

# **Turner Syndrome**

## **Introduction**

This article is a very brief overview of Turner Syndrome (TS). The information presented is based on the resources listed and the reader is encouraged to go to these sites to learn more about this condition.

## **What causes Turner Syndrome?**

No known causes of TS have been found. There is nothing that parents do to cause or increase, the risk of TS in their daughters. Unfortunately there is also nothing they can do to prevent it. Based on the current knowledge, TS appears to be a random event that could happen to anyone [3].

## **What are the characteristics of Turner Syndrome?**

Short stature and lack of ovarian development are two of the most common features of TS [3]. At the appropriate ages, these are treated with growth hormone and estrogen replacement therapy to stimulate a more normal growth pattern.

Other characteristics of TS vary greatly in their presence and their severity [4]. These include heart and kidney abnormalities, physical characteristics such as short neck, a low hairline and the back of the neck, and low-set ears.

## **Where does lymphedema come into this?**

Lymphedema is present in about 70% of Turner Syndrome patients and the hands and feet are most commonly affected [4]. The form of lymphedema is the result of the underdevelopment of the lymphatic system before birth [1,p.14]. As the child matures, this swelling is managed using with the same treatment methods that are used to control other types of lymphedema.

## **How is Turner Syndrome diagnosed?**

A prenatal ultrasound, such as the one shown here, may indicate that the fetus has a physical condition common to TS [1,p.8]. However the ultrasound alone does not provide a definite diagnosis.

## **What does the future look like for girls with Turner Syndrome?**

With good medical and psychological care and the emotional support of friends and family, a girl with TS should look forward to a healthy and satisfying life. [1,p.34]

## **References and Resources**

[1] New Turner Syndrome Guide for Families, which was written by Patricia Rieser, CFNP and Marsha Davenport, MD. This excellent guide is available, in both Spanish and English in a “ready to print” format.

[2] Turner Syndrome- US is the web site of the national Turner Syndrome organization. It contains information and helpful links.

[3] Living with Turner Syndrome- is an excellent informative site the fulfills the promise of its name by presenting helpful information on “Living with Turner Syndrome”

[4] Complications of Turner Syndrome is a part of the Turner Syndrome website that provides details on possible complications and includes information on TS clinical trials

## What is Lymphedema?

Lymphedema is abnormal swelling due to the presence of excess lymphatic fluid within the tissues. This swelling occurs when the lymphatic system malfunctions or is damaged and lymphatic fluid cannot drain as quickly as produced.

- Lymphedema affects an estimate 100 million men, women, and children around the world including at least 3 million Americans.
- Lymphedema occurs most commonly in the extremities (arms, or legs); however, it can also affect the trunk, breast, abdomen, neck, head, and or genitals.
- The fluid that causes the swelling of lymphedema is protein-rich and this makes the tissue easily susceptible to infections.
- Lymphedema is a chronic condition that can be treated but not cured. Early treatments can usually effectively control the condition.
- Without treatment, the lymphedema symptoms become progressively more serious. The seriousness of the condition is described as Stages of Lymphedema.
- The onset of lymphedema can be sudden, gradual, or delayed so that it appears years after the causative event.

The two principle types are primary lymphedema and secondary lymphedema.

### Primary Lymphedema

Primary Lymphedema is a hereditary abnormality of the lymphatic system that occurs in approximately one in six thousand people. Although the cause is not well understood, these abnormalities often include hypoplasia or hyperplasia. The swelling of primary lymphedema usually starts distally (at the far end of the limb) and spreads proximally (upward toward the body).

- **Primary congenital lymphedema** is also known as Nonne- Milroy's disease or Milroy's disease it is either present at birth or develops within the first two years of life. *Shown here is primary lymphedema in a baby. Notice that the swelling is greatest near the toes.*



- **Lymphedema praecox**, also known as Meige disease, is primary lymphedema in which the symptoms begin at the time of puberty. Most cases of primary lymphedema present symptoms at this age and this condition affect mostly girls with symptoms in the lower extremities.
- **Lymphedema tarda**, is a primary lymphedema that occurs in adults and affects both males and females. The onset of symptoms is sudden, with no apparent cause, and can affect one or both of the lower extremities.

## Secondary Lymphedema

Secondary Lymphedema is the result of a damaged or blocked lymphatic system. The swelling of secondary lymphedema usually begins near the body and spread towards the far end of the limb. Causes of secondary lymphedema include:

- Cancer treatment that involves the removal of the lymph node or their destruction due to radiation or chemotherapy. Shown here is secondary lymphedema following cancer treatment.
- Scars due to burns radiation treatment, or other damage to large areas of the skin.
- **Trauma** including all types of accidents, injuries, and surgery that damage to the lymphatic system.
- Those with **chronic venous insufficiency** can develop lymphedema as a secondary condition.
- Those who are **obese** can develop lymphedema as a secondary condition.

