Clinical Case Report Competition

West Coast College of Massage Therapy
New Westminster

August 2014

Second Place Winner

Sydnee Russell

Comparing the effects of superficial effleurage and PNF active stretching techniques to reduce girth size of limbs affected by primary lymphedema
ACKNOWLEDGEMENTS

Sean Cannon, RMT, Case Advisor

A special thank you to my patient for her participation

This study is dedicated to Zachary Darcy Gordon Bennett
Table of Contents

Abstract..............................................pg 4
Introduction........................................pg 5
Methods............................................pg 10
Results.............................................pg 14
Conclusion/Discussion................pg 15
Graphs................................................pg 18
References........................................pg 22
Appendix..........................................pg 24
Abstract

Title:
Comparing the effects of Superficial Effleurage and PNF Active Stretching Techniques to reduce girth size of limbs affected by Primary Lymphedema

Introduction:
Primary Lymphedema is an edemateous condition that can occur at birth, after puberty, or later in life. It involves incompetency of the lymphatic valves to drain interstitial fluid, resulting in edema and fluid pooling in the affected areas. Primary Lymphedema is classified as a hereditary disease, with its only known etiological factors being genetic malinformation of the lymphatic system.

Methods:
Using girth measurement around seven points on the legs, this study measures the decrease in swelling in lymphedemateous lower limbs over a period of five treatments. The right leg was treated with PNF stretching techniques to mimic muscle pumping in every large muscle group in the lower limb. The left leg received superficial effleurage massage in a cephalad direction, aiming to return the accumulated interstitial fluid to venous circulation.

Results:
Though both techniques proved to be useful in decreasing edema, effleurage showed more benefit at the proximal leg and was less effective distally. PNF techniques showed a more steady rate in the decrease of edema.

Conclusion/Discussion:
Through this study I hoped to decrease the amount of swelling in lower limbs affected by Primary Lymphedema. PNF stretching proved to be an effective treatment with somewhat consistent water losses throughout each point measured on the leg. Effleurage, which can create an increase in blood flow, increases the lymphatic load in the tissues. This technique was probably more effective on proximal tissues because the lymphatic system was less affected in this area and could handle the increased load as well as competently return the fluid to venous circulation. However, distally, the lymphatic system was more incapable of responding to this treatment.

Keywords:
Lymphedema, PNF Stretching, Effleurage, Massage Therapy
Introduction

Lymphedema is a condition which involves localized fluid retention resulting in swelling in the affected limbs, due to an incompetency in the lymphatic system. This disease can be categorized into two types: primary and secondary. Secondary lymphedema refers to a form of lymphedema resulting from anything besides genetics. This can include infection, injury or trauma to the lymphatic system, cancer affecting lymph nodes and some cancer treatments. This case study focuses on one patient with Primary Lymphedema, therefore the details of Secondary Lymphedema will not be further discussed. Primary Lymphedema is considered congenital lymphedema when the lymphatic incompetency is present at birth. It is referred to as lymphedema praecox when appearing shortly after puberty, and lymphedema tarda with an onset after the age of 35. Primary lymphedema is rare, occurring in only 1/100,000 people. It is more widely seen in the female gender and can be traced back to genetic malinformation of the lymphatic system (Symvoulakis, Anyfantakis, Lionis, 2010).

The lymphatic system is a network of vessels that work to remove excess interstitial fluid that is not reabsorbed by the venous end of a capillary bed. When there is too much interstitial fluid in the tissues, the tissue stretch and subsequent lymphatic membrane stretch causes lymphatic valves to open, allowing the excess fluid to enter the lymphatic vessel until enough of it is drained and there is no more stretch on the tissue. When the stretch is released, the vessel returns to its resting state and the lymphatic valve closes. The valve remains closed until again there is excess interstitial fluid, thus acting as a mechanism to maintain homeostasis.
Meanwhile, the fluid that has been drained into the lymphatic vessels is then returned to venous circulation. In the case of lymphedema, defined by Zuther (2002), as a “high-protein edema” and “an accumulation of water and proteins in the tissues, caused by a decrease in the transport capacity of the lymphatic system”, the lymph vessels have become incapable of reabsorbing that excess interstitial fluid due to the inability of the valves to close and prevent backflow. The genetic inefficiency of the lymphatic system in Primary Lymphedema results in an “accumulation of interstitial macromolecules [which raises] the hydrostatic pressure within the remaining lymphatics” both of which contribute to increased tissue edema (Petrek, Pressman, Smith, 2000). When the lymphatic load increases, the system in the affected area is unable to respond. The symptoms of lymphedema (besides swelling of limbs) can include a feeling of heaviness or tightness in the affected area, restricted range of motion, pain, aching or discomfort, recurring infections, or hardening and thickening of the skin around the affected area (Mayo Clinic Staff, 2011).

