

Patient information



*Your new
knee joint*

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This brochure is a general guide. It is supposed to give you some information on the principle and the procedure of the implantation of a knee replacement. Additionally this brochure provides you with useful advice and exercises for life with your new knee replacement. This brochure is not a substitute for advice or treatment protocols given by your attending physician and healthcare professionals.

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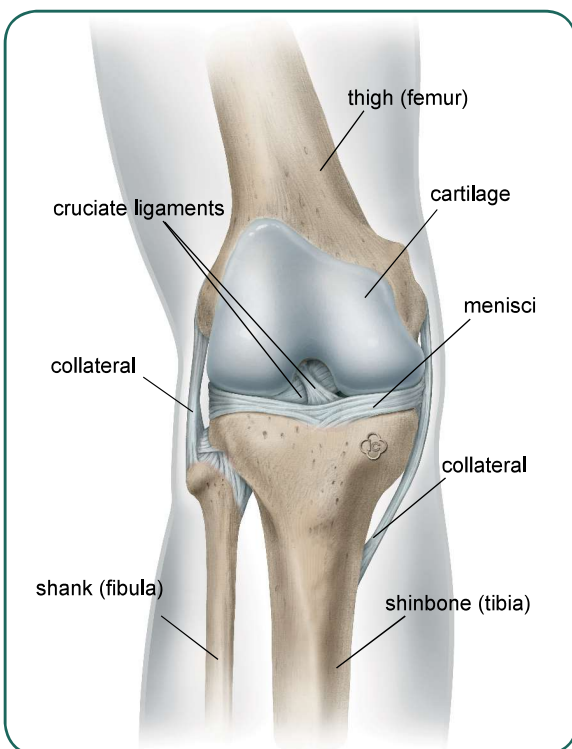
Structure of the knee joint

The knee joint is the largest and most complex joint of the human body.

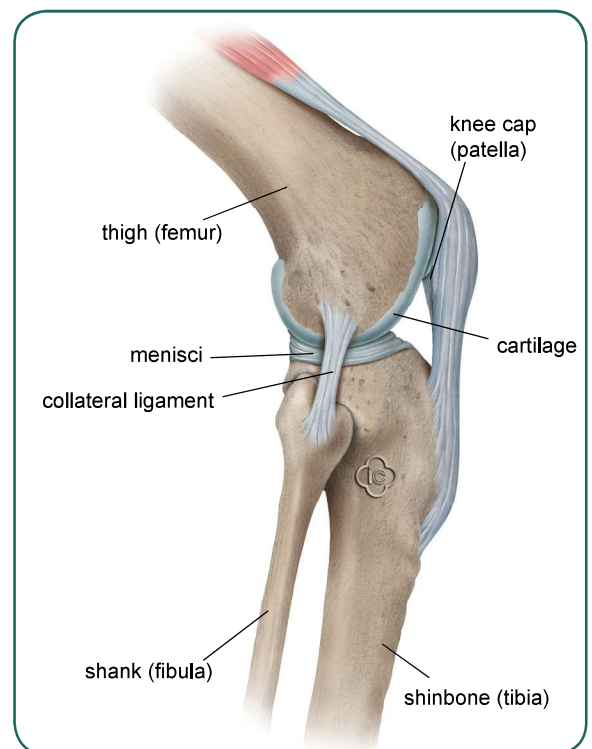
It forms a mobile contact between thigh (femur) and shinbone (tibia). The shank (fibula) is not a part of the knee joint.

The load bearing areas at the bony ends are covered with cartilage, which allows for a smooth and gentle motion of the bones against each other. The menisci are wedge-

shaped, half-moon shaped cartilage pads, which are located between thigh and shank. The menisci are of particular importance as they facilitate motion and load bearing of the knee joint. They absorb load and act as damper when loading the knee joint.



Frontal view of a healthy knee joint
(without illustration of the patella)



Lateral view of a healthy knee joint

There is one additional bone, the knee cap (patella), which is also part of the knee joint, and which forms a further joint with the thigh. The knee cap slides in the notch of the thigh bone during flexion and extension of the knee joint.

The ligaments are responsible for the guidance of the knee joint. There are inner and outer collateral ligaments as well as two cruciate ligaments (the anterior and the posterior cruciate ligament), which are positioned in the joint. These ligamentous constructs together with the muscles are responsible for the stabilisation of the knee joint.

The knee joint is surrounded by a mucuous membrane (synovia), which provides the joint with a fluid called synovial fluid. This joint fluid nourishes the cartilage and reduces the frictional forces between various individual anatomical structures.

The range of motion of the knee joint, which means the flexion and extension of the knee, is a rolling-sliding motion of the thigh on the shinbone. It is not a pure hinged motion. Damage of one or multiple structures of the knee joint could result in an unbalanced knee and thus cause wear of the joint - or so called arthrosis.

Disease of the knee joint - arthrosis

The very fact of an increasing age results in wear of the joint, the so called idiopathic arthrosis. In general more women than men suffer from a knee joint arthrosis. Based on conservative estimates, nearly all people at an age of 75 years show evidence of an altered joint due to arthrosis.