## 18 Preventive Steps for Upper Extremity Lymphedema

These steps are for the patient who is at risk of developing lymphedema, and for those who have developed lymphedema of the upper extremity.\*

1. Absolutely do not ignore any slight increase of swelling in the arm, hand, fingers, or chest wall. *These are warning signs and you should consult with your doctor immediately.*
2. Never allow an injection or a blood drawing, in the affected arm(s). Wear a lymphedema alert necklace or bracelet to alert health care givers that you have, or are at risk for, lymphedema.
3. Have blood pressure checked on the unaffected arm, or on the leg (thigh), if bilateral lymphedema/at-risks arms.
4. Keep the swollen or at risk arm(s) spotlessly clean. Use lotion (Eucerin, Lymphoderm, Curel, or whatever works best for you) after bathing. When drying it, be gentle, but thorough. Make sure it is dry in any crease or between the fingers.
5. Avoid vigorous, repetitive movement such as scrubbing, pushing, or pulling against resistance with the affected arm.
6. Avoid heavy lifting with the affected arm. Never carry heavy handbags or bags with over the shoulder strap on your affected side.
7. Do not wear tight jewelry or elastic bands around the affected finger or arm.
8. Avoid extreme temperature change when bathing or washing dishes. It is recommended that saunas and hot tubs be avoided (at least keep arm out of hot tub). Protect the arm from the sun at all times.
9. Try to avoid any type of trauma, such as bruising, cuts, sunburn or other burns, sports injury, insect bites, cat scratches. If any injury occurs, watch carefully for subsequent signs of infections.
10. Wear gloves while doing housework, gardening, or any type of work that could result in even a minor injury.
11. When manicuring your nails, avoid cutting your cuticles (inform you manicurist).
12. Exercise is important; however you should consult with you therapist before beginning an exercise program. Do not overtire an arm at risk: if it starts to ache, lie down and elevate it. *Recommended exercises:* walking, swimming, light aerobics, bike riding, and specially designated ballet or yoga. ( Do not lift more than 15 lbs.)
13. When traveling by air patients with lymphedema, and those at risk for lymphedema, should wear a well fitted compressive sleeve. Additional bandages may be required on a long flight. Increase fluid intake while in the air.
14. Patients with large breasts should wear light breast prostheses (heavy prostheses may be too much pressure on the lymph nodes above the collarbone). Soft padded shoulder straps may have to be worn. Wear a well-fitted bra: one that is not too tight, and ideally one with no underwire.

15. Use an electric razor to remove hair from axilla. Maintain the electric razor properly and change the heads as needed.
16. Patients with lymphedema should wear a well fitted compression sleeve during all waking hours. At least every 4-6 months, see your therapist for follow up. If the sleeve is too loose, most likely the arm circumference has reduced or the sleeve is worn and needs to be replaced.
17. **WARNING:** If you notice a rash, itching, redness, pain, increase of temperature or fever, see you physician immediately. An inflammation (or infection) in the affected arm could be the beginning of infection or worsening of the lymphedema.
18. Maintain your ideal weight through a well- balanced diet, low sodium, high-fiber diet. Avoid smoking and alcohol. Lymphedema is a high protein edema; however, eating too little protein will not reduce the protein element in the lymph fluid. Instead, this may weaken the connective tissue and make your condition worse. The diet should contain easily digested protein such as chicken, fish, or tofu.

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## 18 Preventive Steps for Lower Extremity Lymphedema

These steps are for the patient who is at risk of developing Lymphedema, and for those who have developed Lymphedema.\*

