

A Review: Possible Approaches For Evaluating Arthritis And Its Management

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Abstract: Arthritis is a form of joint disorder that involves inflammation of one or more joints, Other arthritis forms are rheumatoid or psoriatic arthritis, and related autoimmune diseases. The major complaint about arthritis is that the pain is often a constant and may be localized to the joint affected due to inflammation that occurs around the joint, damage to the joint from disease, daily wear and tear, muscle strains by forceful movements against stiff painful joints and fatigue, in turn give way to inflexibility, immobility and muscular debility. In certain cases of intense inflammation, fever, general feeling of tiredness and lack of sleep occurs. There are no exact causes, but a combination of factors like aging, joint injuries, genetic tendencies, and obesity, are all thought to play a role. Blood tests and X-rays of the affected joints are performed to make the diagnosis. It usually cured with a comprehensive program that emphasizes proper exercise, diet and nutrition, joint protection techniques, coping skills for pain and stress, self-management, and medication. Surgery is not the first line of treatment for osteoarthritis. Early diagnosis is considered to be important in the prevention of joint damage and disability in patients with rheumatoid arthritis.

Keywords: Arthritis, Rheumatoid, genetic, obesity, autoimmune

I. INTRODUCTION

A joint is where two or more bones come together, such as the hip or knee. (figure 1)

Normal Joint

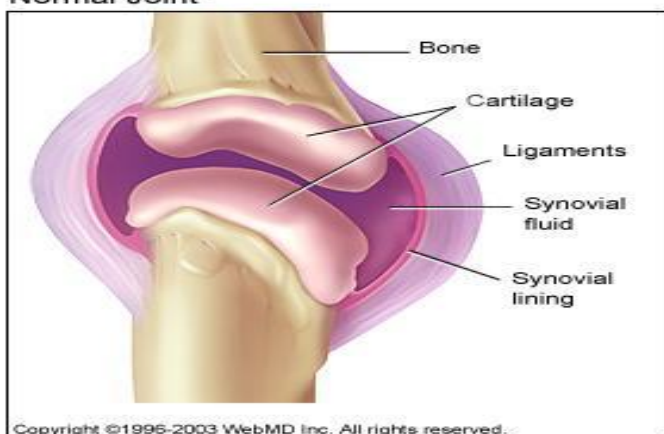


Figure 1: A joint is where two or more bones come together

The bones of a joint are covered with a smooth, spongy material called cartilage, which cushions the bones and allows the joint to move without pain. The joint is lined by the synovium. The synovium's lining produces a slippery fluid called synovial fluid that nourishes the joint and helps limit friction within. External to it is a strong fibrous casing called the joint capsule. Strong bands of tissue, called ligaments,

connect the bones and help keep the joint stable. Muscles and tendons also support the joints and enable to move [1]. With arthritis, an area in or around a joint becomes inflamed, causing pain, stiffness and, sometimes, difficulty moving. Some types of arthritis also affect other parts of the body, such as the skin and internal organs [2,3,4].

II. CLASSIFICATION

There are several diseases where joint pain is primary, and is considered the main feature Figure 2.[5-10] which include:



Figure 2: main features seen in case of arthritis

- ✓ Osteoarthritis
- ✓ Rheumatoid arthritis
- ✓ Gout and pseudo-gout
- ✓ Septic arthritis
- ✓ Ankylosing spondylitis

- ✓ Juvenile idiopathic arthritis
- ✓ Still's disease

An undifferentiated arthritis is an arthritis that does not fit into well-known clinical disease categories, possibly being an early stage of a definite rheumatic disease.[11-14]

III. CAUSES

The causes of osteoarthritis remain unknown. However, certain factors are associated with osteoarthritis [15] such as -

- ✓ joint wear-and-tear,
- ✓ joint overuse,
- ✓ inactivity,
- ✓ excess body weight, and
- ✓ Heredity
- ✓ injury (leading to degenerative arthritis),
- ✓ abnormal metabolism (such as gout and pseudogout)
- ✓ inheritance (such as in osteoarthritis)
- ✓ infections (such as in the arthritis of Lyme disease), and
- ✓ An overactive immune system (such as rheumatoid arthritis and systemic lupus erythematosus).

