Total Hip Replacement

The first step when making the decision about hip replacement is to meet with your surgeon to see if you are a candidate for total hip replacement surgery. Your surgeon will take your medical history, perform a physical examination, and x-ray your hip. Even if the pain is significant, and the X-rays show advanced arthritis of the joint, the first line of treatment is almost always non-operative. This includes weight loss if appropriate, an exercise regimen, medication, injections, or physical therapy. If the symptoms persist despite these measures, and with corroborating X-rays, then you may consider surgery.

The decision to move forward with surgery is not always straightforward and usually involves a thoughtful conversation with yourself, your loved ones and ultimately your surgeon. The final decision rests on you based on the pain and disability from the arthritis influencing your quality of life and daily activities. Those who decide to proceed with surgery commonly report that their symptoms keep them from participating in activities that are important to them like walking, climbing stairs, working, sleeping, putting on socks and shoes, sitting for long periods of time and getting into and out of a car. Surgery is the next option when non-operative treatments have failed. Below are answers to the most common questions about total hip replacement surgery.

How long does it last?

A common reply to this question is that total joint replacement lasts approximately 20 years. A more accurate way to think about longevity is via the annual failure rates. Most current data suggests that both hip and knee replacements have an annual failure rate between 0.5- 1.0%. This means that if you have your total joint replaced today, you have a 90-95% chance that your joint will last 10 years, and an 80-85% that it will last 20 years. As technology improves, it is expected that implants may last even longer.

Despite such improvements it is important to maintain a long-term follow-up plan with your surgeon to assure your replacement is functioning appropriately.

Are all hip replacement implants the same?

Most implants today have become more similar than different as surgeons and manufacturers have determined which designs work best. One variable that remains is the bearing surface. The bearing surface is the ball and liner that attach to the stem and cup that fix to the bone. Hip Components | Hip and Knee Care (aahks.org)

The ball can be composed of either metal (cobalt chromium alloy) or ceramic, and the liner can be made of plastic (polyethylene), metal, or ceramic. The ball and liner can then be used in different combinations and are named for the respective ball liner combination (metal on polyethylene, ceramic on polyethylene, ceramic on ceramic, etc.). As of 2023, the vast majority of bearings utilized a polyethylene liner with a ceramic head, with other combinations being used with less frequency. You can discuss these differences with your surgeon to determine which implant is best for you.

Is surgery and recovery very painful?

Pain management following total hip replacement has come a long way over the last 10-15 years with increased use of regional nerve blocks, spinal blocks, and various other modalities used for pain control. Total hip replacement is generally considered to be less painful than total knee replacement. Early range of motion and rapid rehabilitation protocols are also designed to reduce stiffness and pain, making the procedure in general much less painful than in years past. You may have relatively mild pain following the procedure, or you may have a more difficult time than others. Everyone is unique and handles and perceives pain differently. Keep in mind that while pain management has greatly improved, a pain-free surgery is unlikely. You will want to take your pain medicines as directed by your surgeon. Pain | Hip and Knee Care (aahks.org)

What is minimally invasive surgery?

Minimally invasive surgery is a term that describes a combination of reducing the incision length and lessening tissue disruption beneath the incision. This includes cutting less muscle and detaching less tendon from bone. There have also been advancements in anesthesia and pain management during and after surgery. These practices allow you to feel better, have less pain, and regain function faster than in the recent past. Usage of minimally invasive techniques has become widespread as surgical techniques have advanced.

My surgeon talks about "approach." What is this?

The way a surgeon gains access to the hip during hip replacement surgery is referred to as an “approach.” There are various types of approaches named according to the direction that the surgery is performed. The most common approach today is referred to as the “posterior approach,” which is done from the back of the hip. Some more recent improvements to this approach (small incision and less tissue trauma) have been called “mini posterior approach.” Another currently popular approach is known as the “anterior approach,” which is performed from the front of the hip. The lateral approach is less frequently used but a viable approach for the surgery. There are pros and cons of each approach and little science to endorse one over the other. Surgeons tend to have a preference and comfort level with one approach over the others.

The bottom line is that the best approach is the one your doctor is most comfortable with to allow safe and precise implantation of your hip replacement components. A conversation with your surgeon should help decide which approach is best for you.

Will my surgeon use a computer, robot, or custom cutting guide in my surgery?

There are many studies attempting to evaluate these emerging technologies and their influence on the success of surgeries. Each of these technologies has a specific goal that has fueled its development (i.e. more accuracy in implant placement, more efficient or faster surgery, etc.).

To date, there appears to be both pros and cons to each of these technologies without any clear advantages, but more research is required to determine what advantage, if any, these may offer. Despite a substantial amount of direct-to-consumer marketing, the best approach is to discuss this topic with your surgeon. You may want to know if they use one of these technologies, why they have chosen to do so, and what their experience has been in using it.

How big will my scar be?

The size of the incision can vary and depends on several factors that include the size of the patient, the complexity of the surgery, and surgeon preference. Most studies have shown that smaller incisions offer no improvement in pain or recovery and may worsen the surgeon's ability to accurately and precisely perform the procedure.

Will I need general anesthesia?

While general anesthesia is a safe option, both hip and knee replacements can be performed under regional anesthesia. Choices for regional anesthesia include spinal anesthesia, epidural anesthesia, or one of a variety of peripheral nerve blocks. Many surgeons and anesthesiologists prefer regional anesthesia because data shows it can reduce complications and improve your recovery experience with less pain, less nausea, less narcotic medicine required, etc. You can still be "asleep" and unaware that surgery is occurring even if you have spinal anesthesia. Recently, peripheral nerve blocks have become more popular as an adjunct for pain control. You should have a discussion regarding anesthesia and post-operative pain management with your surgeon and anesthesia team prior to your surgery.

How long will I stay in the hospital/surgery center?

You may stay in a hospital for one to three days or you may go home the very same day! This all depends on your rehabilitation protocol and how fast you progress with physical therapy. This is highly dependent upon your condition before surgery, your age, and medical problems which can influence your rehabilitation. A safe discharge plan will be arranged for you by the orthopaedic team.

How long will it take to recover?

Most people who undergo total hip replacement are able to participate in a majority of their daily activities by six weeks. By three months, most people have regained much of the endurance and strength lost around the time of surgery and can participate in daily activities without restriction. While daily activities have resumed, it is important to avoid high impact activities for the first 2 months to give you the best long-term outcome with your hip. While everyone's recovery can be different, patients can often get back to activities they enjoy. Sports | Hip and Knee Care (aahks.org)

When can I shower?

Most surgeons do not like the wound to be exposed to water for five to seven days; however, more surgeons are using waterproof dressings that allow patients to shower the day after surgery. You can remove the dressing at seven to ten days after surgery. Once you remove the dressings, you still shouldn't soak the wound until the incision is completely healed three to four weeks later. Either way, it is important to discuss this with your surgeon to be assured when it is safe to shower and what wound closure technique/dressings will be used for your surgical wound.

When can I walk after surgery?

Most surgeons and hospitals today emphasize getting you out of bed quickly. Most people are walking with the assistance of a walker, crutches or cane on the day after surgery. Early ambulation has been shown to reduce the risk of a post-operative blood clot and is an important part of your recovery. Progression to using a cane or nothing at all typically occurs within the first month or two after surgery and depends on each individual's progress. Despite the rapid progression to moving without assistance, it is typically not recommended that you return to sporting activities until the third month after surgery.

When can I drive?

Most surgeons allow patients to drive at four to six weeks after surgery, and sometimes sooner if the operative leg is the left leg. There is some literature that states that your reaction time will not be back to normal prior to six weeks. You should not drive while on narcotics and should discuss returning to driving with your operating surgeon.

When can I return to work?

Returning to work is highly dependent on your general health, activity level and demands of your job. If you have a sedentary job, such as computer work, you can expect to return to work in four to six weeks. If you have a more demanding job that requires lifting, walking, or travel, you may need up to three months for full recovery.

What restrictions will I have after surgery?

Depending on how your surgeon performs your surgery, you may have slight differences in your rehabilitation instructions including restrictions. In general, most surgeons prefer that you avoid certain positions of the hip that can increase your risk of dislocation of the hip for about six weeks following surgery. After six weeks, the soft tissues involved in the surgery have healed, and restrictions are often lifted – allowing more vigorous activity.

Many surgeons suggest that you avoid any repetitive impact activities that can increase the wear on the implant such as long-distance running, basketball, or mogul skiing. Otherwise, limitations following hip replacement surgery are few; however, the better you treat your replacement the longer it will last.

Will I need physical therapy, and if so, for how long?

Initially, you will receive some physical therapy while in the hospital or surgery center. Depending on your preoperative conditioning and support, you may or may not need additional therapy as an outpatient. Much of the therapy after hip replacement is walking with general stretching and thigh muscle strengthening, which you can do on your own without the assistance of a physical therapist.

Are there complications to THR?

Total hip replacement is an excellent pain-relieving procedure, and most patients receive approximately 95% pain relief. Although complications are relatively rare (1-5% of patients), patients may experience a complication in the postoperative period. These include very serious and possibly life- threatening complications such as heart attack, stroke, pulmonary embolism and kidney failure. Infection (1%) is one of the most debilitating complications and often requires prolonged antibiotics with several additional surgeries to rid the infection (refer to infection article?). A blood clot in the leg is also a relatively common complication requiring some type of blood thinner following surgery to reduce the incidence.

The implants used can also fail over time due to wear of the bearing components or loosening of the components from the bone, both of which usually occur over many years. Another complication specific to hip replacement is dislocation of the joint (1%) that may require additional surgery if dislocation becomes recurring. Leg length differences following surgery are also a possibility and may be difficult to avoid sometimes to ensure a stable hip. Often this leg length discrepancy is mild and rarely needs treatment.

Living with your new joint will; will my implant set off metal detectors at the airports and courthouses?

Usually, patients with joint replacements will set off metal detectors. It is reasonable for you to inform the TSA screening agent at the airport that you have had a joint replacement; however, you will still require screening and will need to follow the directions of the screening agent Airport Security with an Implant: One Thing to Know (youtube.com). There are millions of individuals with joint replacements, and screening protocols recognize that people who have had joint replacements may set off detectors. You do not need to carry specific documentation to prove that you have a joint replacement. Metal detector screenings follow universal protocols that allow for people with joint replacements to proceed after confirmation that no threat exists.

Will I need to take antibiotics prior to seeing a dentist or having other invasive procedures?

The American Academy of Orthopedic Surgery (AAOS) and American Dental Association (ADA) do not recommend antibiotics prior to dental procedures. THIS IS A SHIFT FROM PRIOR RECOMMENDATIONS where short-term antibiotics prior to dental procedures (one dose one hour prior to dental procedure) were required for patients who have had joint replacements.

These organizations have recommended deferring to your orthopedic surgeon on their preferences and protocols in these cases. Your surgeon will consider many factors including whether or not you are at increased risk of infection due to immune suppression (i.e. diabetic, transplant patients, and rheumatoid arthritis). The use of prophylactic antibiotics prior to dental cleanings and other invasive procedures remains controversial. Patients should discuss whether or not they need antibiotics prior to dental or other invasive procedures with their treating orthopedic surgeon. See also Dentist | Hip and Knee Care (aahks.org).

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Revised 2023

How to Relieve Pain After Hip or Knee Surgery

If you have had hip or knee replacement surgery, you are probably concerned about discomfort in the days following your surgery. It is important to understand that at some point after surgery, you will experience some level of pain - particularly with activity and physical therapy. Pain may also prevent you from sleeping comfortably at night. **There are a variety of ways to help reduce pain after surgery that are simple to do and that don't involve the use of narcotics – otherwise known as opioids.**

RICE

Research has shown that there are effective methods to reduce pain and swelling that don't involve medication at all. Your doctor may have told you to remember "RICE" after surgery. RICE stands for:

- **R**est
- **I**ce
- **C**ompression
- **E**levation

Rest
It may sound obvious, but rest! Try simple relaxation techniques such as journaling, listening to music, practicing controlled breathing or mindful meditation. Research has shown these methods help reduce pain and decrease the need for pain medications.

Ice
Reducing swelling after surgery is key and can be achieved using ice whether in the form of ice packs or cold therapy machines. You can overdo it with ice and damage your skin, so it is recommended to apply ice for 20-30 minutes and then take it off for 30 minutes prior to reapplication if needed. The ice or cold pack should not directly touch your skin. You can place a towel or flexible wrap on the skin to prevent frostbite.

Compression
Use compression dressing. This can be a knee sleeve or a compression wrap. You may have been given compression stockings after surgery that can also be helpful. Compression decreases swelling. It needs to be applied gently. If your foot goes numb or gets cool to the touch, you are wrapping it too tightly.

Elevation
Lie down and prop the leg where you had your surgery on a pillow or other soft material. Make sure your foot is above your heart level for appropriate elevation.

Your attitude towards pain control can also affect how well you manage your pain after surgery. If you believe that the pain will be uncontrollable or unmanageable, your pain and distress will worsen. If you believe that your pain can be managed and controlled, then it will. Research has shown a positive attitude can actually improve the effectiveness of pain medication. But which ones are safe?

