

# **LYMPHEDEMA**

## **Structural Yoga Therapy Research Paper**

**ANNE SOULET ©**

**Boston, Ma.**

**ASoulet@yahoo.com**

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**Edited by Mukunda Stiles**

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## **1 a - Case Study - Initial intake, review of symptoms, subjective pain level, their self assessment**

Ayla who is now 73, height 5'4", weight 173lbs (195lbs when consuming dairy), has had primary lymphedema symptoms since the age of 14, when it was triggered by frostbite. A physician properly diagnosed it for the first time in 1995 at age 65. Lipedema, also diagnosed in 1995, may have been present since birth but was mistaken for chubbiness. The first large lipoma appeared at age 18 and was surgically removed soon after. About 30 new smaller ones developed over the years, without treatment. Venous insufficiency was diagnosed in 1999 by a lymphedema trained physical therapist but Ayla has experienced the symptoms since puberty. Three other family members have none, one or two of the conditions.

### **b - Examination Records – Significant changes in bold**

<b>Dates</b>		<b>6/9/03</b>		<b>9/9/03</b>		<b>3/1/04</b>	
<b>Range of Motion</b>		Left right		Left right		Left right	
Supine position							
Ankle	Dorsiflexion (20 <sup>0</sup> )	2	1	2	1	<b>9</b>	<b>11</b>
	Plantar flexion (50 <sup>0</sup> )	50	47	54	58	54	58
	Eversion (20 <sup>0</sup> )	13	10	13	10	<b>24</b>	<b>15</b>
	Inversion (45 <sup>0</sup> )	55	36	<b>47</b>	36	47	<b>39</b>
Knee	Flexion (150 <sup>0</sup> )	132	129	<b>137</b>	<b>141</b>	133 knees	134 swollen
	Extension (0 <sup>0</sup> )	0	0	0	0	0	0
Hip	Flexion, bent knee (135 <sup>0</sup> -150 <sup>0</sup> )	120	123	<b>133</b>	<b>136</b>	<b>137</b>	<b>142</b>
	Straight knee (90 <sup>0</sup> )	59	68	<b>79</b>	<b>85</b>	74	77 swelling
	External rotation (45 <sup>0</sup> )	35	51	<b>52</b>	<b>57</b>	52	60
	Internal rotation (35 <sup>0</sup> )	26	25	<b>39</b>	<b>35</b>	29*	32*
Side lying position							
Hip	Adduction (300)	22	28	<b>discomfort</b>		32	31
Hip	Abduction (450)	33	31	<b>Lying on side</b>		38	35
Prone position				<b>and</b>			
Knee	Flexion (1350-1500)	122	123	<b>prone</b>		104	108 new compression garment, tighter fit
Hip	External rotation (450)	58	48			47	47
	Internal rotation (350)	14	17			24	31
	Extension (150)	7	10			20	21 standing only
<b>Muscle tests</b>							
Supine position							
Ankle	All 4 movements	5	5	<b>5</b>	<b>5</b>	5	5
Hip	Flexion	3.5	3	<b>4.5</b>	<b>4</b>	4.5	4.5
	Psoas (isolation)	3	3	<b>3.5</b>	<b>4</b>	3.5	3.5*

	Sartorius (isolation)	3	3.5	<b>3</b>	<b>3.5</b>	3*	3.5*
	Flexors with abdominis rectus	3		<b>4</b>		3*	
	Side lying position						
Hip	External rotators	4	4	<b>4</b>	<b>4</b>	3*	4
	Internal rotators	3	3	<b>4</b>	<b>4</b>	4	3.5
	Abductors	3	3	<b>3.5</b>	<b>3.5</b>	3.5	4
	Adductors	4	4	<b>4</b>	<b>4</b>	4	4
	Prone position						
Knee	Extension	4.5	4.5	<b>4.5 Supine only 5</b>		4.5	5
	Flexion	2	2	<b>3.5 supine only 4</b>		4	4
Hip	Extension	3.5	3	<b>discomfort</b>		4	4
	Gluteus maximus isolation	3.5	3	-		3.5	3.5
	External rotators	4	4	-		4	4
	Internal rotators	3	3.5	-		3	3.5

I evaluated Ayla's ROM and muscle strength 3 times in 2 sessions each because of too much effort and discomfort. Most tests were done supine because the prone position created pain and pressure on the chest and abdomen lipomas. Certain days were easier and prone test could be performed.

