Orthobiologics: The Evolving Frontier

Orthobiologics

Bone Marrow Aspirate Concentrate

New Kid on the Block - BMAC

Viscosupplementation

Hyaluronic Acid

AAOS - Strong Evidence Against

AANA - "AAOS Missed the Mark?"

Platelet-Rich Plasma - 2014

Do Growth Factors Exist?

Meta-Analysis - Poor Evidence

- Prostate Fluid
  - No Improvement
- Chronic Lateral Epicondylitis
  - No Improvement
- Rotator Cuff
  - No Improvement
- ACL Reconstruction
  - No Improvement
- Achillea Tendinopathy/Rupture
  - No Improvement
- Patella Tendinopathy
  - No Improvement

Mesenchymal Stem Cells - MSCs

Nucleated Cells

- 3X Concentrated in Aspirate

Advantages

Chondrogenic (Cartilage) Potential

- Animal Studies
- Great

Osteogenic (Bone) Potential

- Animal Studies
- Great

Disadvantages

- Limited Research
- No Long Term Studies
- Cost

$1200-2000

Disclosures

March 2015

- Royalties from Publishers
  - Saunders/Mosby-Elsevier; Thieme
- Medical/Orthopaedic Publications Editorial/Governing Board
- Board Member/Committee Appointments for a Society
  - AAOS; ASES; AANA; ISAKOS; EOA; NY Chapter Arthritis Foundation; NY County Medical Society – Government Affairs
- Principal Investigator - Clinical Trials
  - Pfizer; Zimmer; Anika Therapeutics
- Funding, Fellowship
  - Arthrex; ConMed Linvatec; Zimmer

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New Kid on the Block - BMAC

- Full Thickness Chondral Defect
  - Horseradish Microfracture vs. MFx + BMAC
    - Reduced Time of Defect
    - Safer Type II Collagen
  - Rabbits - 2014
    - MFC x 6, Decalcified Cortical-Cancellous Bone Matrix
      - Improved Articular cartilage Repair
      - Biomechanical Properties Like Normal Cartilage

- Generalized Osteoarthritis
  - Sheep
    - Staged Cartilage Progression

- Isolated Meniscus Tear
  - Sheep
    - Full Thickness Tear Red White Zone
    - Improved Meniscal Healing

- Full Thickness Tear Arvacular Zone
  - MSCs - Improved Meniscal Repair
Focal Talar Dome Lesions
- 25 Patients
- Follow Up - Avg 5 Year
- Improved Functional Scores
  - AOFAS
    - 7.1±17.2 to 92.6±10.5
    - P<0.005
    - 82% Improvement
    - 3 Years
- 1 Year - 2nd Look
  - Harvested Cartilage
    - 100% Patients
      - Hyaline Cartilage in the Defect

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Ankle - Osteochondral Defect

Femoral Head Osteonecrosis - 2014
- 219 Hips
- Meta-Analysis
- Bone Marrow-Derived MSC Injection
- Core Decompression
- Results
  - Higher Harris Hip Scores
    - Pooled Weighted Mean Difference = 8.69
    - 95% CI: 3.76-13.62
    - P<0.01
  - Less Progression of Osteonecrosis
    - Pooled Odds Ratio = 0.11
    - 95% CI: 0.03-0.43
    - P<0.01


Hip - Avascular Necrosis

40-60 Year Old
- Recreational/Professional Athlete
- Knee, Shoulder, Elbow, Hip and Ankle
- Pain Free Return to Sport
  - Tennis
  - Skiing
  - Basketball
  - Running
- No Complications
- Great Promise For Restoration Of Anatomic Architecture

Preparation - BMAC
- One-Step Systems
- Promising Clinical Evidence
  - Regenerate
    - Hyaline-Like Cartilage
    - Meniscus
      - Knee
  - Rotator Cuff Healing Improved
  - Minimal to None
- Manage Patient Expectations
  - New Treatment
  - Variable Results
  - Cost
- More Clinical Evidence Needed
  - FutureDirections
    - Human RCT in BMAC Vs. PRP Regeneration of Other Tissues
      - Tendons and Ligaments

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