Non-Opioid Medications

There are a number of non-opioid medications that are an important part of pain management after joint replacement. Typically, **multiple types of medications** are used to treat pain via a multimodal regimen, which is shown to be most effective in treating pain while also minimizing the risk of dangerous side effects. Common medications used after joint replacement surgery include non-steroidal anti-inflammatories (NSAIDs), acetaminophen, muscle relaxers, and neuroactive agents that target nerve-type pain.

NSAIDs

There are a number of prescription and over-the-counter non-steroidal anti-inflammatory drugs (NSAID). Prescription NSAIDs include meloxicam (Mobic), voltaren (Diclofenac), indomethacin (Indocin), and celecoxib (Celebrex). Over-the-counter NSAIDs commonly recommended are ibuprofen (Advil, Motrin) and naproxen (Aleve). While not used for pain control after surgery, aspirin is another type of NSAID used at low doses to decrease the risk of developing a blood clot. **The NSAID you decide to use for pain control should be taken as instructed by your surgeon**.

Despite some NSAIDs having less side effects, they are not typically recommended if you have kidney disease, have had certain weight-loss related surgery, are at high-risk for or have a history of stomach bleeding or ulcers, or have had recent heart bypass surgery or heart attack.

Acetaminophen

Acetaminophen (Tylenol, Paracetamol) is another effective over-the-counter pain medicine and fever-reducer that can be used in combination with NSAIDs and other pain medicines. When acetaminophen is taken with NSAIDs, the combination of medicines provides more effective pain control than either medicine alone. It is often recommended or prescribed to be taken three or four times per day, **which can reduce the need for stronger pain medicines or opioids** with potentially more harmful side effects.

It is important to note that many prescription opioid medicines contain acetaminophen, and the maximum daily dose of acetaminophen from all sources should not exceed three to four grams (3,000 to 4,000 milligrams). Higher daily doses are associated with increased risk of liver-related side effects. Acetaminophen is typically not recommended for patients with severe liver impairment or disease. Alcohol use while taking acetaminophen is not recommended. Please discuss the risks with your physician.

Muscle Relaxers

Muscle relaxers may be prescribed after joint replacement surgery in order to decrease pain related to muscle spasm. Two common muscle relaxers are methocarbamol (Robaxin) and cyclobenzaprine (Flexeril). These medicines are generally safe, and the most common side effect is described by patients as drowsiness or dizziness. Dry mouth is another common side effect. Because these medicines are broken down by the liver, decreased doses are used in patients who have liver problems. Also, cyclobenzaprine (Flexeril) is not recommended for patients taking certain types of anti-depressants due to an interaction between the medicines. This class of medication can also

make you sleepy, so it is best to **take muscle relaxers before you go to bed or prior to a daytime nap**.

Neuroactive Medications

Another type of medicine used as part of a multimodal pain regimen after joint replacement are medicines that target nerve pain - namely gabapentin (Neurontin) or pregabalin (Lyrica). Using these medications **decreases the amount of opioids required after joint replacement**. Some patients report that these medicines cause drowsiness, but they are considered safer than opioids. Because these medicines are excreted by the kidneys, the dose if you have chronic kidney disease or reduced kidney function may be altered by your physician.

Opioid Medications

If you still have severe pain that is not relieved by any of the above methods, then your surgeon might consider prescribing an opioid or narcotic medicine. **Opioid medications are often necessary for the first few weeks after a joint replacement surgery.** They are most commonly used before or after physical therapy and when trying to calm the pain during sleep.

The various opioid medications differ in strength, meaning that a certain amount of one opioid is not equivalent to the same amount of another. Here are some of the oral opiates that might be prescribed after joint replacement: tramadol (Ultram), hydrocodone (Vicodin or Norco[1]), oxycodone (Roxicodone; Percocet[2]). **Percocet and Vicodin contain acetaminophen, so if you are also taking acetaminophen be sure to adjust the dose.** Side effects common to all opiates include nausea, vomiting, constipation, urinary retention, itching, sleepiness, hypotension, decreased respirations. If one opiate causes you to experience a certain side effect, a different opiate may or may not cause that same side effect. Tramadol may be less likely to cause some of the common side effects; however, it should not be used in conjunction with certain anti-depressants or if you have seizure disorders.

When taking opioids, it's important to note that they are addictive due to their ability to activate "reward centers" within the brain, which can cause you to feel happy or relaxed. Sometimes this causes people to continue to seek out and use opioids long after the resolution of their surgical pain. This behavior is more likely if you have a history of drug or alcohol addiction or if you take more opioids than the minimum amount necessary to alleviate your pain.

Taking opioids on a regular basis will cause you to develop a tolerance to the pain-relieving effects, meaning that higher doses of the opioid medicine are required for pain relief. Although people can quickly become tolerant to an opioid medicine's ability to decrease pain, the dangerous side effects (such as respiratory depression) become more pronounced at higher doses.

Long-term use of opioids is not recommended whether before or after joint replacement surgery. The American Association of Hip and Knee Surgeons has a position statement on the prescribing of opioids for osteoarthritis pain at http://www.aahks.org/position-statements/opioid-use-for-the-treatment-of-osteoarthritis-of-the-hip-and-knee/. If you have been taking an opioid for joint pain prior to your surgery, see our article, "Opioid Use Before Hip or Knee Surgery Can Mean Trouble" at https://hipknee.aahks.org/opioid-use-before-hip-or-knee-surgery-can-mean-trouble/.

If you use multiple types of medicines in conjunction with short-term opioids for severe pain after surgery, then it is less likely to lead to abuse or addiction.

Once you no longer need opioids to control your pain, we recommend **disposing of all leftover pills** by dropping them off at an authorized disposal location. Proper disposal prevents misuse or accidental use by you or others in your household. Most pharmacies are registered as disposal locations, and a full list of locations in your area can be found on the Drug Enforcement Administration website at https://apps2.deadiversion.usdoj.gov/pubdispsearch.

Learning what to expect regarding pain management after surgery can improve your pain control. It is important to discuss your expectations with your doctor or surgical team in the time before your surgery is scheduled.

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AAHKS Patient Education Committee

Getting a Good Night's Sleep After Hip or Knee Replacement Surgery

One of the most common complaints after total joint replacement is difficulty sleeping. **The most common cause of sleep disruption is pain.** It has been reported that more than half of patients wake up with pain after joint replacement.

Many factors can affect the quality of sleep after a major surgery including anesthesia-type, narcotic use and discomfort due to pain or restricted leg movements. As sleep is crucial to the recovery process, it is important to follow appropriate pain management protocols. Contemporary pain management protocols inhibit pain in more than one way. Many protocols use a variety of injections and nerve blocks for localized pain, as well as narcotics and anti-inflammatory medication for several weeks after surgery. **You should carefully follow your pain management plan as outlined by your health care team to ensure an adequate recovery**.

Usually around the second or third week after surgery, you will start to feel better and increase your activity levels while at the same time decrease your use of pain medication. This often coincides with having a difficult time sleeping. When this occurs, **you should take your pain medication an hour before bed to achieve better comfort and help restore your sleep cycle**. A few days off from strenuous activity or physical therapy will not inhibit your recovery, but can have a tremendous effect on your ability to fall asleep and stay asleep.

Overall, sleep deprivation after total joint replacement is manageable through pain management, the occasional use of sleeping pills, and activity modification. If you find these don't work, **call your surgeon** who can help you manage sleep disturbances as you continue to recover after surgery.

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Decreasing Your Risk of Infection

Infection is a difficult problem that affects one out of 100 people after joint replacement surgery. If your joint becomes infected after surgery, it usually means additional surgery will be needed to treat the infection. It also means, your results will not be as good as they could be.

Your overall health is very important to prevent infection. **Research shows that any health issues made better before surgery could decrease your surgical infection risk.** The three most common problems that increase infection risk are obesity, tobacco use and uncontrolled diabetes.

Obese or Overweight

Obesity means a person has a body weight that is more than normal based on height. Physicians define this by a measure called body mass index (BMI). This takes your height and your weight and generates a number that tells if you are a healthy weight or weigh more than normal. You can use an online calculator such as the one provided by the American Diabetes Association to see what your BMI is and where you fall on the scale.
Being overweight or obese is a concern for a successful joint replacement surgery. Research on joint replacement in obese patients found an increased risk of having a problem after surgery. **If you are obese, the decision to proceed with surgery must be made between you and your surgeon.**

There are usually other medical problems that go along with obesity like heart disease, diabetes mellitus and poor nutrition. These other medical problems put you at an even higher risk of having a problem after surgery. Your surgeon may recommend against surgery based on your weight and health.

If your surgeon determines you should lose weight before surgery, there are options such as working with a nutritionist or your primary physician or having weight-loss surgery.

Smoking and Tobacco Use

Tobacco puts you at risk of having problems after your joint replacement. This includes blood clot, infection and poor wound healing. Nicotine is the main addictive chemical in tobacco, and it causes blood vessels to narrow. This means less blood makes it to your healing joint replacement and increasing the chances of your joint replacement getting infected.

Your surgeon may require you to quit using tobacco and anything with nicotine before surgery. It is recommended to stop all these products for at least 4-6 weeks before surgery. Your primary provider and surgeon can frequently provide resources such as prescription medicines and smoking cessation programs to stop this damaging habit.

For more information on the benefits of quitting tobacco, follow this link:
https://www.cancer.gov/about-cancer/causes-prevention/risk/tobacco/cessation-fact-sheet#q1

Diabetes Mellitus

This is a disease where the body can't control blood sugar on its own. There are different ways to control diabetes such as diet, medicines and insulin injections.

If you have diabetes mellitus, it is very important that your blood sugar is well controlled for surgery. Once blood sugar levels frequently reach 180 mg/dL or more, it is uncontrolled, and there is a much higher risk of having a problem with hip or knee surgery.

The heart, lungs, digestive tract, kidneys, skin, nerves, and immune system are damaged by uncontrolled diabetes. This can be a big problem for your overall health and also increases your risk of infection after joint replacement surgery.

Your surgeon may recommend delaying surgery if your blood sugar levels are not well controlled. Your blood sugar levels should be brought under better control before surgery and under tight control as your body heals after surgery.

There is a test called hemoglobin A1C (HbA1c) that lets you see how well you are controlling your blood sugars. You can input your blood glucose numbers into the calculator from the American Diabetes Association to see if you have good control.

We can't put an exact number on your personal infection risk with joint replacement surgery. You may be low, medium or high risk for infection based on your health. **It is important to discuss your health problems with your surgeon and to work with your health care team to improve your health and lower your infection risk before surgery.**

The better your medical and mental condition, the more likely you'll have a successful result. Surgery is a team approach, and you are a very important part of that.

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Preventing Infection in Your Joint at the Dentist's Office

During a dental procedure, it is possible for bacteria from the mouth, teeth or gums to travel through the bloodstream and settle in an artificial joint. The use of an antibiotic pill prior to dental work has been thought to lower this risk. Orthopedic surgeons have historically recommended the routine use of antibiotics prior to dental work due to the catastrophic effects of a prosthetic joint infection and the relative safety of a single dose of oral antibiotics.

Guidelines

In 2013, **The American Academy of Orthopaedic Surgeons** and **The American Dental Association** worked together to create guidelines for this situation. The workgroup reviewed the available published data to try and synthesize recommendations for patients and practitioners. Unfortunately, there is not a large amount of quality data, but they issued three findings:

1. The practitioner might consider discontinuing the practice of routinely prescribing prophylactic antibiotics for patients with hip and knee prosthetic joint implants undergoing dental procedures.
2. We are unable to recommend for or against the use of topical oral antimicrobials in patients with prosthetic joint implants or other orthopaedic implants undergoing dental procedures.
3. In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene.

Factors to Consider

Many factors should be considered when you are making this decision, such as:

- The **type of procedure** being performed – routine cleaning vs. more invasive work
- Your health status – *patients with compromised immune systems are at greater risk*
- The presence or absence of an **active infection in the mouth**
- The **recommendations** of your surgeon and dentist

With the lack of a definitive answer on this question, **we recommend that you discuss this with your surgeon**.

Antibiotics to Use

If your surgeon or dentist recommends antibiotics, the following antibiotics are usually used:

- If you are **NOT allergic** to Penicillin, 2 grams of Amoxicillin, Cephalexin, or Cephradine taken one hour prior to the procedure.
- If you **ARE allergic** to Penicillin, 600mg of Clindamycin taken orally or administered by injection one hour prior to the procedure.

Developing an infection in and around a total hip or knee replacement is one of the most catastrophic complications that can occur. If you suspect you might have an infection, it is important to seek treatment early.

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A Successful Hip or Knee Surgery Depends on You Quitting Smoking

"Doctor, I'm ready to have my knee replacement surgery, but I'm a smoker. Is it safe for me to continue smoking and have my surgery?"

Joint replacement surgeons often hear this question in their offices. **Quitting smoking is one of the most critical things to do in preparation for hip or knee replacement surgery so that your surgery will be successful.** It is well known that the effects of nicotine on the body directly cause chronic obstructive pulmonary disease, lung cancer, vascular disease, hypertension, coronary artery disease and blood clots - just to name a few. You may not know that smoking and using nicotine products can negatively impact your upcoming hip or knee replacement surgery and how well you do after surgery.

