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# **PILGRIM HOSPITAL**

Orthopaedic Department

## **OSTEOARTHRITIS: KNEE**

### **Patient Information**

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## Arthritis of the Knee

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There are three basic types of arthritis that may affect the knee joint.

### Osteoarthritis

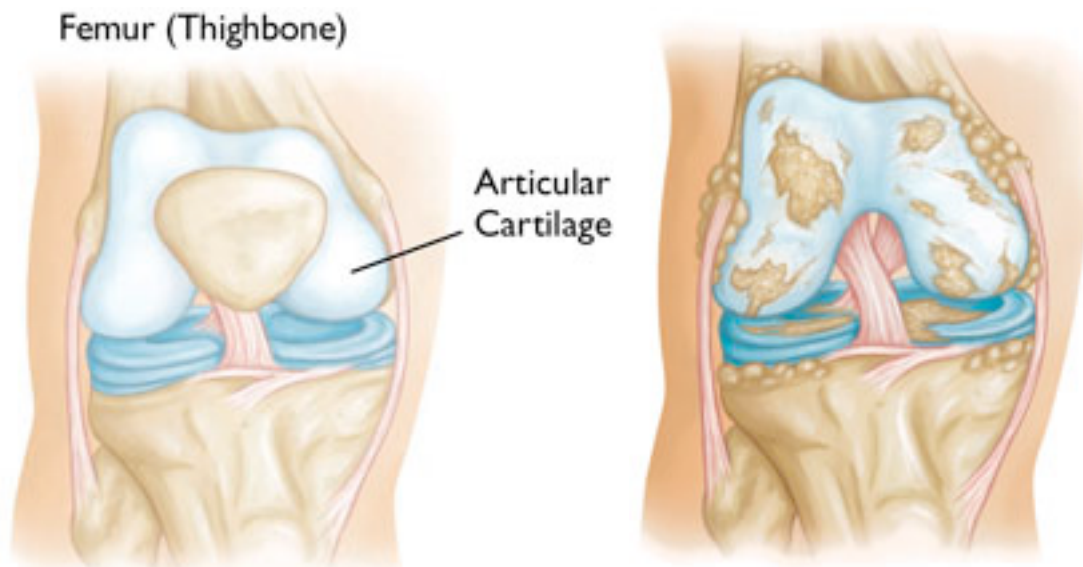
Osteoarthritis (OA) is the most common form of knee arthritis. OA is usually a slowly progressive degenerative disease in which the joint cartilage gradually wears away. It most often affects middle-aged and older people.

### Rheumatoid Arthritis

Rheumatoid arthritis (RA) is an inflammatory type of arthritis that can destroy the joint cartilage. RA can occur at any age. RA generally affects both knees.

### Post-traumatic Arthritis

Post-traumatic arthritis can develop after an injury to the knee. This type of arthritis is similar to osteoarthritis and may develop years after a fracture, ligament injury, or meniscus tear.



A healthy knee

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### Symptoms

An osteoarthritic knee

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Generally, the pain associated with arthritis develops gradually, although sudden onset is also possible.

The joint may become stiff and swollen, making it difficult to bend or straighten the knee.

Pain and swelling are worse in the morning or after a period of inactivity. Pain may also increase after activities such as walking, stair climbing, or kneeling.

The pain may often cause a feeling of weakness in the knee, resulting in a "locking" or "buckling."

Many people report that changes in the weather also affect the degree of pain from arthritis.

