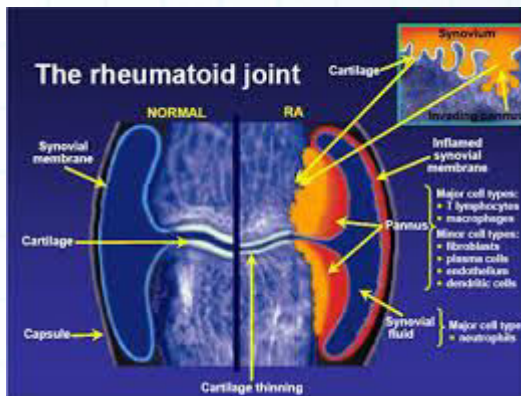


# Rheumatoid Arthritis



Rheumatoid arthritis (RA) is an autoimmune disease that causes chronic inflammation of the joints. Autoimmune diseases are illnesses that occur when the body's tissues are mistakenly attacked by their own immune system. The immune system contains a complex organization of cells

and antibodies designed normally to "seek and destroy" invaders of the body, particularly infections. Patients with autoimmune diseases have antibodies and immune cells in their blood that target their own body tissues, where they can be associated with inflammation. While inflammation of the tissue around the joints and inflammatory arthritis are characteristic features of rheumatoid arthritis, the disease can also cause inflammation and injury in other organs in the body. Because it can affect multiple other organs of the body, rheumatoid arthritis is referred to as a systemic illness and is sometimes called rheumatoid disease. Rheumatoid arthritis that begins in people under 16 years of age is referred to as juvenile idiopathic arthritis (formerly juvenile rheumatoid arthritis). While rheumatoid arthritis is a chronic illness, meaning it can last for years, patients may experience long periods without symptoms. However, rheumatoid arthritis is typically a progressive illness that has the potential to cause significant joint destruction and functional disability.

A joint is where two bones meet to allow movement of body parts. Arthritis means joint inflammation. The joint inflammation of rheumatoid arthritis causes swelling, pain, stiffness, and redness in the joints. The inflammation of rheumatoid disease can also occur in tissues around the joints, such as the tendons, ligaments, and muscles.

In some people with rheumatoid arthritis, chronic inflammation leads to the destruction of the cartilage, bone, and ligaments, causing deformity of the joints. Damage to the joints can occur early in the disease and be progressive. Moreover, studies have shown that the progressive damage to the joints does

not necessarily correlate with the degree of pain, stiffness, or swelling present in the joints.

Rheumatoid arthritis is a common rheumatic disease, affecting approximately 1.3 million people in the United States, according to current census data. The disease is three times more common in women as in men. It afflicts people of all races equally. The disease can begin at any age and even affects children (juvenile idiopathic arthritis), but it most often starts after 40 years of age and before 60 years of age. Though uncommon, in some families, multiple members can be affected, suggesting a genetic basis for the disorder.

### **Causes and risk factors of rheumatoid arthritis**

The cause of rheumatoid arthritis is unknown. Even though infectious agents such as viruses, bacteria, and fungi have long been suspected, none has been proven as the cause. The cause of rheumatoid arthritis is a very active area of worldwide research. It is believed that the tendency to develop rheumatoid arthritis may be genetically inherited (hereditary). Certain genes have been identified that increase the risk for rheumatoid arthritis. It is also suspected that certain infections or factors in the environment might trigger the activation of the immune system in susceptible individuals. This misdirected immune system then attacks the body's own tissues. This leads to inflammation in the joints and sometimes in various organs of the body, such as the lungs or eyes.

It is not known what triggers the onset of rheumatoid arthritis. Regardless of the exact trigger, the result is an immune system that is geared up to promote inflammation in the joints and occasionally other tissues of the body. Immune cells, called lymphocytes, are activated and chemical messengers (cytokines, such as tumor necrosis factor/TNF, interleukin-1/IL-1, and interleukin-6/IL-6) are expressed in the inflamed areas. Environmental factors also seem to play some role in causing rheumatoid arthritis. For example, scientists have reported that smoking tobacco, exposure to silica mineral, and chronic periodontal disease all increase the risk of developing rheumatoid arthritis. There are theories about different gut bacteria (microbes that inhabit the lining of the bowels) that might trigger the onset of rheumatoid arthritis in

genetically susceptible individuals. No specific microbes have been identified as definite causes.

