



Clinical Case Report Competition

West Coast College of Massage Therapy,
Victoria

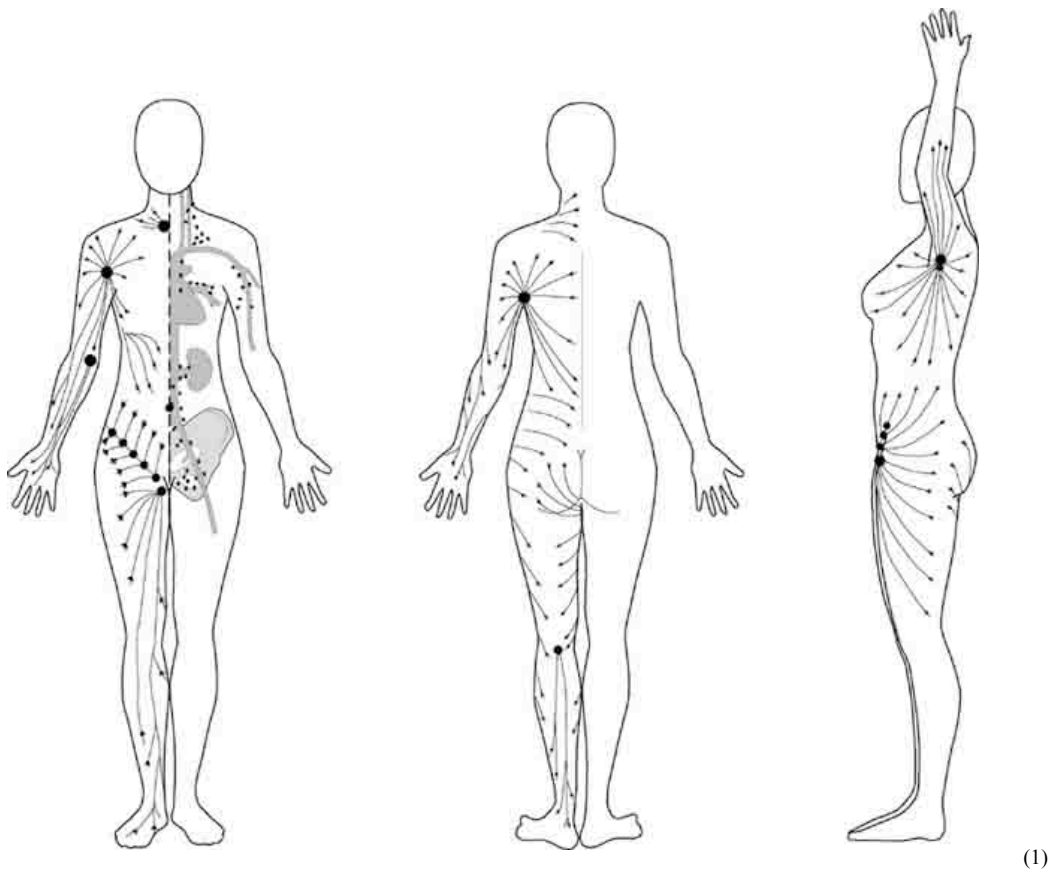
Spring 2010

First Place Winner

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Reducing edema in the legs of a pregnant patient with an intact lymphatic system using manual lymph drainage: A case report

Reducing edema in the legs of a pregnant patient with an intact lymphatic system using manual lymph drainage: A case report



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To the author's knowledge, no conflict of interest exists.

Table of Contents

Abstract	1
Introduction	2
Case Report	3
Diagnosis	5
Treatment	5
Differential Diagnosis	7
Results	7
Discussion	11
Conclusion	13
Acknowledgement	14
References	15
Bibliography	15

Appendix A	- Blood pressure pre treatment	16
Appendix B	- Circumference measurements right	17
Appendix C	- Circumference measurements left	19
Appendix D	- Fatigue scale	21
Appendix E	- Water Displacement	22
Appendix F	- Record of treatments and patient consultation forms	23

Reducing edema in the legs of a pregnant patient with an intact lymphatic system using manual lymph drainage: A case report

1. Abstract

Objective:

To evaluate the effectiveness of manual lymph drainage (MLD) on the edematous ankles of a pregnant patient.

