

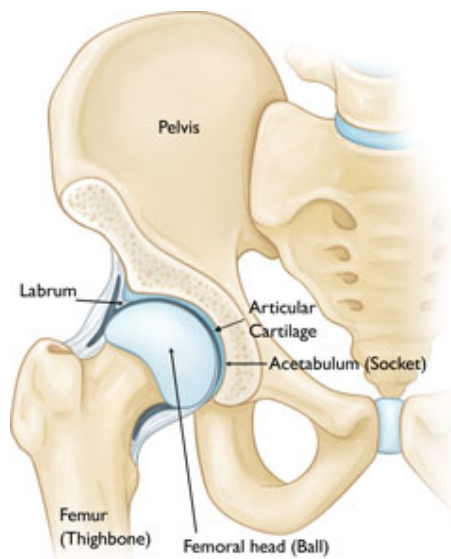
Adolescent Hip Dysplasia

The hip is a "ball-and-socket" joint. In a normal hip, the ball at the upper end of the femur (thighbone) fits firmly into the socket, which is a curved portion of the pelvis called the acetabulum. In a young person with hip dysplasia, the hip joint has not developed normally—the acetabulum is too shallow to adequately support and cover the head of the femur. This abnormality can cause a painful hip and the early development of osteoarthritis, a condition in which the articular cartilage in the joint wears away and bone rubs against bone.

Adolescent hip dysplasia is usually the end result of developmental dysplasia of the hip (DDH), a condition that occurs at birth or in early childhood. Although infants are routinely screened for DDH, some cases remain undetected or are mild enough that they are left untreated. These patients may not show symptoms of hip dysplasia until reaching adolescence.

Treatment for adolescent hip dysplasia focuses on relieving pain while preserving the patient's natural hip joint for as long as possible. In many cases, this is achieved through surgery to restore the normal anatomy of the joint and delay or prevent the onset of painful osteoarthritis.

Anatomy



In a healthy hip, the head of the femur stays firmly within the acetabulum

The hip is one of the body's largest joints. It is a "ball-and-socket" joint. The socket is formed by the acetabulum, which is a part of the large pelvis bone. The ball is the femoral head, which is the upper end of the femur (thighbone)

The bone surfaces of the ball and socket are covered with articular cartilage, a smooth, slippery substance that protects and cushions the bones and enables them to move easily.

The acetabulum is ringed by strong fibrocartilage called the labrum. The labrum forms a gasket around the socket, creating a tight seal and helping to hold the femoral head in place.

Description

In patients with hip dysplasia, the acetabulum is shallow, meaning that the ball, or femoral head, cannot firmly fit into the socket.

As a result of this abnormality, the way that force is normally transmitted between the bone surfaces is altered. The labrum can end up bearing the forces that should normally be distributed evenly throughout the hip joint. In addition, more force is placed on a smaller surface of the hip cartilage and labrum. Over time, the smooth articular cartilage becomes frayed and wears away and the labrum becomes torn or damaged. These degenerative changes can progress to early osteoarthritis.

The magnitude and severity of hip dysplasia can vary from patient to patient. In mild cases, the head of the femur may simply be loose in the socket. In more severe cases, there may be complete instability in the joint and/or the femoral head may be completely dislocated out of the socket.

Cause

Adolescent hip dysplasia usually results from developmental dysplasia of the hip (DDH) that is undiscovered or untreated during infancy or early childhood.

DDH tends to run in families. It can be present in either hip and in any individual. It usually affects the left hip and occurs more often in:

- Girls
- First-born children
- Babies born in the breech position

Symptoms

Hip dysplasia, itself, is not a painful condition. However, pain results when the altered forces in the hip cause degenerative changes to occur in the articular cartilage and the labrum. In most cases, this pain is:

- Located in the groin area, although it may sometimes be more toward the outside of the hip
- Occasional and mild initially, but may increase in frequency and intensity over time
- Worse with activity or near the end of the day

Some patients may also experience the feeling of locking, catching, or popping within the groin.

Treatment

Treatment for adolescent hip dysplasia focuses on delaying or preventing the onset of osteoarthritis while preserving the natural hip joint for as long as possible.

Nonsurgical Treatment

Your doctor may recommend nonsurgical treatment if your child has mild hip dysplasia and no damage to the labrum or articular cartilage. Nonsurgical treatment may also be tried initially for patients who have such extensive joint damage that the only surgical option would be a total hip replacement.

Common nonsurgical treatments for adolescent hip dysplasia include:

Observation. If your child has minimal symptoms and mild dysplasia, your doctor may recommend simply monitoring the condition to make sure it does not get worse. Your child will have follow-up visits every 6 to 12 months so that the doctor can check for any progression that may warrant treatment.

