

OSTEOARTHRITIS OF **THE KNEE**

AN OWNER'S MANUAL



1

**PHYSICAL
WEAR & TEAR**

2

**CELLULAR
BREAKDOWN**

**GET MORE MILEAGE
OUT OF YOUR KNEES**

GETTING MORE

MILES

WHEN TREATING OSTEOARTHRITIS OF THE KNEE

**PHYSICAL
WEAR & TEAR**

1

**CELLULAR
BREAKDOWN**

2



That twinge or ache in your joint might be the first sign of osteoarthritis of the knee (OAK). Symptoms typically increase gradually over time, but they can also come on quickly, significantly impacting your day-to-day routine.¹

With OAK, physical wear and tear to your joints can happen on both the physical and cellular levels, which is why it's important to choose a treatment that works on both levels, too.^{2,3} And early treatment is key to preserving overall knee function.¹

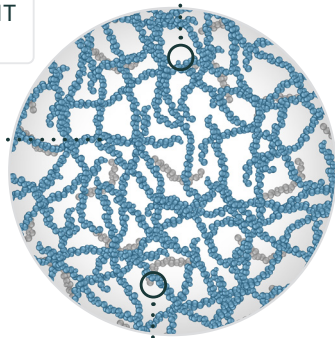
THE HEALTHY KNEE

As your largest joint, your knee is one of the most stressed points in your body. It's also known as a synovial joint, which means it contains synovial fluid (natural lubrication) to cushion your knee—like motor oil in your car.¹

SYNOVIAL FLUID

In a healthy joint, your natural knee fluid (synovial fluid) acts as a lubricant, cushioning cartilage covering the ends of joints so they can move smoothly.¹

HIGH MOLECULAR WEIGHT
HYALURONIC ACID (HA)



NATURAL HA

Natural HA is one of the main parts of synovial fluid found between your joints. When you have OAK, HA becomes thinner. HA injections add to your body's natural supply. Your doctor may refer to these injections as “viscosupplementation”, which means they help increase fluid in your joints.¹

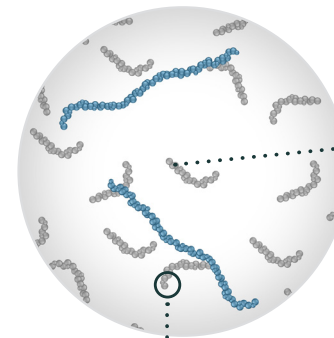
OSTEOARTHRITIS OF THE KNEE (OAK)

During your life, your joints go through a normal cycle of damage and repair. OAK usually happens when the body can't keep up with repairing wear and tear in the knee joint. This can lead to prolonged inflammation, pain, swelling, loss of movement, stiffness, and changes in the shape or structure of the joint.⁶

PHYSICAL WEAR & TEAR

In OAK, physical damage happens after synovial fluid breaks down.⁶ Knee cartilage gradually wears away, becoming frayed and rough, decreasing protective space between bones.⁶

LOW MOLECULAR WEIGHT
HA



BROKEN DOWN HA

Cellular damage happens when the amount of HA in the joint decreases, and molecules of HA become damaged. This can result in painful bone rubbing on bone.⁶