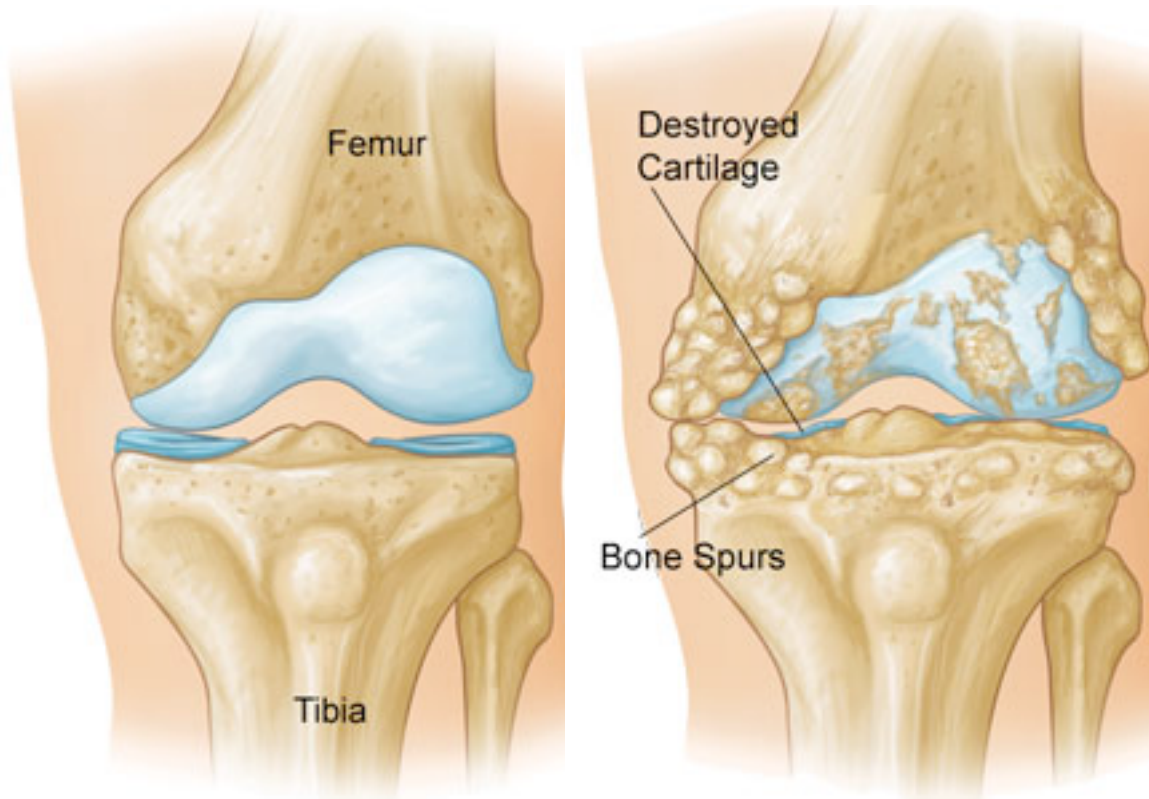
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## Doctor Examination

Your doctor will perform a physical examination that focuses on your walk, the range of motion in the limb, and joint swelling or tenderness.

X-rays typically show a loss of joint space in the affected knee.

Blood and other special imaging tests, such as magnetic resonance imaging (MRI) may be needed to diagnose rheumatoid arthritis.



Normal joint space between the femur and tibia.

Decreased joint space due to damaged cartilage and bone spurs.

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## Nonsurgical Treatment

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If you have osteoarthritis of the knee, you can take advantage of a wide range of treatment options. The effectiveness of different treatments varies from person to person. The choice of treatment should be a joint decision between you and your physician.

The purpose of treatment is to reduce pain, increase function and generally reduce your symptoms. Patient satisfaction is a fundamental goal in treating osteoarthritis of the knee

In its early stages, arthritis of the knee is treated with nonsurgical measures. Nonsurgical treatments fall into four major groups: lifestyle modifications; exercise; supportive devices; other methods.

### ***Lifestyle Modification***

Lifestyle modifications can include losing weight, switching from running or jumping exercises to swimming or cycling, and minimizing activities that aggravate the condition, such as climbing stairs. Many, but not all, people with osteoarthritis of the knee are overweight. Simple weight loss can reduce stress on weight bearing joints, such as the knee. Losing weight can result in reduced pain and increased function, particularly in walking.

### ***Exercise***

Exercises can help increase range of motion and flexibility as well as help strengthen the muscles in the leg. Physical therapy and exercise are often effective in reducing pain and improving function. Your physician or a physical therapist can help develop an individualized exercise program that meets your needs and lifestyle

### ***Supportive Devices***

Using supportive devices, such as a cane, wearing energy-absorbing shoes or inserts, or wearing a brace or knee sleeve can be helpful. Some research studies have focused on the use of knee braces for treatment of osteoarthritis of the knee. They may be especially helpful if the arthritis is centered on one side of the knee. A brace can assist with stability and function. There are two types of braces that are often used. An "unloader" brace shifts load away from the affected portion of the knee. A "support" brace helps support the entire knee load. In most studies, the knee symptoms improved, with a decrease in pain on weightbearing and a general ability to walk longer distances.

### ***Other Methods***

Other measures may include applications of heat or ice, water exercises, liniments or elastic bandages.

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## **Drug Treatment**

Several types of drugs can be used in treating arthritis of the knee. Because every patient is different, and because not all people respond the same to medications, your orthopaedic surgeon will develop a program for your specific condition.

