, including its  
effect on a patient's subjective feelings and  
varying body systems

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*\*To the author's knowledge, no conflict of interest exists in regards to this study.*

**ABSTRACT:** *Objective:* This study was an exploratory study to help determine the benefits of Massage Therapy specific to breast tissue.

*Method:* A total of 8 treatments occurred at 70 minutes per treatment. Modalities applied included Myofascial Release, Swedish Massage, Passive Stretching, Guided Diaphragmatic Breathing, and Trigger Point Therapy. Three assessment techniques were used during each treatment to monitor Pectoralis Minor Muscle length, quality of rib expansion during breath, and compression of the Brachial Plexus. Homecare given was to aid in rib expansion through diaphragmatic breathing.

*Results:* The patients' results included greater rib expansion during breathing, a decrease in neurological symptoms in the brachial plexus, fewer headaches, a decrease in forward-rounded-posture and fewer negative subjective feelings towards her breasts.

*Conclusion:* This study supports the belief that any woman can gain from Breast Massage, even when pathologies of the breast are not evident. It also supports the hypothesis that postural, neurological and headache signs and symptoms can be affected through regular massage therapy of this area.

*Keywords:*

*Breast, Massage Therapy, Breathing, TOS, Headache, Posture*

## **INTRODUCTION:**

### **Pathology**

A woman's breasts require healthcare just the same as any other body tissue (Curties, 1999, p.1). Breasts tend to get attention during times of breast feeding and breast pathologies, such as breast cancer, but healthy breast tissue is in need of observation and treatment as well. Seemingly healthy breasts are generally overlooked due to the sexual connotation of them, as well as possible religious, cultural and a multitude of other reasons. Many women, young and old, are intimidated by the idea of self breast exams and inquiries to their family doctors. If women find it difficult to enquire with their physician about their breast health then it is easy to imagine how few people take advantage of Breast Massage and its therapeutic benefits.

“Responses were gathered from 20 schools and 216 (massage) therapists... 18 did breast massage regularly” (Curties, 1999, p.56).

Many larger-chested women find themselves in a rounded forward posture. This posture can be acquired for various reasons including a woman feeling that it is socially unacceptable to stand with proper posture because of the misconception that this is her “sticking her breasts out” or “showing them off”, and/or due to the sheer weight of them physically pulling her into this position. This habitual stance creates many issues such as muscular imbalances, neurovascular compressions, and a decreased chest expansion while breathing. Below is a chart depicting some of the more common muscular imbalances.

<b>Short and Tight Muscles</b>	<b>Long and Stretched Muscles</b>
<i>Pectoralis Major</i>	<i>Rhomboid Major</i>
<i>Pectoralis Minor</i>	<i>Rhomboid Minor</i>
<i>Levator Scapulae</i>	<i>Lower Trapezius</i>
<i>Upper Trapezius</i>	<i>Anterior Serratus</i>
<i>Anterior Fibers of Deltoid</i>	<i>Posterior Deltoid</i>
<i>Subscapularis</i>	<i>Infraspinatus</i>

<i>Teres Major</i>	<i>Longus colli</i>
<i>Latissimus Dorsi</i>	<i>Teres Minor</i>
<i>Sternocleidomastoid</i>	<i>Longus Capitis</i>
<i>Subclavius</i>	
<i>Rectus Capitis</i>	
<i>Anterior Scalene</i>	
<i>Middle Scalene</i>	
<i>Posterior Scalene</i>	

The Subclavian Artery, Subclavian Vein, Axillary Artery, Axillary Vein, and the Brachial Plexus are structures within the Thoracic Outlet. The Subclavian Artery passes posterior to the Anterior Scalene muscle and then anteriorly over the first rib; this means it travels through the interscalene triangle bordered by Anterior Scalene, Middle Scalene and the first rib (Netter, 2011, Muscolino, 2010). The Brachial Plexus also runs through this interscalene triangle. Axillary and Subclavian Arteries and Veins as well as the Brachial Plexus all run anterior to the first rib and posterior to the clavicle. The Subclavius muscle inserts on the inferior surface of the lateral clavicle. All of these structures continue posterior to the Pectoralis Minor muscle (which itself is posterior to the Pectoralis Major muscle) and they then enter the axillary space (Netter, 2011, Muscolino, 2010). (View Appendix A, figures 1 and 2 for visuals).

Based on the anatomical information given above some compression spots become worrisome. If the Anterior Scalene Muscle and Middle Scalene Muscle are hypertoned the Subclavian Artery and/or Brachial Plexus can become pinched between the two and therefore compressed (Rattray, 2000). If the Subclavius Muscle is hypertoned the clavicle can become fixated toward the first rib creating less space for all structures to pass through and therefore may compress them. If Pectoralis Major/Minor muscles are hypertoned all Thoracic Outlet structures can all become compressed this is called Thoracic Outlet Syndrome, or TOS. Symptoms may be exacerbated in all three areas when the patient takes a deep breath (Rattray, 2000). Traditionally

healthcare professionals are taught that TOS causes pain, numbness, and tingling throughout the upper limb. Few practitioners know, however, that TOS can also cause pain, tingling and numbness in the breast (Curties, 1999, p.27).