STAGES OF OSTEOARTHRITIS OF THE KNEE (OAK) PROGRESSION



STAGE 0

THE HEALTHY KNEE

- No signs of osteoarthritis⁷
- Joint functions well, and with no pain⁷

STAGE 1

EARLY OAK

Little or no pain or discomfort⁷

STAGE 2

MILD OAK

First symptoms may occur when joint in use⁷

STAGE 3

MODERATE OAK

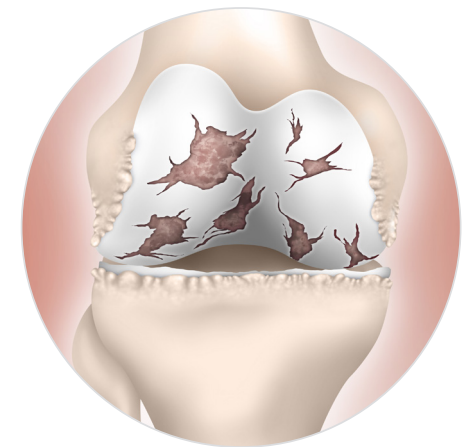
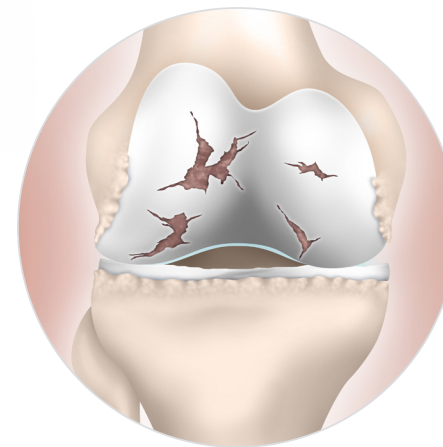
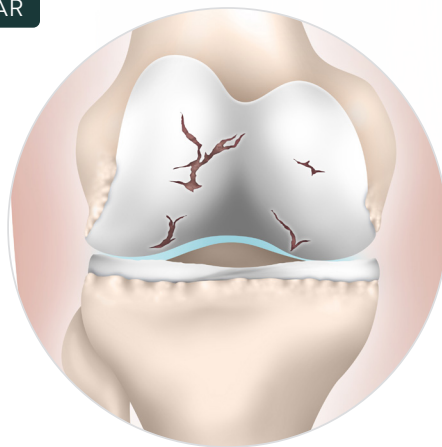
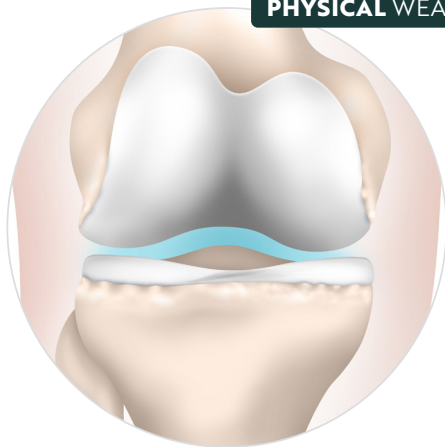
Frequent pain and stiffness when walking, running, bending, or kneeling⁷

STAGE 4

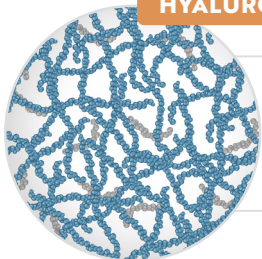
SEVERE OAK

Great pain, stiffness, and lack of range of motion when walking or performing daily activities⁷

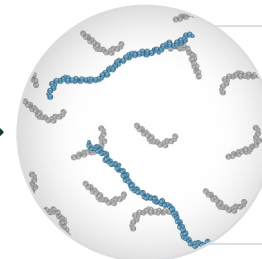
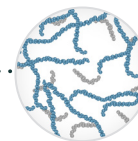
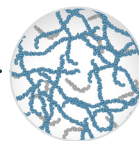
PHYSICAL WEAR & TEAR



HYALURONIC ACID (HA) BREAKDOWN



HA starts to break down, synovial fluid begins to thin and becomes less lubricating.



As OAK progresses, high molecular weight HA breaks down into low molecular weight HA, limiting lubrication and shock absorbing abilities.¹

TREATMENT OPTIONS FOR OSTEOARTHRITIS OF THE KNEE (OAK)

The primary goals of treating OAK are to relieve pain and maximize function and movement.

TREATMENT PLANS WILL TYPICALLY INCLUDE A COMBINATION OF THE FOLLOWING:



Lifestyle changes, like weight loss and exercise



Common pain relievers such as acetaminophen or ibuprofen



Prescription pain relievers



WHEN SHOULD YOU CONSIDER CHANGING TREATMENTS?

If you feel discomfort after trying non-prescription or prescription treatments, speak with your doctor about other options.

TYPES OF INJECTIONS TO TREAT OAK

CORTICOSTEROIDS



Corticosteroid injections (also known as cortisone shots) are anti-inflammatory medicines that can be injected into the knee joint. They provide short-term pain relief and reduce inflammation.^{1,8}



Your doctor may recommend limiting these injections, as they may lead to further cartilage damage in your knee. They can also cause issues for people with diabetes or heart problems.^{1,8}

HYALURONIC ACID (HA)



HA injections supplement the natural HA produced by your body. These natural lubricants are mainly found in your joints and help protect your knees. They can provide long-lasting pain relief and help preserve knee function.^{1,9}

The Importance of Early Treatment with HA

Getting diagnosed and treated early can limit wear and tear on your knee cartilage, and it may be critical for decreasing chronic pain and disability. Some treatments only address the symptoms of OAK.