### **c - Summary of Findings –**

<b>List Muscles to be Strengthened (K)</b>	<b>Stretched (P)</b>	<b>Released (V)</b>
On both sides left and right Rectus femoris and psoas Sartorius Rectus Abdominus Glut medius and TFL Glut maximum and hamstrings Glut minimus	On both sides left and right Gastrocnemius and soleus Anterior and posterior tibialis Quads Hamstrings and glut maximus Left Glut medius and left TFL	Left external rotators Left and right external rotators esp. glut maximus

### **d – Recommendations**

Ayla's former routine had been limbering hip movements, self-massage, Apanasana, and Savasana in bed. We added the following:

**June 03:** 6 intercostal breaths in bed. The Joint Freeing Series (6 repetitions) in the morning, 3 rounds of 10 kapalabhati , a slow and low rolling bridge in 6 repetitions to release low back and strengthen hip extensors, a low sit up to strengthen abdominals, and a 10minute Savasana with visualization of lymph movement from Langfield's Where The Rivers Meet The Sea. She noticed that the Joint Freeing Series made a difference explaining "If I don't do it, I feel sluggish and don't feel like doing anything". Kapalabhati made her feel good and gave her more life. She was pleased to find increased ROM and strength.

**September 03:** Since her husband recently retired, they started practicing together. Ayla felt she had better proprioception and was able to keep some integrity in the waist, abdomen, shoulders and neck instead of slouching during the practice.

In **January 2004**, we increased to 20 kapalabhati breaths. We added the lying abdominal twist (Jathara Parivartanasana) to increase massage of the lower trunk before energy freeing pose (Apanasana) and corpse pose (Savasana).

**March 04:** Since the evaluation showed some weakness in the hips, we modified the Joint Freeing Series #5 which Ayla had been doing only in dragging the leg on the floor. She can now perform the last two of the 6 repetitions with the leg lifted off the floor, a practice that is aimed at strengthening primarily the hip flexors. To strengthen her sartorius, we added a single bent leg lift while sitting on floor soles of feet touching. Since the hip flexors and abdominis rectus test was still weak, Ayla is also practicing a rolling boat while sitting and keeping a 90° angle between chest and bent knees. The rolling happens on the tailbone with a play of pelvic tilt and pelvic thrust.

Ayla's insights into her proprioception (self-awareness) have helped us make changes throughout this study. Recently, Ayla complained that Savasana increased the sense of heaviness in her head that she was trying to decrease in the first place. (When sitting or standing the lymph collects in the lower body and when sleeping some of it goes to the head). She likes exercises, which have more cardiovascular effect like the stationary bicycle, and asanas in dynamic style. So we changed the order of the practice as follows:

- 1- Joint freeing series
- 2- Asana such as rolling bridge, low abdominals, rolling boat, seated bent leg lift, alligator twist,
- 3- A short Savasana lying down supine,
- 4- Standing straight arm movements and trunk rotations as if sowing seeds (Ayla always liked this motion as it freed up Udana prana and increased tejas and ojas)
- 5- Kapalabhati and bandhas

This practice is done 4 times a week and the other three days are kept for some mild cardiovascular stimulation on the stationary bicycle.

## **e - Results**

Ayla gave the following feedback “Overall, I feel more flexible and I have more body awareness”. Considering that the conditions decrease mobility, I think Ayla has gained enough momentum to continue deepening her practice with the wisdom and caring of a Yogini, and I thank her deeply for having helped me find a suitable yoga practice that helps her condition.

