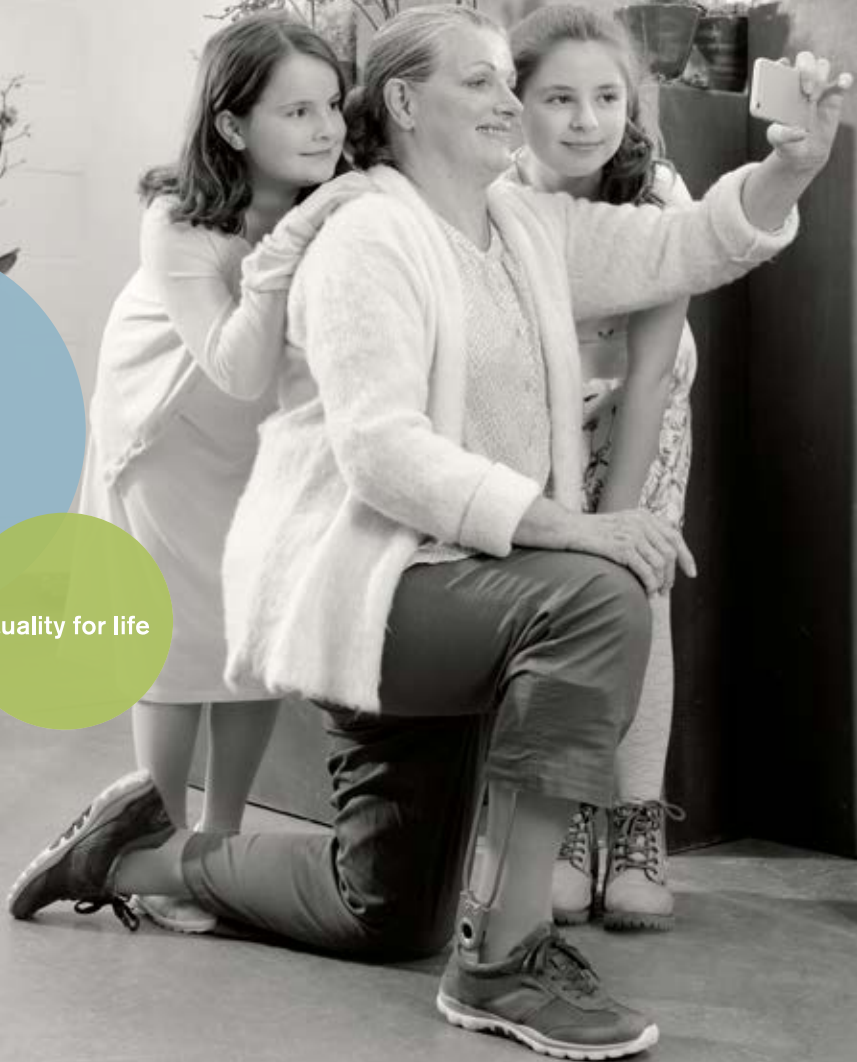


ottobock.

Osteoarthritis of the knee

Patient guide



Quality for life





Dear patient,

Osteoarthritis is the most common of all joint diseases.

Osteoarthritis, sometimes abbreviated as OA, refers to changes in the joint when the layer of cartilage is damaged or destroyed by wear and tear that ultimately can also cause changes to the bone itself. Joint mobility is compromised and this can lead to inflammation and pain. Approximately 60% of all cases of osteoarthritis involve the knee. There are various causes: joint malalignment, age, constant overuse (e.g. from manual labour or obesity), sports injuries and accidents.

However, the ways of actively combating the symptoms of osteoarthritis are as varied as the causes. Options include exercise, mobility aids, healthy nutrition and medication.

There's no "one size fits all". However, patient experiences have proven that many options work. What's right for you will be something that you decide with your doctor.

This guide aims to provide you with support. It explains osteoarthritis in detail and offers useful tips on how to cope with this very common condition.

Your Ottobock knee OA team

Progression of osteoarthritis of the knee

Bones that come in contact with other bones are covered by cartilage at their contact points. Cartilage does not have blood vessels – it is supplied with nutrients through the movement of the joints. That’s why regular exercise is so important.

