

Sports Medicine: Historical Perspectives, Advances, Arthroscopy



Arthroscopy Course

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Sports Medicine: Historical Perspectives and Hot Topics

MAIN MENU

Introduction

Shoulder

Hip

Knee

Foot / Ankle

Elbow

New Techniques

Conclusions

Prior to 1985

- **Extraarticular reconstructions**
 - **Shoulder**
 - Subscapularis transfer
 - Coracoid transfer
 - Capsular shifts
 - **Knee**
 - IT band tendodeses
 - Pes anserine transfer
 - **Ankle**
 - Peroneus brevis transfers

After 1985

- **Anatomic repairs/reconstructions**
 - **The arthroscope paved the way for advances in surgical techniques and understanding injury mechanisms**

Shoulder Pain in a Thrower – Biceps Tendon / Labrum

- **Prior to 1980s, biceps tendinitis**
- **1990s: SLAP lesion**
 - **Repair most**
- **2005: SLAP lesion**
 - **Repair less, no repair greater than age 40**
 - **Biceps tendon – leave alone**
 - **Tenodesis soft tissue**
 - **Tenodesis to bone**
 - **Tenotomy**

Biceps Glenoid Labrum Complex

- Pre-1985
 - Tenodesis
 - Many procedures
 - Originally described 1948: Hitchcock HH and Bechtol CP, “Painful shoulder: observation on a role of the tendon of the long head of the biceps brachii in its causation,” JBJS 30-A: 263 (1948).

Now 62 years later:

- Biceps is still a pain generator

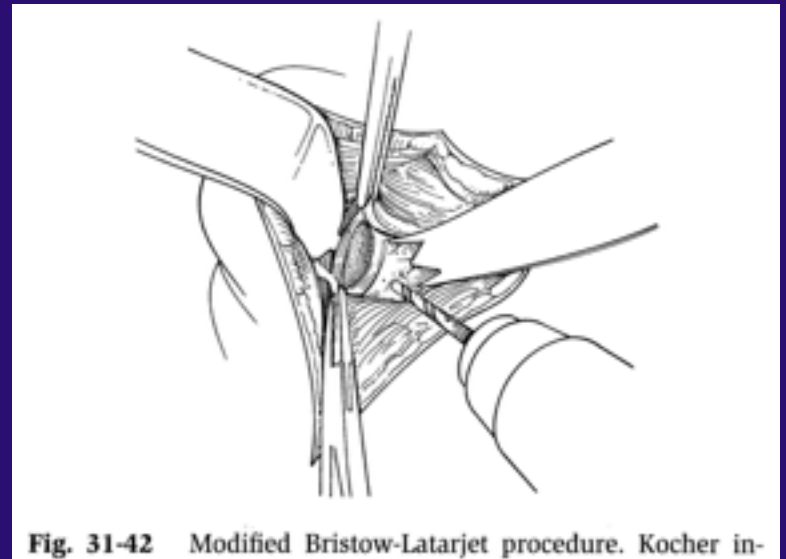
2000 Advances in Biceps Treatment?

- Repair no SLAPs over age 40
- Tenodesis open or arthroscopic
- Tenotomy
 - Question if cutting the tendon anyway, why do surgery if cannot repair the SLAP?

**The more important question:
Who NOT to operate on, not
Who to operate on . . .**

Shoulder Instability

- Extraarticular techniques
 - Tendon transfers
 - Coracoid transfer
- Intraarticular techniques
 - Capsular shifts
 - Latarjet procedure
- Combined intraarticular/extraarticular



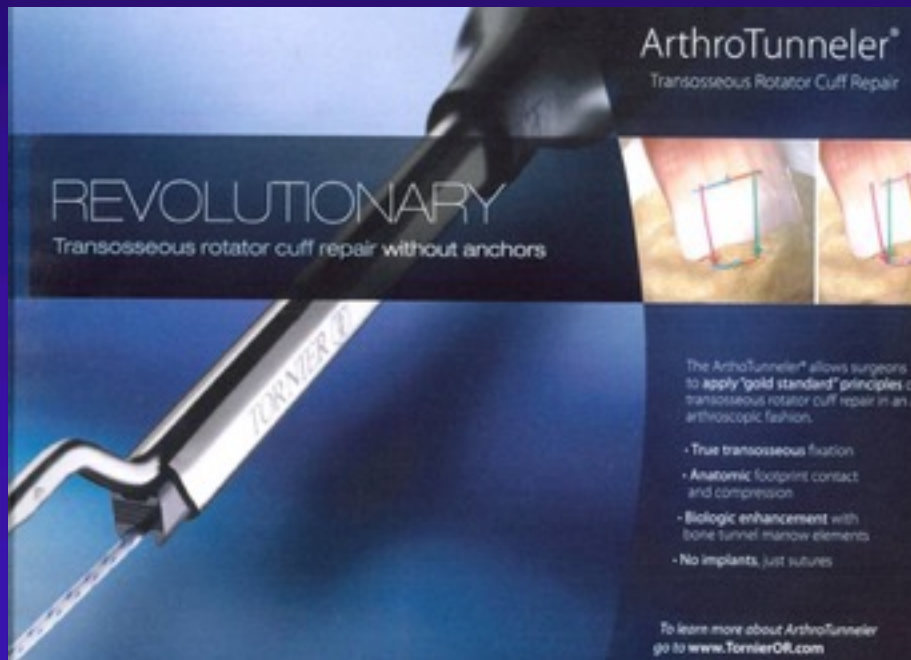
Bankart ASB: Recurrent or habitual dislocation of the shoulder-joint. Br Med J: 2;1132, 1923.

Latarjet M: A propos du traitement des l'ucations recidivantes de l'epeule. Lyon Chir 49:994, 1954.

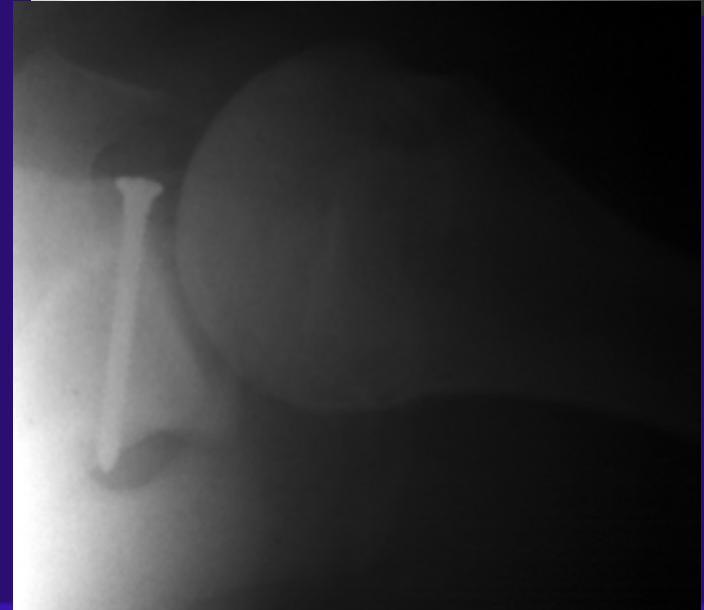
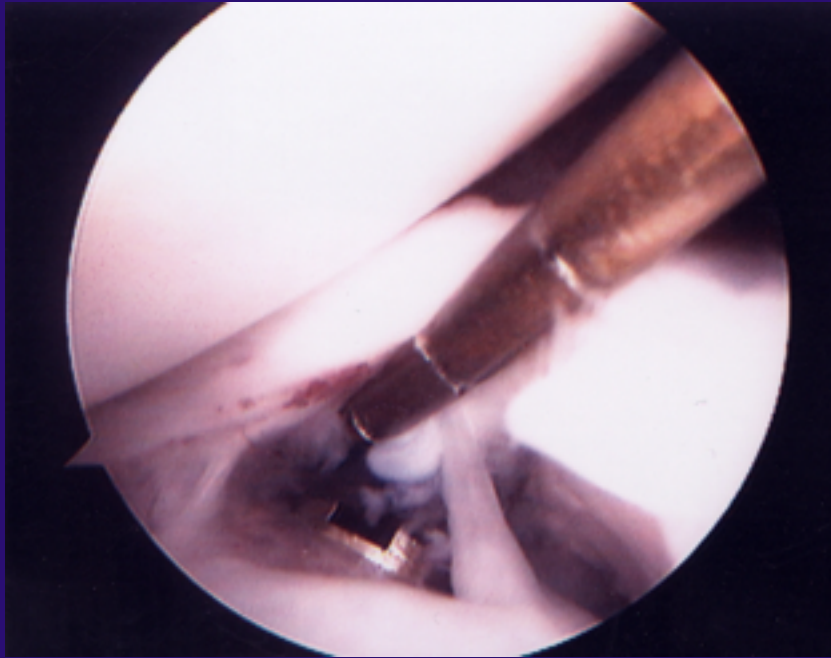
Modified Bristow-Latarjet procedure: Lombardo SJ: Anterior reconstruction. In Shields CL, Jr, editor: Manual of Sports Surgery, New York, 1987, Springer-Verlag.

