# InDependent Diabetes Trust

## Joint and Muscle Problems

Updated January 2013

Registered Company Number 3148360
Registered Charity No 1058284

## Contents



## Introduction

- Joint and skeletal disorders, known as connective tissue disorders, have been recognised as complications of diabetes for some time.
- They tend to receive less attention than the other complications of diabetes and the progress of these conditions is often not monitored.
- They are not life-threatening but they can be distressing and painful conditions that may alter the lifestyles for many people
- Osteoporosis is a common problem and in the UK with one in two women and one in 5 men over 50 will break a bone. Research has shown that there may be links between osteoporosis and Type 1 and Type 2 diabetes.

## Connective tissue disorders

Connective tissue is the material between the cells of the body that gives tissues form and strength. It also is involved in delivering nutrients to the cells around the body. It is made up of dozens of proteins including collagens. These proteins vary in quantity to provide different structures with varying functions: bone, cartilage, tendons and ligaments as well as fatty and elastic tissues.
Many connective tissue disorders are caused by mutations [alterations] in genes for building tissues and these mutations may change the structure and development of skin, bones, joints, heart, blood vessels, lungs, eyes and ears. Some connective tissue disorders are not directly linked to these mutations but some people may be genetically predisposed to becoming affected. Inherited connective tissue disorders may not be evident at birth but may appear after a certain age or after exposure to a particular environmental stress.

## Tests that your doctor may carry out

In connective tissue disorders there may be inflammation/infection present and/or there may be damage to muscles. There are two tests that the doctor may carry out:

- **ESR Test [erythrocyte sedimentation rate]** - this is the 'standard' blood test that GPs often carry out for many conditions to find out if there is any infection present in the body. A high result means that there is an infection and this can then be treated.
- **Creatine Kinase Test** - this is carried out to diagnose and monitor the progress of neuromuscular disorders. Creatine kinase [CK] is a protein found mainly in muscle and it is an enzyme that encourages a biochemical reaction to occur to provide a quick source of energy for the cells. If muscle is damaged, then during the muscle regeneration muscle cells break open and their contents go into the bloodstream. This means that the amount of CK in the blood will rise indicating that muscle damage has occurred and this can caused by chronic disease or by acute muscle injury.

## Myopathy

Myopathy is a general term used to describe any disease of muscles, such as the muscular dystrophies and myopathies associated with thyroid disease. It can be caused by endocrine disorders, including diabetes, metabolic disorders, infection or inflammation of the muscle, certain drugs and mutations in genes. In diabetes myopathy is thought to be caused by neuropathy, a complication of diabetes. General symptoms of myopathies include muscle weakness of limbs sometimes occurring during exercise although in some cases the symptoms diminish as exercise increases. Depending on the type of myopathy, one muscle group may be more affected than others.

**Treatment** - this varies according to the type of myopathy but may include drug therapy such as immuno-suppressants, physiotherapy, bracing or surgery.

## Chiroarthropathy [diabetic prayer]

This is often called limited joint mobility and in people with diabetes generally involves the small joints of the hands, although it can affect larger joints such as wrist, shoulder, knees, hips. It is usually painless but numbness and pain may be present if there is also neuropathy or angiopathy of the hand. Most people do not report the problem until there is some deformity or loss of movement of the fingers. The affected fingers are swollen with a thick, tight and waxy skin and there is an inability to press both hands together hence the term, diabetic prayer. Other disorders of the hand, such as carpel tunnel syndrome and Dupuytren's contracture, have different and distinct clinical

features. Chiroarthropathy is linked with more serious microvascular complications of diabetes eg retinopathy, nephropathy and neuropathy, so diagnosis is important. The causes of chiroarthropathy are not really understood.

**Treatment** - because of the relationship with the microvascular complications of diabetes, improved diabetic control is advised but there is no well established treatment. Physiotherapy is important to maintain movement and prevent further deterioration. Surgery and corticosteriod injections may help in severe cases.