The widespread health impacts of nicotine and tobacco products can increase your risk of a complication in the period of time around surgery. **Toxins in cigarette smoke affect the body's inflammatory response which in turn affect the body's ability to heal.** This can lead to weak scar tissue and increased risk of problems with the wound. Studies have shown that active cigarette smokers have up to 1.5 to 3.2 times increased risk of wound-related complications following a joint replacement surgery. The carbon monoxide and nicotine gas in tobacco smoke reduces the ability of blood to carry oxygen to tissues effectively. The toxins in cigarette smoke also alter the body's immune system by slowing the white blood cells' ability to respond to infections. Ultimately, the poor scar formation, wound problems, poor oxygen delivery, and poor immune response from smoking have the combined effect of greatly increasing your risk of developing a prosthetic joint infection by up to 1.8 times. **Infection after joint replacement surgery can be a devastating complication**, and every effort should be made to prevent these complications.

Many published articles have shown that active smokers take longer to recover and stay longer in the hospital following hip and knee replacement surgeries. In addition, smokers have increased rates of being readmitted to the hospital for complications after surgery. Tobacco smokers have been found to have poor pain control after joint replacement surgery, and compared to nonsmokers, they require significantly greater doses of narcotic pain medications like opioids.

Although smoking can have these devastating complications, the good news is that **quitting smoking and avoiding nicotine products can improve your chances of having a successful surgery**. If you quit smoking for four to six weeks prior to surgery and continue for four weeks after, studies show that you can reduce your risk of complications by up to 50%. The longer you stay away from smoking and nicotine, the greater the benefit.

If you are considering joint replacement surgery, speak to your doctor about quitting smoking prior to your surgery to better your chances of having a safe surgery with great outcomes. There are many ways to do this including counseling, referrals to local smoking cessation programs, nicotine replacement therapy and even quitting "cold turkey." Your doctor can help you plan the right approach that's best for you.

The following is a summary of a recent study on the topic of smoking and complications after joint replacement surgery.

Tobacco Use and Risk of Wound Complications and Periprosthetic Joint Infection: A Systematic Review and Meta-Analysis of Primary Total Joint Arthroplasty Procedures.

This purpose of this study was to conduct a large-scale analysis of all the literature available to assess the association between tobacco use and the risk of any wound complication and periprosthetic joint infection after primary total hip and total knee arthroplasty procedures. Fourteen separate studies on the topic were included in the analysis. The data found tobacco users to have significantly higher risk of wound complications (1.78 increased odds) and periprosthetic joint infections (2.16 increased odds) compared to non-tobacco users. The study also found current tobacco users to have significantly increased risk of periprosthetic joint infections (1.52 increased odds) compared to former tobacco users.

Bedard NA, DeMik DE, Owens JM, Glass NA, DeBerg J, Callaghan JJ. J Arthroplasty. 2019 Feb;34(2):385-396.e4. doi: 10.1016/j.arth.2018.09.089. Epub 2018 Oct 9.

Here are other studies that looked at smoking and joint replacement surgery:

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What Are Hip and Knee Replacements Made Of?

Hip and knee replacement surgery involve replacing the worn-out bone and cartilage lining your hip or knee joint with new implants that are composed of materials such as ceramic, metal and plastic. The materials used for hip and knee replacements are quite similar.

Over the last two decades, the number of total hip replacements being performed each year has steadily increased in the United States. Accompanying this boom in surgery has been the release of information via the news, social media, documentaries and internet. If you're considering hip or knee replacement surgery, it's best to be informed by reliable sources about what is being placed inside of your body. AAHKS has created this guide to provide all the information and research related to materials used in hip or knee replacement surgery.

Total Hip Replacement Materials

Standard total hip replacement implants are typically made up of approximately four individual components (see Figure 1 below):

1. **Stem**—inserts into the femur or thigh bone
2. **Cup**—inserts into the pelvic bone
3. **Ball**—fits onto the end of the stem
4. **Liner**—inserts into the cup—essentially becomes your new cartilage

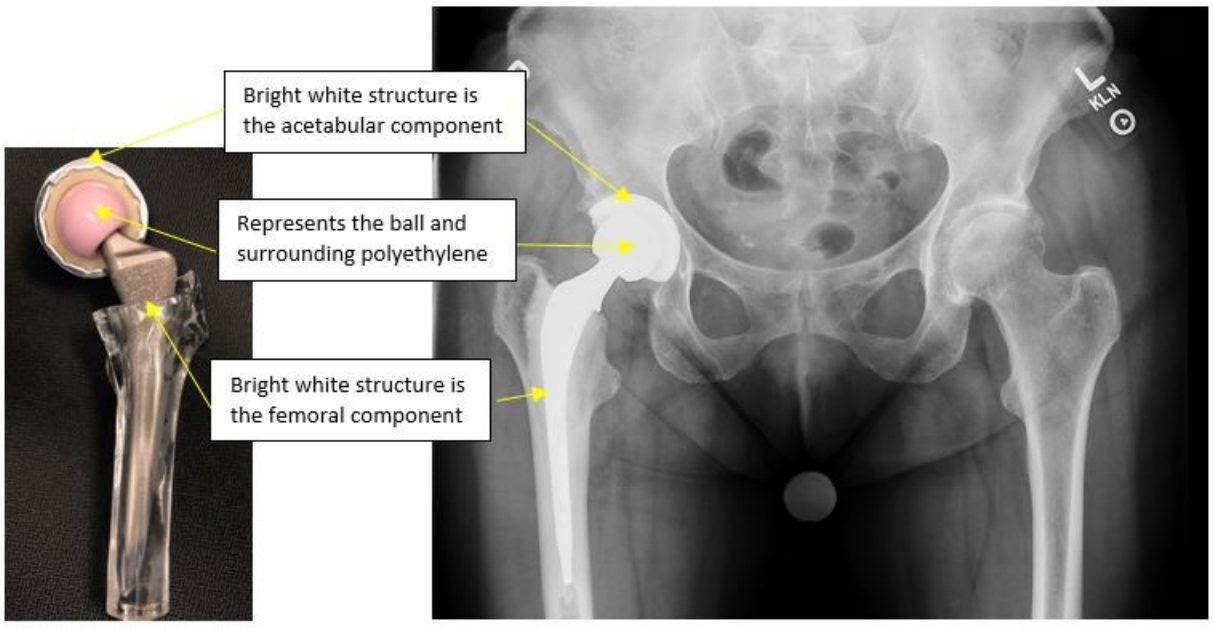

Figure 1

The Stem

The femoral stem is the portion of the replacement that fits into your thigh bone. Historically, this is made from cobalt-chromium and/or titanium metals. In the modern era of hip replacements, cemented stems (inserted with an epoxy bone cement) are composed of cobalt-chromium metals. Cementless stems (implants in which your bone grows into the metal) are routinely made of titanium. Both designs have had excellent long-term results as part of total hip replacement systems.

- Both titanium and cobalt-chromium implants are considered highly biocompatible—meaning they are generally well tolerated by the human body with low risk of adverse reaction. In fact, both materials have been shown to be highly effective in adhering to bone.
- The top end of the femoral stem (called the trunnion) is specially shaped to hold the new ball of the artificial joint. Regardless of the material that the ball is made out of, this is where the head and stem fit together.

The Cup

The acetabulum (cup) structure fits into your pelvis and is also made from various metals. The majority of modern cups are made from titanium or tantalum metals. Both metals are well tolerated by human bone and serve as excellent surfaces for bony attachment.

- The metallic cups serve to hold the liner of the hip replacement, which essentially serves as a replacement for cartilage.
- In rare cases, the plastic liner may be used without a metallic cup and is held in place using an epoxy bone cement.

The Ball

The femoral head (ball) fits on the end of the stem (trunnion). This end of the stem is taper shaped to allow the ball to wedge into position and be held tightly in place with friction. The ball comes in varying diameters often related to the size of the cup that fits into the pelvis. The ball can be made from different materials:

- **Ceramic**—Many refer to this as a porcelain type material. This is a very hard surface and is extremely resistant to scratching or other damage. Ceramic heads can be paired with either ceramic or plastic liners.
- **Cobalt-chromium**—For the better part of the last three decades, this has been the most common material used for the ball as it is relatively-scratch resistant and holds up well (similar to ceramic described above). Cobalt-chromium heads can be paired with plastic or metal liners. Due to some potential concerns for metal debris formation when cobalt-chromium heads are paired with metal liners recently brought to light, cobalt-chromium heads are now most commonly used with plastic liners instead of metal liners.

The Liner

The acetabular liner fits into the cup and serves as your new cartilage. Much like the cartilage in your own hip, it is susceptible to wear and historically this has been the "weak link" of total hip replacement. Early forms of the liner were subject to wear by making contact with the ball and were thought to last only about 10 years. Modern day improvements have made liners last longer by either using alternative materials or strengthening the plastic.

- **Ceramic**—As mentioned above, ceramic is a very strong material and provides low wear rates when coupled with a ceramic ball ("ceramic-on-ceramic").

- **Cobalt-chromium**—Metal liners have fallen out of favor when used with metal balls over the last 10 years; however, newer options where a plastic ball is placed in a metal liner (known as dual mobility) have shown excellent short-term results in the United States and may be useful when utilized in specific patients.
- **Polyethylene**—Plastic is by far the most common material used for hip replacement liners. This material has provided good to excellent results when paired with ceramic or cobalt-chromium balls. Recent advances in the manufacturing of polyethylene have significantly improved the wear rates of these plastic liners over the last 10-15 years.

When it comes time for a total hip replacement, you should discuss with your surgeon the options and pros and cons of each material. Together you can make the best decision for your particular case. While no surgical procedure is risk free or guarantees 100% success rates; remember total hip replacement is one of the most successful procedures in all of orthopedics. Many studies have shown hip implants can last beyond 15 years from the original surgery.

Total Knee Replacement Materials

Total knee replacements are made of 4 parts as well (see Figure 2 below):

1. **Femur** (thigh)—top part
2. **Tibia**—(shin) bottom piece
3. **Liner**—serves as your new cartilage
4. **Patella** (kneecap)—this is an optional part of the surgery, and some physicians do not use this as part of the procedure.

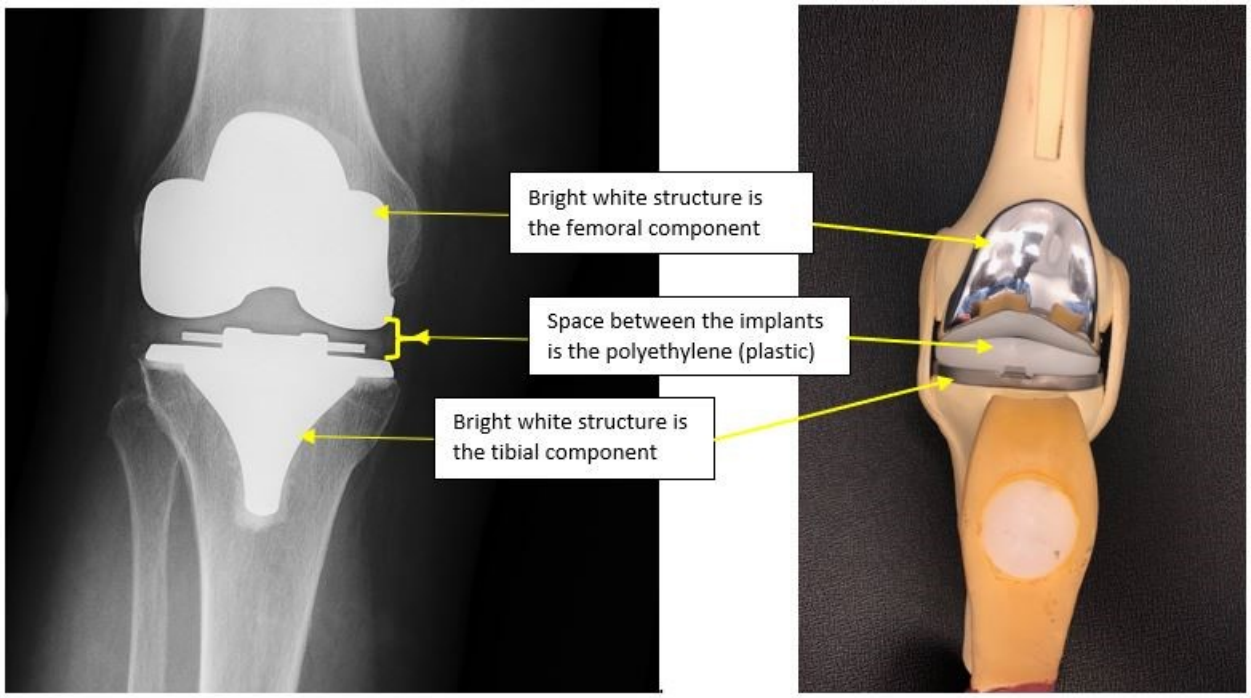

Figure 2

The Femur
Typically made from cobalt-chromium as this material is scratch resistant and safe for use in total knee replacements. The majority of total knee femoral components are made out of cobalt-chromium with excellent long-term success rates. Titanium is often too soft (scratches easily) to be a femoral component in the knee, and ceramics have a much smaller role in procedures done in the United States.

The Tibia
Made from either titanium or cobalt-chromium with excellent results for each. This portion of the replacement is meant to hold the plastic liner. Some tibial components are made of all plastic.

The Polyethylene (plastic) liner
This essentially is your new cartilage and fills the space between the two metal pieces. As with the total hip replacement, this is the "weak link" and is what will possibly wear out with time.

