The influence of manual therapy on biometric parameters in patients with improper body weight

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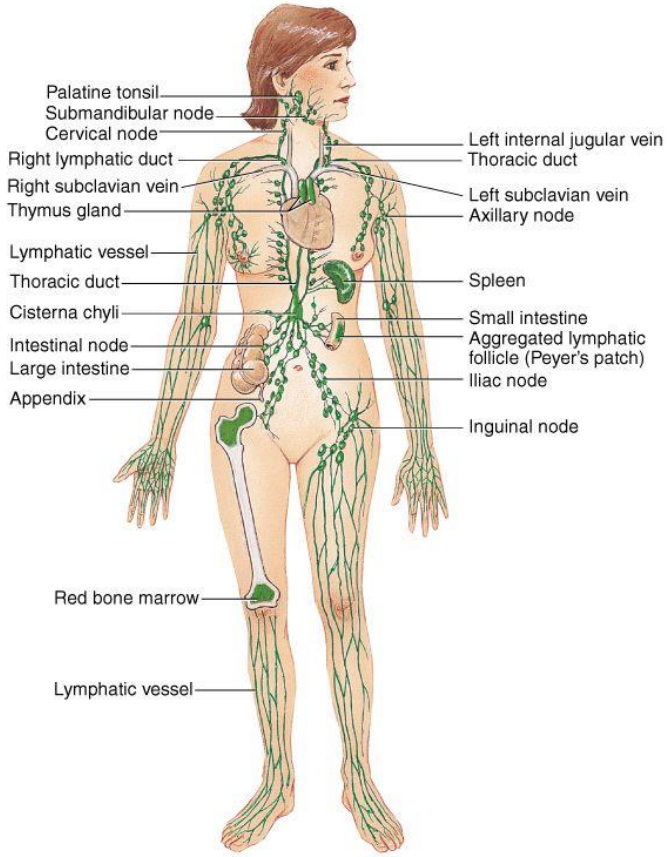
Lymphatic system

- The lymphatic system was first described in the 17th century independently by Olaus Rudbeck and Thomas Bartholin
- The lymphatic system is located within the whole body, it consists of a large network of lymph, lymphatic vessels, lymph nodes, lymphatic or lymphoid organs, and lymphoid tissues.
- The lymphatic system, or lymphoid system, is an organ system that is part of the circulatory system and the immune system.
- Contrary to the cardiovascular system, it forms one- way transport system from the extracellular space to the vessels [1].



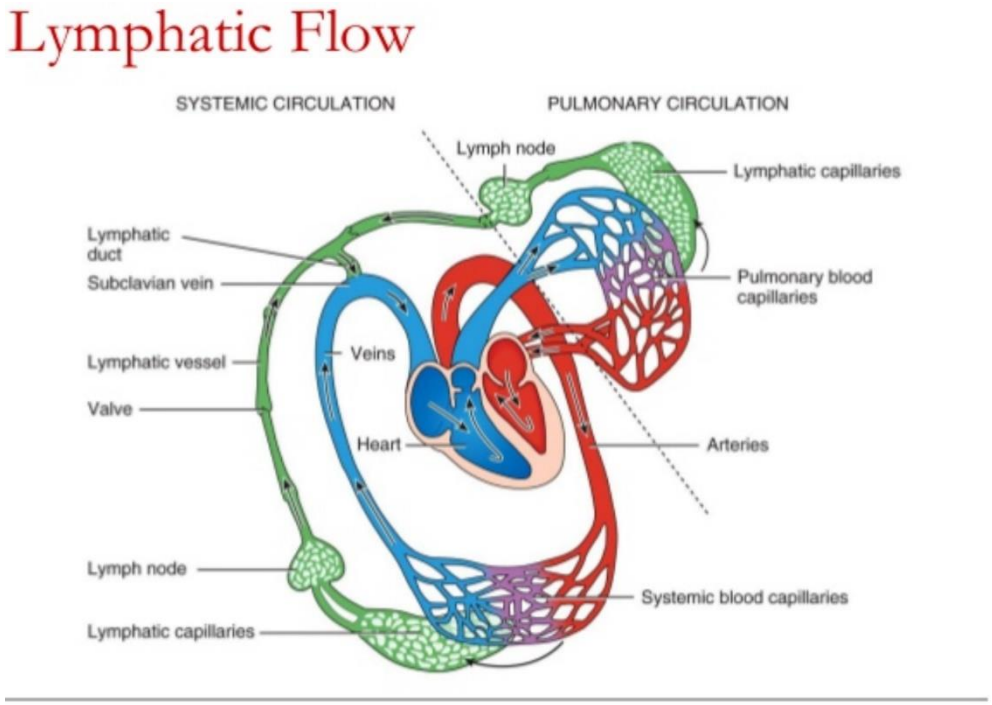
Anterior view of principal components of lymphatic system

Introduction to the human body: the essentials of anatomy and physiology. Hoboken, NJ : John Wiley & Sons, [2012].

Lymphatic vessels' role

Lymphatic vessels have three primary roles in normal human biology:

- **The first role** is to maintain fluid balance. Fluid that leaks from blood vessels in peripheral tissues is transported through lymphatic vessels and returned to the blood circulation. This is important for regulating the amount and the composition of fluids in circulation and within peripheral tissues
- **The second** is to absorb dietary fats in the intestine and transport them back into the blood stream



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Lymphatic vessels' role

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Lymphatic vessels have three primary roles in normal human biology:.

The third function is to facilitate the host's immune defenses.