When a person is in a rounded forward posture their breathing is impaired, due to the ribs being unable to physically expand to their maximal amount. A patient may also be reluctant to take a deep breath if that intensifies any existing TOS symptoms. After a prolonged time where a person is in this poor posture, breathing shallowly, they will have trouble breathing maximally even if moved into a biomechanically correct posture. This person will have had fascia and musculature tighten in the rounded forward position and that will take time to stretch and regain its healthy length and mobility in a healthy posture.

The lymphatic system has three main body functions: draining excess interstitial fluid returning it to the blood stream, the transportation of dietary lipids, and carrying out immune responses (Tortora and Derrickson, 2009, p.832). Within breast tissue lymphatic drainage is considered a very important factor. Lack of lymph drainage causing breast cancer and other breast health issues is a widely discussed theory. The breast is richly supplied with tiny lymphatic vessels (Curties, 1999, p.28). Lymphatic vessels throughout the body resemble veins with thinner walls and with more valves, except for within the breast (Tortora and Derrickson, 2009, p.832). Lymphatic vessels of the breast are believed to be valve-less. This means that gravity can adversely influence breast drainage; the larger the breast, the more negatively affected it can become. The sensitivity of the breasts' lymphatic vessels also means that they are easily obstructed by scars, swelling, and other compressive forces (for example, bra wearing) (Curties, 1999, p.28). Breasts natural mobility promotes lymphatic drainage, however, breasts are forced to be static and compressed when in a bra. Lymph flow must pass through a series of

node clusters which in turn drain into the major nodes laying in the axilla; this route travels through the Pectoralis Major Muscle. All of these pathways can be adversely affected by compressive forces and also the postural restrictions that were previously mentioned. (View Appendix A, figure 3 for a visual of the breast and axillary lymphatic nodes).

**Alternative Treatments**

	<b>Treating Rounded Forward Posture</b>	<b>Treating Poor Circulation of the Breast</b>
<b>Method</b>	Reduction Mammoplasty (Breast reduction Surgery)	Exfoliation: Dry Brush
<b>Efficacy</b>	A study was done of 328 women, 94.2% rated their procedure as being completely or very successful (Curties, 1999, p.178). However, post surgical scars may cause issues including pain, reduced range of motion, and obstruction of circulation.	Dry brushing is a very beneficial and simple way to increase circulation throughout the body. It is quickly effective at promoting this circulation increase superficially; however it will not affect the deeper breast tissue.
<b>Safety</b>	The lower quadrant and nipple typically lose some sensation post-surgery and women who have had this procedure will usually experience trouble with breast feeding (Curties, 1999, p.179).	Unless you have an allergic response to the material the brush is made from it is very safe.
<b>Expense</b>	Usually free in Canada when deemed to be medically necessary.	Anywhere from \$2.00-\$10.00

As seen in the chart above, neither example of alternative treatment methods successfully address the postural changes and the circulatory changes of the breast, as well as the patients’ subjective feelings. Breast tissue in particular needs aid in promoting circulation and tissue mobilization for optimal health. Massage Therapy is one of the most effective ways to address such problems.

### **Expected Outcome**

The primary expected outcome of this treatment is to decrease the patients TOS symptoms, rounded forward posture and headaches; and to increase the patients rib expansion and positive subjective feelings with her breasts.



## **CASE HISTORY:**

The subject in this study is a 22 year old female. She is a student in the Registered Massage Therapy program. She is a non-smoker, participates in light exercise daily. This exercise regime consists of two daily 15 minute bike rides as well as an average of twice a week swimming for upwards of an hour each session.

This participant did not come in with a complaint specific to her breasts. The only thing she said directly in regards to her breasts was that she “feels a detachment from them and physical insensitivity.” Within her RMT course this patient had experienced unexpected relief from receiving breast massage that was less than a half hour. Both the patient and the therapist were willing to continue with breast massage to see the extent of, if any, beneficial results.

Upon further questioning the following information came up that seemed possibly unrelated at the time. She had exercise induced asthma, her last full attack being two years ago. The patient was experiencing numbness and tingling down her arms and into both hands that often woke her up from sleep; she was sleeping with her arms above her head. She was getting headaches in the evening every two days that usually lasted a half hour. On occasion she self treated these headaches with Tylenol.

