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Shoulder Replacement and the Rehabilitation that Follows

Shoulder replacement surgery began in the United States in the 1950s. Initially, it was used as treatment for severe shoulder fractures, but over the years, the surgery has been used successfully to treat other painful conditions of the shoulder, such as osteoarthritis and rheumatoid arthritis.

The shoulder is a ball-and-socket joint that enables you to raise, twist, bend, and rotate your arm through a greater range of motion than any other joint in the body. In a normal shoulder (Fig. 1), the rounded end of the upper arm bone (head of the humerus) glides against the small dish-like

socket (glenoid) in the shoulder blade (scapula). The joint surfaces are normally covered with smooth cartilage and the surrounding muscles and tendons provide stability and support for the joint while it's in motion. Unfortunately, osteoarthritis can lead to cartilage deterioration that results in pain and difficulty with moving your arm.

Risk factors

Osteoarthritis, or wear-and-tear arthritis, often affects older individuals, and it is a major reason a patient needs shoulder replacement surgery. As the cartilage wears over



time, the shoulder joint slowly becomes stiff and painful. Unfortunately, there is no way to prevent the development of osteoarthritis.

If you have osteoarthritis, you can have loss of cartilage in the joint space and flattening or irregularity in the shape of the bone (Fig. 2, pg. 2). You can have bone spurs and loose pieces of bone and cartilage that float inside the joint. In severe cases, bone-on-bone arthritis can lead to erosion, or wearing away, of the bone. All these conditions cause pain and inflammation.

Symptoms

Patients with arthritis typically describe a deep ache within the shoulder joint. Initially, the pain feels worse with movement and activity and eases with rest. As the arthritis progresses, the pain can occur even when you rest. By the time you see your physician, you often have pain at night that is severe enough to prevent a good night's sleep. Your shoulder can make a grinding or grating noise when moved. Or the shoulder can catch, grab, or lock up. Over time, you may notice loss of motion and weakness in the affected shoulder. Simple daily activities like reaching into a cupboard, dressing, toileting, and washing the opposite armpit can become increasingly difficult.

Fig. 2. Often in an arthritic shoulder, the cartilage and glenoid have worn away, exposing bone and the humeral head is irregular in shape.



Nonsurgical treatment

Treatment of an arthritic shoulder starts with rest, exercise, and taking arthritis medications. Resting the shoulder and applying moist heat can ease mild pain. After strenuous activity, an ice pack can be more effective at decreasing pain and swelling. Physical therapy can be helpful when arthritis is in its early stages. Physical therapy can help maintain joint motion and strengthen the shoulder muscles. However, physical therapy is less effective when the arthritis has advanced to the point that bone rubs on bone. When this is the case, physical therapy can make the shoulder hurt more. Arthritis medications, called nonsteroidal anti-inflammatories (NSAIDs), can control arthritis pain. Certain NSAIDs can be purchased overthe-counter, while others require a prescription. Periodic cortisone injections into the shoulder joint can provide temporary pain relief, as well. After all of these attempts have failed, it may be time to talk to your orthopaedic surgeon about shoulder replacement.

Surgical treatment

You may require a preoperative health screening examination to ensure you are healthy enough for surgery and to determine if any further testing is needed. Shoulder replacement surgery can last about 2 hours. The incision for the surgery is along the front of the shoulder joint and usually about 4 to 6 inches long. The surgery is most commonly done under general anesthesia. As always, risks of surgery include risks of general anesthesia, which tend to be dependent on other medical problems you may have. Hospital stays vary from 1 to 3 days for most patients.

Rehabilitation

A careful, well-planned rehabilitation program is critical to the success of your shoulder replacement surgery. Most patients begin some motion immediately after surgery, but this is not true in every case. A physical therapist, under the direction of your surgeon, can begin gentle exercises on the day of your surgery or the day after surgery. Often, with these first movements, you need only to relax and let the therapist move your

elbow, wrist, and hand.

You will be sent home wearing a sling and you should not attempt to use your arm except as specifically instructed by your doctor. Rehabilitation continues after you leave the hospital until you gain function, strength, and endurance in your shoulder. The total rehabilitation program can take several months.

