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Reverse Total Shoulder Arthroplasty

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If you are considering a shoulder replacement, this pamphlet is intended to provide you with some of the nuts and bolts of the surgery and why it's performed, as well as answers to some commonly asked questions about your surgery, your hospital stay, and your return home.

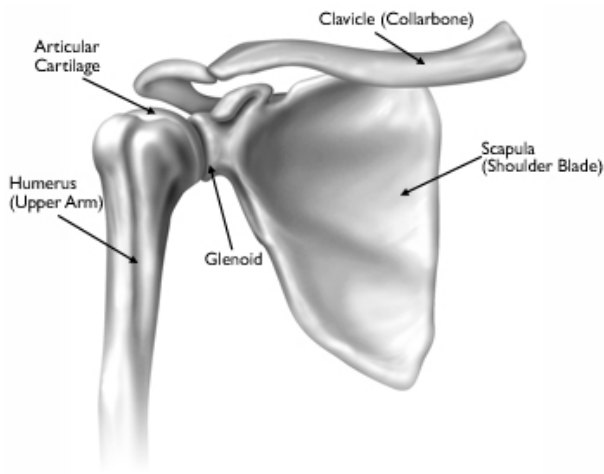
Please do not hesitate to contact my office with any questions or concerns you might have.

Understanding Shoulder Replacement

Shoulder replacement surgery has been recommended for the treatment of your shoulder problem. This operation is most often performed for arthritis, fractures, or irreparable rotator cuff tears. However, other conditions in the shoulder can also successfully be treated with a shoulder replacement.

The Normal Shoulder

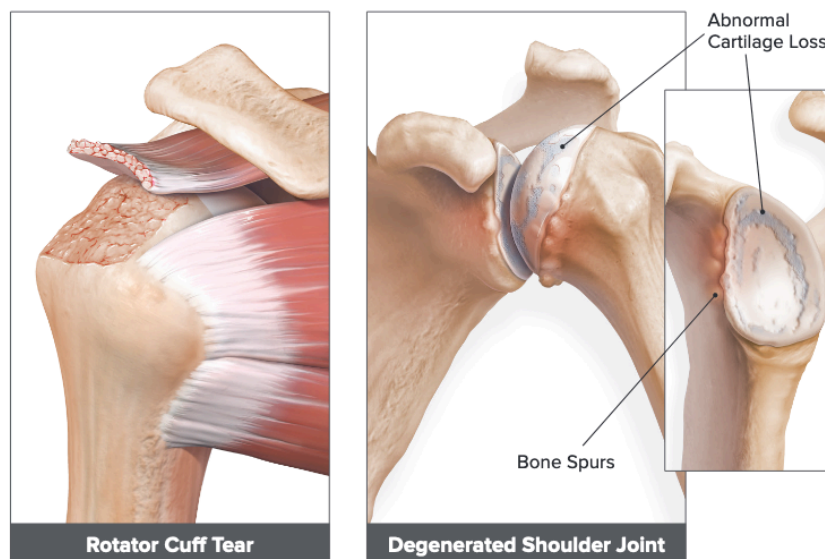
The shoulder is a very complex structure and involves three bones and more than one joint. These bones are the clavicle (collar bone), scapula (shoulder blade), and humerus (arm bone). The upper arm bone (humerus) forms a ball (humeral head), which meets with the outside edge of the shoulder blade (glenoid), forming the main “ball-and-socket joint” of the shoulder (see images below). There are multiple muscles, tendons, and ligaments comprising the shoulder, which help to provide stability for this “golf ball on a tee.” The shoulder is a truly remarkable structure, as it allows greater range of motion than any other joint in your body.



The rotator cuff connects the shoulder blade (scapula) to the arm bone (humerus). Its main function is to stabilize the ball on the socket. It comprises four muscles coming from the scapula that converge as one large “cuff” of tendon on the humerus. The four rotator cuff muscles are the supraspinatus, infraspinatus, teres minor, and subscapularis. The deltoid muscle is the large muscle that forms the rounded curve of the shoulder. Tendons attach muscle to bone. Muscles in turn move bones by pulling on tendons. As such, the rotator cuff muscles stabilize the ball (humeral head) on the socket (glenoid). The socket is shallow and flat. It is rimmed with soft tissue called the labrum that acts as a bumper to make the socket deeper and aid in stability. The joint capsule surrounds the shoulder joint. It is a very stout, fluid-filled sac that lubricates the joint. It has thickenings within it that are ligaments. Ligaments are strong soft tissue structures that hold bone to bone. Shoulder injuries can occur to any part of the shoulder complex.