Since there is currently no cure for lymphedema, precautions and preventions are emphasized. Current modalities utilized for treatment of lymphedema include elevation, elastic garments, pneumatic compression pumps, and complete decongestive therapy (Petrek et al, 2000). However, treatment of lymphedema varies greatly by opinion. In Symvoulakis, Anyfantakis and Lionis’ (2010) study, “Primary lower limb lymphedema: A Focus on its Functional, Social and Emotional Impact”, the authors take a closer look at the details of two cases in particular, where the participants describe being told to manage their lymphedema
with elevation of the extremity, elastic stockings, physical activity and avoidance of trauma. Yet, Petrek et al. (2000) disagree with use of elastic compression garments, saying “tight...garments [can create] stenosis of lymphatic vessels [and] may result in obstruction of lymph flow.” The reader should keep in mind that opinions do, and always will conflict, and the patient should utilize whichever treatment technique they find most effect on an individual level.

Other treatments include massage techniques, exercise routines and manual lymphatic drainage. Though not fully specific to lymphedema, Swedish Massage and superficial effleurage techniques are counted among those to reduce swelling, the main symptom of lymphedema. Effleurage, from the French word “effleurer”, means to glide, stroke or touch lightly; Rattray and Ludwig (2000) describe the effects of effleurage as having “a more reflexive effect on circulation if less pressure is used and a more mechanical effect if deeper pressure is used. Repetitive and sweeping, effleurage is used to increase local venous and lymphatic return, to increase local circulation or to reduce edema” (p. 22). In Kalyani Premkumar’s textbook “The Massage Connection: Anatomy and Physiology” (2004), she says “superficial effleurage and superficial lymph drainage techniques are used to remove fluid and assist drainage, and kneading with the fingertips or hands is used to soften areas of hardened edema” (p. 519). The effleurage stroke has always been taught as one to reduce edema through the logic that one can manually push the lymph and the blood causing the edema back into the central circulation. Fehrs (2010) reiterates that “the mechanical, or physical, effects of effleurage include helping to move blood and lymph more efficiently” and comments that “the general rule with effleurage is
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

to perform the strokes centripetally, or toward the heart”. However, Zuther (2002) warns that if applied incorrectly, massage therapy can have negative effects on lymphedema, as it increases the amount of lymphatic load. Zuther then shares his reasoning:

“Many massage therapy publications list edema as one of the indications for [effleurage]. This statement, while correct, is often misleading if the distinction between edema and lymphedema is not established...With edema, the lymphatic system remains intact but is overloaded [and] results in the accumulation of water in the tissues...lymphedema is always caused by mechanical insufficiency of the lymphatic system.”

He goes on to say that strokes such as effleurage cause local hyperemia, accompanied by an increase in peripheral capillary pressure. Because of this, there is a greater amount of filtration happening, and when the vessels cannot reabsorb the interstitial fluid, the process results in a higher accumulation of water in the interstitium. Again, he warns that “if massage therapy [is applied] to lymphedemateous tissues, an increase in swelling may result,” and notes that “traditional massage techniques can cause focal damage to anchoring filaments and the endothelial lining of lymph vessels.” Rather than using effleurage, Zuther recommends manual lymphatic drainage techniques, as they increase the activity of lymph vessels and move interstitial fluid without causing an increase in local blood flow.

Another approach that has been used with lymphedema is that of muscle pumping. Stick, Grau and Witzleb’s (1989) study used cycling as a means of muscle
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Pumping (via the gastrocnemius and soleus muscles), and found a “difference [that] was statistically significant” from only 18 minutes of exercise. Twenty years later Pierce and McLeod (2009) had similarly positive results in decreasing lower limb edema in 6 patients by using an exogenous calf muscle pump as stimulation to the soleus muscle for an average of 1 hour per day. The authors found “linear regression...of lower limb edema” with increased use of the device. The greater the amount of time using the device also “appeared to be associated with increased efficacy” with effects suggesting that “increased utilization of the calf muscle pump stimulation was associated with increased water losses”. With two of their patient’s showing results of more than a litre of fluid decreased in their legs, their research shows that increased use of muscle pumping was effective for reducing edema.