Most patients are able to perform simple activities such as eating, dressing, and grooming within 2 weeks after surgery. For the first 6 weeks, you will not lift anything that weighs more than a few ounces, and movement using your shoulder muscles will be substantially limited.

The therapist will guide you and advance your exercises as you progress. Your therapist may show you and a family member a few simple exercises that you can do at home.

After 6 weeks and depending on your progress, you can begin exercising and stretching the shoulder muscles during therapy. Your therapist can also begin more vigorous stretching of the soft tissues around the shoulder. Often within 2 to 3 months after surgery, you can return to your normal activities and your rehabilitation will focus on strengthening your muscles around your shoulder and maintaining your range of motion.

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Therapy by Certified Hand Therapists

Problems relating to shoulder, elbow, wrist, and hand injuries greatly affect the way an individual functions in everyday activities. Rehabilitation focuses not only on restoring range of motion and strength, but also on helping patients return to activities that are meaningful to them. Many rehabilitation facilities have specially trained therapists who address the unique needs of patients with upper extremity injuries and dysfunction. For patients, from homemakers to heavy laborers, the goal is to restore function and promote increased participation in all aspects of an individual's life after an injury or surgical treatment.

What do certified hand therapists do?

Occupational therapists and physical therapists certified by the Hand Therapy Commission bear the credentials CHT (certified hand therapist). These clinicians have additional training and experience in the latest surgical procedures and techniques in rehabilitation of the upper limb that allows them to effectively treat the complexities of upper extremity injuries and diseases. Certified hand therapists are dedicated to the restoration of function and the implementation of compassionate, individualized therapy.

The focus in this area includes but is not limited to, broken bones of the arm, elbow, wrist, and hand as well as treatment of injuries to soft tissue, tendons, nerves, and ligaments. Other areas of focus include rehabilitation of repetitive strain injuries and wound care as well as treatments following surgery. Certified hand therapists also specialize in the fabrication of custom braces used to maximize functional outcomes and protect surgical procedures throughout the healing process.

One example of this rehabilitation process is the recent case of an individual who suffered a devastating injury to his dominant arm. my entire career relies on the ability to use my hands. I lost that ability in an instant when I broke my arm and suffered a nerve injury while working out at the gym. I could no longer open my right hand and I knew that meant one thing-the

end of my

"As a facial plastic surgeon,



surgical career. It was, in a word, devastating. I began undergoing hand therapy 3 times a week. My therapist was patient, optimistic, and did not allow me to wallow in self pity. She was gentle and empathetic, but most importantly, she pushed me when I needed to be pushed. After 6 months of hard work, I am delighted to say that I have regained the function in my right hand and I am ready to go back to work as a facial plastic surgeon. As a physician, I truly appreciate the professional and compassionate care I received at The Hughston Clinic."

– Andrew Burchard, MD

A team approach

Dr. Burchard persevered beyond his potentially lifechanging incident with hard work and the help of his specially trained therapist. Patient participation is key in the recovery of any injury. Patients who are willing and able to give full effort and attention to their rehabilitation program are the patients who typically maximize their recovery with fewer complications. Although, certified hand therapists are highly trained and experienced, the best treatments available are only as good as the input of the physician and the patient as well as the therapist.

A team approach provides complete treatment planning and increased patient satisfaction. Certified hand therapists empower the patient by engaging them in all aspects of their treatment from planning to implementation. These clinicians are proud of their commitment and experience in providing patients the highest level of professionalism and quality of care.

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Photos provided by Andrew Burchard, MD ©2010

In the Locker Room REHABILITATION FOR YOUR ANKLE SPRAIN

Injuries to the ankle are common in sports and physical activity, but you can injure your ankle during an activity as simple as walking around your house. The most common ankle injury in sports, an ankle sprain, is caused by the stretching or tearing of a ligament in your ankle. Without proper rehabilitation, a sprained ankle may not regain its full strength, and, even if it completely heals, your ankle may be prone to sprains in the future.

An ankle sprain is classified as lateral or medial. The lateral, or inversion, sprain involves the ligaments on the outside of your ankle, and it occurs when the bottom of your foot rolls inward causing your ankle to roll outward (Fig. 1). A medial, or eversion, sprain is an injury to the inside ligament of your ankle, and it occurs when the bottom of your foot rolls outward causing your ankle to roll inward (Fig. 2). A medial sprain rarely occurs because the deltoid ligament is large and strong and is less prone to stretch or tear. Although these sprain injuries are different, they can be rehabilitated using a similar exercise program.