Anti-inflammatory medications can include aspirin, acetaminophen or ibuprofen to help reduce swelling in the joint. Simple pain relievers such as Tylenol are available without a prescription and can be very effective in reducing pain. Pain relievers are usually the first choice of therapy for osteoarthritis of the knee. All drugs have potential side effects and simple analgesics are no exception. In addition, with time, your body can build up a tolerance, reducing the effects of the pain reliever. It is important to realize that these medications, although purchased over-the-counter, can also interact with other medications you are taking, such as blood-thinners. Be sure to discuss these issues with your orthopaedist or primary physician.

A more potent type of pain reliever is a nonsteroidal anti-inflammatory drug or NSAID. These drugs, which include brands such as Motrin, Advil and Aleve, are available in both over-the-counter and prescription forms. Like all pain relievers, NSAIDs can cause side effects including changes in kidney and liver function as well as a reduction in the ability of blood to clot. These effects are usually reversible when the medication is discontinued.

A COX-2 inhibitor is a special type of NSAID that is often prescribed if knee pain is moderate to severe. Common brand names of COX-2 inhibitors include Celebrex and Vioxx. It should be noted that Vioxx was recently withdrawn from the market by its manufacturer. COX-2 inhibitors reduce pain and inflammation so

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that you can function better. If you are taking a COX-2 inhibitor, you should not use a traditional NSAID (prescription or over-the-counter). Be sure to tell your doctor if you have had a heart attack, stroke, angina, blood clot or hypertension or if you are sensitive to aspirin, sulfa drugs or other NSAIDs.

COX-2 inhibitors can have side effects, including abdominal pain, nausea and indigestion. Antacids or a fatty meal can limit the body's ability to absorb and use COX-2 inhibitors, so do not take them together. These drugs are less irritating to the stomach than other NSAIDs, but abdominal bleeding can occur, sometimes without warning.

### **Glucosamine and Chondroitin**

Glucosamine and chondroitin (kon-dro'i-tin) sulfate are oral supplements that may relieve the pain of osteoarthritis. These are two large molecules that are found in the cartilage of our joints. Supplements sold over-the-counter are usually made from synthetic or animal products.

Glucosamine and/or chondroitin sulfate may be particularly helpful in the early stages of osteoarthritis of the knee, provided they are used as directed on package inserts and with caution. Although glucosamine and chondroitin sulfate are natural substances, sometimes classified as food additives, they can cause side effects such as headaches, stomach upset, nausea, vomiting, and skin reactions. These supplements can interact with other medications, so keep your doctor informed about your use of them.

These substances can help reduce swelling and tenderness, as well as improve mobility and function. If you decide to take this therapy, it is important not to discontinue too soon. At least two months of continuous use is necessary before the full effect is realized.

### **Corticosteroids**

Corticosteroids are powerful anti-inflammatory agents that can be injected into the joint.

They are given for moderate to severe pain. They can be very useful if there is significant swelling, but are not very helpful if the arthritis affects the joint mechanics.

Corticosteroids or cortisone are natural substances known as hormones. They are produced by the adrenal glands in the human body. They can provide pain relief and reduce inflammation with a subsequent increase in quadriceps (thigh muscle) strength. However, the effects are not long-lasting, and no more than four injections should be given per joint per year.

In addition, there is some concern about the use of these injections. For example, pain and swelling may "flare" immediately after the injection, and the potential exists for long-term joint damage or infection. With frequent repeated injections or over an extended period of time, joint damage can actually increase rather than decrease.

### **Viscosupplementation with Hyaluronic Acid**

Viscosupplementation involves injecting substances into the joint to improve the quality of the joint fluid. Complete coverage of this technique can be found in the article titled "Viscosupplementation Treatment for Arthritis."

### **Gold Salt Injections**

Special medical treatments for rheumatoid arthritis include gold salt injections and other disease-modifying drugs.

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## **Alternative Therapies**

Alternative therapies include the use of acupuncture and magnetic pulse therapy. Many forms of therapy are unproven, but reasonable to try, provided you find a qualified practitioner and keep your physician informed of your decisions.

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Acupuncture uses fine needles to stimulate specific body areas to relieve pain or temporarily numb an area. Although it is used in many parts of the world and evidence suggests that it can help ease the pain of arthritis, there are few scientific studies of its effectiveness. Be sure your acupuncturist is certified, and do not hesitate to ask about his or her sterilization practices.

Magnetic pulse therapy is painless and works by applying a pulsed signal to the knee, which is placed in an electromagnetic field. Like many alternative therapies, magnetic pulse therapy has yet to be proven.