The Patella "button"
If your surgeon elects to use this, the undersurface of the patella (knee cap) can be covered with a piece of a plastic. This is optional, and not all surgeons routinely use this implant.

The success rate for total knee replacement is outstanding with modern implants being expected to last between 15-20 years. Similar to hip replacement, total knee replacement has been amongst the most successful orthopaedic surgeries in restoring function and quality of life. Total knee replacements have become incredibly popular in the last two decades rising at greater rates than hips (nearly a 2:1 ratio). The basic materials are the same for both hip and knee replacements, although ceramics are not routinely utilized in knee implant materials in the United States.

Long-Term Outlook

As we continue to pursue perfect hip and knee replacements, there are likely to be some designs and materials that perform better than others. The bulk materials used to make hip and knee replacements are quite similar and have not changed drastically in the last 30 years. Reaction and complications directly related to the materials themselves, while possible, are not common as manufacturer guidelines and standards are strictly followed and monitored.

The majority of total hip and knee patients can anticipate long-term success somewhere between 80-85% at 10-15 years after the surgery.

Despite recent concerns for the metals and materials used in hip and knee replacement, the vast majority of these procedures lead to successful outcomes with improvement in patients' quality of life and function.

Talk to Your Surgeon

AAHKS recommends **discussing implant options with your surgeon** to gain an understanding of the particular materials to be used in your surgery.

Discuss with your surgeon the risks and benefits of different implants and materials to gain an understanding of the proposed procedure.

Developing a good relationship and level of trust with your surgeon is a key aspect of ensuring a successful outcome.

In the end, your surgeon is looking out for your best interests, and as much as you trust an airline pilot and the flight plan they follow, you should have the same trust in your surgeon.

Frequently Asked Questions about Hip and Knee Replacement Materials

What is the chance of my body "rejecting" the implant?

Unlike an organ transplant, the risk of your body rejecting the artificial hip or knee parts is exceedingly rare. The materials used in the typical replacement surgery are well tolerated by the body and have a long track record of successful implantation. While in rare cases the parts may become loose or infected, this is typically related to other factors and not due to your body "rejecting" the parts.

How do I know if I have a recalled implant?

Most modern hip and knee replacement parts have a long history of excellent safety and few known mechanical issues. In recent years, there have been a handful of very specific implants involved in a recall process due to metal reactions, higher than expected failure rates and other unanticipated problems.

Most companies offer numerous models and designs of their implants (like the car makers and the different makes and models they offer). It is important to keep in mind that just because one model has been recalled, the company is likely to have many others that are performing very well.

The vast majority of patients will not experience an issue with a recalled implant. If you are concerned about your particular type of replacement, we recommend you contact your surgeon's office to ensure that your implant has not been involved in a recall.

I have a history of nickel allergy and/or break out in a rash with certain types of jewelry. How do I know if I am allergic to the implants?

The metals used in hip and knee replacements are generally well tolerated by the body, even in patients who have skin sensitivity to certain metals (this type of allergy involves a different part of your immune system). For more detailed information, please see the FAQ on metal allergy and joint replacement.

How do I know if I have developed metal poisoning from the replacement parts?

While recent concerns have been raised about the potential for developing metal poisoning (cobalt or chromium toxicity) from hip and knee replacement parts, such cases are thought to be exceedingly rare. In some cases (typically associated with very specific models of hip replacement – most of which are no longer used by surgeons), excessive levels of metal ions may be generated by the implant surface contact points. These metal ions may in turn cause a reaction in the tissue around the joint and can, in isolated cases, lead to tissue and/or bone destruction.

If your implant is functioning well and you have little pain or change in comfort level, chances are you are at very low risk of a metal reaction.

If you are experiencing new or worsening pain, contact your surgeon to be evaluated. Again, cases of metal poisoning from orthopedic implants are very rare and generally occur in the tissues around the joint

involved. While in theory hip and knee implants can lead to elevated levels of metal ions in the blood, systemic side effects of metal poisoning from joint replacements (kidney damage, neurologic symptoms, psychosis) are exceedingly rare.

Can I have a hip or knee replacement if I am allergic to metal?
Yes, you can still have a joint replacement if you are allergic or sensitive to metal. Metal reactions are very rare. If there is a concern about metal allergy this is an individual discussion to have with your surgeon

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Allergic or Sensitive to Metal

If you are allergic or sensitive to metal, then it is important to alert your surgeon prior to having joint replacement surgery. The most common metal allergy is nickel, which is found in very small quantities in knee implants and in some hip implants. While up to 14% of people will have some reaction to certain metal allergy tests, **metal allergy is a very rare cause of failure in knee replacements**.

Testing for Metal Allergy

In the past, skin patch testing was used to help diagnose a metal allergy; however, research has shown a skin test that is positive for metal allergy does not necessarily mean you will have complications with your joint replacement. Blood tests are available to check for metal sensitivity, but these tests also are not the best predictors of whether or not your joint replacement will have complications. **Routine skin or blood tests to check for metal allergy/sensitivity are not recommended since there is still not enough evidence to suggest these are helpful**.

Signs of Metal Sensitivity before Surgery

If you have had skin reactions to jewelry (rings, necklaces, earrings, etc.) or eyeglasses, this may be a clue to possible metal sensitivity. Let your surgeon know before you schedule your surgery about these reactions. Also, some people who work with or around certain metals can develop a sensitivity to metal. In either case, your surgeon may decide to use special, non-allergenic implants if they are available.

Implants Contain Metal

The metal hip or knee implants themselves will not likely be the cause of a reaction. In older, poorly functioning "metal-on-metal" joint implants, where the metal ends of the implants are in contact, large quantities of metal could be released inside the joint. If you have a metal allergy, and metal particles are present in your joint, then that may play a role in failure of the joint replacement. In implants with plastic parts, wear of the plastic may over time lead to unintended wear of metal against metal. This happens in poorly-functioning joint replacements. Typically, well-functioning joint replacements do not lead to deterioration of the implants and generation of metal particles.

Signs of Metal Allergy after Surgery

The diagnosis of a metal allergy after surgery is very challenging. The symptoms may include skin rash, itching and discoloration in the area around the artificial joint. Other symptoms such as joint pain, swelling, and joint stiffness can have numerous causes and not necessarily be because of a metal allergy/sensitivity. If you develop a skin reaction near the location of your hip or knee implants, steroids or topical creams can be used for mild symptoms.

Revision Surgery

A second surgery, called "revision," to non-allergenic implants is generally not needed and should be considered only as a last resort. Because diagnosing metal allergy after surgery cannot be done with 100% certainty, the outcomes of a revision surgery are unpredictable.

It is rare to have a hip or knee replacement fail because of metal sensitivity/allergy. It is best to discuss a possible metal sensitivity prior to surgery with your surgeon. If you have had a joint replacement surgery and have a skin reaction, contact your surgeon's office for treatment options.

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Home Therapy Exercises Before Hip or Knee Replacement

Exercising before Surgery

Low-impact exercises help to relieve stiffness and pain associated with an arthritic joint. Exercising before surgery will help strengthen your muscles in addition to getting you mentally ready for the recovery process by familiarizing you with some common exercises after surgery.

The American Association of Hip and Knee Surgeons (AAHKS) have outlined a home exercise program for you before your hip or knee replacement. This handout accompanies our patient exercise videos that you can find at (https://hipknee.aahks.org). Exercises will focus on Stretching, Strengthening, and Endurance.

This program starts with a warm-up period of stretching followed by strengthening and endurance exercises. Taking over-the-counter anti-inflammatory medications (ibuprofen, naproxen, meloxicam) or Acetaminophen before or after exercising can help with swelling and discomfort. Please check with your primary care doctor before starting any anti-inflammatory medications especially if you have had heart, stomach, kidney issues in the past. We recommend brief warm-up and cool-down periods before and after exercising.

Exercising should not cause excessive pain or discomfort. If you feel discomfort, stop the exercise or alter the motion so that you are more comfortable. Sometimes your arthritic hip or knee limits your ability to perform certain exercises. Listen to your body and try to perform these exercises to the best of your ability. **Remember putting the work in before surgery will make your recovery easier.**

We recommend attempting these exercises at least **3-4 days a week for 30-60 minutes** each day. You can break up your exercise routine and do some exercises in the morning and others in the afternoon or perform different groups of exercises on different days.

DISCLAIMER

PLEASE USE THESE EXERCISES AS A GUIDE AS IT IS ULTIMATELY BETWEEN YOUR AND YOUR SURGEON TO DECIDE WHICH THERAPY SETTING IS RIGHT FOR YOU BEFORE YOUR SURGERY. YOUR SURGEON MAY RECOMMEND ALTERATIONS TO THIS ROUTINE. IF YOU EXPERIENCE ANY ABNORMAL DISCOMFORT, DIZZINESS, OR FEELINGS OF PASSING OUT, PLEASE STOP EXERCISING AND CONTACT YOUR PHYSICIAN AS SOON AS POSSIBLE.

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STRETCHING EXERCISES

Stretching helps to prevent injury by getting the muscles ready for a workout. Typically, patients are advised to spend **5-10 minutes** stretching before exercising. A heating pad or warm towel can be used to help relax the muscles in preparation for stretching. The following stretches can also be performed in-between exercises to keep the muscles from getting tight. It is recommended that your exercise program **begin and end** with stretches. Ice can be applied to the hip or knee joint after exercising. **Muscle memory** (or training your muscles to move in a certain way so that it becomes second nature) **is an important process to get your muscles ready to work after surgery, so why not start preparing before surgery!!!**

GENERAL TIPS FOR STRETCHING EXERCISES:

- **Warm-up by walking 5-10 minutes to get your muscles ready for the exercise program**
- **Remember to stretch in a slow and controlled manner, avoid rapid motions**
- **Perform each stretch until you experience a "TOLERABLE DISCOMFORT" in the muscle – adjust the stretch to your comfort**
- **Try to hold the position for 10-30 seconds (as indicated for each exercise)**
- **Slowly return back to the original starting position**
- **Take a deep breath and RELAX FOR 5 SECONDS between repetitions**
- **Cool-down—5-10 minutes of icing or slow walking to finish workout**

Note: You can expect some muscle soreness when you first start a stretching program

HAMSTRING STRETCH SEATED

The hamstrings are a group of muscles on the back of your thigh. It is important to stretch these muscles because they can become tight especially with arthritis. This stretch is also used during warm-ups to get your muscles ready for other exercises. There are a few ways to perform a hamstring stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead, focus on taking slow deep breaths while trying to stretch a little bit further. **Remember to keep your toes pointed toward the ceiling at all times.**

1. Begin by sitting in a hardback chair, prop your leg on a stool or chair directly in front of you

2. While keeping your back straight, slowly reach for your toes while at the same time keeping your knee straight. (You will feel a stretch along the muscles in the back of your thigh)

3. Try to hold the stretch for **30 seconds**

4. Slowly return to the starting position

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	1	30 Seconds

CALF STRETCH
HEEL CORD

This exercise stretches the calf muscles. This stretch is also used during warm-ups to get your muscles ready for other exercises. You will need **to lean next to a wall or door** to complete this stretch. There are a few ways to perform the calf stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead focus on taking slow deep breaths while trying to stretch a little bit further. Start by placing your toes on the bottom of the wall/door with your heel on the ground. Be sure to keep your toes pointed forward at all times.

1. Start by placing your toes on the bottom of the wall/door with your heel on the ground. Be sure to keep your toes pointed forward at all times
2. Remember to keep your knee straight and then lean forward until you feel stretch in the back of your calf
3. Try to hold the stretch for **30 seconds**
4. Slowly return to the starting position

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	**1**	**30 Seconds**

SECONDARY CALF STRETCH

The second part of the calf stretch is shown below. This exercise stretches the calf muscles differently compared to the first stretch. This stretch is also used during warm-ups to get your muscles ready for other exercises. You will need **to lean next to a wall or door** to complete this stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead focus on taking slow deep breaths while trying to stretch a little bit further.

1. Stagger your stance with one foot in front of the other
2. Keep the toes of both feet pointed forward while your hands are on the wall/door - Be sure to keep your **back knee** straight with the heel on the ground at all times
3. Now slowly lean forward until you feel a stretch in the back of your calf
4. Try to hold the stretch for **30 seconds**
5. Slowly return to the starting position

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	1	30 Seconds

STRENGTHENING EXERCISES

It is normal for your leg muscles to atrophy (shrink) before joint replacement surgery. Exercises can help muscles regain strength as well as improve the nerve signals to improve strength and function. It is important to exercise the leg muscles in different ways to improve overall function. Exercise bands or ankle weights can be added to most of these exercises to increase the degree of difficulty. **Muscle memory** (or training your muscles to move in a certain way so that it becomes second nature) **is an important process to get your muscles ready to work after surgery, so why not start preparing before surgery!!!**

GENERAL TIPS FOR STRENGTHENING EXERCISES:

- **Strengthening exercises are usually performed after warm-up and stretching**
- **Please use the "SETS, REPETITIONS, HOLD" as a guide during exercising**
- **Remember to control the muscles to slowly return to the original starting position**
- **Take a deep breath and RELAX FOR 5 SECONDS between repetitions**
- **It important to take 5-10 minutes to cool-down after exercising. This should include stretches and applying ice to sore muscles.**

Note: Slight muscle discomfort can be expected - these exercises SHOULD NOT CAUSE PAIN. If you do experience pain, back off and modify your technique. If pain is still present, we recommend holding off with the particular painful exercise.