My curiosities lay in whether a type of active PNF stretching could mimic this muscle pump by means of manually pushing lymph and circulation centrally to reduce swelling caused by lymphedema. PNF stretching is defined in “Therapeutic Exercise: Foundations and Techniques” by Kisner and Colby (2012) as a type of active stretching that “integrates active muscle contractions into stretching maneuvers purportedly to inhibit or facilitate muscle activation and to increase the likelihood that the muscle to be lengthened remains as relaxed as possible as it is stretched” (p. 93). There has been a recent study in which authors Hwang, Ha and Choi (2013) compare the girth measurement results from forty patients, twenty of which were treated with PNF techniques while the other twenty were treated with edema reducing massage. Their end results show a steeper rate of decline in edema in the PNF group, however, the authors note that the results between groups read
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

similar until “four weeks after the beginning of treatment, [when] a larger degree of decline in edema was exhibited in the PNF group than in the massage group.” Ultimately the study showed that “both massage and PNF techniques helped to lower edema rates” and “overall...massage and stretching were both proven to be effective.” This research furthered my interest in the use of active PNF stretching to mimic the results earlier found from muscle pumping. I chose to compare the effects of superficial effleurage and a type of PNF stretching called contract-relax with agonist contraction (CR-AC). In this modality, the patient’s limb is brought into the point of tissue resistance; then the patient performs an isometric contraction of the range-limiting muscle followed by a voluntary relaxation of that muscle and an immediate concentric contraction of the muscle opposite the range-limiting muscle (Kisner & Colby, 2012). I sought to reduce edema by applying each technique on one leg of a patient with bilateral lower limb Primary Lymphedema.

Methods

The goal of this case study was to compare the effectiveness of two treatment techniques on reducing the girth size of edematous limbs which have been affected by Primary Lymphedema. As stated in the introduction, I chose effleurage techniques to promote lymphatic drainage and PNF techniques to mimic muscle pumping, both of which have been shown to achieve my goal for this patient: to aid in reducing edema. The patient involved in this case study is a Caucasian female, 52 years of age. She has experienced Primary Lymphedema, also known as Milroy’s Disease or Lymphedema Praecox, since being diagnosed at the age of 13. Both lower
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

limbs have been affected by this disease, as it began in her right leg, and through the course of only a few weeks, spread to her left leg. The patient comments that she “hasn’t seen [her] ankles bones since [she] was 13 years old.” She last saw a doctor about this condition 25 years ago (14 years after being diagnosed), and the MD informed her that her disease had not progressed farther than the infancy stage.

The only past injuries the patient has ever encountered with her lower limbs was an inversion right ankle sprain, previous to her diagnosis. Though she cannot remember the details of this event, there seemed to be no connection between this event and her diagnosis of lymphedema. She does not experience varicose veins or any ulcerations, symptoms which can be used to differentially diagnose chronic venous insufficiency.

Symptoms experienced by this patient include bilateral cold feet, swelling, pressure, pain, numbness and tingling below the knee and through the legs and feet, as well as sharp shooting sciatic pain which occurs only in her left leg with increased movement. The patient relates this pain to having osteoarthritis in her left hip, and an anteriorly rotated pelvis on that same side. Since experiencing this pain, the patient has seen a physiotherapist and, through effective treatments, no longer has this pain, nor the anterior rotation. Symptoms intensify with increased standing and are relieved when lying in a horizontal position. The patient notes that on nights when she gets less sleep, she can noticeably see an increase in edema the next day, but with enough sleep/horizontal time her symptoms are manageable.

Past treatments mainly included the typical means of controlling symptoms. The patient’s doctor advised her to elevate the affected limbs (which the patient
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

says provides immediate relief of symptoms), wear elastic compression socks, sit half way off of a chair so as not to compress the posterior thighs, avoid salty foods and caffeine and drink lots of water. For the past year and a half the patient has also been losing weight, as to take pressure off the legs. She has lost about 25 pounds and has found that her symptoms are less severe because of this.

About twelve years ago the patient was involved in a three month treatment which included bilateral segmental drainage in which her legs were put into blood pressure cuff-like boots which compressed the feet, moving up the legs in segments. The patient found a noticeable, but temporary decrease in edema which usually lasted up to two days before the girth of her legs reached pre-treatment measurements. Treatments were once every two weeks, for a total of eight sessions; after the allotted time, treatments were no longer covered by her medical insurance and she returned to her previous symptom management.

