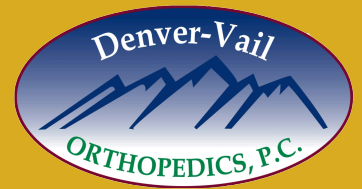
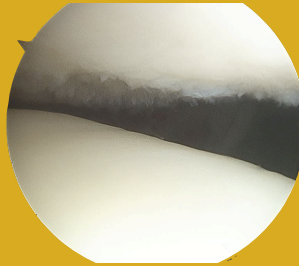
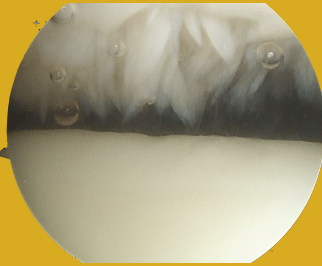


# Chondromalacia Patella



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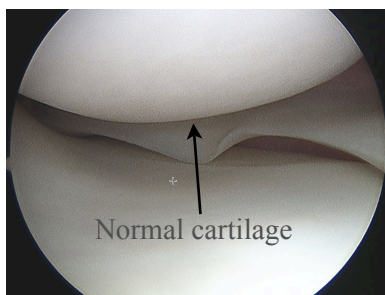
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## Chondromalacia Patella

Chondro means cartilage and malacia means softening. This article discusses a very common problem in which the cartilage on the joint surface of the kneecap (patella) starts to deteriorate and causes pain along the front of the knee.

### Articular Cartilage

Covering the surface of bone in all joints is articular cartilage. Articular cartilage is smooth white and glistening. This type of cartilage is very specialized and has several functions. One of the most important functions is force distribution. If a load is placed on the joint the cartilage spreads the load out



so that it is distributed over a large surface area. This protects the bone and makes it so that the underlying bone is not subjected to large forces.

Normal cartilage also is very smooth and slippery. A joint is able to bend and straighten with very little resistance because of the low coefficient of friction of articular cartilage which is less than that of ice. Lastly the shape of the bone and cartilage surface provides stability to the joint.

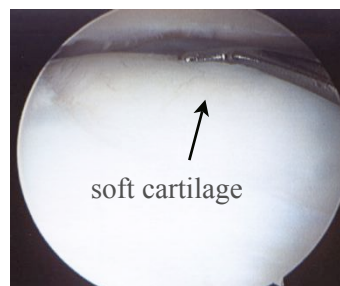
### Composition

The composition of articular cartilage is very complex and is made up of collagen (protein in skin and nails), water and various other proteins. These

proteins and water are in a compressed state and because of this balance are able to resist load. When a load is placed on the joint the cartilage surface will compress and the water and protein will be pushed closer together. Water and protein have opposite charges (positive and negative) and repel each other as they are compressed and therefore resist load. The load is also spread out over a large area to dissipate the force. This is the way that articular cartilage is able to decrease the load on the underlying bone and protect it.

### Damage

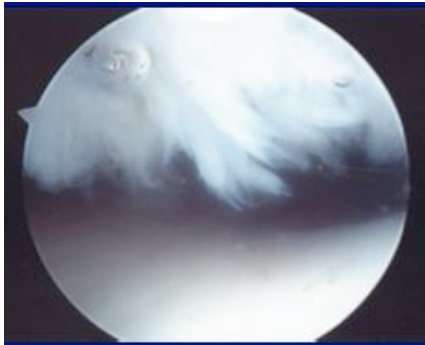
Articular cartilage likes to see load in a certain



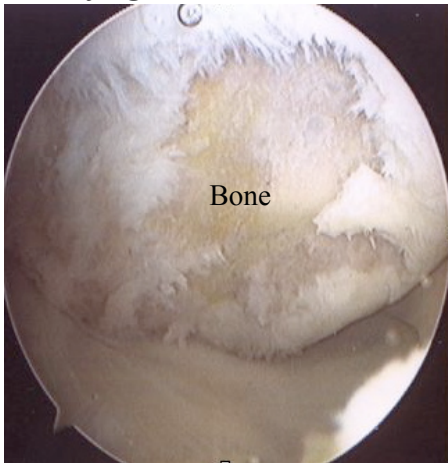
range. It can be damaged if a large acute load is applied or it can be damaged if a smaller repetitive load is applied. One of the first changes that occurs when the cartilage is damaged is that it will

lose some of its proteins. This will change the biomechanical properties and make it softer and less able to resist load. As the process progresses the

cartilage is less able to resist load and a vicious cycle occurs, the cartilage continues to soften and at some point it begins to crack (fissure) and fibrillate.



This is what is commonly referred to as chondromalacia. Overtime the cartilage will begin to delaminate and expose the underlying bone.



This is what arthritis is.

## Patella

The patella is also known as the kneecap. It is a large bone that sits on the front part of the knee. Its function is to improve the biomechanical properties of the quadriceps muscle (muscle on the front of the thigh). This bone increases the lever arm of the quad and improves its strength by 20 to 30%. The articular cartilage on the patellar is the thickest in the

body and is 4 to 6 millimeters thick (1/4 inch). The cartilage on the patella is susceptible to softening, fibrillation and delamination. When this occurs it is called chondromalacia patella.