Joint wear (arthrosis) means that the cartilage layer covering the joint surface wears off and even can wear through to the bone. When this happens it alters the smooth motion of the knee joint. The arthrosis can be either unilateral arthrosis, where just one side of the knee joint is affected or bilateral arthrosis, where the whole joint is affected (refer to figures on page 4).

Possible reasons for the development of an arthrosis could be because of being overweight, misalignment of the leg axes, e.g. X- or O-legs,

but also lack of activity or bad blood circulation of the joints can cause arthrosis. In a healthy person the knee is loaded with 4-times body weight; this load will increase proportionately if you are overweight, potentially accelerating the arthrosis process. Additionally injuries to the knee joint caused through work or sports activities can cause additional stress, which could cause the development of arthrosis. Disease of cartilage, bone, joint mucuous membrane or joint fluid can lead to arthrosis of the knee.

Pain is the main symptom of an arthrosis. Pain occurs as a so called „starting pain“ after longer periods of sitting or lying. This pain can change to loading pain as the arthrosis progresses.



Leg axes:
healthy

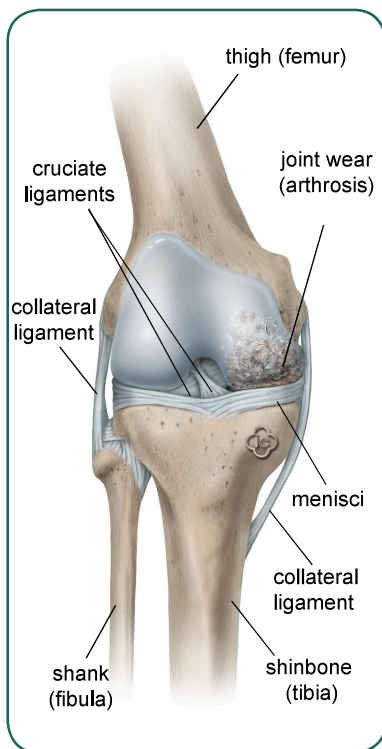


Leg axes:
O-legs

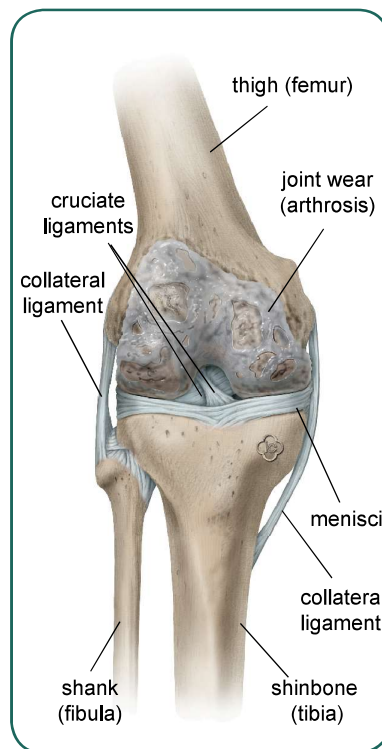


Leg axes:
X-legs

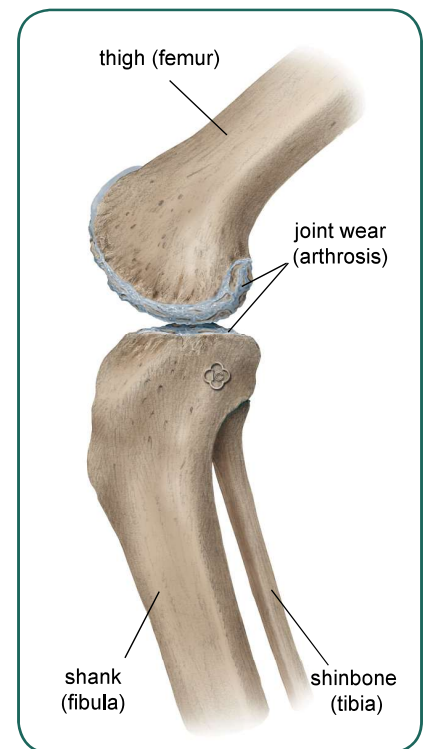
The following figures show knee joints affected by arthrosis.



Frontal view of a knee joint with unilateral arthrosis



Frontal view of a knee joint with bilateral arthrosis



Lateral view of a knee joint with arthrosis

Total knee replacement treatment option

When conservative methods are no longer effective in pain relief management and mobility is significantly reduced causing a reduction in the quality of life, implantation of a total knee replacement (endoprosthesis) can be considered as a treatment option.

The main goal of such operation is to relieve pain and to regain good mobility as well as correction of potential misalignment of the bones.

A successful knee replacement (endoprosthesis) operation addresses knee joint pain generated by arthrosis and improves the motion of your knee.

A knee replacement could never completely replace a healthy, complex knee joint. There could be some limitation in the full range of motion of a total knee replacement.

What does a knee replacement consist of?

