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Total elbow joint replacement for rheumatoid arthritis: A Patient's Guide

Frederick A. Matsen III, M.D.

Professor and Chair, Orthopaedics & Sports Medicine
University of Washington Medical Center

Overview

Total elbow joint replacement surgery (arthroplasty) can help restore comfort and function to elbows damaged by rheumatoid arthritis.

In elbow arthritis the joint surface is destroyed by wear and tear, inflammation, injury, or previous surgery. This joint destruction makes the elbow stiff, painful, and unable to carry out its normal functions. Elbow joint replacement can be effective primarily in the management of severe elbow involvement from rheumatoid arthritis.

After performing a clinical examination, an elbow surgeon experienced in joint replacement can determine if rheumatoid arthritis is the cause of the problem and if surgery is likely to be helpful. Patients are most likely to benefit from this surgery if they are motivated and in optimal health.

The goal of elbow joint replacement arthroplasty is to restore functional mechanics to the joint by removing scar tissue, balancing muscles, and inserting a prosthesis in the place of the destroyed elbow. One part of the artificial joint is fixed to the inside of the humerus (arm bone) and the other part to the inside of the ulna (one of the forearm bones). The two parts are then connected using a hinge pin.

Total elbow joint replacement arthroplasty is a highly technical procedure and is best performed by a surgical team who performs this surgery regularly. Such a team can optimize the benefits and minimize the risks. The two-hour procedure is performed under general or nerve block anesthesia.

Elbow motion is started on the second day after the procedure, as soon as the incision is ready. Patients learn to do their own physical therapy and are usually discharged three to four days after surgery when they are comfortable and have a good range of passive motion. The recovery of strength and function may continue for up to a year after surgery.

Review of Elbow Arthritis

In arthritis of the elbow, the cartilage of the joint is lost; joint replacement may help restore comfort and function.

Individuals with rheumatoid arthritis (RA) of the elbow usually notice pain, stiffness, and loss of the ability to use the elbow for their usual activities. Commonly, they have difficulty sleeping on the affected arm and notice a limited range of motion in the elbow. Some people with arthritis notice a grinding feeling when the elbow is moved. Rheumatoid arthritis of the elbow usually gets worse over time, but the rate of this progression varies widely.

Types

Elbow arthritis may be of several types, including osteoarthritis, joint disease, rheumatoid arthritis, arthritis after injury (traumatic arthritis), and arthritis after previous surgery. Arthritis may also follow infection; this is known as septic arthritis. Patients with severe rheumatoid arthritis are among the best candidates for elbow joint replacement.

Diagnosis

Rheumatoid arthritis must be distinguished from other causes of elbow pain, including infection, other types of arthritis, and conditions involving the nerves of the arm. These distinctions can be made by a physician experienced in the evaluation of elbow problems.

While not as common as severe arthritis of the hip, knee, or shoulder, rheumatoid arthritis of the elbow is among the most prevalent causes of severe pain and loss of function of the elbow. Individuals with rheumatoid arthritis involving one joint are likely to have involvement of other joints as well.

A physician diagnoses rheumatoid arthritis of the elbow by reviewing the patient's history, performing a thorough physical examination of the joint, and taking X-rays. The examination of an arthritic elbow reveals stiffness and roughness of the joint.

X-rays of the elbow reveal the contour of the joint surfaces and the status of the cartilage space between them. X-rays of an arthritic elbow usually show narrowing of the space between the bones of the lower end of the humerus (arm bone) and the upper end of the radius and ulna (forearm bones)—often to the point that bone is touching bone, as shown in figures 1 and 2.

It is essential that the elbow surgeon establish the diagnosis of arthritis before elbow joint replacement is considered.

Medications

Medications are helpful in managing rheumatoid arthritis. Some people take anti-arthritic medications for their entire lives. Specific drugs may treat the inflammation that destroys the cartilage. Some of these medications are administered by injection and others by mouth. These medications can be



Figure 1 – X-ray of elbow showing the humerus, radius, and ulna

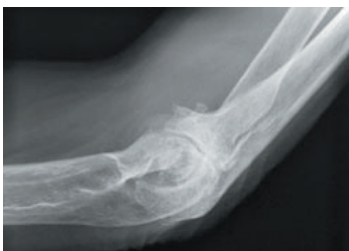


Figure 2 – X-ray of elbow showing the humerus, radius, and ulna

quite helpful, but there may be side effects. These medications should be taken under the close supervision of a rheumatologist or other physician experienced in their use.

