



Osteoarthritis of the knee

This leaflet explains what osteoarthritis is and what may cause it. It also gives advice and exercises to help you manage your symptoms.

Introduction

Osteoarthritis (OA) is the most common disease affecting joints. It is the wear and tear process that occurs in joints in varying degrees, most commonly in weight bearing joints. This condition involves the gradual roughening of the articular cartilage covering the ends of the bones making up the knee joint. It is associated with changes in the underlying bone, which may ultimately cause pain and impaired function. These changes can be seen on an x-ray, but the changes seen and the amount of pain you feel may not always relate.

This condition does not follow the same course in everybody and there are certain things that you can do to help yourself and prevent problems in the future.

Basic anatomy

In the knee joint the ends of the bone are covered in articular cartilage, which reduces friction, promotes smooth movement and acts as a shock absorber. The knee joint lining contains synovial fluid which lubricates the joint and promotes friction free movement of the joint and the structures inside the joint.

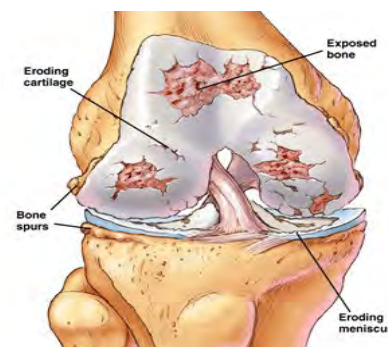
There are strong ligaments both inside and outside the joint capsules in order to protect the joint and to provide stability during movement. The capsule reinforces joint protection and the ligaments within the joint capsules.

There are muscles surrounding the knee joint which help to support, protect and move the knee, helping to dissipate some of the joint load.



The effects of OA

- The cartilage becomes thin and worn away especially where more weight is borne.
- New bone forms at the edge of the joint which can be quite rough (osteophytes).
- The joint space becomes narrower allowing less space between the bones for movement.
- Cartilage may fragment to give loose pieces causing symptoms of locking or giving way of the knee.



- Increased stress/load on the ligaments and muscles and the capsule may lead to inflammation (swelling). The capsule may become thickened.
- The inflammation and swelling may cause pain.
- Decreased mobility due to pain/ aching and fear of making the knee worse may lead to muscles wasting and weakening, therefore causing more stress and decreased protection to the knee joint.
- The knee becomes stiff as it is moved less through its available range of movement.

What causes OA?

Everyone's joints go through a normal cycle of damage and repair during their lifetime but sometimes the body's process to repair our joints can cause changes in their shape and structure.

The cause of OA is not clear, but appears to be premature ageing and may be associated with certain recognized factors such as:

- Age – OA usually starts from the late 40s onwards but is more common in woman over 50. It is more common in older people; this may be due to factors like weakening of the muscles, the body being less able to heal itself or gradual wearing out of the joint with time.
- Gender – OA of the knee is twice as common in women as in men.
- Being overweight. This puts extra stress of the knee joint and can increase the amount of pain you feel.
- After trauma (injury) e.g. an old injury or fracture.
- Family history – Genetic factors play a major part in osteoarthritis of the knee. If you have a parent, brother or sister with knee osteoarthritis then you'll have a greater chance of developing it yourself. Although studies have not identified a single gene responsible.
- Overuse of the joint. Certain occupations are more at risk of some forms of OA.
- Faulty development which can put excessive stress on small areas of the joint.
- Inflammation or infection of the joint in the past.
- Metabolic conditions e.g. gout which can affect the joint.
- Neuropathic conditions, e.g. diabetes.
- Hormonal or endocrine disorders.

Common symptoms

- Aching in/around the joint.
- Pain – usually dull and achy but can be sharp with sudden movements. The pain may be worse at the end of the day or when you move your knee and it may improve with rest. You may have pain at night that wakes you. The pain tends to be variable and you will have good and bad days.
- Stiffness – especially on waking or after periods of rest but this won't normally last for more than half an hour.
- Swelling.

- Joint deformity, due to the changing shape of the bones and muscle spasm.
- Limitation of movement.
- Muscle wasting, especially of the quadriceps (thigh muscles) as a result they become weaker and tire more quickly. Your leg may look thinner due to the muscle wasting.
- Crepitus (creaking) of the joint, as a result of the irregular joint surfaces.