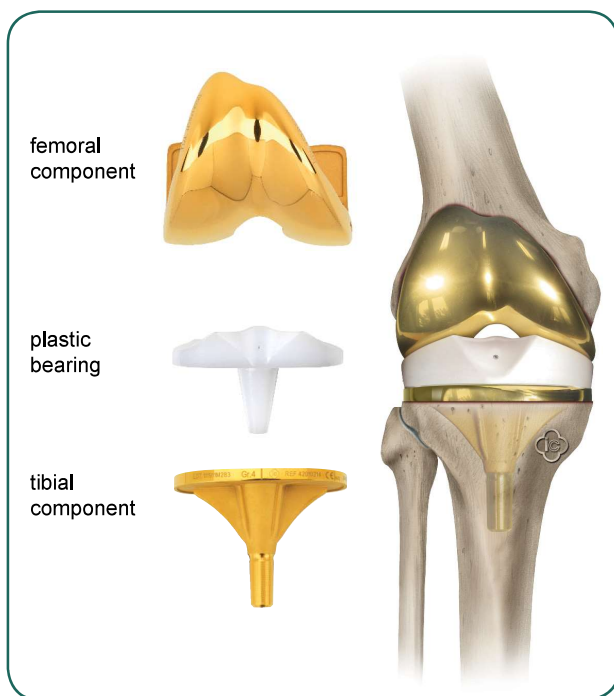
The knee replacement consists of 3 main components (refer to figures below).

The tibial component is a metal plate, which covers the upper end of the shinbone (tibia). The component is fixed to the bone via a short stem.

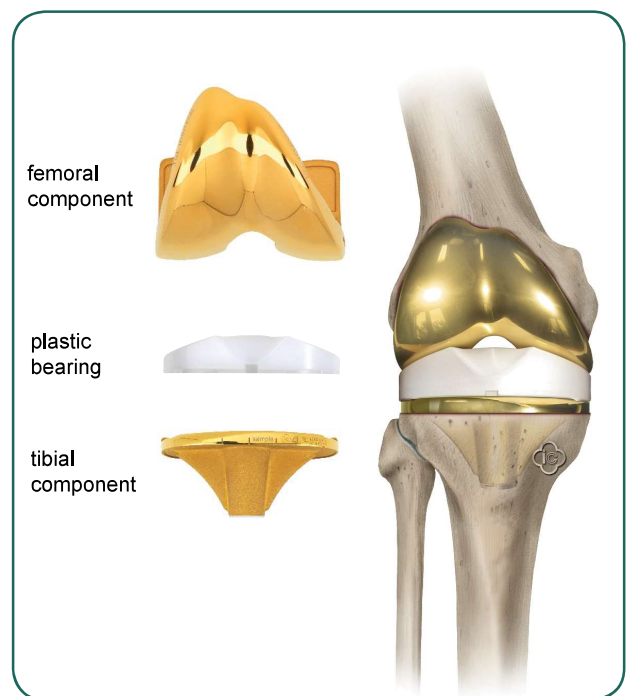
The femoral component is a metal implant, which emulates the surface of a healthy thigh bone. After appropriate reshaping of the thigh

bone (femur) the implant is applied to the surface of the bony end.

A moveable or locked plastic bearing is attached to the tibial component, which covers the whole surface. This plastic bearing reduces the friction between femoral component and tibial component, so a smooth pain-free motion is possible.



Frontal view of a knee replacement with moveable (rotating) plastic bearing without illustration of the patella



Frontal view of a knee replacement with locked plastic bearing without illustration of the patella

The back of the knee cap (patella) can also be replaced by a plastic shim, which slides on the metal surface of the femoral component of the knee joint.

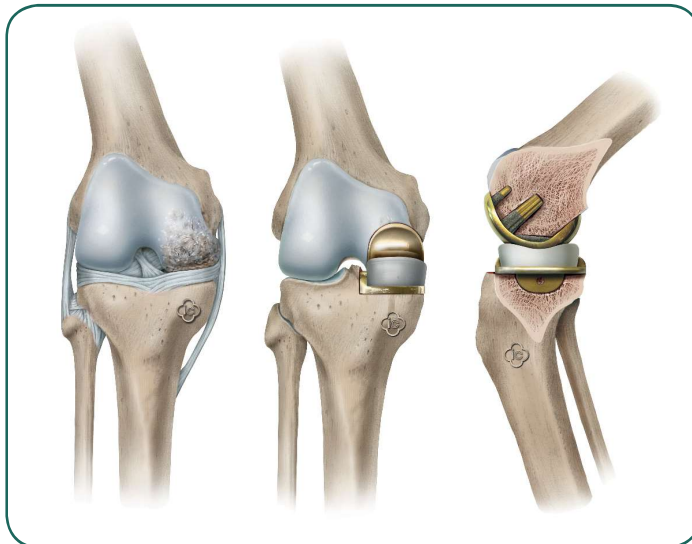
The primary goal of a knee replacement is to preserve as much bone as possible and to just replace the degraded parts of the joint by the implant.