### **Symptoms of rheumatoid arthritis**

RA symptoms come and go, depending on the degree of tissue inflammation. When body tissues are inflamed, the disease is active. When tissue inflammation subsides, the disease is inactive (in remission). Remissions can occur spontaneously or with treatment and can last weeks, months, or years. During remissions, symptoms of the disease disappear, and people generally feel well. When the disease becomes active again (relapse), symptoms return. The return of disease activity and symptoms is called a flare. The course of rheumatoid arthritis varies among affected individuals, and periods of flares and remissions are typical

When the disease is active, RA symptoms can include fatigue, loss of energy, lack of appetite, low-grade fever, muscle and joint aches, and stiffness. Muscle and joint stiffness are usually most notable in the morning and after periods of inactivity. This is referred to as morning stiffness and post-sedentary stiffness. Arthritis is common during disease flares. Also during flares, joints frequently become warm, red, swollen, painful, and tender. This occurs because the lining tissue of the joint (synovium) becomes inflamed, resulting in the production of excessive joint fluid (synovial fluid). The synovium also thickens with inflammation (synovitis).

Rheumatoid arthritis usually inflames multiple joints and affects both sides of the body. In its most common form, therefore, it is referred to as a symmetric polyarthritis. Early RA symptoms may be subtle. The small joints of both the hands and wrists are often involved. Early symptoms of rheumatoid arthritis can be pain and prolonged stiffness of joints, particularly in the morning. Symptoms in the hands with rheumatoid arthritis include difficulty with simple tasks of daily living, such as turning door knobs and opening jars. The small joints of the feet are also commonly involved, which can lead to painful walking, especially in the morning after rising from bed. Occasionally, only one joint is inflamed. When only one joint is involved, the arthritis can mimic the joint inflammation caused by other forms of arthritis, such as gout or joint infection. Chronic inflammation can cause damage to body tissues, including

cartilage and bone. This leads to a loss of cartilage and erosion and weakness of the bones as well as the muscles, resulting in joint deformity, destruction, and loss of function. Rarely, rheumatoid arthritis can even affect the joint that is responsible for the tightening of our vocal cords to change the tone of our voice, the cricoarytenoid joint. When this joint is inflamed, it can cause hoarseness of the voice. Symptoms in children with rheumatoid arthritis include limping, irritability, crying, and poor appetite.

### **Diagnosis of rheumatoid arthritis**

There is no singular test for diagnosing rheumatoid arthritis. The diagnosis is based on the clinical presentation. Ultimately, rheumatoid arthritis is diagnosed based on a combination of the presentation of the joints involved, characteristic joint swelling and stiffness in the morning, the presence of blood rheumatoid factor and citrulline antibody, as well as findings of rheumatoid nodules and radiographic changes (X-ray testing). It is important to understand that there are many forms of joint disease that can mimic rheumatoid arthritis.

The first step in the diagnosis of rheumatoid arthritis is a meeting between the doctor and the patient. The doctor reviews the history of symptoms, examines the joints for inflammation, tenderness, swelling, and deformity, the skin for rheumatoid nodules (firm bumps under the skin, most commonly over the elbows or fingers), and other parts of the body for inflammation. Certain blood and X-ray tests are often obtained. The diagnosis will be based on the pattern of symptoms, the distribution of the inflamed joints, and the blood and X-ray findings. Several visits may be necessary before the doctor can be certain of the diagnosis. A doctor with special training in arthritis and related diseases is called a rheumatologist.

It is the inflammation in the joint that helps to distinguish rheumatoid arthritis from common types of arthritis that are not inflammatory, such as osteoarthritis or degenerative arthritis. The distribution of joint inflammation is also important to the doctor in making a diagnosis. In rheumatoid arthritis, the small joints of the hands and fingers, wrists, feet, and knees are typically inflamed in a symmetrical distribution (affecting both sides of the body). When only one or two joints are inflamed, the diagnosis of rheumatoid arthritis becomes more difficult. The doctor may then perform other tests to exclude

arthritis due to infection or gout. The detection of rheumatoid nodules (described above), most often around the elbows and fingers, can suggest the diagnosis.

Abnormal antibodies can be found in the blood of people with rheumatoid arthritis with simple blood testing. An antibody called "rheumatoid factor" (RF) can be found in 80% of patients with rheumatoid arthritis.

Joint X-rays may be normal or only demonstrate swelling of soft tissues early in the disease. As the disease progresses, X-rays can reveal bony erosions typical of rheumatoid arthritis in the joints. Joint X-rays can also be helpful in monitoring the progression of disease and joint damage over time. Bone scanning, a procedure using a small amount of a radioactive substance, can also be used to demonstrate the inflamed joints. MRI scanning can also be used to demonstrate joint damage.

The American College of Rheumatology has developed a system for classifying rheumatoid arthritis that is primarily based upon the X-ray appearance of the joints. This system helps medical professionals classify the severity of rheumatoid arthritis with respect to cartilage, ligaments, and bone.

