



Ream and Run for Shoulder Arthritis: Conservative Reconstructive Surgery for Selected Individuals Desiring Higher Levels of Activity than Recommended for Traditional Total Shoulder Joint Replacement

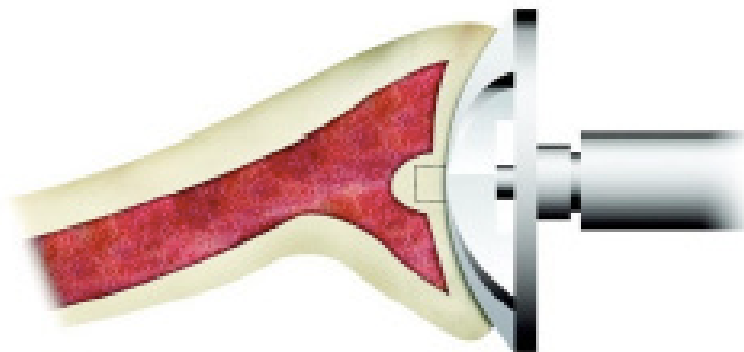
This booklet provides important information for patients, families and referring physicians considering the ream and run procedure. Please read it carefully. If questions arise, please email Dr. Frederick Matsen at matsen@uw.edu.

The Ream and Run procedure is a type of surgical joint replacement for highly motivated active individuals with shoulder arthritis who wish to avoid the potential risks and activity limitations associated with the plastic socket used in traditional total shoulder replacement.



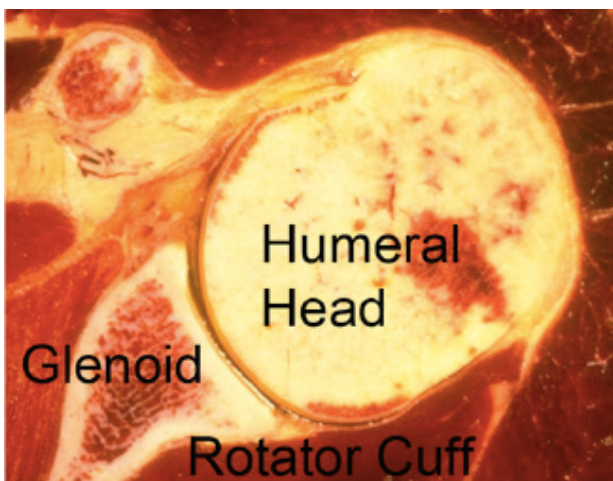
In the ream and run surgery, the arthritic humeral head (ball of the shoulder's ball and socket joint) is replaced by a smooth chrome cobalt prosthesis fixed to the humerus (arm bone) by a titanium stem.

The bone of the arthritic socket is reamed to the desired shape and the raw bone surface is allowed to heal while the patient gently exercises the shoulder. During the period of recovery a biological surface forms on this surface. Success requires technical excellence of the surgery and a steadfast commitment by the patient to a specific exercise and rehabilitation program.



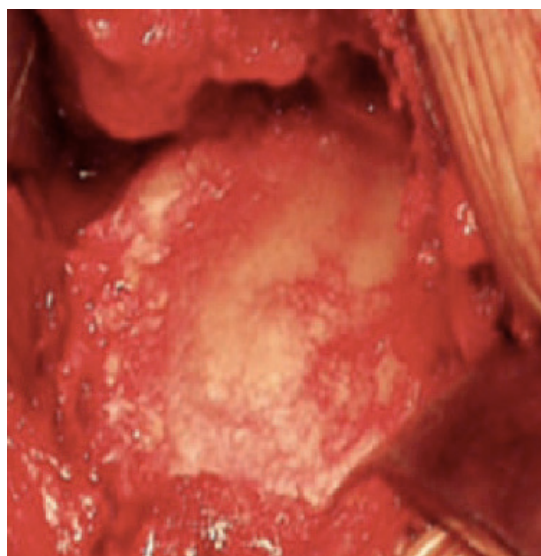
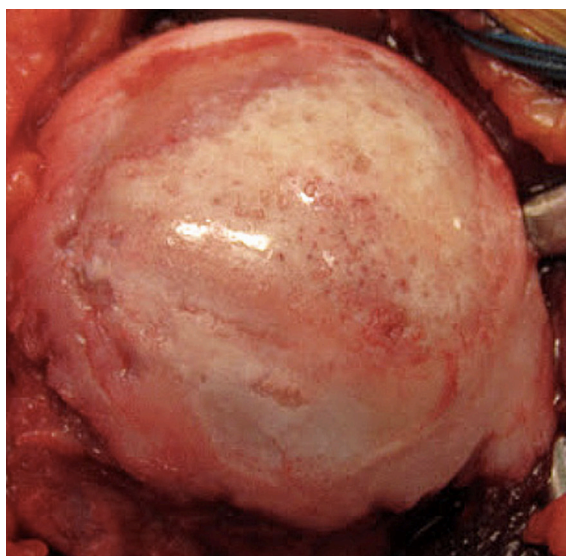
What Are The Key Parts Of The Normal Shoulder Joint?

Normally the smooth round surface of the humeral head (ball of the shoulder joint) fits in the shallow, smooth, round glenoid socket and is held in position by the rotator cuff.



What Is Shoulder Arthritis?

Shoulder arthritis is a condition in which degeneration, injury, inflammation or previous surgery destroys the normally smooth cartilage on the humeral head and glenoid socket.



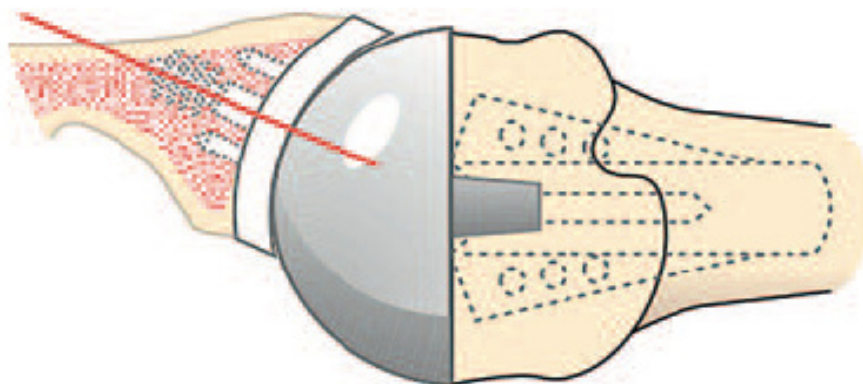
How Is Shoulder Arthritis Diagnosed?