1. Do not ignore any slight increase of swelling in the toes, foot, ankle, leg, abdomen, or genitals. These are warning signs and you should *consult with your doctor immediately*.
2. Never allow an injection or a blood drawing in the affected leg(s). Wear a lymphedema Alert necklace or bracelet to alert health care givers that you have, or are at risk for, lymphedema.
3. Keep the swollen or at risk leg(s) spotlessly clean. Use lotion (Eucerin, Lymphoderm, Curel, or whatever works best for you) after bathing. When drying it, be gentle, but thorough. Make sure it is dry in any crease or between the toes.
4. Avoid vigorous repetitive movement against resistance with the affected legs.
5. Do not wear socks, stockings, or undergarments with tight elastic bands.
6. Avoid extreme temperature change when bathing or sunbathing. It is recommended that saunas and hot tubs be avoided. Keep the leg(s) protected from the sun.
7. Try to avoid any type of trauma, such as bruising, cuts, sunburns or other burns, sports injuries, insect bites, cat scratches. If an injury occurs, watch carefully for subsequent signs of infection.
8. When manicuring your toenails, avoid cutting cuticles (inform pedicurist).
9. Exercise is important; however you should consult with your therapist before beginning an exercise program. Do not overtire a leg at risk; if it starts to ache, lie down and elevate it. Recommended exercises: walking, swimming, light aerobics, bike riding, and yoga.
10. When traveling by air patients with lymphedema, and those at risk for lymphedema, should wear a well-fitted compression stocking. For those with lymphedema, additional bandages may be required to maintain compression on a long flight. Increase fluid intake while in air.
11. Use an electric razor to remove hair from legs. Maintain the electric razor properly and replace the heads as needed.
12. Patients with lymphedema should wear a well-fitted compression stocking during all waking hours. At least every 4-6 months, see your therapist for follow-up. If the stocking is too loose, most likely the leg circumference has reduced or the stocking is worn and needs to be replaced.
13. **Warning:** If you notice a rash, itching, redness, pain, an increase of temperature or fever, see your physician immediately. An inflammation or infection in the affected leg could be the beginning of an infection or worsening of the lymphedema.
14. Maintain your ideal weight through well-balanced, low sodium, high-fiber diet. Avoid smoking and alcohol. Lymphedema is a high protein edema, however eating too little

protein will not reduce the protein element in the lymph fluid. Instead, this may weaken the connective tissue and make you condition worse. The diet should contain easily digested proteins such as chicken, fish, or tofu.

15. Always wear closed shoes (high tops or well fitted boots are highly recommended). No sandals, slippers, or going barefoot. Dry you feet carefully after swimming.
16. See a podiatrist once a year as a preventative measures to check for and treat fungi, ingrown toenails, calluses, pressure areas, athlete's foot.
17. Wear clean socks and hosiery at all times.
18. Use talcum powder on feet, especially if you perspire a great deal. Also talcum will make it easier to pull on compression stocking. Wearing rubber gloves also helps when pulling on stockings. Powder behind the knee often helps by preventing rubbing and reducing irritation.

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In Defense of the 18 Steps to Prevention(c)  
William. J. Schuch, Chairman, NLN Board of Directors

During the 1998 NLN Conference, Prof. med. Michael Földi addressed the issue of the insistence by some U.S. physicians for "evidence-based" validation of the do's and don'ts contained in the "18 Steps." As he pointed out, "there are cases in which 'anecdotal observations' are in harmony with scientific facts, with established knowledge and looking for evidence by prospective, randomized clinical studies is prohibited by ethical considerations."

Cancer survivors who have undergone the excision of lymph nodes and/or radiation therapy are at risk for lymphedema. Yet, the majority of these individuals are unaware of this risk and what can be done to avoid or, at least, delay the onset of lymphedema.

The National Lymphedema Network's 18 Steps to Prevention for both upper and lower limbs has been widely disseminated in an attempt to inform those at risk and their health care providers as to the activities or events which have been identified by experienced MD lymphologists as potential triggers for the onset or exacerbation of lymphedema.

As the American medical profession is slowly beginning to be brought up to speed on lymphedema, its prevention and treatment, some physicians are inclined to dismiss many of the precautions advised in the 18 Steps because they lack scientific substantiation, i.e. there have been no controlled studies to evaluate which of these events or activities are capable of precipitating the onset of lymphedema in those at risk. This attitude is most unfortunate since patients who might otherwise observe these precautions are, instead, often advised essentially to resume their normal activities. As a consequence, many are blindsided by the onset of lymphedema.

While it is true that many of the activities listed in the 18 Steps as potential triggers are based on anecdotal reports rather than structured studies, this is not a problem for experienced MD lymphologists who understand the pathophysiology of lymphedema.

In simplest terms, a regional lymphatic network that has been subjected to nodal basin excision and/or radiation has had its capacity to transport and filter the necessary lymphatic load - protein, water, metabolic wastes, viruses and bacteria - curtailed to a greater or lesser degree. This reduced transport capacity is frequently not enough to result immediately in the swelling which is characteristic of lymphedema.