Rotator Cuff Repair

- **Diagnosis:** arthrogram pre-1980s, now MRI scan
- **Treatment:** repair deltoid detachment, now arthroscopic anchors and revolutionary bone troughs
- **What goes around comes around!**



Bristow Procedure-Coracoid Transfer



Beware of New Products, Advances in Techniques . . .

or

What I'm Glad I did NOT do:

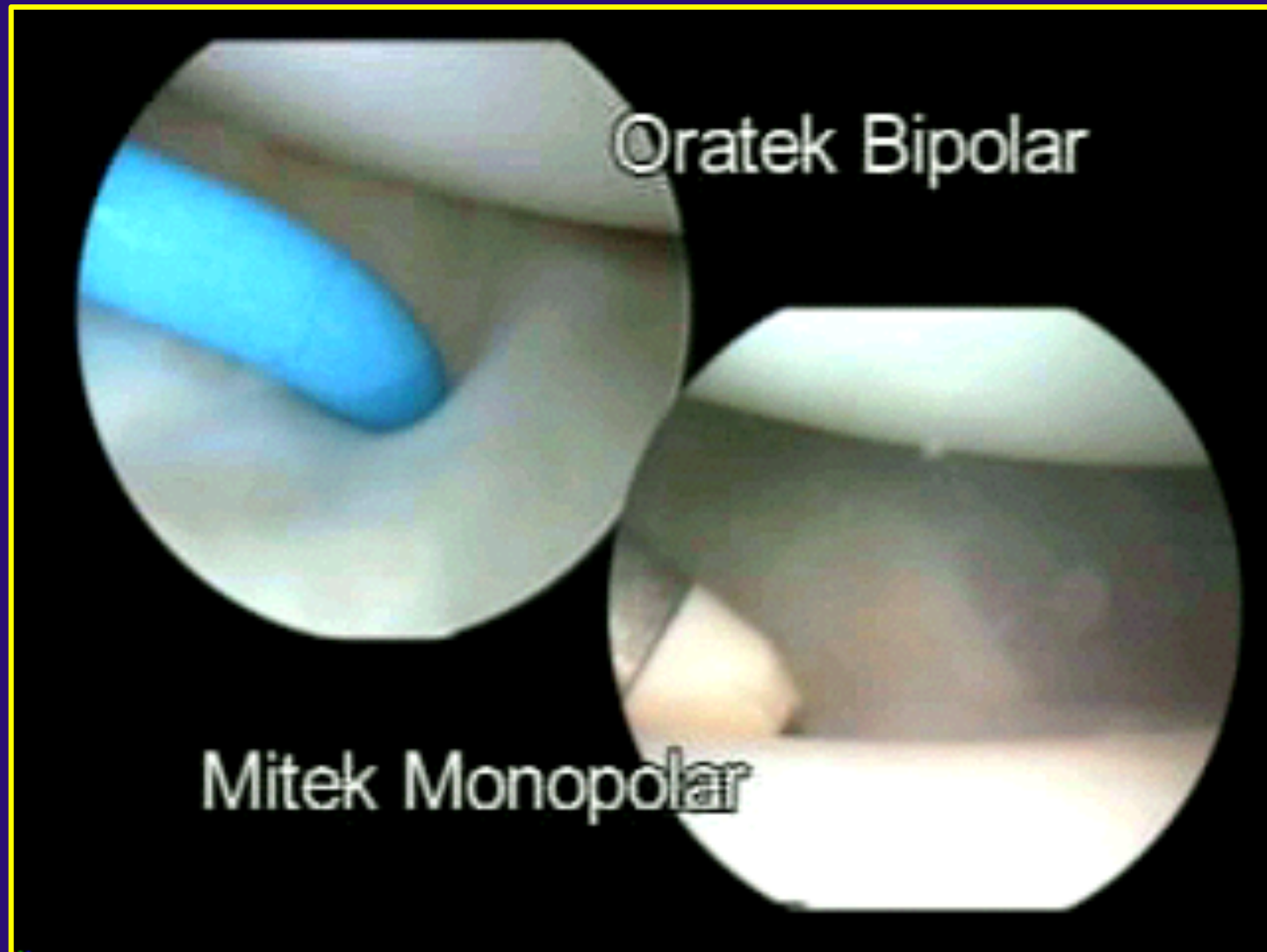
- Radiofrequency thermal capsular modifications
- Metal staples intraarticular
- Pain pumps
- Bioabsorbable fixation implants – may not be!



Thermal Capsular Modification

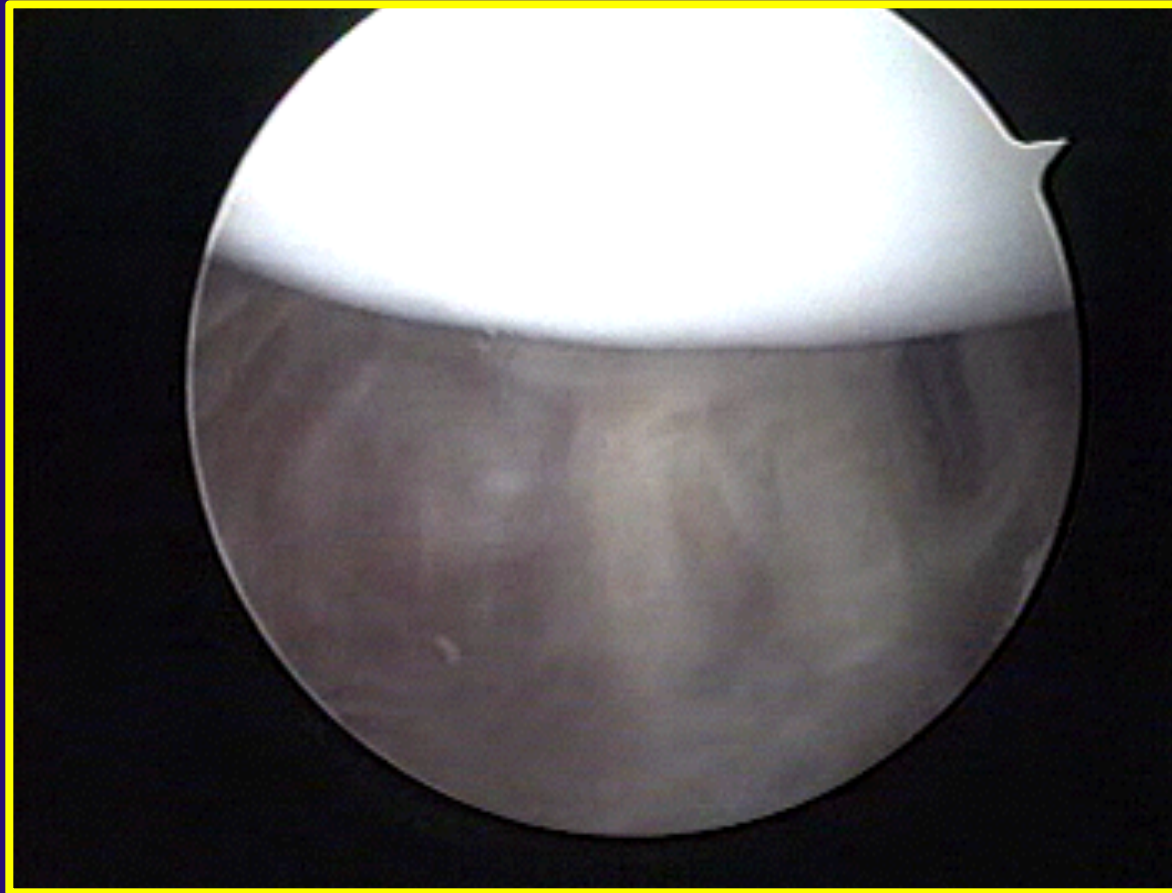
- I don't use
- Is not successful in MDI patient
- With improved suture-passing devices and anchors, tie instead of fry
- Improved results in elite professional baseball athletes with suturing has been reported (J. Andrews et. al.)