### **2 – a. Name and Description of Condition**

**Lymphedema** is the medical term for swelling of body parts, especially the extremities, caused by excess lymph fluid. 2 Types exist: Primary Lymphedema has no known cause and may appear at birth or later and predominantly involves one or more limbs of the upper and lower body. Secondary Lymphedema is often caused by surgery, traumatic destruction of lymphatic vessels, and removal of lymph nodes for cancer screening, radiation, chemotherapy (less destructive than radiation) and a tropical parasitic disease spread by mosquito bite called filariasis. These interventions destabilize the healthy movement of lymph from body tissues through the lymph nodes back to the circulatory system of the blood and the heart.

Lymph and blood share the same system in and out of the heart with one exception: blood does not leave the arteries, veins or capillaries whereas lymph moves in and out of the

capillaries to bathe the entire body before collecting in the lymph nodes for 2 clean-up duties for which they produce:

- a) White blood cells called lymphocytes which secrete substances to combat infections caused by bacteria and viruses,
- b) White blood cells called macrophage, which engulf and consume (like packman) unwanted toxins and pathogens and transform it to waste.

The lymph nodes then discharge the lymphocytes and waste into the bloodstream, which sends the former to the war zones and the latter to the filtering systems of the body for excretion.

Lymphatic fluid contains mostly protein and some fat in various concentrations of large and small molecules. In lymphedema, more lymph is produced in the tissue than can be transported away by the sluggish lymphatic system resulting in stagnation of lymph and swelling of tissues. “Most of the lymphatic vessels have valves that prevent backflow of fluid. A single segment along the collector from valve to valve is called the lymph angion. By contraction and stretching of the lymph angion like a worm advancing, the lymph moves upward” (Burt, p. 14). Slow deliberate movement promotes lymph circulation. The undulations remind one of the movements of chyme through the intestine.

In some instances, a **chronic venous insufficiency** in the legs may further develop into lymphedema. The appearance of one condition does not necessarily preclude the other.

Moreover, another condition, often misdiagnosed as lymphedema, called **lipedema** may exist by itself or co-exist with lymphedema. It is seen in teen females mostly and remains a lifelong often progressive condition. There is a build up of fat under the skin mainly in the lower body which appears pear shaped with most of the volume around the hips and lower limbs. It can become painful to touch or pressure. The subcutaneous fatty tissue of **lipedema** may appear combined with so-called **lipomas**, swollen, soft nodules of fat in the legs, arms, abdomen and buttocks, but never found in the hands or feet. With applied pressure they slide under the skin like shelled soft boiled eggs. People with lipedema may never develop lymphedema or venous insufficiency.

## **b. Gross and subtle body common symptoms**

In **lymphedema**, we first notice swelling of a limb(s) or other body part. Three to six months later, changes in the skin appear such as thickening or formation of fibrosis (hardened tissue). The first symptoms of swelling can decrease with immediate use of Complete Decongestive Therapy (CDT) by a therapist specifically trained in CDT, but if untreated can become chronic. Progressively severe lymphedema can lead to open ulcers, cellulites and eventually elephantiasis (skin appearance of an elephant’s leg).

**Venous insufficiency** in the legs results in stagnation of blood in the lower extremities. It can also cause swollen veins (varicose veins) mostly in the lower legs, ankles or feet that can temporarily disappear as soon as the affected limbs are elevated above the hips and heart. Softness and easy pitting are characteristic of this condition whereas lymphedema limbs appear hard, cold and slower to change.

Swirsky (p. 27) reports: “The World Health Organization estimates that 100 million people worldwide have filaritic lymphedema”. According to the Casley-Smiths (1997, p.83) there is an estimated “180 million people in the world with lymphedema. Thus about one person in thirty of the world’s population, suffers from lymphedema. If one were to add the incidence of chronic venous insufficiency (600 million), the total would

be about 780 million – i.e. two in every fifteen!” They suggest (p.178) in the Journal of Hand Surgery that “1/3 of all patients develop lymphedema after mastectomy”. In many cases, it may develop years after surgery.