Lymphatic vessels are well recognized as the channels through which antigens and immune cells are transported to their draining lymph nodes for immune protection. When infectious microorganisms invade peripheral tissues, lymphatic vessels transport the pathogens, or the antigen presenting cells that had engulfed the pathogens, to the lymph nodes. This initiates adaptive immunity that lead to production of cells and antibodies that will clear the pathogen and generate memory against it [2]

Lymphatic system and obesity

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- In recent years, several studies have been carried out indicating that the obesity can cause pathologic changes in the lymphatic system, which can impair its function [3]
- The research also proved that the dysfunctions of lymphatic system may influence the development of obesity, consequently restoring correct lymphatic functions can hinder the development of obesity [4]
- In recent years, there has been a few research suggesting the possibility of restoring the correct efficiency of the lymphatic system connected to obesity [5]

Manual lymphatic drainage

- Manual lymphatic drainage (MLD), as a form of physiotherapy, aims at supporting the work of lymphatic system due to the increase of the lymph flow
- MLD is one of the method of manual therapy often used with patients after surgeries, radiotherapy or cancer [6], as well as those with heart failure [7]
- Until now, manual lymphatic drainage was particularly applied in the treatment of lymphedema and lipoedema [8]

Manual lymphatic drainage

Manual therapy used in MLD cause stimulation of the lymph flow in two phases. **The first phase in MLD**, the moving phase, in which the stimulus is used to stretch the wall of lymphatic vessels to support its lymphangiomotorics, and **the resting phase** in which thanks to the suction action, the vessels are filled again.

Functions of MLD:

- support in the work of lymphatic system due to inreased lymph flow
- indirect acceleration in removal of the harmful metabolites from the tissues of the body and the increase in the dynamics of bodily fluids
- decrease of the sympathetic nervous system response with simultaneous increase in activation of parasympathetic nervous system
- as a result of stimulating the lymphatic system, the number of lymphocytes transported in the unit of time increases [9]

Aim

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The aim of the study was to assess the effectiveness of using Manual Lymphatic Drainage (MLD) of the abdominal cavity as one of the forms of therapy for lymphatic system dysfunction in people with abnormal body weight.

Patients

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- The study was approved by the Ethics Committee of the Medical University of Gdańsk (no NKBBN/692/2019-2020) and the investigation was carried out in accordance with the principles of the Declaration of Helsinki as revised in 1996
- The study presents the MLD therapy of two women: one was 59 years old and the other 30 years old.
- **The patient number** 1: A 59-year-old woman, professionally active (white-collar worker), overweight (body mass index [BMI]=27 kg/m2) having abdomen obesity (indicator WHR 0.84) and low level of physical activity.
- **The patient number 2** aged 30 years, professionally active (white-collar worker), with the obesity of class °2 (BMI=35 kg/m2) and abdomen obesity (indicator WHR 0.9), having average physical activity.

Methods

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- After medical qualification, each patient underwent a biochemical test performed on the first visit. The concentration of high-sensitivity C-reactive protein (hsCRP) was assessed by immunoturbidimetry (Cobas 8000 analyzer, Roche, Switzerland) and the level of C-peptide was measured by the CMIA method.
- Then, during the first and subsequent physiotherapeutic visits, each subject underwent 10 MLD treatments according to Földi, which covered the abdominal cavity and the groin area [9]
- The 7-point Likert scale was used to evaluate the patients' quality of life [10]

Results – Patient 1 with overweight

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- Based on the anthropometric results, patient No.1 was diagnosed with overweight (BMI=27 kg/m2) and abdominal obesity (indicator WHR=0.84)
- The interview before the therapy revealed frequent constipation, flatulence, gastroesophageal reflux, esophageal erosion and headaches
- After the MLD treatment, there was a noticeable improvement in intestinal motility and a decrease in frequency of flatulence
- In addition, after the treatment, patient declared the improvement of sleep quality and vitality

Results – Patient 1 with overweight

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Table 1. The values of biochemical parameters before and after the MLD therapy in overweight patient

Parameter	Before therapy MDL	After therapy MDL
Age [years]	59	59
C-peptide [ng/mL]	2.95	2.2
hsCRP [mg/L]	3.6	3

- Moreover, a reduction in the levels of C-peptide and hsCRP was found after MLD therapy
- In accordance with the Likert scale, the quality of life was scored 3 points before the therapy vs. 5 points after the therapy

Results – Patient 2 with class °2 obesity

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- Patient number 2 in the age of 30 years old, with the obesity of class °2 (BMI=35 kg/m2) and abdomen obesity (indicator WHR=0.9)
- The medical history included abnormal heart rhythm, diagnosed insulin resistance and polycystic ovary syndrome
- After the completion of MLD treatment, the improvement in intestinal peristalsis and a decrease of menstrual pain were detected

Results – Patient 2 with class °2 obesity

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Table 2. The values of biochemical parameters before and after the MLD therapy in a patient with class °2 obesity.

Parameter	Before therapy MDL	After therapy MDL
Age [years]	30	30
C-peptide [ng/mL]	2.4	1.9
hsCRP [mg/L]	1.3	1.9

- The patient with class°2 obesity showed the reduction of the level of C-peptide and the increase in the C-reactive protein level
- In accordance with the Likert scale, the quality of life was scored 3 points before the therapy vs. 4 points after the therapy

Conclusions

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- Initial research indicates potential benefits of the application of MLD to improve biochemical parameters, including a reduction in the inflammation in overweight patients and improvement in the quality of life in patients with abnormal bodyweight
- The application of manual lymphatic drainage in obesity may point new therapeutic purposes. Good results of MLD application in other diseases point the validity of introducing the treatment in patients with obesity

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Thank you for your attention.

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