Carefully standardized X-rays reveal the loss of space between the humeral head and glenoid that is normally occupied by cartilage, showing bone-on-bone contact.



What Is A Conventional Total Shoulder Replacement?

In a conventional total shoulder replacement, the arthritic surface of the ball is replaced with a metal ball that is attached to a stem, which fits in the humerus. The glenoid socket is resurfaced with a high-density polyethylene (plastic) component that is fixed in position on the shoulder blade using cement.

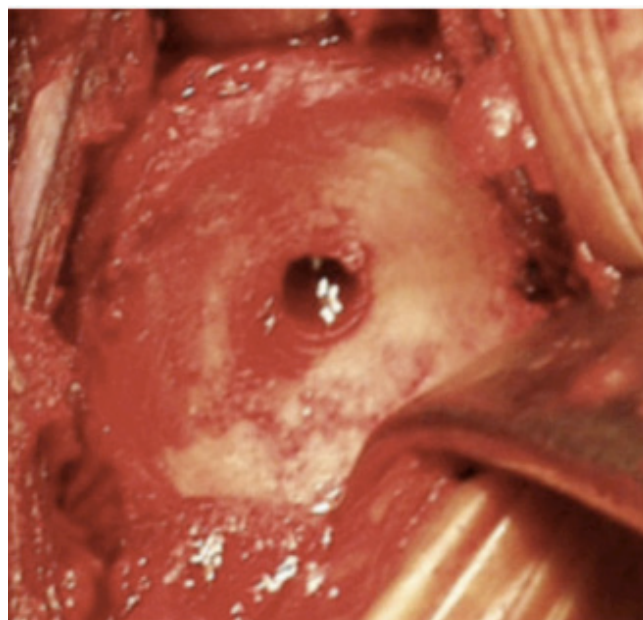
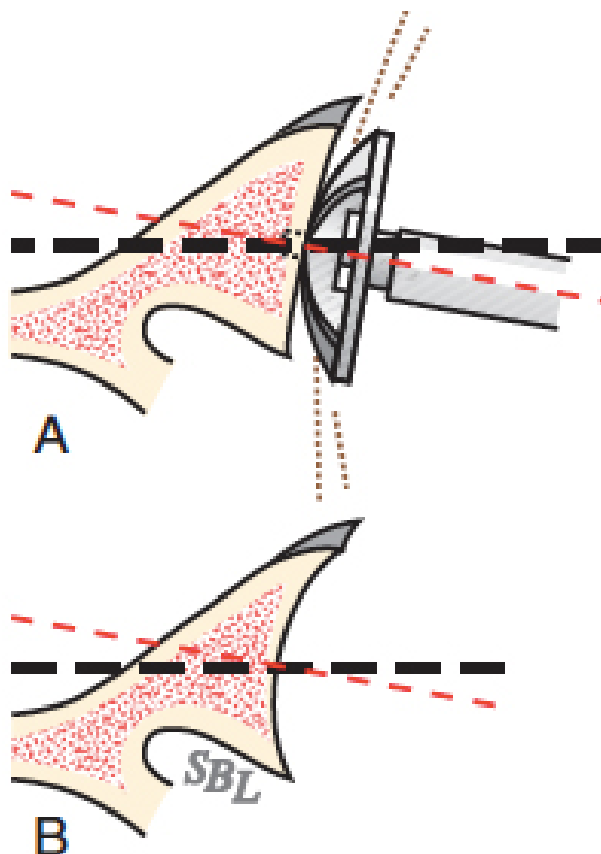


What Are The Possible Risks and Limitations Associated With Total Shoulder?

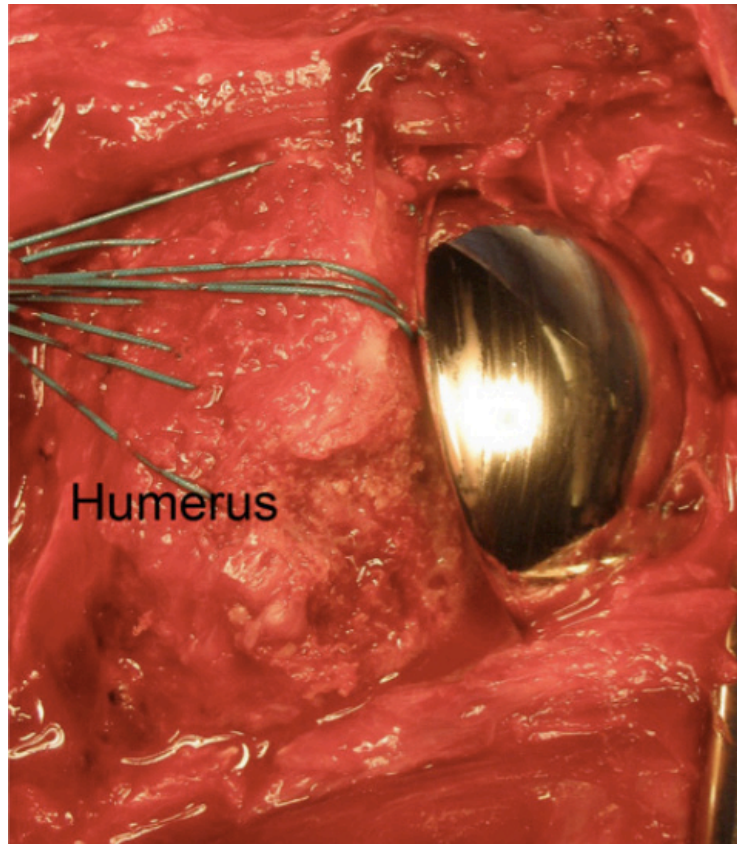
While this is the most common procedure performed for shoulder arthritis, it does carry the possible risks that the plastic glenoid component will wear, loosen or even break over time, especially with heavy use. It is not possible to predict how long a plastic socket will last in each case because the use and geometry of each shoulder is different. For these reasons, most surgeons advise patients to avoid activities that involve impact, weights or heavy use.

What Is A “Ream And Run” Surgery For Shoulder Arthritis?

