

# Osteoarthritis

Bone joints, or regions where bones meet each other, are protected by a special type of tissue called the cartilage. The cartilage is a slippery structure that covers the ends of the bones, and helps to absorb the shock of movement and protect the bone ends from rubbing against each other. Osteoarthritis is a degenerative condition where this cartilage is worn down, and the protection to the joints is lost. As this loss of protection starts to damage the joints, people with osteoarthritis experience painful swellings and stiffness in the joints, most especially in the knees, hips, hands, wrists, neck, and back. The joint pain usually worsens with repetitive use. However, a long period of inactivity can also cause increased joint stiffening and tenderness.

As cartilage loss increases with time, so does the joint pain. Finger joints may show the presence of large bony swellings, which despite not being painful, cause stiffness and loss of mobility. It is estimated that about 250 million people worldwide suffer from osteoarthritis, making it one of the leading contributors to global non-fatal disease burden.

## Risk Factors

Since osteoarthritis is a degenerative condition, one of the strongest risk factors for it is increasing age. In addition, women are more prone to developing this condition than men. This could be due to the role of female hormones. Thus, 45% of all women over the age of 65-years show symptoms of osteoarthritis, while up to 70% of these women show positive evidence of this condition on X-rays. Obesity is another factor that plays a role in the pathogenesis of this condition. Carrying extra weight puts on additional stress, especially on the weight bearing joints, thereby exacerbating the condition. Sustaining a joint injury may also act as a risk

factor for the development of osteoarthritis.

Genetics also plays a major role in the aetiology of osteoarthritis. There is a much higher prevalence of this condition among siblings and among identical twins. At least half of the difference in susceptibility to this condition can be explained by genetic factors. Unfortunately, there is no single gene that can explain the pathogenesis of osteoarthritis, and it is likely that many genes at many different locations in the human genome are responsible. Some of the genes identified are known to be involved in building up the structural matrix of the cartilage, or in cartilage metabolism.

## Diagnosis and Management

Diagnosis of osteoarthritis is made on the basis of clinical history, and clinical and radiological examinations. X-rays are enough to correctly diagnose the condition. Although osteoarthritis cannot be cured, it can be managed with appropriate treatment and lifestyle modifications. Medications such as non-steroidal anti-inflammatory drugs can reduce the pain, the swelling and stiffness in the joints. Steroidal injections can be directly administered to within the joints for better pain relief. Physical therapy and exercise can also help with lessening the pain and stress on the joints. In the worst case scenario, the joints can be replaced with plastic and metal parts. This sort of joint replacement surgery is especially effective for knee and hip joints. Lifestyle modifications include trying to lose weight if over-weight, and avoiding putting too much weight or stress on the joints. Unfortunately, osteoarthritis cannot be prevented. The only protective action that can be taken is to try and avoid joint injuries, and to avoid occupations that cause repetitive joint stress and/or injury.

## Osteoarthritis in the Arab World

In the Arab World, osteoarthritis is recognized as a growing problem, mainly due to the increasing age of the population. However, there are very few reliable estimates of the prevalence of this condition. A study in Saudi Arabia found that about 13% of the adult population had clinical osteoarthritis of the knee. As in all other populations worldwide, age and female sex are associated with the condition in the Arab world too. In Kuwait, a study clearly showed that women with osteoarthritis suffered from more severe pain and other complications compared to men with the condition.

It has been documented that patients with osteoarthritis in the Gulf countries are reluctant to opt for a total knee replacement surgery. This has been attributed to a lack of information and apprehension about the procedure and quality of life post-surgery.

## Novel cell-based treatment for Osteoarthritis

The onset of osteoarthritis is marked by significant imbalance between anabolic and catabolic processes within articular cartilage leading to its attrition. The lack of cartilage self-repair results in progressive damage so that focal lesions become widespread with time. For many patients joint replacement with prostheses is not the best choice because it is not compatible with the lifestyle of young active patients. For this reason, researchers have been focusing on developing novel therapeutics to protect the cartilage and stop progressive loss.

Many studies involve the use of Mesenchymal Stem Cells (MSCs) in this context. Importantly, MSCs have the ability to differentiate into chondrocytes, which provide a set of paracrine secretions of bioactive materials. Therefore, MSCs were chosen to be the basis for cell-based therapy for cartilage repair. Currently, a number of promising results are being produced by numerous clinical studies focusing on the therapeutic role of MSCs as cell-based treatment for knee osteoarthritis.

## HOW THE TREATMENT WORKS

**1** Small amounts of fat are siphoned off from around the stomach

**2** Mesenchymal cells – a type of stem cell – are extracted and grown in a laboratory for two weeks

**3** The cells are then injected into the knee

They grow into new cartilage, slowing and even stopping tissue from being destroyed **4**

The cells migrate to the joint lining, where they help halt inflammation **5**