Knee Arthritis

- Over 20 million people in U.S. alone dealing with knee arthritis
- People living more active lifestyles in the 5th, 6th and even 7th decades
- More significant arthritis identified at earlier ages
- It is the leading cause of chronic disability in those older than 70 years, costing the US greater than $100 billion annually.\(^1\)

OA

- Projected increase in patients diagnosed with arthritis by 2030:
  - 67 MILLION
  - From AAOS

Arthritis effects on...

- Cartilage
- Synovial fluid
- Biochemical markers
**Cartilage**

- Early:
  - Swelling of chondrocytes. Attempt at repair
- Progression:
  - Softening → Flaking or Fibrillations → Thinning
- Late:
  - Erosion/Loss of integrity/Osteophytosis
  - Exposed bone/subchondral disease

**Synovial Fluid/Biochemical changes**

- Normal arthrocentesis, although may note debris or less viscous
- Hypertrophic synovium
- Biochemical alterations:
  - MMPs: matrix metalloproteinases
  - Highly implicated in destructive changes in joint
  - Proinflammatory cytokines: upregulate some of these destructive processes
  - Increased IL-17: studied in both OA and RA as a precursor
  - Collagenases
  - Irreversible cleavage of native Type II Collagen

**Non-Operative Treatment**

- NSAIDs
  - Oral or topical
  - Other topicals including compounding formulations
- Physical Therapy
  - Strengthening programs/aerobic exercise
- Aquatic Therapy
- Supplements/Vitamins
- Bracing
- Injections
  - Steroid
  - Viscosupplementation
  - Platelet Rich Plasma (PRP)???
Osteoarthritis Treatment Head to Head Comparison

- **HA injections**
  - Local treatment
  - Treats underlying condition
  - Over 20 years of utilization (18 yrs in US)
  - Option before or after corticosteroids (demonstrated)
  - ONLY intra-articular treatment approved for treating knee OA

- **PRP injections**
  - Local treatment
  - Treats....??
  - New??
  - Steroid use??
  - Approved??
  - ???
  - ???
  - ???

Viscosupplementation

- **Sodium Hyaluronate or Hyaluronic Acid (HA)**
- **Basic Science**
  - HA and Chondroitin Sulfate (CS) on Glycosaminoglycans (GAGs)
  - HA: large molecular weight. High shock absorbing properties
  - CS: most abundant GAG. Decrease major cause of OA

- **Benefits**
  - Viscoelastic properties, as well as anti-inflammatory, analgesic, and chondroprotective potential

Basic Science
the expert panel achieved unanimous agreement in favor of the following statements:
1. VS is an effective treatment for mild to moderate knee OA;
2. VS is not an alternative to surgery in advanced hip OA;
3. VS is a well-tolerated treatment of knee and other joints OA;
4. VS should not be used only in patients who have failed to respond adequately to analgesics and NSAIDs;
5. VS is a "positive" indication but not a "lack of anything better" indication;
6. cross-linking is a proven means for prolonging IA residence time of HA.

Randomized controlled trial; Level of evidence, 1.
192 patients. Criteria: Unilateral, > 4mos symptoms, radiographic changes
3 weekly injections
Evaluation at time zero, 2, 6, and 12 months International Knee Documentation Committee (IKDC) subjective score (main outcome), Knee injury and Osteoarthritis Outcome Score, EuroQoL visual analog scale, and Tegner score. Range of motion, transpatellar circumference, patient satisfaction, and adverse events were also recorded
Also they noted increased postinjection pain and swelling with PRP.
Studies

- Arthroscopy. 2015 May 18.
  - Compared HA injections with other non-op treatments (NSAIDs, Cortisone injection, PRP injection, Placebo Injection)
  - Fourteen meta-analyses met the eligibility criteria and ranged in quality from Level I to IV evidence
  - Conclusion: HA is a viable option for knee OA. Its use results in improvements in knee pain and function that can persist for up to 26 weeks. IA-HA has a good safety profile, and its use should be considered in patients with early knee OA.

Viscosupplementation in the hip: evaluation of hyaluronic acid formulations
- Arch Orthop Trauma Surg. 2008

Future

- Viscosupplementation in the hip: evaluation of hyaluronic acid formulations
  - Arch Orthop Trauma Surg. 2008
- Can viscosupplementation be used in the hip? An Italian perspective. Orthopedics. 2014

***Already injecting other joints in Canada and Europe***