Unique features of the ACS® Total Knee System

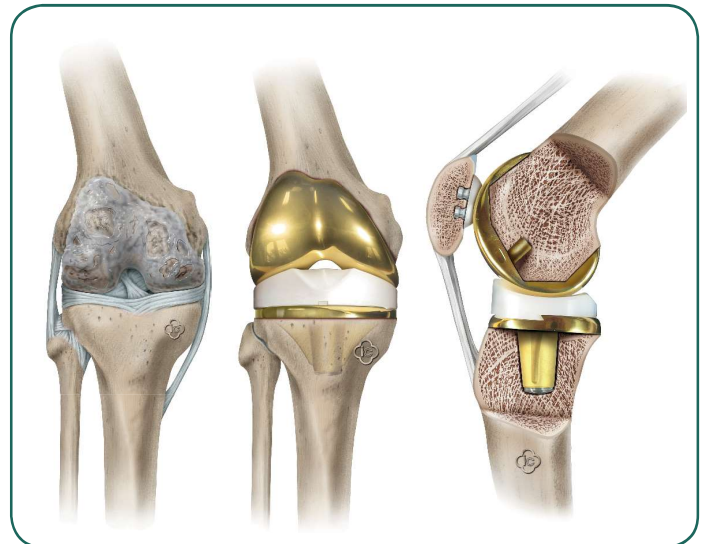
Your doctor will decide based on the degree of wear of your knee joint whether a total knee replacement (replacement of both sides of a knee joint) or a partial knee replacement (unicondylar prosthesis, replacement of one side of the knee joint) is required. In some cases the surgeon may need to surgically assess the damage prior to selecting the appropriate implant type.

Depending on the size of your knee joint there are several sizes of the prosthesis available. The ACS® knee system provides additional extension possibilities, which allow the ACS®

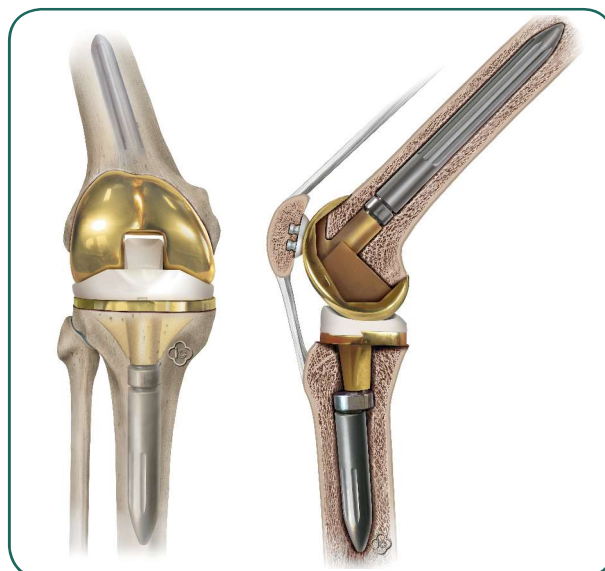
to be adapted to suit the patient's specific requirements and the goals of the surgeon. The ACS® Total Knee System offers a comprehensive range of treatment options in one carefully design proven system. In case of a unilateral arthrosis, a unicondylar prosthesis can be used, which replaces the surface of just one side of the knee joint. A total knee joint replacement replaces the surfaces of both sides of the joint. There are also options for revision surgery of an artificial knee joint, which enhances the surgical options for both patient and surgeon alike (refer to figures below).



Unicondylar prosthesis: from diseased joint (left) to knee replacement (middle and right)



Total joint replacement: from diseased joint (left) to knee replacement (middle and right)



Revision system as option for revision of a knee replacement

Materials and allergy

The ACS® knee prosthesis differs from other prosthesis by the fact that it is available with a ceramic coating as standard. The metallic components of the ACS® knee prosthesis are manufactured from a biocompatible cobalt chromium casting alloy, which is covered with a golden coloured titanium nitride (TiN) coating.

The coating has the advantage that the friction and thus the potential wear between the components is minimized. The reduction of friction improves the wear of the plastic component, and this in turn, will improve the longevity of the ACS® total knee replacement in the body. The coating also forms a protective barrier against the release of nickel metal ions and elements used in the cobalt chromium casting,

which can cause allergic reactions in some people. The ACS® provides a unique innovative bearing surface that improves the life of the implant components in the body, and provides additional protection against infection and allergic reaction to metal ion elements found in cobalt chromium.

The plastic components (plastic bearing and patella implant) are manufactured from an ultra high molecular weight polyethylene (UHMWPE), which is a plastic specifically developed for use in total knee replacements.

Prior to surgery you should talk to your physician about known allergies and intolerances, e.g. a nickel allergy, to avoid potential complications.



