



Medicine for Managers

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Why Do My Legs Swell?

We see it often enough. You only need to sit on the tube and look down and you will see plenty of ankle swelling. I'll bet you didn't know there are at least thirty common causes and, including rarities, many more. More professionally known as *peripheral oedema* it is usually not painful unless due to injury. It may be uni- or bilateral and may be a sign of a more serious underlying health issue.

The Common Causes of Ankle Swelling

1. Injury
 - a. Ankle sprain
 - b. Fracture
 - c. Achilles tendonitis and post-calcaneal bursitis
2. Heart and Blood Vessel Disease
 - a. Congestive Heart Failure
 - b. Hypertensive heart disease and Cor Pulmonale
 - c. Ischaemic Cardiomyopathy
 - d. Mitral Stenosis
 - e. Myocarditis and Pericarditis
 - f. Infective endocarditis
 - g. Peripheral Vascular Disease
 - h. Deep Vein Thrombosis
 - i. Varicose Veins
3. Obesity
4. Kidney Disease
 - a. Kidney Failure
 - b. Glomerulonephritis
 - c. Chronic Kidney Disease
 - d. Acute Nephritis
5. Osteoarthritis
6. Osteomyelitis
7. Pregnancy
8. Liver Disease
 - a. Cirrhosis
 - b. Ascites
9. Malnutrition
10. Lung Diseases
 - a. Emphysema
 - b. Chronic Bronchitis
11. Hormonal Disorders
 - a. Hypothyroidism
 - b. Pre-menstrual syndrome
12. Lymphoedema

1. ***Bone, tendon, muscle and bursal injuries*** are common causes of unilateral, usually lower leg swelling and they are usually easy to identify.

There is normally a history of trauma which results in tearing of ligaments or muscles or, in more severe cases, fracture of bones. Sprains, strains and fractures result in swelling, tenderness bruising and pain. It is usually difficult to put weight on the affected leg.

Easily distinguishable from other causes of leg swelling, it is normally reversible with rest or other appropriate treatment. Some bursal swellings are the result of chronic

irritation of a bursa. A bursa is a sac of fluid which lubricates tendons and, if irritated, it may respond by increasing the amount of fluid manufactured, resulting in a localised tender, painful, often hot swelling.



Bursae normally subside with rest, anti-inflammatory treatment and protection from irritation.

2. Heart and Blood Vessel Disease. A host of cardiovascular disorders can result in lower leg swelling. Whatever the nature of the cardiovascular abnormality, the result is that there is pooling of fluid in the periphery.

The mechanism to return blood to the heart is not fully effective because of heart muscle disease or damage, valve damage, obstruction in a vessel or vessels leading back to the heart, destruction of the non-return valves in the veins or increased pressure in the system.

It is often insidious at first, with the patient perhaps noticing increased tiredness, some weight gain and some early signs of leg swelling, such as indentations on the legs when removing socks or shoes.

As the problem worsens the symptoms become more marked with increasing swelling of the feet, ankles and the legs

(depending on the severity). The congestion throughout the system starts to affect other organs resulting in cough (due to congestion in the lungs), wheezing, breathlessness, some blue discoloration of the skin and having to get up at night (nocturia).

The heart starts to struggle with the increased load, enlarges, the beat may become irregular and the heart itself may start to fail.



Once leg swelling becomes apparent with heart disease the problem is becoming quite serious.

Treatment is of any disorder of the heart including medication to improve function, surgical repair of valves, treatment of blocked or narrowed arteries, treatment of any associated conditions such as high blood pressure (hypertension) or diabetes, methods to assist pushing fluid back to the heart (e.g. pressure stockings) and of course, the stalwarts of keeping the legs up and losing weight.

Prognosis depends on how much improvement in function can be achieved and how much damage has already been done. Generally treatment is aimed at preventing the situation

worsening and there is often no dramatic improvement.

A **Deep Vein Thrombosis** is a serious condition which occurs when a blood clot forms in one of the deep veins in the leg. The clot may occur because of injury, smoking, prolonged sitting, some cancers, having a family history, or sometimes for no obvious reason at all.