Clinical Features:

A pregnant woman in her early 30's. Patient observed significant swelling of ankles at four months of pregnancy, including palpation, and discomfort wearing shoes. Levels of edema varied daily. Edema with pregnancy is familial for patient. Patient complained of "heavy", "thick", and fatigued legs.

Intervention and outcome:

Seven, 45-minute treatments of Basic level Dr. Vodder's MLD sequences for the neck and legs. Compression stockings considered but decided against unless edema had become more severe. Edema decreased in the ankles and positive subjective feedback was recorded at the completion of each treatment. Treatment effects were short term.

Conclusion:

A temporary decrease in edema of the ankles may be accomplished by using Dr. Vodder's Manual Lymph Drainage. Compression stockings would be indicated if the edema were to become severe. MLD can provide temporary relief and possibility of preventing severity.

Key Words: Massage Therapy, Manual Lymph Drainage, MLD, Pregnancy, Intact lymphatic system, Dr. Vodder, Edema.

Introduction:

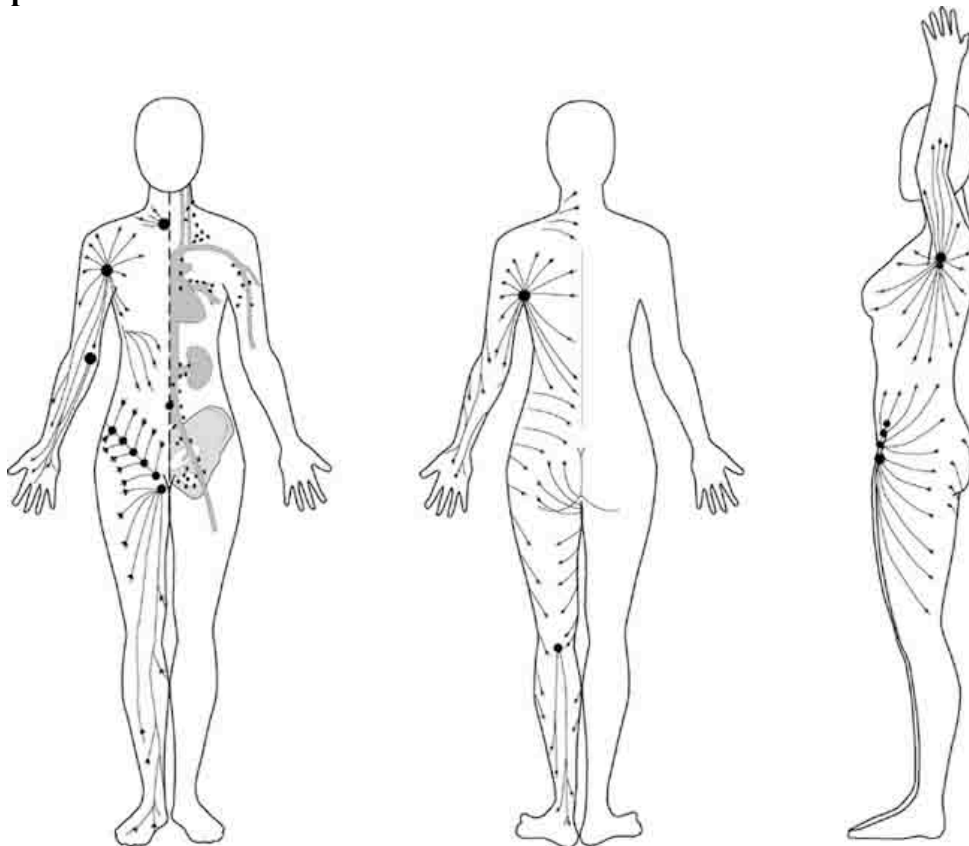
Edema is common at any time during a pregnancy due to the retention of fluid. As the pregnancy advances, edema occurs in up to 40 percent of women. Edema with pregnancy is most commonly caused by mechanical obstruction to the Inferior Vena Cava, and increased fluids within the body resulting in low blood osmolarity. ⁽²⁾

MLD is effective in increasing lymph drainage. However once severe edema has occurred it is irreversible on it's own and compressions stocking are a daily necessity. If edema is kept to a minimum the lymph system will most likely be able recuperate. ⁽³⁾