**Prevalence:**

- 4 -14% of the nondiabetic population
- 8.4 - 55% of people with Type 1 diabetes
- 4.2 -77% of people with Type 2 diabetes

Studies show a wide variation which could be due to genetic or racial factors or incorrect diagnosis. However, it does increase with the duration of diabetes

## Frozen Shoulder [adhesive capsulitis]

An early sign of frozen shoulder is when lifting the arm above the head, reaching across the body or behind the back is difficult. This is followed by pain, often worse at night, the pain then reduces but the range of movement is more limited and may last for 4-12months. In the final stage the condition begins to resolve although surgery may be needed to restore movement. The cause is unknown but thought to involve an underlying inflammatory problem. The capsule around the shoulder joint thickens and contracts leaving less space for the upper arm bone to move around. It can also occur after long periods of immobilisation eg after injury or surgery.

**Treatment** - drugs such as aspirin or ibuprofen to reduce the inflammation and pain, muscle relaxants, physiotherapy, exercises, heat or ice therapies, corticosteroid injections but surgery only if there is no improvement after several months. Some people have reported a positive response from acupuncture.

**Prevalence:**

Frozen shoulder affects more women than men, usually starts between ages 40 and 65 and affects 10-20% of people with diabetes.

## Trigger finger

This is a common condition which results in a bent finger, as if pulling a trigger on a gun. The finger may be swollen, stiff and painful and there may be a bump over the joint in the palm of the hand. It involves the tendons and pulleys in the hand that bend the finger. The tendons connect the muscles to the forearm with the bones of the finger and each tendon is covered by a sheath. As the fingers are bent, the tendons glide backwards and forwards guided by a restraining pulley. If the tendon sheath becomes inflamed it swells and may develop a nodule or thickening of the tendon. The nodule passes through the pulley as the finger bends but gets stuck as the finger straightens which causes further irritation and swelling until eventually the finger locks in this bent position. The exact cause is unknown. It affects people over 40 and people with a history of diabetes or rheumatoid arthritis particularly at risk of developing it.

**Treatment** - aims to reduce the swelling and cycle of irritation so initially treatment is rest, splintering of the finger and taking aspirin or ibuprofen to reduce the swelling and pain. If the problem persists a steroid injection in the tendon sheath can relieve the pain and locking for several months. People with diabetes may require surgery to release the tendon and this can restore movement immediately.

## Dupuytren's Contracture

This is a fairly common condition in the palm of the hand that can cause the fingers to contract. It occurs when the connective tissue under the skin in the palm of the hand begins to thicken and shorten and as the tissue tightens it may pull the fingers down towards the palm of the hand. The first sign is a nodule near the base of the little finger and the ring finger. Gradually other nodules may appear across the first joint of the fingers, the skin puckers and the finger is pulled towards the palm. It usually affects the ring finger first followed by the little, the long and the index fingers, although there is evidence that in diabetes different fingers are affected. The problem is not pain but the restriction of movement. Although again the cause is unknown, there is a genetic link because it affects people of northern European decent. It is seven times more common in men than women and usually does not show up until after 40 years of age. People with diabetes, alcoholics and those taking anticonvulsant drugs have a higher risk of Dupuytren's contracture.

**Treatment** - the only treatment is surgery but this is usually only if the contracture has developed into a deformity. The outcome is usually good.

## Carpel Tunnel Syndrome

The carpel tunnel is a narrow, rigid passage of ligament and bones at the base of the hand that contains the median nerve [runs from the forearm to the hand] and tendons. If there is thickening of irritated tendons or other swelling the tunnel narrows and the median nerve is compressed. The symptoms often start gradually at night during sleep with burning, tingling or itching in the palm of the hand and fingers, especially the thumb and first two fingers and this can progress to daytime pain, weakness or numbness in the hand and wrist that may extend up the arm.

It is thought to be a combination of factors that put pressure on the nerve and tendons, rather than a problem with the median nerve itself. The most likely cause is congenital with some people just having a narrower tunnel but other common factors are injury to the wrist that causes swelling, overactivity of the pituitary gland, rheumatoid arthritis, and fluid retention.

Carpel tunnel problems affect three times as many women as men. People with diabetes or other metabolic disorders that can directly affect nerves are more susceptible to compression have a higher risk of developing carpel tunnel problems.

Treatment - obviously underlying causes such as diabetes or arthritis should be looked at first but treatment generally is resting the affected hand for two weeks, avoidance of anything that may worsen the symptoms and if necessary applying a splint to immobilise the wrist. In more severe cases drugs physiotherapy and/or surgery may be needed.

