

Wrist Joint Replacement (Wrist Arthroplasty)

Joint replacement surgery in the wrist is less common but can be an option if you have painful arthritis that does not respond to other treatments.

Anatomy

The wrist is a more complicated joint than the hip or the knee. On the hand side of the wrist, there are two rows of bones at the base of the hand. There are four bones in each row. The bones in these rows are called the carpals. The long thin bones of the hand radiate out from one row of carpals and form the basis of the fingers and thumb.

The radius and the ulna are the two bones of the forearm that form a joint with the first row of carpals.

The ends of the bones are covered with an elastic tissue, called cartilage. Cartilage creates a slick surface that enables the bones to move smoothly when they move against each other.

Cause



Rheumatoid arthritis of the hand and wrist.

Reproduced with permission from Papp SR, Athwal GS, Pichora DR: The Rheumatoid Wrist: J Am Acad Orthop Surg 2006;14:65-77

If the cartilage is worn away or damaged by injury, infection, or disease, the bones themselves will rub against each other, wearing out the ends of the bones. This causes a painful, arthritic condition.

Osteoarthritis, the most common form of arthritis, results from a gradual wearing away of the cartilage covering on bones.

Rheumatoid arthritis is a chronic inflammatory disease of the joints that results in pain, stiffness and swelling. Rheumatoid arthritis usually affects several joints on both the right and left sides of the body.

Both forms of arthritis may affect the strength of the fingers and hand, making it difficult to grip or pinch.

The typical candidate for wrist replacement surgery has severe arthritis but does not need to use the wrist to meet heavy demands in daily use. The primary reasons for wrist replacement surgery are to relieve pain and to maintain function in the wrist and hand.

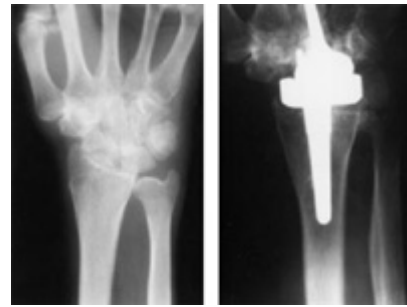
Treatment

Wrist replacement surgery may help retain or recover wrist movements. It may also improve the ability to perform daily living activities, especially if there is arthritis in the elbow and shoulder. During any total joint replacement, the worn-out ends of the bones are removed and replaced by an artificial joint (prosthesis).



X-ray of a wrist with severe rheumatoid arthritis throughout the wrist before (left) and after (right) replacement of the wrist joint with an implant.

Reproduced with permission from Carlson JR, Simmons BP: Total Wrist Arthroplasty. J Am Acad Orthop Surg 1998;6:308-315.

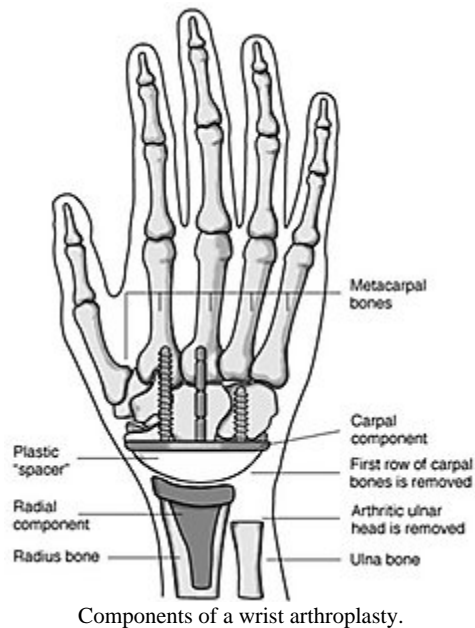


X-ray of a wrist with osteoarthritis before (left) and after (right) wrist replacement surgery.

Reproduced with permission from Carlson JR, Simmons BP: Total Wrist Arthroplasty. J Am Acad Orthop Surg 1998;6:308-315.

In some cases, fusing the bones of the wrist together will reduce or eliminate pain and improve grip strength. However, if the bones are fused together, the wrist will not be able to bend .

Implants



Components of a wrist arthroplasty.

There are several different designs. Most have two components, one for each side of the joint. These components are made of metal. A high-quality plastic, called polyethylene, is used as a spacer between the two metal components. Newer implant designs try to replicate the anatomy of the wrist.

One component inserts into the radius of the forearm. The portion of this component that faces into the wrist joint has a curve that fits the second component in the wrist side. The component that inserts into the hand bone (the carpal component) has a flat surface that faces the first component. It inserts into a carpal bone through one long stem and one or two shorter stems. A plastic spacer fits into the components in the joint area. Spacers come in different sizes so they can match the hand. A spacer is normally flat on one side and rounded on the other. This design enables it to fit into the carpal component while it rocks on the radial component, creating a more natural wrist motion.

Surgery

Wrist joint replacement can be done as an outpatient procedure, unlike a hip or knee replacement. Wrist replacement surgery is often combined with other procedures to correct deformities or disorders in the tendons, nerves, and small joints of the fingers, and thumb.

An incision is made on the back of the wrist. The damaged ends of the lower arm bones are removed and the first row of carpal bones may also be removed. The radial component of the prosthesis is inserted into the center of the radius bone on the outside of the lower arm. It is held in place with bone cement.

Depending on the component design, the carpal component is then inserted into the center hand bone (third metacarpal) or screwed into the remaining row of carpal bones. Bone cement may be used to hold the component in place. The carpal bones may be linked or fused together to better secure this component.

An appropriately sized spacer is used between the metal components.

After Surgery

A cast will need to be worn for the first several weeks. When the cast is removed, a protective splint will need to be worn for the next six to eight weeks. Although pain relief is immediate, gradual exercises will need to be done for several weeks to restore movement and, eventually, to increase power and endurance. Wrist arthroplasty can improve motion to about 50 percent of normal.

The physical demands that are placed on the wrist prosthesis will have an effect on how long the implant lasts. There will be some limitations. Use of a hammer or pneumatic tools may need to be avoided. The amount of weight lifted will need to be limited. A fall on the outstretched hand may break the prosthesis, just as it might fracture a normal wrist, so activities that could result in a fall, such as roller sports, should be avoided.

Although there have been significant advances in wrist prostheses, implants may loosen or fail, due to wear or deformation. In these cases, additional surgery may be necessary.

On average, a wrist replacement can be expected to last 10 to 15 years with careful use. As with all implants, long-term follow up is advised. Generally, follow up every year or every two years will identify any developing conditions or problems.

Last reviewed and updated: October 2007



Co-developed with the American Society for Surgery of the Hand

AAOS does not review or endorse accuracy or effectiveness of materials, treatments or physicians.