A clinician should understand the directions of the lymph system. Beginning by opening the terminus during the neck sequence and continuing to work the affected area in the direction of lymph flow as demonstrated below. ⁽³⁾

Fig. 1 Direction of flow in the lymph system. ⁽¹⁾

*** Please note small black arrows directing from peripheral to proximal groupings of lymph nodes.**



It seems likely that MLD has a systemic effect on the lymphatic system and that it may improve flow from otherwise normal tissues. ⁽⁴⁾ Using a control where the conditions of a MLD treatment were approximated but no actual treatment was applied, proved to have a mild effect but not nearly as pronounced as with treatment. ⁽³⁻⁴⁾ The hypothesis of this study was that MLD can ease the edematous ankles in a pregnant patient.

Anatomical Considerations

- Structure of Lymphatic system.
Lymphatic vessels are an additional vascular network connecting the tissues with the venous system. In evolutionary terms, they develop from primordial veins. Very fine lymphatic capillaries start blind in the tissue. They flow into larger transport vessels and finally into the right and left venous arch. ⁽³⁾
- Direction of lymphatic flow.
From periphery to trunk; following intricate lymph vessel pathways.
- Areas of Watersheds.
Lymphatic watersheds delineate skin territories. Between skin territories, there are almost no cross connections. ⁽³⁾

CASE REPORT

Clinical Presentation

Patient is an early 30's RMT who began treatment at 22 weeks of pregnancy (five and a half months). Patient's L5-S1 is affected by spina bifida, disc bulging, degeneration, and osteophytes. Her overall health is very good. The patient is currently participating in pre-natal yoga and mediation once per week. She began to notice substantial swelling of ankles at 4 months of pregnancy, mainly by palpation and discomfort with putting on shoes. Her main complaint is of legs feeling "fatigued" and "heavy".

Physical Examination

The physical exam was completed objectively by measuring water displacement, and circumference measurements. Subjective analysis involved using a "fatigue/heaviness" scale (0/10-zero being no symptoms and 10 being extreme fatigue/heaviness) in the sitting and standing positions.

Table 1-Explanation of objective measurement tools

Device	Measures	Method
Water displacement	Changes in volume of the lower leg.	Fill a bucket with water and measure the difference between initial and secondary readings of volume displacement before and after treatment. Buckets is filled to the exact same level each treatment before measurement.
Manual circumference Measurements	Circumference of head and base of metatarsals, smallest part of the ankle, and largest part of the calf.	Tape measurement

Water Displacement All photos by author

Fig 2. Initial reading



Fig. 3 Secondary reading



The initial assessment showed 2 centimeters between the initial and secondary readings of water displacement. Volume is too difficult to calculate due to irregular shape of bucket.

Circumference measurements

Fig. 4

Head of the metatarsals



Fig. 5

Base of the metatarsals



Fig. 6

Smallest part of the ankle



Fig. 7

Largest part of the calf



Table 2- Initial circumference measurements

Initial circumference measurements (cm)	Right leg Pre Treatment 1	Left leg Pre Treatment 1
Head of Metatarsals	21.7cm	21.7cm
Prox Metatarsals	22.5cm	22.5cm
Smallest part of ankles	22.5cm	22.5cm
Largest part of calves	39.5cm	39.5cm

Fatigue and heaviness scale was not used during initial assessment but was used from treatment two to seven.

Diagnosis

Fluid retention in lower extremity due to pregnancy.

Treatment

The primary treatment goals were to decrease the circumference, water displacement, and fatigue/heaviness scale of the legs.

Informed consent was obtained prior to commencement of treatment. Each treatment consisted of the exact same routine: Dr. Vodder basic training sequences. Techniques can be learned by attending a Dr. Vodders basic training class at any locations worldwide. ⁽⁵⁾

Treatment was performed with patient supine, legs elevated by four pillows stacked. A cervical pillow was placed under her right buttock to direct her weight on to her left side. Treatment consisted of a 10min neck sequence, followed by a 10- 15min leg sequence for each leg.

