Knee osteoarthritis: Maximising the non-surgical approach

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Osteoarthritis (OA) is the most common joint disorder, it is a chronic arthropathy of one or more joints characterized by degeneration and loss of joint cartilage, along with other joint changes, including bone hypertrophy.[1]

A progressive disease that occurs mainly in the latter half of life, OA can be progressively disabling.

Patients mainly seek medical care because of the intractable pain caused by OA.[2] It often becomes symptomatic in the fifth and sixth decades of life and is almost universal by age 80.[3]

In individuals younger than 40 years, OA occurs more frequently in men and is primarily a result of trauma.

Occurrence predominates in women from age 40 to 70 years, after which men and women are equally affected.

The pathogenesis and pathophysiology of OA is complex and affects several systems, beginning with the articular cartilage, which is a complex material synthesized and maintained by its living component, the chondrocyte.[5]

Water makes up 65% to 85% of cartilage and interacts with matrix proteoglycans, matrix collagens, hyaluronic acid, and other components. Healthy cartilage is balanced between matrix synthesis and matrix degradation.

In OA, regardless of the involved joint, matrix degradation overtakes matrix synthesis. Articular cartilage degradation is associated with abnormal joint stresses over time.

Stresses include obesity, which can place an abnormal load on the knee joint, microfractures in the subchondral bone, and trauma.

Concurrent factors, including normal aging, metabolic diseases, inflammation, and immune system malfunctions, lead to biochemical changes that also result in cartilage degradation.[5]

Projected burden of osteoarthritis in Australia

The number of people with OA is expected to increase nationally from almost 2.2 million in 2015 to almost 3.1 million Australians in 2030.

Health care costs for OA were estimated to be over $2.1 billion in 2015; by the year 2030, these are forecast to exceed $2.9 billion ($970 for every person with the condition).[6]

The role of Hyaluronic Acid (HA)

Normal articular cartilage is composed of an extracellular matrix and chondrocytes, the cells that produce and maintain the cartilage.[7]

Within the matrix, water, collagen fibers, and proteoglycan macromolecules - large molecules containing protein and a type of polysaccharide - are cross-linked into an integrated network.

The backbone of each proteoglycan network is

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Dr Ibrahim has published research into hip and groin injuries in professional soccer players.

a large molecule of hyaluronic acid, also called hyaluronan or sodium hyaluronate.[5]

The interaction of these molecules forms the structural network providing cartilage with its most important biomechanical properties, compressibility and elasticity.[5]

High concentrations of hyaluronic acid are also found in the synovial fluid.[8]

In healthy joints, this highly viscous, shock-absorbing lubricant is contained within the joint capsule and helps enable articulation of the joint.

The synovial fluid in osteoarthritic joints contains a decreased concentration and molecular weight of hyaluronic acid compared with those found in healthy joints.[8]

The synovial fluid in osteoarthritic joints does not have the same elastic and viscous qualities as those of a healthy joint.

Viscosupplementation as a treatment of OA

Viscosupplementation with an elastoviscous fluid containing polymers of hylan derivatives of natural glycosaminoglycan hyaluronan is indicated for treating pain of osteoarthritis of the knee that has not responded to or is contraindicated for conservative nonpharmacologic therapy and traditional analgesics. These analgesics include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), and cyclooxygenase-2 (COX-2) inhibitors.[9]

A systematic review of meta-analyses comparing Intra-articular HA treatment with other IA therapies and oral NSAIDs concluded HA to be a viable treatment option for knee OA, producing improvements in pain and function that can persist for up to 26 weeks, and demonstrating a good safety profile.[10]

Monovisc is a newly available Hyaluronic Acid viscosupplement in Australia. It is a single, high dose viscosupplement injection for the treatment of OA in all synovial joints.

Monovisc is manufactured from ultra-pure, high molecular weight sodium hyaluronate produced by bacterial fermentation and is a non-avian HA.[11]

Preclinical studies suggest that there is an optimal molecular weight of HA required to stimulate native HA production. Monovisc falls into this category of having Optimal molecular weight.[12]

Monovisc lubricates, cushions and protects the joint, bringing pain relief that lasts up to six months.[13]

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- >> The safety of Monovisc is equivalent to that of saline.[2]

Disease-Modifying Effects of Hyaluronan in the Osteoarthritic Disease State

- >> Hyaluronan has the potential to reduce osteoarthritis pain as well as to protect and restore the chondral matrix.[3]
- >> Exogenous Hyaluronan can reduce pain transmission and blunt the inflammatory cascade via the CD44 receptor that is associated with osteoarthritis.[3]

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