## ASSESSMENT:

On the first and last day of treatment there were a variety of assessments performed on the patient. All of these tests can be viewed in greater detail in Appendix B. The Upper and the Lower Appley's Scratch Test's were used to assess the patients range of motion of the glenohumeral joint, specifically abduction, external rotation, and flexion with the Upper and adduction, internal rotation and extension with the Lower (Magee, 2008, p.255). A Plumb Line Posture Assessment was used to get an accurate depiction of any physical body imbalances the patient had. The Upper Limb Tension Test was used to assess possible impingement of Median Nerve, Musculocutaneous Nerve, and Axillary Nerve (Magee, 2008, p.165). The Pectoralis Minor Manual Muscle Test was used to assess the strength of Pectoralis Minor using the Muscle Test Grading Scale to determine strength (Magee, 2008, p.35). The Rhomboid Manual Muscle Test was used to assess the strength of Rhomboids (Magee, 2008, p.318). The Pectoralis Minor and Pectoralis Major Length Tests were used to determine if the correlating muscles were shortened (Magee, 2008, p.318). Halstead maneuver and Wright's Test assessed the costoclavicular space as a test for TOS symptoms (Magee, 2008, p.321,322). Adson's Test assessed for possible TOS symptoms caused by compression from the Scalene Muscles (Magee, 2008, p.322). Chest Expansion Measurements were used to evaluate the patient's quality of breath by measuring the ribs during inhalation and exhalation at three levels (Magee, 2008, p.490). The first level was under the axilla for apical breathing, the second level was under the breast for midthoracic expansion, and the last was on the lower ribs for lower thoracic expansion.

Before and after every treatment the patient was assessed and then reassessed with Pectoralis Minor Length Test, Chest Expansion, and Halstead Maneuver. At the beginning of each treatment the patient and therapist went through an interview to determine general health

and any weekly changes. Also prior to every treatment the patient was asked to use a Postural Evaluation Chart to write any comments of hers, to circle any areas of discomfort and to write the numeric value of her pain if present. This pain charting was done using the Numeric Pain Scale as seen in Appendix B figure 10.

**TREATMENT PLAN:**

This study was an exploratory study to help determine the benefits of Massage Therapy on breast tissue in regards to subjective feelings as well as the musculoskeletal system, respiratory system, circulatory system, lymphatic system and the neurological system. The model treatment frequency would have been 1 treatment per week for 8 weeks; however schedule compatibility made the treatments less consistent than would have been ideal.

There were eight treatment sessions at seventy minutes each. All treatments were identical in terms of techniques. The treatment dates were September 27<sup>th</sup>, September 30<sup>th</sup>, October 6<sup>th</sup>, October 11<sup>th</sup>, October 18<sup>th</sup>, November 3<sup>rd</sup>, November 15<sup>th</sup> and November 22<sup>nd</sup>. The patient remained supine for the entire treatment. The following chart is a depiction of the treatment specifically.

<b>Modality/Technique (In order of application)</b>	<b>Area/Tissue</b>	<b>Description of TX</b>
Compressions	Shoulders and upper arms	To initiate touch a few firm compressions were bilaterally used on the client beginning with their shoulders and moving down until mid arm.
Effleurage	Full chest/ upper abdomen	The patient's breasts were draped at this point with her upper abdomen exposed. Effleurage was performed to increase circulation and further initiate touch. This technique was used throughout the treatment.
Cross hands 1	Diagonally across chest	Broad cross hands were used to open the patient up through her chest fascially.
Cross hands 2	Around the bra line	More specific cross hands performed with fingers rather than full palm were used to decrease fascial adhesions around the breast. These were done from medial to inferior to lateral on both breasts.

Passive stretch	Pectoralis minor/major	This was done to decrease any hypertonicity within the pectoral musculature.
C-cupping	Breast tissue	The breasts tissue was undraped. C-cupping was used to increase the circulation and lymphatic drainage of the breast tissue. This technique was used throughout the treatment.
Kneading	Breast tissue	The circular motion of kneading was used around the breast tissue. It was done by starting on the distal breast tissue and working proximal, while still always avoiding the nipple.
Lift and jiggle	Breast tissue	This is arguably the most important technique in breast massage. It was used often through the whole treatment. The therapist picks the breast tissue up away from the rib cage gently jiggling it to promote healthy circulation and lymphatic drainage.
Rib raking	Ribs/Intercostals	Finger tips apply a firm pressure between the ribs to release any hypertonicity within the intercostals muscles.
Stripping	Pectoralis Minor/Major muscles	Varying levels of pressure were used to strip through the pectoral muscles in order to decrease their hypertonicity.
Ischemic compressions	Trigger point therapy within Pectoralis Minor and Major muscles	This method was used to decrease any trigger points found within the pectoral muscles.

The patient was told to practice diaphragmatic breathing as her homecare, once in the morning and once before sleeping. She was asked to start with 15-20 breaths per session and to take care not to sit or stand up too quickly after this to avoid dizziness. Involving hydrotherapy treatments as well as self-massage for homecare would have been of great benefit.