Highly polished, non-coated component made from cobalt chromium alloy

cobalt chromium



Highly polished component made from cobalt chromium alloy coated with titanium nitride

titanium nitride

cobalt chromium

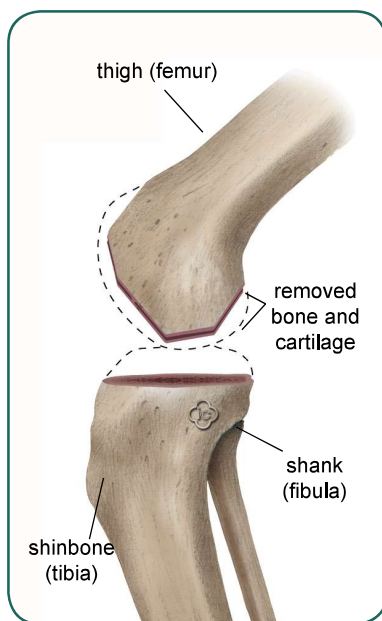
cobalt chromium alloy
chemical composition

element	cut-off grade % (weight percent)
chromium	26,5-30
molybdenum	4,5-7
nickel	max. 1,0
iron	max. 1,0
carbon	max. 0,35
manganese	max. 1,0
silicium	max. 1,0
cobalt	rest

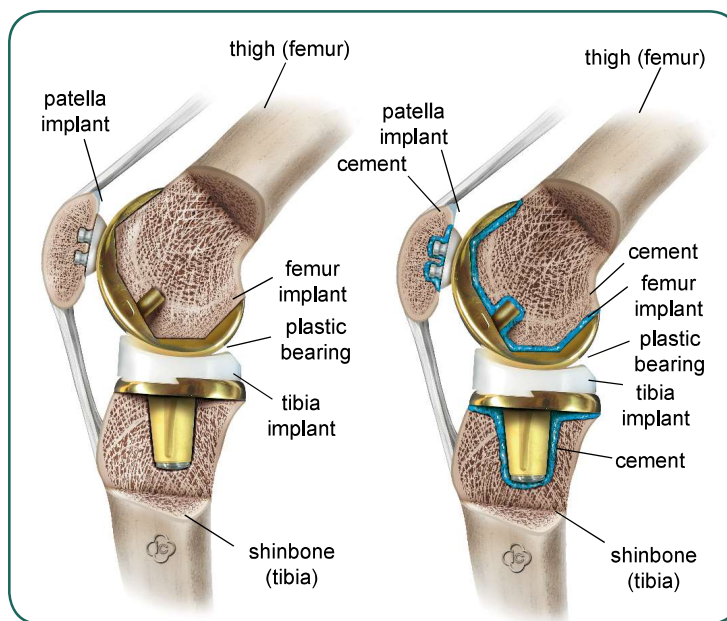
What you should be aware of prior to and during surgery

Prior to surgery: Implantation of a knee replacement is a planned surgery, which you can well prepare for. The outcome can be improved by improving your general health and fitness prior to surgery. The healthier and fitter you are, the speedier is your recovery process.

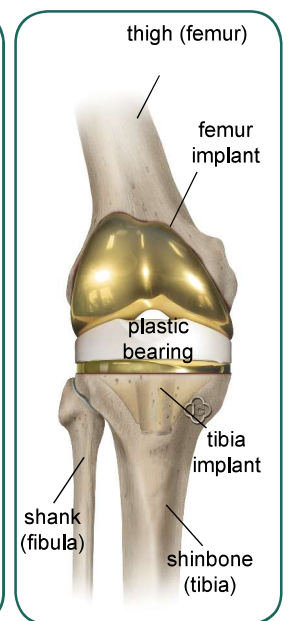
The operation will take place either under general anesthetic or epidural and this will be discussed with you directly prior to surgery.



Lateral view of a knee joint prepared for an implant



Lateral view of a cementless (left) and a cemented (right) implanted knee replacement



Frontal view of an implanted knee replacement without illustration of the patella

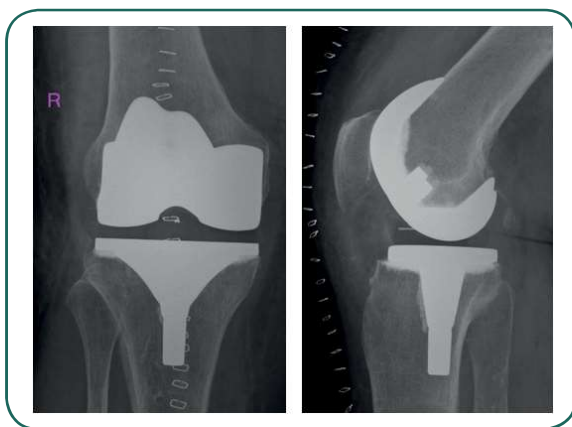
During surgery the knee joint is opened from the front while you are in a supine position (lying on your back). The joint is flexed so that all structures can be seen. The first step of surgery is the removal of the diseased elements of the knee (superficial degraded bone and cartilage as well as the menisci). The remaining bone is adapted by means of corresponding templates and dedicated instruments so that the components of the knee replacement fit accurately.

The ligaments of the knee joint are preserved, if possible, in order to retain the natural course of motion of the knee.

After checking the fit of the implant, the size and the mobility of the knee joint with the trial prosthesis, the final prosthesis is inserted.