The patient presented with a non-pitting edema from the hips down, a moderately increased lordotic curve in the lumbar spine and a hypertoned erector spinae group bilaterally in the lower back without tenderness on palpation. There was tenderness found on palpation in the gluteal muscles bilaterally, as well as numbness in the skin over her hamstrings and quads, and her anterior and posterior calves. The patient also showed slightly decreased arches in both feet, though she does not use orthotics. She was able to complete a squat and rise test within normal limits, though experienced a lot of pain in her gluteals, lateral and anterior thighs and her anterior calves. Her blood pressure and pulse read on the lower end, however both were still somewhat normal. The range of motion in her ankles was
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema
decreased equally in every range in both feet. Active plantar flexion caused tingling in her toes, and the end feels in passive movement included soft tissue approximation in plantar flexion and hard capsular in dorsiflexion. There was no significant weakness or pain found in resisted range of motion.

The appointments within this case study occurred from March 18th, 2014 to April 8th, 2014, occurring twice a week for the first two weeks, then once a week for another two weeks to manage the active problem. The first appointment was the initial interview and did not include hands-on treatment time. Inactive problems/issues not being treated could include osteoarthritis of the left hip and cervical spine, neck pain and low blood pressure. Treatments administered in this time period were distinct for each leg; within each treatment 20 minutes were dedicated to light effleurage in a cephalad direction on the left leg, in order to reduce edema by manual strokes encouraging venous return. The strokes began at the proximal thigh, working down toward the foot and then back up the leg, all in a cephalad direction. Another 20 minutes were spent administering PNF CR-AC techniques on the right leg. The stretches targeted all main muscle groups in the leg, beginning with the quadriceps and hamstrings, then moving onto the gastrocnemius and soleus muscles, then to the tibialis anterior muscle and the ankle dorsiflexors. Then in a reversal, the stretches were administered in groups moving up the leg, from the dorsiflexors back up to the quads. Both treatment types followed the principles of massage in treating proximal to distal to proximal.

In terms of measuring results, there are three physical measures of lymphedema: circumferential girth measurements of various points on the body.
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

using bony landmarks to reference, volume measurements taken by submersion in fluid, and soft-tissue tonometry in which soft tissue compression is quantified (Petrek et al, 2000). Of the three methods of measuring results in lymphedema patients, I chose to use girth measurement, using seven points on the legs dictated by bony landmarks:

- Measurement around the Greater Trochanter to the Pubic Tubercle
- Measurement around the thigh half way between ASIS and the Base of the Patella
- Measurement around Femoral Condyles
- Measurement around Tibial Condyles
- Measurement around lower leg half way between Medial Tibial Condyles and Medial Malleolus
- Measurement around Dome of the Talus to Calcaneal Tuberosity
- Measurement around base of the Metatarsals

There was no remedial exercise or hydrotherapy prescribed as home care for this patient due to the need to quantify the specific results of each modality.

Results

Overall, each point measured on the leg showed decrease in girth size, in both effleurage and PNF modalities. On the right leg (treated with PNF modalities) the measurements began as 74.5cm, 61cm, 44cm, 38cm, 39cm, 33cm and 23.5cm, respectively, to the list found in the methods section. By the end of treatments those same points measured as 65.4cm, 57.8cm, 43.1cm, 36.5cm, 39cm, 32cm and 23.1cm. This shows decreases in girth with a maximum of 9.1cm around the greater
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

trochanter to the muscle belly of the adductors, and a minimum of 0cm measured half way between the medial tibial condyle and the medial malleolus. In the left leg (treated with superficial effleurage) the measurements were initially 76cm, 58.5cm, 45cm, 37.5cm, 37cm, 32cm and 23.5cm. After all treatments were administered, the left leg measured 62.8cm, 56.8cm, 42.2cm, 36.7cm, 34.7cm, 31.4cm and 22.9cm. These numbers show decreases in girth with a maximum of 13.2cm measured from the greater trochanter to the muscle belly of the adductors and a minimum showing an increase of 1.7cm measured half way between the anterior superior iliac spine and the base of the patella. See graphs for more details.

Discussion/Conclusion

My results were greatly varied and showed a higher decrease in edema through effleurage in some areas, yet was not as effective, and even increased the girth of other areas. PNF techniques showed a decrease in edema at a more steady rate, without the fluctuation seen in the left (effleurage) leg.

