Cartilage Tears

There are two types of cartilage in the knee:

1. MENISCUS CARTILAGES are two C-shaped cushions in your knee which function to absorb shock. Meniscus cartilage tears in young people usually occur as a result of a fairly severe knee injury. As people age, the meniscus cartilage weakens and can tear with much less force. With people over age 30, cartilage tears can occur *without* any known injury. The symptoms of a meniscus cartilage tear are:
    - Swelling of the knee
    - Joint line tenderness
    - Sensation of catching, popping, or snapping in the knee with locking being the most severe symptom
    - Difficulty with squatting or the "duck walk"
    - Pain and/or catching with rotation and flexion of the knee (McMurray's test, Apley's test)
    - Activity related pain – the more *active* you are the more severe is the knee pain and swelling. The more *rested* the knee is, the less knee pain and swelling.
2. ARTICULAR CARTILAGE is the pearly white covering of the end of bones which provide nearly frictionless gliding of your knee joint surfaces with knee movement. Tears of articular cartilage occur commonly. Injuries to the articular cartilage can cause cartilage softening, surface fraying, surface tears, cartilage flaps, and cartilage delamination. The symptoms of an articular cartilage injury are about the same as for meniscus cartilage injuries.

X-rays of the knee are used to look for broken bones, abnormal bone structures, and arthritis changes. Cartilage injuries are *not* seen with standard x-rays.

An MRI scan of the knee can be helpful if your pattern of symptoms is not conclusive for a cartilage injury. MRI scans do not identify all cartilage tears. Articular cartilage injuries are the most difficult to see on MRI. Small meniscal cartilage tears are also not seen well on MRI scans. MRI scans of meniscus cartilage are often abnormal even without symptoms or injury after age 50 due to the natural degenerative process of aging.

Only about 20% of meniscus cartilage tears are repairable. Likewise, articular cartilage injuries have very limited ability to repair themselves when injured. Some meniscus and articular cartilage injuries can heal without surgical treatment. Usually if healing is going to occur, the pain will be markedly decreased by 6 to 8 weeks after the injury. Cartilage injuries which can HEAL include: non-catching, small (less than 1 cm), stable, peripheral (vascular) meniscus tears with significant bleeding into the joint. Cartilage tears UNLIKELY to heal include: catching, large (over 1 cm), unstable tears of cartilage in central (avascular) portion of the meniscus, in an unstable (ACL deficient) knee. Cartilage tears associated with *locking* is least likely to heal without treatment.

Walking on the leg is generally not harmful with a cartilage tear. The results of urgent surgery and delayed surgery for cartilage injuries are very similar.

Non-surgical treatment for a meniscus or articular cartilage injury is:

- Activity restrictions (no squatting or sports that involve significant knee flexion). Symptoms typically increase as your amount of activity increases, and decrease with periods of rest.
- Anti-inflammatory medicine (Advil, Motrin, ibuprofen, Aleve, aspirin, Celebrex). These medicines should be taken with food. Celebrex is best if you have a sensitive stomach or history of ulcers.
- Neoprene or elastic knee sleeve. The more swelling you have, the more you will notice an improvement with wearing the sleeve. The sleeve works by physically pushing the fluid out from around your knee.

Surgical treatment for a meniscus or articular cartilage injury:

- Arthroscopy (arthro-"joint" and scope-"look into") is a common procedure used to look into your knee joint through tiny skin wounds. Diagnosis is made by directly viewing the knee pathology. Treatment or repair of injured cartilage is performed using small pencil sized instruments with a fiber optic camera and TV monitor
- Meniscus repair is done using specialized instruments, absorbable tacks (meniscal arrows), or suturing devices. Repair is done if there is reasonable potential for the cartilage to heal. Generally, only tears in the outer 1/3 of the meniscus have enough blood supply for healing to occur. Repair is done in younger patients to decrease the risk of future knee degenerative arthrosis. Most meniscus cartilage repairs are done in the setting of ligament reconstructions. If a ligament reconstruction is not done, inducing bleeding into the knee can sometimes be used to increase the chances that a borderline meniscus cartilage repair may heal. If the cartilage does not heal, removal of the torn cartilage may be required at a later date. Only about 20% of meniscus cartilage tears can be successfully repaired.
- If the meniscus cartilage is not felt to be repairable, partial meniscus removal (torn portion) results in the most predictable improvement in your knee symptoms. Removal of the torn portion of meniscus is done with a fine motorized shaving instrument or with fine hand meniscus cutting instruments. Articular cartilage flap removal or shaving is done to smooth out rough surfaces on the joint surface.