## Symptoms of Chondromalacia Patella

Symptoms of chondromalacia include pain, crepitus (popping and cracking), decreased function and occasionally swelling. Pain is the most common symptom and is what usually causes people to see their physician. The pain is localized in the anterior aspect of the knee. Activities such as running, jumping, stairs, hiking, squats and lunges will exacerbate the condition. People will also notice that sitting in one position for a period of time (driving, riding in a plane or a car) will also bring on their symptoms.

On physical exam the knee may be swollen and have fluid in it. Frequently small pieces of cartilage can flake off and this can cause the knee to form fluid and swell. This may cause pain especially when the knee is straightened or flexed (bent). The knee may also pop and click and sound similar to Rice Krispies. This is usually heard when straightening the knee, or descending or ascending stairs.

Radiographs (xrays) may be normal or may show some tilt of the patella or narrowing of the joint surface. An MRI is much

better visualizing articular cartilage and will note any fissures or thinning.

## Treatment of Chondromalacia Patella

The treatment of this problem is usually non-operative and includes; weight loss, medication, activity modifications, softer soled shoes, physical therapy and occasionally injections. If these modalities are unsuccessful then surgery is an option. The goal of treatment is to improve pain and improve function. None of these options will change the underlying wear and there is nothing at this point that will re-grow cartilage.

The patella helps to improve the biomechanics of the quad muscle. In studies that have been done it has been noted that each additional pound that is carried translates to 4 additional pounds to the patellar load. The converse to that statement is that if one pound is lost that decreases the pressure on the patella by 4 lbs. That is why weight loss is very important, if one can reduce their weight by 10 lbs. this takes 40 lbs off the patella. It is also important to remember that if one carries 20 lbs. (child or backpack) this adds 80 lbs. to the load on the knee.

Wearing softer soled shoes can also improve symptoms. Hard soled shoes do not dissipate any of the force of walking and that load is transmitted up into the knee. A

softer soled shoe or an insert will help absorb some of the load and decrease the forces on the knee.

Medications are also helpful in alleviating pain. Acetaminophen (Tylenol) is a good analgesic (pain reliever) and may decrease symptoms. Although overall it is a safe drug if taken for an extended period or at a greater than recommended dose it can cause damage to the liver. If you have a liver disorder you should consult your primary care physician before taking it. Non-steroidal anti-inflammatories can also be beneficial. These medications reduce pain by reducing inflammation. Usually it will take 10 to 14 days before they reach a steady level and work as an anti-inflammatory, initially they act as an analgesic. Common over the counter products include Advil, Motrin, (generic is Ibuprofen) and the other is Alleve (generic Naprosyn). These medications are generally safe but as with all drugs do have side effects. The most common side effect is nausea, while the more serious side effects include ulceration, increase in blood pressure and heart problems. If any blood is noted in your stool or the stool is black this may be a sign of an ulcer and the medication should be stopped and a physician consulted.

There are certain activities that will exacerbate symptoms. These activities are ones that will increase the load on the patella and include: high impact (jumping, running), deep squats,

lunges, stairs, hiking (up and down hills) and weight lifting. It is best to stick with exercises that are more “kneecap friendly” which include low impact activities such as bike, elliptical, swimming, and walking on level surfaces. Strengthening is important and exercises that put less pressure on the kneecap are: leg presses and mini squats (0-60 degrees), hamstring curls and hip abductor exercises. Avoid leg extension exercises as these increase the load on the knee significantly.

Injections with steroids or with lubricants are also helpful. Steroids are powerful anti-inflammatories and can help when the knee becomes acutely painful. A longer term solution is injecting the knee with hyaluronans (lubricant) which can have a beneficial effect for 4 to 8 months.

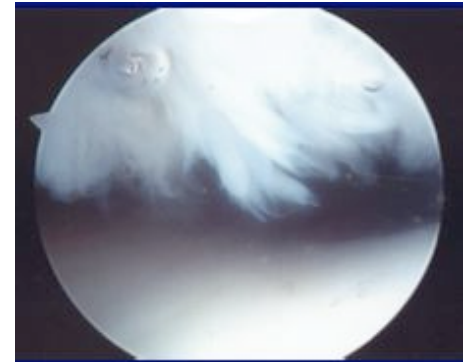
Physical therapy is usually included in the treatment of this problem. A therapist can assist one with an exercise program that will be the most beneficial. They will concentrate on the tracking of the patella, the synergy and balance of the muscles as well as flexibility and CORE strengthening.

## **Surgery**

If all these other modalities are unsuccessful then surgery is an option. The surgical procedure is an arthroscopic procedure. The goal of the procedure is to improve pain, however it does nothing to change the underlying disease. The wear of the cartilage

is still there and will still progress over time.

When the cartilage wears it starts to fissure and fibrillate and looks like a shag carpet.



The goal of surgery is to smooth down the joint surface and this will usually improve ones pain.



Usually with this procedure 70 to 80 percent of people will note improvement in their pain and function. Occasionally if the patella is “off track” a release of the tissue around the kneecap will be done. If this is done swelling may be noted for up to 6 weeks after the surgery.

After surgery weight bearing is allowed and therapy is initiated to improve motion and strength.

If you have any questions about this or other knee problems please call Dr. David Oster’s office and make an appointment  
303-214-4500