Similar to the study The Effects of PNF Techniques on Lymphoma in the Upper Limbs, both treatments proved to be effective in decreasing edema. It is interesting that this study notes that the two treatments seemed to produce equal effects until the fourth week, where PNF then showed a steeper rate in decline of edema. Seeing as I only had five hours of treatment time, I did not see a huge difference in results between the two techniques. It is possible that, had my treatments continued, PNF techniques could have proved to have a greater effect on reducing edema, if given the time to do so. It is also interesting that effleurage seemed to affect certain areas
of the leg positively, while increasing edema in other areas. One possible reason for this can be related back to what Zuther stated about massage techniques increasing the lymphatic load, and how a system affected by lymphedema cannot cope with the rise in fluid levels due to localized hyperemia. There was a greater loss in edema more proximally in the left leg, while the increase in edema and lower results of decreased girth came from more distal areas. These results beg the question if the parts of the lymphatic system least affected by lymphedema (proximally at the hip) were more capable of dealing with the increased lymphatic load. Meanwhile, the areas of the leg more affected by incompetency of the lymph valves were more incapable of responding to the lymphatic load effleurage offers.

This study was certainly limited in various areas. To start, the fact that there were only five hours of treatment time certainly proves the study to be too short to see significant and long term changes in the patient. Secondly, there absolutely is a discrepancy when it comes to measuring the girth of an edematous limb with a cloth measuring tape. Though I tried to maintain a relatively similar tension in all areas, it was not the most error-free or precise form of measurement. There is also a limitation on the amount of research available when looking at Primary Lymphedema. Since Secondary Lymphedema is a much more common manifestation of the disease, a lot more time and research has been spent on looking at lymphedema secondary to other pathologies such as cancer or chronic heart failure. One of the huge conclusions drawn from nearly every research journal I looked at regarding lymphedema, was that there is not enough knowledge on possible treatments for the disease. Even going into this study, I had not yet read
Zuther's warning of effleurage on lymphedema patients. Had I known beforehand, it may have been a more wise choice to pick a different modality (another limitation being my own inexperience with manual lymphatic drainage techniques).

Though both the modalities I chose to test were effective, there will always be a discrepancy between different opinions and treatment plans. While one side may argue that light stroking and effleurage could damage lymphatic vessels, there is still the widely accepted opinion that effleurage is a good treatment for lymphedema. Moreover, regardless of my muscle pumping theory, some may argue that exercise of any kind (including active PNF stretching) creates an increase in local blood flow and could end up overloading the lymphatic system even more. Ultimately, a lymphedema patient should try various treatments and decide what works best to control their own symptoms. Hopefully, in future years there can be more research done on the pathophysiology and treatment possibilities of lymphedema, so that there might be a standard of practice in response to this disease.
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Graph 1: Measured around Greater Trochanter to Pubic Tubercle

Graph 2: Measured half way between ASIS and Base of the Patella
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Graph 3: Measured around Femoral Condyle

Graph 4: Measured around Tibial Condyles
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Graph 5: Measured half way between Medial Tibial Condyle and Medial Malleolus

Graph 6: Measured around Dome of the Talus to Calcaneal Tuberosity
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Graph 7: Measured around base of the Metatarsals

Right Leg

Left Leg
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

References


Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema


Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

---

**PATIENT INTAKE FORM**

Please complete this form in order to assist us in becoming familiar with your health history, and to ensure that massage therapy services provided are not contraindicated for you.

1. Are you currently receiving treatment from any of the following healthcare practitioners?
   - Chiropractor
   - Massage Therapist
   - Medical Doctor
   - Physiotherapist
   - Other: __________________________

2. Are you over the age of 16? Yes ☐ No ☐
   
   Please note: Massage therapy cannot be given if you are under the age of 16 years without the consent of a parent or legal guardian.

3. Are you presently involved in a WCB or ICBC litigation / claim involving an injury? Yes ☐ No ☐
   
   Please note: Massage therapy cannot be given at WCCMT if you are on an ICBC / WCB claim.