Thermal Shoulder





Capsular Necrosis



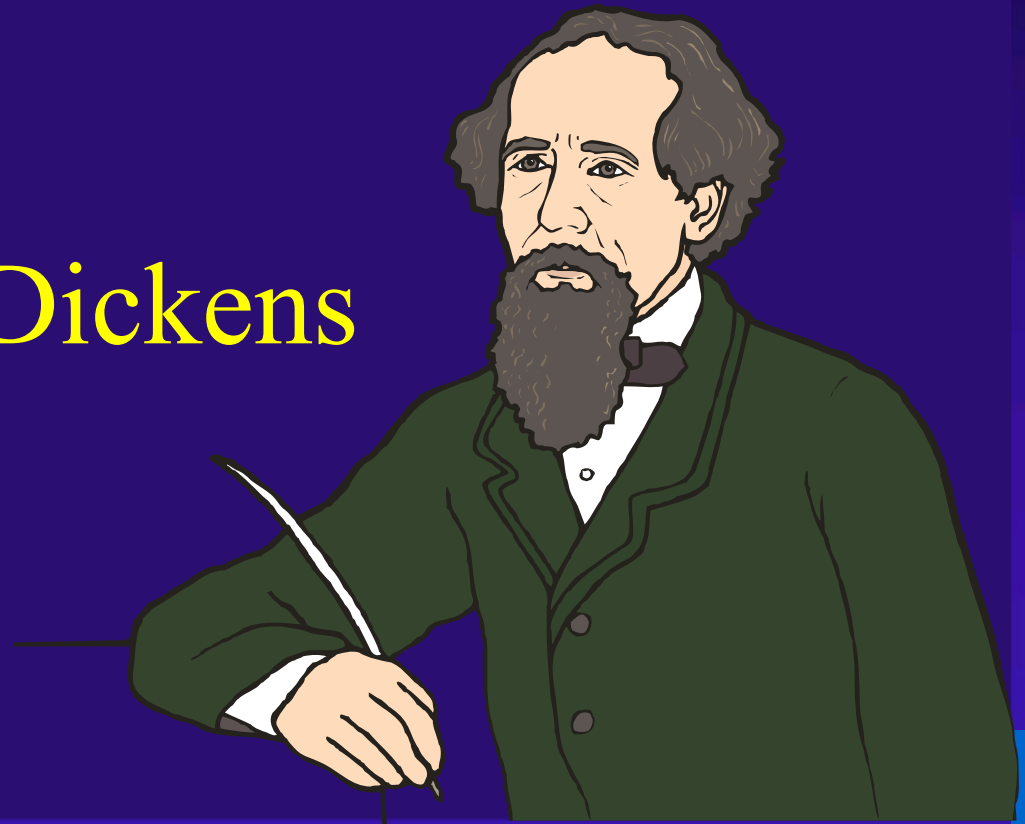
Courtesy of Tony Romeo, M.D.
S/P Thermal Modification, Continued Instability, Rescope 6 months

Radiofrequency Applications

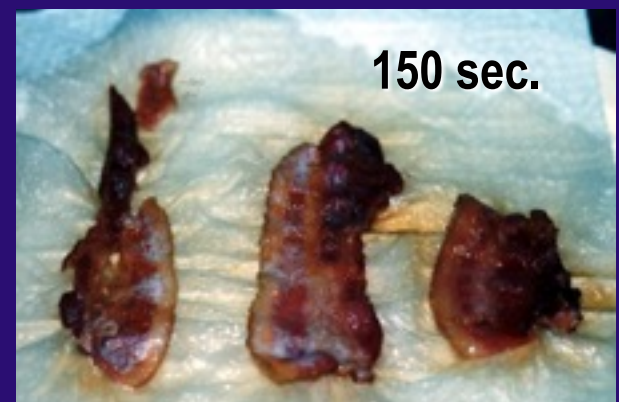
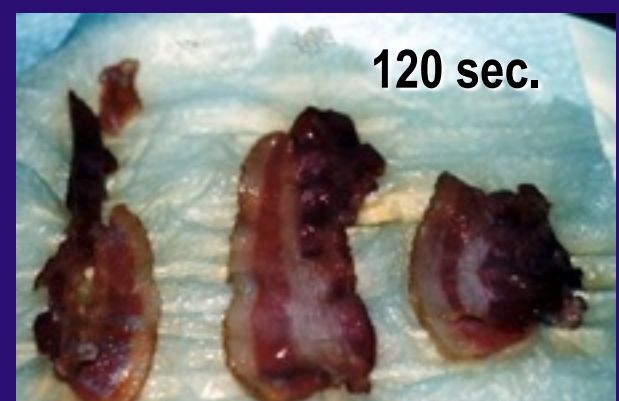
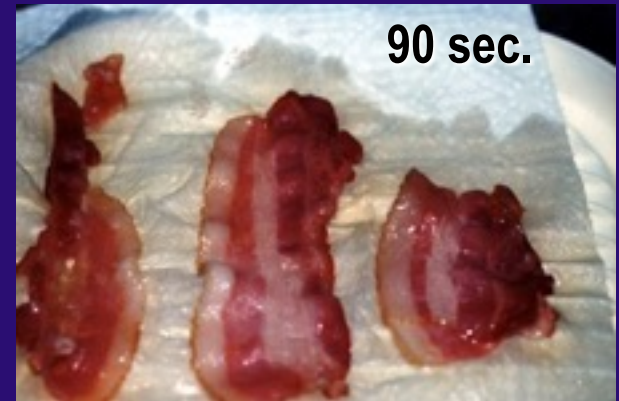
- Shoulder capsule shrinkage
- Knee
 - Patella lateral release
 - Meniscectomy
 - Debridement
 - Ligament Stumps
 - ? Articular cartilage