From that point forward, however, any activity or event which directly or indirectly further impairs the transport capacity of the affected lymphatic network or increases the lymphatic load (the amount of hi-protein interstitial fluid that is to be returned to the circulatory system via the regional lymphatic networks) has the potential to trigger the onset of chronic lymphedema, viz. swelling that is visible, measurable and palpable.

With a thorough understanding of the anatomy, physiology and pathophysiology of the lymphatic system, it is possible to identify certain events or activities which either reduce the transport capacity or increase the lymphatic load, or both. Therefore, it is not a quantum leap in defensible reasoning to conclude that those certain events or activities ought to be avoided to minimize, as far as possible, the risk for lymphedema.

Clearly, the following can have the effect of further reducing transport capacity of superficial impaired regional lymphatics: the high-end pressures involved in the taking of blood pressure on the afflicted limb, carrying heavy handbags with over-the-shoulder straps, wearing tight jewelry or elastic bands around afflicted fingers or limbs, wearing heavy breast prostheses, narrow bra straps, tight bras, underwire bras, tight socks, stockings, shoes and underpants.

The amount of lymphatic load is directly related to the level of blood flow to the affected areas. Approximately 10% by volume of the fluid delivered to the cells through ultra-filtration ultimately is returned to the systemic circulation via the superficial and deep lymphatic networks. Therefore, heavy lifting with the affected limb, extreme climatic heat and cold, extreme water temperatures when bathing or washing dishes, hot tubs, saunas, sunburn and vigorous repetitive movements against resistance, all of which increase blood flow, should be avoided.

Airplane travel involves pressure changes which allow interstitial fluid to pool in the dependent extremities while the vasomotor activity of the lymphangia (the valved vessels which pump the lymph towards the regional lymph nodes) is at a low level because the individual is essentially at rest during flight. Hence, the need to wear compression bandages, sleeves or stockings and to move around as much as possible to prevent the pooling which increases the lymphatic load.

Infections have the potential for not only curtailing transport capacity, but also increasing the lymphatic load. Cellulitis and lymphangitis, which can become episodic, inflame the superficial lymphatic vessels, rendering them progressively dysfunctional and, thereby, adversely affecting the transport capacity.

A second effect, the so-called "inflammatory response," increases the permeability of the walls of the arterial capillaries to allow for the ultra-filtration of additional plasma protein into the interstitial spaces already laden with the troublesome hi-protein fluid. This increases the lymphatic load and promotes the proliferation of fibrotic tissue which, in turn, further impedes transport capacity.

Even a needle puncture, for whatever purpose, through a perfectly antiseptic topical environment can evoke the inflammatory response in the absence of an infection. Therefore, it is important to avoid needle sticks of every kind into the affected limb (cuts, insect bites, animal scratches, cuticle trimming, shaving under arms and legs with a razor blade) and necessary to keep the affected limb, hand or foot scrupulously clean and supple, and as free of topical bacteria and fungi as possible.

All of the above precautions make preeminent sense. However, whether or not one or more of these events or activities will be the immediate or ultimate precipitating trigger is dependent upon a number of factors. They include, but may not be limited to, the initial degree of surgical

impairment(number of lymph nodes excised or the extent of other surgical disruption, or collateral damage of nearby lymphatic networks and the amount of lymphatic scarring from radiation therapy) , or the degree of impairment from other causes, i.e. burns, infections, or severe physical trauma; the degree of obesity, if any; the individual's specific lymphatic anatomy and the level of anastomoses (connections) between neighboring lymphatic networks and regions; the lymphangion fatigue factor resulting from long-term dynamic compensation for the impaired networks; and the cumulative or progressive effect of the previously cited events and activities subsequent to the initial impairment.

Because cancer survivors and others with secondary lymphatic impairment frequently are not afflicted with lymphedema immediately and appear able to carry on their normal activities without modification does not mean that these activities and events will not trigger the onset of lymphedema eventually. Upwards of five percent of breast cancer survivors are afflicted with lymphedema in their first year of survival, but the lifelong affliction rate is reported to be between 30 and 40% - secondary to en bloc excision of lymph nodes and radiation therapy.

There is an abundance of reinforcing anecdotal reports that experienced MD lymphologists and lymphedema therapists, both here and abroad, have heard from their patients concerning one or more events cautioned against in the 18 Steps which immediately preceded the onset of their lymphedema. I would conclude, therefore, that those who choose to ignore these cautions place themselves at risk for lymphedema.

