

How to Diagnose and Treat Osteoarthritis

Analysis by [Dr. Joseph Mercola](#)

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STORY AT-A-GLANCE

- › Osteoarthritis (OA) is often described as a "wear and tear" disease because it typically involves the breakdown of joint cartilage due to repetitive use and load over time
- › However, the understanding of osteoarthritis has evolved, and it is now recognized as a more complex condition influenced by a combination of factors beyond just mechanical wear and tear
- › Growing recognition among medical professionals suggests osteoarthritis should be considered a systemic disease, not just a localized joint condition
- › Maintaining a healthy weight is a key part of osteoarthritis prevention; avoiding linoleic acid in seed oils can help you avoid obesity
- › Homemade bone broth is rich in collagen, making it a natural food to support joint health; collagen is a major component of cartilage, the tissue that's degraded in OA

Osteoarthritis (OA), the most common form of arthritis, is a degenerative joint disease that affects 32.5 million U.S. adults.¹ Worldwide, about 595 million people are living with the condition, a 132% increase since 1990.²

Osteoarthritis occurs when the protective cartilage that cushions the ends of your bones wears down over time. Although osteoarthritis can damage any joint, the knee joint is most frequently affected, followed by the hip and hand.³ While there's no known cure for osteoarthritis, it typically progresses slowly.

This means you can take steps to reduce further damage from the disease, like avoiding obesity and making collagen-rich bone broth. Scientists are also working on methods for early detection, which would allow treatment to begin before joint damage occurs.

Osteoarthritis Is Often Diagnosed After the Damage Is Done

Osteoarthritis is typically diagnosed based on a combination of clinical symptoms, physical examinations and diagnostic tests, including X-rays. Key symptoms of osteoarthritis include:

- **Joint pain and tenderness** – Affected joints may hurt during or after movement.
- **Stiffness** – Joint stiffness may be most noticeable upon waking up in the morning or after a period of inactivity.
- **Loss of flexibility** – There may be a loss of flexibility in the affected joint.
- **Grating sensation** – You might feel a grating sensation or hear a popping or crackling sound, when you use the joint.
- **Bone spurs** – These extra bits of bone, which feel like hard lumps, can form around the affected joint.

Your doctor will ask about any such symptoms and how long you've had them, as well as whether you've had past injuries or engage in activities that could contribute to joint damage. For instance, according to the Osteoarthritis Action Alliance (OAAA):⁴

"Certain occupations (e.g., construction, healthcare, farming, law enforcement, first responders, military) involving prolonged standing, squatting, lifting, kneeling, and repetitive motion with resultant excessive mechanical stress on a joint, raises the risk of OA and can worsen symptoms.

Osteoarthritis and back pain are the most common diagnoses related to disability-caused separation from the military, both during periods of peacetime and war.

High impact professional sports (e.g., hockey, soccer, and football), where there is not only repetitive loading with excessive force, but also increased joint trauma puts players at risk of OA. In addition to elite-level athletes (soccer, long-distance running, weightlifting and wrestling), non-elite soccer athletes are also at risk of developing OA."

X-rays are commonly used to diagnose osteoarthritis, as they can reveal changes in joint structure. The problem is that by the time osteoarthritis is visible on an X-ray, the joint is already damaged. Research suggests, however, that earlier diagnosis may be possible.

Blood Biomarkers May Reveal Osteoarthritis Eight Years Before X-Rays Can

Researchers from Duke University conducted a study to find blood markers that could predict the development of knee osteoarthritis in women before any joint damage is visible on X-rays.⁵ In a group of 200 women, they found that just six specific blood proteins were able to indicate a 77% chance of developing OA, up to eight years before it could be seen on X-rays.

Predicting OA based on these blood markers was more accurate than using age, body mass index (BMI) or reports of knee pain, all of which showed much lower accuracy (51% for age and BMI, 57% for knee pain). The findings suggest that the joint tissue may already be undergoing changes long before OA is visible on an X-ray, hinting at an ongoing inflammatory process or "OA continuum."

Moreover, the majority of the blood proteins that indicated the potential onset of OA also suggested the possibility of OA getting worse. So, the early changes leading to OA and the worsening of OA once it's begun may share similar underlying processes.