DEGENERATIVE ARTHROSIS develops along two pathways:

- Slow wear of articular cartilage (microscopic) is similar to the balding of your car tires as they increase their mileage. With aging, the tendency toward joint surface wear exceeds the rate of your body's rate of repair. Progressive arthrosis is typically very slow with this type. Arthrosis typically begins with softening,

followed by fraying, then fissuring (deep splits), and finally wearing down to bone. With slow wear, x-ray changes over time typically occur over a period of several years.

- Rapid wear or delamination of articular cartilage (chunks) is similar to pot-hole development on an asphalt road. Rather than a slow progression of stages, de-lamination involves loss of joint surface cartilage in large sheets or visible fragments. Like with pot-holes, blebs develop on the articular surface. Over time, the blebs rupture. Flaps develop when the blebs rupture partially without complete detachment. Craters develop when the blebs separate completely from the joint surface. Partial thickness delaminations leave craters with some joint surface cartilage remaining in the depth of the crater. Full thickness delaminations leave exposed bone in the depth of the crater. When large areas of exposed bone exist on the knee surfaces, knee replacement surgery may be needed.

The most common reason for failure to improve with arthroscopy of a meniscus or articular cartilage injury is due to degenerative arthrosis. Usually, even if significant arthrosis is present, symptoms can be improved with arthroscopic treatment. Arthroscopy can be used to treat many knee problems, but we are not yet able to reverse the effects of aging.

The more mechanical (catching and popping) the symptoms, the more likely arthroscopy is to decrease your symptoms. Risks are small with arthroscopy. Infection or blood clots can occasionally occur. General anesthesia is usually needed, although spinal or local anesthesia can be used.

You will go home the same day (outpatient) of the procedure. Numbing medicine injected into the knee helps control the pain for about 8 to 12 hours after surgery. Physical therapy begins the day of surgery and exercises are continued until normal strength is obtained. Most people need crutches for 3 to 5 days. Most people can return to sitting work within 48 hours. Alternate sitting and standing work can generally be resumed in 1 to 2 weeks. Full time standing work generally requires about 2 to 3 weeks. Squatting and climbing may require 2 to 3 months or more to return to these activities. A knee sleeve is worn for 4 to 8 weeks after surgery to help control swelling. In the absence of degenerative arthrosis, good or excellent results will occur in over 90% of patients with arthroscopic treatment of isolated meniscus cartilage tears. Less predictable results occur with arthroscopic treatment of articular cartilage injuries. Return to work and sports is much slower after knee arthroscopy in the setting of degenerative arthrosis.

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Rotator Cuff Problems

Rotator cuff problems are the most common source of shoulder pain. Rotator cuff disease commonly begins between the ages of 20 and 40. Pain from rotator cuff disease begins later, usually between the ages of 35 and 60. There are two main causes of rotator cuff disease. First, *degeneration* of the tendon leads to thickening of the rotator cuff. The tendon weakens as a result of this degeneration. The second cause is *impingement*. Impingement is the mechanical compression of the rotator cuff between the bones of the shoulder especially with overhead activities.

Over time, the degeneration leads to a weaker tendon which is more prone to injury. The thickening of the rotator cuff leads to less room available for the cuff. This results in more intense pinching of the rotator cuff. Over time, tears develop within the cuff substance. Rotator cuff tendon tears generally occur between the ages of 40 and 80. With injuries or continued impingement, the tears progressively enlarge resulting in increasing pain and weakness. Factors that worsen rotator cuff pain include: injuries, overuse, tightness of the posterior shoulder capsule, weakness of shoulder muscles, excessive laxity of the anterior shoulder joint capsule, or inappropriate lifting or throwing techniques.

NON-SURGICAL TREATMENT of rotator cuff pain involves:

- **Rest** – particularly from overhead activities. Time is necessary for the inflammation to cool down.
- **Ice** – cold decreases inflammation and decreases pain. Heat may help decrease the pain.
- **Medicines** – Aspirin, Advil (ibuprofen), Aleve (naproxen), and Orudis can decrease pain and stiffness. Avoid these medicines if you have kidney disease or a sensitive stomach.
- **Stretching exercises** - especially for the posterior shoulder capsule (cross-body stretch and internal rotation stretch)
- **Strengthening exercises** – rotator cuff strengthening improves shoulder stability and decreases the risk of further injury to the tendons. Care must be taken to avoid the impingement positions with the exercises. Start with 3 to 5 pound weights and build up to as much as 10 pounds. Theraband stretchable tubing can also be used for shoulder strengthening.
- **Cortisone/anesthetic injections** – are the most helpful when symptoms are too severe to allow performance of rotator cuff exercises. These injections usually contain two medicines. The *numbing medicine* (lidocaine) gives significant diagnostic information. The *cortisone* (Kenalog/Celestone) cools down inflammation. Repeated cortisone injections can be harmful to the rotator cuff tendons and can interfere with rotator cuff healing.