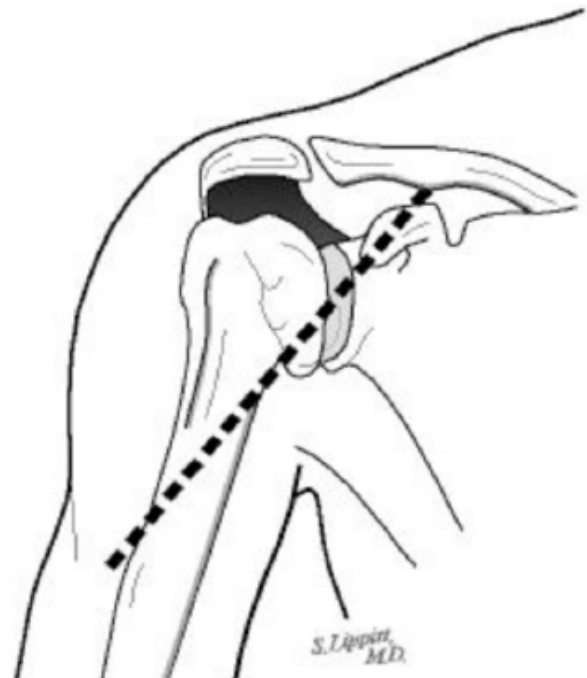
In a Ream and Run, the possible risks and limitations associated with the use of a plastic socket, as is used in a conventional total shoulder, are avoided. Instead of implanting a glenoid prosthesis, the arthritic glenoid socket is reshaped with a reamer so that a smooth concavity results.



The surface of the arthritic humeral head is replaced with a cobalt-chrome head with a titanium stem that is press fit down the inside of humerus so that only the smooth surface extends from the bone.

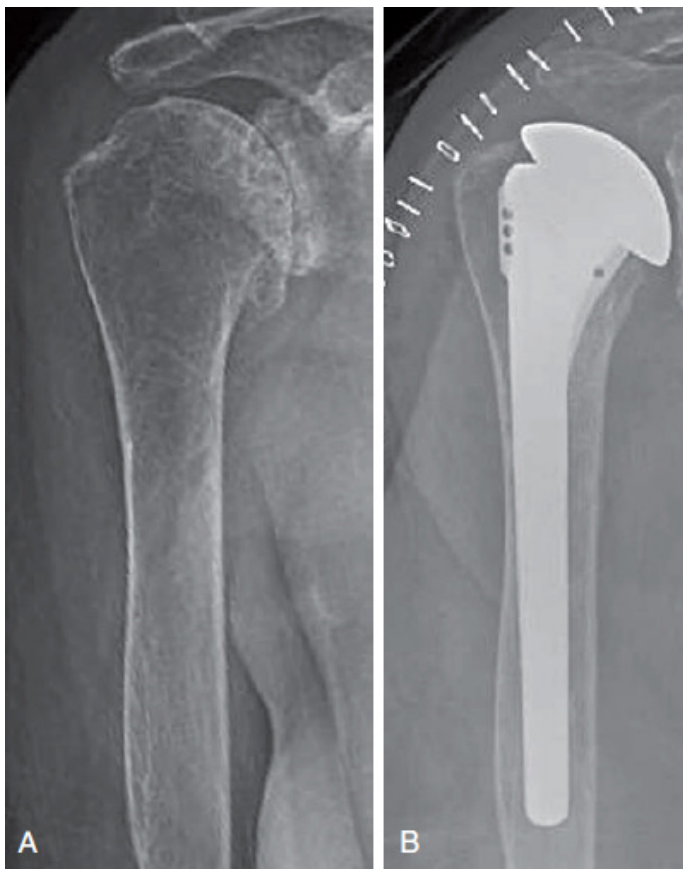
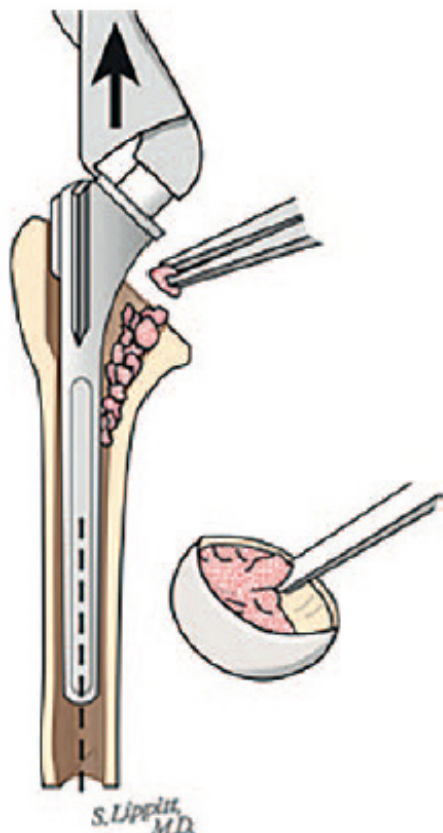


This procedure is performed through an incision between the deltoid and the pectoralis major muscles on the front of the shoulder. Before placement of the humeral head prosthesis, we additionally release adhesions and contractures and remove bone spurs and scar tissue that may limit range of motion. Our team of experienced surgeons, anesthesiologists, and surgical assistants usually perform this procedure in less than two hours.



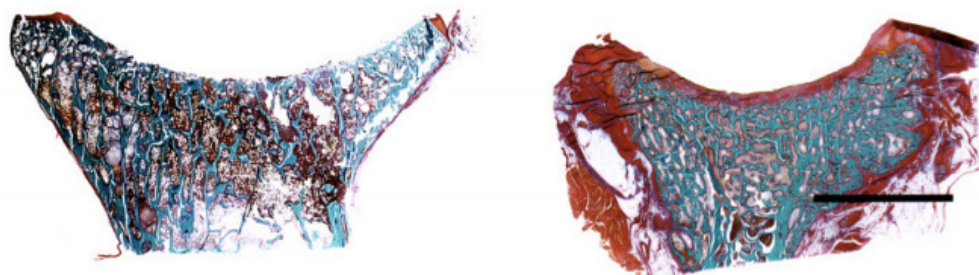
How Is The Humeral Component Fixed In The Humerus?