Cartilage ensures that the joint surfaces move against each other in the most efficient way and with little friction. It cushions and distributes the forces acting on the joint.

If the cartilage is damaged and its gliding characteristics are affected, it can no longer serve this purpose and the joint’s range of movement can become limited. Because the cause of osteoarthritis of the knee (malalignment, as a result of an accident, etc.) is long-term, damage to the cartilage is permanent, too.

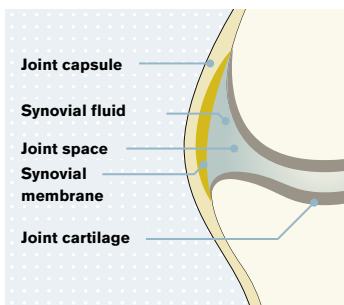
Ultimately, the cartilage develops cracks and begins to break down. At the same time, the bone thickens at the site of the damage. When the cartilage layer is completely worn away, the affected bones come into direct contact and rub against each other. Typical symptoms of osteoarthritis include joint pain and inflammation.

Because osteoarthritis is a natural part of the aging process, it cannot be halted. By taking the right steps, however, you should be able to delay its onset.

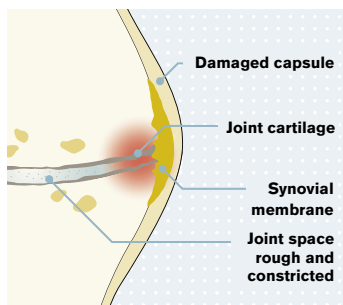
A brief description of the four stages of osteoarthritis of the knee

The progression of osteoarthritis is described by the medical community as having four stages. Stage one describes the initial cartilage changes, which generally do not cause pain. Stages two and three indicate that the deterioration has progressed, including cartilage damage. This is normally when knee pain begins. When the cartilage has completely worn away, doctors identify this as stage four.

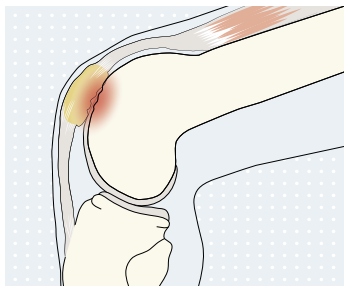
Healthy knee joint – arthritic knee joint comparison



▶ Healthy knee joint



▶ Arthritic knee joint



▶ Patellofemoral osteoarthritis

The thickest joint cartilage in the human body is located behind the kneecap (patella). This area experiences high loads. Osteoarthritis occurring in this area is referred to as patellofemoral osteoarthritis.

Signs of osteoarthritis of the knee

There are several common symptoms that signal osteoarthritis of the knee. These can occur individually or together. With the initial onset of osteoarthritis, however, you may not notice any of these symptoms.

When symptoms appear, they usually occur in the following order:

- 1 Cracking in the joint
- 2 Pain during load-bearing activities, such as carrying heavy objects
- 3 Pain during everyday activities, such as climbing stairs
- 4 Limited mobility
- 5 Swelling and inflammation

Typical progression of osteoarthritis

When osteoarthritis of the knee causes pain, a vicious circle starts: to find relief for a painful knee, the affected person assumes a compensatory posture and limits knee movement. Because this posture is unnatural, it can cause problems in other parts of the body, such as the hips. This reduced movement has a further effect, in that it reduces the supply of nutrients to the cartilage. The cartilage breaks down even more, which in turn increases pain.

**The vicious
circle of
osteoarthritis**

Cartilage wear

Cartilage damage

**Poor cartilage
nutrition**

**Inflammation,
pain**

Lack of exercise

**Compensatory posture
and movements**



Helpful treatments for osteoarthritis of the knee

As it is not possible for damaged cartilage to regenerate, the treatment of osteoarthritis is generally aimed at alleviating its symptoms. The goal of treatment is thus to limit pain and to maintain or increase mobility.

Joint-preserving (invasive) treatment

- **Hyaluronic acid:** hyaluronic acid is injected into the knee, improving the consistency of the synovial fluid and thereby relieving the cartilage. This reduces discomfort and improves the function of the joint.
- **Corrective osteotomy:** corrects faulty alignment of the bones and the resulting stress within the knee joint. This includes separating misaligned bones and relocating them to the correct position.

