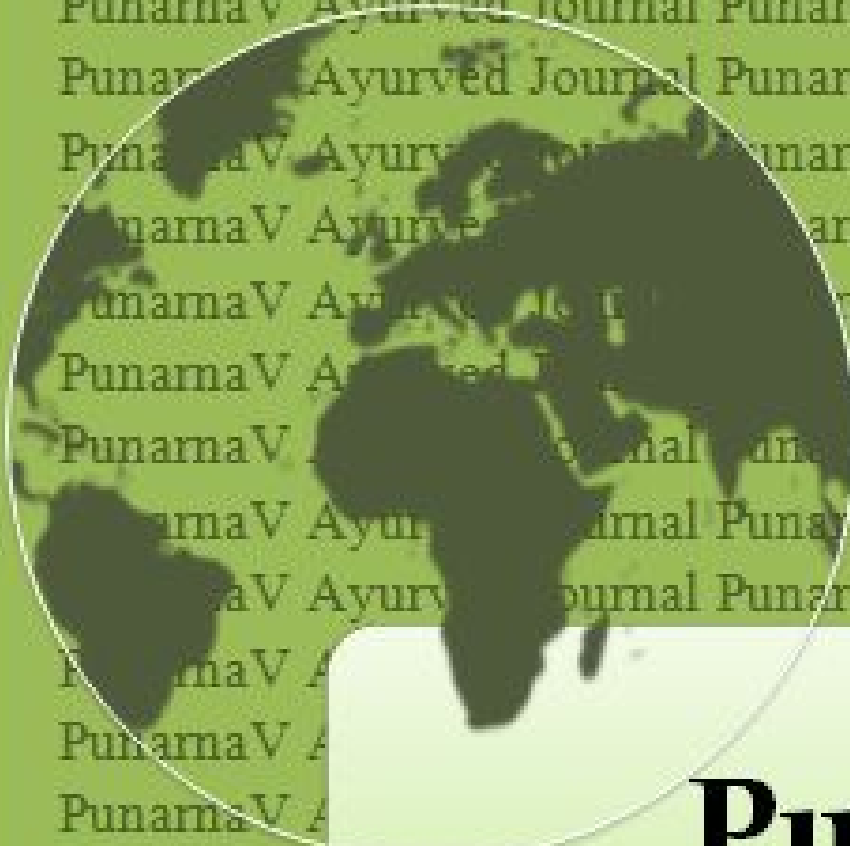


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ANATOMICAL CHANGES IN JOINTS DURING PROGRESSION OF OSTEOARTHRITIS

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ABSTRACT:

Musculoskeletal disorders predominate in the older adults and are a major reason for chronic disability and health care utilization in the geriatric age group. The prevalence of osteoarthritis (OA) increases with age such that 30 to 50% of adults over the age of 65 years suffer from this condition. Osteoarthritis can be defined as a disorder of movable joints characterized by deterioration of articular cartilage, osteophyte formation, bone remodeling, changes in periarticular tissues and a low-grade, nonpurulent inflammation of variable degree. It is also known as degenerative arthritis, degenerative joint disease or osteoarthrosis. Although classically considered a “wear and tear” degenerative condition of articular joints, recent studies have demonstrated an inflammatory component to OA. The most common symptoms are joint pain and stiffness. Although OA is most common in the hands, involvement of the knees and hips is usually much more disabling. It is believed to be caused by mechanical stress on the joint and low grade inflammatory processes. Rather than directly causing OA, aging changes in the musculoskeletal system contribute to the development of OA by making the joint more susceptible to the effects of other OA risk factors that include abnormal biomechanics, joint injury, genetics and obesity.

In Ayurveda osteoarthritis is described as Sandhigata vata. Sandhigata vata (Osteoarthritis) is primarily a disease of vitiated Vata.

KEY WORDS: *Cartilage, Osteophytes, Sandhigata vata.*

INTRODUCTION

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Musculoskeletal disorders predominate in the older adults and are a major reason for chronic disability and health care utilization in the geriatric age group. Osteoarthritis is the most common type of arthritis. Osteoarthritis is an important cause of disability and second most common musculoskeletal problem in the world (30%) after back pain (50%). The reported prevalence of OA in rural India is 5.8%. Because of the aging of western populations and obesity, a major risk factor, are increasing in prevalence, the occurrence of osteoarthritis is on the rise. Osteoarthritis (OA), also called osteoarthrosis or degenerative joint disease, is the most

common form of chronic disorder of synovial joints. Osteoarthritis can be defined as a disorder of movable joints characterized by deterioration of articular cartilage, osteophyte formation, bone remodelling, changes in periarticular tissues and a low-grade, nonpurulent inflammation of variable degree.