The severity of your injury dictates the starting point of your rehabilitation program, and how you progress dictates how the program will continue. Every person and injury offers different challenges, and one rehabilitation program cannot be appropriate for all. You may need to discontinue an exercise, perform fewer repetitions, reduce your exercise time, or continue at the same level for some time before progressing to the next step. No matter how you are progressing, you should always ice your ankle after finishing the exercises.

Fig. 1. Lateral or inversion ankle sprain.



Fig. 2. Medial or eversion ankle sprain.





Day 1 and Day 2

For the first 2 days after an ankle sprain, ice your ankle for 20 minutes every 2 hours to help reduce pain and inflammation. On the 2nd day, try to gently move your ankle. Sit on a table and rotate your ankle in slow circles. Write the alphabet with your foot, using your ankle as the pivot point. Start gently stretching your ankle by doing calf stretches for 2 minutes total. You can try to kneel and sit on your ankles. If that is too painful, wait a little longer for that. If available, use a BAPS board (Biomechanical Ankle Platform System) to improve your range of motion. A BAPS board is a round, thick piece of plastic that has half balls of different sizes on the bottom allowing it to pivot and swivel. To use the BAPS board, sit down, and slowly move your ankle around and back and forth. You can make your own BAPS board by putting a solid, flat object (a hardback book or clipboard) on top of a tennis ball, and sitting in a chair and using that to help rotate your ankle. Do not put your weight on the BAPS board because it is not stable. It is only used for range of motion while you are sitting down. After performing the exercises, apply ice for 20 minutes.

Day 3 to Day 4

Depending on your pain and swelling, you can start doing 4-way ankle exercises. Sit on a table with your leg hanging off to about mid calf. Use a green Thera-Band®, which is a wide, thin strip of rubber banding. Hook the ball of your foot into the Thera-Band®, apply some resistance, and move your ankle against the resistance. Press the ball of your foot downwards like pressing the accelerator pedal of a car, and then pull the ball of your foot back up toward your knee. Next, using your ankle, rotate your foot toward the other leg. Then move your foot toward the outside by rotating your foot at the ankle away from the other leg. When moving toward the inside or outside, move your foot with your ankle as the pivot point. When moving toward the outside, there should be no more than an inch or two of movement for most people. You may need someone to hold the Thera-Band® for you while you make the movements.

To perform towel scrunches, sit on a low stool or chair so that your knees are at a 90° angle. Lay a small handtowel or dishtowel flat on the ground. For the towel scrunch using your toes, have the heel of your foot off the towel and the ball of your foot and toes on it. Using your toes, try to gather the towel under the arch of your foot. The goal is to get the entire towel under the arch. If your arch is full before the towel is completely under it, you can pull some of the towel out from under your heel to make room.

For the towel scrunch using your foot, your foot should be on the towel with the length of the towel lying laterally to the side of your foot. Keeping your heel stationary, pivot at your ankle, and stretch your foot toward the end of the towel. Place your foot down and slide it back toward the other side of your foot, trying to gather the towel on the opposite side of your foot. In this exercise, your heel does not lift off the ground. Then do the same exercise in the opposite direction.

On the 4th day you can add the marble pick-up exercise. Use marbles, cotton balls, or small pieces of foam and a bowl to put them in. Sit on a stool or chair so that your knees are bent at a 90° angle. Scatter the marbles around where you are sitting. Use your toes to pick up the marbles and place them in the bowl. Ice when you are done.

Day 5 to Day 6

If you are progressing well, you can start the 5-cup pickup exercise. Use 5 lightweight paper or plastic cups that you can stack. Stand on one leg, holding the cups stacked up in 1 hand, then slowly squat down and place 1 cup on the floor, then stand back up, then squat down again, and place the 2nd cup, and stand up. Do this until all the cups are down, then go back and pick them up in the same fashion. If this is too painful, you can start out using both feet. Remember, your level of pain with the exercise lets you know when to progress. If you are having trouble with 1 exercise, it is important to modify it, change it, or back up until you are ready to progress. As you start to perform the harder exercises, it is even more important to remember to ice when you have finished.