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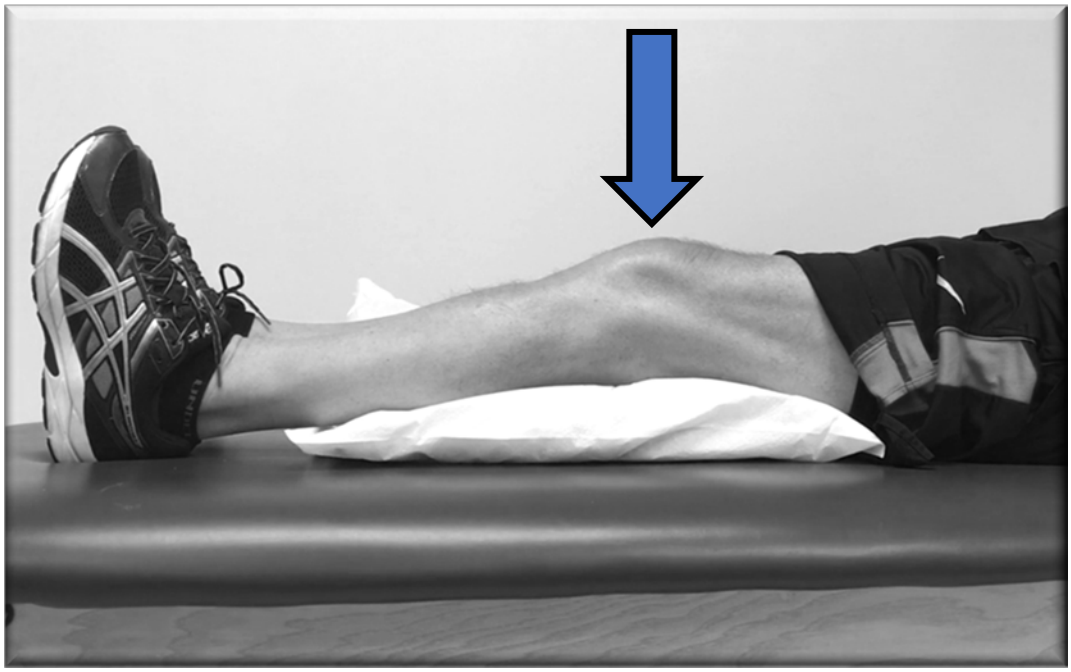
QUAD SETS

The Quadriceps are a group of muscles on the front of your thigh. This simple exercise helps to wake up the muscles in preparation for more difficult exercises. To perform this exercise, we recommend lying on your back on a soft surface or mat. Place a small towel or pillow behind your knee.



1. Keep your toes pointed toward the ceiling and slowly push the back of your knee down into the towel/pillow (You will feel your thigh muscles tighten)

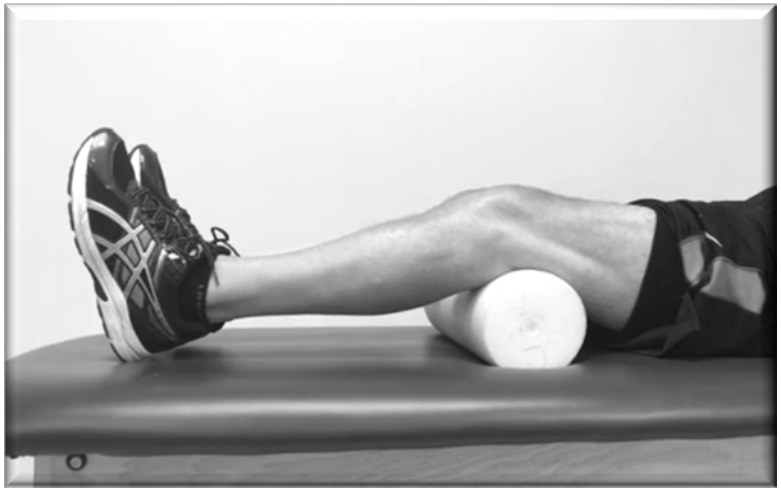
2. Hold the muscle contraction for **5 seconds** before slowly relaxing and returning to the starting position.

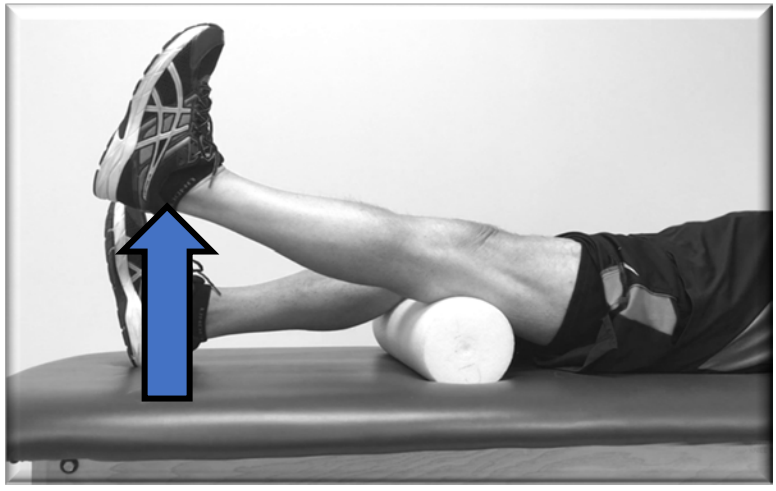
This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	10	5 Seconds

QUAD ARCS

Quad arcs are a slightly more difficult exercises for your thigh muscles. To perform this exercise, we recommend lying on your back on a soft surface or mat. For this exercise, place a rolled up towel or pillow behind your knee that allows your knee to rest in a comfortable bent position.





1. With your toes pointed toward the ceiling, slowly straighten your knee while keeping the back of your knee on the towel/pillow (you will feel your thigh muscles tighten)

2. Try to hold the muscle contraction for **5 seconds** with the knee straight

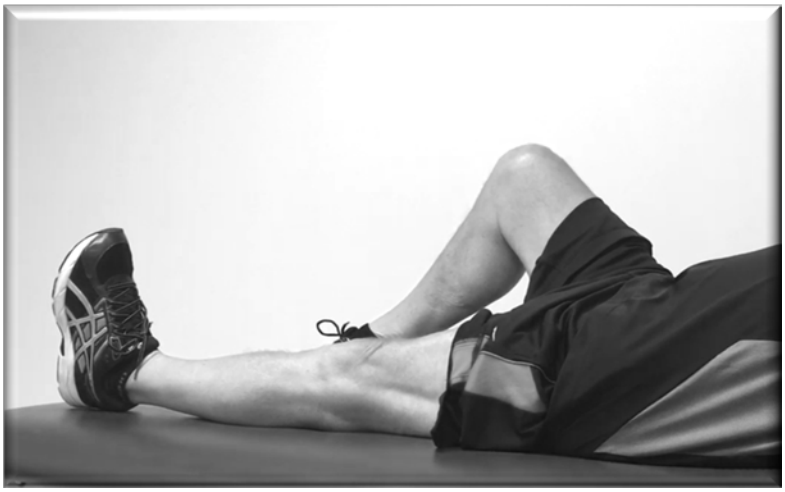
3. Next **SLOWLY RELAX** the thigh muscles and allow the leg to return to the starting position

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	10	5 Seconds

STRAIGHT LEG RAISE

This exercise also works the quadriceps (thigh) muscles. This exercise is the hardest of all the quadriceps exercises. To perform this exercise, we recommend lying on your back on a soft surface or mat. To take pressure off your back, your opposite leg should be comfortably resting in a bent position with the foot on the ground.



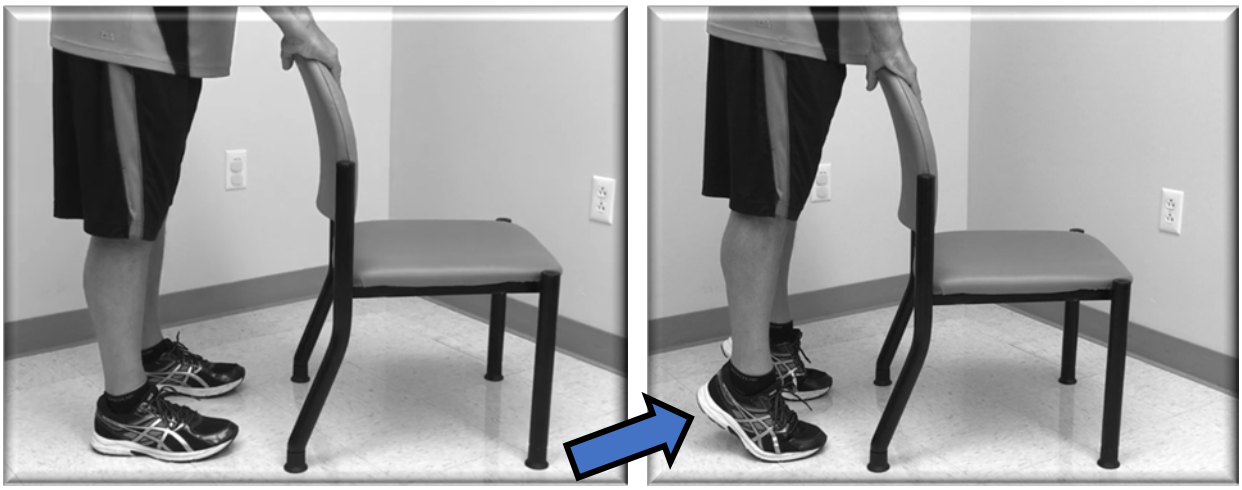
1. Begin by tightening your thigh muscles with your toes pointed toward the ceiling
2. Slowly lift your entire leg off the ground while keeping your knee straight
3. Try to bring your leg up until your thighs are at the same level
4. Try to hold your leg up for **5 seconds** and then **SLOWLY RETURN** your leg to the starting position

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	10	5 Seconds

CALF RAISES

This exercise works the calf muscles. To perform this exercise, we recommend using a chair, counter, or railing for balance. Begin by spacing your feet shoulder-width apart.



1. Push up onto your toes to raise both heels off the ground

2. Hold for **5 seconds** before slowly lowering your heels back to the ground

******AS YOU GET STRONGER, YOU CAN PERFORM THIS EXERCISE STANDING ON ONE LEG AT A TIME******

SETS	REPETITIONS	HOLD
3	**10**	**5 Seconds**

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ENDURANCE EXERCISES

Before a hip or knee replacement, it is also important to work on endurance exercises. Endurance is the ability to work over a period of time. Think of it as another form of strengthening before surgery. Endurance exercises can be anywhere between a few minutes to 1 hour or more. Walking, bicycling, and swimming build endurance by improving nerve impulses to your muscles and as well as improving your cardiovascular health. Sometimes your arthritic hip or knee limits your ability to perform these exercises. Listen to your body and try to perform these exercise to the best of your ability. Remember putting the work in before surgery will make your recovery easier. We recommend attempting these exercises 2-3 days a week.

TREADMILL WALKING – The treadmill is a good starting point before your hip or knee replacement. The idea is to walk at a comfortable pace while still keeping the "Heel-Toe" pattern. Sometimes walking in front of a mirror can help remind you to keep a smooth and even gait pattern. Patient's usually start at a speed of 2-3 mph (it is okay to be slower as well). Once comfortable, you can increase the speed and incline in a safe responsible manner.

ELLIPTICAL – The elliptical machine is unique in that it simulates a normal walking pattern. You can adjust the resistance for a more difficult workout. Some machines also allow you to change the incline or decline resistance. It is important to gradually work up to a comfortable pace. Remember to complete exercises by going forward as well as going backwards on the elliptical to work different muscle groups.

STATIONARY BICYCLE – The stationary bicycle (and for some a recumbent bicycle) are important to build strength and endurance. This machine is unique in that you can alter the resistance as well as adjust the seat position during a workout. For instance, moving the seat closer to the pedals will work more of the hip and thigh muscles. On the contrary, moving the sear further from the pedals will work more of the knee and lower leg muscles. Remember to spend part of your time pedaling **FORWARD** as well as **BACKWARD** to work different muscle groups.

WALKING OUTSIDE– Beginning with flat surfaces, walking can be progressed to uneven surfaces including hills and inclines/declines. Walking on different surfaces is a great way to build endurance before your joint replacement surgery.

GENERAL TIPS FOR ENDURANCE EXERCISES:

- **Endurance exercises are performed after a warm-up and stretching period.**
- **It is better to exercise longer with lower resistance or incline to build your endurance before a hip or knee replacement**
- **It important to take 5-10 minutes to cool-down after exercising. This should include stretches and applying ice to sore muscles.**

REMEMBER IF YOU EXPERIENCE ANY ABNORMAL DISCOMFORT, DIZZINESS, OR FEELINGS OF PASSING OUT, PLEASE STOP EXERCISING AND CONTACT YOUR PHYSICIAN AS SOON AS POSSIBLE.

AAHKS
AMERICAN ASSOCIATION OF HIP AND KNEE SURGEONS

Your Complete Guide to Joint Replacement

Trustworthy information from AAHKS surgeon members

At-Home Exercises Before Hip or Knee Replacement Surgery

Members of the American Association of Hip and Knee Surgeons have put together this basic rehabilitation program for you to use before hip or knee replacement surgery. Please use these exercises only as a guide as it is ultimately between you and your surgeon to decide which therapy setting is right for you before your joint replacement.