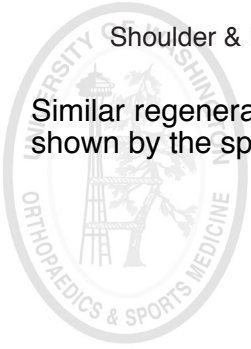
While some surgeons cement the humeral component and others use implants that foster bone in-growth, we find that these approaches (a) stiffen the bone making it more likely to fracture in a fall and (b) greatly complicate any revision surgery that may become necessary in the future. We prefer to fix the component by impaction grafting the inside of the humerus (using bone harvested from the humeral head that has been removed) until a tight press fit of the implant is achieved.



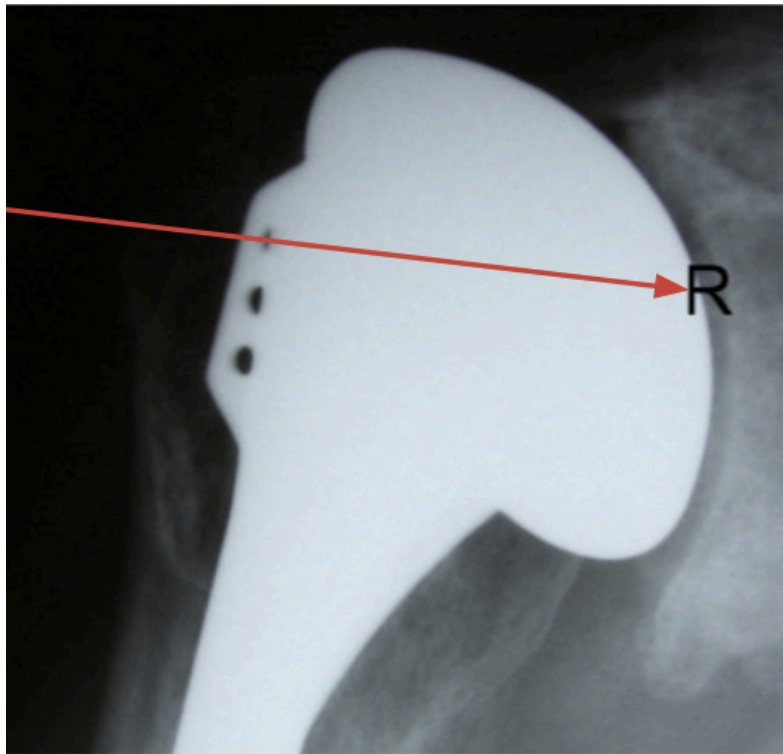
What Happens To The Raw Bone Surface Left After The Reaming Of The Glenoid?

Laboratory studies at the University of Washington have shown that the reamed socket (glenoid) can heal over with a smooth fibrocartilaginous surface. The illustration shows the socket surface just after reaming and six months later with the reddish fibrocartilage on the surface.





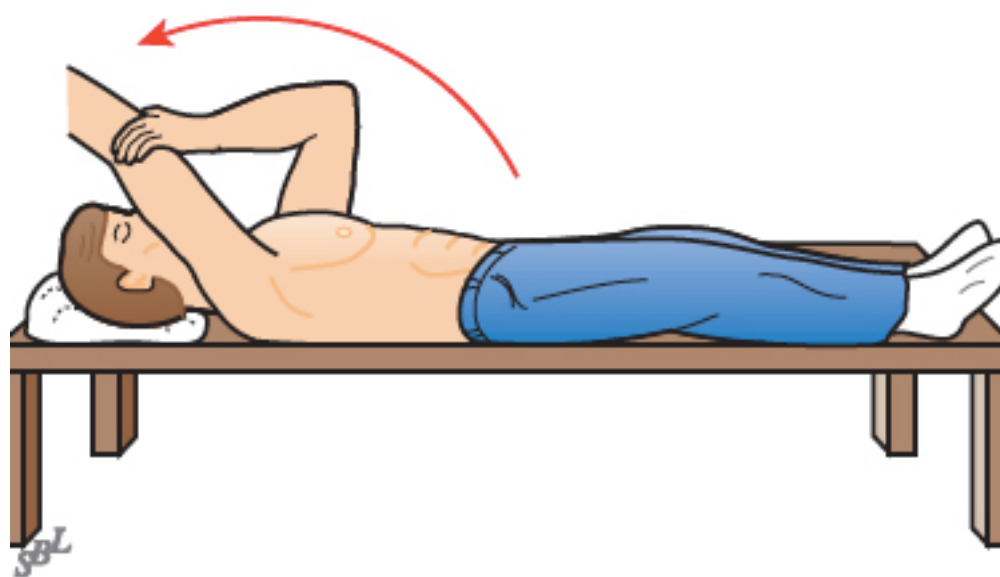
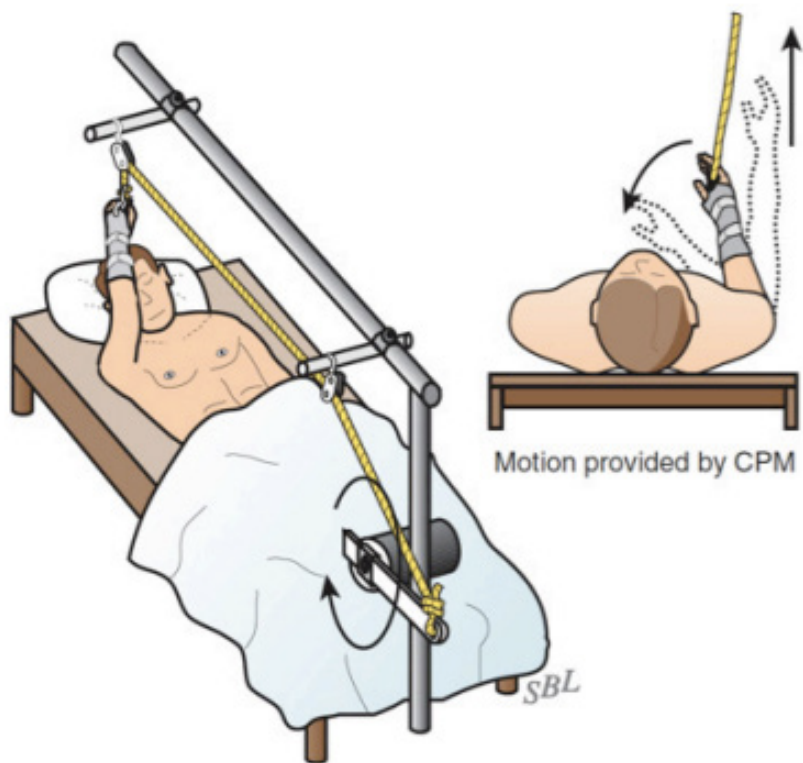
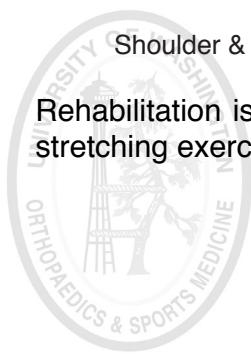
Similar regeneration often, but not always, occurs in patients having the ream and run procedure, as shown by the space between the metal ball and the bony socket on x-rays (demonstrated as (R)).

