

# COMPREHENSIVE APPROACHES TO THE INVESTIGATION AND MANAGEMENT OF KNEE OSTEOARTHRITIS

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## ABSTRACT

Osteoarthritis is a degenerative joint disorder of ageing, osteoarthritis is now considered to be a joint disorder resulting from damage and repair to cartilage and reaction in the surrounding bone. The patient complains initially of pain on movement, and over a period the joint becomes stiffer and stiffer, gradually fixing in the position of maximum comfort. The muscles around the joint tend to waste and weakness sets in, further hampering the patient's mobility. Eventually the joint may actually collapse, the limb shortens and the joint may lose its normal alignment. The homoeopathic medicines are effective in reducing pain of patient with osteoarthritis of knee joint as well as changes in accompanying symptoms along with variations in pain on a case of osteoarthritis of knee joint and the medicines affective in improving pain of osteoarthritis of knee joint.

## INTRODUCTION:

Articular cartilage is a complex structure made up of collagen and proteoglycan molecules which are highly hydrophilic and create the turgor pressure of the articular cartilage which gives it its strength and resilience. The joint surface itself is lubricated by a film of fluid squeezed out of the articular cartilage by the pressure applied. The first signs of osteo-arthritis appear to be some softening of the articular cartilage (or at least loss of this turgor pressure) followed by a break-down in the smooth surface. Micro cracks appear in the articular surface (fibrillation) and pieces of the articular cartilage start to break off. These small fragments are mopped up by the macrophages in the synovium but this produces an inflammatory response. At the same time, it appears that some form of repair mechanism is going on. This repair mechanism does not seem able to replace the articular cartilage in the load-bearing area of the joint. Instead, there is new bone formation and fibrocartilage laid down around the edge of the joint. <sup>(1)</sup>

This ring of new bone may be visible on the X-ray as osteophytes. The bone arcades lying immediately beneath the articular cartilage and which supported it now become more sclerotic, perhaps because of the increasing load coming on to the bone. The synovial fluid appears to break through the cartilage to create cysts in the subchondral bone. Finally, the articular cartilage is completely worn away (eburnation) and there is direct articulation bone to bone. Pain may serve a protective function because in those joints lacking pain perception (Charcot's joints) the disintegration of the joint is both more rapid and more severe. Eventually the bone itself breaks down and the joint collapses completely. <sup>(2)</sup> There are two types i.e., primary osteoarthritis: Risk factors include obesity, increasing age, female sex, wear of cartilage through repeated trauma. Secondary osteoarthritis: Osteoarthritis may result from damage to the joint or changes to the way forces are transmitted through the cartilage. Peak onset of age group is 45-60 years. The clinical features with gradual onset of joint pain, which is exacerbated by exercise and relieved by rest. As the disease progresses, pain occurs with less activity and eventually occurs at rest.

## KEYWORDS:

Bone, Degenerative, Knee, Pain, Osteoarthritis.

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Stiffness occurs after a period of rest, but is less severe than rheumatoid arthritis and lasts 5-15 minutes in morning. On examination there may be joint line tenderness, joint effusion, crepitus and bony enlargement due to osteophyte development. There is gradual limitation of movement with resultant muscle wasting and deformity. Changes in upper extremity are enlargement of the distal (Heber den's nodes) and proximal interphalangeal (Bouchard's nodes) joints results in a square appearance of the hands. The development of Heber den's nodes appears to have a genetic predisposition. <sup>(2)</sup> Changes in feet and ankles are first metatarsophalangeal joint is commonly affected; subtalar joint involvement may cause difficulty with walking. Changes in medial part of the knee joint may be affected more than the lateral causing a genu varum. Knee involvement often results in osteophyte formation, joint effusion, crepitus and a Baker's cyst palpable in the popliteal fossa. Changes in hips are commonly affected, although some apparent hip pain may be referred from other areas. Changes in spine are Particularly the cervical and lumbar region.

#### **Cardinal features of osteoarthritis:**

Present with loss of joint space, subchondral sclerosis, osteophytes, cysts. joint narrowing, osteophyte formation, subchondral sclerosis and cyst formation. On inspection the joint may be slightly red and there may be swelling of the soft tissues, combined with muscle wasting. The limb is held in the position of comfort and may even be deformed. There may be some heat over the joint, and careful examination usually reveals at least a small effusion (although it can be very large). <sup>(3)</sup> The osteophytes around the joint may be palpable and the joint line itself is often tender to palpation. Movement will be markedly limited and crepitus may be both palpable and audible. In osteoarthritis, the knee tends to fall into varus (bow legs), while in rheumatoid arthritis the knee falls into valgus (knock knees). The hip tends to flex into internal rotation, and the limb may actually shorten if there is bone loss.