The 18 Steps are prudent advice, notwithstanding the lack of scientific research studies which some physicians insist on having before endorsing these precautions. In view of our understanding of the factors in the lymphedema trigger equation - transport capacity vs. lymphatic load - and the substantial anecdotal history that points to the cited activities and events as lymphedema precipitators, one wonders whether controlled studies in which some of those at risk for lymphedema would be encouraged to resume normal activities would be medically advisable.

The construct of such controlled studies also would be complex because of the number of alleged triggers, their cumulative or reinforcing effects, the variations in the lymphatic anatomy of individuals, the degree of lymphatic impairment and the fact that the risk for lymphedema is over a lifetime. Clearly, there are significant technical and logistical obstacles to the scientific evaluation of the individual alleged triggers in the short and intermediate term.

Observance of the 18 Steps is a matter for the at-risk patient to weigh seriously and to decide. Tragically, lymphedema is a serious quality-of-life issue for many thousands of people who were uninformed as to its prevention and treatment.

The 18 Steps are positive steps for improvement in the life-styles of those afflicted with this disease.

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# Lymphoscintigraphy

Lymphangiography is no longer used in the diagnosis of lymphedema!

## Introduction

Approximately 90 percent of all lymphedema cases are diagnosed on the basis of observations, measurements, and symptoms. The remaining 10 percent of lymphedema cases require more complex diagnostic measures.

Although infrequently required, these tests can be useful in confirming the diagnosis in complex cases, to evaluate residual lymphatic function, and to establish treatment preferences. The purpose of this article is to discuss the test used in these cases.

## Lymphangiography

Lymphangiography is a radiographic examination of lymphatic vessels and nodes in which an oily contrast medium is injected into a lymphatic vessel in the foot or hand. A series of radiographs are then taken to trace the flow of the contrast medium through the lymphatic vessels. Unfortunately the residue from this oily contrast medium often damages the remaining functional lymphatic vessel.

In the past lymphangiography was used to diagnose lymphedema; however the damage caused by the test often makes the lymphedema worse. For this reason lymphangiography is no longer used in the diagnosis of lymphedema.

## Lymphoscintigraphy

Lymphoscintigraphy is now widely accepted as a diagnostic test for lymphedema. Lymphoscintigraphy involves the injection of a water-based radionuclide that does not damage the lymphatic tissues. The flow of this substance is traced with a gamma camera and then a computer is used to create images of the lymph flow and to calculate speed of uptake.

### References

- **A Primer on Lymphedema** by Deborah Kelly. Upper Saddle River, NJ: Prentice Hall, 2002, pages 39-40.
- **The Third Circulation: Radionuclide Lymphoscintigraphy in the Evaluation of Lymphedema** by A Szuba et al. JNM, Volume 44, Number 1, January 2003.

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# Fibrosis

## Introduction

The term fibrosis means hardening of the tissue. Fibrotic means pertaining to fibrosis or hardened tissue. For a lymphedema patient, these are two very important words!

## What Happens

In the early stages of lymphedema, the tissues swell with protein-rich lymph that does not drain properly. These tissues are soft to the touch and pressure leaves an indentation that takes time to fill back in. This is known as pitting edema.

If the lymphedema is not treated at this stage, the stagnant lymph causes fibrosis within the affected tissues. Fibrosis can also be caused by chemotherapy, radiation treatment, burns, and the long-term treatment of lymphedema with a compression pump.

- The amount of swelling is not an indicator to the risk for developing fibrosis. Fibrosis can occur in tissues with only moderate swelling.
- As fibrosis develops normal tissue is replaced by fine scar- line structures that create obstructions and make lymph drainage even more difficult.
- Fibrotic tissue is not soft to the touch like normal tissue. Instead it feels firm, even hard, and pressure does not leave an indentation. These changes increase the risk of more swelling, tissue infections, and skin problems.
- Because lymph cannot drain properly, protein molecules accumulate in the tissue and cause more fibrosis.
- The tissues are further damaged because the fibrosis prevents tissue fluid from bringing essential nutrients to the cells.
- This produces an increase in the toxic waste in the fluid surrounding the cells within these tissues.
- These tissue changes result in infection with the tissues and open wounds they do not heal properly.

References:

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# Recognizing a Lymphedema Related Emergency

*Any sign of an infection in a limb that is at risk lymphedema may be an emergency and you should seek medical help immediately!*

## **Introduction**

For many individuals the diagnosis of lymphedema comes only after a lymphedema related infection. Since these infections can quickly develop into a life-threatening emergency, it is important that anyone who is at risk for lymphedema should know how to recognize, and react to such an emergency.

If you are at risk for Lymphedema, you need to be aware of the following is the basic information.