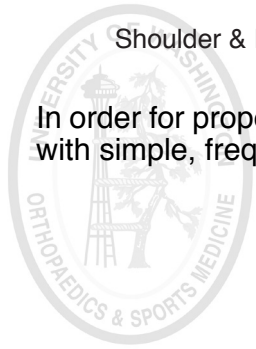


Here are the typical x-rays after a ream and run procedure.



Rehabilitation is started immediately after surgery using a continuous passive motion machine and stretching exercises under the supervision of an expert physical therapist.

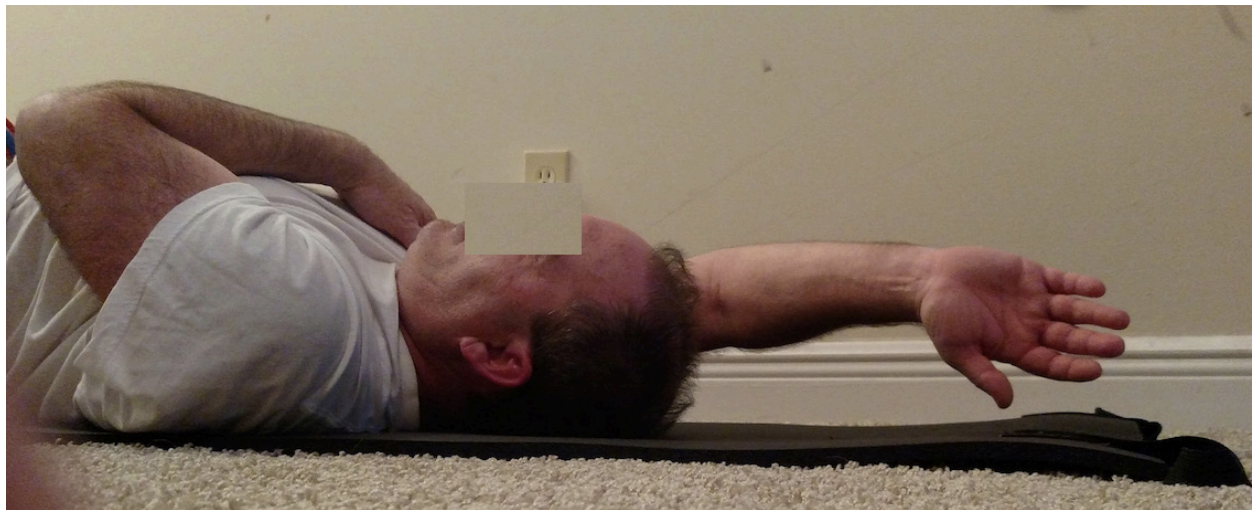




In order for proper healing to occur, the patient must maintain the range of motion achieved at surgery with simple, frequent stretching exercises.



Attaining and maintaining, at least, 150 degrees of forward elevation is critical to the success of this procedure.



Who Should Consider A Ream And Run?

Surgery for shoulder arthritis should only be considered when the arthritis is limiting the quality of the patient's life and after a trial of physical therapy and mild analgesics to determine if non-operative management is sufficiently helpful. Severe arthritis is usually best managed by a joint replacement, either a total shoulder or a ream and run. The Ream and Run procedure is considered by those who are strongly motivated to put in substantial time and effort in the rehabilitation process to assure that proper healing occurs and who recognize that the pain relief and range of motion achieved with this procedure may not match that of a conventional total shoulder replacement. The ideal patient is healthy, active, and committed to work diligently to achieve a shoulder reconstruction that does not require plastic and bone cement.

A patient who has had a terrific recovery after this procedure states "R&R patients must be very motivated to endure the challenges of the rehab. I don't think that this can be overstated. It is most certainly a tough, painful, and lengthy process, but most definitely worth it. As they say, 'The juice is worth the squeeze,' but patients must prepare themselves mentally for the journey and be willing to put in the work."

Studies have shown that for some patients the recovery time after a ream and run procedure can be substantially longer than that typically seen with a full total shoulder replacement.

Who Should Probably Not Consider A Ream and Run?

This procedure is unlikely to be successful in individuals with rheumatoid arthritis, depression, obesity, diabetes, Parkinson's disease, multiple previous shoulder surgeries, prior shoulder joint infections, rotator cuff deficiency and severely altered shoulder anatomy. Patients who routinely use narcotic medication or who use tobacco are generally not candidates for this procedure.

What Are The Keys To Success Of A Ream and Run?

Success requires technical excellence of the surgery and a steadfast commitment by the patient to the exercise program until the desired range of motion can be achieved comfortably. Attaining and maintaining at least 150 degrees of forward elevation is critical to the success of this procedure. Patients point out that the recovery is progressive – often the shoulder continues to improve as long as two years after surgery.

How Does A Patient Prepare For The Ream and Run Procedure?

As for all elective surgical procedures, the patient should be in the best possible physical and mental health at the time of the procedure. Any heart, lung, kidney, bladder, tooth, or gum problems should be managed before surgery. Any infection may be a reason to delay the operation. Any skin problem (acne, scratches, rashes, blisters, burns, etc) on the shoulder, armpit, arm, forearm or hand should be resolved before surgery. The shoulder surgeon needs to be aware of all health issues, including allergies as well as the non-prescription and prescription medications being taken. For instance, aspirin and anti-inflammatory medication may affect the way the blood clots. Some medications, such as blood thinners, may need to be modified or stopped before the time of surgery.

What Happens After Surgery?

