

Osteoarthritis



In brief

Osteoarthritis is the inflammation of joints – where the ends of two bones meet. Almost any joint in the body can be affected but the most common are the spine, fingers, hip, knee and toe joints. It is the most common form of arthritis.

The cause is not completely understood but it is thought to be due to a disturbance in the normal stresses across the joint, due to getting older or having had an injury. This leads to a thinning of the lining of the bone ends (cartilage), causing pain in the affected joint as the cartilage wears away and ultimately leading to bone rubbing on bone.

The treatment consists of painkillers, physiotherapy and in some cases surgery is required.

It is very common in people over 50. Osteoarthritis can also be called spondylosis.

What is it?

Osteoarthritis is a disease that affects the joints of the body. The word itself can be split into two parts: 'osteo' meaning bone and 'arthritis' meaning inflammation of the joints. It can affect any joint in the body but the most common sites are knees, hips, hands, spine, shoulder and ankles.

The ends of bones meet to form a joint and these bone ends are covered by a thick lining called cartilage. The ends of the bone and the cartilage are connected and enclosed in a sheath-like layer of tissue called the synovium. Inside this is a small amount of fluid that acts like oil and is called synovial fluid. The joint is stabilised by flexible tissue (ligaments) that in some cases are inside the joint but in other cases are outside the joint. Muscles passing across the joint give further stability and cause the joint to move to our brain's commands.

The human body is in a constant state of cell death and repair, degeneration and regeneration respectively. When the degeneration exceeds the regeneration of the articular cartilage then osteoarthritis results.

When osteoarthritis is present in a joint it causes the articular cartilage to initially become swollen and softened. This then becomes damaged and roughened. The cartilage can eventually be completely worn away causing bone to rub on bone and leading to even more pain when the joint is moved. In an effort to prevent this from happening the body tries to restrict the movement of the joint. It does this by causing some inflammation in the synovium and an increase in the amount and thickness of the synovial fluid. In addition to these soft tissue changes the bone itself can become increased in quantity and density. These secondary effects cause the joint to appear swollen.

The amount of cartilage damage influences the amount of pain experienced. Mild thinning of the cartilage causes just a niggle but increased damage causes more severe discomfort which eventually leads to the severe bone-on-bone wear and constant severe pain.

What are the symptoms?

In mild forms of osteoarthritis you will not experience much pain except on exercise or lifting heavy weights. This type of pain can best be described as an ache. As the wear progresses the pain will gradually increase so that lesser movements of the joint cause the pain to appear. This pain is still

an ache but can have a sharp component to it. In the later stages the pain becomes constant and more severe and can disturb your sleep.

The joints can feel stiff at all stages of the disease but this feeling will increase as the damage increases. This stiffness is usually noticed when you first get up in the morning. The joints can appear swollen – again this is more noticeable when the damage to the cartilage is more severe. When there is bone-on-bone wear the joint may click or crack.

The symptoms, especially in the early stages, may go away for several months at a time but when the damage is severe the symptoms are usually constant. Some people find that their pain and stiffness are worse in cold or wet weather.

What causes it?

In many people the cause of osteoarthritis is not known. It is thought to be the result of damage to the cartilage. The human body is in a constant state of cell death (degeneration) and repair (regeneration). When the degeneration is greater than the regeneration of the cartilage in the joints the result is osteoarthritis.

When osteoarthritis is present in a joint it causes the cartilage to initially become swollen and softened. This then becomes damaged and roughened. It becomes thinner and can eventually be completely worn away causing bone to rub on bone. In an effort to prevent this from happening the body tries to restrict the movement of the joint.

Who gets it?

Anyone can get osteoarthritis but there some people who are more at risk than others:

- Age – osteoarthritis is much more common in older people.
- Previous trauma – the chance of getting osteoarthritis in a joint is much higher if you have had a previous fracture (break) in a bone that enters the joint. Osteoarthritis of the ankle is usually secondary to previous trauma. If there is damage to some ligaments that normally keep the joint stable this can allow abnormal movement in the joint, which will also cause damage to the cartilage.
- Racial group – the incidence of osteoarthritis is lowest in black people, moderate in Chinese people and highest in white people.
- Sex – the number of people affected is the same for both sexes but in women with the disease more joints are affected in the body.
- Occupation – osteoarthritis is more common in those with manual occupations.
- Obesity – being overweight causes more stress on the joints and therefore increases the risk of osteoarthritis.