### **c. Related Challenges**

Lymphedema related challenges involve combating the ignorance of the medical profession regarding the lymphatic system and its functions. Few physicians are prepared to diagnose, treat and help manage the condition. Complete Decongestive Therapy by a well-trained therapist and follow-up visits are as important as a personal maintenance program of nightly bandaging, self-massage and exercises in order to stop the possible deteriorating progression of lymphedema

Since the condition remained obscure and rather misunderstood until recently, **insurance coverage** for lymphedema and related conditions is frequently inconsistent and insufficient. In Massachusetts, State Senate Bill #848 mandating insurance coverage for lymphedema treatments and related medical expenses has been filed. The state of Virginia has passed the first state legislation dealing with insurance coverage for any lymphedema treatments exists for women who have had breast cancer. Through their insurance, women can have reimbursement for reconstructive surgery, prostheses and physical complications including “**lymphedema**”.

Another challenge is the gradual weakening of the lymphatic functions leading up to the fully apparent symptoms of lymphedema. Therefore prevention is extremely important to avoid further damage and infection. If the traumatized limb does not yet show signs of lymphedema, then the patient should avoid blood pressure cuffs, straining of the limb, and keep good hygiene of wounds.

So far there is no cure for lymphedema. The CDT treatments can only reduce the symptoms. In order to conserve the reductions, the patient needs to remain vigilant and keep a regimen of compression, exercise, diet and self-care. Other challenges in the condition involve pain if the limb is very swollen and restricted in its range of motion.

### **3 - Ayurvedic assessment and Ayurvedic based yoga recommendations**

I explained the 3 conditions of lymphedema, lipedema and venous insufficiency because my case study with Ayla involves them all.

Stagnation of venous and lymphatic fluids in the body is due to Kapha increase. The primary seats of Kapha are the stomach and lungs. The lymph is one of the subsidiary or subdosha sites of Kapha. The lymphedema sufferer becomes more vulnerable to diseases and infections because of the weakening of its lymphatic system in the affected area.

Lipedema may stems from a build up of Long chain Fatty acids according to Ayla, another sign of elevated Kapha. Ayla claimed that her dairy free diet reportedly decreases the size of some of her lipomas. Venous insufficiency is another aspect of aggravated kapha where the veins are less able to return the blood back up to the heart.

David Frawley \*(p. 91) mentions that” Prana, tejas and ojas give energy to the immune system. **Ojas** is the basic capacity of the immune system, our potential to defend ourselves against external pathogens. It provides endurance, resistance and strength to ward off diseases. **Tejas** is the immune system, which is able to burn and destroy toxins

when activated. It generates the fever that the body produces to destroy the pathogens, which attack it. Tejas is our ability to overcome acute diseases, which are generally infectious in nature. Tejas is ojas converted into heat, warmth and vitality. It is our ability to mobilize our immune systems' forces. **Prana** is the long term activation of the immune function to project and develop life energy, which manifest when we are dealing with a chronic disease. It is the adaptability of the immune system and sustains all long term healing processes. With sufficient prana, tejas and ojas, no disease can approach us. Increasing prana, tejas and ojas helps all low immune conditions."

All 3 conditions show tamasic characteristics of **Kapha** with stagnation and weight, low digestive power, slow metabolism. The attributes are heavy (guru), slow (manda), dense (sandra), static (sthira), gross (sthula), and cloudy (avila). Increased **Pitta** conditions occur when inflammation and infection happen. These conditions may arise due to the poor clean up ability of the lymphatic nodes, and the poor drainage of the lymphatic vessels. But these acute episodes are symptoms of deep seated kapha imbalances due to the poor ability of the lymphatic system to stop infections of open wounds.

#### **4 - Common body reading**

The limited ROM may be due to a combination of muscle tightness due to swelling which leads to an increasing lack of movement, compounded by the necessary wearing of a compression garment to keep the swelling down. The subject should keep the garment during all movements so that lymph flow does not stagnate in the extremities. Although it impedes freedom of movement, the garment is beneficial.