The patient should be aware of the possible side effects of these medications, including stomach irritation, kidney problems, and bleeding. Injections of steroids (cortisone) or lubricants (such as hyaluronic acid) into the elbow have not been demonstrated to have lasting benefit and carry some risk of infection.

For each medication, patients should learn:

1. the risks,
2. possible interactions with other drugs,
3. the recommended dosage, and
4. the cost.

Exercises

If exercises are not too painful, they may be helpful in maintaining the flexibility and strength of joints with arthritis. In most cases these exercises can be done in the patient's home with minimal equipment. Elbow exercises are best performed gently several times a day on an ongoing basis. These usually include bending and straightening the elbow as well as rotating the forearm so the palm faces up and then down. Often the exercises will be of benefit in the earlier phases of the condition. The exercises are not dangerous if they are performed gently.

Sometimes physical therapists suggest other types of therapy. Patients should learn the possible risks of these approaches as well as their costs and anticipated effectiveness.

Considering elbow replacement surgery

Elbow joint replacement arthroplasty offers the opportunity for people to regain much of the lost comfort and function in an arthritic elbow. In experienced hands, this procedure can address the restricting scar tissue that frequently accompanies arthritis. It also can restore smooth, stabilizing joint surfaces when these surfaces have been damaged by arthritis.

Joint replacement surgery can improve the mechanics of the elbow, but cannot make the joint as good as it was before the onset of arthritis. In many cases, the tendons and muscles around the elbow have been weakened from prolonged disuse before the elbow replacement. The scar around them needs to be removed. After the surgery, it may take months of gentle exercises before the elbow has achieved maximal improvement.

The effectiveness of the procedure depends on the health and motivation of the patient, the condition of the elbow, and the expertise of the surgeon. When performed by an experienced surgeon, total elbow joint replacement arthroplasty usually leads to improved elbow comfort and function. The greatest improvements are in the ability of the patient to sleep and to perform activities of daily living.

Types of surgery recommended

When the normally smooth surfaces of the elbow joint are severely damaged by rheumatoid arthritis, elbow joint replacement arthroplasty may be the most effective method for restoring comfort and function to the joint. Other surgical options, such as arthroscopy or “clean up” operations have not been shown to give lasting benefit. Elbow fusion can stabilize the joint, but does not allow motion at the elbow joint. Removing the joint allows some motion at the joint, but does not provide stability.

Several types of surgery have been used to manage arthritis of the elbow. If the arthritis primarily affects the joint between the lower end of the humerus (upper arm bone) and the head of the radius (one of the forearm bones), removal of the head of the radius may restore comfort and function to the elbow.

Joint replacement of the elbow may be of the constrained (hinge) or unconstrained (joint resurfacing) types. In the treatment of severe rheumatoid arthritis of the elbow, the constrained (or hinge) joint replacement is often preferred because it offers stability to the joint and does not depend on ligaments, which may be weakened by the arthritis.

Joint replacement surgery is considered when:

1. the arthritis is a major problem for the patient,
2. the patient is sufficiently healthy to undergo the procedure,
3. the patient understands and accepts the risks and alternatives,
4. there is sufficient bone and tendon to permit the surgery, and
5. the surgeon is experienced in elbow replacement surgery.

Total elbow joint replacement is most effective when the patient follows a simple exercise program after surgery. As long as the elbow is cared for properly and subsequent injuries are avoided, the surgery’s benefits can last for decades.

Urgency

In general, this surgery is elective, and can be performed when conditions are optimal. Sometimes the pain and stiffness from elbow arthritis will stabilize at a level that is acceptable to the patient. However, in rheumatoid arthritis, progression of the condition may result in loss of the tendon and bone, making the surgery more difficult for the patient and for the surgeon.

Risks

The risks of total elbow joint replacement surgery include:

- infection
- injury to nerves and blood vessels
- fracture
- stiffness or instability of the joint
- loosening or wear of the artificial parts
- failure of the triceps tendon
- pain
- the need for additional surgeries

There are also risks associated with anesthesia and blood transfusion (although transfusions are not always necessary). An experienced elbow joint replacement team will use special techniques to minimize these risks, but cannot totally eliminate them.