4. Have you had a bad/negative reaction to heat or cold? Yes ☐ No ☐

5. How did you hear about the WCCMT student clinic?
   - Friend
   - Student
   - Co-worker
   - Family
   - Website
   - Advertising
   - Other

---

Please check ☑ if any of the following apply to you:

### General
- Allergies
- Depression/Axiety
- Dizziness
- Fainting
- Fatigue
- Headaches
- Loss of sleep
- Weight loss/gain
- Other

### Muscle / Joint / Bone
- Arthritis
- Low Back Pain
- Mid Back Pain
- Muscle weakness
- Neck Pain
- Osteoporosis
- Sore/Achy
- Stiff / Tight
- Other

### Skin
- Bruise easily
- Dry / Oily
- Eczema
- Hives / Rash
- Psoriasis
- Other

### Cardiovascular
- Anemia
- Arteriosclerosis
- Cold feet
- Edema
- Heart Disease
- High / Low blood pressure
- Platelet
- Poor Circulation
- Rapid/Irregular pulse
- Rheumatic fever
- Stroke
- Swelling of ankles
- Varicose veins
- Other

### Women
- Menopause
- Pregnant
- Yes ☐ No ☐
  
  If yes # months: ______________________

### Breast conditions

### Nervous System
- Epilepsy
- Multiple Sclerosis
- Numbness / Tingling
- Other

### Gastrointestinal
- Abdominal Pain
- Appendicitis
- Constipation
- Diarrhea
- Heart Burn
- IBS/Chrohn's/Colitis

### Respiratory
- Asthma
- Bronchitis
- Chest Pain
- Chronic Cough
- Difficulty breathing
- Emphysema
- Pneumonia
- Other

### Systemic Disorders
- Cancer
- Diabetes (Type I)
- Fibromyalgia
- HIV / AIDS
- Osteoporosis
- Post Polio Syndrome
- Thyroid disease
- Other

---

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED).

Please turn over.
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Patient History Term 6 and 7

Patient Name: [Redacted]
Occupation: Sales Rep - Desk Job
Age: 52
Intern: Sydnee Russell
Class: 145
Term: 1

- Primary Hereditary Lymphedema (Milroy's Disease)
- Diagnosed at age 13
- Doesn't know anyone in the family who has it, but doesn't know father's side of family
- Both legs affected
- Started in @, travelled to ()
- Previous to diagnosis, PT sprained @ ankle.
- Leapfrogged over friend & tell - cannot remember which way
- How ankle was sprained
- Edema: hasn't seen ankle bones since 13
- Symptoms: cold feet (@), swayback = pressure, swelling (@)
- Numbness + tingling below the knee (@) through legs + feet
- Sharp shooting sciatica (L) in (L) leg w/ movement, & thinks is due to (A) hip + anteriorly rotated pelvis
- Saw physiotherapist to fix it, "she said it was fine now" (last visit in Jan, 2014)

- Post tx.
  - 3 months, 12 yrs ago. → segmental drainage (@) in blood pressure cuff
  - boots → temporary & in edema. (noticeable)
  - Only lasted 1–2 days
  - Every 2 wks (8 sessions)
  - Insurance only covered 8 months.
- Wasn't getting enough sleep.
- When PT has + sleep she sees + edema
  - Swell through day, when sleeps enough is manageable.
  - X varicose veins, + ulcersations (DVT chronic venous insufficiency)

- Worse @ night, agg. too much walking/standing → walking on pavement
- Best @ morning, rel. elevating legs + stay above heart → immediate relief

Preventative:
- Always tries to elevate legs
- Wears diabetic socks (or compression socks only on planes)
- Sit half off chair side compression to post thighs
- Eat salt
- Drink lots of water, avoid caffeine
- For 1 yr and a half been losing weight to take pressure off (25 pounds)

- Last saw a doctor 25 yrs ago, MD said PT was still
  in infancy stage.

Clinic Instructor: [Signature]

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED)

Goal: + Edema by promoting lymphatic drainage and
  by using mm pumping via PNF stretching.
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Initial Scan Exam (ISE)

Palpation summary (4 T's & location)
- HT'd ESG in l spine. Ø tenderness on palp.
- Tender in glutes on palp.
- Numbness in skin over hamstrings & quads.
- Pitted edema in ankles.
- Numbness in anterior & posterior calves.