The lymphedema condition therefore seriously limits flexibility and gradually shortens the muscles moving the affected limbs. Their strength might equally be affected especially at the end and beginning motion of the limb. This phenomenon would appear because the subject cannot fully contract or extend the swollen limb leading to a lack of weight bearing ability at either end of the range of movement.

In the case of Lipedema, fatty deposits can sag at the knees and ankles and hinder a complete range of motion. It may also create too much bulk for the spine and hips to flex fully. Lipomas are painful in the chest while lying down prone. Swollen tissue around the knees becomes painful while kneeling in cat, hero and cross legged.

#### **5 - Contraindicated yoga practices**

1- Environmentally heated yoga practices are strongly discouraged for lymphedema sufferers. Heat dilates the veins and capillaries of blood and lymphatic system. As explained in Coping with Lymphedema (p.6)"Unlike blood vessels which are closed, the lymphatic system's capillaries are open at one end. It is through these openings that the interstitial fluid enters the capillaries to become lymph." As heat dilates veins and capillaries, it pushes more lymphatic fluid out into the tissues, which swell. The impaired limb cannot reverse this by drainage since it is already compromised and sluggish. The build up of excessive protein creates a thick mass, which slows down drainage and increases the discomfort and symptoms of the disease.

2- Hatha Yoga that involves holding asana for a long time is contraindicated as this increases earth element (stagnation). Any static and constricting practice encourages stagnation of lymphatic fluid in the affected area.

3- Vigorous Hatha yoga is not recommended either because it increases heat in the body, which brings us back to the 1<sup>st</sup> example.

4- For leg lymphedema, any standing, weight bearing and static asana should be done with moderation so that swelling does not increase in the affected limb. For arm lymphedema, any arm weight bearing asana is discouraged for the same reason. Moreover, constricting asanas such as cross arms or legs may affect the injured limb.

5 – Bandhas may be appropriate in advance practice but contraindicated with acute symptoms.

If the lymphedema sufferer has lipomas as well, any pressure on the fatty deposits creates pain and their displacement. The practitioner needs therefore to modify certain asanas in order to maintain comfort.

## **6 –General recommendations** – Progressive through 3 phases

Since the predominant imbalance happens in the Kapha dosha with tamasic qualities, the treatment will include reduction of kapha excess with:

- Detoxification
- Reduction of stagnation
- Tonification to increase ojas and tejas.

Successful treatments were developed by Dr. Emil Vodder and were later slightly improved by others. The late John R. Casley-Smith, Dsc, MD, and Judith R. Casley-Smith, MA, PhD. Founders of the Australian Lymphedema Association describe in Modern Treatment for Lymphoedema\* the practice of Complex Physical Therapy (C.P.T.) (in the US known as CDT) which includes skin cleansing, Manual Lymph Drainage (M.L.D.), bandaging, wearing of a compression garment and exercise. Moreover, elevation of the swollen limb may reduce swelling especially when the symptoms start.

### **a – Therapeutic – Free of pain**

The acute phase is uncommon except when treatment is not available or the disease has progressed to the later stages. However, to decrease pain for venous insufficiency and lymphedema in the lower body, practice inverted poses such as bridge pose resting supine with the pelvis and legs elevated to decrease painful swelling, or half shoulderstand with feet up the wall. If a pool is available, the buoyancy decreases body weight, congestion and pain on affected limbs, and resistance of the water enhances muscle tone and strength.

To lessen pain in all 3 conditions, a gentle practice of the Joint Freeing Series (JFS) once a day will help decrease stagnation of lymph, blood and fat from the affected limb(s). The modified JFS sequence respects proper lymphatic drainage starting above the heart, medially and proximally as follows: (see Appendix p.11 & 12) Head #19 to 21, shoulders 13 to 15, elbows 12, wrists 9 to 11, truck 16 to 18, hips 6 7 8 5, knees 4, ankles 3 to 1.

The Cookstown Center for Wellness in Canada has published a booklet “Where the Rivers Meet the Sea” (order form on p.13) which describes an “Integrated Wellness Plan”



to reduce pain and relax. There are visualizations, meditations, grounding breath awareness and other mind-body exercises. Pain decreases when the body starts to relax, thus diminishing vata, as in Yoga Nidra and relaxation techniques.