I. Treatment of the Neck

1. Effleurage: five fan-shaped strokes with the thumbs from sternum to the axillae. Last stroke is along the clavicle. (once)
2. Cervical lymph nodes: five stationary circles each over the lymph nodes at profundus, middle, and terminus. (three repetitions)
3. Occiput: five stationary circles each beginning below the occiput at the base of the skull, middle of the nape and terminus. (three repetitions)
4. Mandible: five stationary circles each in three positions from the tip of the chin to the angle of the jaw then continue to profundus, middle, terminus. (three repetitions)
5. Fork technique: five stationary circles each in three positions from the tip of the chin to the angle of the jaw then continue to profundus, middle, and terminus. (three repetitions)
6. Shoulders / trapezius: five stationary circles each with the whole hand moving in the skin over the ball of the shoulder and with four flat fingers in two positions on the trapezius border then the terminus. (three repetitions)
7. Shoulders / acromion: five stationary circles each starting again at the ball of the shoulders then the acromion (above the clavicle) and then the terminus. (three repetitions)

8. Cervical lymph nodes: five stationary circles each on the profundus, middle, and terminus as in number two. (once)
9. Final effleurage. (once)

II. Treatment of the Legs

1. Effleurage: beginning from the foot up the leg. (once)
2. Anterior thigh: pump technique, with both hands alternating (six). (three repetitions)
3. Thigh: pump – push technique distal to proximal over the thigh (six each):
 - a) on the medial side (over adductors) use inferior hand to pump and superior hand (fingers only) to push. (three repetitions)
4. Inguinal lymph nodes: five stationary circles using eight flat fingers on a diagonal upwards. Pressure toward the fingertips with circles releasing toward the head in three places starting at medial mid-upper thigh (three repetitions)
Then three continuous circles down to the knee with pressure on the upward part of the stroke making a spiral movement. (once)
5. Knee:
 - a) Pump-push with six alternating thumb and finger circles along the “cauliflower”. Fingers are underneath vastus medialis and make 90 degree turns together with thumb while other hand pushes with thumb only.
 - b) Scoop technique: five parallel in the popliteal space with eight flat fingers distal to proximal. (three repetitions)
 - c) Patella leave the fingers in the popliteal space and now make parallel thumb circles on each side of the patella. (three repetitions)
 - d) Pump technique (five) with inferior hand over knee superior hand supports underneath. (three repetitions)
 - e) Pes anserinus with six alternating thumb circles. (three repetitions)
6. Lower leg, with knee flexed:
 - a) Alternate between pump technique with inferior hand over the shin and scoop with the other hand under the calf (six). (three repetitions)
 - b) Alternating scoop technique (six) with thumbs running parallel to the tibia one hand in front the other working up to the popliteal space. (three repetitions)
7. Achilles tendon: extend leg again: five parallel, four-finger spirals on each side of the Achilles tendon. (three repetitions)
8. Ankle: 6 alternating thumb circles in three lines. Repeat each line. (three repetitions)
9. Dorsum of the foot: with six alternating thumb circles in three lines. Repeat each line. (three repetitions)
10. Lymph Sea: parallel thumb circles (five) edema-technique, in one position. (three repetitions)
11. Transverse arch: pressing with fingers underneath. (three repetitions)
12. Final effleurage: from the foot up the leg. (once)

Homecare for the patient consisted of taking circumference measurements in the morning as well as using cool water to complete each shower to encourage vasoconstriction. ⁽²⁾

Differential Diagnosis

Congestive heart failure, deep vein thrombosis, pre-eclampsia, and eclampsia were considered and removed as possibilities due to lack of pitting edema, lack of pain or redness, and normal blood pressure respectively.

Results of Treatment

Table 3- Differences between initial physical exam pre treatment and final physical exam pre treatment.

	Initial assessment Pre-Treatment (Treatment 1)	Final Assessment Pre-Treatment (Treatment 7)
Water displacement	2cm	1.7 cm
Circumference measurements Right		
Head of Metatarsals	21.7cm	22cm
Prox Metatarsals	22.5cm	22.5cm
Smallest part of ankles	22.5cm	22.8cm
Largest part of calves	39.5cm	39.5cm
Circumference measurements Left		
Head of Metatarsals	21.7cm	22.2cm
Prox Metatarsals	22.5cm	22.5cm
Smallest part of ankles	22.5cm	22.7cm
Largest part of calves	39.5cm	39.5cm
Fatigue/Heaviness scale (starting treatment 2)		
sitting	4	1
standing	2	0.5