IV. RISK FACTORS

- ✓ Increasing age
- ✓ Female gender
- ✓ Obesity
- ✓ Injurious physical activity
- ✓ Bridging muscle weakness
- ✓ Malalignment
- ✓ Proprioceptive deficiencies(eg.charcot arthropathy)
- ✓ Genetic susceptibility(hands and hips)
- ✓ Trauma,
- ✓ Surgery,
- ✓ Excessive occupational use,
- ✓ Family history.

V. PATHOPHYSIOLOGY OF RHEOMATOID ARTHRITIS

Some external element like an infection or a trauma , genetic vulnerability to rheumatoid arthritis, surgeries, excessive occupational use, etc



Stimulate the autoimmune reaction and can give abnormalities in the immune system as well as genetic factors



Give rise to synovial hypertrophy and chronic joint inflammation



Leads to the extra-articular manifestations (overgrowth of synovial cells and activation of endothelial cells)



Progresses towards uncontrolled inflammation



Consequently gives rise to cartilage and bone damage.[31]

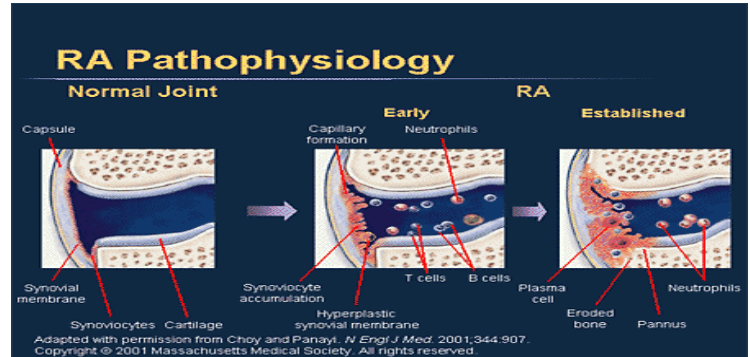


Figure 3: Pathophysiology of Rheumatoid arthritis

VI. SIGNS AND SYMPTOMS

- ✓ Malaise and a feeling of tiredness
- ✓ Weight loss
- ✓ Poor sleep
- ✓ Muscle aches and pains
- ✓ Difficulty moving the joint
- ✓ Tenderness
- ✓ Muscle weakness
- ✓ Loss of flexibility
- ✓ Decreased aerobic fitness
- ✓ Disability

VII. DIAGNOSIS

Diagnosis is made by:

- ✓ History taking
- ✓ Clinical examination
- ✓ 3.Radiology
- ✓ 4.Blood tests

Various anatomical locations have more specific guidelines for diagnosis of OA.

VIII. KNEE

A diagnosis of knee OA can be made purely with clinical findings or with a combination of clinical and radiographic findings. The European League Against Rheumatism (EULAR) recommended 3 signs (crepitus, restricted range of motion, and bony enlargement) and 3 symptoms (persistent pain, limited morning stiffness, and reduced function) for making the diagnosis. The more factors present, the greater the likelihood of OA occurring. When all 6 signs and symptoms

are present, the probability of radiographic knee OA is 99%. The synovial fluid white blood cell count should be less than 2000/ μ L.[20-22]

IX. HAND

In many cases, a diagnosis of hand OA also can be made clinically. Symptoms and signs include hand pain with use; limited morning or inactivity stiffness; involvement of the distal interphalangeal (DIP) joints, proximal interphalangeal (PIP) joints, and base of the thumb; and the presence of Heberden and Bouchard nodes. EULAR recommendations state that the probability of a patient having hand OA is 88% with the presence of the following features: patient older than 40 years, presence of Heberden nodes, family history of nodes, and joint-space narrowing in any finger joint. hemochromatosis, and secondary OA resulting from trauma or occupational factors should be considered. Imaging findings show central erosions.[23-24]

X. HIP

True hip pain often is felt in the groin, and it can radiate down the thigh or refer to the knee. Physical examination findings consistent with hip OA include tenderness and limited range of motion on internal rotation. Making a diagnosis of inflammatory hip pain can be difficult. That is why laboratory and radiographic analyses are needed to help confirm the diagnosis of hip arthritis. Prominent stiffness and uniform joint-space narrowing may suggest an inflammatory arthritis, such as ankylosing spondylitis.[25-26]