Developmental factors

In the hip joint, four childhood conditions increase your chances of getting osteoarthritis in later life. These are:

- Congenital (from birth) dislocation of the hip.
- Perthes' disease (death of the head of the thigh bone due to interrupted blood supply).
- Slipped upper femoral epiphysis.
- Infection – Infection of a joint with bacteria at any age can lead to arthritis in this joint in later life. The commonest joints to be affected are the hip and knee joint in children (in the UK). The child or adult will be unwell with a high temperature and the joint will be painful, swollen and red. Movement will increase the pain. The diagnosis is usually obvious if the knee is affected but can be more difficult if it is the hip.

The commonest bacterial infection in the UK is staphylococcus aureus and it affects the synovium, usually through the blood stream, secondary to a wound elsewhere. The synovium is grossly inflamed and releases chemicals that lead to destruction of the articular cartilage.

Genetic influences are also a factor in the risk of the condition. In some families there is an increased risk of developing osteoarthritis. For example osteoarthritis of the hands is twice as frequent in first-degree female relatives (mother, daughter, sisters).

How might it affect me?

Mild osteoarthritis is a minor nuisance but severe osteoarthritis can alter your life to a major degree.

Early stages

In the early stages osteoarthritis will not affect you that much. The affected joint may be a little stiff first thing in the morning and there might be stiffness and pain after resting following exercise. This usually settles down quickly however and you can live a normal life.

As it gets worse

As the arthritis gets worse you may find that the pain is more intrusive and, depending on the joint affected, may stop you walking as far as you previously could. If you play certain sports the pain in the joint may prevent you from taking part in them. Osteoarthritis of the hip and knee can make it more difficult to run and even walk and osteoarthritis of the shoulder will cause difficulties if you play racket sports.

Advanced stages

When osteoarthritis of the knee or hip is in its advanced stages you may only be able to walk 100m or so before the pain is unbearable. If you have advanced osteoarthritis of the hands you may find it difficult to write or manage fine movements. Severe osteoarthritis of large joints such as the hip, knee and shoulder will prevent you from sleeping at night.

Should I see a doctor?

Yes, if the pain is too much to bear after taking over-the-counter painkillers then you should go to your GP. If you have seen your doctor previously and the pains are getting worse even though you have done what they suggested it is important to return to your doctor.

Treatments

All treatments for osteoarthritis are designed to reduce the pain. They can be split into several different groups:

Pharmacological

Painkillers of different types are used:

- Simple painkillers such as paracetamol.
- Anti-inflammatory drugs are good for osteoarthritis (such as aspirin, ibuprofen and diclofenac). Ibuprofen can be bought over the counter from both supermarkets and pharmacies. If you have had asthma or suffer from indigestion, do not take these medicines until you have discussed this with your GP.
- New anti-inflammatory drugs such as the Cox 2 inhibitors are being used now with some success.

Physiotherapy

Physiotherapists will be able to give you some exercises to improve the range of movement in the

affected joints. The exercises will also build up wasted muscles. This helps stabilise the joints, making them move in better alignment, reducing the loads and shocks to the cartilage surfaces. Physiotherapists also teach techniques to reduce swelling and pain after exercise, eg icepacks.

Appliances

When osteoarthritis makes it hard to walk then a walking stick or crutches can sometimes help. If osteoarthritis is affecting other joints then a brace supporting the joint may be useful to reduce the pain.

Steroid injections

Steroid injections can be given directly into a joint. The common places for this are the knee and shoulder joint but other joints can also be injected. The steroid used is not the same one as body-builders use. As the injection is given directly into the joint the other side effects from steroids such as weight gain, skin thinning and the many other side effects from systemic steroids are not seen. However you may get a local skin reaction from them.

Their effect is variable from none at all to a few months' worth of relief up to a year. Their effect can diminish after the first injection and it is generally advised that no more than two or three injections are given each year.

Surgery

If all other treatments fail you may be offered an operation. The operations for every joint affected are different but they can be grouped according to the type of operation. The main types of operation are:

- Keyhole surgery.
- Replacement of the affected joint with a prosthesis, such as hip replacement.
- Excision arthroplasty – where part of the joint may be removed to stop the bone-on-bone rubbing.
- Osteotomy – where the bone is cut to realign and change the way weight is passed through a joint.
- Arthrodesis – union or permanent stiffening of the joint.