The clot may impair blood return to the heart in the affected leg resulting in swelling of the lower leg which often provides the clue to diagnosis.

Such clots may be serious because of the risk that a piece may break off and circulate through the blood stream, sticking in a vessel in the lung producing a pulmonary embolus which can be fatal.

Treatment on diagnosis is anti-coagulation to dissolve the clot.

Varicose veins may also result in some leg swelling. Varicose veins occur when the valves in the veins, which prevent backward flow, burst allowing a column of blood to collect in the affected veins. The veins become distended as their thin walls are dilated by the accumulating volume of blood.

They are a feature of pregnancy, regular prolonged standing and obesity and they cause pain, heaviness and aching in the legs. They also cause lower limb swelling most noticeably round the ankles.

Treatment is by addressing the causes, conservatively using support compression stockings or sometimes by stripping out the varicose veins.

3. Obesity is a major cause of lower leg swelling. Much publicised obesity is becoming a major epidemic and is defined as having a BMI of thirty or more. It is commonly the simplest medical problem of all.

Eat more calories than you burn and you put on weight. There are plenty of aggravating factors; the consumptions of poor quality fat laden foods (often for convenience or in cases of poverty), sedentary lifestyle, hormonal changes (such as



hypothyroidism, polycystic ovaries, Cushing's syndrome or pregnancy) and aging, where there is less muscle mass and a slower metabolic rate.

Depression may result in weight gain through the use of food as a comfort. Genetic, environmental and psychological factors may increase a person's risk of obesity.

The result is a range of medical complications including leg swelling and the pressure within the abdomen compresses the vessels returning blood to the heart resulting in pooling. The life consequences of obesity have been well reported.

4. Kidney Disease may cause lower limb swelling because the blood filtration and chemical balance mechanisms may be lost. A variety of chemical and inflammatory diseases may impair the kidneys' ability to fulfil its cardinal function of filtering the blood and eliminating toxins and water. The filtration mechanism is simply the creation of a balance

and osmotic pressures applied by discarded or retained blood components controls the amount of fluid lost or retained.

Failure to discard unwanted blood constituents results in too much fluid being retained and it accumulates under gravity in the lower limbs. Urine output is reduced.

Kidney diseases cause symptoms in almost every body system; drowsiness, breathlessness, chest pain, confusion, seizures and coma.

5 Osteoarthritis does not cause generalised swelling but usually swelling associated specifically with an osteoarthritic joint, commonly the knee or the ankle.

The diagnosis is usually plain from the examination. The joint is painful, limited in movement, stiff, sometimes reddened and swollen. None of this will be new



to many of the readers over 50! Management is by rest, heat, analgesia, exercises, etc. with, as a last resort knee replacement.

The joints in the lower limb may also become swollen as a result of **6 Osteomyelitis** which is a bone infection, or a **Septic Arthritis**, which occurs when a circulating infection in the blood (**septicaemia**) reaches a joint. A joint may also swell during an attack of **Gout**.

Gout occurs as a result of the accumulation of uric acid crystals in the joint which irritate it and cause swelling, severe pain and reddening. For

osteomyelitis and septic arthritis the treatment is urgent and depends on appropriate antibiotic therapy. For gout, anti-inflammatory drugs form the mainstay of treatment.

7 Pregnancy. The legs may swell during pregnancy. Normally there is a visible clue to the diagnosis because it is increasingly common as the pregnancy advances.

Most women get some leg swelling in the final three months (**third trimester**) due to pressure of the enlarging uterus on the veins carrying blood back from the legs to the heart.

More serious is pre-eclampsia with its triad of signs and symptoms; **rising blood pressure**, **protein in the urine** and **oedema** (not confined to the legs but with puffiness of the face and hands as well).