"This tells us that there is an osteoarthritis continuum," lead study author Dr. Virginia Byers Kraus told The New York Times. "You're already on an escalator that's leading you up the path to symptoms and X-ray changes way before we thought."⁶ One day, a blood

test may be used to diagnose osteoarthritis in its early stages, when treatment may be able to stop joint damage from occurring.

Osteoarthritis Is Caused by More Than Wear and Tear

Osteoarthritis is often described as a "wear and tear" disease because it typically involves the breakdown of joint cartilage due to repetitive use and load over time. However, the understanding of osteoarthritis has evolved, and it is now recognized as a more complex condition influenced by a combination of factors beyond just mechanical wear and tear.

While excessive or abnormal forces on your joints can accelerate the breakdown of cartilage, biomechanical imbalances that place uneven stresses on your joints can also contribute. Further, although osteoarthritis is not a traditional inflammatory arthritis like rheumatoid arthritis, inflammation does play a role. Chemicals in the joint can cause inflammation and damage to the cartilage and surrounding structures. According to OAAA:⁷

"Osteoarthritis is not simply caused by 'wear and tear' of the joint but is rather a complex disorder characterized by molecular, anatomic and physiologic changes. As such a complex disease, there are a variety of risk factors – both modifiable and non-modifiable – that contribute to its onset and progression, some of which can be mediated with appropriate management strategies."

There is growing evidence, for instance, linking metabolic syndrome – a cluster of conditions including high blood pressure, high blood sugar excess body fat around the waist and abnormal cholesterol levels – to an increased risk of osteoarthritis.⁸

Extra body weight also increases the stress on weight-bearing joints like the knees and hips, increasing osteoarthritis risk, but adipose (fat) tissue also produces inflammatory substances that may contribute to joint deterioration. In fact, the Osteoarthritis Research Society International (OARSI) defines osteoarthritis as:⁹

"A disorder involving movable joints characterized by cell stress and extracellular matrix degradation initiated by micro- and macro-injury that activates maladaptive repair responses including pro-inflammatory pathways of innate immunity.

The disease manifests first as a molecular derangement (abnormal joint tissue metabolism) followed by anatomic, and/or physiologic derangements (characterized by cartilage degradation, bone remodeling, osteophyte formation, joint inflammation and loss of normal joint function), that can culminate in illness."

Age is also a primary risk factor, as the cumulative effects of use on your joints are often compounded by an age-related decrease in the body's ability to heal and maintain tissue. Hormonal changes, particularly during menopause, also play a significant role in the development of osteoarthritis in women. Genetics may also predispose individuals to osteoarthritis, influencing the durability of cartilage and the body's repair mechanisms.

Is Osteoarthritis a Systemic Disease?

Growing recognition among medical professionals suggests osteoarthritis should be considered a systemic disease, not just a localized joint condition. Writing in *Aging Clinical and Experimental Research*, one team of scientists proposed renaming the disease "systemic OA" to move away from the perception that it's focused solely on joints. They explained:¹⁰

"Its pathogenic mechanisms involve a variety of systemic conditions that contribute to joint damage. These include metabolic dysfunction, chronic low-grade inflammation, neuroplastic pain, and the influence of the central nervous system in the development of neuropathic pain.

Besides, OA can negatively affect other aspects of health, such as quality of life, reduced physical activity, social isolation, depression, and anxiety. OA can be

considered a complex system in which pathological interactions involve not only obesity and metabolic dysfunction, but also fragility syndrome, sarcopenia, neurological complications, and systemic energy redistribution."

This has implications for the way osteoarthritis is treated as well, since conventional treatment typically relies on support care, such as medications, physical therapy and heating pads.¹¹ Instead, the researchers noted that medical care for OA should be "more holistic and personalized."¹²

In addition to considering individual factors like genetics, lifestyle must be addressed, and resolving obesity should be a primary treatment, along with maintaining muscle health to support the joints.