The Ream and Run is a major surgical procedure that involves cutting of skin, tendons and bone. The pain from this surgery is managed by the anesthetic and by pain medications. Immediately after surgery, strong medications (such as morphine or Demerol) may be administered, although we minimize the use of narcotics to speed the recovery of the bladder, bowel and balance. Patients are transitioned to oral medications the evening of surgery. We encourage the use of Tylenol and anti-inflammatory medications, such as Aleve, and continue these at least for the first 6 weeks after surgery. An intravenous infusion is used to replace fluids and to give antibiotics. This is usually removed on the second day after surgery. Antibiotics are given just before surgery and stopped on the first day after surgery. While a blood transfusion is rarely necessary, we do send a blood sample to the lab for a type and screen. A urinary catheter is usually placed for male patients while they are under anesthesia before the surgery begins.

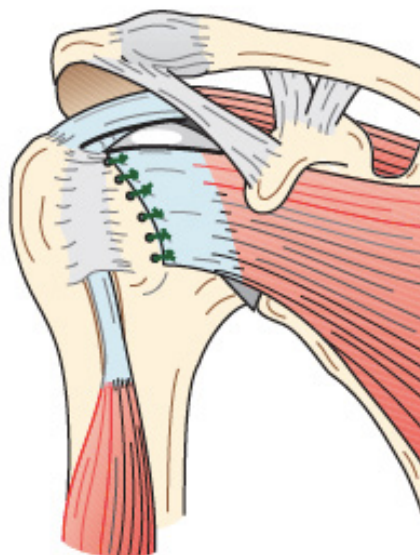
The shoulder rehabilitation program is started on the day of surgery. The patient is encouraged to be up and out of bed soon after surgery and to progressively reduce their use of pain medications. Hospital discharge usually takes place on the second day after surgery. Patients are to avoid lifting, pushing, or pulling more than one pound for the first six weeks after surgery.

What Is The Rehabilitation Program After Ream and Run?

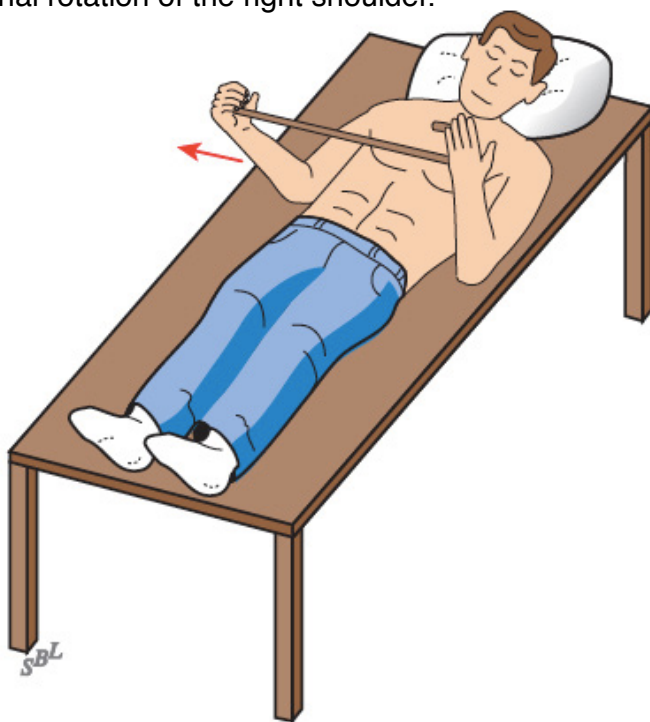
Arthritic shoulders are stiff. Although a major goal of the surgery is to relieve this stiffness by release of scar tissue, it may tend to recur after surgery. To prevent the recurrence of stiffness, rehabilitative exercises are started by our experienced shoulder therapists immediately after surgery using continuous passive motion and stretching by the patient. In order for proper healing to occur, the patient must attain and maintain at least 150 degrees range of forward elevation. Achieving this range of motion within the first few days of the procedure is critical to the success of this procedure. For the first 6 weeks of the recovery phase, the focus of rehabilitation is on maintaining this range of flexion.



We avoid stretching in external (outward) rotation of the shoulder, so as to avoid failure of the tendon repair that takes place during the surgery. External (outward) rotation of the shoulder is limited to the “handshake position” with the hand pointing forward.

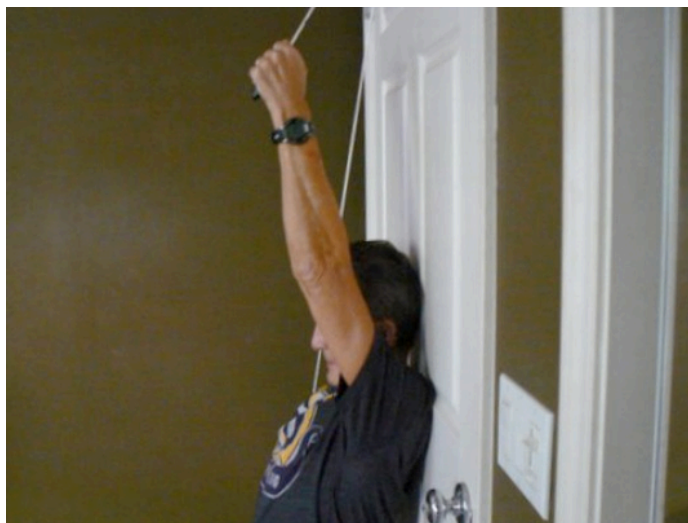


Avoid stretching in external rotation beyond the ‘hand straight ahead’ position. This figure shows too much external rotation of the right shoulder.

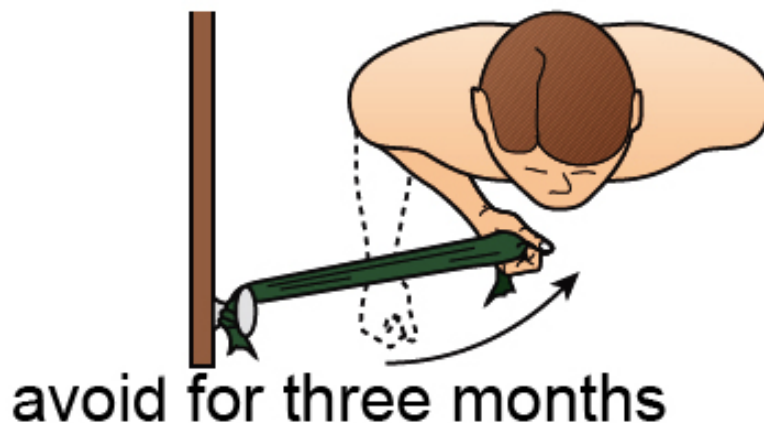


In addition to the stretching exercises, we recommend thirty to sixty minutes of aerobic exercise a day (stair climber, treadmill, brisk walking, stationary bike, etc.), as this has proven to be a very helpful part of the recovery process.