## **b - Stabilize situation and potential lifestyle change recommendations**

After mastery of the JFS, start learning pranayama techniques to lessen Kapha stagnation. Intercostal breathing (Structural Yoga Therapy p.54) brings oxygen and fresh blood to the ribcage, trunk, armpits, neck and sides. It helps increase the volume and flow of blood and lymph in the upper mid-section.

For Kriya pranayama, kapalabhati (Sivananda method) is best as it purifies the upper body, decreases Kapha to lessen mucous and weight. For this purpose it can be done after asana practice. The flood of oxygen after kapalabhati activates the cardio-vascular system then quiets body/mind to allow carbon dioxide to return to normal.

Yoga postures and breathing improve circulation and boost the immune system because they exercise muscles; chest and heart pump with each asana. Moreover they squeeze, soak and create space in the organs such as skin, gastrointestinal and respiratory tracts.

Moderation is the key to a well-managed lymphedema condition. Physical activity that helps stimulate the flow of lymphatic fluid is highly recommended as explained in Coping with Lymphedema p. 128: “As the body moves, muscle contractions serve as a pumping force that can facilitate lymphatic flow. If at any time the limb responds with increased edema or pain, decrease the intensity of the exercise.”

Therefore a dynamic practice with slow rhythmic breath, a regular practice of JFS and inverted asanas like Supta Baddha Konasana and Viparita Karani would be most beneficial. Use of the psoas in hip flexion and external rotation and pelvic tilt increase movement of fluid in the thoracic duct. So a mild version of the boat would be good too.

## **c - Maintenance (of underlying issues at the root of the situation)**

Since kapha imbalance is at the root of the problem; an anti kapha diet, the maintenance of supportive therapies such as compression garments, lymphatic massage, exercise and pranayama are recommended. Blood donation, which satisfies the deeply nurturing aspects of karma yoga, and cleansing programs, will also improve venous insufficiency and weight management.

The practice of Pancha Karma would be beneficial as well. It is explained in Yoga and Ayurveda (p.215) as follows: “to eliminate kapha by herb induced emesis (vomiting) causes and effect on the nutrient tissue-fluid pool, containing water and electrolytes, plasma, muscles and fat”.

For lipedema, a semi-vegan diet based on elimination of all meats and dairy is strictly recommended. Oily fish, nuts and seeds do not aggravate lipodema since they do not contain the problematic Long chain fatty acids which exist in meat and dairy.

A daily walk would regenerate lymph circulation from the legs back up to the groin. Some subjects have found the use of a trampoline helpful. The same result can be done supine while pushing feet against a wall. A cool climate helps constriction of the capillaries and lessens edema.

There are 2 Q & A by Mukunda on Yogaforums.com. On page 4, (12/1/03) you will see recommendations for working with chemotherapy patients and how to restore the immune system. On page 6, (4/26/02) one can read some recommendations for mastectomy with lymphedema complications.

## **8 - References**

Burt, Jeannie and Gwen White PT. Lymphedema, A Breast Cancer Patient's Guide to Prevention and Healing. Hunter House Inc, 1999.