Who Needs a Reverse Total Shoulder Arthroplasty (Replacement)?

Reverse shoulder replacement surgery is often recommended when there is severe damage to the rotator cuff beyond repair, and/or when there is severe destruction of the socket (glenoid). Severe rotator cuff problems can occur in association with arthritis, shoulder instability, certain fractures, failure of previous joint replacement, or failed rotator cuff repair surgery. The “reverse” is a very versatile surgery, as it can be used for a host of different pathologies. It works by altering the mechanics of the shoulder, transferring more load to the strong deltoid muscle and less load to the rotator cuff muscles (which are often severely damaged). The reverse replacement puts the deltoid at a biomechanical advantage, such that it can raise your arm without a properly functioning rotator cuff. That said, the best results for a reverse replacement are seen in patients who have some functional rotator cuff remaining. However, very good results can be seen even with large or massive rotator cuff tears. Ultimately, the reverse changes the mechanics of the shoulder such that it is less dependent on the rotator cuff for overhead motion and strength, and instead relies on the deltoid.



Common Reasons for Reverse Total Shoulder Arthroplasty:

- Cuff tear arthropathy (chronic rotator cuff tear with associated arthritis)
- Large, chronic, irreparable rotator cuff tear
- Complex proximal humerus fracture
- Malunion or nonunion of a proximal humerus fracture
- Severe osteoarthritis (“wear-and-tear” arthritis)

- Severe inflammatory (rheumatoid) arthritis
- Post-traumatic arthritis
- Revision of a previous shoulder replacement
- Failure of a prior rotator cuff repair surgery
- Reconstruction following some tumor surgeries

The Surgery

For a reverse total shoulder arthroplasty, most of the surgery follows the same steps as for a standard (“anatomic”) shoulder replacement—the damaged areas of the ball-and-socket joint are replaced with a prosthesis (artificial joint). The incision is made on the front of your shoulder, and your shoulder joint is accessed by splitting the deltoid and pectoralis major muscles. After exposing the joint, the damaged ends of the ball (humeral head) and socket (glenoid) are replaced, just as they are in a standard (“anatomic”) shoulder replacement, but this time they are quite literally reversed. The socket (glenoid) portion of your shoulder is replaced with a prosthetic metal ball that attaches to a metal baseplate secured to the socket (shoulder blade) with screws. The ball (humeral head) is replaced with a plastic cup, or “socket,” that is attached to the top of a metallic stem placed within the humerus (see images below). Most commonly, the stem and socket (humerus) are press-fit into place. However, sometimes bone cement is needed to secure fixation. An important aside: because the prosthesis is largely made of metal, it can sometimes set off metal detectors. Unfortunately, there is no “special card” to get you through airport security. Fortunately, joint replacement surgery is very common and airport security encounters this situation all the time.



Expected Outcomes

Reverse shoulder replacement surgery has been performed in the United States since about 2003. Therefore, long-term outcomes and risk of long-term complications are not fully known at this time. However, up to 10-15 years after surgery, the reverse shoulder replacement has performed very well clinically. The reverse has about a 90-95% survivorship at 10 years based on a recent large registry study of >30,000 reverse replacements. It currently is the most common shoulder replacement performed in the United States and throughout the world. The surgery is reliable for pain relief in over 90% of patients. That said, while some patients have complete relief of pain, many experience mild activity-related discomfort in the shoulder and arm. This is generally felt to be muscular pain and is usually quite mild. If the surgery is properly indicated and performed by myself, you can expect a dramatic improvement in pain and function. However, it is important to remember that most patients are not completely pain free and this is normal.

Most patients will also have an improvement in the ability to raise the arm overhead, but this is somewhat dependent on the age of the patient, the strength of the deltoid muscle, and the presence of some remaining rotator cuff tissue. It is very realistic and expected to be able to raise the arm above shoulder level, to reach the top of the head, and to reach the opposite shoulder. The reverse also reliably improves strength when lifting your arm away from your body. Your ability to rotate your arm outward is dependent on the presence of some intact rotator cuff tendon as well. Some patients may lose some motion reaching behind the back. Most patients will be able to reach their belt line or back pocket, but it is unpredictable who will be able to reach higher up their back. It is also important to know that the risk of early dislocation following a reverse shoulder replacement is slightly higher than a standard (“anatomic”) replacement, and can occur in up to 2-3% of patients. Thus, it remains a very rare event, but it can happen. When it does, it usually happens within the first 6 weeks after surgery. That is why we restrict certain motions during this early post-operative period.