SURGICAL TREATMENT is needed usually when other methods of treatment (medications, injections and therapy) have not been successful. All rotator cuff tears do not need surgery, but healing of the rotator cuff will not normally occur without surgical repair. Pain from rotator cuff tears can increase or decrease over time. The weakness from a rotator cuff tear will not improve without surgical repair. Surgery results in a normally predictable decrease in rotator cuff pain, increase in shoulder strength, and improvement in motion in over 80% of cases. In some situations, good or excellent relief of symptoms can occur in over 95% of cases with surgical treatment.

Surgical treatment of rotator cuff tears usually results in better pain relief and greater return of strength than non-surgical treatment. Surgical procedures can be arthroscopic or through traditional surgical incisions. Large rotator cuff tears are better repaired through traditional incisions. Arthroscopic procedures may result in less pain after surgery and more rapid return of function in some cases. Degenerative arthrosis of the acromioclavicular (AC) joint commonly occurs in the setting of rotator cuff disease and surgical removal of the end of the collar bone may be necessary to relieve your shoulder pain. Surgery for rotator cuff disease is done either as an outpatient or with a 23 hour stay in the hospital. A sling is used for 1-3 weeks post-operatively. Exercises for the shoulder are begun immediately to prevent stiffness. If a large rotator cuff tear is repaired, lifting your hand overhead is avoided for 6 weeks. Strengthening exercises are begun at 3 months after repair. When a decompression operation alone (without rotator cuff repair) is performed, the rehabilitation is much more rapid. Return to overhead activities is avoided for 4 months with cuff repair. Sometimes permanent restrictions for overhead activities may be necessary. Remember, the rotator cuff that tears is frequently degenerated. Occasionally, the rotator cuff is so degenerated and atrophied that a good repair may not be possible.

ARTHROSCOPY is the use of small fiber optic cameras and special small instruments to perform surgery on your shoulder through tiny incisions. Arthroscopy allows better understanding of the severity and complexity of disease in your shoulder. Some small rotator cuff tears can be treated solely with arthroscopic methods. Shaving away bone pinching the rotator cuff or treating arthrosis of the AC joint can frequently be done arthroscopically. Arthroscopic methods can result in less pain and faster rehabilitation. Long term results from some types of arthroscopic surgery can be inferior to conventional rotator cuff procedures.

ROTATOR CUFF REPAIR is usually recommended for all large rotator cuff tears. Large rotator cuff tears are always associated with weakness and usually are associated with loss of motion. Shaving impinging bone (acromioplasty) is almost always necessary when a repair of the rotator cuff is performed. Rotator cuff repair typically results in improved strength and decreased pain by improving how the ball (humerus) rotates in the socket (glenoid). Re-tears of rotator cuff may occur due to the frequently degenerative nature of the cuff tissue. The risk of re-tear increases with the size of the rotator cuff tear. Pain free overhead activity does not always return with rotator cuff repair. Exercises for the shoulder begin immediately after cuff repair. Gentle below shoulder activities can begin at that time. Active elevation of your hand above the head is usually avoided for 2 months. Strengthening (resistive) exercises can safely begin at 3 months from your surgery.

ACROMIOPLASTY is the surgical removal of bone, spurs, and soft tissue which obstructs normal movement of the rotator cuff. Impingement is the pinching of the

rotator cuff between bony surfaces that occurs primarily with overhead activities. Impingement is not always painful. With time, impingement can lead to wear and even tearing of the rotator cuff. Removal of the pinching bone is believed to prevent the development of rotator cuff tears. With increasing age, the rotator cuff frequently begins to thicken as part of a degenerative process. The thickened rotator cuff is then more vulnerable to pinching with overhead activities. Removing the pinching bone and soft tissues usually results in a marked improvement in pain particularly with overhead activities.

DISTAL CLAVICLE RESECTIONis needed when degeneration of the acromioclavicular (AC) joint contributes to pain in the shoulder. Bone spurs and thickened soft tissue from the inflamed AC joint are another common source of pinching of the rotator cuff. The inflamed AC joint sometimes is the primary source of pain in the shoulder. Surgical treatment of AC joint pain usually involves removal of the outer 5mm to 15mm of the outer end of the collar bone. This procedure is commonly combined with surgical treatment of the rotator cuff.

After rotator cuff surgery, sutures are removed in about 8 to 10 days. Gentle pendulum exercises are usually begun the day after the surgery. Formal physical therapy usually begins about three weeks after rotator cuff repair. Overhead activities are usually avoided for approximately 3 to 4 months.

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