Managing risk

Many of the risks of total elbow joint replacement arthroplasty surgery can be effectively managed if they are promptly identified and treated. Infections may require a wash out in the operating room; occasionally, removal of the artificial components is necessary. Blood vessel or nerve injury may require repair. Fracture may require surgical fixation. Stiffness or instability may require exercises or additional surgery. Loosening or wear of the components may require surgical revision.

If the patient has questions or concerns about the course after surgery, she should tell the surgeon as soon as possible.

Preparing for surgery

Patients should optimize their health so that they will be in the best possible condition for this procedure. Smoking should be stopped a month before surgery and not resumed for at least three months afterwards. Any heart, lung, kidney, bladder, tooth, or gum problems should be managed before surgery. Any infection may be a reason to delay the operation.

The surgeon needs to be aware of all health issues, including allergies and the non-prescription and prescription medications being taken. Some of these may need to be modified or stopped. For instance, aspirin and anti-inflammatory medication may affect the way the blood clots. The skin of the arm must be clean and free from sores and scratches.

Patients should recognize that the result of surgery depends in large part on their efforts in rehabilitation after surgery. The patient needs to plan on being less functional than usual for six to twelve weeks after the procedure. Driving, shopping, and performing usual work or chores may be difficult during this time. Plans for necessary assistance need to be made before surgery. For individuals who live alone or those without readily available help, arrangements for home help should be made well in advance.

Costs

The surgeon's office should be able to provide a reasonable estimate of: (1) the surgeon's fee, (2) the hospital fee, and (3) the degree to which these should be covered by the patient's insurance.

Finding an experienced surgeon

Elbow joint replacement arthroplasty is a technically demanding procedure that is ideally performed by an experienced surgeon in a medical center accustomed to performing elbow joint replacements at least several times a

year. Patients should inquire as to the number of elbow arthroplasty procedures that the surgeon performs each year and the number of these procedures performed in the medical center each year.

Because less than several thousand of these procedures are performed in the United States each year, it is unlikely that every community has an experienced elbow arthroplasty surgeon who performs many of these procedures each year. Surgeons specializing in elbow joint replacement may be located through university schools of medicine, county medical societies, or state orthopaedic societies. Other resources include local rheumatologists or professional societies such as the American Shoulder and Elbow Surgeons.

About the procedure

Technical details

Elbow joint replacement surgery is a highly technical procedure; each step plays a critical role in the outcome.

After the anesthetic has been administered and the elbow has been prepared, an incision is made along the inside of the arm, from three inches above the elbow to three inches below it. This incision allows access to the joint without damaging the important muscles that are responsible for the elbow's motion. The ulnar nerve (the one that is bumped when one hits the "crazy bone") is isolated to protect it during the procedure; as a result, the little finger is sometimes numb for a period of time after this surgery.

The muscles and other tissues near the elbow are mobilized by removing any scar tissue that may restrict their motion. The capsule is released in front of and behind the elbow joint.

The bone of the lower end of the humerus (upper arm bone) and the upper end of the ulna (one of the forearm bones) are fit to receive their respective implants. The components are stabilized by cementing their stems inside the bones using polymethylmethacrylate (bone cement). Once the implants are