**“Take nothing on its looks.
Take everything on evidence.
There is no better rule.”**

- Charles Dickens



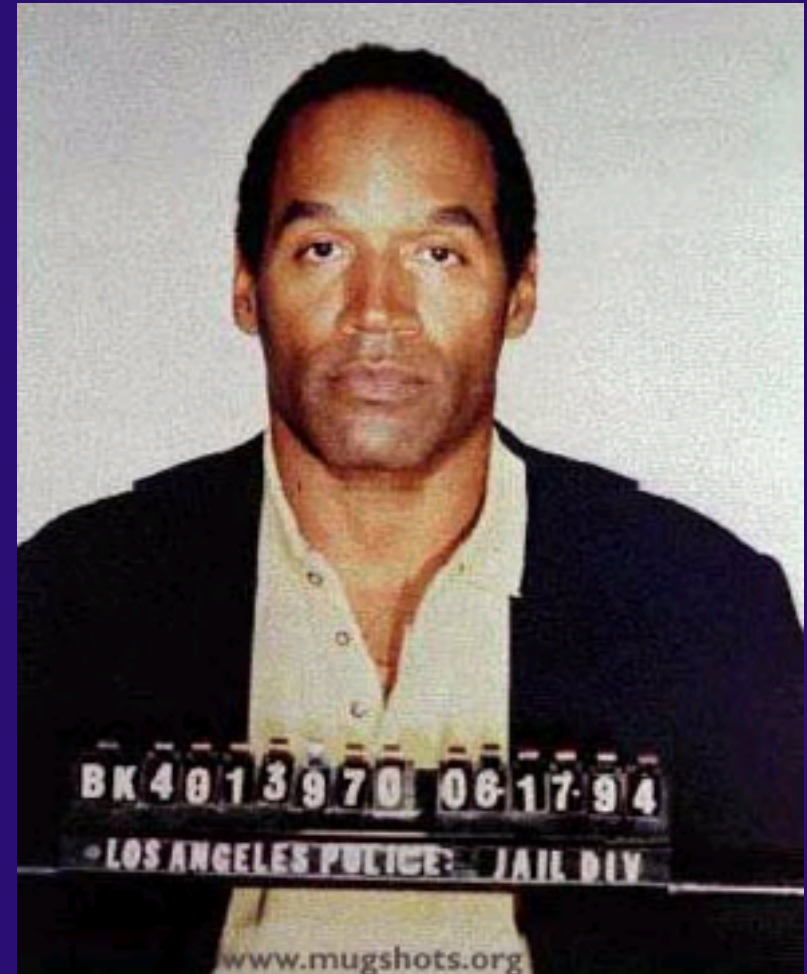
Thermal Shrinkage of Bacon by Microwave



Thermal Kills:

cells, capsule, articular cartilage, and other tissues

- Killing is BAD
- You may get away with it, but...



Hip Pain in Athletes - Groin

- Prior to 1985:
 - Most common dx was: Adductor strain
- 1985 to 1990: inguinal hernia
- 1990 to present: athletic pubalgia
 - Rectus abdominus insertional fibrocartilaginous plate injury
 - Adductor longus, brevis avulsion

Differential Diagnosis

- Intraarticular? Extraarticular? or Both?

Intraarticular Hip Disorder

- If symptomatic, arthroscopic treatment is indicated

Excellent teacher of diagnosis of hip disorders and hip arthroscopy



Tom Byrd, MD

Hip Pain in Athletes – Femoroacetabular Impingement

- **Cam type**
 - Pistol-grip deformity?
 - Slipped Capital Femoral Epiphysis
 - Developmental Disorder
 - Premature Growth Arrest
 - Bill Harris, 1975
- **Pincer type**
 - Acetabular side
 - Labral tear
 - Smith Peterson

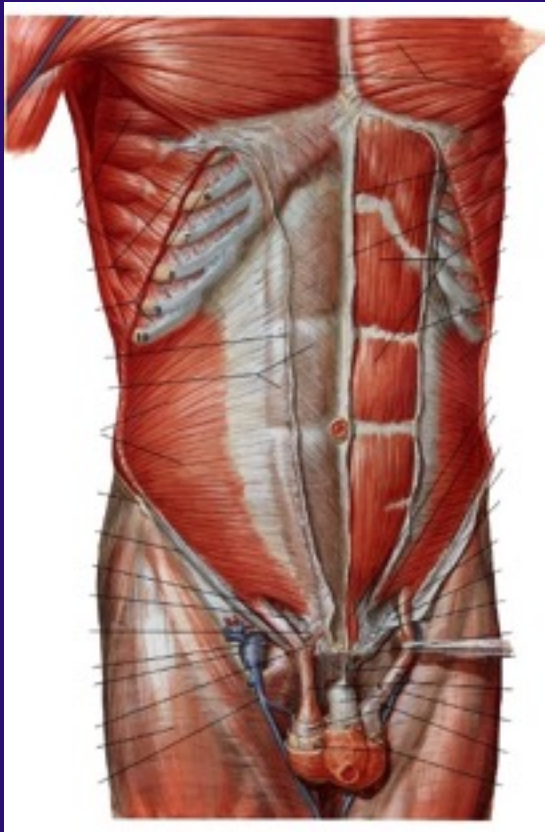


Athletic Pubalgia is a Sports Hernia but A Sports Hernia is not a Hernia

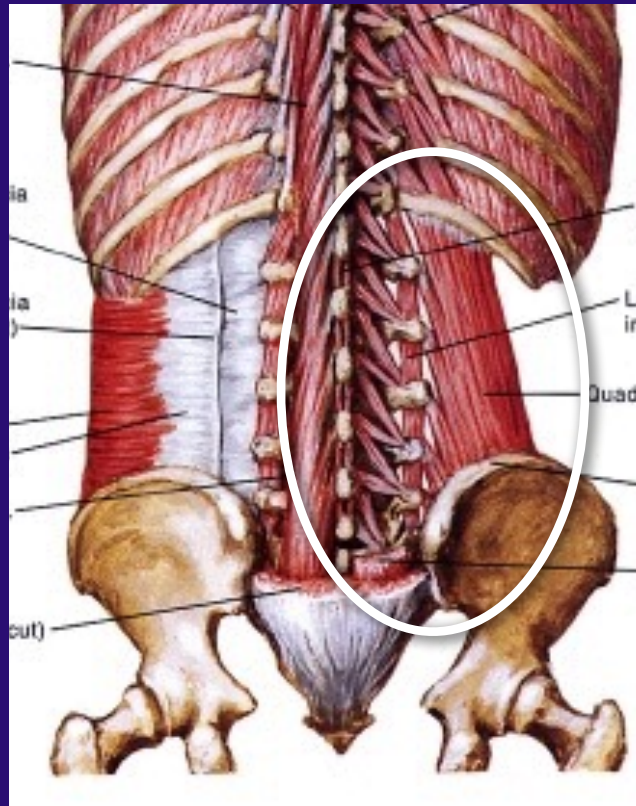
- **What is it?**
 - Rectus abdominus insertional aponeurotic tear
 - Adductor longus/brevis and pectineus origin tear avulsion fibrocartilaginous plate
 - **Compartment syndrome?**
- **Workup**
 - History and Physical Exam
 - **Imaging**
 - MRI scan, special series: axial/oblique imaging plane
- **William Meyers, General Surgeon, Philadelphia, PA**

Core Musculature

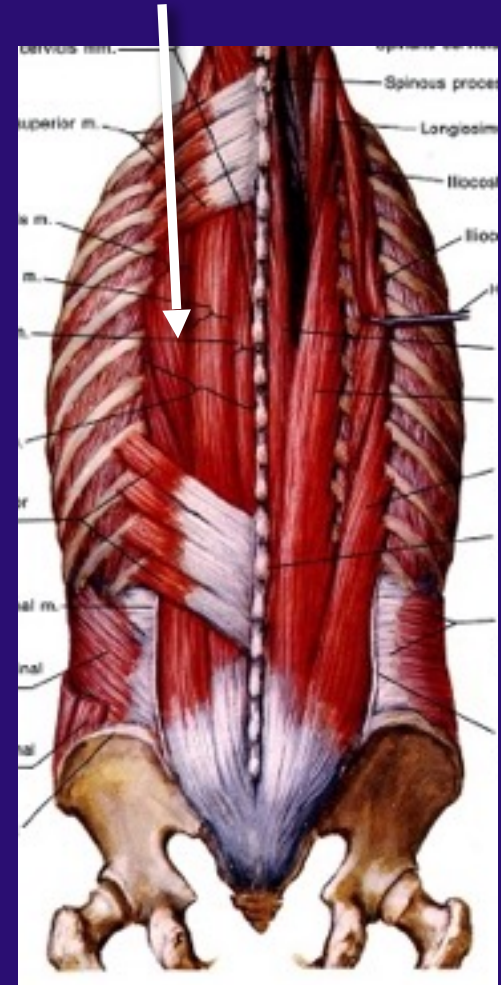
- Rectus Abdominus
- Abdominal Musculature



