


Cartilage Resurfacing: What is the Evidence

John Ketz, MD
CSFS 2016

Disclosures


- I have no financial disclosures



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MECHANISM OF INJURY

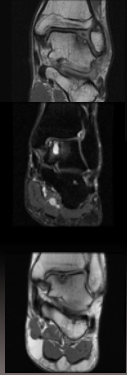
- OCCULT
 - ? MICROTRAUMA?
- SPRAINS
 - 50% WITH SOME CHONDRAL INJURY
 - Saxena et al. AJSM 2007*
- ANKLE FRACTURES
 - 73% WITH CHONDRAL INJURY
 - Leontaritis N et al. JBJS 2009*



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EPIDEMIOLOGY

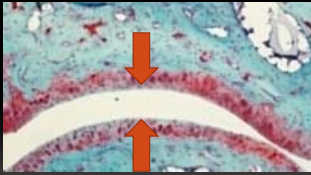
- ANTEROLATERAL
 - TRAUMATIC
- POSTEROMEDIAL
 - MORE COMMON
- CENTRAL (RARE)



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COMPRESSION INJURY

- OLT CARTILAGE MAY BE CONTINUOUS WITH ADJACENT JOINT SURFACE



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SHEAR INJURY

- EDGE DETACHED / DISPLACED



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20M 4WKS S/P ANKLE SPRAIN

- MRI: UNSTABLE OVERLYING CARTILAGE



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Talar Osteochondral Defects

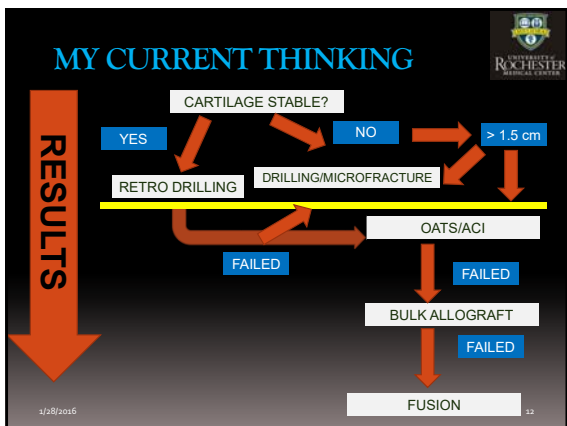
Options if lesion is not fixable?

- Retrograde Drilling
- Arthroscopic Drilling/Microfracture

WHAT IS THE EVIDENCE THAT ANY OF THIS WORKS?

Autologous Chondrocyte Implantation

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CLASSIFICATION

- FERKEL - ARTHROSCOPIC GRADING
AJSM 2008

• MOST EFFECTIVE CLASSIFICATION TOOL

• RESULTS BEST CORRELATE WITH ARTHROSCOPIC GRADING

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DOES SIZE MATTER?

- RETROSPECTIVE REVIEW 130 PTS
- 20 PTS WITH OLT >1.5 CM²
- WORSE CLINICAL OUTCOME
Cattica et al. FAJ 2011

- 120 ANKLES TREATED FOR OCD
- FAILUE IN 10 OF 95 ANKLES (10.5%) DEFECT AREA <150 MM²
- FAILUE IN 20 OF 25 ANKLES (80%) DEFECT AREA >150 MM²
 - 8 WITH OATS
Choi Foot Clinics 2013

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DOES LOCATION MATTER?

- STILL DEBATE
- SOME STUDIES SHOW IMPROVED OUTCOMES WITH MEDIAL LESIONS
Chuckpaiwong ASCOPY 2008
Schimmer FAJ 2001

- MULTIPLE STUDIES SHOWING NO DIFFERENCE

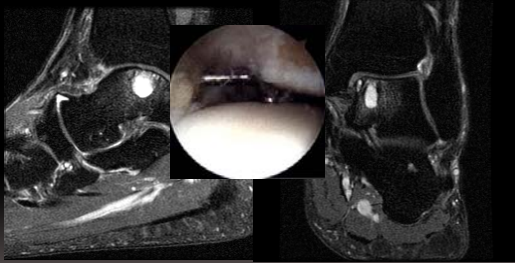
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NONOPERATIVE TREATMENT