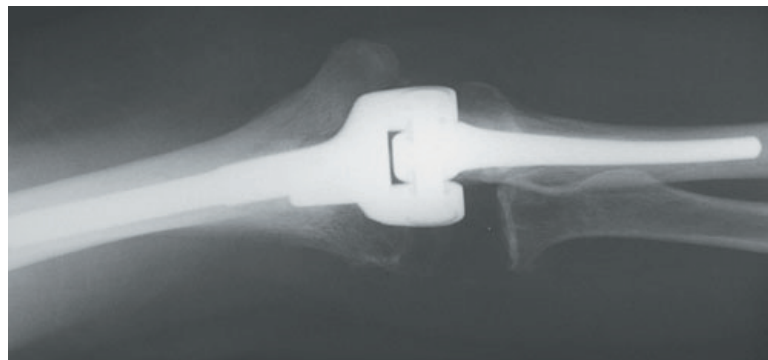


Figure 3 – X-ray of elbow joint replacement

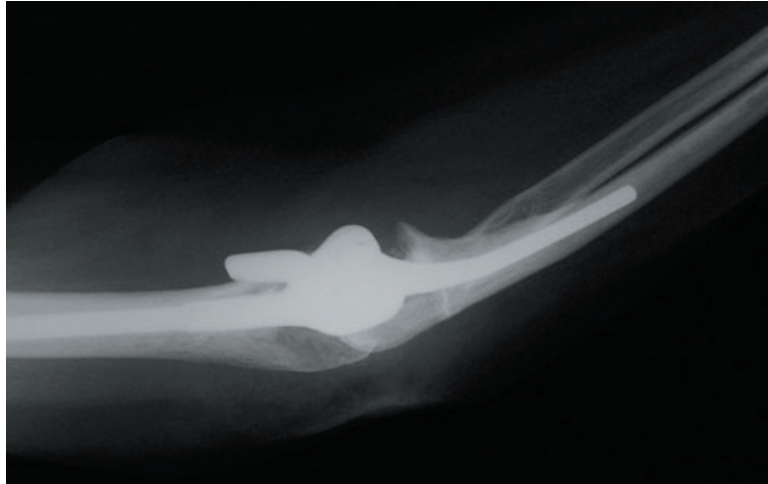


Figure 4 – X-ray of elbow joint replacement

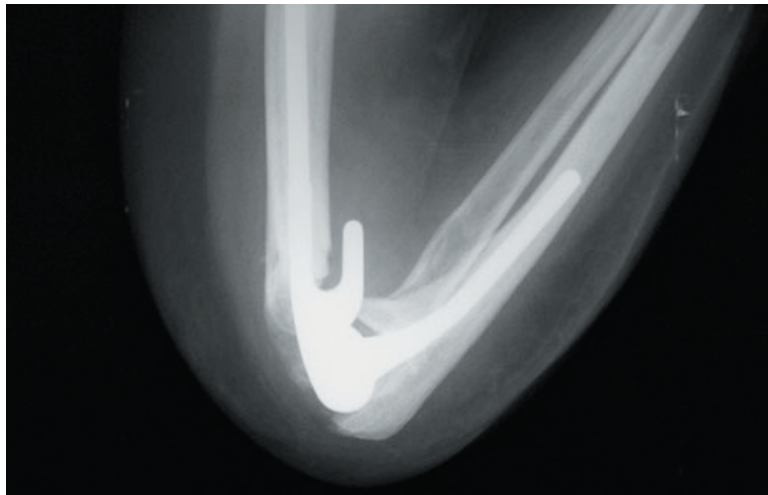


Figure 5 – X-ray of elbow joint replacement

securely fixed, they are linked together using a hinge pin. Figures 3, 4, and 5 show the joint replacement from the front and from the side in the straight and bent positions.

At the conclusion of the procedure, the deep tissues and skin are closed and a protective dressing is applied.

Length of surgery and stay

The procedure usually takes approximately two hours. However, the preoperative preparation and the postoperative recovery may add several hours to this time. Patients often spend two hours in the recovery room and two to four days in the hospital after surgery.

Recovering from surgery

Pain and pain management

Recovery of comfort and function after total elbow joint arthroplasty continues for many months after the surgery.

Elbow joint replacement arthroplasty is a major surgical procedure that involves cutting of skin, tendons and bone. Immediately after surgery, strong medications (such as morphine or Demerol) are often given by injection. Within a day or so, oral pain medications (such as hydrocodone or Tylenol with codeine) are usually sufficient.

These medications are usually needed only for the first two weeks after the procedure.

Patients should notify their surgeon if they have had previous difficulties with pain medication or pain control.

Hospital stay

After surgery, the patient spends an hour or so in the recovery room. A drainage tube is usually used to remove excess fluid from the surgical area. The drain is usually removed on the second day after surgery.

Moving the elbow soon after total elbow joint replacement helps achieve best possible elbow function. During the hospitalization, the patient learns a simple rehabilitation program that will be used for maintaining the range of motion at home after discharge. On the second day after surgery, the physical therapist teaches the patient gentle range of motion exercises. These include flexion (bending), extension (straightening), pronation (palm down) and supination (palm up).

Hospital discharge

Patients are discharged as soon as:

- the incision is dry,
- the elbow is comfortable with oral pain medications,
- the patient can perform the range of motion exercises, and
- the home support systems for the patient are in place.

