

KNEE STUDY-University of Puget Sound

© Loraine Lovejoy-Evans, MPT, DPT

Remarkable improvements achieved for cancer patients and people with obvious swelling (edema) problems led me to suspect that knee pain may be related to a swelling problem in the lower leg. I have come to understand that the leg is filling up with fluid due to stretched out veins and skin along with overwhelmed lymphatic vessels. Eventually the fluid reaches the knee and pushes on the nerves in the knee causing pain. By getting rid of the fluid we commonly see knee pain resolve. So I felt this idea would make a good research project as part of my doctoral studies. We titled our study: **Managing Knee Pain Due To Venous And Lymphatic Congestion With A Home Program Of Manual Lymphatic Drainage And Over-the-counter Compression Stockings.** This study was performed through the University of Puget Sound by Loraine Lovejoy-Evans, PT, DPT, CLT-Földi, and Kathie Hummel-Berry, PT, PhD.

Hypothesis: Chronic venous and lymphatic congestion may contribute to knee pain.

Complete Lymphedema Therapy (CLT) is used to manage lymphatic congestion. CLT includes: skin care, education, manual lymphatic drainage (MLD) massage, specific exercises, and compression bandaging until girth is reduced enough to keep swelling down with compression garments (surgical socks). Elements of CLT then may be effective to manage related knee pain and reduced function. Patient-directed interventions are useful due to limited health care resources.

Purpose: To investigate the effectiveness of exercise versus over-the-counter (OTC) compression garments and self-MLD to reduce impairment and increase function among patients with knee pain related to venous and lymphatic congestion.

Number of Subjects: Twenty-nine consecutive patients with knee pain and who were felt by the researcher to also have venous and lymphatic congestion. Ages ranged from 42-88, the majority of subjects, 12 of the 29, were aged 70-80.

Gender: Males-12 and Females-17.

Research Design: ABBA single subject design with repeated enrollment was used with consecutive adult patients with venous and lymphatic lower extremity congestion and functionally limiting knee pain. Patients with contraindications to CLT were excluded.

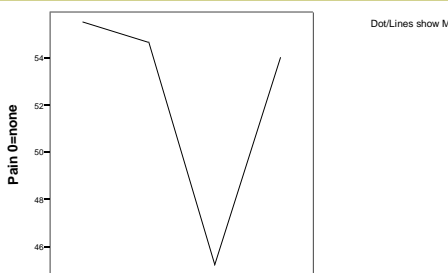
Measurements: Taken at the beginning of the study and repeated at the end of each two-week phase of the study: Ankle, calf and figure-of-8 girth in cm; knee active range of motion; body weight; pain intensity (visual analog scale); knee function (Lysholm score); and Quality of life (Medical Outcomes Study Short-Form 36). Girth and range of motion measurements were repeated until there were three measurements within 5 millimeters for girth and within 5 degrees for active range of motion to establish baseline.

Interventions: Two weeks of specific exercises (strength and flexibility). Two weeks of wearing 20-30mmHg OTC knee-high compression stockings during all waking hours plus self-MLD. In the final phase of the study treatment was withdrawn for two weeks.

Conclusions: After a home program including use of OTC compression garments with self MLD subjects demonstrated reduced pain intensity, reduced girth, and increased function.

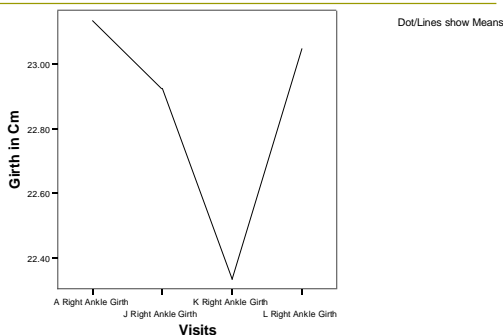
Statistics for Worst pain in 2 weeks:

Worst Pain in 2 wks



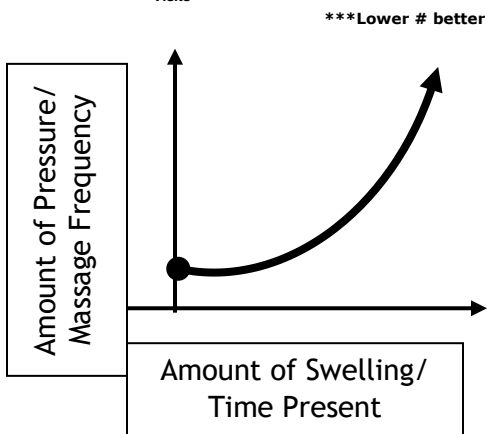
	Mean (SD)		F	p	N
	Before	After			
Exercise	54.04 (24.66)	54.67 (23.92)	0.014	0.91	27
Socks+MLD	55.08 (23.95)	45.21 (20.39)	6.516	0.02	24
Withheld rx	45.21 (20.39)	53.88 (22.90)	5.648	0.03	24

Right Ankle Girth



STATISTICS FOR Right Ankle Girth in cm:

	Mean (SD)		F	p	N
	Before	After			
Exercise	23.13 (3.78)	22.93 (3.54)	1.427	0.24	27
Socks+MLD	22.94 (3.68)	22.34 (3.69)	43.869	0	25
Withheld Rx	22.34 (3.69)	23.05 (3.90)	33.677	0	25



I believe we are all on the swelling spectrum, most of us are on the bottom edge and do not realize there may be a problem until we get to the middle or top edge of the curve. There are several techniques or tools you can use to help manage swelling. It is your decision when you want to jump in and control the mechanical damage that has occurred. If you have a trauma that starts the swelling, the more RICE (rest, ice, compression, elevation) you do immediately after the injury the less fluid you will create and the faster it will go away. The longer you take to finally rest well enough and long enough and do the treatments to resolve the swelling, the more stretching you caused to the skin and the sooner you will likely see

swelling that will not resolve. You might be 50 instead of 80 years old, but it will likely catch up. If you have surgery to remove lymph nodes or varicose veins-once the body can no longer keep up with the fluid levels that are present, you will see swelling.

Doing a simple massage technique-Manual Lymphatic Drainage (MLD)-helps pull the fluid back up to the heart by creating a suction mechanism at the top of the pumping system (just as using a straw to pull fluid up to the mouth). To help support the stretched out veins and skin-using compression (socks or stiff wraps) can dramatically help move fluid out of the limb and push it back inside the vessels where it can be pulled back up to the heart by the veins and lymphatic vessels (tubes). The more fluid is present and the longer it stays, the harder it becomes to get it out of the area and the stronger amount of compression you will need to keep it under control. If you wait so long that you become a water balloon, it will take several times a day of doing the massage technique and it will take much tighter compression to overcome the fluid to keep it pushed into the tubes. Recognize swelling early and do something about it to make it easier to manage.

I broke a leg when I was 13 years old and find that at age 44 if I do not wear compression stockings after about 3-5 days I get knee pain. Every morning I have a choice. If I want to control the knee pain and prevent the swelling from worsening, I put on compression socks. I am able to use a very light amount of compression because of jumping on board early. Daily I see people who have a water balloon for a leg or even skin that has burst open and now has a wound and this encourages me to keep using my socks so I do not go down that path. I have worked with people who have such stretched out skin and the fluid pressure is so strong they have to wear a compression sock in the shower so they can get their sock on afterwards. They also have to wear a sock that is at least 3 times stronger than mine which means it takes 3 times the effort to put it on. It feels like trying to put on a wet-suit. Me, I will stick with my easier-to-get-on sock and prevent the knee pain.