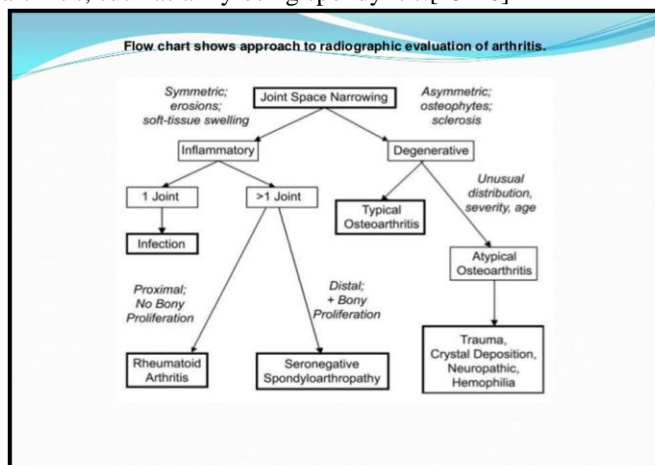


Figure 4: Main radiographic approaches for evaluation of arthritis

XI. VARIOUS TYPES

A. OSTEOARTHRITIS

Osteoarthritis is the most common form of arthritis. It can affect both the larger and the smaller joints of the body, including the hands, wrists, feet, back, hip, and knee. The disease is essentially one acquired from daily wear and tear of

the joint; however, osteoarthritis can also occur as a result of injury. Osteoarthritis begins in the cartilage and eventually causes the two opposing bones to erode into each other. Initially, the condition starts with minor pain during activities, but soon the pain can be continuous and even occur while in a state of rest. [27].

B. RHEUMATOID ARTHRITIS

Rheumatoid arthritis is a disorder in which the body's own immune system starts to attack body tissues. The attack is not only directed at the joint but in many other parts of the body. In rheumatoid arthritis, most damage occurs to the joint lining and cartilage which eventually results in erosion of two opposing bones. Rheumatoid arthritis often affects joints in the fingers, wrists, knees and elbows. The disease is symmetrical (appears on both sides of the body) and can lead to severe deformity in a few years if not treated. [28].

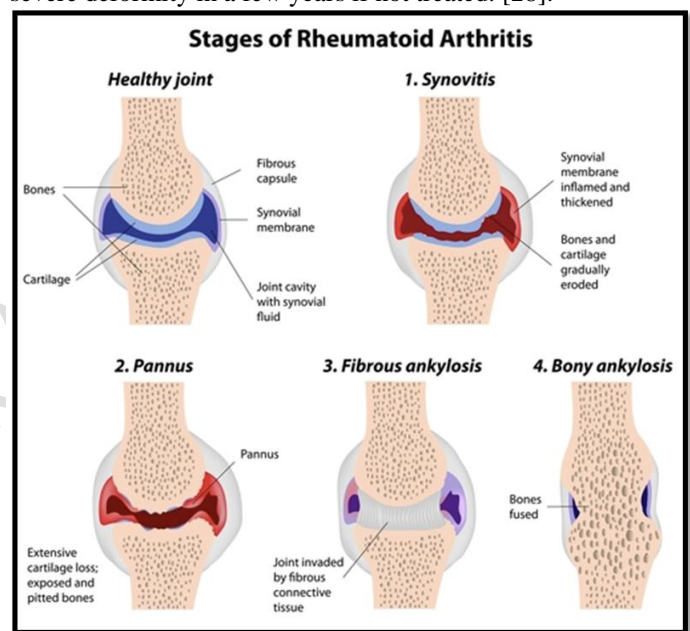


Figure 5: Stages of Rheumatoid arthritis

C. LUPUS

Lupus is a common collagen vascular disorder that can be present with severe arthritis. Other features of lupus include a skin rash, extreme photosensitivity, hair loss, kidney problems, lung fibrosis and constant joint pain.[29]

D. GOUT

Gout is caused by deposition of uric acid crystals in the joint, causing inflammation. There is also an uncommon form of gouty arthritis caused by the formation of rhomboid crystals of calcium pyrophosphate known as pseudo gout. In the early stages, the gouty arthritis usually occurs in one joint, but with time, it can occur in many joints and be quite crippling. [30,31].