**OUTCOMES:**

The greatest benefits that were seen in this case study were in the areas of Chest Expansion, headache frequency, neurological and circulatory compression syndromes, Pectoralis Minor muscle length, subjective feelings and with posture.

The patient’s ability to chest expand while breathing improved nearly threefold as seen in Appendix C, figure 1.

The patient’s headaches became much less frequent as seen in the chart below which depicts the week to week check in between therapist and patient.

<b>Treatment</b>	<b>Headache Monitoring</b>
TX1	Patient was having 1 headache every 1 or 2 days.
TX2	Patient currently had a headache.
TX3	No headaches to report
TX4	No headaches to report
TX5	Patient had gone 2 weeks without a headache then had a headache lasting 2 days.
TX6	No headaches to report
TX7	Patient had not had a headache in 28 days then became ill. She came into this treatment with an active sinus headache.
TX8	Patient had no headache for 6 days, then she came into the final treatment with an active headache

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The patient’s symptoms from neurological and circulatory compression of the upper limb gradually improved during the treatments. This can be seen in Appendix C, figure 2.

The length of Pectoralis Minor improved quickly in this study as seen in the chart below.

Column1	Pre-TX	Post-TX
TX1	R- (+) / L-(+) (more positive than R)	NTR
TX2	R- (+) / L-(+) (more positive than R)	R- (-) / L- (-)
TX3	R- (+) / L-(+) (more positive than R)	R- (-) / L- (-)
TX4	R- (-) / L- (+) (very slight)	R- (-) / L- (-)
TX5	R- (-) / L- (-)	R- (-) / L- (-)
TX6	R- (-) / L- (-)	R- (-) / L- (-)
TX7	R- (-) / L- (-)	R- (-) / L- (-)
TX8	R- (-) / L- (-)	NTR

*(Tx=Treatment, NTR=Nothing to report, (R)=Right, (L)=left, (-)= negative, (+)= positive)*

The patient’s subjective feelings were monitored by getting her to write her opinion of how she was feeling before each treatment and to circle areas on an anatomy body of where her own pain or discomfort was. Pain was charted by using the Numeric Pain Scale. On the first day of treatment the patient marked over fifteen different areas on the paper as areas of “tension” or “tightness” along with seven different numerical indications of pain. The patient went on to say that she felt “heaviness” in her chest and that she felt a “need to slump forward to alleviate the pressure in her back and chest.” On the last day of treatment, however, only seven areas were marked as being slightly “achy” along with no areas of pain. She said she now feels a “connection” to her breasts that replaced her prior dismay and that her breasts feel “lighter and less of a burden.” The patient went on to say that she believes she now has more body awareness. (This can be seen in Appendix C, figure 3).

Through the treatments it became evident that some of the postural deviations the patient had been experiencing were now reduced. The slight rounded forward posture the patient has been showing with her shoulders and chest diminished. There was a great difference between shoulder heights in this patient initially which was reduced greatly by the end of the treatments. This can be viewed in Appendix C, figure 4.

There were other improvements as well, such as continued improvement with TOS and compression syndromes as seen in the Upper Limb Tension Test and Wright's Test. There was also some improvement in the strength of the patient's left Rhomboid that was assessed by the Rhomboid Muscle Test. All remaining test results can be seen in the chart below.

<b>Test Name</b>	<b>First Treatment</b>	<b>Last Treatment</b>	<b>Comments</b>
Upper Apley's Scratch Test	1 1/2" difference	1 1/2" difference	No change
Lower Apley's Scratch Test	4" difference	4"difference	No change
Upper Limb Tension Test	R-(+) (worse) L-(+)	R-(+) L-(+)	1st TX- symptoms in medial elbow and wrist/2nd TX- had no wrist symptoms
Pectoralis Major Muscle Test	R-Grade 5/5 L-Grade 5/5	R-Grade 5/5 L-Grade 5/5	No change
Rhomboid Muscle Test	R-Grade 5/5 L-Grade 4/5	R-Grade 5/5 L-Grade 5/5	L Rhomboid strength improvement
Pectoralis Major Tightness Test	R-(-) L-(-)	R-(-) L-(-)	No change
Wright's Test	R-(+) L-(+)	R-(-) L-(-)	Bilateral Improvement
Adson's Maneuver	R-(-) L-(-)	R-(-) L-(-)	No change

*(Tx=Treatment, NTR=Nothing to report, (R)=Right, (L)=left, (-)= negative, (+)= positive)*



## **DISCUSSION AND CONCLUSION:**

The goal of creating a study to explore the benefits of breast massage on the body as a whole was achieved. This case study successfully demonstrates that the effects of breast massage are extensive: it can increase chest expansion, decrease headaches, improve neurological and circulatory compression syndromes, improve a patient's subjective feelings towards her breasts as well as many other factors.