**New research** - has found that genetics, rather than repetitive hand use, is responsible for carpal tunnel syndrome.
*[American Academy of Orthopaedic Surgeons annual meeting: February 20, 2007]*

However, according to the researchers genetics do not provide the whole answer.

Age, genetics, obesity, diabetes, thyroid, various types of hormonal conditions, even pregnancy are predisposing factors but there are external factors that will bring on the symptoms. So the researchers suggest that a person may have a genetic or multi-factorial predisposition to carpel tunnel syndrome but something may cause the symptoms to develop. In other words, people who use their hands continuously and laboriously don't get carpel tunnel more frequently eg construction workers don't get it any more frequently and nor do

court reporters who don't stop using their hands all day for hours on end.

The study authors suggest that these findings may affect disability, workers' compensation and personal-injury claims.

## Stiff Man's Syndrome [SMS] or Stiff Person's Syndrome

This is a rare slow progressive neurological disorder and the symptoms are painful contractions and spasms of voluntary muscles, particularly those of the back and upper legs. It is caused by rogue antibodies in the blood causing muscles to lock unexpectedly leaving the person with this condition paralysed for minutes or hours at a time. The symptoms may worsen when the person is exposed to anxiety or sudden motion or noise. Sleep usually suppresses the frequency of the contractions.

Researchers think that stiff person syndrome may be an autoimmune disorder. How rare is rare? This is difficult to estimate because doctors often think that the symptoms are psychological or due to depression. 50% of people with SMS also have Type 1 diabetes although the link between the two conditions has not been proved scientifically.
It is interesting to note that the information on the National Institute of Health website says that other autoimmune disease such as diabetes may occur more frequently in people with Stiff Man's Syndrome. Interesting because if we look at the diabetes literature it is described the other way around as a 'rare complication of diabetes'!

**Treatment** - the drug diazepam, a muscle relaxant, provides improvement in most cases, as do some other drugs. Physiotherapy may also be helpful in some people.

## Diffuse idiopathic skeletal hyperostosis [DISH]

This is where there is calcification of the spinal ligaments and the most common part to be affected is the thoracic [chest] spine. It may also be accompanied by general calcification of other ligaments and tendons. The symptoms are stiffness of the neck and back with decreased movement but pain is not the most marked symptom. The cause is not known but the prevalence of DISH is higher in people diabetes than the general population, especially in people with Type 2 diabetes who are obese.

**Treatment - there is no evidence that good diabetic control delays the onset or improves the condition. Treatment is physiotherapy, aspirin or ibuprofen**

## Osteoporosis – is there a link with diabetes?

**What is osteoporosis?**

It literally means 'porous bones'. Our bones are made up of a thick outer shell and a stronger inner mesh of tiny struts of bones and in osteoporosis some of these struts become thin or break. This makes the bone more delicate and likely to break. The most common fractures in people with osteoporosis are wrists, hips and spinal bones. Osteoporosis often goes undetected until a fracture occurs.

**Causes of osteoporosis**
There are two types of cells in bones that are constantly working – one group of cells builds up new bone and the other breaks down old bone. Calcium and phosphate are essential for normal bone formation and up to the mid-20s uses these minerals to enable the bone-building cells work harder to build strength into the skeleton. If calcium and phosphate intake is insufficient or if the body does

not absorb enough calcium from the diet, then bone production and tissue may suffer.

As part of the natural aging process, from 40 years onwards the cells that break down bones overtake and bones gradually lose their density.

**Who is at risk of osteoporosis?**
It is a common problem and in the UK one in two women and one in five men over 50 will break a bone. It is extremely rare in children, young people and pregnant women.

Bone health is largely hereditary but there are factors that can increase the risk of osteoporosis:

- Women who have early menopause or hysterectomy.
- Men with low levels of testosterone.
- People who have broken a bone after only minor injury.
- Medical conditions which make people immobile for a long time.
- The use of certain medications such as steroids and anticonvulsants.
- Medical conditions that affect the absorption of food eg Crohn's disease, coeliac disease or ulcerative colitis.
- Smoking.
- Excessive alcohol intake.
- Women who are underweight or have an eating disorder.

**Symptoms**
There are no symptoms of osteoporosis in the early stages. In the late stages the symptoms include:

- Fractures of the vertebrae, wrists or hips.
- Low back pain.
- Neck Pain
- Bone pain or tenderness
- Loss of height over time.
- Stooped posture.