	Osteoarthritis	Rheumatoid arthritis	Gouty arthritis
Speed of onset	Months	Weeks-months	Hours for an attack
Main location s	Weight-bearing joints (such as knees, hips, vertebral column) and hands	Hands(proximal interphalangeal and metacarpop halangeal joint) wrists,ank les and knees	Great toe, ankles, knees and elbows
Inflam mation	May occur, though often mild compared to inflammation in rheumatoid arthritis	Yes	Yes
Radiolo gic Change s	<ul style="list-style-type: none"> ✓ Narrowed joint space ✓ Osteophytes ✓ Local osteos clerosis ✓ Subchondral cysts 	Narrowed joint space Bone erosions	Punched out" bone erosions
Laborat ory findings	None	Anemia, elevated ESR and C-reactive protein (CRP), rheumatoid factor, anti-citrullinated protein antibody	Crystal in joints
Other features	<ul style="list-style-type: none"> ✓ No systemic signs ✓ Bouchard's and Heberden's nodes 	<ul style="list-style-type: none"> ✓ Extra-articular features are common ✓ Ulnar deviation, swan neck- and Boutonniere deformity of the hand 	Tophi

Table 1: Comparison of some major forms of arthritis

XII. PREVENTION & MANAGEMENT OF ARTHRITIS

Osteoarthritis (OA) was once considered a disorder in which joints simply wore out – the unavoidable result of a long and active life. But recent research has shown that OA is a complex process with many causes and may even be more than one disease. It is not an inevitable part of aging experts say, but rather the result of a combination of factors, many of which can be modified or prevented.[34]

- ✓ MAINTAIN A HEALTHY WEIGHT

Excess weight is one of the biggest risk factors for OA. Each kg weight gain adds nearly four kg of stress to the knees and increases pressure on the hips six-fold. Over time, the extra strain breaks down the cartilage that cushions these joints. But mechanical stress is not the only problem. Fat tissue produces proteins called cytokines that promote inflammation throughout the body. In the joints, cytokines destroy tissue by altering the function of cartilage cells. When there is weight gain, body makes and releases more of these destructive proteins.[35]

- ✓ CONTROL BLOOD SUGAR

The latest research suggests that diabetes, which affects the body's ability to regulate blood sugar (glucose), may be a significant risk factor for OA. That's because high glucose levels speed the formation of certain molecules that make cartilage stiffer and more sensitive to mechanical stress. Diabetes can also trigger systemic inflammation that leads to cartilage loss. [36]

- ✓ PHYSICAL ACTIVITY

Physical activity is the best available treatment for OA. It's also one of the best ways to keep joints healthy in the first place. As little as 30 minutes of moderately-intense exercise five times a week helps joints stay limber and strengthens the muscles that support and stabilize the hips and knees. Exercise also strengthens the heart and lungs, lowers diabetes risk and is a key factor in weight control.

- ✓ CHOOSE A HEALTHY LIFESTYLE

Some risk factors for OA can't be changed. For instance, OA becomes more common as people age, though the cause isn't clear. One idea is that the number of cartilage cells simply diminishes over time. Women develop OA more than men, especially after age 50, lower estrogenic levels after menopause may also play a role. In addition, some people inherit genes that make them more susceptible to OA. It's important to remember, though, that arthritis is a multifactorial disorder and simply inheriting a gene doesn't mean one will develop it. Ultimately, the best defense against any disease, including OA, is a healthy lifestyle. The way one eats, exercises, sleeps, manages stress and interacts with others, and whether smokes or drinks can have a tremendous influence not just on overall health, but also on the health of joints [37].

XIII. TREATMENT

There is no cure for either rheumatoid or osteoarthritis. Treatment options vary depending on the type of arthritis and include-

- ✓ Physical therapy
- ✓ Lifestyle changes (including exercise and weight control),
- ✓ Orthopedic bracing

- ✓ Medications (medications can help reduce inflammation in the joint which decreases pain and by decreasing inflammation, the joint damage may be slowed).
- ✓ Joint replacement surgery may be required in eroding forms of arthritis. [38]

XIV. NON-PHARMACOLOGICAL

PATIENT EDUCATION: Although patient education obviously is essential, it can be especially important in OA, where much of the treatment is based on patient initiative. Education should delineate the objectives and importance of nonpharmacological treatments and cover specific topics, such as non-pharmacological management of pain, problem solving, and principles of joint protection. Adjunctive methods include providing reading materials, group education, spousal education, and follow-up telephone calls.

