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## **VISCOSUPPLEMENTATION**

**The goal of viscosupplementation** is to increase the molecular weight and concentration of hyaluronic acid in arthritic joints that presents a decrease in viscosity and elasticity of the synovial fluid so that the intra-articular milieu more closely resembles that of healthy synovial fluid.

### **Biochemistry**

Hyaluronic acid (HA) is a glycosaminoglycan that is composed of glucuronic acid and N-acetylglucosamine. It is the most abundant Glycosaminoglycans ( GAGs ) in synovial fluid. It is produced and secreted by synoviocytes.

It is also present in the extracellular matrix of articular cartilage, where it is produced by chondrocytes and where it forms the foundation for proteoglycan aggregates.

It serves as a lubricant and shock absorber in the synovial fluid.

After its intra-articular injection, HA stays round 10 to 18 hours inside the joint ( 40 hours with very high weight HA).

**The mechanism of action** by which viscosupplementation alleviates arthritic knee pain is a subject of debate.

It has been proposed that exogenous viscoelastic substances injected :

- act biomechanically by providing a “cushioning” effect, but as it stays few hours inside the joint, it is not the only one explanation.
- might stimulate the high MW HA by cartilage matrix synthesis and reaggregation of proteoglycans.
- might have a possible direct anti-inflammatory effect on synoviocytes by inhibiting arachidonic acid release and reducing levels of inflammatory mediators, including prostaglandin and cyclic adenosine monophosphate by blocking prostaglandin-E2 production.
- might have a protecting superficial layer it may inhibit damage mediated by oxygen free radicals and phagocytosis.
- might have an analgesic effect: protecting superficial layer it may exert a direct analgesic effect on articular nociceptors.
- might have a possible additional lubrication of the synovial membrane, and controlling permeability of the synovial membrane, thereby controlling effusions.

### **Clinical Effectiveness**

Viscosupplementation is a proven adjunct to the treatment armamentarium of general practitioners and surgeons. A number of recent clinical trials have evaluated the efficacy and safety of intra-articular hyaluronic acid injections

the chondroprotective effect of HA delaying the structural progression of osteoarthritis

remains unproved.

More than 60 clinical trials have been published and show that there is a good action on pain and function.

### **Precautions**

Patients should consult their doctor or surgeon if they have a history of hypersensitivities to hyaluronan preparations or are allergic to avian proteins, feathers and egg products. Intra-articular viscosupplements should not be given to patients with an infection or skin disease around the injection site, and should not be used if venous or lymphatic stasis is present in the leg, or if the joint is severely inflamed

### **Safety**

Adverse effects published during the last 15 years are very rare: 10% are painful reactions after the puncture, and exceptional synovitis or pseudoaseptic arthritis ( transient redness, local pain, warmth, and effusion, usually lasting up to three to four days ) without danger.

It is possible to do a second sery of injections if benefic effect was first noted.

### **availability**

In France, 13 HA are available. All but one are reimbursed at 65% by Social Security in knee arthrosis treatment when anti-inflammatory and antalgic treatments have failed ( 3 injections / knee / year ).

### **Conclusion**

Viscosupplementation represents a valuable alternative treatment for osteoarthritis when other forms of medical treatment are contraindicated or have failed.

This treatment may be proposed when the indication of prosthesis is not yet suitable , ( specially in young patient ), or when operations as arthroscopic debridement or osteotomy are problematic.