Joint replacement

- **Endoprosthesis:** the natural knee joint is replaced with an artificial joint. In the UK, this is a routine operation for knee pain caused by osteoarthritis. According to the NHS Choices website, over 70,000 such procedures are carried out annually in England and Wales, and the number is rising.

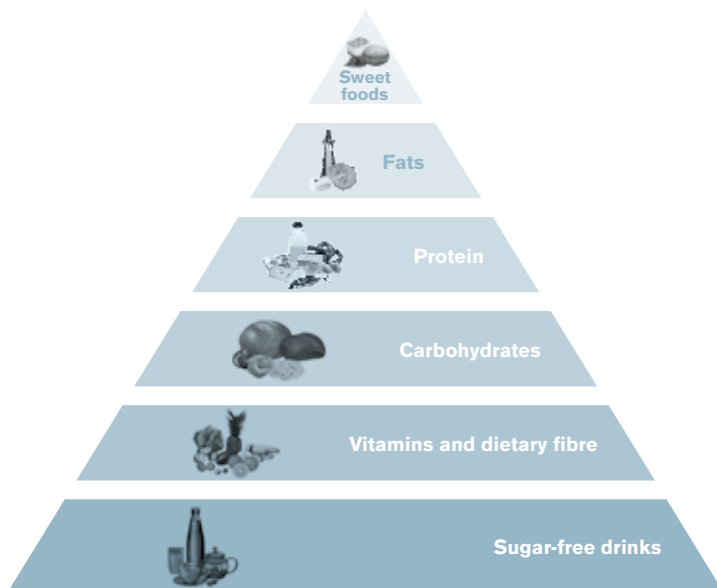
Joint-preserving (non-invasive) treatments

- ▶ Joint-specific exercises (such as physiotherapy and sports): by exercising regularly, you can maintain your mobility, strengthen your muscles and ensure your cartilage is supplied with the nutrients it needs, thus breaking the vicious circle of osteoarthritis.
- ▶ Temperature: is warmth or cold good for the knee? The answer depends on the situation. In the event of acute inflammation, cold relieves pain and helps control swelling. Heat may be applied only if the joint is not inflamed. It relaxes muscles and tendons and increases the flow of nutrients.
- ▶ Creams: various over-the-counter products are available at your local pharmacy, including pain gels and creams that can help relieve osteoarthritis pain.
- ▶ Dietary supplements: shops now sell various supplements that claim to prevent further deterioration of cartilage. Most of these contain various quantities of the cartilage components glucosamine and chondroitin. Their effects are presently under debate.
- ▶ Orthopaedic devices (braces and supports): these are applied externally to the knee or leg and are intended to help relieve pain and improve mobility.
- ▶ Lifestyle: one of the most important things you can do to manage osteoarthritis is to live a healthy lifestyle. You can find out more about how to achieve this in the pages that follow.

Lifestyle and diet

There are several things you can do to actively combat osteoarthritis. Living a healthy lifestyle definitely helps. If possible, avoid smoking and drinking. Eat plenty of salad, vegetables and fish and use cold-pressed oils. Apart from that, try to be calorie-conscious and limit high-fat foods, since every kilo matters and the less you weigh, the easier it will be on your knees. If you are severely overweight, it may be advisable to diet under the supervision of your doctor.

The food pyramid below gives a quick overview of how you can eat in a balanced, nutritious way that will promote the health of your joints.



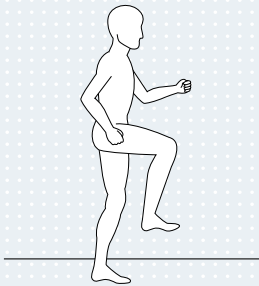


Four exercises that can help your knees

To promote muscle growth and supply the cartilage with nutrients, you need to keep your knee moving.

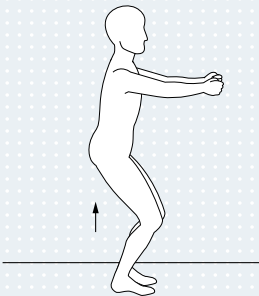
Talk to your doctor or physiotherapist first to find out whether the following exercises are suitable for you.