There are two ways to fix the implant components in the bone. The components can be fixed to the bone with a bone cement. Or alternatively there is a cementless press fit version which has a specific structured surface so that the bone bonds directly to the implant. The surgeon decides which type of implant fixation is suitable for you.

At the end of the surgery drains (small tubes) are inserted into the knee. This allows the removal of body fluid and prevents swelling of the knee joint. The knee is sutured layer by layer and wrapped with a tight bandage.



X-rays of a knee joint with knee replacement in frontal view (left) and lateral view (right)

What happens after surgery?

After surgery mobilisation is started as soon as possible. It is started with exercises that focus on early mobility of the joint.

The operated leg is laid on a passive motion machine, which moves slowly and thereby flexes and extends the knee; the range of motion thus can be widened continuously.

The drains are removed on the first or the second day after surgery. Your postoperative pain will be managed as per your individual surgeons instructions, and this may additionally involve a course of anticoagulants to avoid thrombosis. Furthermore x-ray control and repeated blood examinations may be performed.

In addition to the passive motion machine a physiotherapist will instruct you on a course of exercises for your knee joint in order to achieve good mobility and strengthen your muscles.

Around the third to fifth day you likely will be able to do first steps, in the beginning with help of the physiotherapist - this will depend on individual progress. When you feel safe enough, you can walk on your own. It is important not to fully load the operated leg for about 6 weeks. Therefore you have to use two crutches to only partially load the operated leg.

When you have reached sufficient proficiency at walking on flat ground, stair climbing will be attempted under your physiotherapist guidance. Between the 10th and the 14th day after surgery your stitches or staples will be removed and you can be discharged for post op treatment at home or in a rehabilitation clinic.

Potential risks and complications

Implantation of a knee joint replacement is a well-established operation, which has been proven to be safe and effective. Every operation – even the smallest – has a certain risk. It is a balance between general risk and specific risk, in this case that is related to the knee replacement.

General risks can occur as a part of any given operation irrespective of reason for that operation. Some risks included in this category are thrombosis and embolism - these are minimized by administration of anticoagulants. Additional risk factors are infections, injuries of blood vessels and nerves. These risks have been become very rare occurrences due to improvement in medical care over the many decades and the vast experience gained by surgeons on knee joint operations.

An example of specific risk would be the formations of adhesions, if the knee is not moved sufficiently in the first days after surgery.

Today's experiences show that about 90% of the patients are satisfied with their new knee joint after 10 years.

However the materials used for the knee replacement are not as resilient as the natural joint. So there could be circumstances when the initial endoprosthesis needs to be revised. Implants could fail due to excessive loading, e.g. when doing competitive sports.

Should there be an early loosening of the prosthesis for any reason, a revision of the knee replacement is required.

This has been exacerbated by an increasing elderly population with a much more active life style than when the first total knee replacements were performed.

The ACS® Knee system uses a modular principle based on components being interchangeable, so if revision surgery is required, it is easily achieved as the revision components use the same templates and have the same profiles as the primary implants.

Your patient / endoprotheses pass

When discharged from the clinic you will receive your patient / endoprotheses pass. The pass contains important details of your new knee joint replacement, e.g. the used implant

components and the date of surgery. Always carry this pass with you.

In case of potential joint injuries or complications it could be very helpful.



Hinweise information ⊗ Ein künstliches Gelenk ist geringer belastbar als ein natürliches. Vermeiden Sie extreme Belastungen, Ratsam sind gleichmäßige Belastungen wie beim Radfahren oder Schwimmen. Als Träger einer Endoprothese sollten Sie jede Infektion frühzeitig (z.B. an Zähnen, Harnwegen etc.) behandeln lassen. Nutzen Sie das Angebot zur Nachuntersuchung, so können evtl. Komplikationen frühzeitig erkannt werden. ⊗ An artificial joint can't withstand the load a human joint can. Please prevent extreme loading. Constant loads as they appear while bicycle riding and swimming are appreciated. Any infection (i.e. dental and urenal infection) should be treated immediately. Regular follow up investigation allow to face possible complication early. Version 3.0 Datum/date: 30.08.2017	Nachuntersuchung follow up 1. Nachuntersuchung follow up date 2. Nachuntersuchung follow up date 3. Nachuntersuchung follow up date 4. Nachuntersuchung follow up date 5. Nachuntersuchung follow up date 6. Nachuntersuchung follow up date Name des Operateurs surgeon's name Klinikstempel stamp of hospital www.implantcast.de	implantcast endoprotheses pass Endoprothesenpass	Bescheinigung certification Vorname first name Name surname Geburtsdatum date of birth Straße street PLZ/Ort zip/town Telefon phone ⊗ Der Inhaber des Passes hat ein künstliches Gelenk, das teilweise aus Metall besteht. Metalldetektoren können evtl. ansprechen. ⊗ The owner of this certification has an artificial joint partly consisting of metal. Detectors may respond. www.implantcast.de
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Implanttyp type of implant Operationsdatum date of surgery ☐ links left ☐ rechts right Platz für Etiketten space for labels so passen maximal 2 Etiketten this way 2 labels fit AC200 302 Femurkomponente Seriennummer A links / left Jahresherstellung / manufactured 2017-02-08 2023-02-08	Implanttyp type of implant Operationsdatum date of surgery ☐ links left ☐ rechts right Platz für Etiketten space for labels so passen maximal 2 Etiketten this way 2 labels fit AC200 302 Femurkomponente Seriennummer A links / left Jahresherstellung / manufactured 2017-02-08 2023-02-08	Implanttyp type of implant Operationsdatum date of surgery (optional) ☐ links left ☐ rechts right ☐ (for 2. Operation for 2nd surgery) Platz für Etiketten space for labels so passen maximal 3 Etiketten this way 3 labels fit AC200 302 Femurkomponente Seriennummer A links / left Jahresherstellung / manufactured 2017-02-08 2023-02-08	Implanttyp type of implant Operationsdatum date of surgery ☐ links left ☐ rechts right Platz für Etiketten space for labels so passen maximal 3 Etiketten this way 3 labels fit AC200 302 Femurkomponente Seriennummer A links / left Jahresherstellung / manufactured 2017-02-08 2023-02-08
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Back to normal daily life