## **WARNING SIGNS**

Gradual swelling, a feeling of heaviness, and discomfort in the affected limb, are often the first symptoms of lymphedema. These signs are a wake-up call that you need to seek a diagnosis and treatment soon; however, these warning signs are often overlooked.

## **A Lymphedema Related Infection**

The fluid that causes the swelling of lymphedema is protein rich, and this creates an environment that bacteria love! Any break in the skin, even an insect bite, allows bacteria to gain access through the skin and to happily set up housekeeping within the affected tissue.

If untreated, an Infection Related to Lymphedema spreads rapidly through the tissues, past the lymph nodes, and into the bloodstream. When this happens, you are faced with a spreading and life threatening emergency.

## **What to Watch For**

These signs and symptoms of these infections include:

- Malaise
- Chills and fever
- Discoloration( such as redness, or streaky lines)
- Rash

- Tissue that feels hot and tender
- Sudden swelling
- Itching
- Pain

**Take Action Immediately!**

Don't wait! This type of infection requires prompt treatment with antibiotics. If you have any of these symptoms in an "at risk" limb, seek medical care immediately. If your physician is not readily available, go directly to the nearest emergency room (ER).

When you check in for treatment be sure to mention that you are at risk for lymphedema!

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# First Aid and Lymphedema

Lymphedema puts you at risk for serious infections that require immediate medical treatment; however, you also need to know how to handle those every day bumps and scratches that we all encounter.

## Prevention is the Best Action

- If you are going to be outside wear insect repellent and sunscreen. A compression sleeve does not provide protection from sunburn.
- If swimming, reapply insect repellent and sunscreen after each swim.
- If you have an affected arm, wear gloves while doing house work or tasks such as home repairs. For gardening gloves and long sleeves are a must.
- If you have an affected leg, do NOT go barefoot!
- If you have an affected leg, wear long pants, socks, and sturdy shoes when walking over rough terrain or through high grass, weeds, or brambles that might scratch you.

## First aid Steps

When a minor accident does occur, carefully follow the basic first aid procedures for your type of injury. The following are guidelines for managing injuries that slightly damage or break the skin.

- **A minor cut or scratch:** Carefully clean the wound then apply an antibiotic cream, such as Neosporin®, and place a bandage. Watch for signs of infection. *Caution: Because of their concern about the development of drug resistant bacteria, some physicians are reconsidering using an antibiotic cream for this purpose.*
- **A minor (first degree burn):** If there is no break in the skin follow the four C's of burn care: (1) *Rinse with cool water.* (2) *Clean the burn.* (3) *Cover the burn.* (4) *Consult a physician if this is a burn with a blistering or break in the skin.*
- **An insect bite or poison ivy:** After an insect bite clean the area and apply an antibiotic cream. For a bite or rash, don't scratch! Anti-itch ointments, such as Cortaid®, may help. If the itching is severe, seek medical help.

## What to Do When Things Go Bump!

Despite your best efforts to be careful, at some time you are likely to fall or bump into something and bruise yourself. After examining the injured area carefully to determine that you are only dealing with a bruise, the following suggestions can help ease the discomfort.

- Place ice on the bruised area. No longer than 20 minutes at one time.
- Perform self-massage in the head and neck region to open drainage to accept the flow of lymph.
- Gently perform your self-massage routine for the affected limb.
- Repeat these steps as necessary always taking care to massage the tissue gently.
- Surprise! This will also ease bruises in tissues that are not affected by lymphedema.

**Pay Attention!**

Watch for signs of infection. If any of these indications of trouble occur, seek medical attention immediately!

- Malaise (not feeling well) chills and fever
- Redness (particularly in a streaky pattern) tissues that feel hot and tender
- Sudden swelling of the lymphedema affected area, pain or itching.

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## **Massage**

Massage is an important part of the treatment for lymphedema. For it to be effective in treating lymphedema, it is important to use the correct technique. The aim of massage is to stimulate or move the excess fluid away from the swollen area so that it can drain away normally. A very specialized form of massage called manual lymphatic drainage (MLD) is used to do this. This differs from an ordinary massage—it is very gently and performed to encourage movement of lymph in the right direction. Simple lymphatic drainage (SLD) is a modified form of MLD that you can be taught to do for yourself.