Self-help / management

Some people only ever have mild symptoms which do not worsen. In unfortunate cases, the disease progresses more rapidly and the joint function deteriorates to such a degree that surgery may become necessary. However, many people are able to manage their OA themselves and with simple management may be able to decrease their pain, increase their activity and function, and reduce their need for painkillers.

The following may be helpful.

Exercise

Joints need to be exercised regularly to remain healthy. Whatever your fitness level, exercise can help the knee cope with normal daily activities again.

- Exercise can help to strengthen the muscles around your knee, improve your posture and help you lose weight; all of which will help to reduce your symptoms.
- Maintain joint stability and movement. Non-weight bearing exercises will help to build up the muscles so that the stress is reduced on the joint and surrounding soft tissues and can help to maintain the range of movement. This could include cycling outside or on a static bike. Ensure that the saddle is correctly adjusted and not too low. Avoid lots of hills as the extra stress may aggravate your knees. Do your exercises daily, 10-15 minutes is all that is needed.
- Exercises in weight bearing positions can also be included if your symptoms are not aggravated by them. They can be incorporated into your activities of daily living, e.g. squats climbing stairs etc.
- Aerobic exercise (any exercise that increases your heart rate and makes you a little short of breath) should also be included. It is good for your general health and well-being and can reduce pain by stimulating the release of endorphins (pain relieving hormones). It can also make you sleep better. You should aim to do 2 hours and 30 minutes of aerobic exercise a week. You do not need to do this all in one go.
- Swimming and exercises in water can help your joints as the water helps to support the weight of your body and reduces the stresses on your knees but allows you to keep moving. Be careful with breaststroke as the twisting action may aggravate your knee.
- Avoid long periods of standing. If unavoidable, shift weight from one leg to the other. Sitting for long periods may cause stiffness, try to get up and walk around or change your position regularly e.g. every 20 -30 minutes. Remain as active as you can and find the right balance between exercise and rest for your knee. Most people with OA, find that too much exercise aggravates their knee while too little makes their joints stiffen up.

Weight management

- Being overweight can lead to increasing stress on the knee and increased pain.
- If you are overweight, losing weight can help. For every one pound in weight lost, there is a six pound reduction in the load exerted on the knee for each step taken during daily activities.
- There is no special diet that will help with OA but if you need to lose weight you should follow a balanced, reduced calorie diet combined with regular exercise. Your doctor should be able to advise you regarding diets and exercise that may help.
- For guidance and information on weight management, including interventions for weight loss, see NICE's topic page on obesity.

Reducing the stress on your knee.

There are also a number of ways that can help you to avoid unnecessary stress on your knees.

- Pace your activities – don't tackle all your physical jobs at once. Break the harder jobs into smaller chunks and do something lighter in between them. Keep using your knee even if it is slightly uncomfortable but rest before it becomes too painful.
- Avoid long, hilly walks on hard ground. Walk slowly and with care on uneven ground.
- Avoid, where possible carrying heavy loads. Balance loads between both hands and decrease the loads by increasing the number of journeys when possible.
- Avoid twisting the knee, move the whole body and feet as one.
- Wearing a knee support may help your symptoms. You can purchase these off the shelf from many pharmacies, or ask your physiotherapist for advice. A simple Tubigrip support may help to provide some relief and a feeling of stability to the knee.
- Use a stick to reduce the stress on the joints when walking or standing for long periods.
- Try to wear sensible shoes that support your feet and have low heels.

Coping with low mood and sleep problems

You might find that your OA makes you feel depressed or anxious. Contact your doctor if you are feeling low and they may be able to recommend psychological therapies to help you e.g. cognitive behavioural therapies (CBT) and stress relieving techniques.

If your sleep is disturbed because of your knee this could make your pain feel worse. Things that could help which might help include

- Keeping a sleep diary to work out if there are any patterns to your sleep problem
- Sleep at regular times to get your body into a routine
- Avoid phones and other screens in the bedroom to help you wind down before bed.

If you are still struggling speak to your doctor who may be able to give you other tips and techniques to try known as sleep hygiene.

Pain relief

Pain relieving medication can be used to help ease pain and stiffness caused by osteoarthritis but they will not prevent or cure the condition itself.