Rheumatologists also classify the functional status of people with rheumatoid arthritis as follows:

- Class I: completely able to perform usual activities of daily living
- Class II: able to perform usual self-care and work activities but limited in activities outside of work (such as playing sports, household chores)
- Class III: able to perform usual self-care activities but limited in work and other activities
- Class IV: limited in ability to perform usual self-care, work, and other activities

### **Treatment for rheumatoid arthritis**

There is no known cure for rheumatoid arthritis. To date, the goal of treatment in rheumatoid arthritis is to reduce joint inflammation and pain, maximize joint function, and prevent joint destruction and deformity. Early medical intervention has been shown to be important in improving outcomes.

Aggressive management can improve function, stop damage to the joints as monitored on X-rays, and prevent work disability. Optimal RA treatment involves a combination of medications, rest, joint-strengthening exercises, joint protection, and patient (and family) education. Treatment is customized according to many factors such as disease activity, types of joints involved, general health, age, and patient occupation. RA treatment is most successful when there is close cooperation between the doctor, patient, and family members.

Rheumatoid arthritis diet, exercise, home remedies, and alternative medicine:

There is no special RA diet or diet "cure" for rheumatoid arthritis. One hundred years ago, it was touted that "night-shade" foods, such as tomatoes, would aggravate rheumatoid arthritis. This is no longer accepted as true. There are no specific foods or food groups that should be universally avoided by individuals with rheumatoid arthritis.

Nevertheless, there are some home remedies that may be helpful, although these are not considered as potent or effective as disease-modifying drugs. Fish oils, such as in salmon, and omega-3 fatty acids supplements have been shown to be beneficial in some short-term studies in rheumatoid arthritis. This suggests that there may be benefits by adding more fish to the diet, such as in the popular Mediterranean diet. The anti-inflammatory effects of curcumin in dietary turmeric, an ingredient in curry, may be beneficial in reducing symptoms of rheumatoid arthritis. Supplements such as calcium and vitamin D are used to prevent osteoporosis in patients with rheumatoid arthritis. Folic acid is used as a supplement to prevent side effects of methotrexate treatment of rheumatoid arthritis. Alcohol is minimized or avoided in rheumatoid arthritis patients taking methotrexate.

Because impact loading the joints can aggravate inflamed, active rheumatoid arthritis and also be difficult when joints have been injured in the past by the disease, it is important to customize activities and exercise programs according to each individual's capacity. Movement exercises that are less traumatic for the joints, including yoga and tai chi, can be beneficial in maintaining flexibility and strength as well as lead to an improved general sense of well-being.

Proper regular exercise is important in maintaining joint mobility and in strengthening the muscles around the joints. Swimming is particularly helpful because it allows exercise with minimal stress on the joints. Physical and occupational therapists are trained to provide specific exercise instructions and can offer splinting supports. For example, wrist and finger splints can be helpful in reducing inflammation and maintaining joint alignment. Devices such as canes, toilet seat raisers, and jar grippers can assist in the activities of daily living. Heat and cold applications are modalities that can ease symptoms before and after exercise.

Surgery may be recommended to restore joint mobility or repair damaged joints. Doctors who specialize in joint surgery are orthopedic surgeons. The types of joint surgery range from arthroscopy to partial and complete replacement of the joint. Arthroscopy is a surgical technique whereby a doctor inserts a tube-like instrument into the joint to see and repair abnormal tissues.

Total joint replacement is a surgical procedure whereby a destroyed joint is replaced with artificial materials. For example, the small joints of the hand can be replaced with plastic material. Large joints, such as the hips or knees, are replaced with metals.

Finally, minimizing emotional stress can help improve the overall health in people with rheumatoid arthritis. Support and extracurricular groups provide those with rheumatoid arthritis time to discuss their problems with others and learn more about their illness.

### **Is it possible to prevent rheumatoid arthritis?**

Currently, there is no specific prevention of rheumatoid arthritis. Because cigarette smoking, exposure to silica mineral, and chronic periodontal disease all increase the risk for rheumatoid arthritis, these conditions should be avoided.

### **What research is being done on rheumatoid arthritis?**

Scientists throughout the world are studying many promising areas of new treatment approaches for rheumatoid arthritis. Indeed, treatment guidelines are evolving with the availability of newer treatments. These areas include treatments that block the action of the special inflammation factors, such as

tumor necrosis factor (TNF alpha), B-cell and T-cell function, as well as interleukin-1 (IL-1), as described above. Many other drugs are being developed that act against certain critical white blood cells and chemical messengers involved in rheumatoid inflammation. Also, new NSAIDs with mechanisms of action that are different from current drugs are on the horizon.