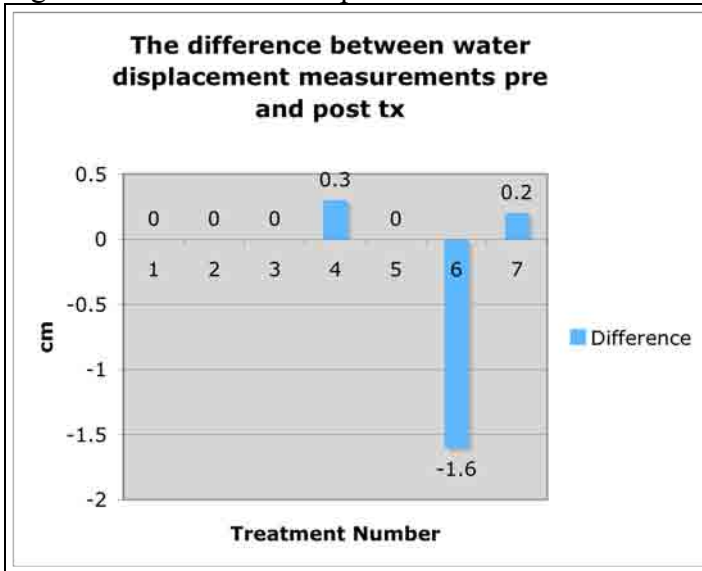
Water Displacement shows a decrease in the total water displacement by three millimeters. Circumference measurements increased or stayed the same. Fatigue/Heaviness scale demonstrates a significant decrease in subjective feedback with a difference of three numbers for sitting and one and a half for standing.

Symptoms at the beginning of each treatment in all three categories of measurements mentioned above varied substantially each week with no obvious pattern (see appendix). Therefore the rest of the results section will focus specifically on pre versus post treatment as oppose assessing the progress from treatment one to seven.

*Full data in appendix

Water displacement

Fig. 8 Results of water displacement measurements



On days four and seven there was an increase of volume within the leg and on day six there was a decrease of 1.6cm.

Circumference Measurements

Fig.9 Results-Right

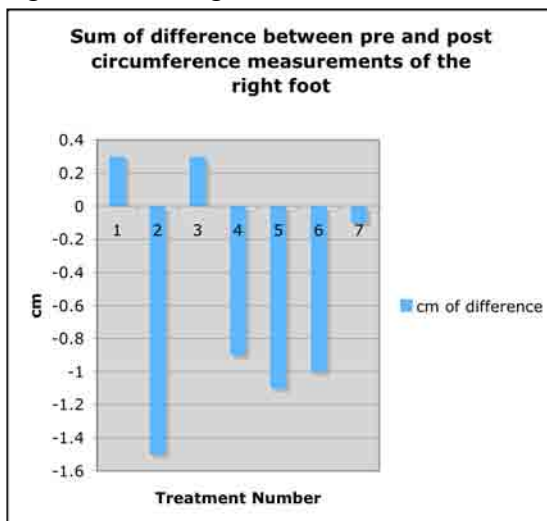
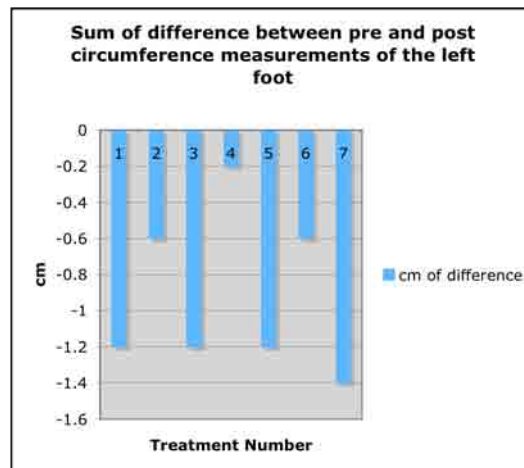


Fig.10 Results -Left



The right foot showed an increase in the sum of differences of circumference measurements on days one and three. Each treatment there was a decrease in the sum of circumference of the left foot.