The client in this study felt that breast massage greatly improved her everyday life on both a mental and physical level. She felt that this therapy created a continuity and wholeness within her body that she had never experienced. The therapy created a body awareness that the client did not know was absent prior to treatment. This feedback illustrates the immense relief the patient experienced.

It is difficult to determine to what extent breast massage contributed to an increased chest expansion rate. The patient's homecare of diaphragmatic breathing surely did play a large role in these increases. Further testing would have to be done in order to determine how much benefit was received from the massage therapy compared to the homecare.

The patient expressed a large decrease in her pain throughout the treatments. The variance between the first and last subjective assessment emphasises this difference. Although patient bias is always a possibility when working with subjective findings, it is safe to assume this decrease in pain was a direct benefit from the massage therapy. The patient reported no pain medication consumption that could alter these findings.

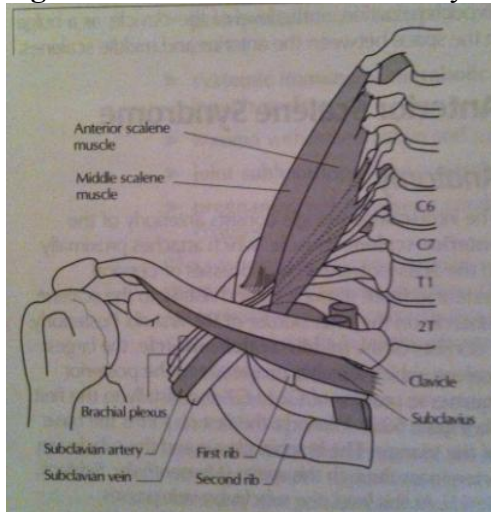
The consistency of the patient's headaches dramatically lessened with treatment. Further testing would have to be done in order to determine if this benefit was due to breast massage specifically, or if any massage would have aided in these issues. Further testing is also needed in

order to determine if the headache reduction was from massage therapy sessions, or if it was a vicarious effect after the patient had experienced stress decrease.

Do to the small body of research material available, it became very evident that breast massage applied to healthy breast tissue is seldom studied. As such, it is difficult to draw solid conclusions on the efficacy of breast massage as a preventative measure against breast pathologies without further research. Given the knowledge the medical community has about the importance of breast lymphatics and the hindrance of gravity and bra wearing, it would be of great benefit to continue further research in the direction of breast massage as a preventive modality for certain breast pathologies, like breast cancer. Massage in this field is unstudied and underfunded indicating the significance of this particular case presentation in the massage therapy community.

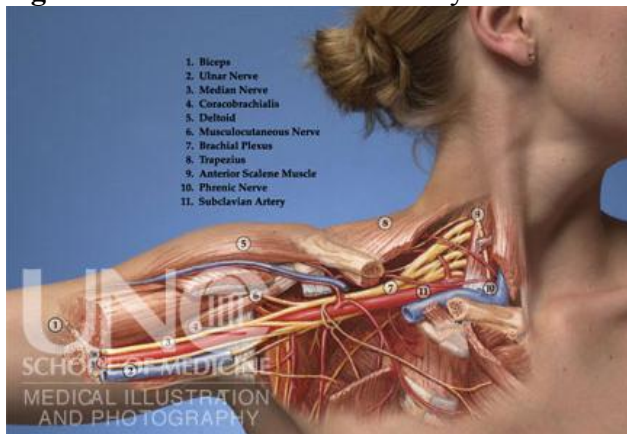
## APPENDIX A

**Figure 1:** General thoracic anatomy



(Rattray, 2000, p.828)

**Figure 2:** General thoracic anatomy continued



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**Figure 3:** Breast and axillary lymphatic nodes, 2011

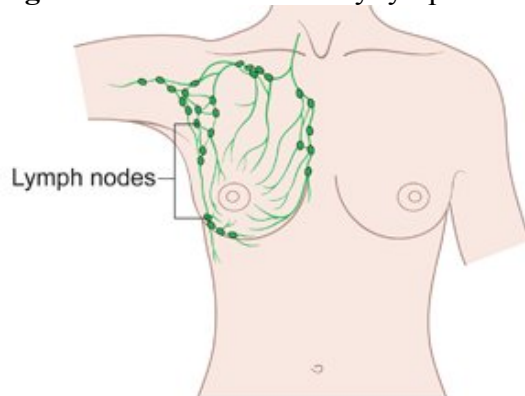
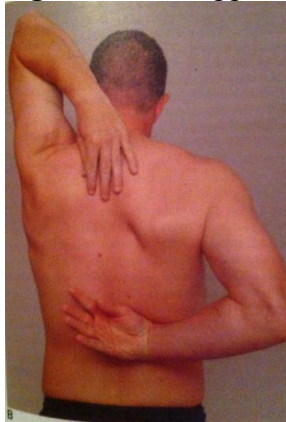


Diagram showing the network of lymph nodes in and around the breast  
Copyright © CancerHelp UK