- ✓ **ORTHOSES FOR KNEE OA:**
 - knee sleeves(elastic nonadhesive devices that stabilize the patella and tibiofemoral joint).
 - unloading knee braces,
 - custom-fitted devices (that have external stems, hinges, and straps). [40]
- ✓ **ORTHOSES FOR HAND OA:**
Splints that immobilize both the wrist and the thumb base appear to be more effective than others [41].
- ✓ **INSOLES AND FOOTWEAR FOR KNEE OA:** Patients with knee OA should be evaluated for foot deformities that may affect gait and mechanical loading of the knee. The presence of foot deformities, including pes planus and hallux valgus, has been associated with increased disability in women with knee OA[42]Treatment of patients with these conditions may improve gait mechanics. In the absence of foot deformities, there may still be a benefit of insoles for knee OA.
- ✓ **INSOLES AND FOOTWEAR FOR HIP OA:**
 - Cushioning or neutral insoles
 - lateral wedge insoles
- ✓ **EXERCISE FOR KNEE OA:**
Aerobic exercise improves general physical performance.
- ✓ **EXERCISE FOR HIP OA:**
 - aerobic exercise
 - muscle strengthening
 - range of motion.
 - Underwater exercises
- ✓ **EXERCISE FOR HAND OA:**
 - grip strength
 - preserving range of motion
 - adaptive modalities for specific activities of daily living.
- ✓ **DIET/WEIGHT LOSS:** Obesity is a risk factor for all 3 types of OA; the greatest association is with knee OA. Weight loss may improve pain and function in both knee and hip OA. A nutritional and weight loss plan should be recommended to overweight patients.
- ✓ **FOR HIP OA,**
 - thermotherapy and TENS, which may have a slight benefit of improving pain.

- Assistive walking devices also are recommended on the basis of expert opinion.
- ✓ **FOR HAND OA,**
 - Paraffin wax treatments often are used; paraffin wax machines may be purchased for home use at a modest cost.
 - Application of local heat may be used in managing pain and is recommended before exercise.

XV. PHARMACOLOGICAL

- ✓ **Acetaminophen.** Recommendations for the use of pharmacological therapies are similar for all kinds of OA. Acetaminophen should be the first choice, unless there is a contraindication, because of its safety, efficacy, and tolerability.
- ✓ **NSAIDs.** If acetaminophen is not sufficient, NSAIDs may be used at the lowest effective dose possible. For patients with an increased risk of GI adverse effects, a cyclo-oxygenase (COX)-2 inhibitor or nonselective NSAID should be prescribed with misoprostol or a proton pump inhibitor. Renal function should be monitored in patients taking NSAIDs for extended periods.
- ✓ **Topical NSAIDs and capsaicin.** These agents may be used as alternatives or adjunctive therapy to oral analgesics. They generally are safe and well-tolerated.
- ✓ **Intra-articular therapy.** If the aforementioned therapies are not sufficiently effective or are intolerable, a trial of intra-articular therapy may be considered. The efficacy of intra-articular corticosteroids is well established; they may be used with or without signs of inflammation.
- ✓ **Glucosamine and chondroitin sulfate.** These agents may provide benefit in patients with knee OA, because these agents have minimal adverse effects, they may be considered for patients for whom other therapies have not succeeded or for those who are intolerant to them
- ✓ **Narcotic analgesics.** If the previously discussed treatments have not succeeded or are intolerable, narcotic analgesics may be used. At this point, surgical treatment should be considered, and the use of nonpharmacological therapies should be optimized. Strong opioid analgesics should be used only in cases of extreme pain. Because many patients with OA are older, narcotics should be used with caution—their adverse effects include somnolence, constipation, and nausea.
- ✓ Nonpharmacological treatments should form the basis of any OA regimen, but they often are underutilized and underemphasized. The Figure shows a flowchart that summarizes the general strategy in OA management.