- Quadratus lumborum
- Obliques
- Transversus Abdominus



- Erector Spinae
Back Extensor
Musculature



Treatment

- Athletic pubalgia
 - Soft tissue tightening
 - Rectus abdominus
 - Adductor release
 - Fasciotomy
-
- William Meyers, General Surgeon, Philadelphia, PA
 - Specialty liver transplants
 - Now sees 25 athletic pubalgias per week, surgeries: 15/week



ACL Reconstructions

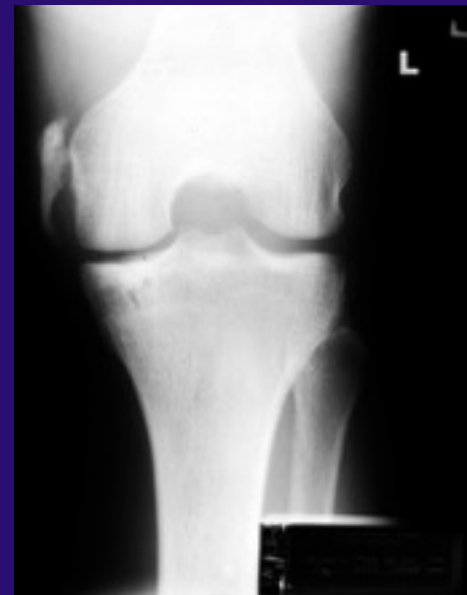
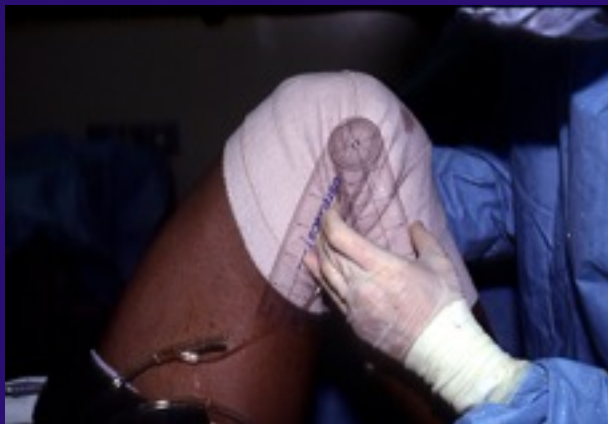
- **70s to Early 80s:**
 - Extraarticular IT band tenodesis
 - Arthrotomy, open ACL reconstruction
- **Mid-80s to Mid-90s:**
 - Arthroscopic intraarticular ACL reconstruction
 - Single bundle
- **Mid-90s:**
 - Anatomic ACL reconstruction
 - Single / Double bundle
 - Improved fixation techniques
 - Understanding anatomic landmarks
 - Improvement in guides, reaming — all inside, inside-out

Capsular Ligament Injuries

- **Pre-1975:**
 - Capsular repairs, cut out the ACL
- **Evolution to reconstruct ACL**
 - Ignore the capsule
- **2000: The capsule is BACK!**
 - Diagnose AMRI and PLRI
- **PCL injuries reconstruct if associated with medial or lateral injuries**

Flandry, F., et. al., Evaluation and Treatment of Acute and Chronic Injuries to the Capsular Ligaments of the Knee, AAOS Instructional Course Lectures, Vol. 58, 2009, 397-421.

We've come a long way from extraarticular to intraarticular anatomic reconstruction . . .

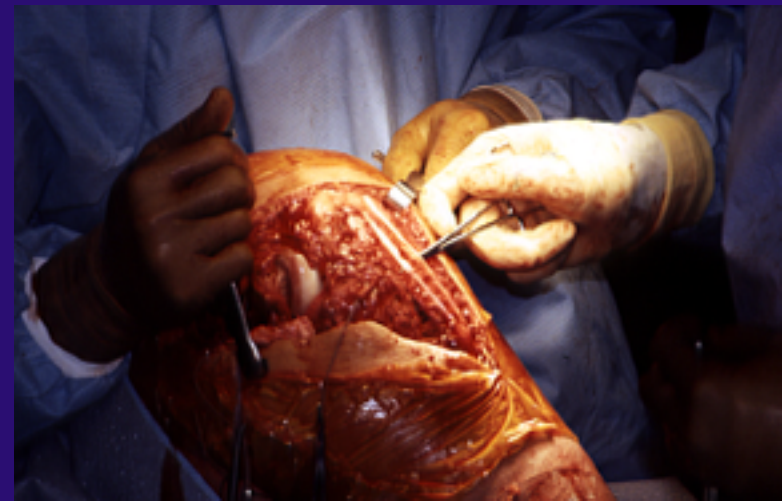
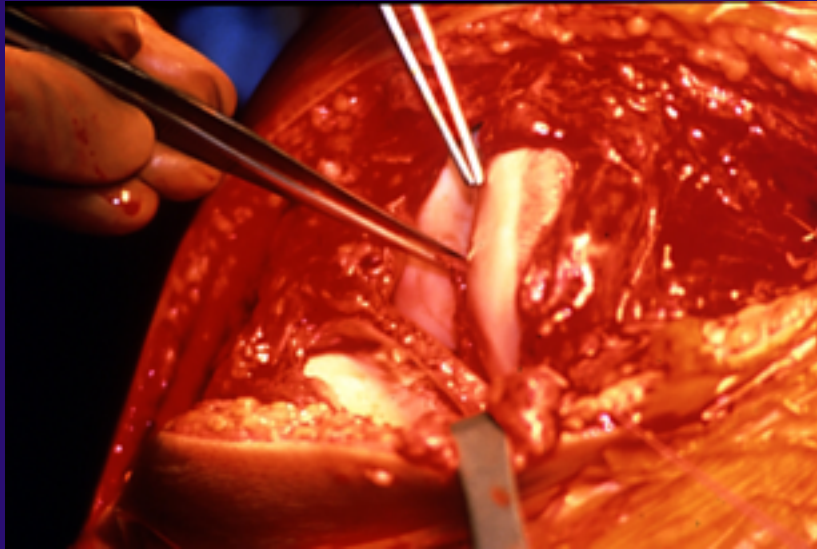


Concept of Rotatory Instability, Not Cruciate-Deficient Knee

- Dr. Jack Hughston's legacy
 - My fellowship at Hughston Clinic, Columbus Georgia, 1984
 - Taught me how to listen to patients and examine knees



Hughston JC, Andrews JR, Cross MJ, Moschi A: Classification of knee ligament instabilities Part 1. The medial compartment and cruciate ligaments. Part 2: The lateral compartment. *J Bone Joint Surg Am* 1976;58:173-179.



Instabilities: Describe the Rotation or Straight Direction

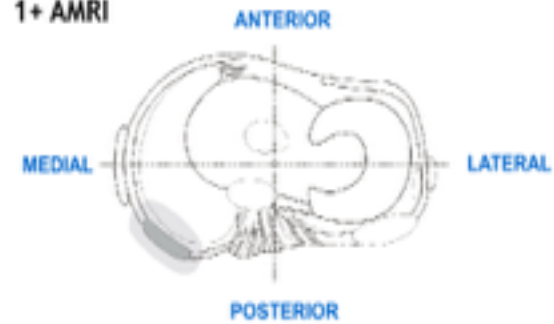
- **Anteromedial rotatory instabilities (AMRI)**
- **Combined AMRI and ALRI**
- **Anterolateral rotatory instabilities (ALRI)**
- **Straight posterior**
- **Posterolateral rotatory instabilities (PLRI)**
- **Combined ALRI and PLRI**
- **Straight instabilities**