**If you think you are at risk of osteoporosis**
You should discuss this with your GP. You may need a special scan called a dual energy x-ray absorptiometry (DXA), which measures bone density. It is a simple and painless procedure that is recommended for people at high risk. Osteoporosis diagnosed on a bone density scan does not always mean you are at high risk of bone fractures as other factors such as age, have to be taken into account.

**Treatment**
Treatments focus on slowing down or stopping bone loss, preventing bone fractures by reducing the risks of falls and controlling pains associated with having the condition. There is a range of drug treatments to reduce the risk of breaking bones which your doctor will discuss.

**Lifestyle changes can also help.**

- Regular exercise that requires muscles to pull on bones help the bones to retain or even gain density eg walking, jogging, yoga, resistance exercises. [Not exercises that increase the risk of falling.]
- Diet should include adequate amounts of calcium, vitamin D and protein. High calcium foods include low-fat milk, yogurt, ice cream and cheese, salmon and sardines (with the bones), and leafy green vegetables.
- Give up unhealthy habits such as smoking and limit alcohol intake.
- Prevent falls by making sure vision is as good as possible, remove hazards around the house, wear good fitting shoes, avoid walking on icy roads alone.

**Are there links between osteoporosis and diabetes?**
A review of 16 studies involving over 800,000 people who sustained a total of nearly 140,000 hip fractures has found that having diabetes, especially Type 1 diabetes, makes people more likely to have hip fractures.

The review of 12 studies showed that people with Type 2 diabetes are 70% more likely to fracture their hip and in the review of 6 studies, those with Type 1 over 6 times more likely to do so. The researchers suggest that the cause could be diabetes complications, such as

retinopathy, neuropathy, low blood sugars and stroke making people more likely to fall.

Another study refers to bone loss [which can lead to osteoporosis] as 'a less well-known complication of Type 1 diabetes' and that there are differences between bone loss in Type 1 diabetes and age-related bone loss. It suggests that possible contributors to the suppression of bone formation in Type 1 diabetes include: increased marrow adiposity, hyperlipidemia, reduced insulin signaling, hyperglycemia, inflammation, altered adipokine and endocrine factors, increased cell death and altered metabolism.

Yet another study carried out in Germany has shown the trends of longer life expectancy and a lifestyle of low physical activity and high-energy food intake contribute to an increasing incidence of diabetes and osteoporosis. However, people with newly diagnosed Type 1 diabetes may have impaired bone formation due to the absence of the anabolic effects of insulin and amylin, but in people with long-standing Type 1 diabetes, vascular complications may account for low bone mass and increased fracture risk. It is suggested that prevention of fractures caused by osteoporosis in people with Type 1 diabetes may include tight control of blood glucose levels and aggressive prevention and treatment of vascular complications.

People with Type 2 diabetes have an increased fracture risk thought to be caused by increased risk of falling. The research suggests that people with Type 2 diabetes may benefit from early visual assessment, regular exercise to improve muscle strength and balance and specific measures for preventing falls.

Excess body fat may contribute to poor bone health, according to a study of 115 young women between 18 and 19 years old. The finding adds to the growing list of obesity-related health problems, which already includes an increased risk of heart disease, stroke, cancer, and others.

In the study, researchers conducted three-dimensional bone scans of women with normal body fat (less than 32%) and high body fat (greater than 32%). Women with high body fat had bones that were 8 to 9% weaker than those with normal body fat.

While it's not known exactly why excess fat is bad for bone health, animal studies have found that obese rats produce more fat cells than bone cells in bone marrow, which may explain the weakening.

The finding could be particularly damaging for obese children, whose bones are still developing. Childhood obesity, researchers said, could have a lasting negative impact on the skeleton.

**General information about osteoporosis can be obtained from:**
**National Osteoporosis Society,**
**Manor Farm, Skinners Hill, Camerton, Bath, BA2 0PJ**
**Helpline: 0845 450 0230 or 01761 472721**
**Email: info@nos.org.uk**
**Website: www.nos.org.uk**

**InDependent Diabetes Trust**
PO Box 294
Northampton
NN1 4XS

tel: 01604 622837
fax: 01604 622838
e-mail: enquiries@iddtinternational.org
website: www.iddtinternational.org