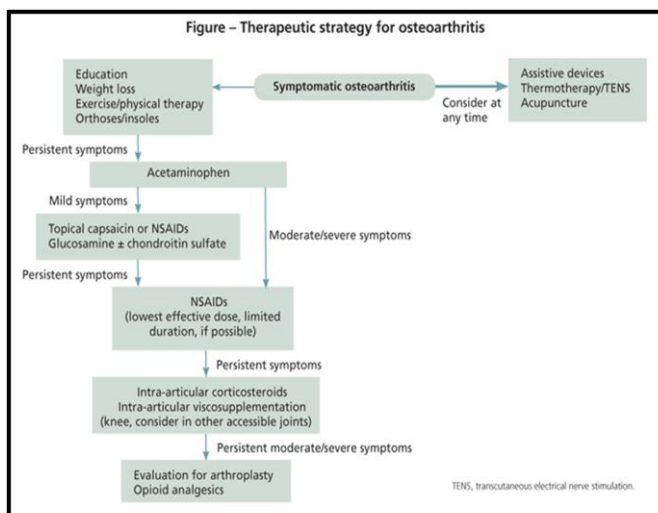


Figure 6: general strategy in OA management

XVI. SURGERY

- ✓ Surgery is generally reserved for those patients with arthritis that is particularly severe and unresponsive to the conservative treatments.
- ✓ Surgical procedures can be performed to relieve pain, improve function, and correct deformity.
- ✓ Occasionally, joint tissue is surgically removed for the purpose of biopsy and diagnosis.
- ✓ Joint surgery using a viewing tube with a cutting instrument is called arthroscopy.
- ✓ Osteotomy is a bone-removal procedure that can help realign some of the deformity in selected patients, usually those with knee disease.
- ✓ Removal of inflamed joint lining tissue is called synovectomy.
- ✓ In some cases, severely degenerated joints are best treated by fusion (arthrodesis) or replacement with an artificial joint (arthroplasty).
- ✓ "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. Total hip and total knee replacements are now commonplace. These can bring dramatic pain relief and improved function.
- *Self-Care at Home[48-49]*
- ✓ As a first step, rest, heat/cold applications, and topical pain creams can be helpful.
- ✓ Supplements glucosamine and chondroitin have been helpful for some. These supplements are available in pharmacies and health-food stores without a prescription. If patients do not benefit after a two-month trial, they may discontinue these supplements.
- ✓ For another type of dietary supplementation, it should be noted that fish oils have been shown to have some anti-inflammation properties. Moreover, increasing the dietary fish intake and/or fish oil capsules (omega-3 capsules) can sometimes reduce the inflammation of arthritis.

- ✓ Weight reduction is recommended for patients who are overweight and have early signs of osteoarthritis of the hands, because they are at a risk for also developing osteoarthritis of their knees. Even modest weight reduction can be helpful.
- ✓ Pain medications that are available over the counter, such as acetaminophen (Tylenol), can be very helpful in relieving the pain symptoms of mild osteoarthritis and are often recommended as the first medication treatment. Since acetaminophen has fewer gastrointestinal side effects than nonsteroidal antiinflammatory drugs (NSAIDs), especially in elderly patients, acetaminophen is generally the preferred initial drug given to patients with osteoarthritis.
- ✓ Some patients get significant relief of pain symptoms by dipping their hands in hot wax (paraffin) dips in the morning.
- ✓ Warm water soaks and wearing night time cotton gloves (to keep the hands warm during sleep) can also help ease hand symptoms..
- ✓ Gentle range of motion exercises performed regularly can help to preserve function of the joints. These exercises are easiest to perform after early morning hand warming.
- ✓ Pain-relieving creams that are applied to the skin over the joints can provide relief of daytime minor arthritis pain. Examples include capsaicin (Arthricare, Zostrix), diclofenac cream, salicyl (Aspercreme), methyl salicylate (Bengay, Icy Hot), and menthol (Flexall).
- ✓ For additional relief of mild symptoms, local ice application can sometimes be helpful, especially toward the end of the day.
- ✓ Occupational therapists can assess daily activities and determine which additional techniques may help patients at work or home. There are a few forms of arthritis, such as gout, that can be impacted by dietary changes.
- ✓ Finally, when arthritis symptoms persist, it is best to seek the advice of a doctor who can properly guide the optimal management for each individual patient.