(<http://cancerhelp.cancerresearchuk.org/type/breast-cancer/about/the-breasts-and-lymphatic-system>, 2011)

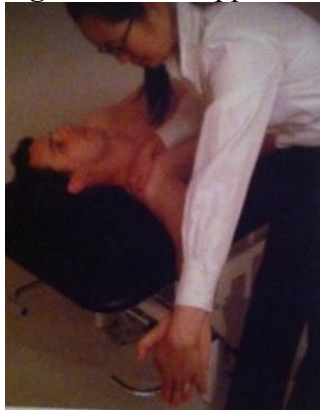
**APPENDIX B**

**Figure 1:** The Upper (left arm) and the Lower (right arm) Appley’s Scratch Tests



(Magee, 2008, p.255)

**Figure 2:** The Upper Limb Tension Test



(Magee, 2008, p.166)

**Figure 3:** Muscle Test Grading Scale (as used in Pectoralis Minor Manual Muscle Test and Pectoralis Major Manual Muscle Test)

Grade	Value	Movement Grade
5+	Normal 100%	Complete ROM and maximal resistance against gravity
4	Good 75%	Complete ROM against gravity with some resistance
3+	Fair+	Complete ROM against gravity with minimal resistance
3	Fair 50%	Complete ROM against gravity
3-	Fair-	Some but not complete ROM against gravity
2+	Poor+	Initiates motion against gravity
2	Poor 25%	Complete ROM without gravity
2-	Poor-	Initiates motion without gravity
1	Trace	Evidence of slight contractility but no joint movement
0	Zero	No contraction

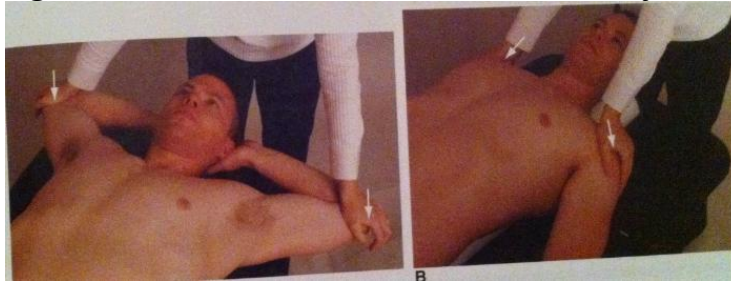
(Magee, 2008, p.35)

**Figure 4:** The Rhomboid Manual Muscle Test



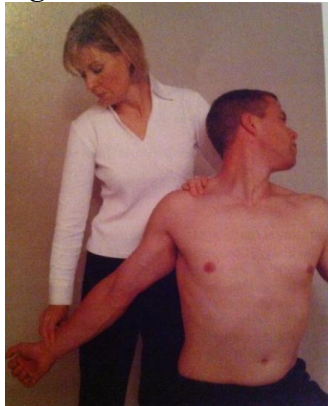
(Magee, 2008, p.318)

**Figure 5:** The Pectoralis Minor and Pectoralis Major Length Tests



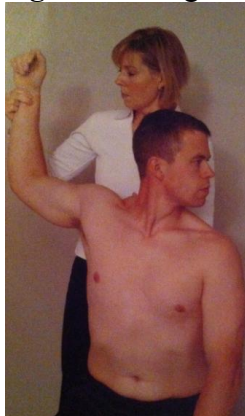
(Magee, 2008, p.319)

**Figure 6:** Halstead Maneuver



(Magee, 2008, p.323)

**Figure 7:** Wright's Test



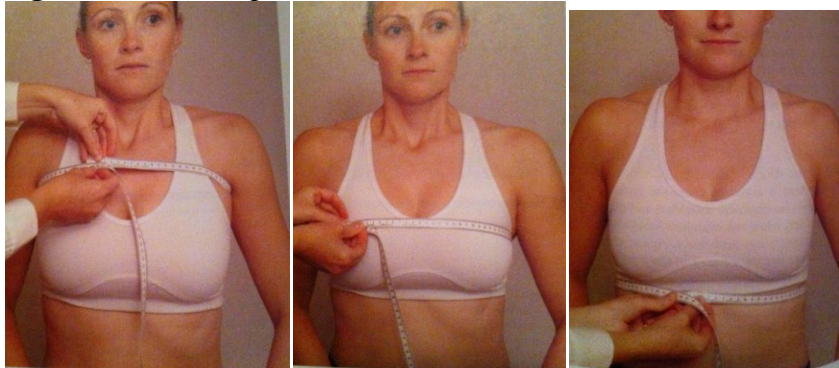
(Magee, 2008, p.321)

**Figure 8: Adson's Test**



(Magee, 2008, p.323)