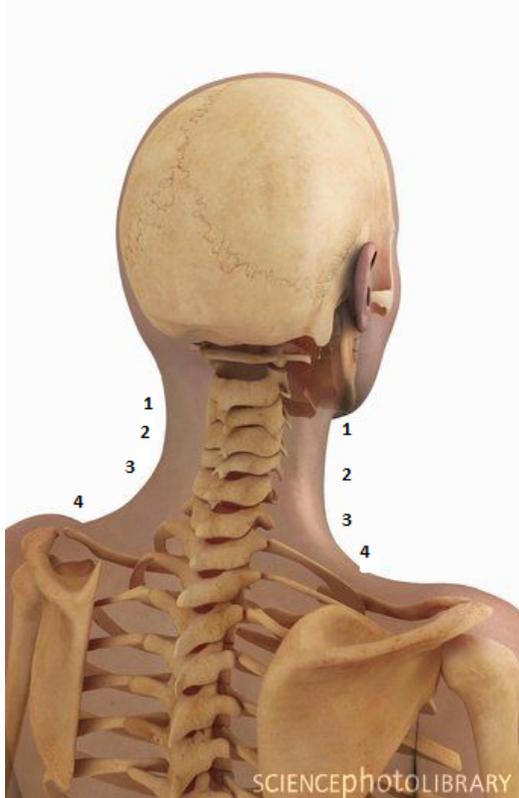
## **MLD**

As this is a specialized form of massage, it should be given only by a trained therapist. There are four different techniques called the Vodder, Foldi, Leduc or Calsey-Smith methods. Therapists should be trained in at least one of these. MLD is particularly useful if there is swelling in the face, breast, abdomen, genitals or elsewhere on the trunk.

## **Self massage**

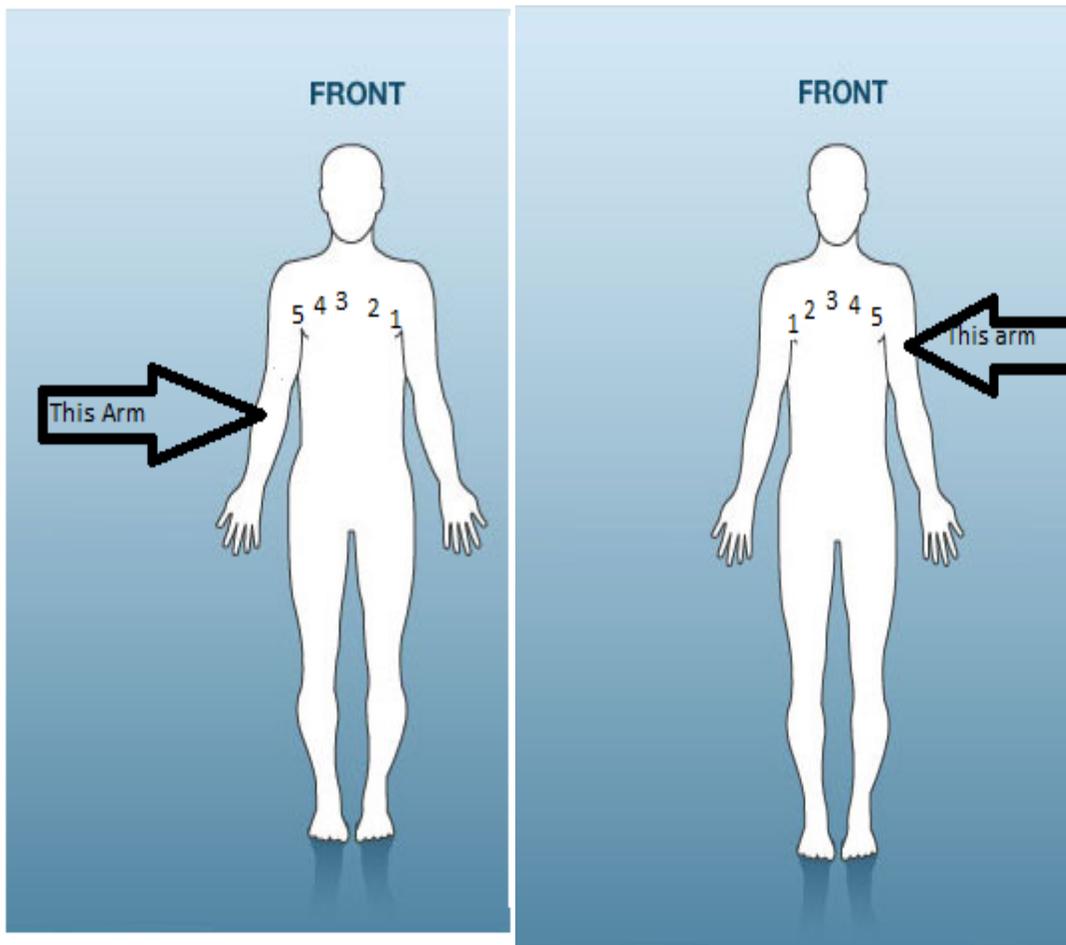
You can do a simplified version of MLD yourself at home, called simple lymphatic drainage (SLD). SLD is done by using your fingers very gently to move the skin in a particular direction. If you find that the skin is red when you have finished, then the movement is too hard. It is often easier your partner or a friend also learns the technique, so they can help you in any areas you cannot reach. Your physiotherapist or nurse will be able to show you or your partner the technique. The diagrams and explanations on the following pages should also help.