These exercises can be performed in a graduated fashion in the weeks following your joint replacement as outlined in the plan. If you experience any abnormal discomfort, dizziness or feelings of passing out, please stop exercising and call your physician's office immediately.

Companion Videos

Demonstrations of these exercises along with a library of articles on hip and knee replacement can be found at www.AAHKS.org/HipKnee.

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Home Therapy Exercises After Total Hip Replacement

Recovery after Surgery

To see the full benefit of hip replacement, therapy will be a necessary part of the rehabilitation process. Therapy can **reduce swelling, decrease pain, improve range-of-motion, build strength, challenge balance, and develop endurance.** The majority of patients are able to return to sedentary jobs and activities such as driving within **4-6 weeks** while more demanding occupations may take longer.

It is recommended you dedicate **30-60 minutes** each day for exercises. You can break up your exercise routine and do some exercises in the morning and others in the afternoon or perform different groups of exercises on different days.

The American Association of Hip and Knee Surgeons (AAHKS) has outlined a home exercise program for you after your hip replacement. This handout accompanies our patient exercise videos that you can find at www.AAHKS.org/HipKnee. Exercises will focus on stretching, strengthening, endurance, and balance. The hip rehabilitation program is broken down into three phases: ***Weeks 1-3, Weeks 4-6, Weeks 7 and Beyond***. You can print the accompanying schedule to keep track of your progress.

This program starts with a warm-up period of stretching followed by more specific exercises for the hip muscles. We recommend using over-the-counter anti-inflammatory medications such as ibuprofen, naproxen, meloxicam or a pain reliever such as acetaminophen before or after exercising to help with swelling and discomfort. Please follow your physician's guidance and the dosing directions on the package. We recommend brief warm-up and cool-down periods before and after exercising.

These exercises are a general guide to rehabilitation after total joint replacement. After completing the eight-week program, you should continue a "maintenance exercise program" two to three days a week to keep your muscles strong and to keep a healthy lifestyle. Frequent follow up appointments will be required to check your progress. Please keep in mind that your surgeon may have you follow certain **hip precautions** depending on your particular hip surgery. **PLEASE CHECK WITH YOUR SURGEON BEFORE STARTING ANY OF THE FOLLOWING EXERCISES TO BE SURE YOU EXERCISE IN A SAFE MANNER.**

DISCLAIMER

PLEASE USE THE EXERCISES AS A GUIDE AS IT IS ULTIMATELY BETWEEN YOUR AND YOUR SURGEON TO DECIDE WHICH THERAPY SETTING IS RIGHT FOR YOUR RECOVERY AFTER HIP REPLACEMENT. YOUR SURGEON MAY RECOMMEND ALTERATIONS TO THIS ROUTINE. IF YOU EXPERIENCE ANY ABNORMAL DISCOMFORT, DIZZINESS, OR FEELINGS OF PASSING OUT, PLEASE STOP EXERCISING AND CONTACT YOUR PHYSICIAN AS SOON AS POSSIBLE.

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Summary Of Hip Exercises

	WEEKS 1-3	WEEKS 4-6	WEEKS 7+
STRETCHES	Hamstring Stretch	Hamstring Stretch	Hamstring Stretch
	Calf Stretch Heel Cord	Calf Stretch Heel Cord	Calf Stretch Heel Cord
	Secondary Calf Stretch	Secondary Calf Stretch	Secondary Calf Stretch
STRENGTHENING	Glute Sets	Quad Arcs	Hip-Abduction / Adduction
	Ankle Pumps	Prone Knee Bends	Mini-Squats
	Thigh Squeezes	Straight Leg Raise	Step-ups
	Quad Sets	Hip Abduction / Adduction	Bridges
	Quad Arcs	Heel Slides	
	Prone Knee Bend	Mini-Squats	
	Calf Raises		
ENDURANCE	Walking	Treadmill	Treadmill
		Elliptical	Elliptical
		Stationary Bicycle	Stationary Bicycle
BALANCE	Eyes Open	Eyes Open / Eyes Closed	Eyes Open / Eyes Closed

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HIP EXERCISES

STRETCHING EXERCISES

Stretching helps to prevent injury by getting the muscles ready for a workout. Typically, patients are advised to spend **5-10 minutes** stretching before exercising. A heating pad or warm towel can be used to help relax the muscles in preparation for stretching. The following stretches can also be performed in-between exercises to keep the muscles from getting tight. A good stretching routing can also help to break up scar tissue that will form after your hip replacement. It is recommended that your exercise program begin and finish with stretches. Ice can be applied to the hip or sore muscles after exercising.

GENERAL TIPS FOR STRETCHING EXERCISES

- ✓ Warm-up by walking 5-10 minutes to get your muscles ready for the exercise program.
- ✓ Remember to stretch in a slow and controlled manner, avoid rapid motions.
- ✓ Perform each stretch until you experience a **"tolerable discomfort"** in the muscle; adjust the stretch to your comfort.
- ✓ Try to hold the position for **10-30 seconds** (as indicated for each exercise).
- ✓ Slowly return to the original starting position.
- ✓ Take a deep breath and **relax for 5 seconds** between repetitions.
- ✓ Cool-down—5-10 minutes of icing or slow walking to finish workout.

Note: You can expect some muscle soreness when you first start a stretching program.

HAMSTRING STRETCH SEATED

The hamstrings are a group of muscles on the backs of your thighs. It is important to stretch these muscles because they can become tight after knee replacement. This stretch is also used during warm-ups to get your muscles ready for other exercises. There are a few ways to perform a hamstring stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead, focus on taking slow deep breaths while trying to stretch a little bit further. **Remember to keep your toes pointed toward the ceiling at all times. Please check with your surgeon before attempting this stretching exercise.**

1. Begin by sitting in a hardback chair, prop your leg on a stool or chair directly in front of you.

2. While keeping your back straight, slowly reach for your toes while at the same time keeping your knee straight (you will feel a stretch along the muscles in the back of your thigh).

3. Try to hold the stretch for **30 seconds.**

4. Slowly return to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	1	30 seconds

CALF STRETCH
HEEL CORD

This exercise stretches the calf muscles. These muscles can become tight after hip replacement. This stretch is also used during warm-ups to get your muscles ready for other exercises. You will need to **lean next to a wall or door** to complete this stretch. There are a few ways to perform the calf stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead focus on taking slow deep breaths while trying to stretch a little bit further. Start by placing your toes on the bottom of the wall/door with your heel on the ground. Be sure to keep your toes pointed forward the entire time.

1. Start by placing your toes on the bottom of the wall/door with your heel on the ground. Be sure to keep your toes pointed forward at all times.
2. Remember to keep your knee straight and then lean forward until you feel stretch in the back of your calf.
3. Try to hold the stretch for **30 seconds.**
4. Slowly return to the starting position.

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	**1**	**30 seconds**

SECONDARY CALF STRETCH

The second part of the calf stretch is shown below. This exercise stretches the calf muscles differently compared to the first stretch. This stretch is also used during warm-ups to get your muscles ready for other exercises. You will need to **lean next to a wall or door** to complete this stretch. It is important to try to relax during stretching exercises. Do not hold your breath. Instead focus on taking slow deep breaths while trying to stretch a little bit further.

1. Stagger your stance with one foot in front of the other.
2. Keep the toes of both feet pointed forward while your hands are on the wall/door. Be sure to keep your **back knee** straight with the heel on the ground the entire time.
3. Now slowly lean forward until you feel a stretch in the back of your calf.
4. Try to hold the stretch for **30 seconds.**
5. Slowly return to the starting position.

This exercise should be performed on both legs

SETS	REPETITIONS	HOLD
3	1	30 seconds

STRENGTHENING EXERCISES

It is normal for your leg muscles to atrophy (shrink) before and after joint replacement surgery. Exercises can help muscles regain strength as well as improve the nerve signals to improve strength and function. As your swelling decreases, muscle strength improves. It is important to exercise the leg muscles in different ways to improve overall function. Exercise bands or ankle weights can be added to most of these exercises to increase the degree of difficulty

GENERAL TIPS FOR STRENGTHENING EXERCISES

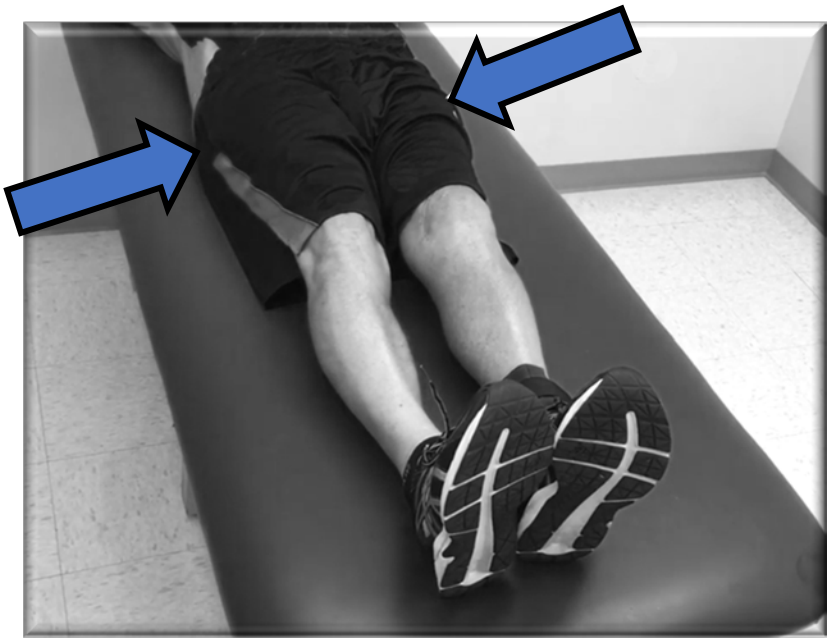
- ✓ Strengthening exercises are usually performed **after warm-up and stretching.**
- ✓ Please use the "**sets, repetitions, hold"** as a guide during exercising.
- ✓ Remember to control the muscles to slowly return to the original starting position.
- ✓ Take a deep breath and **RELAX FOR 5 SECONDS** between repetitions.
- ✓ It important to take 5-10 minutes to cool-down after exercising. This should include stretches and applying ice to sore muscles.

Note: Slight muscle discomfort can be expected - these exercises **should not cause pain**. If you experience pain, back off and modify your technique. If pain is still present, we recommend holding off with the specific painful exercise.

PLEASE CHECK WITH YOUR SURGEON BEFORE STARTING ANY OF THE FOLLOWING EXERCISES TO BE SURE YOU EXERCISE IN A SAFE MANNER.

GLUTE SETS

This exercise works the buttock muscles and helps with your circulation after surgery. To perform this exercise, we recommend lying on you back on a soft surface or mat.

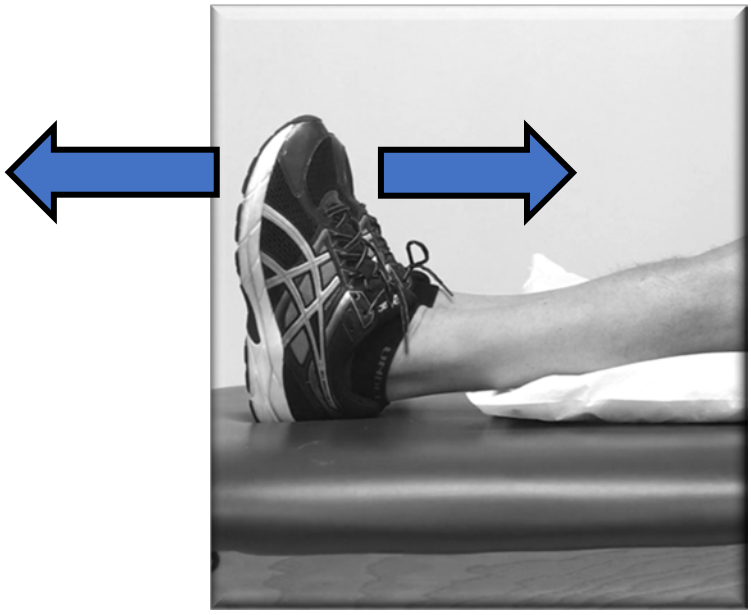


1. Your legs should be straight out in front of you.
2. Next, slowly squeeze your buttocks together without raising off the surface.
3. Hold the muscle contraction for **5 seconds.**
4. Slowly relax your muscles – your legs should not move during this exercise.

SETS	REPETITIONS	HOLD
3	10	5 seconds

ANKLE PUMPS

This exercise works the calf muscles and helps with your circulation after surgery. To perform this exercise, we recommend lying on you back on a soft surface or mat. Place a small towel or pillow behind your knee. Remember to keep your knee straight and your toes pointed toward the ceiling.