Some of the medications that you can try include:

- **Painkillers** – simple over the counter painkillers such as Paracetamol may help but your doctor can prescribe stronger painkillers if necessary.
- **Non-steroidal anti-inflammatories (NSAIDs)**, e.g. Ibuprofen. A short course may help to reduce any pain, inflammation and swelling in your knee.
- **Capsicum cream** – a pain relieving cream made from the pepper plant which is available on prescription may help if rubbed into the painful area.
- **Intra-articular steroid injections** – may provide short term pain relief. The effects can last for a variable length of time between a few weeks and a few months. These are usually saved for when symptoms are bad. Injections are generally limited to three injections for a weight bearing joint and should not be given within 3 months of potential surgery to the joint.

Other treatments that may help with pain relief are:

- **Ice** – for 15-20 minutes. Place a dampened cloth over the knee and apply the ice pack over this to prevent an ice burn. Wrap the knee in a towel if necessary to keep the ice pack in place. Packets of frozen peas or crushed ice in a bag are the most convenient and re-usable although re-usable gel packs are also available.
- **Heat** – heat, is generally pleasant after having done your exercises. Wrap a hot water bottle / heat pad in a dry towel to prevent burning the area.

Possible treatments

Although there is no cure, but much can be done to help relieve some of the symptoms.

Physiotherapy

This is only one part of your treatment. It will help to identify the main contributory factors for your pain and give you a specific targeted rehabilitation programme.

1. **Exercises** – to increase the muscle power in the muscles at the front of your thigh, to help support the knee joint and to maintain range of movement are one of the most important treatments for OA knees. They may help to alleviate pain and stiffness. Exercises targeted at the bottom muscles (glutes) can improve the control of single leg movements e.g. climbing stairs and walking.

It is important to continue with your exercises even if your knee starts to feel better.

Stopping or reducing the amount of exercise you do could cause your knee symptoms to come back. Try to build them into your daily routine.

Surgery

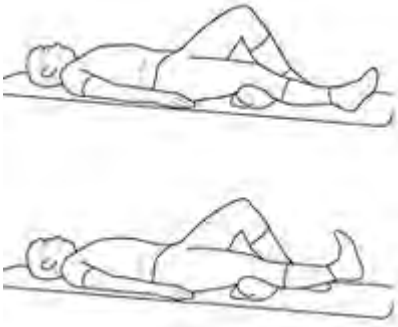
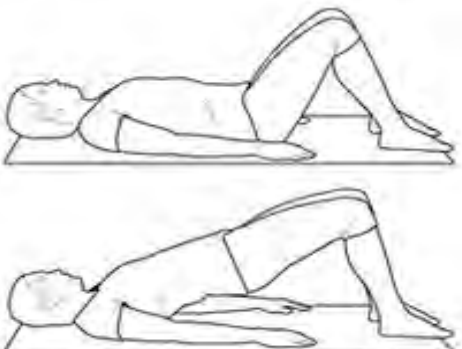
1. **Arthroscopy** – this is not routinely recommended under the Osteoarthritis Care and Management NICE guidelines (CG177) but may be beneficial if there is a clear history of mechanical locking in the knee.

2. **Osteotomy** – where a wedge of bone may be taken out to change the area of loading on the knee, away from the worn area. This may be suggested if you are younger and the damage to your knee is only in one area of your knee.
3. **Joint replacement** – where either part of (unicompartmental knee replacement) or the whole knee (total knee replacement) is replaced dependent on the extent of the damage.

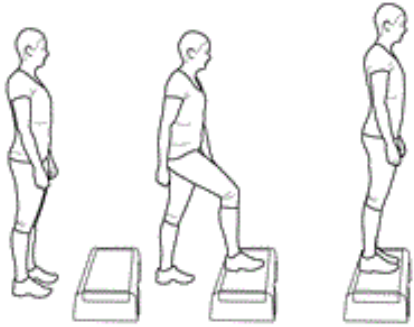
There are set criteria which need to be met for consideration for joint replacement surgery and include shared decision making (see NICE guideline CG177 Osteoarthritis: Care and Management).

Home exercises

	1. Sitting with your back supported and your legs out straight in front of you. • Bend your knee as far as possible. Gently bend your knee a little more. • Hold for 10 seconds. • Repeat 10 times. • To help bend your knee, you may put a towel around your foot, or help bend your knee with your hands around your thigh. • Try to do this exercise 2-3 times a day.
	2. Lying on your back or sitting with your back supported and your legs out straight in front of you. • Place a rolled towel under your ankle. • Pull your feet up towards you. Push your knee down firmly so that your thigh muscles tighten. • Try to touch the floor with the back of your knee. • Hold for 10 seconds. • Repeat 10 times. • Try to do this exercise 2-3 times a day.
	3. Lying on your back or sitting with your back supported and your legs out straight in front of you. • Pull your feet up towards you. Push your knee down firmly so that your thigh muscles tighten. • Keeping your knee straight, lift your leg up to just clear the bed. • Hold for 10 seconds and lower slowly. • Repeat 10 times.