Fig. 11– *Please note veins, shape of ankle, shapes of toes.
Pre Treatment Seven – All photos by author



Fig. 12
Post Treatment Seven



Fatigue/Heaviness Scale

Fig 13 - Subjective – Fatigue/Heaviness scale (0/10) seated
-Data not recorded treatment one pre/post and treatment four post

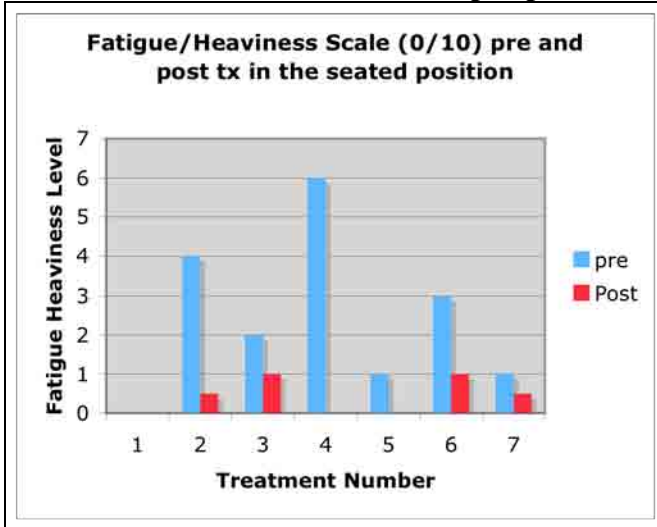
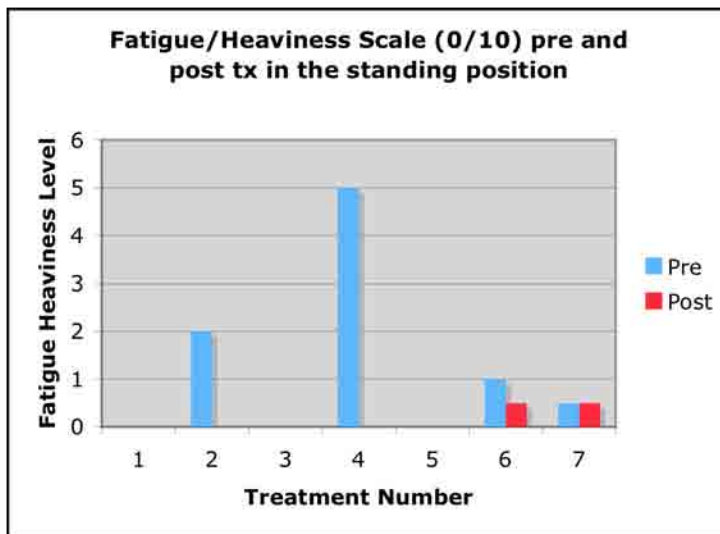


Fig 14 – Subjective – Fatigue/heaviness scale (0/10) standing
-Data not recorded treatment one pre/post and treatment four post



Discussion

Water Displacement

Water displacement measurements indicate that treatment four and seven resulted in an increase in volume within the lower extremity. Only increments greater than three millimeters (mm) were mentioned as significant. Both of these measurements were three mm or less and therefore not considered significant. A three mm buffer is used to account for measurement errors.

Treatment six had a water displacement difference measurement decrease of 1.6cm. It is interesting to note that the patient complained of increased sensation of edema in the ankles and foot as opposed to the thighs and knees on this day compared to other days. This finding suggests that the height of the bucket may account for the lack of findings using water displacement; as the fluids were moving from the whole leg and not just the ankles.

Circumference measurements

When comparing circumference measurements pre treatment one to pre treatment seven it is important to consider that the pregnancy was progressing, therefore fluids within the body and edema were increasing. This could account for why the circumference measurements increased over the seven treatments.

Before looking at pre measurements versus post for each treatment, one must take into account a relative picture of the findings. If you imagine taking off a sock that is three mm thick, than taking a section of that sock and squeezing it together. The total space taken up is a significant amount even though when evenly distributed it would appear as though it is not.