Day 7 to Day 11

Depending on your progress, in the 2nd week, you can do the 5-cup pick-up standing on top of a large foam pad. You can also start standing with 1 foot on the ground and throwing a ball to someone or onto a tilted trampoline and catching it. You begin by having a ball tossed to the center of your body, then progress to throwing toward the outside so you have to reach for it. The exercise helps your ankle to relearn how to balance and respond to unexpected stresses from different directions.

Each athlete is different and every person's body responds to treatment in different ways. Some athletes can return to practice in 3 days, while others may need several weeks. Even if you return to practice, continue your rehabilitation because the exercises will help to strengthen the musculature of your ankle and reduce the risk of another ankle sprain.

Elizabeth	Sm	ith,	ATC
Columb	us,	Geo	orgia

REHAB FOR YOUR ANKLE				
Day	lce	Range of Motion	Ankle Exercises	
1	20 mins every 2 hrs			
2	20 mins every 2 hrs	Stretching 2 mins Ankle circles 1 to 2 mins Writing alphabet 1 to 2 mins BAPS board 2 to 4 mins		
3-4	20 mins after exercise	BAPS board 2 to 4 mins	4-way ankle exercise 2x15 reps Towel scrunch exercises 2 each toe & foot Marble pick-up 2x	
5-6	20 mins after exercise	BAPS board 2 to 4 mins	4-way ankle exercise 2x15 reps Towel scrunch exercises 2 each toe & foot Marble pick-up 2x 5-cup pick up 2x	
7-9	20 mins after exercise	BAPS board 2 to 4 mins	4-way ankle exercise 2x15 reps Towel scrunch exercises 2 each toe & foot Marble pick-up 2x 5-cup pick up 2x One-leg ball toss 5 mins	
9-11 The Hu	20 mins after exercise ughston Foundatio	BAPS board 2 to 4 mins on, Inc. ©2010	4-way ankle exercise 2x15 reps 5-cup pick up 2x One-leg ball toss 5 mins	

Rehabilitation for Disorders of the Kneecap

Patellofemoral dysfunction is a group of disorders that ranges from an abnormally positioned patella (kneecap) to a subluxating patella (partial dislocation) to a full dislocation of the patella. Subluxation or dislocation of the patella can be due to a traumatic injury or it can be a long-standing balanced pull on the patella. The physical therapy program progresses to standing and squatting activities as the patient's strength allows. When the patient's strength in the injured leg is approximately equal to that in the uninjured side, a return to running and a sports program can be initiated.

Chronic injury

Chronic, or long-standing, patellar subluxation can

disorder. Patellar subluxations and dislocations are usually treated nonoperatively with a patellar stabilizing brace, rest, and physical therapy to restore strength to the joint. Early treatment tends to minimize wear and tear on the joint, which can cause arthritis later in life.



Normal kneecap tracking

When the knee bends and straightens, the kneecap tracks, or slides up and down, in a groove called the trochlea on the end of the femur, or thighbone. Normally, soft tissues and muscles around the knee help to stabilize the kneecap allowing it to glide smoothly up and down (Fig. 1). However, if the muscles are weak or the soft tissues are loose, the kneecap can slide out of the femoral groove causing pain and swelling. For some patients, the improper tracking causes no problem, but for others, it can cause the kneecap to subluxate or dislocate (Fig. 2).

Acute injury

Acute, or traumatic, patellar subluxations and dislocations occur most often from a blow to the knee while the foot is planted. This trauma can sprain, or tear, one of the patellofemoral ligaments. Initially, physical therapy is aimed at controlling swelling with the use of ice, compression, and elevation of the injured knee. The patient is instructed in range-of-motion exercises to ensure full return of both flexion (bending) and extension (straightening).

Strengthening exercises for the lower extremity focus on the quadriceps muscle group with special attention to the medial quadriceps muscle (vastus medialis) for a subluxate by visual and hands-on determination of the patella's position relative to the femur, as well as its movement. The physical therapist assesses the tracking, or movement, of the patella as the knee is extended passively (straightened by the therapist) and actively (straightened by the patient). Normal tracking is described as a C-shape as the knee extends. J-tracking is defined as lateral (outward) movement of the patella as the knee straightens. If the patella is positioned laterally or tilted in its resting position or tracks laterally when the knee is passively extended, the physical therapist can perform mobilizations to stretch the lateral ligaments. Bracing or taping techniques can be used to keep the patella in a normal position during strengthening exercises.