When you are back home you will need assistance for general housekeeping chores and shopping in the beginning.

After about 6 to 8 weeks post operation your muscles will be strengthened in a way that they will stabilise your joint. The following illustrations show you ways of getting back to your normal daily life, in the first weeks post-surgery, while still protecting your newly implanted knee endoprosthesis.

Talk to your doctor / therapist about recommended aids in daily life, e.g.

- dressing sticks, stockings dresser
- long shoe horn
- shower stool, shower mat
- trolley, trolley-table
- grips
- anti-slip mats
- crutches, walking frame



Climbing upstairs with crutches

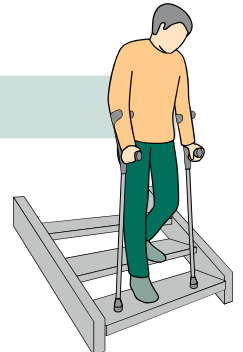
Put the healthy leg on the first stair, the crutches are positioned left and right to the affected leg. Lean on the grips with both hands and lift the affected leg also on the first stair; pull the crutches. Repeat

those steps stair by stair. Proceed the same way, if the stairs feature a handrail. Then use the handrail instead of the crutches for stabilisation.

Climbing downstairs with crutches

Place both crutches on the lower stair and afterwards bring the affected leg on the same stair. Shift your weight preferably on the crut-

ches and bring the healthy leg also on that stair. Repeat those steps stair by stair.



Walking with crutches

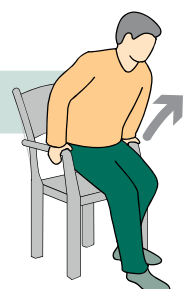
Your feet are positioned shoulder width apart and facing straight forward. Place both crutches a little in front of your feet sideways staggered. Prop yourself with the elbows

slightly flexed on the grips of the crutches. Bear the weight via the hands and not via the forearms.

Sitting and getting up

Optimally sit up straight in high, stable chairs with arm rests. Slide forward on the seat and prop yourself on the healthy leg using

the armrests to get up. In doing so the affected leg is positioned a foot breadth in front of the healthy leg.





Sexual intercourse

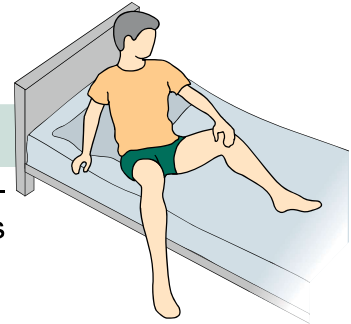
You should be careful the first weeks after the operation; do not overload your knee joint. Avoid

deep flexion and excessive internal and external rotation (twisting) of the knee.

Going to bed

First lift the healthy leg and afterwards the affected leg into bed. In doing so the upper part of the body remains straight and is slightly leaned backwards. Try to sleep lying

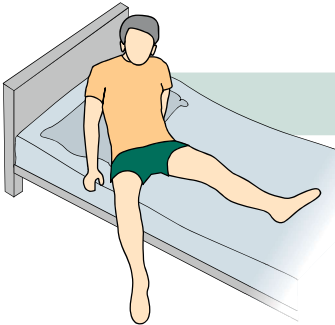
on your back with slightly abducted legs. Avoid crossing your legs when lying on your side.



Getting up from bed

For getting up slide to the edge of the bed and lift the legs consecutively out of bed. The bed should

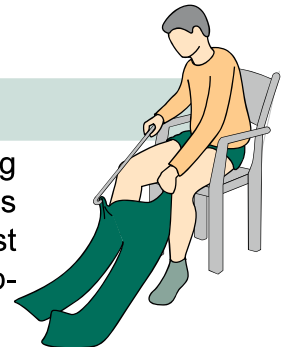
stay stable on the floor. If your bed is too low, raise the bedframe or insert a second mattress.



