Hymovis® (HYADD® 4) High Molecular Weight Viscoelastic Hyaluronan Scientific Update

Hymovis® is a next generation hydrogel that is engineered for greater viscoelasticity and prolonged residence time in the joint. Hymovis® is a non-crosslinked modification of hyaluronic acid that incorporates alkyl side chains which results in reversible hydrophobic interactions that increase the viscosity and elasticity.

Scientific articles highlighting the benefits of Hymovis®:

Bonnevie E, Galesso D, Secchieri C, Bonassar L

Frictional characterization of injectable hyaluronic acids is more predictive of clinical outcomes than traditional rheological or viscoelastic characterization.
Plos One. 2019 May 10;14(5):e0216702.

- 6 Commerically available viscosupplements were tested for their ability to effectively lubricate cartilage by measuring cartilage friction reduction
- Hymovis® (HYADD® 4) demonstrates superior lubricating and friction-reducing properties compared to other commercially available hyaluronic acid-based viscosupplements
- Hymovis® enabled greater friction reduction across a wide range of sliding speeds that may be indicative of daily activities
- Chondrocytes are susceptible to dysfunction due to altered friction levels. There is a correlation between cartilage friction and wear of the articular surface

Benazzo F, Perticarni L, Padolino A, et al.

A multi-centre, open label, long-term follow-up study to evaluate the benefits of a new viscoelastic hydrogel (Hymovis®) in the treatment of knee osteoarthritis.
Eur Rev Med Pharmacol Sci. 2016 Mar;20:959-968.

- Hymovis® alleviates OA knee pain from the first treatment cycle in a 2 cycle regimen
- After treatment with 2 cycles of IA Hymovis®, patients experienced progressive pain reduction that was maintained at 1-year follow up
- Demonstrated improvements in OMERACT-OARSI criteria responder rates of 88% responders at 26 weeks

Bisicchia S, Bernardi G, Tudisco C

HYADD® 4 (Hymovis®) versus methylprednisolone acetate in symptomatic knee osteoarthritis: a single-centre single blind prospective randomized controlled clinical study with 1-year follow up. *Clin Exp Rheumatol.* 2016 Sep-Oct;34(5):857-863.

- Hymovis® treated patients had significantly greater improvement in total WOMAC scores, VAS for pain scores, and SF-36 scores at 26 weeks
- Hymovis® group demonstrated significantly better total WOMAC scores from week 6 through 26 weeks
- Excellent safety profile of Hymovis® with no significant difference in reported adverse events between treatment groups in the study

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Bonnevie E, Devis G, Secchieri C, Bonassar L

Degradation alters the lubrication of articular cartilage by high viscosity, hyaluronic acid-based lubricants. *J Orthop Res.* 2018 May;36(5):1456-1464.

- Disease, injury and aging all affect the concentration of lubricants of synovial fluid
- Hyaluronic acid's lubricating ability is tied to its viscosity and molecular weight
- Higher viscosities are necessary to reduce friction when cartilage is rougher, softer, and more permeable
- The most viscous lubricants resulted in consistently lower friction than the other lubricants

Priano F

Early efficacy of intra-articular HYADD® 4 (Hymovis®) injections for symptomatic knee osteoarthritis. *Joints.* 2017 Jul 28;5(2):79-84.

- Retrospective study of patients with knee osteoarthritis (American College of Rheumatology criteria) with Kellgren-Lawrence grade II-IV. Two injections, 1 week apart with 6 month follow up
- 698 patients were evaluated after 6 months
  - 48.8% NSAID use at baseline
  - 19.6% NSAID use after 1 month
  - 85.6% patient satisfaction at 6 months
  - No significant adverse events
- In a subpopulation of the study, n=106 efficacy on pain was observed to 12 months
- Hymovis® is effective and safe in patients with mild to severe knee OA
- WOMAC scores reduce by 56.3 from baseline

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