If the patella is in a normal position during rest and passive tracking, active tracking is assessed. J-tracking during active extension indicates an imbalance in the pull of the quadriceps muscles, typically a weakness in the vastus medialis muscle. Although the vastus medialis cannot be isolated from the other quadriceps muscles, exercises will be designed to increase the activity and strength of the vastus medialis. Often, electrical stimulation and biofeedback are used for this purpose. Typically, "quad sets," an isolated contraction of the quadriceps, and straight leg raises have been the exercises of choice to strengthen the quadriceps. In cases of an extremely hypermobile patella or a very inactive or weak vastus medialis, quad sets may have to begin in a slightly flexed position. Positioning the knee in slight flexion provides more stability at the patellofemoral joint and blocks lateral movement of the patella when the quadriceps contracts. Also, knee extension from 90° to 45° engages the lateral and medial quadriceps in a more balanced manner, as well as providing stability from the bony structures. As the patient's strength improves, the physical therapy program will include standing movements, work simulation, and sport-specific movements to ensure the patient can perform all these movements with normal patellar tracking.

More recently, the concept of a relatively stationary patella with a rotating femur has been the subject of study

by physical therapists. When the muscles of the hip and pelvis are weak, the femur will internally rotate and adduct (move toward midline) beneath the patella during squatting or walking down stairs, placing the patella in a position that is too far lateral in its groove. In these cases, the physical therapy program will focus on strengthening the abductor and external rotator muscles of the hip to improve control over femoral rotation at the knee.

If physical therapy cannot correct painful patellar subluxation, surgery may be needed to correct the problem. Surgery can involve repair of damaged ligaments or realignment of the quadriceps muscles. Physical therapy is an important part of postoperative recovery and is designed to return the patient to full strength and function.

> Kim Hargrove, PT Columbus, Georgia

Rehabilitation for Low Back Pain

If you have low back pain, your physician may prescribe rehabilitation as an effective nonsurgical treatment plan. Often, your pain can be reduced or eliminated with physical therapy, or rehabilitation, and lifestyle changes, such as smoking cessation, and losing weight. If your pain is not a medical emergency, your doctor can prescribe a physician-supervised program of physical therapy that is designed to increase your muscle strength in the back and abdomen and increase your range of motion in the spine.

Core muscles

The core muscles that stabilize and control movement of the lumbar spine and pelvis comprise the extensor muscles, the pelvic muscles, the abdominal muscles, and the hip muscles. These muscles wrap around the lower trunk and pelvis like a built-in back brace. Not only do the core muscles need to be strong enough to stabilize the lower spine and pelvis, but they also need to be balanced with each other for the spine to move with normal mechanics. Often, strengthening and balancing this muscle group can be an important part of your rehabilitation plan.

Before starting physical therapy

Before starting physical therapy, your therapist will ask you questions regarding your symptoms such as the location, type, and frequency of your pain and what positions or activities alleviate or aggravate your symptoms. Your therapist will also ask you about your activity level and any functional limitations due to your pain. At your first visit, your physical therapist will also perform a comprehensive physical evaluation based on your individual needs. Wear comfortable clothing that does not restrict your movement and wear comfortable shoes, such as sneakers or tennis shoes. The evaluation can include an assessment of your gait, range of motion, and strength. Your treatment plan is developed based on a combination of the information your therapist gains from the evaluation, as well as any additional information provided in future visits. The treatment plan can include, but is not limited to, manual therapy, exercises, stretches, traction, modalities (such as electrical stimulation or ultrasound), or anything else your therapist deems appropriate for you. Your therapist works with you to get you back to the highest, safest level of functioning as soon as possible.

After a few months, physical therapy can help strengthen the muscles that support your lower back. If you have stopped smoking, lost weight, and are continuing your exercises, but still have pain, you should talk to your orthopaedist about other options, such as epidural injections or surgery.

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