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## **Surgical Treatment**

If your arthritis does not respond to these nonsurgical treatments, you may need to have surgery.

There are a number of surgical options, including the following:

- Arthroscopic surgery uses fiber optic technology to enable the surgeon to see inside the joint and clean it of debris or repair torn cartilage.
- An osteotomy cuts the shinbone (tibia) or the thighbone (femur) to improve the alignment of the knee joint.
- A total or partial knee arthroplasty replaces the severely damaged knee joint cartilage with metal and plastic.
- Cartilage grafting is possible for some knees with limited or contained cartilage loss from trauma or arthritis.

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## **On the Horizon**

Orthopaedic surgeons are continuing to search for new ways to treat arthritis of the knee. Current research is focusing on new drugs as well as on cartilage transplants and other ways to help slow the progress of arthritis.

# Viscosupplementation for the Treatment of Knee Arthritis



Viscosupplementation is becoming a popular treatment for knee arthritis. As rehabilitation and fitness specialists, it is important to have a clear understanding of what viscosupplementation is and what it means for our patients and clients that may be dealing with knee osteoarthritis. There are many options, benefits, and even side effects that we should be aware of.

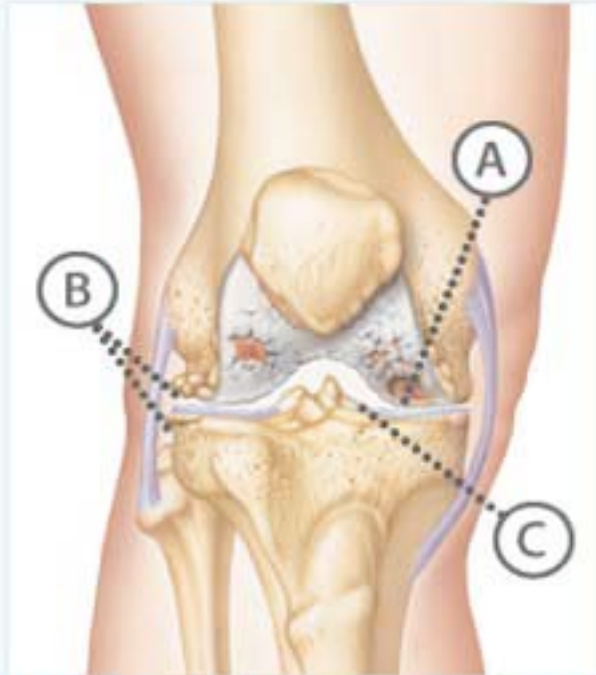
## ***An Overview of Viscosupplementation for the Treatment of Knee Arthritis***

Viscosupplementation is an intra-articular injection of hyaluronic acid into the knee joint by an physician. Hyaluronic acid (also known as hyaluron and hyaluronate) is a natural substance normally found in the synovial fluid of our joints. Its function is to act as a joint lubricant and shock absorber. It has been found that patients with knee arthritis have less hyaluronic acid in their joint.(1)

The theory behind the injections is that by injecting hyaluronic acid into the knee joint, the knee will have the necessary amount of hyaluronic acid and will also help the body stimulate production of more hyaluronic acid in the joint. This will improve patient symptoms of pain and allow for better functional mobility.

Here is an image from Genzyme, the makers of Synvisc, describing the benefit of viscosupplementation:

## What is Synvisc-One?



**In knees with osteoarthritis, the joint fluid (called synovial fluid) can break down and not provide the cushioning your knee needs.**



**Synvisc-One supplements your knee joint fluid to relieve the pain and improve the knee joint's natural shock absorbing abilities.**

**A. Cartilage wears away B. Bone spurs may develop C. Joint fluid breaks down  
D. Synvisc-One replaces joint fluid**

Viscosupplementation injections were first approved as a treatment for knee arthritis by the FDA in 1997. The important point to remember is these injections are a treatment, not a drug or a cure for arthritis. Hyaluronic acid injections, derived mostly from rooster combs, can provide several months of pain relief, and are given typically in a series of 3-5 injections. However, they do NOT provide any immediate effect on pain. Success is greater for patients with mild to moderate osteoarthritis. Viscosupplement injections can be repeated every 6 months if necessary.