1 Warm-up exercise – marching in place



- 1 Before you begin joint exercises, you should warm up well. This prepares your body for the exercises, which will help you avoid injury.
- 2 For this reason, perform this warm-up for at least half a minute.
- 3 Take a short break, then repeat this exercise.


2 Gentle knee bends



- 1 Stand upright with your feet a hip-width apart.
- 2 Lift your arms in front of you to shoulder height.
- 3 Now go into a slight knee bend. Make sure you don't push your knees too far forward; instead, focus on pushing your bottom backwards. Your back should stay straight throughout the exercise. Finally, extend your legs and stand up.
- 4 Repeat the exercise ten times.

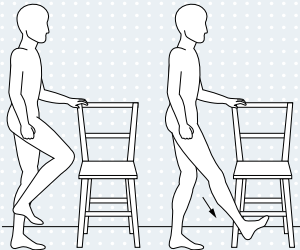
See more osteoarthritis exercises on YouTube:

videoguides.ottobock.com/uebungen-orthetik

 Type the link into your browser to access our exercise videos.

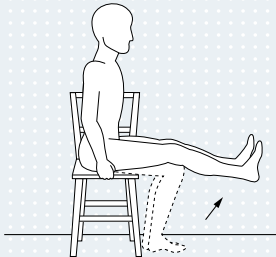


3 Leg stretches



- 1 Stand upright and hold onto a wall or a chair. This will help you maintain your balance.
- 2 Lift your leg from the floor and bend it slightly.
- 3 Now, stretch your leg as shown in the illustration. Your foot should be flexed, with the toes pulled upwards.
- 4 Repeat the exercise ten times. Now perform the exercise with your other leg.

4 Alternating steps while sitting



- 1 Sit down on a chair or stool.
- 2 Extend your leg forwards by sliding your heel along the floor. Do not overextend the knee. The other leg should remain bent, with the foot flat on the floor.
- 3 Now switch legs.
- 4 Repeat the exercise for about one minute.

Mobility aids

The Agilium range

Orthopaedic mobility devices for osteoarthritis of the knee normally refer to supports or braces. Both are medical devices that are applied externally to the leg.

Ottobock's Agilium range consists exclusively of braces. These are specially designed to support patients with osteoarthritis of the knee, and each works in a different way to address the various characteristics of the condition. The braces have been specially designed for everyday use to encourage osteoarthritis patients to wear them as much as possible. They are also extremely comfortable.

Our online selection tool "Agilium Select", which is found on our website, makes your search for the right brace easier. It displays braces or brace combinations that can offer relief and alleviate your pain. We recommend that you then discuss the proposed solutions with your doctor.





Did you know?

On average, osteoarthritis patients take around 1,200 tablets a year to manage their pain. But these can also damage organs such as the stomach, intestines and liver. So a brace from the Agilium range is a good alternative. Anyone with osteoarthritis of the knee should test the effects of the braces for themselves.

Agilium Freestep 2.0

We developed the Agilium Freestep 2.0 to treat general osteoarthritis of the knee – although it is not applied to the knee, and is instead worn on the foot, right inside the shoe! In order to provide targeted relief for the affected cartilage in the knee, the sophisticated Agilium Freestep 2.0 changes the load line of the knee. The load line describes the point where the body weight impacts primarily the cartilage.



Agilium Freestep 2.0

Dynamic load distribution in the knee

- ▶ When standing, walking or running, the brace provides relief to the affected area as soon as it's needed

Easy to wear below the knee

- ▶ Optimal comfort
- ▶ The knee is kept free
- ▶ No restriction when sitting
- ▶ Doesn't slip down the leg

Support in many situations

- ▶ During everyday activities such as shopping or going for a walk
- ▶ During high-stress activities such as running or hiking



“Most of my patients are very satisfied with the new brace. A good half of them have been able to avoid surgery so far.”

Dr. Hartmut Stinus

Specialist in Orthopaedics and Trauma Surgery

Discovering new things
Karin rediscovers many everyday
experiences





“When I put the brace on right, it simply doesn’t move. Nothing slips.”

Karin

Karin has had osteoarthritis in her right knee for around 20 years. Over the years, she tried out a number of different braces – prompted not least by the fact that she was manager of a medical supply company for 30 years. But the Agilium Freestep 2.0 didn’t come into her life until just a few weeks ago.