Most patients can be very active following a reverse shoulder replacement. Golf, tennis, swimming, yard work, and gardening are allowed and encouraged. Some patients can lift weights, shoot a gun, or play more vigorous sports once they regain their strength. It is important to know, though, that the ability to do these things depends on many factors and varies greatly between patients. I do not place any formal lifting restrictions on patients after a reverse replacement, as long as their activities are within reason. That said, it is generally recommended that patients do not routinely lift more than 25lbs overhead after surgery, but there are no lifting or push/pull restrictions below shoulder level. Generally, light and medium work demands are well tolerated, but it is not advisable to perform heavy labor jobs following this surgery. It is worth noting that the long-term durability of the reverse is not fully known beyond about 15 years, so the more you take care of your shoulder, the longer it will likely last. This is because the plastic spacer between the two metal parts can wear out over time, much like the treads on your tire. Finally, I always like patients to know that the reverse shoulder replacement slightly lengthens the arm (approximately 1-2cm). This is not noticeable by most patients. However, you may notice that the contour of the shoulder appears slightly different compared to the other side, and this is because the deltoid muscle is lengthened and therefore may appear thinner. This is normal.

Preoperative Planning

Before having surgery, you will need to be seen in the Missouri Baptist Surgical Evaluation Center. This is a very important step in the process, as it gives us an opportunity to medically optimize your treatment and make your surgical experience as safe as possible. Please make this

appointment in advance. The number is **314-996-5187 Option #2** (before 3PM). The pre-op evaluation center will help obtain clearance and obtain labs or any other necessary testing. You will need to be evaluated by an anesthesiologist and other medical staff. You will also need to stop the use of certain medications that may cause increased bleeding risk during the surgical procedure.

These medications include **ASPIRIN, COUMADIN (WARFARIN), PRADAXA (DABIGATRAN), XARELTO (RIVAROXABAN), ELIQUIS (APIXABAN).**

ALSO STOP ALL ANTI-INFLAMMATORIES SUCH AS: ALEVE, IBUPROFEN, MOTRIN, MOBIC (MELOXICAM), CELEBREX (CELECOXIB), AND CERTAIN DIETARY SUPPLEMENTS SUCH AS FISH OIL, GINKGO BILOBA, & GINSENG.

Please discuss with me or my staff if you are on any of these above medications prior to surgery.

In addition to the above, I may also recommend advanced imaging studies such as an MRI or CT scan of the shoulder to assess the rotator cuff and bone stock of the glenoid (socket). This is to help with surgical planning and allows me to template your individual surgery before it is actually done.

Your Surgery and Hospital Stay

What do I do on the morning of surgery?

Plan to arrive at least 2 hours before your surgical time. Please plan on dedicating your entire day to the surgical process. It takes quite a bit of time to check you in and prepare you for surgery. We try to run as efficiently as possible, and a part of the process requires your cooperation. If you are going to be late, please call my office or the hospital with as much advanced notice as possible. Unfortunately, if you are running too late, your surgery may need to be rescheduled. Do not eat anything after midnight on the day of surgery. You may be advised to take some of your medications with a sip of water only. The anesthesia team will discuss this with you at the time of your pre-op evaluation appointment. After checking in, at the appropriate time you will be brought into the pre-operative holding area. At this point a nurse will see you, review your records, and an IV will be started.

What type of anesthesia will I receive?

A member of the anesthesia team will meet with you to discuss any anesthesia concerns and anesthetic options. Your surgery will be performed under general anesthesia (you will go to sleep and not feel or remember any of it). In addition, the anesthesiologist may recommend a regional nerve block to help with post-operative pain. This is very commonly done. This involves an injection of local anesthetic (numbing medication) near the nerves at the base of your neck. This will cause your shoulder and entire arm to “fall asleep.” This usually lasts for 12-24 hours. The anesthesiologist will discuss the risks and benefits of the block. The decision to perform this is a mutual decision between you and the anesthesiologist.

How long is surgery?

Provided there is nothing out of the ordinary required in your shoulder replacement, you can anticipate that your surgery will last approximately 2 hours. If any family members have accompanied you, they will wait in the waiting room during this time. I will speak with them after

the surgery to let them know that you are finished. Your belongings will be stored in a locker in the pre-operative area during your surgery. Please leave valuables at home or with family. When you wake up from surgery, you will be located in the post-operative recovery room. Family members are not allowed to be present in this area, as there are many other patients and nurses providing important care. Once you are stabilized and comfortable—approximately 1-2 hours after surgery, you will be transferred to your hospital room and will be able to see your family.