Pictured below are three of the exercises that will help the shoulder achieve the goal of over 150 degrees of forward elevation: the supine stretch (with assistance from other arm), the forward lean and the pulley.



Strengthening exercises are avoided during the first 6 weeks so as not to stress the tendon repair or the healing bone surface. At six weeks, gentle progressive strengthening exercises are started as described below. Internal rotation strengthening is avoided for three months and until it is completely comfortable.



It is critical that the patient be evaluated by our team at the six week post-operative mark. If full range of motion has not been achieved by this point, a manipulation of the joint under anesthesia might be considered.

What Is Involved With A Manipulation Under Anesthesia?

If the shoulder has not attained 150 degrees of comfortable forward flexion by one month after surgery, a manipulation under anesthesia is considered. For this reason it is essential that the surgeon be informed of persistent stiffness so that the manipulation can be scheduled at the time of the 6 month follow-up. The manipulation involves returning to the operating room for a secondary procedure (not an open surgery), which involves receiving general anesthesia and performing a gentle closed manipulation of the shoulder to re-obtain the 150 degrees of forward flexion. This manipulation is performed without making any further incisions. After the manipulation, the stretching rehabilitation program will be restarted.

What If My Arm Or Hand Swells After Surgery?

Swelling is not uncommon after the Ream and Run. This occurs mainly from removing bone spurs and reaming the socket, which causes a small amount of unavoidable bleeding. Swelling is best managed by squeezing a ball and elevating your arm on a pillow whenever possible. If the swelling gets to the point where the arm feels tight, be sure to let your surgeon know.

What If My Shoulder Clicks Or Pops While Doing The Exercises?

It is not uncommon for the shoulder to make some noise when it is moved during the period of healing. If this happens, we recommend slightly modifying the position of the lower arm (turning it more in or outward) to see if this avoids the sensation. If the sensation persists, the surgeon should be notified.

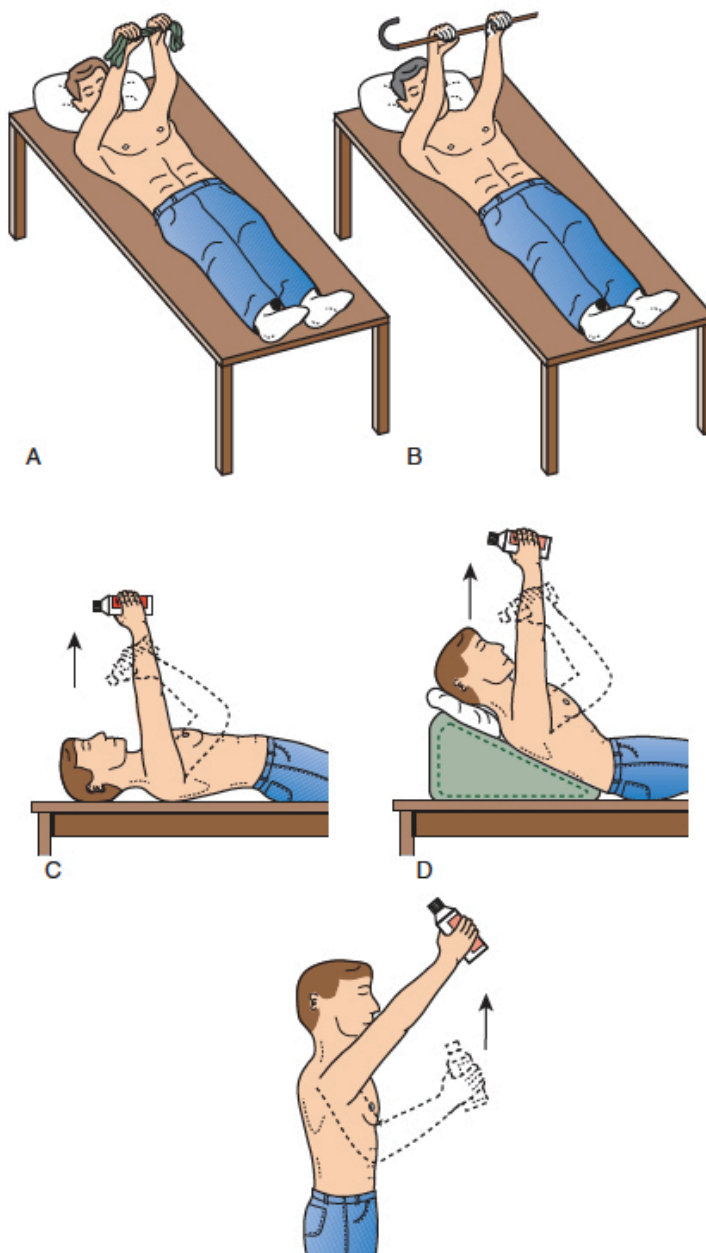
When Can Ordinary Daily Activities Be Resumed?

After surgery, you should be prepared to have less arm function than before surgery for about a month. In general, patients are able to perform gentle activities of daily living using the operated arm from two to six weeks after surgery. Patients often require some assistance with self-care, activities of daily living, shopping and driving for approximately six weeks after surgery. We highly recommend waiting to drive for, at least, six weeks. More importantly, you should avoid driving until the shoulder has regained the necessary comfort, motion and strength that is required of driving.

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

How Do I Strengthen My Shoulder After I Have The Full 150 Degrees Of Flexion?

After six weeks and after 150 degrees of assisted flexion is easy and comfortable, gentle strengthening exercises are started. These are started with two hands together on a washcloth, pushing both hands to the ceiling while lying flat. Then we move to two hands on a cane or yardstick about two feet apart, performing the same movement. Next, the same movement is performed with the one hand alone holding a very light weight. The weight is gradually increased as is the angle of sitting up, until the hand can lift one pound overhead. The rule is that the shoulder needs to be able to do 20 repetitions comfortably at one level before graduating to the next step. However, it is **CRITICAL** that no strengthening exercise cause discomfort that lasts more than a few minutes after its completion. Some individuals in their enthusiasm have pushed so hard that the healing process is disrupted.



