The latest and greatest in Orthopedics!
Disclosures:

None
Objectives:

"The most important changes in contemporary orthopedics"

- Locking plates for fractures
- Advanced bearing surfaces for hip and knee replacements
- The reverse shoulder replacement
- Kyphoplasty for compression fractures
- Tranexamic acid to control intraoperative bleeding
- Technologies that hold promise for the future
What’s New?

• The reverse total shoulder
• Volar locking plates for wrist fractures
• Direct anterior surgical approach for total hip replacements
• Alternative bearing surfaces in hip replacements
• Tranexamic acid to control bleeding in joint replacement
• Kyphoplasty for vertebral compression fractures
• Viscosupplementation injections for knee arthritis
• Platelet rich plasma (PRP) injections
• Stem cell injections
• Metal allergies affecting outcomes of total joint replacement
• Indications for joint replacements in morbidly obese patients
Acromioclavicular joint

Glenohumeral joint
#1: The Glenoid is Small and Shallow
#2: The deltoid force vector is essentially vertical when the Arm is at the side
#3: The deltoid inserts on the lateral humerus
Shoulder Impingement

- Bursitis
- RC & Biceps Tendonitis
- RC & Biceps Tears
- Cuff Tear Arthropathy
Surgical Rx: Shoulder Replacement
Colles Fracture
Anterior approach hip replacement
(slide with data on advantages of anterior approach)
Alternative bearing surfaces in total joint replacement
Traditional metal ball and polyethylene socket liner
**Typical Crosslinking Process**

**Gamma Rays**

**PE Molecules**

Schematic showing radiation process.

**Crosslinking**

Schematic showing crosslinked molecular structure.
Traditional vs. New Poly

![Wear Rate Comparison](image)

- **CoCr/Polyethylene**: 200 microns/year
- **CoCr/Crossfire Polyethylene**: 20 microns/year
Cobalt chrome on cobalt chrome bearing surfaces transcend existing cobalt chrome on poly systems.
Metal on Metal

Wear Rate (microns/year)

- CoCr/Polyethylene: 200 microns/year
- CoCr/Crossfire® Polyethylene: 20 microns/year
- Metal/Metal: 4.3 microns/year
Trace metal elevation compared to normal people

- Chromium in blood: 28 fold increase
- Chromium in urine: 146 fold increase

(Jacobs, 1996)
Ceramic Head Fracture
Ceramic on Ceramic

*Wear Rate (microns/year)*

- **CoCr/Polyethylene**: 200 microns/year
- **CoCr/Crossfire Polyethylene**: 20 microns/year
- **Metal/Metal**: 4.3 microns/year
- **Alumina/Alumina**: <1 micron/year
Ceramic Head Fracture
Ceramic on New Poly

Wear Rate (microns/year)

- CoCr/Polyethylene: 200 microns/year
- CoCr/Crossfire® Polyethylene: 20 microns/year
- Metal/Metal: 4.3 microns/year
- Alumina/Alumina: <1 micron/year
- Alumina/X3™: 1.4 micron/year
Tranexamic Acid
(slide on history of tranexamic acid)
(slide showing data on decreased bleeding, transfusion rates, etc)
Kyphoplasty for vertebral compression fractures
Braces
Kyphoplasty
Kyphoplasty
Viscosupplementation Injections
Viscosupplementation Injections
<table>
<thead>
<tr>
<th>CONSTITUENT</th>
<th>VALUE BY WEIGHT</th>
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<tbody>
<tr>
<td>Water</td>
<td>66%–79%</td>
</tr>
<tr>
<td>Solids</td>
<td>21%–34%</td>
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<tr>
<td>Inorganic</td>
<td></td>
</tr>
<tr>
<td>Ash</td>
<td>5%–6%</td>
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<tr>
<td>Organic</td>
<td></td>
</tr>
<tr>
<td>Collagen</td>
<td>48%–62%</td>
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<tr>
<td>Protein</td>
<td>8%–15%</td>
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<tr>
<td>Glycosaminoglycan</td>
<td>14%–23%</td>
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<tr>
<td>Hyaluronate</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Lipid</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Lysozyme</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Glycoprotein</td>
<td>?</td>
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</table>
Platelet Rich Plasma Therapy (PRP)
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(slide(s) summarizing results of studies on PRP here)
Stem Cell Therapy
What needs to happen...

• Injected stem cells must *understand* to differentiate into chondrocytes
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• Injected stem cells must understand to differentiate into chondrocytes

• The cells must be able to see where the area of cartilage loss is

• The cells must then swim to the defect and attach to the exposed surface of bone

• The cells need to turn on their synthesis of matrix, and, when the surface layer is flush with the surrounding cartilage surface, turn it off
Allergies to metal affecting outcomes of total joint replacement
Cobalt Chrome alloy
“19% of population allergic to Ni”*

Dxed: Metal Allergy

- Positive skin patch test
The “Nickel Free Total Knee”

Hypoallergenic – Total Knee

Regional Orthopedics offer the latest Hypoallergenic Total Knee Replacement technology for active knee patients: the Smith & Nephew LEGION Cruciate Retaining Knee implant with FDA-cleared VERILAST Knee Technology. This implant is an innovative solution with the potential to double the life of traditional knee implants to 30 years, under normal conditions.

Unlike traditional implants made from metal the VERILAST Knee Technology is compose of Oxinium (oxidized zirconium).

What is OXINIUM™ (Oxidized Zirconium) material?

- OXINIUM Oxidized Zirconium, a tough, smooth metal whose ceramic surface is 4,900 times more abrasion resistant than cobalt chrome. The ceramic surface is created through a manufacturing process where oxygen is naturally diffused into the zirconium metal as it is heated in air. When the metal is saturated with oxygen, the surface transforms from a metal to a ceramic. This is a transformation of the original metal surface into a ceramic and not an externally applied coating. This combination of materials provide potential benefits safe to use for patients who have a history of metal allergy.
Oxinium

...and .001% Ni

Titanium (.01%Ni)
Metal Allergies

- Do they exist?
- Where were they 10 years ago?
- Why does lowering (not eliminating) the allergen seem to work?
- Do the low levels of allergen desensitize pts?
- What is the best test to use to make the Dx?
Total joints in obese patients
Literature: “Don’t operate!”

• High chance of intra-op complications

• High chance of post-op complications

• Poor results (WOMAC, Lyscholm, others)

• Joints won’t last
Literature: “Don’t operate!”

- High chance of intra-op complications
- High chance of post-op complications
  - DVT, infection, wound healing problems, malposition of components, pneumonia, aspiration, other
- Poor results (WOMAC, Lyscholm, others)
- Joints won’t last
Literature: “Don’t operate!”

- High chance of intra-op complications
- High chance of post-op complications
- Poor results (WOMAC, Lyscholm, others)
  - rise from chair without using arms
  - climb stairs without banister
  - walk more than three blocks
- Joints won’t last
Literature: “Don’t operate!”

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- High chance of post-op complications
- Poor results (WOMAC, Lyscholm, others)
- Joints won’t last