1. Begin by pulling your toes back toward you (like taking your foot off a gas pedal).

2. Next point your toes away from you (like pushing on a gas pedal). You will feel your calf muscles tighten.

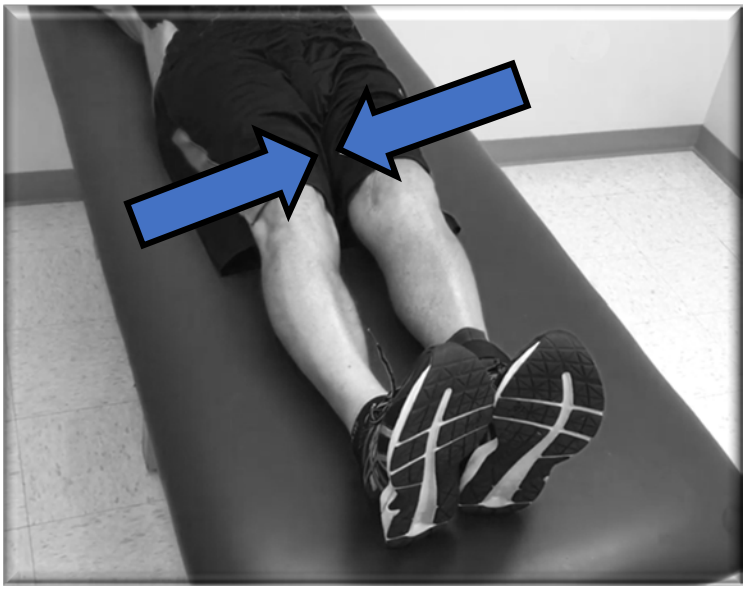
3. Hold each position for **3 seconds** before slowly relaxing and returning to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	3 seconds

THIGH SQUEEZES

This exercise works the inner thigh muscles (adductors) and helps with your circulation after surgery. To perform this exercise, we recommend lying on your back on a soft surface or mat.



1. Begin with your legs together and straight out in front of you.

2. Next, slowly squeeze your thigh muscles together (you will feel the muscles on the inside of your thigh tighten).

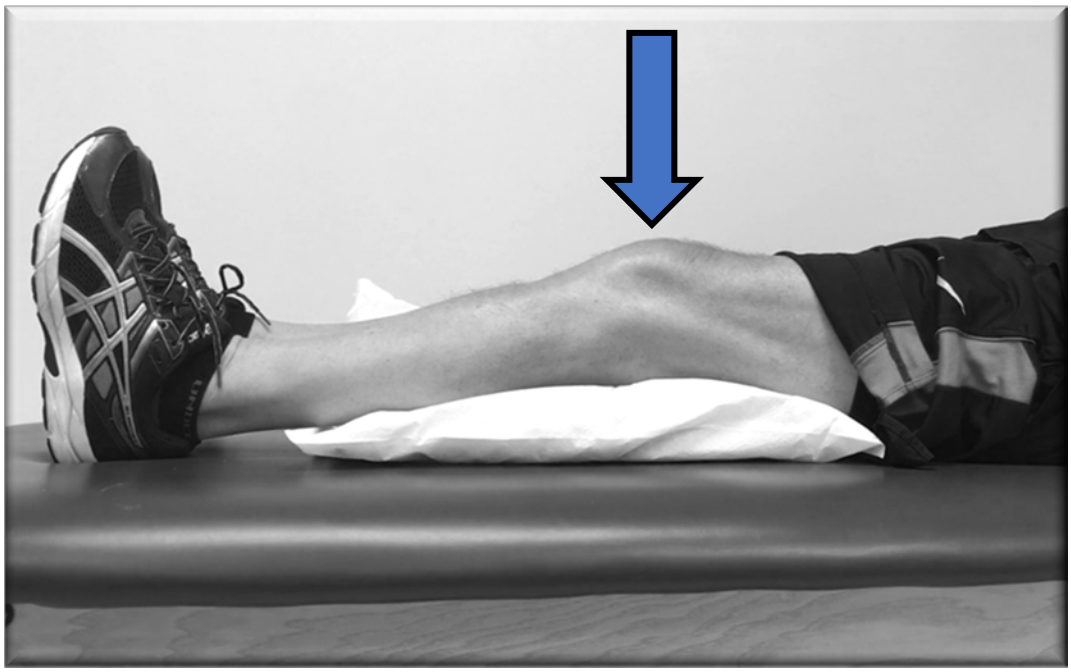
3. Hold the muscle contraction for **5 seconds.**

4. Slowly relax the inner thigh muscles. Your legs should not move during this exercise.

SETS	REPETITIONS	HOLD
3	**10**	**5 seconds**

QUAD SETS

The Quadriceps are a group of muscles on the front of your thigh. This exercise helps to wake up the muscles for the first few weeks after surgery. To perform this exercise, we recommend lying on your back on a soft surface or mat. Place a small towel or pillow behind your knee.



1. Keep your toes pointed toward the ceiling and slowly push the back of your knee down into the towel/pillow. You will feel your thigh muscles tighten.

2. Hold the muscle contraction for **5 seconds** before slowly relaxing and returning to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

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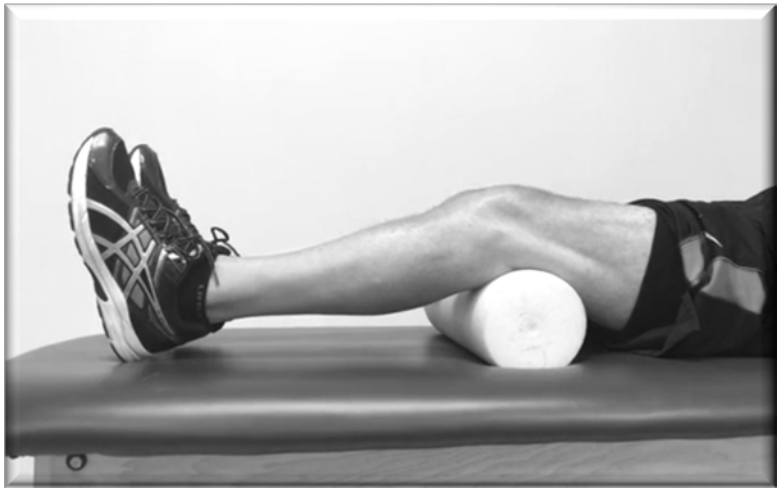
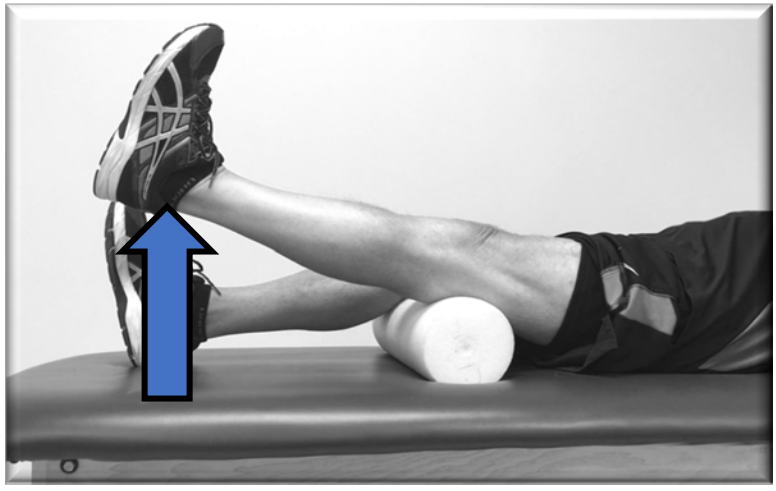
QUAD ARCS

The Quadriceps are a group of muscles on the front of your thigh. This exercise helps to wake up the muscles for the first few weeks after surgery. To perform this exercise, we recommend lying on your back on a soft surface or mat. For this exercise, place a rolled up towel or pillow behind your knee that allows your knee to rest in a comfortable bent position.





1. With your toes pointed toward the ceiling, slowly straighten your knee while keeping the back of your knee on the towel/pillow. You will feel your thigh muscles tighten.

2. Try to hold the muscle contraction for **5 seconds** with the knee straight.

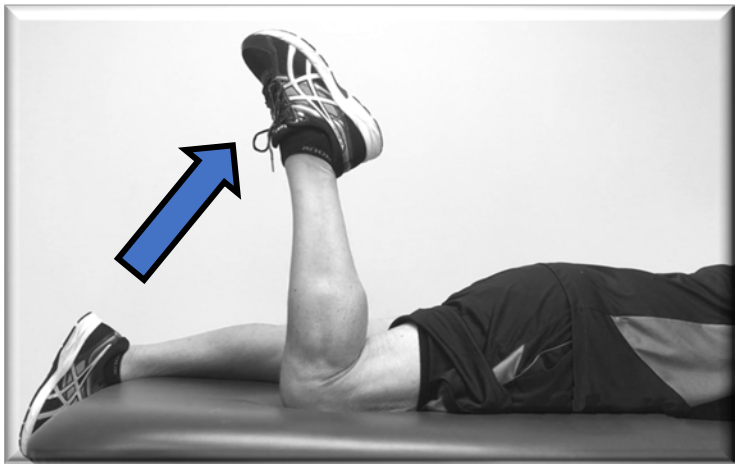
3. Next slowly relax the thigh muscles and allow the leg to return to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

PRONE KNEE BENDS

This exercise works the hamstring muscles on the back of your thigh. To perform this exercise, we recommend lying on your stomach on a comfortable surface. Keep the front part of your thigh in contact with the surface at all times. Ankle weights or exercise bands can be added to increase the degree of difficulty. Please make sure you are comfortable with getting into this position with your hip replacement.



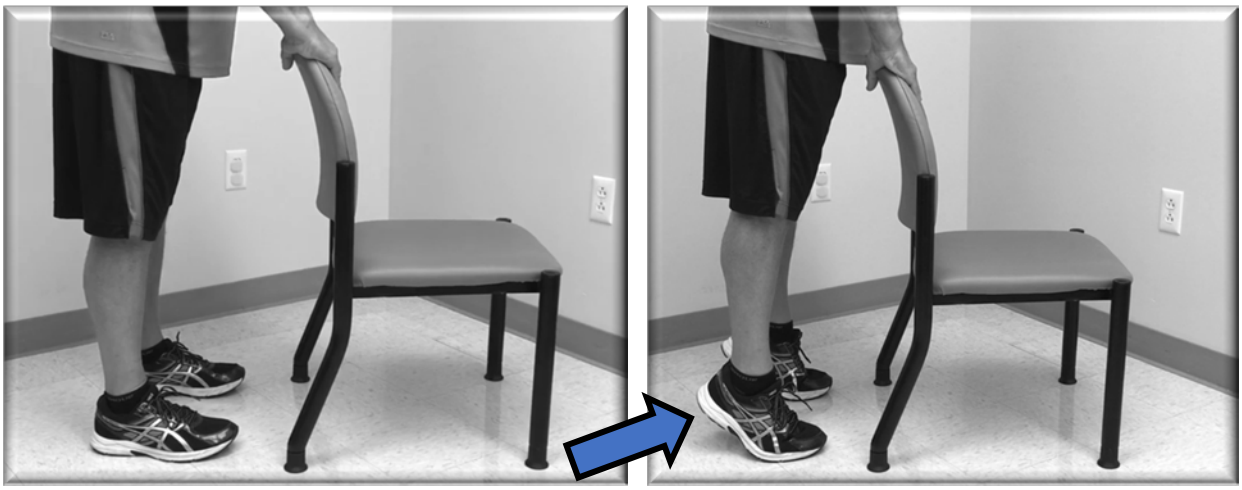
1. Point your toes away as if you were pushing on a gas pedal.
2. Slowly bend your knee up until your lower leg points towards the ceiling.
3. Hold the bend for **5 seconds** before slowly returning your leg to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

CALF RAISES

This exercise works the calf muscles. To perform this exercise, we recommend using a chair, counter or railing for balance. Begin by spacing your feet shoulder-width apart.



1. Push up onto your toes to raise both heels off the ground.

2. Hold for **5 seconds** before slowly lowering your heels back to the ground.

As you get stronger, you can do these standing on one leg at a time.

SETS	REPETITIONS	HOLD
3	**10**	**5 seconds**

STRAIGHT LEG RAISE

This exercise works the quadriceps (thigh) muscles. To perform this exercise, we recommend lying on your back on a soft surface or mat. To take pressure off your back, your opposite leg should be comfortably resting in a bent position with the foot on the ground.

1. Begin by tightening your thigh muscles with your toes pointed toward the ceiling.
2. Slowly lift your entire leg off the ground while keeping your knee straight.
3. Try to bring your leg up until your thighs are at the same level.
4. Try to hold your leg up for **5 seconds** and then slowly return your leg to the starting position.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

HIP ABDUCTION / ADDUCTION SUPINE

This exercise works the muscles on the inside (adductors) and outside (abductors) of your hip. The exercise can be performed in three different positions. We recommend starting with the exercises lying on your back. When that becomes easy then progress to the exercises in standing, and finally for a more challenging exercise you can perform the exercises while lying on your side. Removing your shoes before attempting this exercise can allow your leg to slide easier.

Lying on Your Back (supine)

1. Remember to keep your toes pointed toward the ceiling and your knee straight.
2. Slowly move your leg out to the side until a comfortable stretch is felt in your groin.
3. Next slowly move your leg back to the starting position.

Ankle weights or exercise bands can be added to increase the degree of difficulty.

This exercise should be performed on both legs.