A. EFFECTIVE NATURAL TREATMENT FOR ARTHRITIS

Listed below are some effective arthritis home remedies which are found to be useful in arthritis cure and arthritis pain relief. Natural treatment for arthritis is also without side effects.

- ✓ As part of the dietary regimen, it is imperative that patients of arthritis choose a diet that will contribute to the alkaline content of blood. Diet rich in raw vegetables, sprouts and juicy fruits should be opted for in place of one rich in animal protein, carbohydrate and fat.
- ✓ Sometimes in course of therapy, patients are recommended diet solely consisting of raw vegetables and fruits.
- ✓ Sea water has been found effective in relieving painfulness and stiffness of the affected joints. The iodine content of sea water not only helps to balance the pH of the body but also positively influences the thyroid functioning. Thus bathing in sea water can be recommended for patients struck by arthritis.

- ✓ As an alternative, patient may be advised to take a dip into warm water enriched with common salt.
- ✓ Special care should be taken to exposure oneself to sunlight and ambience marked by proper ventilation.
- ✓ Drinking water stored in copper content proves to be beneficial from the point of view of arthritis patients as traces of copper accumulation making its way to the system contributes to strengthening the skeletal and muscular system.
- ✓ Calcium supplements as well as calcium taken as 'calcium lactate' serves to strengthen bones and muscles.
- ✓ Garlic with its multi sided medicinal qualities is also useful for arthritis. Consumption of two to three cloves of garlic work wonder against inflammation leading to aching joints.
- ✓ Besides garlic, ginger is also effective from the point of view of rheumatic arthritis. Consumption of at least thirty to fifty grams of ginger serves to reduce the painful conditions.
- ✓ Juice extracted from potato is similarly beneficial if consumed before breakfast. One may also soak sliced potato along with its peel in a bowl filled with water for drinking the water used for soaking potato slices.
- ✓ Water soaking sesame seeds can be had early in the morning along with the seed being soaked. The remedy will make your joint pains infrequent.
- ✓ Pineapple juice is also an effective natural option on account of its 'bromelain' content which serves to reduce swelling and pain.
- ✓ Though animal protein is not recommended the Omega3 fatty acids of certain oily fish proves to be beneficial from the view point of arthritis. Supplements of the same or food rich in Omega 3 fatty acid can be taken.
- ✓ One table spoon measure of cod liver oil may be added to a glass filled with orange juice. The said mixture will assure you of the requisite nutrients in forms of Vitamin C and Omega 3 fatty acid.
- ✓ Juice extracted from raw vegetables such as celery, spinach and carrot blended in equal measure is also one of the healthy options which serve to clear blood of the accumulated deposits.
- ✓ Coconut water and milk of the same are equally beneficial as natural remedial measures
- ✓ While the consumption of tea and coffee should be reduced, as an alternative option you may go for herbal tea. Herbal tea based on alfalfa has been found to be beneficial from the point of view of arthritis.
- ✓ Regular consumption of banana is also beneficial because Vitamin B content of the fruit acts against stiffness of joints.
- ✓ Soup made out of green gram is another of your naturally nourishing options which works wonders if consumed regularly with crushed cloves of garlic.
- ✓ For soothing and instantaneous relief from joint pains; application of tolerably warm coconut or mustard oil enriched with crushed camphor proves to be relieving.
- ✓ Circulation around the affected tissues can be enhanced with the help of massaging of herbal oils such as lemon, rosemary, lavender and chamomile. Thus gentle

massaging of the mentioned oils will prove to be relieving.

- ✓ Gentle massaging of castor oil is also similarly beneficial.
- ✓ Applying mildly hot compresses of apple vinegar before pushing off to bed can also serve to keep your joints warm and soothing.

XVII. CONCLUSION

Besides adopting the mentioned strategies for the arthritis patients are also advised to keep themselves sufficiently mobile as lack of movement leads to more pain and joint stiffness. In fact, certain yogic exercises and postures are considered beneficial too but maintaining overall good health and strength with exercise and good nutrition can be helpful in preventing joint disease.

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