- NO GOOD CONSENSUS
 - 3 TO 6 MO?
- NO LITERATURE TO HELP GUIDE NONOPERATIVE TREATMENT

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RETROGRADE DRILLING



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RETROGRADE DRILLING



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RESULTS OF DRILLING

- 16 PATIENTS
- ALL IMPROVED
 - AOFAS SCORES 54 → 83
 - COMPARABLE TO OTHER TECHNIQUES
- NO COMPLICATIONS

Taranow et al. FAI 1999

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RESULTS OF DRILLING

- 30 PATIENTS (19 TMD, 11 RGD)
 - TMD VS. RGD WITH MRI AT 12MO
 - TMD - 11 OCD UNCHANGED, 8 WORSENER
 - RGD - 3 LESIONS IMPROVED, 8 - UNCHANGED
- NO COMPLICATIONS

Kono et al AJSM 2006

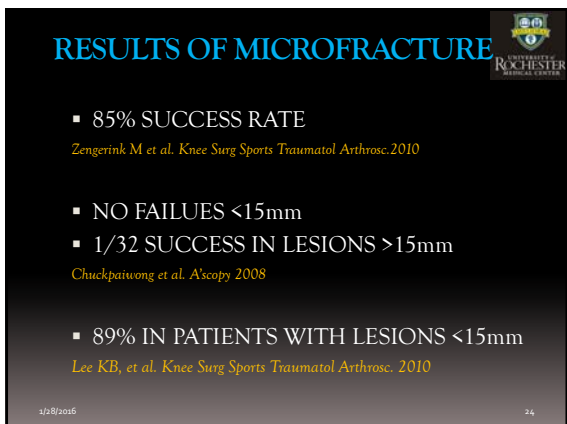
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ARTHROSCOPIC DRILLING MICROFRACTURE

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RESULTS OF MICROFRACTURE

- 1YR FOLLOWUP ON 20 ANKLES WITH 2ND LOOK ARTHROSCOPY
- 90% SUCCESS RATE
- 8 (40%) was graded as abnormal cartilage
- 7 (35%) demonstrated incomplete healing

Lee KB et al. AJSM 2009

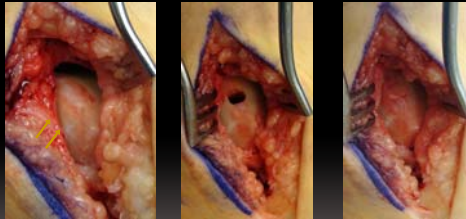
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OSTEOCHONDRAL AUTOGRAFT TRANSFER (OATS)


- BONE-CARTILAGE PLUG FROM DONOR SITE
 - NWB SURFACE OF KNEE / TALUS
- MALLEOLAR OSTEOTOMY
 - MEDIAL
 - LATERAL
- BONE PLUGS OF <10-12 mm
- CARTILAGE MISMATCH / SHOULDER LESIONS

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OATS



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RESULTS OF OATS SURGERY 

- 1097 PATIENTS
- 93% GOOD TO EXCELLENT RESULTS
- 3% KNEE PAIN
Hangody et al. Injury 2008
- 26 PATIENTS (9 SECONDARY PROCEDURES)
- ALL HAD IMPROVED VAS AND OUTCOME SCORES
- SECONDARY PROCEDURES HAD WORSE AOFAS SCORES, HIGHER VAS
Imhoff et al. AJSM 2011


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RESULTS OF OATS SURGERY 

- SOLUTION TO DONOR SITE MORBIDITY
- **ALLOGRAFT**
 - NO DONOR SITE MORBIDITY
 - HIGH COST
 - AVAILABILITY?



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RESULTS OF OATS SURGERY 

ALLOGRAFT OATS

- 42 PATIENTS
- GRAFT FAILURE IN 4 (10%)
- 28/38 FAIR OR POOR RESULTS
- 15 HAD MRI GRAFT SUBSIDIENCE
ElRashidy et al. JBJS 2011

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RESULTS OF OATS SURGERY

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ALLOGRAFT OATS

- 85 PATIENTS
- MRI AT 1 YR
- FAOS IMPROVED 50→81
 - TRAUMATIC LESION DID BETTER

Flynn et al. FAJ 2015

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MOSAIoplasty

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- MULTIPLE OATS
 - LESIONS >10-12mm
- DIFFICULT TO CONFORM TO ARTICULAR CARTILAGE
 - SURFACE IRREGULARITY



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RESULTS OF OATS SURGERY

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ALLOGRAFT OATS

- FRESH FROZEN ALLOGRAFT TALUS



EASLEY JAAOS 2010

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RESULTS OF OATS SURGERY

ALLOGRAFT FF BULK TALUS

- 15 PATIENTS, LESIONS >3000 mm³
- AOFAS 38 → 83
- 10 (67%) COLLAPSE OR RESORPTION
- 67% EVIDENCE OF ARTHROSIS
- 2 WENT ON TO FUSION

