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# Total hip replacement explained

Nurses care for patients before, during, and after hip replacement one of the most common joint surgeries along with knee replacement. Here's what you need to know to provide your patients with the best possible care.

By Amanda Perkins, DNP, RN

Editor's note: Last issue, we took a look at total knee replacement. This issue, we explore total hip replacement.

The first hip replacement surgery was performed in 1940; the modern total hip replacement (THR) was introduced in the 1960s and improved over the years to significantly decrease the risk of complications and increase patient outcomes. Over 450,000 people in the US have a THR each year. Of these individuals, 90% report satisfaction with their outcome.

Patients undergoing THR surgery are cared for in a variety of settings, including, but not limited to, hospitals, healthcare provider's offices, and the home setting. In this article, we discuss the anatomy and physiology of the hip, disorders leading to THR, the THR procedure, pre- and postoperative care, and potential complications.

# Anatomy and physiology of the hip

The hip is a large ball-and-socket joint. Together, the acetabulum and femur make up the hip joint. The acetabulum is part of the pelvis, forming the hip socket, whereas the upper part of the femur forms the ball. Articular cartilage cushions the ends of the bones and allows for smooth movement. The synovial membrane surrounds the joint

and provides lubrication, also helping with smooth movement of the joint.

The hip joint is a stable joint, which is necessary because it bears much of a person's weight during ambulation and movement. Extra pressure on this joint can lead to medical conditions such as arthritis, which may eventually result in the need for a THR (see Anatomy and injuries of the hip).

# **Conditions that lead to a THR**

A variety of conditions can lead to the need for a THR, with osteoarthritis being the most cited reason. Other common conditions that can lead to a THR include:

- rheumatoid arthritis
- posttraumatic arthritis
- osteonecrosis
- childhood hip disease.

For information on osteoarthritis and rheumatoid arthritis, refer to "Total Knee Replacement Explained" in the November/ December 2020 issue.

Posttraumatic arthritis is caused by a direct trauma to a joint; in this case, a trauma to the hip joint. This condition can be caused by injuries as the result of sports, motor vehicle crashes, and falls. In some cases, the cause is unknown and labeled idiopathic. The risk of posttraumatic arthritis is increased with repeated injuries and obesity. Additionally,

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this condition can be acute or chronic, with the chronic form leading to the need for a THR.

Osteonecrosis of the hip joint, also known as avascular necrosis, is an interruption of circulation to the femoral head. The poor blood circulation results in necrosis of the bone. This disorder can cause a collapsed femoral head and socket degeneration. Of all THRs performed in the US, avascular necrosis makes up approximately 10% of the cases. In some instances, this disorder goes undetected until a considerable amount of damage has occurred, which can lead to the need for a THR. The risk of osteonecrosis is increased with alcohol intake, corticosteroid use, sickle cell anemia, blockage from fat particles, and dislocation trauma.

Two childhood hip diseases that can lead to the need for a THR are developmental dysplasia of the hip (DDH), in which the hip anatomy is altered resulting in abnormal wear and tear, and Legg-Calvé-Perthes disease (LCPD), which is caused by a disrupted blood supply to the femur, leading to necrosis.

Occurring in 1 out of 1,000 people, DDH is commonly seen in individuals with a family history of the condition, first-born children, and babies who are breech. The abnormal wear and tear caused by DDH can develop at an early age.

LCPD is rare and typically develops in children between the ages of 3 and 10. Although more common in males, the damage that occurs may be more severe in females. With this condition, the acetabulum may become shallow and enlarged and the socket may be positioned abnormally. Additionally, the head of the femur may also be deformed, with flattening and widening. Over time, the head of the femur begins to collapse, with the eventual return of blood supply and regrowth of bone. Patients who have LCPD may develop secondary osteoarthritis, which can lead to the necessity for a THR.

# **Preoperative care**

Before a THR, the following should occur:

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- medical history and physical exam
- diagnostic labs and imaging studies
- preoperative education
- patient blood donation (in some cases)
- meeting between patient and physical therapy
- antibiotic administration (in some cases).

# **THR 101**

Most THRs are completed in individuals who are age 60 or older, but patients younger than age 60 may be candidates. Although THR surgery is necessary due to pain and mobility issues, it's important to understand that this procedure is often considered an elective surgery. Instances in which the patient has sustained a fracture may make the THR a necessary surgery as opposed to an elective surgery.

# Indications

The following are indications for a THR: • pain with activities, such as walking and climbing stairs

- moderate-to-severe pain when at rest
- decreased hip range of motion

• pain not relieved by nonsurgical treatments.

# Procedure

THR, also known as a total hip arthroplasty, involves the removal of damaged bone and cartilage and replacement with prosthetic pieces. The steps of the procedure are as follows:

• The femoral head (upper part of the femur) is removed and replaced with a metal femoral stem.