**Figure 9: Chest Expansion Measurements**

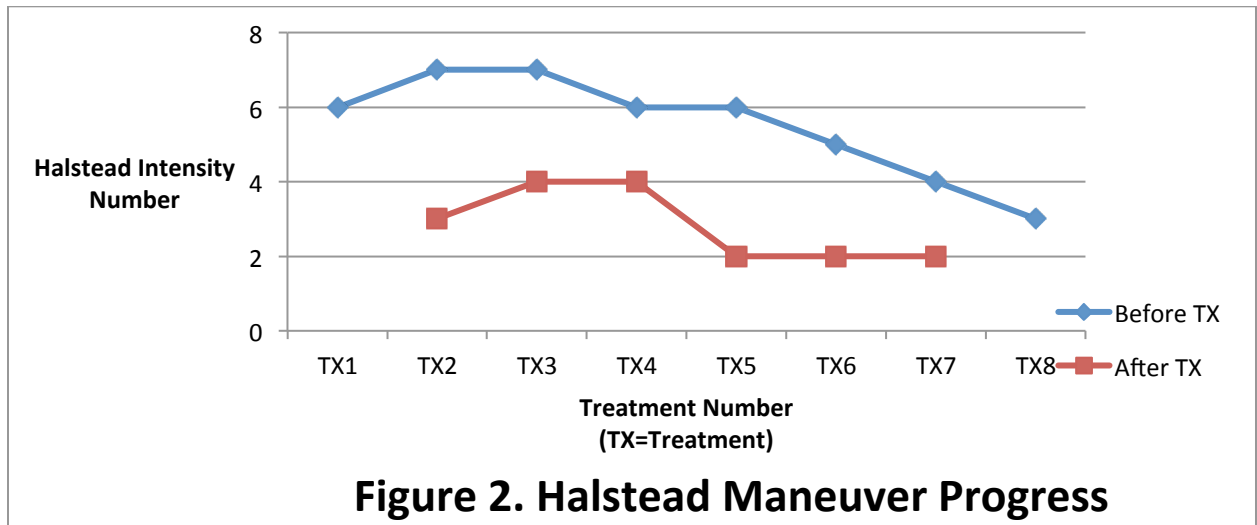
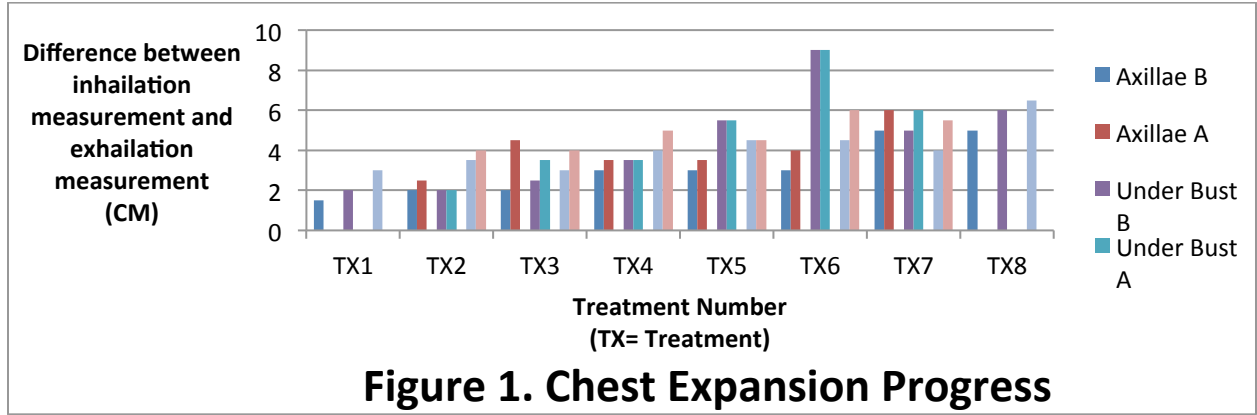


(Magee, 2008, p.490)

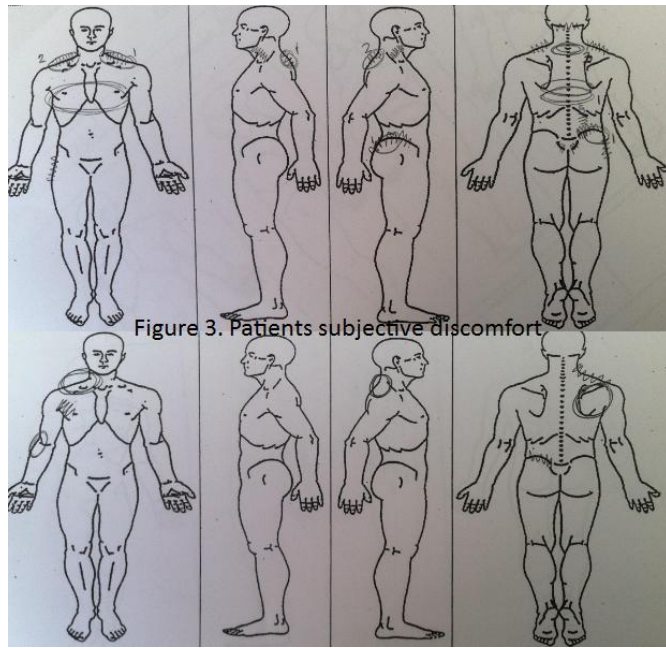
**Figure 10: Numeric Pain Scale**

The patient is asked their subjective opinion of how much pain they are in. Zero indicates no pain, 10 indicates an excruciating amount of pain.