But certain attributes of HA injections may help slow the progression of the disease itself and help preserve your knee cartilage. Because early treatment is so important, ask your doctor if HA injections may be right for you.^{2,3}



HYALURONIC ACID (HA) INJECTIONS ARE NOT ALL THE SAME

All HA injections offer physical benefits like lubrication of the knee joint, with the increase of fluid acting as a shock absorber or cushion. But only certain HAs resemble the natural HA found in the knee joint and may slow down osteoarthritis in the knee (OAK), preserving knee function.^{1,9}

ASK YOUR DOCTOR ABOUT HA WITH TWO IMPORTANT ELEMENTS:

High Molecular Weight

In clinical trials, HAs with high molecular weight made a clinically significant difference in pain relief when compared to HAs with low molecular weight.^{1,9-10}



Linear Structure

In a healthy knee, natural fluid has a linear structure and high molecular weight. Linear HA most closely resembles the HA naturally found in the knee.¹⁰



CHOOSING THE RIGHT HA PROVIDES BOTH

PHYSICAL BENEFITS

- ✓ Provides joint lubrication
- ✓ Increases shock absorption

- ✓ Coats nerve endings in the knee to reduce pain^{1,9}
- ✓ Reduces inflammation^{1,9}
- ✓ Studies have shown it helps protect cartilage and decreases future wear and tear^{1,9}
- ✓ Helps your body create more of your own naturally made HA¹¹

CELLULAR BENEFITS



If you and your doctor decide that an HA injection is right for you, make sure to ask about the differences in molecular weight and structure so you receive HA's full range of benefits.

GET MORE MILEAGE OUT OF YOUR KNEES

Because osteoarthritis of the knee (OAK) is a disease that can worsen over time, early treatment with hyaluronic acid (HA) is important for decreasing pain, increasing mobility, and preserving joint function.¹

Get the Most Out of Your HA Injections

Not all HA injections are the same. To get the full benefit of your HA treatment, be sure to ask for one with high molecular weight and linear structure.

Also, be sure to complete the course of injections prescribed by your doctor. Some patients feel relief after the first injection, but it's still important to complete the recommended course to achieve the best results.

ALL HAs: PHYSICAL BENEFITS

- Provides joint lubrication
- Increases shock absorption

HIGH MOLECULAR WEIGHT, LINEAR HAs: ADDED CELLULAR BENEFITS

- Coats nerve endings in the knee to reduce pain^{1,9}
 - Reduces inflammation^{1,9}
- Helps protect cartilage and decrease future wear and tear^{1,9}
- Helps your body create more of your own naturally made HA¹¹

BE SURE YOU AND YOUR DOCTOR CONSIDER THE COMBINED BENEFITS OF HIGH MOLECULAR WEIGHT, LINEAR HA INJECTIONS

References: **1.** Altman RD, Manjoo A, Fierlinger A, et al. The mechanism of action for hyaluronic acid treatment in the osteoarthritic knee: a systematic review. *BMC Musculoskeletal Disorders*. 2015;16:321. **2.** Smith MM, Ghosh P. The synthesis of hyaluronic acid by human synovial fibroblasts is influenced by the nature of the hyaluronate in the extracellular environment. *Rheumatol Int*. 1987;7:113-122. **3.** Band PA, Heeter J, Wisniewski HG, et al. Hyaluronan molecular weight distribution is associated with the risk of knee osteoarthritis progression. *Osteoarthritis Cartilage*. 2015 January; 23(1):70-76. **4.** Moreland LW. Intra-articular hyaluronan (hyaluronic acid) and hylans for the treatment of osteoarthritis: mechanisms of action. *Arthritis Res Ther*. 2003;5:54-67. **5.** Bowman S, Awad ME, Hamrick MW, et al. 2018;7:6. **6.** Bauer C, Niculescu-Morza E, Jeyakumar V, et al. *J Inflamm*. 2016;13:31. **7.** Healthline. Stages of Osteoarthritis of the Knee. Updated March 12, 2021. Accessed September 16, 2022. <https://www.healthline.com/health/osteoarthritis-stages-of-oo-of-the-knee>. **8.** Silvers HJ. Viscosupplementation during rehabilitation. *Sports Phys Ther*. 2014;6(5):422-426. **9.** Altman R, et al. Anti-inflammatory effects of intra-articular hyaluronic acid: a systematic review. *Cartilage*. 2019;10(1):43-52. **10.** Nicholls M, et al. Rheological properties of commercially available hyaluronic acid products in the United States for the treatment of osteoarthritis knee pain. *Clin Med Insights Arthritis Musculoskeletal Disord*. 2018;11:1-5. **11.** Yang C, Cao M, Liu H, et al. The high and low molecular weight forms of hyaluronan have distinct effects on CD44 clustering. *J Biol Chem*. 2012;287(51):43094-43107.