Ayurvedic review

In *Ayurveda* it is described as *Sandhigata vata* which occurs due to *Vata dosha*.

Nidana

- *Charaka* has described *Sandhigata vata* under the heading *Vata vyadhi*. So the *Nidana* are same as of *Vata vyadhi*.
- *Aharaja nidana* – *Atiruksha, atishita, atialpa, atilaghu, abhojana*.
- *Viharaja nidana* - *Atijagarana, divasvapna, ativyavaya, vegasandharana, plavana, ativyayama*.
- *Manas nidana*– *Atichinta, atishoka, atikrodha, atibhaya*.
- Others – *Langhan, vishama upachara, dhatu samkshaya*.

Samprapti

Nidana of Vata prakopa ahara vihara



Vitiation of Vata dosha



Sthana sanshraya of Vata dosha in joints



Vikruti of Sira, snayu and kandara



Sandhigata vata

Samprapti ghatak

Dosha – Vata

Dushya – Rasa, rakta, asthi

Adhithana – Asthi-sandhi

Srotas – Asthivaha, Majjavaha

Srotodushti – Sanga, granthi, vimargagamana

Agni – Vishmagni

Vyadhi swabhava – Chirkari

Sadhyasadhyata – Kruchrasadhya/ yapyata

Purvaroopo of Sandhivata

There is no specific description about *Purvaroopo* of *Sandhivata*. Signs and symptoms of *Sandhivata* in initial stage of onset are mild and not clearly manifested. Therefore mildly manifested signs and

symptoms of *Sandhivata* at onset may be considered as *Purvaroopo*.

Lakshana or Roopa of Sandhigata vata

If the *Vata* located in the joints is provoked, there occurs the swelling of the joints which feel on palpation as if they are bags inflated with air and the movements of extension and flexion are accompanied with pain. Other symptoms

✓ *Sandhi Shoola* (Pain in joints)

✓ *Sandhi Shotha* (Swelling over joints)

✓ *Sparsha – asahatva* (Tenderness)

✓ *Sandhigraha* (Stiffness)

✓ *Akunchana Prasarana Vedana*

✓ *Sandhi Sphutana* (Crepitus)

✓ *Hanti Sandhi Gati* (Restricted movements)

MODERN REVIEW

OA affects certain joints, yet spares others. Commonly affected joints include the cervical and lumbosacral spine, hip, knee and first metatarsal phalangeal joint (MTP). In the hands, the distal and proximal interphalangeal joints and the base of the thumb are often affected. Usually spared are the wrist, elbow and ankle. However, the pattern of joint involvement may be related to the type of physical activity.

Pathologic changes

The pathologic changes occur in the articular cartilages, adjacent bones and synovial membrane.

1. Articular cartilage

The regressive changes are most marked in the weight bearing regions of articular cartilages. Initially, there is loss of cartilaginous matrix (proteoglycans)

resulting in progressive loss of metachromasia. This is followed by focal loss of chondrocytes and at other places, proliferation of chondrocytes forming clusters. Further progression of the process causes loosening, flaking and fissuring of the articular cartilage resulting in breaking off of pieces of cartilage exposing subchondral bone. Radiologically, this progressive loss of cartilage is apparent as narrowed joint space.

2. Bone

The denuded subchondral bone appears like polished ivory. There is death of superficial osteocytes and increased osteoclastic activity causing rarefaction, microcyst formation and occasionally microfractures of the subjacent bone. These changes result in remodelling of bone and changes in the

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shape of joint surface leading to flattening and mushroom like appearance of the articular end of the bone. The margins of the joints respond to cartilage damage by osteophyte or spur formation. These are cartilaginous outgrowths at the joint margins which later get ossified. Osteophytes give the appearance of lipping of the affected joint. Loosened and fragmented

osteophytes may form free 'joint mice' or loose bodies.

3. Synovial membrane

Initially, there are no pathologic changes in the synovium but in advanced cases there is low grade chronic synovitis and villous hypertrophy. There may be some amount of synovial effusion associated with chronic synovitis.