• A metal or ceramic ball is used as a replacement for the femoral head.

• The acetabulum is hollowed out and replaced with a metal socket.

• A plastic, ceramic, or metal spacer is placed between the ball and socket.

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# Postoperative care

- After a THR, postoperative care should include the following:
- Monitor the dressing and check for bleeding.
- If bleeding is noted, mark the dressing appropriately.
- Monitor for signs and symptoms of bleeding.
- Monitor for signs and symptoms of infection.
- Monitor all ordered labs.
- Complete neurovascular checks.

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- Monitor for pain and treat accordingly.
- Encourage ambulation.
- Avoid adduction of the legs.
- Keep legs abducted.
- Avoid rolling the patient to the
- operative side.
- Avoid flexion greater than 90 degrees.
- Implement deep vein thrombosis
- prevention measures.

The two most common THR approaches are the posterior and anterior approach. Although the posterior approach is the most common, the anterior approach is gaining in popularity.

With the posterior approach, the incision is made at the back of the hip, near the buttocks; with the anterior approach, the incision is made through the front of the leg. Visualization is optimal when the posterior approach is used; however, the incision is typically smaller when the anterior approach is used, which helps decrease the risk of associated complications.

Due to the methods used with the anterior approach, recovery time and hospital length of stay are often decreased, and dislocation is less likely. The reason for this is that with the anterior approach, the muscles are separated as opposed to being cut and reattached as happens with the posterior approach. When the muscles are cut and reattached, muscular support for the joint is lacking.

## Preoperative evaluation and care

Before a THR, the patient's medical history should be obtained and a physical exam, including imaging such as X-rays and MRI, should be completed. Providing preoperative education is necessary and important. In some cases, the patient may be asked to provide a blood donation in case blood is needed during or after surgery because an autologous blood transfusion is safer for the patient. For information on autologous blood transfusion, refer to "Total Knee Replacement Explained" in the November/December 2020 issue.

It's good practice for the patient to meet with a physical therapist before THR surgery to discuss the postoperative plan and postoperative exercises and to learn how to walk with assistive devices such as crutches or a walker. In some cases, antibiotics will be administered pre- and postoperatively to prevent infection.

# Postoperative evaluation and care

Postoperatively, monitor the patient's neurovascular status, pain level, and mobility. After THR surgery, the patient will be placed supine with the head of bed elevated. The patient should be out of bed and moving relatively early; in some instances, the evening of the surgery, but no later than postoperative day 1. The methods used for pain control vary depending on the surgeon's preference, but may include epidural analgesics, patientcontrolled analgesia, I.V. analgesics, and/ or oral analgesics. The length of stay for a patient with a THR will vary from 1 to 5 days, depending on the approach used during surgery. Surgical complications may increase the length of stay.

Because it can take months for the muscles to adequately support the joint, hip precautions may be in place after surgery. Due to dislocation being less likely with the anterior approach, the precautions implemented for the patient are significantly decreased, with some patients having no hip precautions in place. Always check the surgeon's orders to determine if hip precautions need to be followed.

To prevent dislocation, the patient should avoid adduction and hyperflexion. Educate the patient not to flex the joint more than 90 degrees. In many cases, a raised toilet seat will be used in the hospital and recommended for the patient at home to prevent excessive flexion. Pillows, splints, and wedges may be used to prevent adduction, particularly when the patient is in bed.

When positioning the patient, caution should be used to avoid adduction. For example, when rolling the patient in bed, keep the legs abducted and move them at the same time. Additionally, when rolling the patient, the pillow, splint, or wedge should be kept in place. The surgeon will typically write orders not to roll to the operative side.

Every effort should be made to get the patient out of bed for toileting but, in some cases, the patient may need to use a bedpan. When using a bedpan, a fracture pan should be used to help prevent dislocation.

Instruct the patient not to bend forward to put on socks, tie shoes, or put on pants. When caring for patients on hip precautions, pay special attention to patients who have difficulty following instructions, such as a patient who's confused. These patients may need frequent reminders, large signs, and close supervision. Identifying at-risk patients can decrease the risk of injury and adverse outcomes.

## **Complications**

A THR is designed to last at least 15 years, but complications can develop that lead to the need for additional surgeries. However, the overall risk of complications after THR is relatively low. Possible complications include:

- infection
- neurovascular injury
- blood clot/pulmonary embolism (PE) (see Signs and symptoms of blood clot/PE)
- skin breakdown
- bleeding
- leg length discrepancy (LLD)
- hip dislocation
- prosthetic fracture
- hardware loosening
- implant wear.

