

Osteoarthritis



What actually happens?

In osteoarthritis the main problem is deterioration (degeneration) of the articular cartilage and because of this the cartilage is easily and quickly eroded until the underlying bone is exposed. The erosion of the cartilage is variable over the joint so at first there are only small parts of bone exposed but as the process continues the islands of bare bone will ultimately join together.

The cartilage away from the weight-bearing areas of the joint becomes stimulated to produce more cells. This leads to an overgrowth of the non-articular parts of the cartilage (which is known as 'lipping') and outgrowths appear that are at first composed of cartilage but eventually become ossified to form thorny projections of bone called osteophytes.

The synovium becomes inflamed and this leads to the scarring of the joint capsule (the fibrous tissue that surrounds the joint). This is called synovitis. When the synovium is inflamed it produces more synovial fluid in an attempt to 'oil' the joint. This increased fluid in the joint is called a joint effusion. Pieces of cartilage that have been shed from the bone ends are loose in the fluid around the joint and can aggravate the synovitis.

As the process of cartilage wear extends and more bone is exposed these areas experience more and more friction. This causes tiny breaks in the substance of the bone. The bone tries to repair itself and forms a thin layer of thickened bone that becomes polished as the two bone ends continually rub over one another. The joint only infrequently fuses itself but osteophytes and the capsular thickenings restrict the movement of the joint.

Can it be passed on?

Osteoarthritis is not an infectious disease therefore you cannot catch it from someone else. There is a risk of inheriting osteoarthritis but this is not fully understood. Therefore if your parents or other family members have osteoarthritis there is a chance that you may also develop it.

What could affect it?

There are several things that you can do that will make your arthritis less troublesome.

If you have osteoarthritis of joints in your legs or spine it is advisable to lose weight or do not gain any weight. This is sometimes easier said than done as the pain can prevent you from taking exercise.

Most people with osteoarthritis find that their stiffness improves if they take some regular exercise. If they take too much this can make the pain worse therefore the advice is to take a little exercise but often. Swimming can be a very good form of exercise as the warm water relaxes muscles and joints. Also, the joints are moving without much weight going through them. Many people think that their osteoarthritis is worse in cold or wet weather. The damage to the joints is not worsened by weather but arthritic joints can be stiffer or more painful when the barometric pressure falls.

What could I expect?

Most people who develop osteoarthritis do so in their early middle age. It usually begins with just an ache in one of their joints. This joint may or may not have been injured previously. Along with this early pain there may be some associated stiffness that is worse in the early morning. In a lot of people the condition does not progress from this point.

The most common places for this to start are the joints of the fingers where there is swelling and stiffness. These swellings of the joints are called Heberden's nodes and are a form of osteophytes. These joint changes are common in female members of the same family. Sometimes other joints can become involved – usually the knees, feet and the spine – however many people with osteoarthritis of the hands do not develop it in other joints. As arthritis progresses the stiffness and aching after rest increases and this is probably due to the synovitis (inflamed synovium) and a small joint effusion. As the disease gets worse the pain in the joint increases as the amount of bone-on-bone contact increases.

Muscle spasm then occurs which stops the joint from moving. When the joint moves it stretches the already inflamed synovium causing more and more pain. As the bone wear progresses, there is further bone collapse and new bone formation, which causes areas in the bone where the blood stagnates. This increases the pressure in the bone and leads to severe constant pain, which is not relieved by exercise or rest.

When the bone is rubbing on bone this can be heard as grating or cracking coming from the joint and is known as joint crepitus. As the joint capsule becomes tighter, due to prolonged inflammation and the associated muscle spasm, the joint develops a flexion contracture, which is where the joint will not straighten out fully. When the wear of the bone is increased, the position of the joints may change, causing for example, 'bow legs' or 'knock knees'. Once it is present, arthritis usually progresses to some degree but it is impossible to predict how far it will go. At all stages osteoarthritis will usually respond to treatment.

Condition management

The treatment of osteoarthritis can be divided into two parts: conservative and operative management.

Conservative management

In the first stages the treatment should be based on relieving the pain in the joint.

This can be done through:

- Encouraging the person suffering from osteoarthritis to take some exercise.
- Introducing local warmth to the joint, e.g. a hot-water bottle containing warm water placed on the painful joint.
- Wearing a brace can sometimes support a joint – the joints that can commonly be braced are the ankle, knee and wrist.
- Physiotherapy based on aiming to keep the joints as mobile as possible. It uses exercises to build up wasted muscles, helping to stabilise the joints. It makes 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, e.g. icepacks.
- A TENS machine – this machine uses pads over the joint and stimulates nerve fibres in the skin which interact with pain nerve fibres in the spinal cord and prevent the pain messages reaching the brain.
- Painkillers – these can be simple like paracetamol or can be anti-inflammatory such as aspirin, ibuprofen and diclofenac and more recently Vioxx and the other cox 2 inhibitors.
- Using a walking stick – this is useful for osteoarthritis of the legs and should be held in the opposite hand to the affected joint.

Operative management

- Keyhole surgery where the cartilage damage is assessed and loose bits can be removed is most commonly used in the knees.

- Replacement of the affected joint using metal and plastic is where the affected bone and cartilage are removed and a new joint is put there instead. The most common sites for this are the hips and knees. The big toe joint is sometimes replaced as well.
- Part of the joint may be removed (excisional arthroplasty) to stop the bone-on-bone rubbing, which causes pain. This is usually done in the big toe but is infrequently used in other joints.
- Cutting of the bone (osteotomy) to change the way in which weight passes through a joint is used in younger people with osteoarthritis of the knee to give them more time before they require a joint replacement. In the big toe a surgical procedure called an osteotomy can be made to realign the position of the joint to relieve pain.
- Fusion of the joint (arthrodesis) removes part of the bone and all cartilage from the joint. The two bone ends are held together using staples or wires and the bones then heal but will no longer move. The joints become rigid and are therefore painless. This operation is usually used in the big toe or foot and ankle.

The future

Research is being conducted in all areas of arthritis treatment especially into the results of existing surgery.

Cartilage transplant

Cartilage transplant has been performed in laboratories, which grow cartilage cells in a culture medium and then transplant them into other animals. This research is still at a very early stage and it will be many years, if ever, before it is used in humans.

In February 2001, a report was published in the newspapers that cartilage cells could be grown from fat cells. The article speculated that fat could be harvested by liposuction and then transplanted into the same person after the cells had been altered by genetic manipulation. This research is still in its infancy but would herald a whole new treatment if it were to prove successful.

Glucosamine and chondroitin

These pills are sold over the counter in supermarkets and chemists and are also available by mail order. They are sold with the promise that they will improve the pain and stiffness of osteoarthritis.

Most studies of their effects are not conclusive. Recently a study from North Carolina has shown that giving glucosamine, chondroitin and manganese ascorbate together compared with ineffective medicine (a placebo) gives some relief from the symptoms of osteoarthritis. This study shows an improvement only in early osteoarthritis and the numbers of people in the study was small. Therefore it is still not proven that these substances have any great effect on the symptoms of osteoarthritis. Larger and more controlled trials are needed before these substances can be recommended. However they rarely do any harm and therefore a number of people do try them for a few months to see if they work.

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.