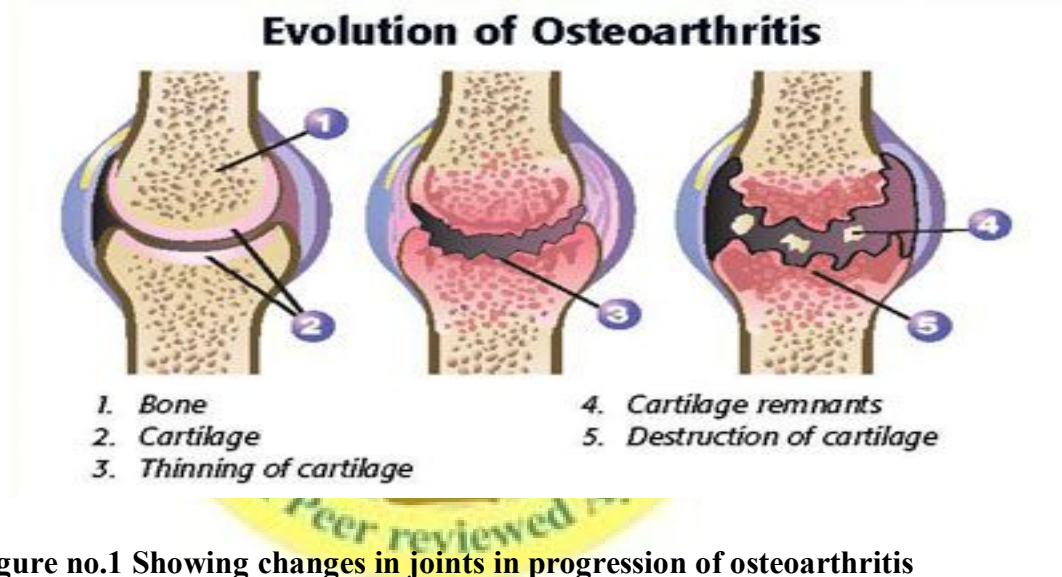


Figure no.1 Showing changes in joints in progression of osteoarthritis

Clinical features

- ✓ Minor degree of OA may remain asymptomatic.
- ✓ In symptomatic cases, clinical manifestations are joint stiffness, diminished mobility, discomfort and pain.
- ✓ Pain in or around the involved joints is the cardinal symptom. Usually it starts

insidiously as intermittent, localised, deep ache, often aggravated by joint use and relieved by rest, in an asymmetric fashion and then become symmetric. The pain becomes persistent and in advanced cases night pain may be very disturbing.

- ✓ Stiffness in joints on first awakening (morning stiffness) in OA usually lasts 5 minutes to 30 minutes. Stiffness occurring after periods of rest or

inactivity is frequent and lasts for a few minutes. Functional impairment in OA is variable and depends on associated muscle wasting, weakness and radiological severity of the disease.

- ✓ Degenerative changes in the interphalangeal joints lead to hard bony and painless enlargement in the form of nodules called heberden's nodes (at distal phalanx) and bouchard's nodes (at proximal interphalangeal joints). These nodes are more common in females and heredity seems to play a role.
- ✓ In the spine, osteophytes of OA may cause compression of cervical and lumbar nerve root with pain, muscle spasms and neurologic abnormalities.
- ✓ Signs of OA include bony swelling, crepitus (sensation of bone rubbing against bone on movement), restricted movement, and deformity of joints, muscle weakness and muscle wasting.

Types

OA occurs in two clinical forms – primary and secondary.

1. Primary OA

It occurs in the elderly, more commonly in women than in men. The process begins by the end of 4th decade and then progressively and steadily

increases producing clinical symptoms. Little is known about the aetiology and pathogenesis of primary OA. The condition may be regarded as a reward of longevity. Probably, wear and tear with repeated minor trauma, hereditary, obesity, aging; all contribute to focal degenerative changes in the articular cartilage of the joints.

2. Secondary OA

It may appear at any age and is the result of any previous wear and tear phenomena involving the joint such as previous injury, fracture, inflammation, loose bodies and congenital dislocation of the hip.

Risk factors for development of OA

Besides age, the common risk factors for OA include obesity, previous joint injury, genetics and anatomical factors including joint shape and alignment. Additional factors include gender, race, and nutritional factors, such as vitamin D deficiency. These risk factors appear to interact with age to determine which joints are affected by OA and how severe the condition will be. A joint injury earlier in life predisposes that particular joint to OA later in life. There is also evidence to

suggest that an older adult will develop OA faster than a younger adult after an acute joint injury such as an anterior cruciate ligament tear. Other age-related factors that contribute to the development of OA include

a decline in muscle strength, loss of proprioception, degenerative changes in the meniscus and joint ligaments, increased bone turnover, as well as calcification of joint tissues.

DISCUSSION AND CONCLUSION

Osteoarthritis is characterized by focal loss of cartilage with accompanying peri-articular bone response in the form of sub chondral bone sclerosis and attempted new bone formation by way of bony overgrowths called osteophytes. It involves all components of joints, including bone

cartilage, meniscus and synovium. It clinically presents as joint pain and crepitus in the elderly. Its high prevalence, especially in the elderly and the high rate of disability related to disease make it a leading cause of disability in the elderly.

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