#### **Confirmatory test of OA:**

**Fluctuation Test:** Fluctuation is demonstrated by pressing the suprapatellar pouch with one hand and feeling the impulse with the thumb and the fingers of the other hand placed on either side of the patella or the ligamentum patellae. <sup>(3)</sup>

**Patellar tap Test:** Patellar tap which is a pathognomonic sign of effusion of the knee joint, is elicited by pressing the suprapatellar pouch with one hand driving whole of its fluid into the joint proper so as to float the patella in front of the joint. With the index finger of other hand, the patella is pushed backwards towards the femoral condyles with a sharp and jerky movement. The patella can be felt to strike on the femur, which is known as "patellar tap". A moderate amount of fluid must be present in the joint to make this test positive. For demonstration of small amount of fluid in the knee

joint two tests can be performed. The patient keeps standing and gentle pressure is applied over one of the obliterated hollows on either side of the ligamentum patellae (in order to displace fluid) and now the pressure is released. The hollow will be refilled slowly. The second method is to elicit 'patellar tap' with the patient standing.

**Trans illumination test:** Trans illumination test should always be performed in case of swellings around the knee joint. This test will be positive when swelling is an enlarged bursa or any cystic swelling e.g. Marrant-Baker cyst <sup>(4)</sup>

**McMurray's Test:** This is a very popular test to detect any tear either in the medial or lateral semilunar cartilage. In making the examination the patient must be in recumbent and relaxed, the surgeon standing at the side of the upper limb. He grasps the foot firmly with one hand and the knee with the other hand. The knee joint is completely flexed that means the heel touches the buttock. The foot is now rotated externally and the leg abducted at the knee. This twisting movement is done for a few times and then the joint is slowly extended keeping the foot externally rotated and abducted. <sup>(4)</sup> If the posterior end of the medial semilunar cartilage is torn the patient will complain of pain at this stage as the torn cartilage will be caught between the femur and the tibia. At the same time a definite 'click' will be felt by the hand at the knee and the patient will experience a feeling of giving way of the knee joint simultaneously. The angle at which this occurs, indicates the position of the cartilaginous lesion. When middle of the cartilage is torn the click is felt at the middle of the extension and when the anterior horn is torn click is felt almost at the end of extension.

**Apley's Grinding Test:** The patient lies prone on the table. The clinician places his knee on the patient's thigh in order to fix the femur. The knee joint is flexed to the right angle. Now the clinician applies compression and lateral rotation to the leg from the foot ie. Grinding. If the patient complains of pain by the manoeuvre, there is a tear in the medial semilunar cartilage. If the patient complains of pain while the clinician compresses and internally rotates the leg, there is a tear in the lateral semilunar cartilage. <sup>(5)</sup>

#### **Investigations**

The first radiological finding is narrowing of the joint space. In weight bearing joints narrowing is maximal in the areas subjected to the greatest pressures. As the cartilage is worn away, friction causes the exposed subchondral bone to become sclerotic (subarticular bony sclerosis). The presence of bone cyst formation is a common finding. Later findings include bony collapse and the formation of osteophytes (bony outgrowths that are seen at the margins of the joint). Inflammatory markers and autoantibodies are negative. <sup>(5)</sup>

### Treatment

The early treatment of osteoarthritis is aimed at treating the pain and disability. Nonsteroidal anti-inflammatories may help with the pain. Physiotherapy should help to maintain mobility. It is said by some that weight loss improves symptoms. Walking sticks and household aids including a seat in the shower and handles around bathroom fittings may help the patient to maintain independent existence. Once these non-operative measures are no longer adequate, joint replacement should be considered in the hip, knee and the shoulder, as replacement in these joints now has good long-term results. <sup>(6)</sup> Even so, in a young active patient, an arthrodesis should always be considered as an alternative. It should give complete pain relief and can always be taken down and replaced with an artificial joint if necessary. Arthrodesis should only be considered when a single joint is affected, otherwise it transfers extra load on to already compromised joints.

### Management

Non-pharmacological management includes weight loss, physiotherapy, walking aids and hydrotherapy to rebuild lost muscle bulk. Medical treatments are used for pain relief. Simple analgesia and nonsteroidal anti-inflammatory drugs are the mainstay of treatment supplemented by intra articular steroid injection. See also indications for Cox II antagonists under rheumatoid arthritis. Surgical to relieve pain not treated by medical management and to increase useful function. <sup>(7)</sup> Osteotomy is the surgical realignment of a joint (normally hip or knee), which may produce benefit for 1-10 years' post-surgery. It allows alteration of the muscle use, the contact areas and the blood dynamics within the joint. It is of most use in younger patients with a good range of movement and relative preservation of the intra-articular cartilage. Arthroscopic procedures include synovectomy (removal of the synovium), irrigation of joints and debridement.

Arthroplasty (joint replacement) is the treatment of choice in older patients. Hip and knee replacements are the most successful; however, there is a risk of failure after about 10 years. In the upper limb, although the joints are not weight bearing, the normal range of movement is difficult to achieve and the prostheses are prone to failure. Arthrodesis (joint fusion) can be useful for pain, but can only be used if the loss of function is acceptable. <sup>(8)</sup>

### Common Passive Treatments for Knee Osteoarthritis

**Cold therapy:** By reducing circulation, cold therapy can help decrease swelling. For example, your physical therapist may place a cold compress on your knee joint.