Tips for Osteoarthritis Prevention

Maintaining a healthy weight is a key part of osteoarthritis prevention. Reducing body weight if you're overweight can decrease the stress on weight-bearing joints like hips and knees and lower inflammation levels associated with obesity. Obesity is also a leading cause of knee replacements. One Australian study of 56,217 patients showed that, of the patients who received a knee replacement due to osteoarthritis, 31.9% were overweight and 57.7% were obese.¹³

Consuming too much **linoleic acid** (LA) in seed oils is a primary factor driving the overweight and obesity epidemics. At a molecular level, excess LA consumption also damages your metabolism and impedes your body's ability to generate energy in your mitochondria.

Examples of seed oils high in LA include soybean, cottonseed, sunflower, rapeseed (canola), corn and safflower. To limit LA in your diet, you'll need to avoid most processed foods.

Injury prevention is also important, as it's estimated that up to 12% of OA cases result from injuries caused by automobile or military accidents, falls or sports.¹⁴ "Proper precautions such as stretching and strengthening exercises, appropriate footwear and

other devices, along with supportive workplace or athletic team policies, can help reduce onset and progression of OA in occupational and sports settings," OAAA notes.

Consuming specific **anti-inflammatory and healing foods** is another strategy to support overall health and osteoarthritis prevention. Cruciferous vegetables like broccoli, Brussels sprouts, cauliflower and cabbage, for instance, contain a compound called sulforaphane, which also helps reduce the risk of osteoarthritis,¹⁵ in part by blocking enzymes that are linked to joint destruction.

A team of researchers from the University of East Anglia published a study in the journal *Arthritis and Rheumatism* that showed substances in cruciferous vegetables could slow the progression of osteoarthritis, or possibly prevent it.¹⁶

Sulforaphane did this by inhibiting metalloproteinases that have been implicated in the development and progression of osteoarthritis. The researchers found it also blocked inflammation to protect against cartilage destruction both in the lab and animal models.

Other natural compounds, like turmeric, are useful for relieving osteoarthritis pain. A 2021 randomized trial compared turmeric against paracetamol, a painkiller also known as acetaminophen.

Bioavailable turmeric extract was as effective as paracetamol against osteoarthritis pain and symptoms in the knee and was safe and more effective in reducing tumor necrosis factor alpha (TNF alpha) and C-reactive protein (CRP).¹⁷ Acupuncture is another natural strategy that's useful for pain relief and improving function in osteoarthritis.¹⁸

Bone Broth for Joint Health

Considering the underlying pathological processes leading to osteoarthritis start long before its symptoms, taking steps to support your joint health early on makes sense. One way to do this is by making homemade bone broth. Bone broth is made by simmering animal bones and connective tissue, which releases collagen and other nutrients into the broth.

Collagen is a major component of cartilage, the tissue that's degraded in OA. While there are plenty of collagen supplements on the market, bone broth is by far the least expensive option. Collagen accounts for about 30% of the total protein in your body.

One of its primary functions is to provide structural support and strength to your tissues, such as skin, bones, tendons, ligaments and cartilage,^{19,20,21} allowing them to stretch while still maintaining tissue integrity. As such, collagen is crucial for repairing soft tissue, muscle and connective tissue, all of which tend to get weaker and less elastic with age.

Further, bone broth may help reduce joint pain and stiffness,²² including osteoarthritis pain.²³ It helps reduce joint pain and inflammation, in part, courtesy of chondroitin sulfates, glucosamine and other compounds extracted from the boiled down cartilage.

To make homemade bone broth, simply place bones in an Instant Pot, fill the pot with pure, filtered water – just enough to cover the bones – add salt and other spices to taste, then set it to cook on high for two hours if the bones are from a concentrated animal feeding operation (CAFO) or four hours if organic and grass fed.

Using bones from CAFO beef can be problematic due to potential heavy metal contamination. So, when cooking these bones in the Instant Pot, it's best to limit the time to two hours to avoid introducing heavy metals into your broth.

If you're using beef bones from grass fed organic sources, you can safely cook them for four hours. Using bones from an organic source is even more important if you're using chicken, as CAFO chickens tend to produce stock that doesn't gel,²⁴ which raises questions about the quality of the collagen you're getting.

You can further customize your **bone broth** to align with specific health goals and nutritional needs. For instance, if you're looking to support joint health, consider adding other ingredients that are rich in collagen such as chicken feet to maximize the health benefits.

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