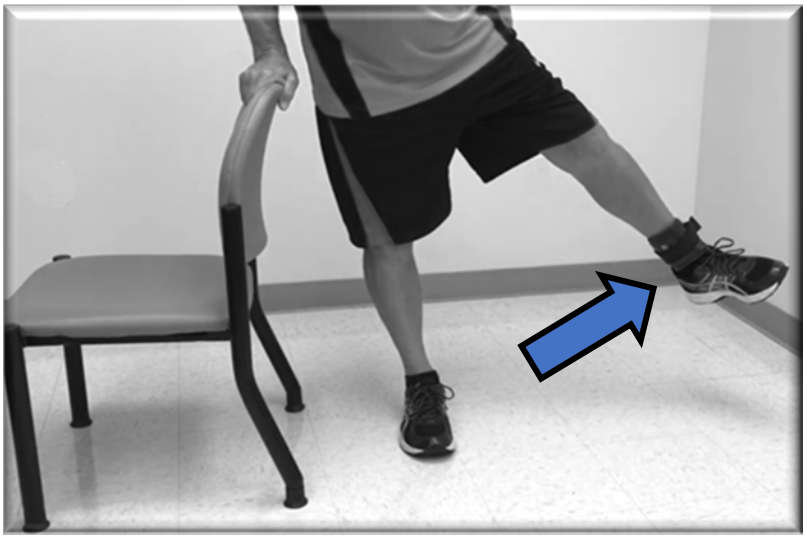
SETS	REPETITIONS	HOLD
3	10	none

HIP ABDUCTION / ADDUCTION STANDING

When performing this exercise, we recommend using a chair, counter or railing for balance. Remember to keep your back straight for this exercise.

Standing

1. Begin by slightly rotating your toes toward the side.
2. While keeping your knee straight, slowly move your leg out toward the side. You will feel the muscles on the side of your hip tighten.
3. Try to hold the end position for **5 seconds** before slowly returning your leg to the starting position.



Ankle weights or exercise bands can be added to increase the degree of difficulty.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

HIP ABDUCTION / ADDUCTION SIDELYING

This position modification is the most difficult for this exercise. You should only progress to this exercise after the supine and standing exercises become too easy. To perform this exercise, we recommend lying on your side on a comfortable surface. Begin by lying on your side with your lower leg resting on the ground with the knee slightly bent.

Sidelying

1. Start by rotating your toes so they are pointing toward the ceiling.

2. While keeping your knee straight, slowly raise your leg toward the ceiling until a comfortable stretch is felt in your groin. You will feel your outer hip muscles tighten.

3. Try to hold the end position for **5 seconds** before slowly returning your leg to the starting position.

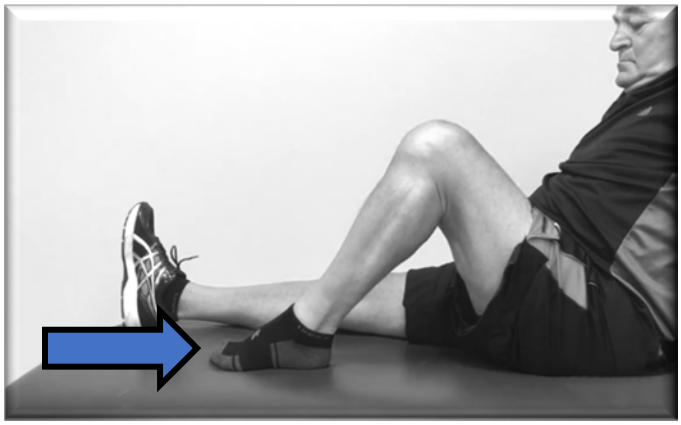
Ankle weights or exercise bands can be added to increase the degree of difficulty.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

HEEL SLIDES

This exercise works the quadriceps (thigh) and hamstring muscles. To perform this exercise, we recommend lying on you back on a soft surface or mat. We also recommend performing this exercise while **wearing socks** so your foot can slide easier. Remember to keep your knee pointing toward the ceiling at all times.



1. Slowly bend your knee and slide your heel back toward your buttock until a comfortable stretch is felt at the front of your knee.

2. Try to hold the position for **5 seconds** before slowly pushing your knee straight until the back of your knee rests against the surface.

A strap can also be used to help slide your heel further to increase the stretch on the knee.

This exercise should be performed on both legs.

SETS	REPETITIONS	HOLD
3	10	5 seconds

MINI-SQUATS

This exercise works several muscle groups including the quadriceps (thigh muscles), hamstrings, and calf muscles. It is important to protect your back, therefore we recommend using a smooth surface such as a wall during this exercise. Be sure to have a chair, countertop or railing close by for balance if needed. Begin with your feet about shoulder-width apart and about 18 inches from the wall.

1. Start by slowly bending your knees and sliding your back down the wall until your knees are at a **comfortable bend.**

2. Try to hold the position for **5 seconds** before slowly straightening your knees and sliding your back up the wall.

3. **Be sure to concentrate and keep your knees directly over your toes at all times during the exercise.**

To increase the difficulty, you can use an exercise ball between your back and the wall.

SETS	REPETITIONS	HOLD
3	10	5 seconds

STEP-UPS

This exercise works several muscle groups including the quadriceps (thigh muscles), hamstrings and calf muscles. Be sure to have a chair, countertop or railing close by for balance if needed. In the beginning, you can start with a **4-inch step** and then progress to a **6-inch**, then **8-inch**, then **10-inch** and finally a **12-inch** step.

Start with the leg with the hip replacement on the step (the step leg).

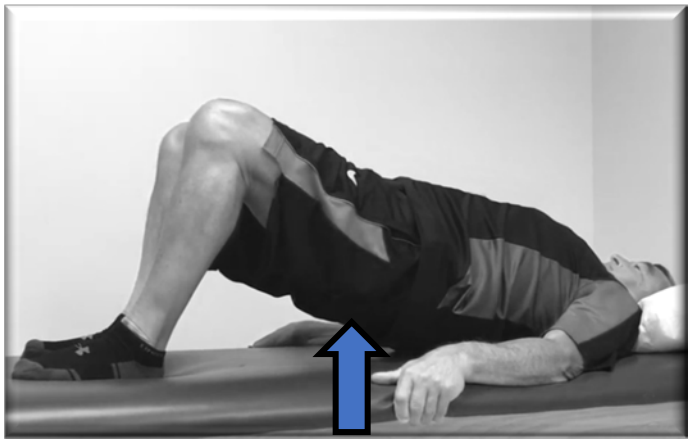
1. Begin by shifting your weight to the step leg as if you were to climb the stairs. The goal is to bring your opposite leg up to match the step leg. **Do not place weight on the opposite leg.**
2. Hold for **5 seconds.**
3. Now slowly lower your opposite leg back to the floor by controlling the muscles of your step leg. You will feel the hip and thigh muscles contract during this exercise.

This exercise can be attempted in different directions. Try stepping in different directions such as forward, backward, and to the side to work different muscles.

SETS	REPETITIONS	HOLD
3	10	5 seconds

BRIDGES

This exercise works the thigh and hip muscles in addition to the abdominals and low back muscles. To perform this exercise, we recommend lying on your back on a firm comfortable surface. Both knees should be comfortably bent with your feet flat on the floor and about **shoulder-width** apart at all times during this exercise.



1. While keeping your hands at your sides, begin by slowly lifting your bottom off the ground by tightening your leg and stomach muscles.
2. Keep lifting as high as you can until your stomach is in line with your knees.
3. Hold for **5** seconds.
4. Next slowly return to the starting position.

SETS	REPETITIONS	HOLD
3	**10**	**5 seconds**

ENDURANCE EXERCISES

After a hip replacement, it is also important to work on endurance exercises. Endurance is the ability to work over a period of time. Think of it as another form of strengthening during your recovery process that will allow you to perform your day-to-day activities without getting too tired. Endurance exercises can be anywhere between a few minutes to one hour or more. Walking, bicycling and swimming build endurance by improving nerve impulses to your muscles and as well as improving your cardiovascular health. These types of exercise usually start about four to six weeks after your hip replacement. Continuing these exercises two to three days a week will not only keep your hip replacement working well, but these exercises are a key for maintaining a healthy lifestyle. We currently do not recommend running or high impact exercises after your hip replacement.

Treadmill Walking – The treadmill is a good starting point to improve your walking after hip replacement. The idea is to walk at a comfortable pace while still keeping the "heel-toe" pattern. Sometimes walking in front of a mirror can help you keep a smooth and even gait pattern. Most people usually start at a speed of two to three miles per hour. Once comfortable, you can increase the speed and incline in a safe responsible manner.

Elliptical – The elliptical machine is unique in that it simulates a normal walking pattern. You can adjust the resistance for a more difficult workout. Some machines also allow you to change the incline or decline resistance. It is important to gradually work up to a comfortable pace. Remember to complete exercises by going forward as well as going backwards on the elliptical to work different muscle groups.

Stationary Bicycle – The stationary bicycle (and for some a recumbent bicycle) are important to build strength and endurance. This machine is unique in that you can alter the resistance as well as adjust the seat position during a workout. For instance, moving the seat closer to the pedals will work more of the hip and thigh muscles. On the contrary, moving the sear further from the pedals will work more of the lower leg muscles. Remember to spend part of your time pedaling forward as well as backward to work different muscle groups.

Walking Outside – Begin with flat surfaces and then progress to uneven surfaces including hills and inclines/declines. Walking on different surfaces is a great way to build endurance. Hiking is an excellent exercise because of the uneven nature of the ground and hills which can also challenge your balance.

Stair Climber – The stair climber adjusts the pedal resistance and speed as you lift and lower your legs as if you were climbing a never-ending set of stairs. You can adjust your step length where short steps work more of the lower leg and calf muscles and long steps work more of the thigh and hip muscles.

Rowing – A rowing machine uses both upper and lower body muscles for more of a complete body workout. The key is to find a comfortable resistance and pace and to perform the exercises at a moderate pace to keep up your heart rate.

(continued)

ENDURANCE EXERCISES

OVERALL INSTRUCTIONS FOR ENDURANCE EXERCISES

We recommend starting at a **low resistance** and a comfortable pace for **5 minutes**. Over the next few weeks as the exercise gets easier, you can add 5 minutes to the exercise to make it more challenging. We recommend being able to exercise at your current resistance level for 20 minutes before increasing the resistance.

GENERAL TIPS FOR ENDURANCE EXERCISES

- ✓ These exercises are usually started **four to six weeks** after your hip replacement.
- ✓ Endurance exercises are performed after a warm-up and stretching period.
- ✓ It important to take 5-10 minutes to cool-down after exercising. This should include stretches and applying ice to sore muscles.

REMEMBER IF YOU EXPERIENCE ANY ABNORMAL DISCOMFORT, DIZZINESS, OR FEELINGS OF PASSING OUT, PLEASE STOP EXERCISING AND CONTACT YOUR PHYSICIAN AS SOON AS POSSIBLE.

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BALANCE EXERCISES

It can take three months or more for your body to adjust to your new hip replacement. Initially your hip replacement leg will feel longer than the opposite side. This is because your muscles have to learn how to "work" with your new hip joint. The perception of a leg length difference will smooth out with time.

Balance and coordination exercises can help challenge your body during the recovery period. These types of exercises are necessary for a complete recovery. To perform these exercises, we recommend having a chair, countertop or railing nearby.

Tandem Standing – During this exercise, place one foot in front of the other so that the heel of one foot is touching the toes of the opposite foot. Be sure to stand straight with your head looking forward. Now try to maintain your balance for 30 seconds. Be sure to challenge your balance again by switching your feet to the opposite position.

Single-Leg Standing – Once you feel comfortable with tandem standing, you can try balancing on one leg while standing on a foam pad or pillow to further challenge your balance. Again aim for standing on one leg for 30 seconds at a time. Be sure to practice on both feet.

When these exercises get easier, try to balance for 10 more seconds until you get up to 1-2 minutes of balancing at time. To make it even more challenging, try the same exercise with your eyes open and then your eyes closed.

GENERAL TIPS FOR BALANCE EXERCISES

- ✓ These exercises are usually started **4-6 weeks** after your hip replacement.
- ✓ Balance exercises are performed at the end of your workout session.
- ✓ We suggest being able to maintain your balance for at least **30 seconds** with your eyes open before attempting the same exercises with your eyes closed. **Eyes-closed exercises really challenge your balance – be sure to have a chair, railing or countertop close by if you lose your balance.**
- ✓ It is important to take 5-10 minutes to cool-down after exercising. This should include stretches and applying ice to sore muscles.

REMEMBER IF YOU EXPERIENCE ANY ABNORMAL DISCOMFORT, DIZZINESS, OR FEELINGS OF PASSING OUT, PLEASE STOP EXERCISING AND CONTACT YOUR PHYSICIAN AS SOON AS POSSIBLE.

AAHKS
AMERICAN ASSOCIATION OF HIP AND KNEE SURGEONS

Your Complete Guide to Joint Replacement

Trustworthy information from AAHKS surgeon members

At-Home Exercises Following Hip or Knee Replacement Surgery

Members of the American Association of Hip and Knee Surgeons have put together this basic rehabilitation program for you to use after hip or knee replacement surgery. Please use these exercises only as a guide as **it is ultimately between you and your surgeon to decide which therapy setting is right for your recovery after joint replacement**.

These exercises can be performed in a graduated fashion in the weeks following your joint replacement as outlined in the plan. If you experience any abnormal discomfort, dizziness or feelings of passing out, please stop exercising and call your physician's office immediately.

Companion Videos

Demonstrations of these exercises along with a library of articles on hip and knee replacement can be found at www.AAHKS.org/HipKnee.

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