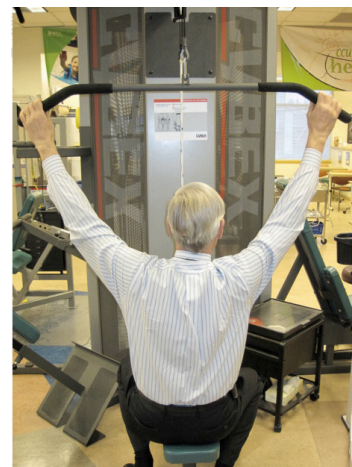
What Other Exercises Have Patients Found To Be Helpful?

After the first three months, patients have informed us that three exercises, known as the 'Traction 3,' can help the shoulder regain range and coordination.

The first is the gravity swing in which a light weight held in the hand is allowed to swing gently while the patient bends over at the waist.

The second is the row, where slow relaxed pulls on a rowing machine stretch out the shoulder.

Finally there is the lat-pulldown, where, again, light resistance is allowed to stretch out the shoulder.



Each of these should be done only as much as comfort allows, starting with minimal resistance. Gentle swimming, starting with the breast stroke also seems helpful at this phase.

Once A Shoulder With Ream and Run Procedure Has Successfully Completed The Rehabilitation Program, What Activities Are Permissible?

Once the shoulder has a nearly full range of motion, strength and comfort, we impose no limitation on the activities it can perform. While there are no strict limitations on participation, those activities that involve impact (chopping wood, contact sports) and those that involve heavy loads (weightlifting) should be resumed gradually to allow the rotator cuff tendons, muscles and joint surface to regain their strength and flexibility.

What Problems Can Complicate A Ream and Run?

The ream and run procedure is a major operation conducted under general anesthesia. At the University of Washington we have the advantage of an experienced team of surgeons, anesthesiologists, nurses, and therapists all dedicated to patient safety and optimizing the quality of the result. However, there are still risks associated with the procedure, including the small chances of death, bleeding problems, heart problems, breathing problems, blood pressure problems, infection, nerve injury, blood clots, stiffness, pain, weakness, instability, fracture, tendon and muscle failure, breakage, loosening of the implants, and the need for revision surgery. In male patients having any type of shoulder surgery there is an increased risk of infection from bacteria that normally inhabit the hair follicles and sebaceous glands within the patient's skin. These bacteria may not be completely eliminated by surgical preparation of the skin and by intravenous antibiotics. We use irrigation with antibiotic-containing solutions and topical 'in-wound' antibiotics to minimize the risk of infection from these bacteria. Infrequently

patients may experience the delayed onset of pain and stiffness due to the lingering presence of these bacteria in the wound. These are essentially the same risks that exist for all joint replacement surgeries, such as total hips and total knees. We are happy to discuss these risks with you and to explain how we strive to prevent them and how we manage them in the rare event that they occur.

In our experience to date, with over 500 of these procedures performed, a few shoulders have required repeat surgery for either (a) failure of the subscapularis tendon from over stressing, (b) stiffness, (c) loosening of the prosthesis, (d) infection, and (e) failure to achieve the desired level of comfort.

How Many Ream and Run Surgeries Are Done At The University Of Washington?

We currently perform 40-50 of these procedures each year on carefully selected patients from across the United States.

What If The Patient Lives A Long Way Away From Seattle?

Patients often come to Seattle from a long distance for this procedure. You can begin the process by emailing Dr. Matsen at matsen@uw.edu. If you wish, we can make a tentative 'one stop' plan in which we consider performing the evaluation and the surgery in the same week, if all systems are go. We are available by appointment in the Shoulder and Elbow Clinic, 4245 Roosevelt Way N.E. Seattle to evaluate individuals with shoulder arthritis to discuss the procedures that might be most ideally suited for them. The phone number to schedule clinic appointments is 206 290 8284. We perform surgery at the University of Washington Medical Center, 1959 NE Pacific St, Seattle, Washington.

Patients having a Ream and Run procedure are usually able to be discharged from the medical center/hospital in two days and return home in three to four days after the procedure, assuming they have mastered their exercises and have reasonable comfort on reasonable medications. The staples used to close the skin can be removed by a nurse or physician near the patient's home. Ideally, we like to see patients back at six weeks after surgery to assure that satisfactory progress is being made. We request that patients complete questionnaires at 3, 6, 12, 18 and 24 months after surgery so we can track their progress and that the patient obtain and send to us X-rays at 12 and 24 months after surgery if they are unable to return to Seattle for the annual follow-ups. All patients have our personal email and the clinic contact phone numbers to use in contacting us at any time questions arise.

Conclusion

Summary Of The Ream and Run Procedure For Arthritis Of The Shoulder

The Ream and Run procedure is a technically exacting procedure that can restore comfort and function to shoulders damaged by degenerative joint disease and osteoarthritis to selected patients who are strongly motivated. This procedure provides an approach to treating arthritis in young and physically demanding patients whose arthritis has advanced to the point of surgical treatment. By reshaping, reorienting and smoothing the bony socket, this procedure removes the risks associated with wear, loosening and fracture of the plastic socket.

Pre-planning and persistent rehabilitation efforts will help assure the best possible result for the patient. If you have questions now or any time in the future, please feel free to send us an email at matsen@uw.edu.



Shoulder & Elbow Service, University of Washington Department of Orthopaedics and Sports Medicine

You are encouraged to spend some time looking at the following posts listed on our blog:

<http://shoulderarthritis.blogspot.com>

[Shoulder arthritis consultation for those who live away from Seattle](#)

[From what cities do our patients come?](#)

[The Shoulder Arthritis Book](#)

[X-rays for arthritis](#)

[Should I have a Ream and Run or a Total Shoulder](#)

[Ream and Run – state of the art](#)

[Rehab tips from super stars](#)

[Preventing and managing a stiff shoulder after joint replacement](#)

[Cautions about rehabilitation after arthroplasty](#)

[The Rotator Cuff Tear Book](#)

[Pre surgery safety checklist.](#)