## Viscosupplementation Options

Currently, there are five approved viscosupplements known as the brand names Hyalgan, Synvisc, Orthovisc, Euflexxa, and Supartz. Each vary slightly:



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- **Hyalgan:** First FDA approved viscosupplement; manufactured by Sanofi-Aventis; series of 3-5 injections at once per week; up to 6-7 months relief
- **Synvisc:** Manufactured by Genzyme; 3 injections a week apart; 6 month relief; now with SynviscOne, a single injection for 6 month relief
- **Orthovisc:** Manufactured by DePuy; Only viscosupplement not from an avian source; 4 injections with 6 month relief
- **Euflexxa:** Manufactured by Ferring Pharmaceuticals; 3 injections, 6 month relief
- **Supartz:** Manufactured by Smith & Nephew; 5 injections; Only viscosupplement approved to state it provides up to 12 months relief; also 3 injection series, providing 6 months relief (2)

HYALGAN (Sanofi-Aventis)

Hyalgan® (hyaluronate) is supplied as a sterile, non-pyrogenic solution in 2 mL vials or 2 mL pre-filled syringes. – 3 such

## Side Effects of Viscosupplementation

There are few side effects to these injections. Most often, there can be a local injection site reaction of redness and pain. A “hot knee” or a pseudo sepsis can also occur up to 72 hours after injection. NSAIDs, steroids, and/or arthrocentesis may be used to treat this. On a rare occasion, allergic reactions may occur. In general, this is a very safe treatment for knee arthritis.

## Benefits of Viscosupplementation

A study done by Bannuru et al (3) published in 2009, compared hyaluronic acid injections to cortisone injections for treatment of painful knee OA. They found that after two weeks, the cortisone group had significantly less pain. At four weeks, both groups pain levels were the same. Finally at eight weeks, the hyaluronic acid group was significantly better than the group receiving cortisone. This is an important point to remember when patients ask about these injections. Viscosupplements can work well, but will NOT have an immediate result.

There are also studies comparing viscosupplements to saline injections (3) that have shown no difference between groups. Therefore, I tell my patients that there is a chance these injections may or may not help, but they are safe and may prolong the need for surgical intervention.

### References

1. Felson DT. An update on the pathogenesis and epidemiology of osteoarthritis. *Radiol Clin North Am* 2004; 42:1-9.

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2. [www.hyalgan.com](http://www.hyalgan.com); [www.synviscone.com](http://www.synviscone.com); [www.orthovisc.com](http://www.orthovisc.com); [www.euflexxa.com](http://www.euflexxa.com); [www.mykneeandme.com](http://www.mykneeandme.com)
3. Bannuru et al. Therapeutic trajectory of hyaluronic acid versus corticosteroids in the treatment of knee osteoarthritis: A systematic review and meta-analysis. *Arthritis Rheum* 2009; Nov 30; 61 (12):1704-1711
4. Lundsgaard et al. Intra-articular sodium hyaluronate 2 mL versus physiological saline 20 mL versus physiological saline 2 mL for painful knee osteoarthritis: a randomized clinical trial. *Scand J Rheumatol.* 2008 Mar-Apr;37(2):142-50.

# BIONICARE

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## WHAT IS BIONICARE

BioniCare is a non-invasive, non-drug treatment option for osteoarthritis (OA) of the knee and rheumatoid arthritis (RA) of the hand. The BioniCare system provides an electrical signal that stimulates the joint tissue to reduce the pain and symptoms of arthritis and helps maintain the health of the knee joint and improve the function of the hand. The arthritic joint has a diminished electrical signal which likely contributes to the deterioration of the joint. BioniCare is the first and only patented proprietary signal and system demonstrated to be safe and effective in [multiple clinical studies](#).

## THE BIONICARE KNEE SYSTEM

THE BIONICARE KNEE SYSTEM CONSISTS OF:



A knee brace that unloads the affected compartment, relieving pressure and pain, using a 3-

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point leverage system. The OActive knee brace and the Eagle OA knee brace provide immediate pain relief by unloading the affected compartment.



The BIO-2000 device delivers the patented electrical signal that relieves the pain and symptoms of osteoarthritis and provides for overall improvement of the knee over time. The BIO-2000 device attaches to the patient via electrodes that are worn under the knee brace and a lead wire.



The Night-Wrap can be worn while sleeping to extend the number of hours Bionicare is worn and achieve symptom relief and return to activities more rapidly.

[Night-Wrap Guide Video](#)

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## THE BIONICARE HAND SYSTEM

THE BIONICARE HAND SYSTEM CONSISTS OF:



The BIO-2000 device delivers the patented electrical signal that relieves the pain and stiffness of rheumatoid arthritis of the hands.



A wrist wrap applied over the glove to attach the BIO-2000 device without the use of a lead wire.

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A conductive glove with fingertip electrodes deliver the signal from the BIO-2000 device to the patient.

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