How can I help myself?

If you develop osteoarthritis in a weight-bearing joint such as your back or legs try to lose some weight if you are overweight. This will reduce some of the stress on the joint and reduce the pain experienced.

If the pain is in the knees or hips then try to avoid high-impact sports such as road running, step aerobics and any sport which calls for a quick change in direction such as football, hockey, rugby and racket sports. You should try to wear good shock-absorbing trainers for other sports.

If you find that the pain is exacerbated by certain movements try to avoid performing them. In more severe cases do not stop moving altogether but try to keep as mobile as possible as this may prevent some of the associated stiffness.

What is the outlook?

Once you have started to develop osteoarthritis there is no going back. It will not get better; however it is not a fatal disease. The symptoms may be reduced by ensuring you are not overweight, or by making lifestyle changes. Regular exercise (such as brisk walking) and stopping smoking are especially important. Nobody can predict how severe it will get – some people develop mild osteoarthritis in their 40s and it doesn't get any worse throughout their life but in

others it can progress at varying rates.

Painkillers and physiotherapy are very good in treating early to moderate osteoarthritis. When the condition requires an operation then joint replacement is excellent at relieving the pain but it should be noted that these operations are not necessarily designed to give you more flexibility and they will wear out with time. All the other operations are good at relieving pain but have different effects on the stiffness of the joint.

If you develop it in the major joints of your legs and you have a manual job, it may be that you will no longer be able to work. If you have osteoarthritis in the hands and have a 'fiddly' job you may have to find alternative employment. If you have a major operation your surgeon will advise you on the likelihood of your return to work or sporting activities. In most cases you will be advised against manual labour and high impact sports, such as running and jumping.

Can I prevent it?

Because the cause of osteoarthritis is unknown there is no way that you can prevent it. However you can reduce your risk factors by making sure you are not overweight, do regular exercise and quit smoking.

What else could it be?

Other conditions that affect joints include:

- Gout – this is inflammation of the joint due to the accumulation of uric acid crystals.
- Pseudogout – this is the inflammation of the joint caused by pyrophosphate crystals in the joint.
- Rheumatoid arthritis – this is another form of arthritis characterised by inflammation of the synovium which then destroys the ends of the bone.
- Sero-negative arthritis – this arthritis is similar to rheumatoid arthritis but associated with other diseases such as psoriasis (a chronic skin disease) or Crohn's disease (a condition where parts of the alimentary tract become inflamed).

Questions people ask

Will my diet affect osteoarthritis?

No, there are no special dietary requirements but if you have arthritis in weight-bearing joints it is a good idea not to put on too much weight. If you are already overweight then the advice is to lose some and you may find that the pain will improve. Also, many operations to help arthritis are dangerous if undertaken in obese people; therefore loss of weight may reduce these risks and allow surgery and considerable relief of pain.

How much exercise of my joints should I do?

It is better to keep your joints as mobile as possible therefore you should exercise often but in moderation rather than doing a lot in one session. The golden rule is 'if it doesn't hurt then do it and if it hurts don't do it'.

Complementary options

Osteoarthritis is long-term condition affecting many elderly people. Conventional drugs are often associated with severe side effects and so many individuals turn to complementary medicine.

Diet

Obesity is a risk factor for osteoarthritis. In women, losing weight reduces the risk of osteoarthritis. It also seems to help reduce pain in people who already have the condition. Therefore adopting a healthy diet low in fat and high in fresh fruit and vegetables, pulses and wholegrains will help most

arthritis sufferers. Most of the studies linking allergies to joint disease have focused on rheumatoid arthritis. If other therapies are unsuccessful, people with osteoarthritis might consider checking for food intolerances. A properly trained doctor should supervise identification and elimination of food intolerances. However there is little evidence for acute food allergy being a problem in osteoarthritis.

Solanine is a substance found in nightshade plants. These include tomatoes, potatoes (not sweet potatoes), all peppers (except black pepper), and aubergines. Some naturopaths and nutritional therapists believe that some people with osteoarthritis may not be able to destroy solanine in the gut leading to a toxic effect on the joints. Anecdotal reports suggest that eliminating solanine from the diet may bring relief to some arthritis sufferers. However this diet has never been studied in a properly designed randomised clinical trial. Moreover it is extremely hard to follow and even fans of the diet admit that it doesn't help many people. Therefore, long-term trial avoidance of solanine-containing foods may only be appropriate for people with severe cases of osteoarthritis who have not responded to other natural treatments.