How long will I be in the hospital?

You can expect to stay in the hospital for 1 night. About 10-20% of patients may require a second night in the hospital depending on pain control, your ability to transfer and walk on your own, and/or other medical issues. If you are planning to go to an extended care or rehab facility, you will likely need to stay 3 nights due to insurance reasons, which is outside of my control. The social work staff will assist with placement once you are in the hospital.

How will my wound be closed?

I generally use absorbable sutures under the skin for wound closure. There are tails at the ends of the incision that may need to be trimmed short at your first post-operative appointment. You will have a sealed dressing covering the incision, which you may shower on. Your dressing should come down on the 5th day after surgery (more detailed instructions will be provided later in this pamphlet and at discharge).

Your arm will be immobilized in a sling. You may also have a drain in place to collect fluid and blood from the surgery. This will be monitored during your hospital stay and usually removed the morning after surgery before you are discharged. Other equipment you can expect to encounter while hospitalized includes: an IV in your arm until you are eating, drinking, and voiding normally, a cold therapy unit or ice bags for your shoulder, compression stockings on your legs to prevent blood clots, and possibly a temporary urinary catheter if you are not able to void normally after surgery.

What else do I need to know?

As stated earlier, you may be given a regional block before surgery for pain control. This usually wears off 12-24 hours after surgery, sometimes in the middle of the night. We recommend that you begin taking the pain medication when it is offered (before you go to bed) even if you are not in pain, so that the medication will be in your system when the block wears off.

Lab work will be done during your stay to make sure you are recovering appropriately from surgery. In order for the lab results to be ready when I see you in the morning, the staff will collect samples from you. This normally has to be done between 12-4am. I apologize for any inconvenience this may cause you.

Occupational therapy will see you after your surgery to evaluate your needs. This normally starts around 8am. If they feel it necessary, a referral will also be made to physical therapy. They will work with you on sling management and activities of daily living. Depending on my recommendation, they may begin working with you on simple range of motion exercises.

I will see you early in the morning the day after your surgery. If cleared for discharge, the drain will be pulled and discharge orders written. Your nurse will go over your discharge instructions before you leave. Normally, patients are able to leave around lunchtime.

Risks and Complications

The list below includes some of the more common possible side effects from this surgery. Fortunately, these complications are very rare. Please note that this list includes some, but not all, of the possible side effects or complications. In some cases, like infection, further surgery may be needed to treat the problem. Some complications will resolve and improve with time. There are also risks associated with general anesthesia that are dependent on the overall health of the patient.

- Infection – 1% risk, can occur early or late
- Dislocation – 2-3% risk, rare after initial 6 weeks
- Vascular injury – very rare
- Hematoma/excessive swelling – 2-3% (usually resolves on its own)
- Nerve complication – up to 10%, these are partial injuries from nerve irritation and resolve in 95% of cases over time
- Blood clots in legs or lungs – clots that cause symptoms are seen in 1-2% of cases despite steps taken to prevent them. **Please let your surgeon know if you have a personal or family history of blood clots**

Postoperative Care

1. Sling instructions

After surgery, your shoulder will be placed in a sling. The sling should be worn as directed. The sling is used to limit motion of your shoulder, which will help with pain control and to prevent the rare complication of dislocation (as I discussed earlier). You may—and are encouraged to—remove your arm from the sling to bend and straighten your elbow and move your wrist, hand, and fingers several times per day. You may also remove the sling to bathe and dress. Otherwise, until instructed differently by me, you should wear your sling. This includes at night, and especially when out of the house in public areas. In general, you should wear your sling at home and at night for the first 3 weeks. After this, you may discontinue it at home and at night, and only wear it outside the home for another 3 weeks (6 weeks total).

2. Diet

It is safe and encouraged to resume a regular, balanced diet as soon as you can tolerate. I recommend starting with a light meal the evening of surgery, accompanied with plenty of fluids and dietary fiber (fruits, vegetables, whole grains), as well as protein.