Knee Instabilities

AMRI



1+ AMRI

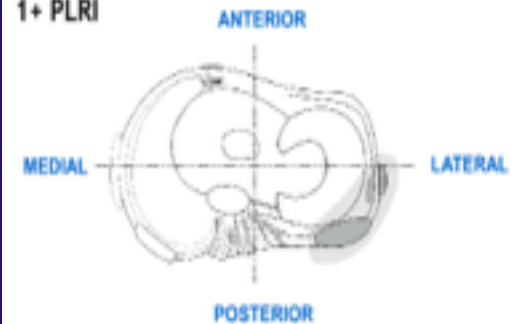


Knee Instabilities

PLRI



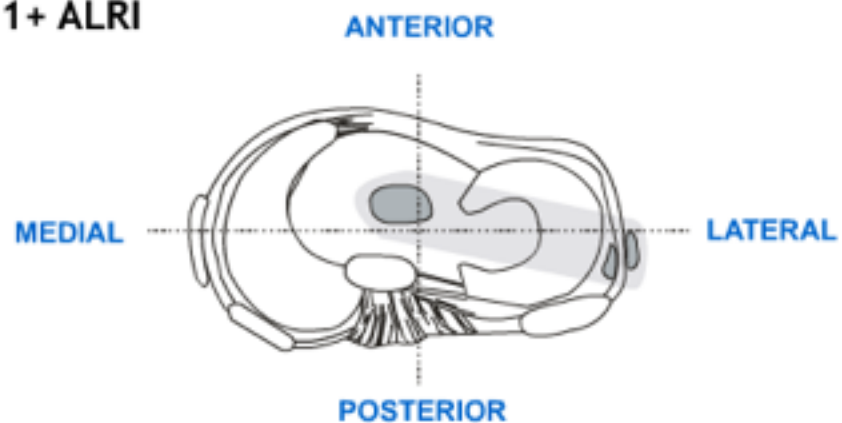
1+ PLRI



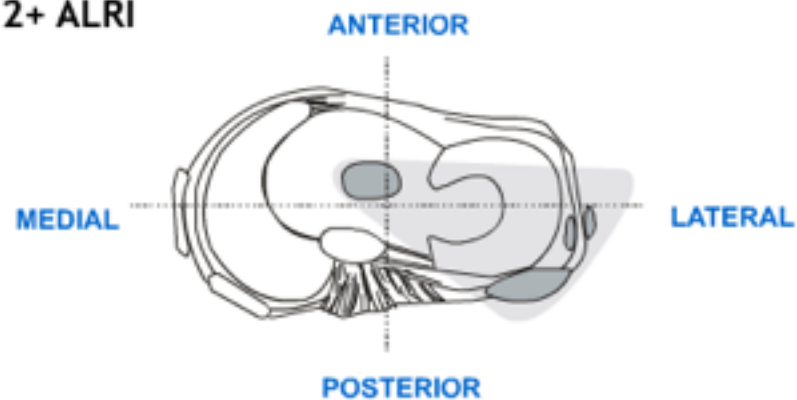
Knee Instabilities

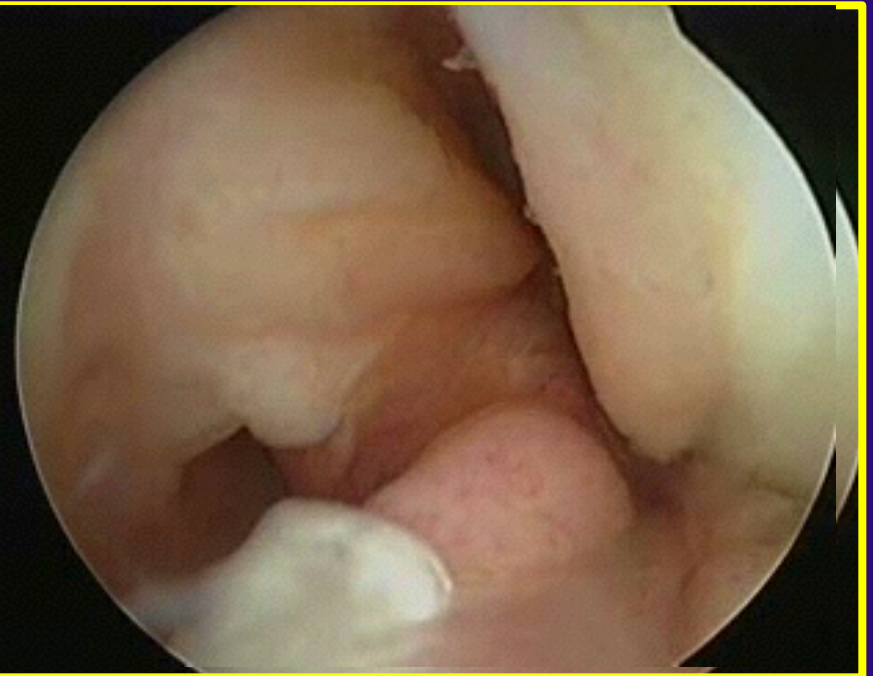
ALRI

1+ ALRI



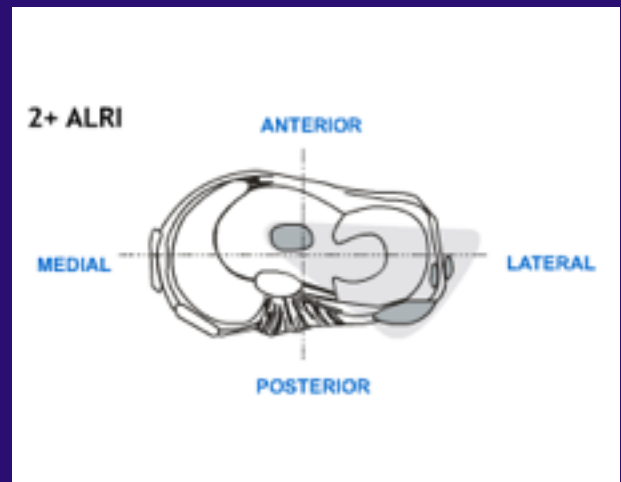
2+ ALRI

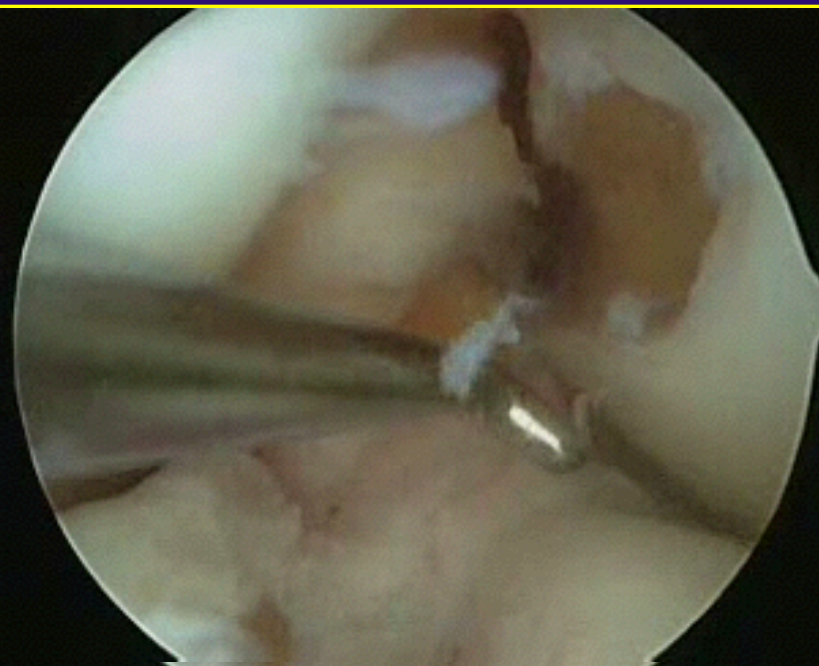




EUA:

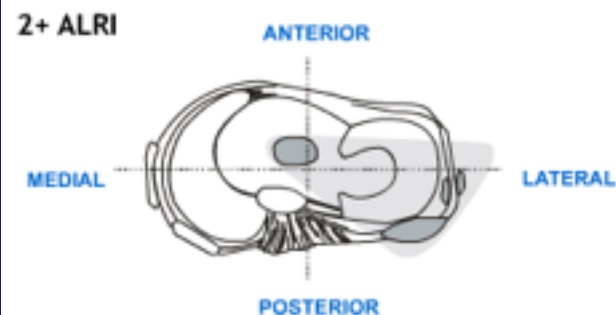
Correlate mechanism of injury, anatomy, surgical findings to study design in the lab