Functional tests

<table>
<thead>
<tr>
<th>Region</th>
<th>Functional Test</th>
<th>Findings (pain/ROM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee/hip/ankle</td>
<td>Squat + Rise</td>
<td>WNL, very @ful, &quot;mega sore&quot; along glutes, lat + ant. thigh, ant. calves.</td>
</tr>
<tr>
<td>BP</td>
<td>100/68</td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>58 bpm</td>
<td></td>
</tr>
</tbody>
</table>

Regional Functional Tests
- Shoulder (Apley's superior/inferior)
- Elbow (flexion/extension)
- Wrist/hand (hand shake/grip)
- Hip (squat & rise)
- Knee (squat & rise)
- Ankle (squat & rise, heel/toe walk)
- C-spine (shoulder check, up/down)
- T-spine (flexion/extension)
- L-spine (squat & rise, touch toe)
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Legend

<table>
<thead>
<tr>
<th>Movement</th>
<th>Contraindications or Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active ROM</td>
<td>Lymphedema, pitted edema</td>
</tr>
<tr>
<td>Passive ROM</td>
<td></td>
</tr>
<tr>
<td>Hypermobility</td>
<td></td>
</tr>
<tr>
<td>Pain in ROM</td>
<td></td>
</tr>
</tbody>
</table>

1. Joint Examined: **Ankles (most affected)**
   - R
   - L

   **Pre-treatment**
   - DF Flex.
   - INV Flex.
   - EV Flex.

   APOM caused tingling in toes

   Ext. PF


2. Abnormal End-feels
   - Movement: PF DF
   - Quality: soft tissue approx. hard capsular

3. Restriction Pattern
   - Capsular
   - Non-capsular
   - X

4. Resisted ROM Testing
   - Direction: DF PF INV EV
   - R: Grade - L
   - Pain (y/n)
     - DF: 4 5
     - PF: 5 5
     - INV: 5 5
     - EV: 5 5

5. Joint Play (C-L) Assessment

6. Special Tests
   - +/-

7. Differential Diagnosis

8. Joint Examined:
   - R
   - L

   **Post-treatment**
   - Ext.
   - Flex.

Clinic Instructor: Sydnee Russell
Date: March 18/14
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

Case Study

Treatment Plan:

<table>
<thead>
<tr>
<th>Modality</th>
<th>Technique</th>
<th>Area/Tissue</th>
<th>Result</th>
<th>Re-assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNF Stretching</td>
<td>contract-relax</td>
<td>R leg</td>
<td>See Girth</td>
<td>measurement</td>
</tr>
<tr>
<td></td>
<td>agonist-contral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sw (M)</td>
<td>light effleurage</td>
<td>L leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in a cephalad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>direction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P

PTE: ___ days, ___ wks, ___ mth, □ PRN, □ recommend next visit

Home care (FID - frequency, intensity, duration):

□ Stretch
□ Strengthen
□ Postural
□ Heat
□ Cold

Student: Sydrine Ruskell

Clinic Instructor:
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

<table>
<thead>
<tr>
<th>Location</th>
<th>Right Leg</th>
<th>Left Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Trochanter around to greater</td>
<td>74.5 cm</td>
<td>76 cm</td>
</tr>
<tr>
<td>MM belly of adductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halfway b/w ASIS and base of patella</td>
<td>61 cm</td>
<td>58.5 cm</td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>44 cm</td>
<td>45 cm</td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>38 cm</td>
<td>37.5 cm</td>
</tr>
<tr>
<td>Halfway b/w med. tibial condyle + med. malleolus</td>
<td>39 cm</td>
<td>37 cm</td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>33 cm</td>
<td>32 cm</td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>23.5 cm</td>
<td>23.5 cm</td>
</tr>
</tbody>
</table>
### Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

#### Girth Measurement of Lower Limbs

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater trochanter to mm belly of adductors</td>
<td>75 cm</td>
<td>75 cm</td>
</tr>
<tr>
<td>Halfway between ASIS and base of patella</td>
<td>62 cm</td>
<td>56.7 cm</td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>44 cm</td>
<td>42 cm</td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>38 cm</td>
<td>38.2 cm</td>
</tr>
<tr>
<td>Halfway between med. tibial condyle and med. malleolus</td>
<td>40 cm</td>
<td>39.5 cm</td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>33 cm</td>
<td>32.4 cm</td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>24 cm</td>
<td>23.5 cm</td>
</tr>
</tbody>
</table>

Clinic Instructor: RS

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED)