Raitken et al. JBJS 2009

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AUTOLOGOUS CHONDROCYTE IMPLANTATION

- TECHNIQUE
 - 2 STAGES
 - HARVEST (KNEE, TALUS)
 - IMPLANTATION
 - DEBRIDE OCD
 - CREATE PERIOSTEAL FLAP (DISTAL TIBIA)
 - SECURE THE PERIOSTEAL FLAP TO CARTILAGE
 - INJECTION CHONDROCYTE UNDER FLAP

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AUTOLOGOUS CHONDROCYTE IMPLANTATION

- ADVANTAGE
 - REPLACE NATIVE CARTILAGE
- DISADVANTAGE
 - HIGH COST
 - 2 SURGERIES
 - TECHNICALLY DIFFICULT



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AUTOLOGOUS CHONDROCYTE IMPLANTATION

- IS WORTH IT?
 - METANALYSIS (16 STUDIES)
 - SUCCESS RATES SIMILAR TO BONE MARROW STIMULATION ~ 89%

Niemeyer et al. Surg Sports Traumatol Arthrosc. 2012
Giannini et al. FAI 2001

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AUTOLOGOUS CHONDROCYTE IMPLANTATION

- 10 YEAR FOLLOWUP ON 10 PTS
- 2ND LOOK ARTHROSCOPY 12-20 MO
- 5/8 RETURNED TO SPORTS
- AOFAS SCORES 38→93

Giannini et al. AJSM 2009

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BIOLOGICS

- ROLE IS UNKNOWN
- NO GOOD PROSPECTIVE STUDIES

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BIOLOGICS

- JUVENILE HYALINE CARTILAGE
- FIBRIN SEALANT




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BIOLOGICS

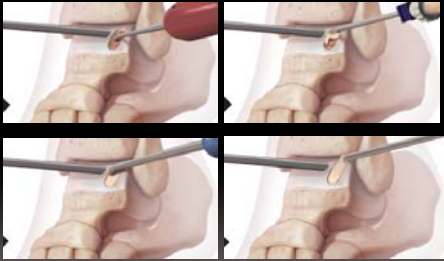
- POROUS SCAFFOLD OF DEHYDRATED ALLOGRAFT CARTILAGE
- ADJUNCT TO MICROFRACTURE TECHNIQUES



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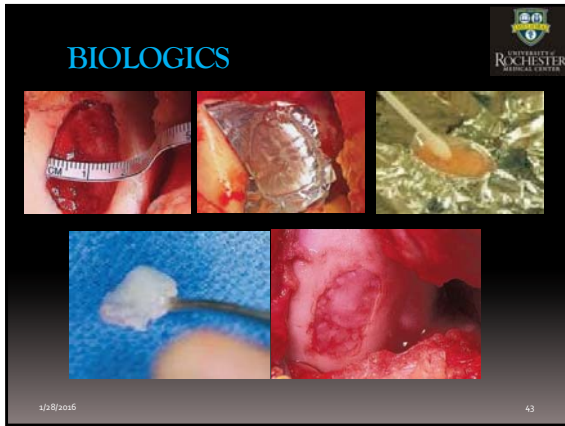
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BIOLOGICS

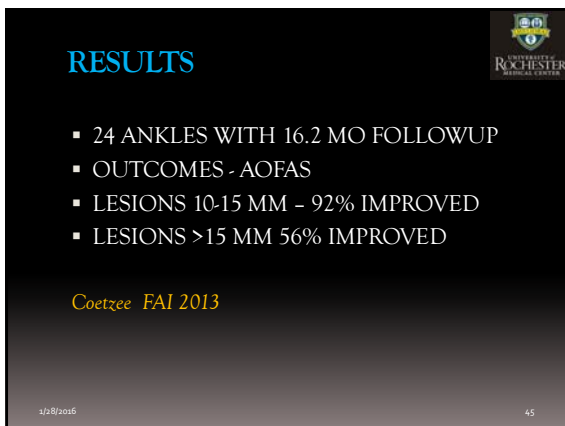


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SUMMARY

- MOST STUDIES ARE RETROSPECTIVE OR CASE SERIES
- NEED BETTER STUDIES
- FIX WHAT YOU CAN FIX
- MICROFRACTURE/DRILLING SMALL LESIONS PREDICTABLE GOOD RESULTS

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THANK YOU