## Massage 1- for both arm and leg swelling



- Place your fingers, relaxed, on either side of your neck at position 1.
- Gently move the skin in a downward direction, toward the back of your neck.
- Repeat 10 times at position 1, 2, and 3.
- On the top of your shoulder use a gentle inward scooping movement down towards the top of your breast bone (where the collarbones meet)
- Repeat 5 times.

## Massage 2- for swelling of one arm



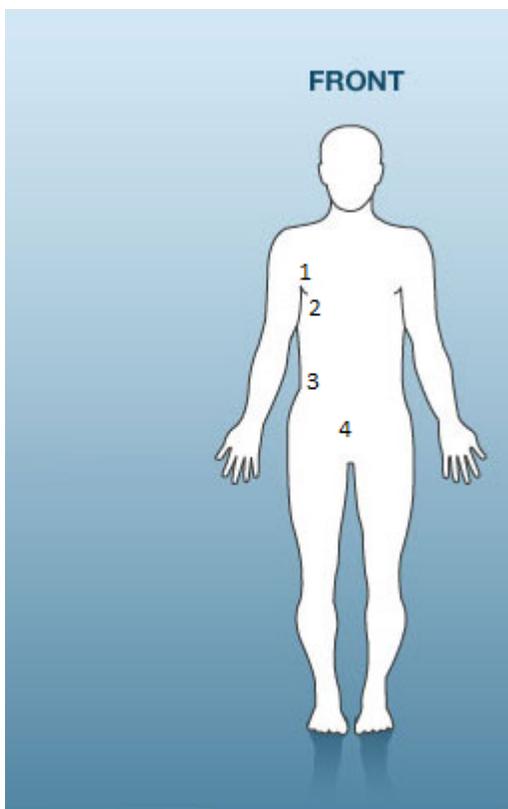
The aim of this massage is to stimulate the lymph channels on the trunk to clear the way ahead so excess fluid can drain away.

The skin is always moved toward the non-swollen side. You will find it easier to start with one hand, and then swap to the other as you move across your body.

- Starting in the armpit on the non-swollen side (position 1), use light pressure to gently stretch the skin up into the armpit. Your hand should be flat and not slide all over the skin. Repeat 10 times.
- Next, at position 2, use light pressure to gently stretch the skin up into the armpit. Your hand should be flat and not slide over the skin. Repeat 10 times.

- Next, at position 2 use a light push to stretch the skin toward non-swollen side, with a slow and gentle rhythm. Repeat 5 times.
- Repeat the same movement at position 3.
- Swap hands, and repeat the movement 5 more times at position 3 with your other hand, as this position is very important for lymphatic drainage. This time, the movement with your fingers is a slight pull to move the skin to the non-swollen armpit.
- Repeat movement 5 times at position 4, then 5.

## Massage 3- for swelling of one leg



The aim of this massage is to clear a path ahead of the affected leg to allow excess fluid to drain away.

- Starting at the armpit on the same side as you affected leg (position 1), use light pressure to stretch the skin up gently into the armpit. Your hand should be flat and not slide over the skin. Repeat 5 times.

- Repeat 5 times each at chest level (position 2), waist level (position 3), then at your abdomen (position 4). Each times you will be gently pushing the skin up to the armpit on the same side as the swelling.

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You must be properly taught these techniques before you start. These diagrams are intended as a guide only when you are doing your SLD.

## **Deep breathing exercises**

Before and after SLD, breathing exercises can stimulate lymphatic drainage. Use the following simple exercises.

- Sit in a comfortable chair or lie on your bed with your knees slightly bent. Rest your hands on your abdomen.
- Take deep breathes to relax.
- As you breathe in--- direct the air down to your abdomen which you will feel rising under your hands.
- Breathe out slowly by ‘sighing’ the air out. While breathing out let your abdomen relax in again.

Do the deep breathing exercise five times and then have a short rest before getting up.

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