The prevention of complications is essential because complications may lead to increased length of stay, hospital readmission, additional surgeries, decreased quality of life, and added costs. Educate the patient about potential complications, signs and symptoms of complications, and treatment.

It's important to understand that infection in the

prosthetic joint often leads to the need for a major revision surgery. Additionally, a prosthetic joint infection can cause severe pain, immobility, social isolation, and psychological problems. For more information on infection and for details on neurovascular injury, refer to "Total Knee Replacement Explained" in the November/December 2020 issue.

With skin breakdown in mind, implement measures to identify at risk areas. When caring for patients who've undergone THR surgery, complete thorough skin checks, turn and reposition the patient, encourage ambulation and movement, and provide prompt incontinence care if needed.

As is the case with any surgery, bleeding is a potential complication. When caring for a patient after THR surgery, monitor the dressing for bleeding. Any blood showing through the dressing, also referred to as shadowing, should be circled, dated, and timed to allow for monitoring of continued bleeding. Monitor lab values, paying close attention to hemoglobin and hematocrit levels. In some cases, a blood transfusion may be needed. When administering blood, monitor the patient for complications and know what to do if complications develop (see Transfusion safety).

If LLD occurs, the patient will have one leg that's shorter than the other after THR

# Signs and symptoms of blood clot/PE

#### **Blood clot**

- · Pain in the lower extremity
- Tenderness
- Hot and reddened area in the lower extremity
- Edema
- Decreased or
- absent pulses
- Cyanosis
- Venous distension

Chest pain

- Shortness of breath
- Tachypnea

PE

- Tachycardia
- Coughing Hemoptysis
- Crackles

surgery. The symptoms and tolerance associated with this complication vary, with some patients having no symptoms and others experiencing significant symptoms. In some patients, this complication can affect gait and posture, in addition to causing lower back pain. LLD can cause loosening of the THR hardware, which is associated with additional complications. Treatment may vary, with some patients requiring no treatment and others needing a revision surgery. For some patients, treatment may be as simple as using a special shoe that adds height.

Of these complications, the most common is a hip dislocation. The two types of dislocation that can develop are a subluxation or partial dislocation and a total dislocation. If a dislocation occurs, the patient will often report hearing and/or feeling a pop, in addition to feeling pain. Shortening of the limb with internal rotation is also possible. If a dislocation is suspected, the patient should remain in bed

# Transfusion safety

- Ensure the correct patient using two patient identifiers.
- Ensure the correct blood product.
- Check for a signed consent form before the transfusion.
- Flush lines with 0.9% sodium chloride solution only.
- Don't transfuse the blood product unit for longer than 4 hours.
- Always use filtered tubing.
- Stay with the patient for at least 15 minutes after initiating the transfusion.
- Monitor and document vital signs before administering the blood product and after per facility policy.
- Assess the patient for signs and symptoms of complications, such as fever, chills, shaking, hives, back pain, chest pain, shortness of breath, nausea, and vomiting.
- Assess for circulatory overload.
- If symptoms develop, stop the transfusion immediately and keep the line open with 0.9% sodium chloride solution.

and the surgeon should be notified as soon as possible. Notifying the surgeon is essential because the patient may need to go back into the OR.

When a patient develops a prosthetic fracture, it means that the bone has fractured around the prosthetic components. These fractures are seen most often in patients who've undergone a revision surgery. Common causes of prosthetic fractures are falls or other trauma, such as damage during a motor vehicle crash, and loosening of the femoral stem. Patients with muscle weakness, poor vision, and poor balance are at increased risk for a prosthetic fracture because they're more likely to fall. Patients with weak bones from conditions such as osteoporosis also have an increased risk.

Patients who experience a prosthetic fracture often report pain, swelling, bruising, difficulty bearing weight, and/ or a shortened leg. Due to the risk associated with hardware loosening, it's recommended that routine follow-up imaging be ordered. It can be difficult to treat a prosthetic fracture and, as a result, outcomes may be poor. The treatment is often surgery. With a prosthetic fracture, approximately 50% of patients won't return to a previous level of function and some may deteriorate to the point that they need assistance with activities of daily living.

Hardware loosening not associated with a prosthetic fracture is rare; however, when it does occur, the patient may report pain or feeling as if the hip is unstable. Loosening may be caused by the hardware actually coming loose or thinning of the bone surrounding the implant. Implant wear can lead to deterioration of the surrounding bone and tissue, which may also lead to hardware loosening. If hardware loosening develops, it's typically at least 10 years after the initial surgery and often results in the need for a revision.

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# A common surgery

THR is a common surgery that most nurses will be exposed to during their career. It's important to have a working knowledge of THR and how to care for patients before and after the procedure. Nurses play an important role by identifying patients with symptoms indicating the need for a THR and keeping patients safe both in and out of the OR.

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