**Heat therapy:** Heat therapy increases blood flow to decrease stiffness in the knee joints and muscles surrounding the knee. For example, the physical therapist can place a warm heating pad on your knee joint to promote circulation.

**Hydrotherapy:** Also sometimes referred to as aquatic therapy, this treatment uses water to decrease your knee osteoarthritis symptoms. There are several advantages of hydrotherapy. For example, you can do gentle exercises in the water (which won't aggravate your joints). Also, just being in warm water can help facilitate motion as well as help you deal with pain and other knee OA symptoms. <sup>(8)</sup>

### Prognosis

The disease may show a slow progression, little or no change over years, or a stepwise deterioration. There are some genetically inherited disorders with early onset osteoarthritis, which have a much worse prognosis. Common Physical therapy can help to reduce the pain, swelling, and stiffness of knee osteoarthritis, and it can help improve knee joint function. It can also make it easier for you to walk, bend, kneel, squat, and sit. The two main types of physical therapy—*passive* and *active* treatments—can help make your knee OA more manageable. With passive treatments, the physical therapist does the majority of the work. But with active treatments, you do more of the work, such as at-home exercises. <sup>(9)</sup>

### Osteoarthritis Exercises:

There are mainly three kinds i.e., range-of-motion to maintain normal joint movement and relieve stiffness these make the joints flexible. Strengthening exercises to increase the strength of muscles that support the joints affected by arthritis. Endurance exercises improve cardiovascular fitness, control weight and improve overall body function. <sup>(10)</sup> Some examples of exercises specifically for the legs good for those with osteoarthritis of the knee and or hips. Quad sets while in a seated position, with legs fully extended in front of you, make a muscle with your thighs trying to push the back of your knee down towards the floor. Hold for 10 seconds, relax and then repeat. Wall slide place your back up against the wall with your hips and knees bent to a 90-degree angle as if you were sitting in a chair. Hold this position for 10 seconds, then come up and relax. Isotonic Quad exercise, sitting in a chair with your feet planted flat on the floor, raise your right leg straight out in front of you. Relax and bring back to the floor. Repeat on the left. As you are able to you can add ankle weights to increase resistance. <sup>(11)</sup>

Isometric Hamstrings while lying on the floor place heels on surface such as a couch or an exercise ball. Press down using the backs of your thighs and hold contraction for 10 seconds. Relax and then repeat. Isotonic Hamstrings lying on your belly with a pillow under your abdomen to support your back, bend your knee and bring your foot back towards your buttock. Bring back down to the floor repeat on the other side. <sup>(11)</sup> Isometric Glutes Lying down on a flat surface back flat on the floor, bend your knees so that your feet are flat on the floor. Raise your buttocks up off the ground contracting your butt muscles together. Hold for 10 seconds then

relax. Calf muscles Strengthening Using a wall or chair for balance, go up on your toes using your calf muscles hold yourself. Contract for 10 seconds, relax and repeat. Osteoarthritis exercises reduces joint pain and stiffness, and increases flexibility, muscle strength, and endurance. It also helps with weight reduction and enhances a sense of well-being. <sup>(12)</sup>

#### CONCLUSION:

Osteoarthritis of knee joint is one of the condition which is most commonly affecting the people of now a day. The homoeopathic medicines are very much effective in treating the osteoarthritis of knee joint, and there are various medicines for treating this condition. For getting a good result in treating this condition needs a proper case taking and individualization has to be considered. In homoeopathy, master says those who frequently assign the cause of chronic even with inveterate diseases, either thorough cold wetting, drinking cold water<sup>(13)</sup> or being after being heated or a sprain, a vexation etc. are much insignificant to develop a chronic disease in a healthy body, and to aggravate it year by year, with all chronic diseases from developed Psora<sup>(14)</sup> By the homoeopathic medicine Aconitum Napellus, Bryonia Alb, Rhus toxicodendron, Gnaphalium are helpful for pain and inflammation reduction which comes on suddenly after exposure to cold wind and weather. The person is likely to feel fearful, panicked, or agitated. Painless crackling of all joints. Hot hands and cold feet. Rheumatic inflammation of joints, worse at night. Red shining swelling, very sensitive, knees unsteady. <sup>(15)</sup> Weak and lax ligaments of all Chronic arthritis with a feeling of bruised soreness can indicate a need for this remedy. Pain is worse from touch, and may occur in joints that were injured in the past. Cannot walk erect. On account of bruised pain in pelvic region. This remedy relieves joint pain improved by staying immobile and applying pressure. Knees stiff and painful. Joints red, swollen, hot with stitches and tearing. Worse on least movement. Stiffness and soreness of the joints, worse from drafts and cold, may be relieved by this remedy. Aching in the bones and tiredness are common, and the person feels worse from exertion.

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