Dressing

For dressing a dressing-stick and stockings dresser could be helpful. You catch the waistband of your clothes with the clamp of the stick and pull your clothes over the af-

ected leg while sitting. Sit up using the crutches and completely dress yourself. When undressing first take your healthy leg out of the clothes.



Showering

Use anti-slip shoes to move around. First enter the shower cubicle with the healthy leg. Exit the shower first with the affected leg. Place an anti-slip mat in front of the shower

cubicle. Further grips on the wall, a shower stool as well as a sponge with handle can be helpful.





hands preferably clasp around the affected thigh and bear the weight. Also a bath tub stool, an anti-slip mat as well as grips could be helpful.

Optimally sit in the front with the seat extended as far back as possible to ensure plenty of room. The seat should be raised to the highest position. Sit backwards on the seat and lift the legs consecutively in the car. Use your hands to lift the thigh. Proceed the same way when

Illustration of a person sitting in a car seat, demonstrating the correct posture for driving. The person is wearing a yellow shirt and green pants, and is holding the steering wheel. The car's interior, including the dashboard and steering wheel, is visible.

Notes:

[illegible]

Knee exercises at home

Do joint-friendly sports with low impact like walking, swimming, cycling.

The following exercises will help you to increase the mobility of your new knee joint and to strengthen the muscles. Talk to your doctor or

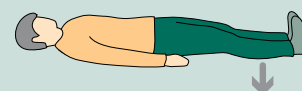
physiotherapist, which exercises are suitable for you and how long you should practice. Perform the exercises as described and immediately stop practicing when you feel pain or discomfort.

1. Calf muscles

☐ times daily

☐ repetition

Lay on your back with the legs extended and the arms extended next to your body. Tense your abdominal muscles. Pull the tips of your toes to your body and push the heels to the floor. Keep the tension in the calf muscles for a few seconds prior to releasing the tension.

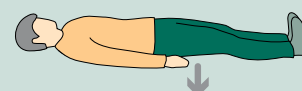


2. Gluteal muscles

☐ times daily

☐ repetition

Lay on your back with the legs extended and the arms extended next to your body. Tense your abdominal muscles. Pull the tips of your toes to your body. The knees stay straight extended. Tension the gluteal muscles for a few seconds prior to releasing the tension.

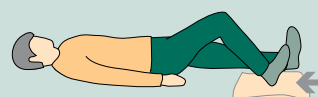


3. Knee flexion

☐ times daily

☐ repetition

Lay on your back with the legs extended and the arms extended next to your body. Tense your abdominal muscles and pull the affected leg with flexed knee to the center of the body. In doing so the heels stay on the floor while pulling them in direction of the buttocks. Hold the position for a few seconds prior to bringing the heels back in the original position.

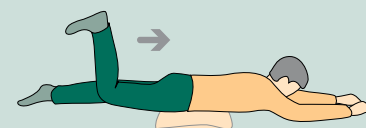


4. Knee flexion

☐ times daily

☐ repetition

Lie with the face down and the arms and legs extended. Flex the knee of the affected side to the center. After holding the position for a few seconds bring the leg back in the original position.

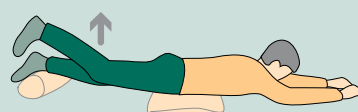


5. Knee and hip extension

☐ times daily

☐ repetition

Lie with the face down on a pillow under your belly; the arms and legs extended. The dorsum of the foot are positioned on a roll (e.g. a rolled up towel), the tips of the legs point to the floor. Slightly lift the extended leg and tense your thigh. After holding the position for a few seconds, lay your foot back down on the roll.



6. Hip extension

☐ times daily

☐ repetition

Stand behind a chair and grip the back. Shift your weight to the healthy leg. Bring the affected leg with the knee extended backwards keeping your body in an upright position. After a few seconds of holding the position bring the leg back in the original position.



7. Knee flexion

☐ times daily

☐ repetition

Grip the back of a chair. Slightly lift the affected leg and flex the knee. After a few seconds of holding the position bring the knee back in the original position. In doing so the knee is directed forward.



8. Thigh muscles

☐ times daily

☐ repetition

Stand straight on both legs. Lift the affected leg as if doing a step forward. Then put your heel on the floor, extend the knee and tense the thigh muscles. After a few seconds of holding the position, release the tension.

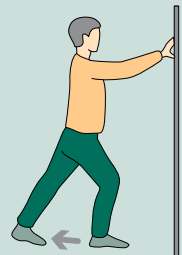


9. Calf muscles

☐ times daily

☐ repetition

Stand with your legs hip-width apart in a step position. Shift the weight on the fore leg until you feel tension in the calf. In doing so the upper part of the body and pelvis slightly move forward, but remain upright. After a few seconds of holding the position release the tension.

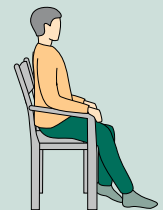


10. Thigh muscles

☐ times daily

☐ repetition

Push the heel of the affected leg on the floor while sitting and tense the thigh muscles. After a few seconds of holding the position, release the tension.





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