Discharge is usually on the third or fourth day after surgery.

Convalescence and Rehabilitation

For the first month or so after this procedure, the operated arm may be less useful than it was immediately beforehand.

The patient's specific limitations can be specified only by the surgeon who performed the procedure. It is important that the repaired elbow not be

challenged until it has had a chance to heal. Usually the patient is asked to lift nothing heavier than a cup of coffee for six weeks after the surgery.

Management of these limitations requires advance planning to accomplish the activities of daily living during the period of recovery.

Recovery of comfort and function after elbow joint arthroplasty continues for many months after the surgery. Improvement in some activities may be evident as early as twelve weeks. With persistent effort, patients make progress for as long as a year after surgery.

Rehabilitation

Arthritic elbows are often stiff. One of the major goals of total elbow replacement surgery is to restore motion to the joint. However, after surgery scar tissue will tend to recur and limit movement unless motion is started soon afterwards. This early motion is facilitated by the complete surgical removal of the tight tissues so that after surgery the patient needs to only maintain the range of motion achieved at the operation. Later on, once the elbow is comfortable and flexible, strengthening exercises and additional activities are started.

It is often most effective for the patient to carry out their own exercises so that they are done frequently, effectively and comfortably. Usually, a physical therapist or the surgeon instructs the patient in the exercise program and advances it at a rate that is comfortable for the patient.

Once the range of motion and strength goals are achieved, the exercise program can be cut back to a minimal level. However, gentle stretching is recommended on an ongoing basis.

Long-term patient limitations

Patients should avoid activities that involve impact (hammering, chopping wood, contact sports, sports with major risk of falls) or heavy loads (lifting of heavy weights, heavy resistance exercises). These activities may increase the chance of loosening, wear or fracture.

Costs

The surgeon and therapist should be able to provide information on the usual cost of the rehabilitation program. The program is quite cost-effective, because it is based heavily on home exercises.

Conclusion

Total elbow joint replacement arthroplasty helps restore comfort and function to elbows damaged by rheumatoid arthritis.

In the hands of an experienced surgeon, elbow joint replacement arthroplasty can be a most effective method for restoring comfort and function to elbows with joint surfaces damaged by rheumatoid arthritis in a healthy and

motivated patient. Pre-planning and persistent rehabilitation efforts will help assure the best possible result for the patient.

Surgery for elbow joint replacement at the University of Washington Medical Center

If you are interested in making an appointment to discuss this procedure, you can request an appointment using our online referrals website. To request a referral online, www.orthop.washington.edu. You can also call 206-598-7416 to make an appointment.

To see this article online and review other articles and links to videos on related subjects, visit:
www.orthop.washington.edu/uw/elbowreplacement

ABOUT DR. FREDERICK MATSEN

Dr. Matsen has dedicated his entire professional life to developing excellence in Orthopaedics and Sports Medicine at the University of Washington. Starting with his residency here in 1971, he developed an interest in shoulder and elbow reconstruction. A fellowship with the father of modern shoulder surgery, Dr. Charles S. Neer II, confirmed his lifetime commitment to improving the art of care of patients with simple and complex problems involving the shoulder and elbow. He has partnered with Charles Rockwood, a fellow Texan, in editing the definitive text in shoulder surgery, *The Shoulder*, now in its third edition from Saunders. He has also written *Practical Evaluation and Management of the Shoulder* and most recently, along with a former shoulder fellow Steve Lippitt, has published *Shoulder Surgery, Principles and Procedures*, also published by Saunders. Matsen and his partner Kevin Smith are the primary faculty for a fellowship in shoulder and elbow surgery.

Dr. Matsen is also the medical director for University of Washington Sports Medicine, a group that has the honor of caring for the varsity student athletes at the UW. He is also director of the Residency Program (coordinated by fellow professor Doug Hanel), which is recognized as one of the top orthopaedic residencies in the United States.

Finally, he is chair of the Department of Orthopaedics and Sports Medicine, a position he has held since 1986. During his tenure the department has become one of the top departments in the U.S., according to rankings by *U.S. News and World Report* and by the National Institutes of Health. These dramatic accomplishments are a direct result of the wonderful faculty, staff, residents, fellows, postdoctoral students, graduate students, alumni, and benefactors that have together made the department what it is today.

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