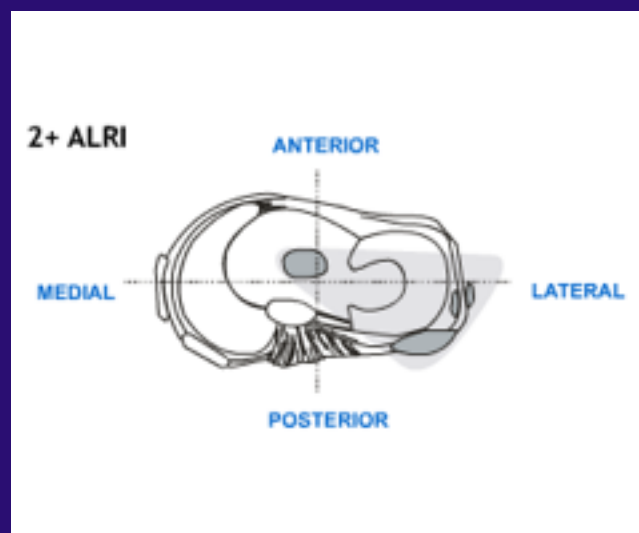
Pivot Shift

Lateral tibial plateau internally rotating,
anteriorly subluxing at 30 to 0 degrees





Medial compartment:
compressive forces posterior medial meniscus,
typical tear pattern vertical, posterior



TREATMENT:

We can establish stability,
but not normality with ACL reconstruction.



Do we have Tunnel Vision?



**Why do ACL reconstructions fail? Maybe not surgeon.
Why does noncontact ACL tear occur?**

Risk Factor Categories (Murphy et. al.)—ACL Risk

| Intrinsic | Extrinsic |
|--|---|
| <ol style="list-style-type: none">1. Age2. Sex (Male / Female)3. Phase of menstrual cycle4. Previous injury and Inadequate Rehabilitation5. Aerobic fitness6. Body size7. Limb dominance8. Flexibility9. Muscle strength imbalance10. Reaction time11. Limb girth (Wide / Narrow notch)12. Postural stability13. Anatomic alignment14. Foot morphology | <ol style="list-style-type: none">1. Level of competition Games / Practice2. Skill level3. Shoe type Edge-Cleats Other Cleats4. Ankle bracing5. Playing surface |

5 Significant ACL Factors

Murphy DF, Connolly DAJ, Beynnon BD, "Risk factors for lower extremity injury: a review of the literature," *Br J Sports Med* 2003, 37:13-29.

Advances in Rehab programs

THEN



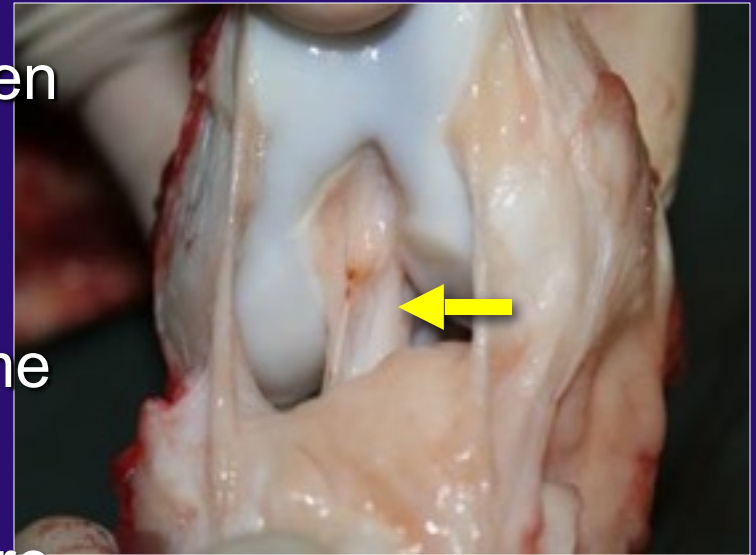
NOW



Sport-specific rehab: hip/core balance programs

Early Results for Enhanced Primary Repair in Porcine Model

- Suturing enhanced with collagen and platelet rich plasma (PRP)
- Strength similar to that of ACL Reconstruction at early time points
- Additional testing needed before clinical trial can be considered



ACL after 3 mos
of healing after
enhanced primary
repair

Slide courtesy of Martha M. Murray, MD

- **John Feagin**
 - Research with US Army 30 years ago
 - Repair doesn't work
- **2011:**
 - ACL repair research looks promising
 - Manipulation of healing factors and synovium around ACL may allow healing to occur

The Future

ACL Repair

- Cells within synovial sheath
- ACL1

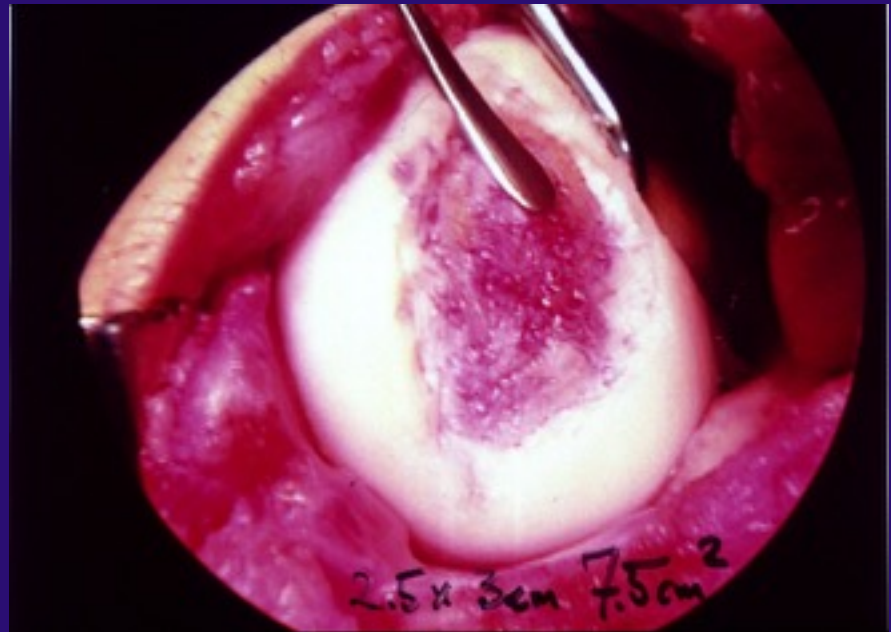
Detection of arthrosis

- Synovial fluid factors
- Turn off destruction



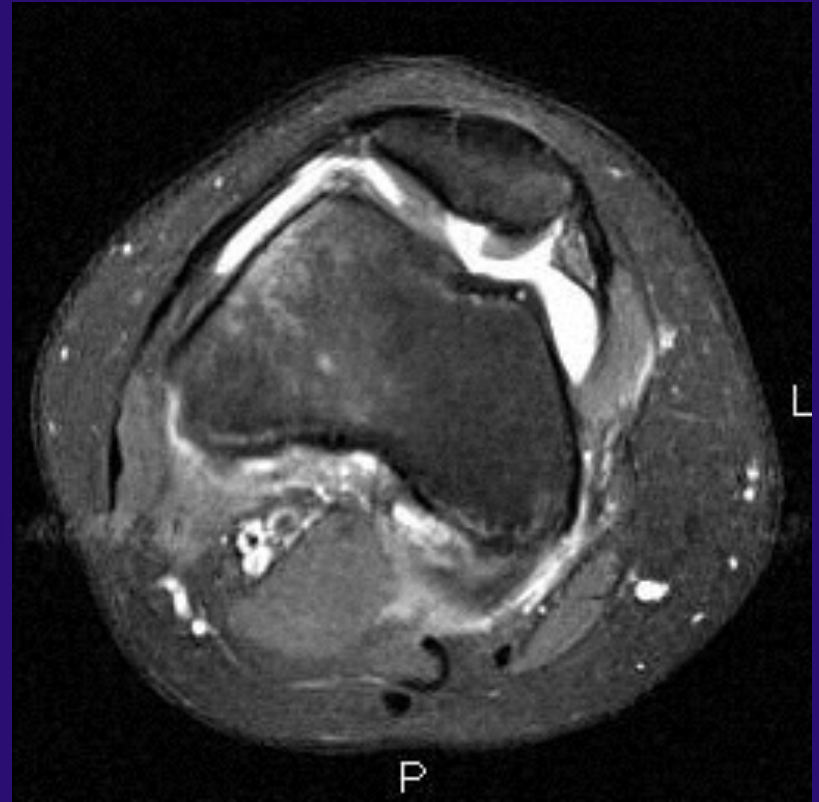
Hunter 1743

“....once violated ...Articular cartilage defects are a troublesome thing..... they don't heal!!!”