3. Pain control

When you are discharged from the hospital, you will be given several medications for pain, blood clot prevention, and nausea:

- Oxycodone (narcotic)
- NSAID/anti-inflammatory (Celebrex, Aleve, Motrin, Mobic, etc.)
- Tylenol (acetaminophen)
- Aspirin 81mg
- Zofran (ondansetron) for nausea

I ask that you also take an over-the-counter stool softener like Colace, MiraLAX, or Senokot while you are on the narcotic. This should be taken twice a day to prevent constipation. If you are having loose stools or diarrhea, hold the stool softener.

The dosage and frequency for each medication will vary. Please take these medications as directed on the medication instructions. It is safe to take these medications together. Also, continue to ice your shoulder with the cold pack machine or individual ice bags 2-3 times per day for the first 1-2 weeks after surgery.

4. Wound care

You will likely be discharged with an adhesive dressing covering your incision. This type of dressing can get wet, so you may shower when you get home. You may remove this dressing **5 days** after surgery. There will be small paper strips (called Steri-Strips) placed directly over your incision. Do not remove these with the dressing. At this point, it is safe to leave your incision open to air. You may continue showering once the dressing is down. Let warm water and soap run over the incision (and Steri-Strips). Pat incision dry after showering. The Steri-Strips will begin to fall off, and this is ok. If after 14 days any Steri-Strips are still covering your incision, please gently remove.

Do NOT soak or submerge the incision in a bath or pool until cleared by me (usually about 6 weeks). Do NOT place any ointments over the incision—it is best to keep it dry. Sometimes significant bruising is seen along the front of the shoulder, arm, and even chest wall. This is normal and will resolve within a couple weeks. If you notice drainage from the incision after 1 week from surgery, please call my office. Redness around the incision is very common and should not be a concern unless it is associated with persistent drainage, redness spreading away from the incision, or with a fever.

5. Sleep

It is often difficult to get a good night's sleep in the week or two following shoulder surgery. The surgery and anesthesia themselves may interfere with your sleep-wake cycle. Additionally, many patients have increased pain lying flat. I recommend that you try sleeping in a recliner or in a reclined position in bed. Also, place a pillow behind your elbow in order to keep the arm at the side or slightly in front of you. This will be a more comfortable position. Wear your sling when you sleep until I instruct otherwise (usually about 3 weeks).

6. Driving

Driving a car may be difficult due to your inability to use your operative arm. If you were to have an accident or get pulled over while wearing a sling, the authorities may consider that driving while impaired. Additionally, no one should operate a motor vehicle while taking narcotics. The decision to drive is based on your comfort level with driving essentially one-handed. You should wait at least until your first postoperative visit at 2 weeks before driving. Once you are out of your sling, you may drive when you feel safe operating a vehicle. Everyone is different. It is generally about 4 weeks.

7. Therapy

In most cases, you will begin occupational therapy the morning after surgery. You will be instructed on the proper exercises by myself and/or the occupational therapist. This is usually gentle range of motion exercises. Outpatient physical therapy will not start until after your first post-operative visit. Those details will be discussed with you at the first post-operative visit. Therapy is usually started about 2-3 weeks after surgery.

Infection Prevention

Infections are uncommon after shoulder arthroplasty, but can be detrimental to your outcome if they occur. Fortunately, there are many things **we** can do to significantly decrease infection risk:

1. Pre-operative surgical bath and antibiotic scrub
2. Good personal hygiene, including fingernail and toenail grooming
3. Clean sheets and clothing at home
4. Stop the use of all tobacco and vapor products
5. Reduction of hemoglobin A1c (for diabetic patients) prior to surgical procedure
6. Very tight glycemic (sugar) control post-operatively—low carb diet
7. Weight loss prior to surgical procedure (BMI under 40 ideally)
8. IV Antibiotics given—1 dose pre-operatively, and 2 doses post-surgically
9. Meticulous surgical technique and attention to detail

Antibiotic Prophylaxis

Please refrain from any dental, bladder, or bowel procedure for 3 months following surgery. Once you are 3 months out from surgery, you will need to be pre-medicated with oral antibiotics prior to any of these procedures for 2 years from the date of surgery. You may call my office at 314-714-3230 to have a prescription sent to your pharmacy.

Follow Up Appointment

A follow up appointment is usually scheduled at the time that surgery is scheduled. Patients are seen in the office about 2 weeks after surgery. If you have not been scheduled for an appointment, please call the office to set up an appointment at 314-714-3230

I understand that there are probably questions you have that were not answered here. I do not want any patient feeling unsure about anything before surgery. As such, I encourage you to write down any additional questions that you may have, so that they can be addressed when you come to the office.