	4. Lying on your back or sitting with your back supported and your legs out straight in front of you. • Place a rolled up towel or cushion under your knee. • Push your knee down hard and straighten your leg. • Hold for 10 seconds. Repeat 10 times.
	5. Lying on your back or sitting with your back supported and your legs out straight in front of you. • Bend your knee to 45 degrees. • Pull your toes up towards you, and dig your heel into the bed. • You should feel the muscles of the front and back of your thigh tighten. • Hold for 10 seconds. • Repeat 10 times.
	6. Lying on your back with your knees bent and feet hips width apart. • Draw in your abdominals and tighten your buttocks. • Tilt your pelvis backwards and lift your pelvis up. Only lift as high as you are able while maintaining your pelvis position. Do not let your back arch. • Hold for 5-10 seconds. • Lower your pelvis down in a controlled manner. • Repeat 10 times.
	7. In standing, hold onto a support and bring one leg slightly backwards. • Bend your knee and lift your foot off the floor, taking it towards your buttocks. • Hold for 10 seconds. • Repeat 10 times. • To make this exercise more difficult, you can put a small weight around your ankle.

	If this is difficult in standing this exercise can be completed lying on your front Lying face down with your hips straight and knees together. • Bend your knee as far as possible, keeping your hip straight and your ankle flexed. • Hold for 10 seconds. • Repeat 10 times. To make this exercise more difficult, you can put a small weight around your ankle.
	8. From a sitting position, try to stand up from the chair without using your hands. • Slowly lean forwards and stand up, then slowly sit down again. • You may need to use your arms to help at first. Try not to drop into the chair but try to control the movement. • This can be made easier and more difficult by changing the height of the chair. • Try to avoid letting your knees roll in to touch each other. It may help to place a resistance band around your legs to encourage you to keep your knees apart. • Repeat 10 times.
	9. Stand in front of a table or chair, holding on to the support with both hands. • Slowly crouch down, keeping your back straight and your heels on the floor. • Stay down for approximately 30 seconds and feel the stretching in your buttocks and the front of your thighs. • Repeat 10 times.

	10. Stand up straight and try to balance on one leg. • If you are unsteady rest your hand lightly on a nearby surface. • Try to hold this position for 5-10 seconds. Gradually increase the time up to 30 seconds as it becomes easier. • You can make this exercises more difficult by: - o Closing your eyes. - o Using a folded towel or cushion to stand on. - o Tapping the toes of your non weight wearing leg around the numbers of an imaginary clock face. Allow your weight bearing leg to bend slightly. • Repeat 5-10 times
	11. Start by standing in front of a step or at the bottom of the stairs. • Step up onto the step and straighten the hip and knee. • Do not let your knees roll in keep good hip knee, ankle alignment. • Step down again. • Repeat x 5-10 times on each leg. Repeat 2-3 sets.

In the gym:

If you have access to a gym and they have a leg press machine and /or knee extension and hamstring curl machines then these are also good exercises to do to strengthen your leg muscles.

Start with lower loads and gradually build up.

Speak to your physiotherapist if you have any questions regarding using these machines.

Please note: During the above exercises you should not push into pain but mild discomfort is acceptable. They are designed to stretch, strengthen and stabilise your knee.

As is usual with any new exercise, your muscles may ache and you may experience new aches and pains for a few days, these should settle. If they do not, try to establish the aggravating exercise and leave this out of your exercise programme for a few days and then try again. Carry on exercising even if your symptoms ease as this can help stop them coming back.

Exercise pictures © Physio Tools Ltd.

Further information sources

www.versusarthritis.org

<https://www.nice.org.uk/guidance/cg177>

Contact us

RBFT Physiotherapy Department

0118 322 7811 or 7812

To find out more about our Trust visit www.royalberkshire.nhs.uk

Please ask if you need this information in another language or format.

Debbie Burden, Orthopaedic Physiotherapy Specialist, RBFT Orthopaedic Physiotherapy

Revised: December 2023

Next review due: December 2025