The right leg demonstrated that on treatment one and three there was an increase in the sum of differences by three mm. Allowing three mm of error it is still significant to note that these are the lowest findings of change within the case report. Also significant is that the therapist only had time to treat half of the right leg on those two days due to being a novice therapist. The left leg was treated fully and did decrease in size. This example is consistent with findings of other papers mentioned within the introduction that state “It seems likely that MLD has a systemic effect on the lymphatic system... Using a control where the conditions of MLD were approximated but no actual treatment was applied, proved to have a mild effect but not nearly as pronounced as with treatment.”⁽²⁻³⁾

The left leg consistently showed a decrease in the sum of the differences of circumference and was always treated with the full leg sequence.

Measurements that the patient took in the morning each day were very similar, therefore an average of these numbers would be a suitable number to refer to as a baseline measurement. When comparing the circumference measurements taken in the morning to the measurements taken pre treatment there are no significant changes in both the

measurements of the head and base of the metatarsals, or the ankle for both the left and right leg. However there is consistently a dramatic increase in the size of the calf throughout the day of one to two centimeters. (see appendix B1, B4 & C1, C4). This indicates that the calf is the structure within the areas being measured where the largest amount of edema is collecting. This furthers the conclusion that the use of water displacement covering the ankles and some of the lower leg would not accurately cover the area most affected by the edema.

Fatigue/heaviness scale

Fatigue/heaviness scale consistently shows a decrease in subjective feedback post each treatment. The initial symptoms vary treatment to treatment with no consistent progression. The patient described the results as effective until the next day after work, when symptoms would return.

MLD appears to have short term effects on the edematous legs of a pregnant patient, providing temporary relief.

If one were to replicate this case presentation, a larger bucket would be indicated, covering higher up the leg and using one where volume could be determined would be helpful. More effective measurement tools are indicated to have a more accurate representation of edema including use of tonometry, perometry, and/or Bio-impedance.

A controlled trial where circumstances were approximated but no MLD was applied would be appropriate in the future. Experimentation in this case was inappropriate because of time constraints and the primary goal was to provide the patient with relief of symptoms.

MLD is not well documented. The most current and up to date research are the pilot studies mentioned earlier.

The tissue of the patient was very tight and increasing in tightness. This made MLD increasingly difficult to perform and may have decreased effectiveness. The author noted that at the final treatment tissue was very resistant to stretch.

The patient described that some patterns within her symptomatic presentation were linked to temperature outside. The hotter it was the more edematous her legs became. Heat should not be used during treatment as it increases edema of the area.

It should be noted that it would be valuable to take measurements four times per day during the treatment period as well as completing a diary of symptoms to further document the effects of MLD and outside contributing factors. Although this would be time consuming and patients may be resistant to such extensive homecare. As each treatment progressed, the therapist became more efficient and precise with the MLD techniques.

Conclusion

MLD had a positive effect on the edema in the legs of a pregnant patient in this case. A temporary decrease in edema of the ankles may be accomplished by using Dr. Vodder's Manual Lymph Drainage. Compression stockings would be indicated if the edema were to become severe. Performing MLD may provide temporary relief and the possibility of preventing severity. No firm conclusions can be made based on the results of a single study. Although it does suggest that MLD may provide a reduction in lower extremity edema resulting from pregnancy. This approach should be considered in patients with similar conditions. Further studies are encouraged.

Acknowledgment

I would like to sincerely thank the patient for their time and effort put forth. I really appreciate her commitment and openness to treatment. As well as a grand thank you for the support of Robert Harris for teaching MLD, aiding in developing the idea for the project, and finding supporting research. Thanks to Nicole Scovill for over seeing this project and Clarck Konzack for his excellent guidance in the Research and Statistics classroom.

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Appendix A – Blood Pressure Pre Treatment

A.1

Blood pressure pre treatment		
Treatment	Blood pressure	Pulse
1	100/70	60
2	110/65	60
3	105/70	66
4	100/50	54
5	95/60	56
6	105/65	84
7	110/70	60

Appendix B- Circumference Measurements Right

B.1

Circumference Measurements				
Pre treatment- right				
Treatment	Head of Metatarsals	Proximal Metatarsals	Smallest part of the ankles	Largest part of the calves
1	21.7	22.5	22.5	39.5
2	22	22.5	22.5	38.5
3	21.5	21.5	22.2	38.5
4	22	22.1	22.9	39
5	22.4	22.5	22.5	39
6	21.9	22.1	23	39.2
7	22	22.5	22.8	39.5