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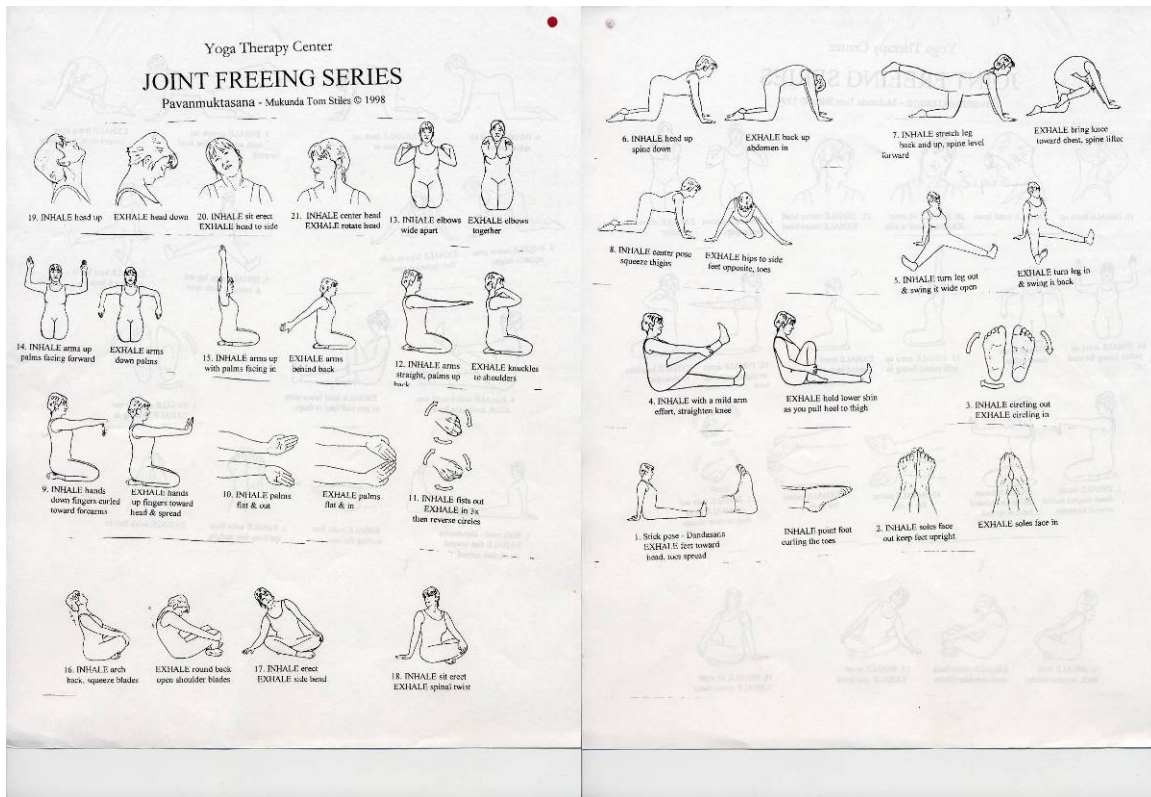
## **9 – Appendix**

P. 11 – The Joint Freeing Series modified for lymphedema.

The order in the Joint Freeing Series has been modified to facilitate return of the lymph back to the heart starting from the places closest to the heart and then working the joints progressively further.