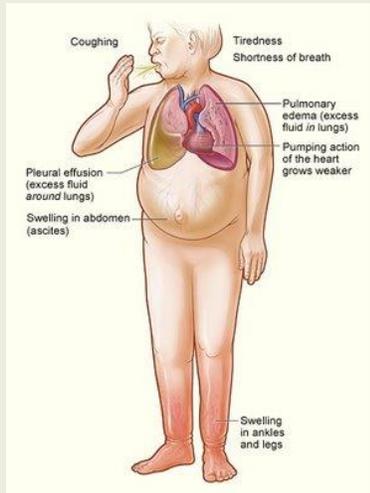
Pre-eclampsia needs to be managed medically and closely monitored. The baby may need to be delivered quickly to avoid **eclampsia** which is a condition in which convulsions may occur in a pregnant woman with the other pre-eclamptic features, often followed by the development of coma and posing a threat to the health and even to the survival of mother and baby.

8. Liver Disease is amazing and is able to regenerate itself despite severe chemical insults, such as viral infections and alcohol.

However, if the damage is overwhelming, the liver cells die and are replaced by scarring. When too much of the liver has been damaged or destroyed the liver can no longer fulfil its functions and cirrhosis results.

Aside from its protective functions for the body, much blood passes through the liver. If the organ has become hardened and scarred, the blood cannot easily pass through and the

pressure rises (**portal hypertension**). Early symptoms result from the liver failure and include loss of appetite, itchy skin, weakness and lassitude and the development of jaundice due to accumulation of bilirubin in the blood. Later symptoms include confusion and the development of swelling as fluid accumulates in the legs and in the abdomen (**ascites**).



Once established, treatment to achieve improvement is difficult.

9. Malnutrition occurs as a result of lack or absence of any nutritional factors required for good health.

They cause a host of symptoms including pallor, weakness, breathlessness, tiredness, constipation, palpitations, tingling and numbness and poor concentration.

Peripheral oedema may also be a feature if the deficiency is of protein such that plasma proteins are not formed. If the blood lacks plasma proteins, the osmotic pressure they exert to draw fluid back from the tissues into the blood vessels is diminished resulting in too much extra-vascular fluid which is seen as oedema.

Resolution can normally be achieved by reversal of the malnutrition; simple medically but it may be exceptionally complex socially.

11. Hormonal Disorders.

Hypothyroidism is a deficiency of the hormone thyroxine which results in a condition called **myxoedema**. It may be the result of iodine deficiency, certain drugs or Hashimoto's disease which is an unusual auto-immune disease (where the body reacts against its own thyroid gland).

Fatigue, lethargy, weakness, tiredness, constipation and a hoarse voice are common and the patient may also suffer from swelling of the body, particularly the lower legs, because of the deficiency and the consequent sedentary lifestyle. Treatment is of the deficiency with replacement thyroid hormone.

Many women develop signs of swelling in the legs during the second half of the menstrual cycle. **Premenstrual syndrome** causes anxiety, depression, acne, fatigue and headaches. It also causes fluid retention which may present as swollen legs. It is believed to be associated with the variations in hormone levels and may affect up to 85% of all women.

12 Lymphoedema. This is a relatively rare condition which results in obstruction to the lymphatic system (in essence arteries carry the blood from the heart to the body tissues, veins and the lymphatics carry it back to the heart).

The lymphatic system is really an overflow arrangement, working at no pressure to allow extracellular fluid to return to the heart).

Primary Lymphoedema results from a hereditary condition where the lymphatic system does not develop correctly. This is commonly due to **Milroy's Disease**.



Secondary Lymphoedema is usually seen in the arms following surgery or radiotherapy for breast cancer where the delicate lymph channels are damaged and fluid accumulates in the arm.

Occasionally it is seen in the leg following radiotherapy to a pelvic tumour with damage to the femoral lymphatic vessels. Treatment is normally by compression increasing the pressure to push the fluid through the remaining lymphatics or through the venous system.

So, there are many reasons for swollen legs. Sit on any crowded underground train and look down at the passengers' legs and you will quickly realise it is the older people who struggle with either chronic heart failure or obesity, or both, who are the most likely sufferers. It doesn't take long to realise just how common it is.

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