Lifestyle modification. Your doctor may also recommend that your child avoid the activities that cause the pain and discomfort. For a child who is overweight, losing weight will also help to reduce pressure on the hip joint.

Physical therapy. Specific exercises can improve the range of motion in the hip and strengthen the muscles that support the joint. This can relieve some stress on the injured labrum or cartilage.

Medications. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen and naproxen, can help relieve pain and reduce swelling in an arthritic joint. In addition, cortisone is an anti-inflammatory agent that can be injected directly into a joint. Although an injection of cortisone can provide pain relief and reduce inflammation, the effects are temporary.

Surgical Treatment

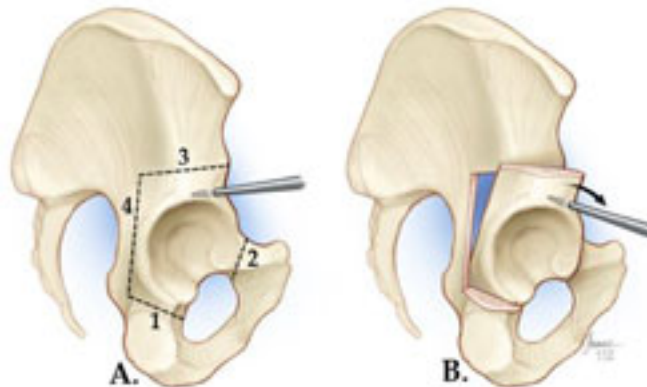
Your doctor may recommend surgery if your child is experiencing pain and has limited damage to his or her articular cartilage. The surgical procedure most commonly used to

treat hip dysplasia is an *osteotomy*. "Osteotomy" literally means "cutting of the bone." In an osteotomy, the doctor reshapes and reorients the acetabulum and/or femur so that the two joint surfaces are in a more normal anatomic position.

There are different types of osteotomies that can be performed to treat hip dysplasia. The specific procedure your doctor recommends will depend on a number of factors, including:

- Your child's age
- The severity of the dysplasia
- The extent of damage to the labrum
- Whether osteoarthritis is present
- The number of remaining growing years

Periacetabular osteotomy (PAO). Currently, the osteotomy procedure most commonly used to treat adolescent hip dysplasia is a *periacetabular osteotomy* (PAO). "Periacetabular" means "around the acetabulum."



(A) In a periacetabular osteotomy, four cuts are made in the pelvic bone. **(B)** The doctor uses a specialized tool to manipulate the bone fragment to gain access to the acetabulum.

In most cases, PAO takes from 2-3 hours to perform. During the surgery, the doctor makes four cuts in the pelvic bone around the hip joint to loosen the acetabulum. He or she then rotates the acetabulum, repositioning it into a more normal anatomic position over the femoral head. The doctor will use x-rays to direct the bony cuts and to ensure that the acetabulum is repositioned correctly. Once the bone is repositioned, the doctor inserts several small screws to hold it in place until it heals.



In this x-ray image, the acetabulum has been repositioned during surgery and held in place with screws.

Arthroscopy. In conjunction with PAO, your doctor may use hip arthroscopy to repair a torn labrum. During arthroscopy, the doctor inserts a small camera, called an arthroscope, into the joint. The camera displays pictures on a television screen, and your doctor uses these images to guide miniature surgical instruments. Arthroscopic procedures may include:

- **Labral refixation.** In this procedure, the doctor trims the torn and frayed tissue around the acetabular rim and reattaches the torn labrum to the bone of the rim.
- **Debridement.** In some cases, simply removing the torn or weakened labral tissue can provide pain relief.

Complications

As with any surgical procedure, there are risks involved with PAO. Your doctor will discuss each of the risks with you and will take specific measures to help avoid potential complications.

Although the risks are low, the most common complications include:

- Infection
- Blood clots
- Injuries to blood vessels and nerves
- Persistent hip pain
- Failure of the osteotomy to heal

Recovery

Your child will remain in the hospital for 2 to 4 days after surgery. During this time, he or she will be monitored and given pain medication.

In most cases, full weight-bearing will not be allowed on the operated leg for 6 weeks to 3 months while the bones heal in their new position. During this time, your child will need to use crutches.

About 6 weeks after surgery, your child will have a follow-up visit with the doctor. X-rays will be taken so that the doctor can see how well the PAO has healed. During your visit, the doctor will determine when it is safe to put weight on the leg and when physical therapy can begin. The physical therapist will show your child specific exercises to help maintain range of motion and restore strength and flexibility in the hip joint.

Outcomes

Periacetabular osteotomy is usually successful in delaying the need for an artificial hip joint and relieving pain. Whether or not a total hip replacement will be needed in the future depends on a number of factors, including the degree of osteoarthritis that was present in the joint when the PAO was performed.