1st leg → effleurage.
2nd leg → PNF stretching.
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Treatment</th>
<th></th>
<th></th>
<th>Post-Treatment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater trochanter to mm belly of adductors</td>
<td>68.5 cm</td>
<td>66 cm</td>
<td>68 cm</td>
<td>62 cm</td>
<td></td>
</tr>
<tr>
<td>Halfway b/w ASIS and base of patella</td>
<td>61.5 cm</td>
<td>58 cm</td>
<td>55 cm</td>
<td>56 cm</td>
<td></td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>45.5 cm</td>
<td>46 cm</td>
<td>45.5 cm</td>
<td>46 cm</td>
<td></td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>40 cm</td>
<td>38.5 cm</td>
<td>37.5 cm</td>
<td>37.2 cm</td>
<td></td>
</tr>
<tr>
<td>Half way b/w med. tibial condyle and med. malleolus</td>
<td>41 cm</td>
<td>39 cm</td>
<td>39.7 cm</td>
<td>36.5 cm</td>
<td></td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>23 cm</td>
<td>33 cm</td>
<td>32 cm</td>
<td>32 cm</td>
<td></td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>24 cm</td>
<td>24 cm</td>
<td>23.5 cm</td>
<td>23.5 cm</td>
<td></td>
</tr>
</tbody>
</table>

(P) = PNF  
(€) = Effleurage

Clinic Instructor: [Signature]

* Pr only got 6hrs of sleep last night, + horizontal time = 4 in edema
Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater trochanter to mm belly of adductors</td>
<td>64cm</td>
<td>61cm</td>
</tr>
<tr>
<td>Halfway b/w ASIS and base of patella</td>
<td>57cm</td>
<td>56.5cm</td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>44.5cm</td>
<td>45.5cm</td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>36.5cm</td>
<td>36cm</td>
</tr>
<tr>
<td>Halfway b/w med. tibial condyle and med. malleolus</td>
<td>41cm</td>
<td>39cm</td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>33cm</td>
<td>31cm</td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>23cm</td>
<td>24cm</td>
</tr>
</tbody>
</table>

*Post tx there was a noticeable difference b/w legs (lower). L leg appears smaller.*
## Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

### Girth Measurement of Lower Limbs

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left</td>
<td>Right</td>
</tr>
<tr>
<td>Greater trochanter to mm belly of adductors</td>
<td>63.5cm</td>
<td>64.2cm</td>
</tr>
<tr>
<td>Halfway b/w ASIS and base of patella</td>
<td>56.5cm</td>
<td>56cm</td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>44cm</td>
<td>42.5cm</td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>38cm</td>
<td>36cm</td>
</tr>
<tr>
<td>Halfway b/w mid tibial condyle and med. malleolus</td>
<td>40.6cm</td>
<td>39.5cm</td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>32cm</td>
<td>31.3cm</td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>24cm</td>
<td>23.5cm</td>
</tr>
</tbody>
</table>

**Clinic Instructor:**

*Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED)*
### Comparing Effleurage and PNF Stretching to reduce symptoms of Lymphedema

<table>
<thead>
<tr>
<th>Location Description</th>
<th>Pre-Treatment (L)</th>
<th>Pre-Treatment (R)</th>
<th>Post-Treatment (L)</th>
<th>Post-Treatment (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater trochanter to mm belly of adductors</td>
<td>66.7 cm</td>
<td>63.7 cm</td>
<td>65.4 cm</td>
<td>62.8 cm</td>
</tr>
<tr>
<td>Halfway b/w ASIS and base of patella</td>
<td>57 cm</td>
<td>57.4 cm</td>
<td>57.8 cm</td>
<td>56.8 cm</td>
</tr>
<tr>
<td>Around femoral condyles</td>
<td>43.5 cm</td>
<td>43.9 cm</td>
<td>43.1 cm</td>
<td>42.2 cm</td>
</tr>
<tr>
<td>Around tibial condyles</td>
<td>35.5 cm</td>
<td>37 cm</td>
<td>36.5 cm</td>
<td>36.1 cm</td>
</tr>
<tr>
<td>Half way b/w med tibial condyle and med malleolus</td>
<td>39.3 cm</td>
<td>40.7 cm</td>
<td>39 cm</td>
<td>34.7 cm</td>
</tr>
<tr>
<td>Around dome of talus to calcaneal tuberosity</td>
<td>31.6 cm</td>
<td>32.5 cm</td>
<td>32 cm</td>
<td>31.4 cm</td>
</tr>
<tr>
<td>Around base of metatarsals</td>
<td>24.3 cm</td>
<td>21.5 cm</td>
<td>23.1 cm</td>
<td>22.9 cm</td>
</tr>
</tbody>
</table>

Patient information is considered strictly confidential under the guidelines of the Personal Information Protection and Electronic Documents Act (PIPED).