“At first, I just couldn’t get how this brace worked,” she says. All the previous braces and supports that she had tested were worn over the knee. But she certainly notices the impact her foot and lower leg brace has on everyday situations. Coming home from the bank, for example, which involves going down a flight of steps. “Suddenly I thought, hey – why am I walking so fast?” she reports, and laughs. It wasn’t until she was halfway down that she realised she was walking down the steps naturally, rather than pausing to match her feet on each step so as not to put too much pressure on her affected knee.

“I’m delighted with the brace!” Karin says. “I’ve been avoiding the pain for so long.” Despite the fact that she always tried hard to stand up straight, she found herself making small compensatory movements to take the pressure off her knee. But now even simple things like getting in and out of her car are easier, because she can put weight on her knee. Karin also loves travelling. “I really enjoy discovering new things,” she says. She loves flowers, and tells how she chose gardens and the countryside as destinations for past trips. “That gave me the chance to pause every now and again to rest my knee,” she says. But now she’s thinking about visiting a city. “If someone came to me tomorrow and said, ‘Let’s go to New York!’, my reaction would be – ‘Great, when do we leave?’”

Agilium Patella

The Agilium Patella is particularly effective in relieving patellofemoral osteoarthritis, i.e. that which occurs behind the kneecap. It is an excellent example of how fluid the transition from a support to an brace can be. The Agilium Patella consists of a fabric framework with stabilising elements. It uses what is called a dynamic re-alignment mechanism to ensure that the patella is aligned precisely in the middle. This has been shown to reduce pressure on the patella.¹



Agilium Patella

Dynamic patella tracking

- ▶ The patella is only guided as much as the movement demands.

High level of wearer comfort

- ▶ A setting option on the patella bar makes it possible to adapt the Agilium Patella to various everyday situations.
- ▶ The padding on the patella bar makes it comfortable to wear – even for those with sensitive kneecaps.

¹ Schmalz et al. 2006; Schmalz et al. 2011; Fantini-Pagani et al. 2014; Stinus et al. 2015 (not yet published).



“This brace is perfect for me because I have a very sensitive kneecap and I can adjust the Agilium Patella so that it’s always comfortable to wear.”

Kadri

Agilium Reactive

The Agilium Reactive is a classic brace used to treat general osteoarthritis of the knee. It is ideal for patients who want a brace that covers the knee. Users often find that such braces feel tight and uncomfortable when they sit down. This is because the upper calf strap – which is fine whilst the user is standing – suddenly feels too tight when the user lowers him or herself to a sitting position. For this reason, the Agilium Reactive features a strap with an innovative closure system, which can be loosened at the mere press of a button.



Agilium Reactive

For a high level of comfort

- ▶ Minimal weight
- ▶ Slim, flat design
- ▶ Specially engineered non-slip surface

Easy to loosen strap

- ▶ In a sitting position, the strap can be loosened with a single movement. This gives the calf muscle more room in the new position.



“The brace is very light-weight and comfortable to wear. It works precisely where it’s supposed to. I tried other braces before, but they restricted me a great deal.”

Dirk

Agilium Softfit

Developed for patients with unicompartmental osteoarthritis of the knee, the Agilium Softfit impresses users with its 3-point principle. In addition to providing relief for the affected area of the knee, the knee brace can alleviate pain. Worn inconspicuously under clothing, the support provides assistance in everyday life, recreation and sports. The innovative material combination with Vector-Grip technology means that the brace no longer inconveniences the user by shifting out of place.



Athletic users such as former ski racer Christian Neureuther also value the Agilium Soffit as a second brace for sports activities. While the Agilium Freestep 2.0 brace provides him with optimum support in day-to-day life, he benefits from the slim and slip-proof design of the Agilium Soffit for skiing.



Agilium Soffit

Proven 3-point principle

- ▶ Effective relief for the affected area of the knee
- ▶ Very comfortable to wear thanks to slim design
- ▶ Inconspicuous under clothing
- ▶ Good fit without slipping

“I wear the Agilium Soffit for skiing because it stabilises my knee and feels as though invisible hands are firmly enclosing my knee. At the same time, it’s important to me that others cannot see I am wearing a device. I still want to look good while skiing, but of course be free of pain at the same time.”

Christian Neureuther





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