Microfracture
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Articular Cartilage
- Hyaline cartilage that covers the ends of the bones to allow for smooth painless joint movement
- Type II collagen and chondroitin sulfate
- Does not have regenerative properties

Articular Cartilage
- Pristine in the young healthy knee
- Variety of injuries/pathologic states can be very difficult to treat
- Relative to other pathology, less predictable outcomes
Meniscus

- Fibrocartilage
  - Collagen 60-70% dry weight of meniscus
  - 90% type I
  - Elastin
  - Non collagenous proteins
- Fiber orientation
  - Circumferential
    - Resist compressive force
  - Radial
    - Resist longitudinal force
- Mesh network
  - Distribute shear force

Function of Meniscus

- Cushions the articular cartilage
- Secondary stabilizer
- Proprioception
- Joint congruity

Cartilage

- Outcome of knee surgery is usually highly dependent on the integrity of the meniscus and articular cartilage
- Goal is to preserve as much meniscus as possible as well as treating injured or degenerative articular cartilage

Greis PE, et al, JAAOS 2002
Joints-Aging
- As we age our joints age too
- The water and protein concentrations decrease
- Arthritis can develop
  - Softening, thinning and degeneration of cartilage

Articular Cartilage Injury
- Variety of pathology can affect the articular cartilage
  - Isolated chondromalacia
  - Multifocal chondromalacia
  - End stage arthritis
  - Focal osteochondral injury
- Extremely important to distinguish between a degenerative process and acute focal problem.

Evaluation Cartilage Injury
- Articular cartilage pathology can present with non specific complaints
  - Pain
  - Instability
  - Mechanical Symptoms
  - Locked knee
  - Asymptomatic
Evaluation Articular Cartilage Injury

- Given that frequent lack of specificity of the presentation it is extremely important to consider the history, physical exam and imaging
- Differentiate between an acute focal chondral defect and a chronic/degenerative or multifocal process

Chondral Injury

- Microfracture is for focal chondral injuries
- Consider alternative treatment options for multifocal, diffuse or degenerative pathology

Microfracture

**Advantages**
- Easy
- Requires minimal instrumentation
- Can be used for large or small defects
- No graft
- Cheap
- Can use without associated instability or alignment procedures

**Disadvantages**
- Heals with fibrocartilage
- Scar cartilage
- Not nearly as durable as articular cartilage
- Lack of predictability
Microfracture Technique

- Complete inventory of the knee
  - Exclude other articular cartilage lesions
  - Identify other pathology
  - Identify the defect
  - May need to make accessory portals
  - Difficult to reach some lesions

Microfracture Technique

- Debride loose/unstable pieces of cartilage
- Use a ring curette
  - Create vertical shoulders
  - Remove the calcified cartilage
- Multiple poke holes with a microfracture awl deep enough to reveal bleeding bone

Microfracture Technique

- Confirm bleeding bone by deflating the tourniquet
Microfracture Rehab

- NWB x 6w if on WB portion of the femur or tibia
- Don’t want the surgically created edges to abrade the articulating surface
- Physical Therapy for ROM
- CPM-no set time

Microfracture Outcomes

- Long-term results after microfracture for full-thickness knee chondral lesions in athletes
- 1991-2001
- 61 athletes available at final f/u
- Average lesion size 401 +/- 27mm²
- Lysolm, Tegner and IKDC scores pre-op, 2y, 5y and final f/u
- KOOS, VAS and Marx at final f/u

Gobbi et al, Results

- IKDC, Lysholm, Tegner increased significantly at 2y, but gradually deteriorated at long term, but sig above baseline at f/u
- 7 Pts(11%) considered failures as they underwent another operation during first 5 y
- Pain and swelling during strenuous activities reported only in 9 pts by end of 2 y and in 35 pts at final f/u
- Smaller lesions (≤400mm²) and younger pts (≤30y) significantly better results in KOOS, VAS, Marx scores
- Final f/u XR showed progression OA changes in 40% of knees, with higher rate in older pts with large or multiple lesions (p<0.05)
Gobbi, et al

- Conclusions
  - Microfracture in young patients with smaller lesions can yield good clinical short and long term results
  - Lesion size is a more prognostic indicator than age
  - Deterioration can be expected at 2 and 5 years
    - Deg changes at long term f/u
    - Higher rate in older athletes with large, multiple lesions

Microfracture Outcomes

- Outcomes following microfracture of full thickness articular cartilage lesions of the knee in adolescent patients
- 26 patients (14 female, 12 male), 1992-2008
- Ave age 16.6 y (range 12-18.9y)
- 37% patellar, 26% MFC, 33% LFC
- Min 2 year f/u in 22/26 pts
- Ave f/u 5.8 y (range 2-13.3 y)

Steadman et al, 2015

- Results
  - Ave post-op Lysholm score 90 (range 50-100)
  - Median Tegner- 6 (range 2-10)
  - Median patient satisfaction 10 (range 1-10)
  - Lysholm correlated with Tegner (rho=.586; p=0.011)
  - Patient satisfaction (rho=.70; p<0.001)
  - Ave post op Lysholm males 93, females 86 (p=0.22)
  - 1 patient underwent revision microfracture
  - Authors conclude adolescent patients undergoing microfracture for full thickness chondral defects demonstrated increased activity levels and excellent function
19 year old college basketball player presents mid March with right knee pain she had after an injury in a game when someone stepped on her foot. Mid season.
Vague intermittent lateral pain with occasional swelling throughout the season. Dx with lateral collateral ligament sprain.
Present with persistent anterolateral pain and instability.

Exam:
- Trace effusion with pain over her lateral femoral condyle more than over anterolateral joint line
- Cruciates and collateral ligaments stable

MRI:
- Bone bruise lateral femoral condyle and small paramensical cyst adjacent to anterior horn LM

Treatment:
- TTTW
- PT
Thank You