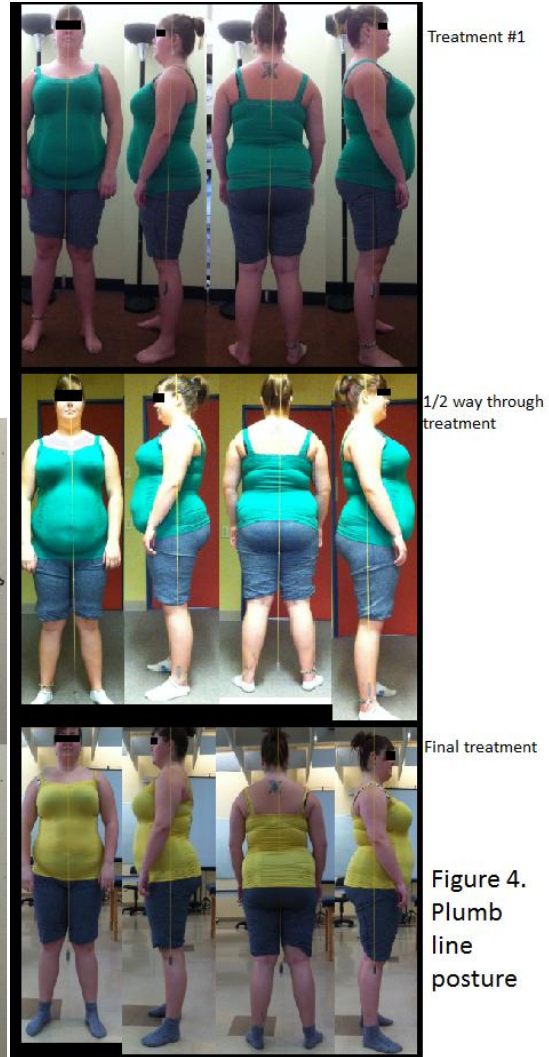
**APPENDIX C**



*\*\*In order to properly graph the findings from the Halstead Maneuver special test I devised a scale with a number associated to determine intensity of the findings. 1 point is added if the effects were on 1 limb, 2 points were added if both upper limbs were symptomatic. An additional 1 point was added for each area of the limb that was affected of each limb; these areas included neck, shoulder, upper arm, forearm, and hand. An additional 1 point was added for each number of the Numeric Pain Scale the patient associated with this test at the time. For example: "...Both limbs of the patient are symptomatic (2), the upper arm of the right arm is effected (1), the upper and lower arm of the left arm is effected (2), the patient said her left arm was a 2 on the Numeric Pain Scale (2)" Then the Halstead Intensity Number is 7.*



**Figure 3:** (Top= September 27<sup>th</sup>, 2011),  
Bottom= November 22<sup>nd</sup>, 2011)



**Figure 4:** Source: Therapist's photos



## REFERENCES:

### **Book:**

Curties, D. (1999). *Breast massage*. Moncton, N.B.: Curties-Overzet Publications.

Netter, F. (2011). 3. *Atlas of Human Anatomy* (5 ed., p. 178). Philadelphia: Saunders.

Muscolino, J. E. (2010). 4, 5. *The muscular system manual: the skeletal muscles of the human body* (3. ed., pp. 111, 127). St. Louis, Mo.: Mosby/Elsevier.

Rattray, F. S., & Ludwig, L. (2000). Thoracic Outlet Syndrome. *Clinical massage therapy: understanding, assessing and treating over 70 conditions* (pp. 820-840). Toronto: Talus Inc.

Tortora, G. J., & Derrickson, B. (2009). *Principles of anatomy and physiology* (12th Ed.). New York: John Wiley & Sons, Inc.

Magee, D. J. (2008). *Orthopedic physical assessment* (5. Ed.). St. Louis, Miss.: Saunders Elsevier.

### **Website:**

Search Results brachial & femonade. (2011, April 20). *femonade*. Retrieved December 27, 2011, from <http://factcheckme.wordpress.com/?s=brachial&searchbutton=go!>

The breasts and lymphatic system : Cancer Research UK : CancerHelp UK. (2011, August 24). *CancerHelp UK Homepage : Cancer Research UK : CancerHelp UK*. Retrieved December 27, 2011, from <http://cancerhelp.cancerresearchuk.org/type/breast-cancer/about/the-breasts-and-lymphatic-system>