Nutritional supplements

The two most widely studied supplements are glucosamine sulphate and chondroitin sulphate. Glucosamine sulphate, a nutrient derived from seashells, contains a building block needed for the repair of joint cartilage. Chondroitin sulphate is a major component of the lining of joints. For a long time derided by conventional medicine, the evidence that glucosamine and chondroitin are effective in osteoarthritis continues to build. Extensive research seems to confirm that both supplements are effective in reducing pain and improving functioning. They also appear to be safe. Both doctors and patients are extremely enthusiastic about their effects. It should be noted that glucosamine can take several months to work. Also there are many different preparations on the market and it is not currently clear which is best. A large randomised outcome study using a standardised glucosamine preparation confirms that a dose of 1,500mg a day is effective in improving symptoms and slowing down the degeneration of joint disease.

There are many other supplements that have been suggested as treatments for osteoarthritis. These include: antioxidants such as vitamin E, the omega-3 fatty acids present in fish oil, EPA and DHA, S-adenosyl methionine (SAMe), D-phenylalanine (DPA), dimethyl sulfoxide (DMSO), Cetyl myristoleate (CMO). However these have not been as extensively studied and their use for treating osteoarthritis is not so clear.

Several trials have suggested that individuals with osteoarthritis may benefit from supplementation with bovine cartilage. It is thought it may be because it contains chondroitin. Another intriguing possibility is New Zealand green-lipped mussel. Preliminary studies look encouraging. However side effects may be unpleasant. Stomach upset, gout, skin rashes, and one case of hepatitis have been reported.

Herbal treatments

Willow bark is the natural source of aspirin and is anti-inflammatory and painkilling. Although it is slow acting, its effects last longer than aspirin. Research confirms that it seems to work well in osteoarthritis. In one particular study a product featuring willow (with black cohosh, guaiac, sarsaparilla, and aspen bark) effectively reduced pain compared to a placebo (a dummy pill).

Stinging nettle has been used historically for joint pain. The leaves are placed on the affected joint to produce stinging. In a preliminary study it was more helpful than placebo (in this case dead nettle) for people with osteoarthritis of the thumb and wrist. Capsaicin, an alkaloid derived from chillies, is another traditional remedy. Extensive research has shown it can be useful in osteoarthritis pain when applied as an ointment.

In a recent review of studies of herbal remedies, avocado-soybean unsaponifiables were found to be particularly effective in the treatment of osteoarthritis.

Ginger has been used historically for inflammatory arthritis and rheumatism. However it is probably only marginally effective. Devil's claw extract was found in one clinical trial to be as effective as the slow-acting analgesic drug diacerhein. However the trial was flawed and more research is probably needed.

Horsetail and cat's claw both contain silicon and are traditional remedies for osteoarthritis, though there is no scientific evidence for their effectiveness.

Homeopathy

Homeopathy has not been extensively studied in osteoarthritis but preliminary research is promising, though a convincing effect has yet to be demonstrated in clinical trials. In one trial a homoeopathic gel was as effective as piroxocam topical ointment.

Acupuncture

The jury is still out on acupuncture. Several clinical trials have looked at the effects of acupuncture in osteoarthritis, with mixed results. Some trials found acupuncture treatment to be no more effective than placebo or sham acupuncture at relieving pain; other trials have shown a significant effect. A recent review of all the trials conducted was less equivocal however: it stated that there was no convincing evidence that acupuncture is helpful in osteoarthritis.

The transcutaneous electronic nerve stimulator (TENS), which is thought to work along similar principles to acupuncture, has been found to be effective in some research.

Body therapies

Physiotherapy, has been shown to be effective in maintaining mobility. Chiropractic and osteopathy have been less well studied but is thought to have a similar effect. Massage has predominantly psychological effects rather than physical effects. Low-level laser therapy is not effective.

Biography

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This article was written by Dr Andrew McAndrew, a specialist registrar in trauma and orthopaedic surgery in the South of England.

Reviewer

This article was reviewed by Dr Chris Walker, a consultant orthopaedic surgeon on Merseyside.