B.2

Circumference measurement				
post treatment- right				
Treatment	Head of Metatarsals	Proximal Metatarsals	Smallest part of the ankles	Largest part of the calves
1	22.5	22.5	22.5	39
2	21.3	22.2	22.5	38
3	22	22	22	38
4	22	22.1	22.6	38.4
5	22.5	22.4	22	38.4
6	22	22.2	22.5	38.5
7	22.3	22.4	23	39

B.3

Differences of circumference measurements for the- Right					
Treatment	Head of metatarsals	Prox metatarsals	Smallest part of ankle	Largest Part of calves	sum
1	0.8	0	0	-0.5	0.3
2	-0.7	-0.3	0	-0.5	-1.5
3	0.5	0.5	-0.2	-0.5	0.3
4	0	0	-0.3	-0.6	-0.9
5	0.1	-0.1	-0.5	-0.6	-1.1
6	0.1	0.1	-0.5	-0.7	-1
7	0.3	-0.1	0.2	-0.5	-0.1

-yellow highlight indicates increases in circumference

B.4

Circumference measurements in the morning-right				
Treatment	Head of metatarsals	Prox metatarsals	Smallest part of ankle	Largest Part of calves
1				
2	22.5	23	22.5	37
3	22	23	22.3	37.5
4				
5	22	22.8	22	37.5
6	22.8	23	22.5	38
7	22.5	23	22.7	38
Average	22.36	22.96	22.4	37.6

Appendix C – Circumference measurements Left

C.1

Circumference measurements				
Pre treatment-Left				
Treatment	Head of metatarsals	Prox Metatarsals	Smallest part of ankles	Largest part of calves
1	21.7	22.5	22.5	39.5
2	21.5	22.3	22.5	38.5
3	21.5	22	22.5	39
4	22	22.4	22.5	38.2
5	22.5	23.5	22.5	39
6	22.4	22.5	22.5	39
7	22.2	22.5	22.7	39.5

C.2

Circumference measurements				
Post treatment left				
Treatment	Head of metatarsals	Prox Metatarsals	Smallest part of ankles	Largest part of calves
1	21.5	22.5	22.5	38.5
2	21.8	22.1	22.3	38
3	21.5	22.3	22	38
4	21.9	22.6	22.3	38.1
5	22.3	23	22.5	38.5
6	22.2	22.6	22.3	38.7
7	22.2	22.1	22.2	39

C.3

Circumference Differences Left					
Treatment	Head of metatarsals	Prox Metatarsals	Smallest part of ankles	Largest part of calves	sum
1	-0.2	0	0	-1	-1.2
2	0.3	-0.2	-0.2	-0.5	-0.6
3	0	0.3	-0.5	-1	-1.2
4	-0.1	0.2	-0.2	-0.1	-0.2
5	-0.2	-0.5	0	-0.5	-1.2
6	-0.2	0.1	-0.2	-0.3	-0.6
7	0	-0.4	-0.5	-0.5	-1.4

-yellow highlight indicates increases in circumference

C.4

Circumference measurements in the morning- left				
Treatment	Head of metatarsals	Prox metatarsals	Smallest part of ankle	Largest Part of calves
1				
2	22.5	23	22.5	37.5
3	22	22.7	21.8	37.5
4				
5	22.5	22.7	21.6	36.8
6	22	22.8	21.5	37
7	22	22.5	22.3	37.7
Average	22.2	22.7	21.9	37.3

Appendix D - Fatigue scale

D.1

Fatigue scale - Pre and post treatment in sitting and standing				
	Pre	Pre	Post	Post
Fatigue scale	sit	stand	sit	stand
1				
2	4	2	0.5	0
3	2	0	1	0
4	6	5	-	-
5	1	0	0	0
6	3	1	1	0.5
7	1	0.5	0.5	0.5

Appendix E- Water Displacement

E.1

Water displacement differences between initial reading and secondary reading			
Treatment	Pre	Post	Diff
1	2	2	0
2	2	2	0
3	2	2	0
4	1.6	1.9	0.3
5	2	2	0
6	3.5	1.9	-1.6
7	1.7	1.9	0.2

-yellow highlight indicates increases in circumference

Appendix F - Record of treatments and patient consultation forms