P. 12 – The lymphatic drainage system (from Casley-Smith's 1997 p. 27).

# Variation of JFS Practices for Lymphedema



## SCHEMATIC THE LYMPHATIC DRAINAGE SYSTEM

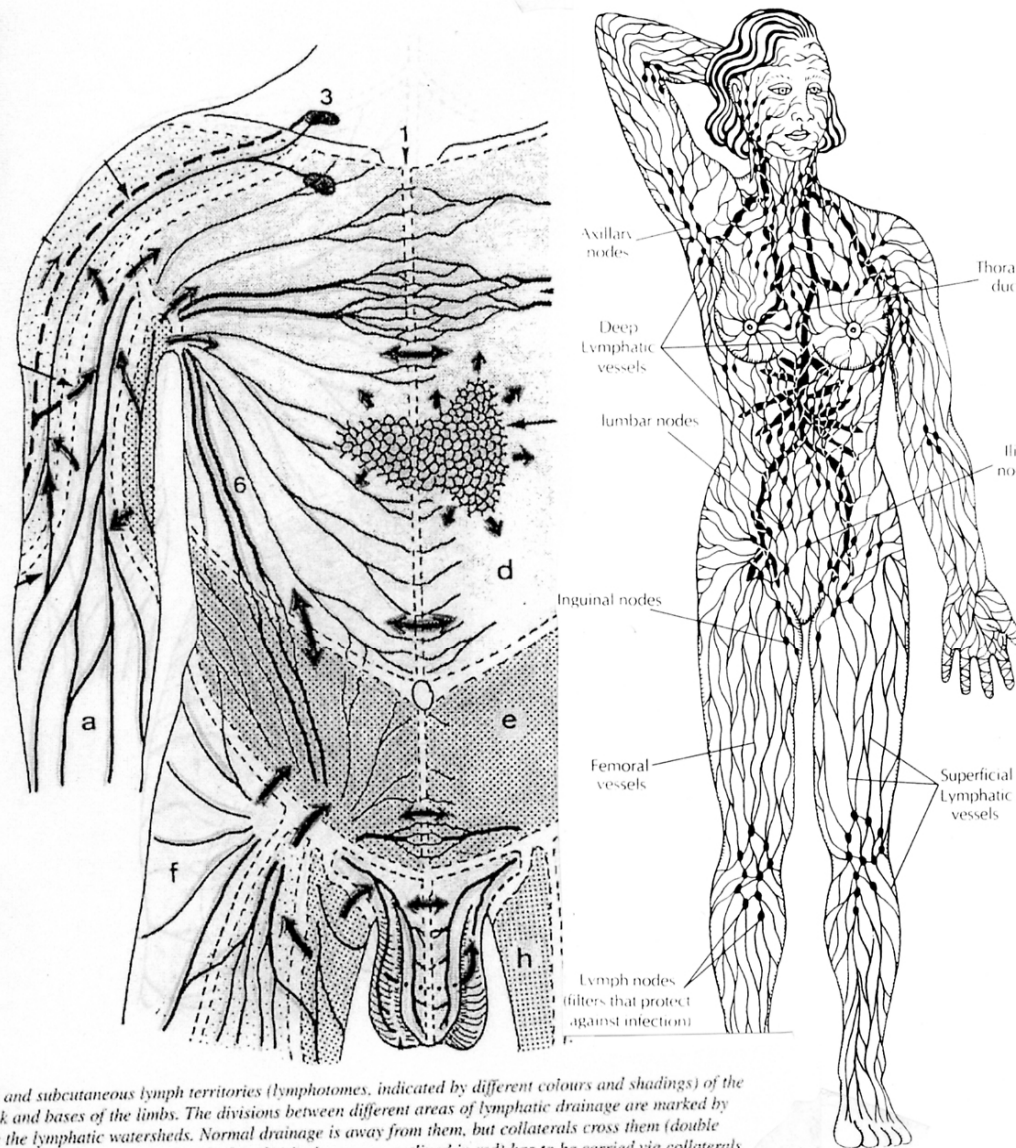


Fig. 3. The dermal and subcutaneous lymph territories (lymphotomes, indicated by different colours and shadings) of the anterior of the trunk and bases of the limbs. The divisions between different areas of lymphatic drainage are marked by (====). These are the lymphatic watersheds. Normal drainage is away from them, but collaterals cross them (double arrows, outlined in red). It is across these that the lymph (single arrows, outlined in red) has to be carried via collaterals and the plexuses, when the main drainage paths from each of these regions are blocked.

Various collections of lymphatic trunks are shown, and collaterals crossing the watersheds. The cutaneous lymphatic plexus (black arrow) is shown in the centre of the chest only. It is filled from the tissues and covers the whole body, but this is not shown to avoid confusion. These initial lymphatics fill superficial collectors, which drain into deep ones and so into the lymphatic trunks (small arrows).

Letters refer to: a. forearm lymphotomes (shown in detail in Fig. 5); d. thoracic lymphotome; e. abdominal lymphotome; f. lateral thigh lymphotome; h. medial thigh lymphotome. The lymphotome of the external genitals and perineum is shown but unlabelled. Numbers refer to: 1. mid-trunk watershed; 3. supraclavicular nodes; 4. lateral upper arm trunks ("cephalic", or deltoid trunks); 6. axillo-inguinal anastomotic pathways. (Adapted from Földi & Kubik 1989)

*Anatomy of Lymphatic System for Physical Therapy*