Bone Bruise Patterns

- Acute patellar dislocation
- Medial patella anterolateral femoral condyle
- No OA from bone bruise, but from articular cartilage injury and mal-tracking



2014: Unanswered Questions

- Can we prevent osteoarthritis in ACL reconstructed knees, long-term followup needed?
- If heavy bench-pressing done, can we prevent shoulder osteoarthritis?

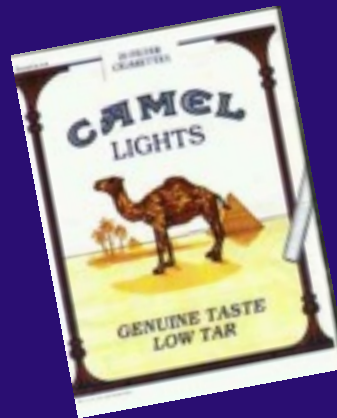


Knee “pack-years” as in smoking: Additive effects of years of participation in basketball. . .

- Pack-years of smoking on **lungs**
- Pack-years of activity on **knees**



? Too many pack years of basketball ?



Foot/Ankle: Posterior impingement and Haglund's syndrome
Open approach prior to 2000

Arthroscopy post 2000

- Prone arthroscopy
- Ballet dancers post ankle pain
- Os trigonum excision
- FH tenosynovectomy
- Haglund syndrome
 - Endoscopic calcaneoplasty
 - Subacromial view of the foot

Medial ankle instability - Repair and Advance Deep Deltoid

Youth Elbow: Baseball Pitcher

- Little Leaguer's Elbow
 - Described by Adams, 1964
- Medial humeral epicondyle stress fracture
 - My definition of Little Leaguer's Elbow
- 1980s: osteochondritis dissecans
 - Incidence reduced in US? from pitch count restrictions?
 - Increased incidence in Japan
- 2000: ulnar collateral ligament tears
 - Epidemic

**Need Injury Registry
for childhood sports injuries**

12 YO boy

- Little Leaguer injured while pitching 5 months prior
- Felt pop in medial elbow
- Did not seek medical attention
- Sat out rest of season, got better
- Played football -- no problems

Rapid growth phase, medial elbow pain when started pitching again

Case courtesy of Dr. Adam Smith

Follow up:

2 weeks:



6-weeks:



7 months:



4-weeks:



4 months:



19 months:



BB Bullet Appearance to medial epicondyle fracture

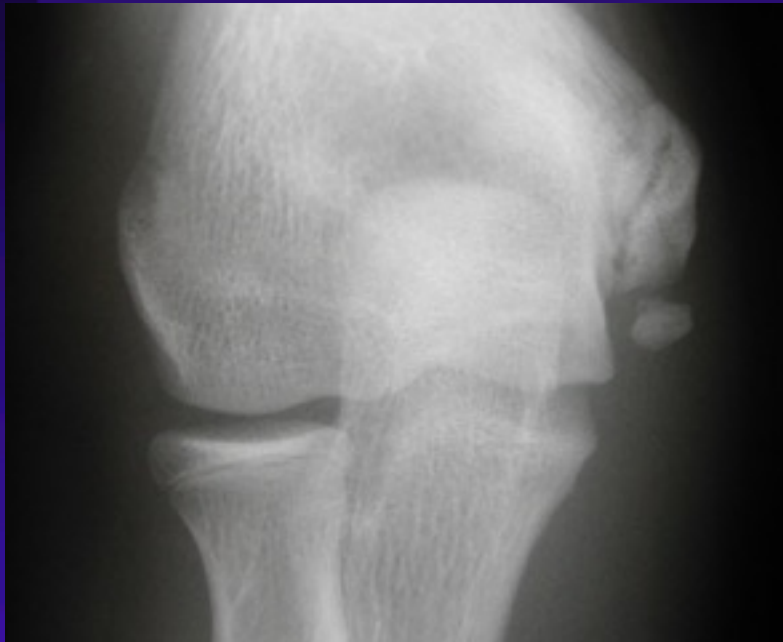
- May heal if you don't allow pitching too early
- May take long time to heal, but UCL is intact

BB Gun

- Don't allow to fire too soon



14 YO Pitcher, medial elbow pain for a year, open medial humeral epiphysis torn UCL



Stress Views

UCL reconstruction performed, baseball career ended

Kids Will Be Kids

“I went to bed one night
and I was a kid, and when
I woke up the next
morning I was a grown
up.”

-- Josh Baskin in “Big,”
played by **Tom Hanks**,
20th Century Fox, 1998



Editorial, Bruce Reider, M.D.

Chicago, Illinois

Editor in chief, *Am J Sports Medicine*

Vol. 39, No.5, May 2011

Kids Will Be Kids

13 YO:

- Spontaneity
- Sincerity
- Vulnerability

30 YO:

- Cynical
- Calculated behavior of his adult workmates

“Kids are not just miniature adults. As a specialty, orthopaedic sports medicine should continue to strive to uncover the optimal means of diagnosing, treating and preventing injury in this unique and important population.”

Editorial, Bruce Reider, M.D.

Chicago, Illinois

Editor in chief, *Am J Sports Medicine*

Vol. 39, No.5, May 2011

Conclusion: 13 YO “Big Pitcher” Syndrome

- Skeletally and mentally immature
- Fast growth phase
- Poor pitching mechanics
- Hip weakness
= UE overuse injury



Protect our young athletes

- Reduce rate of Rotator Cuff and UCL tears in young pitchers

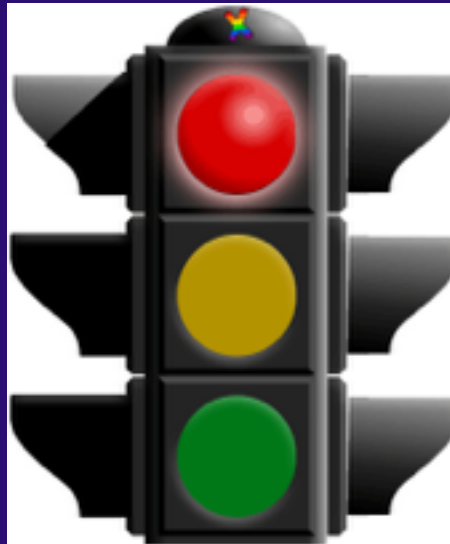
STOP Elbow Injuries in Youth Baseball: Youth Sports Injury Prevention

Sports
Trauma and
Overuse
Prevention



www.stopsportsinjuries.org/

Should the “STOP” program really be the “GO and PARTICIPATE in activities” program?



We all should encourage our youth to be physically active, fit, and healthy . .

.

Unique Aspects

- Young athletes:
 - Feel no pain
 - Goal is to please parents, peers, coaches
 - Must be protected



Injections: Prior to 1985

- Steroids
- Lidocaine

Injections: NOW

- PRP

No scientific evidence/studies on effectiveness in athletes

Hines Ward: Injection MCL

Faster healing, faster return to play

Anecdotal evidence only

PRP: Platelet Rich Plasma

- Key is platelet activation
- Ultrasound guided into soft tissue and joints
 - now the rage
- Intraop repair rotator cuff, Achilles tendon
- Blood Doping ?
 - IOC and other athletic organizations have not yet regulated

Beware of new drugs and devices which seem to be too good to be true



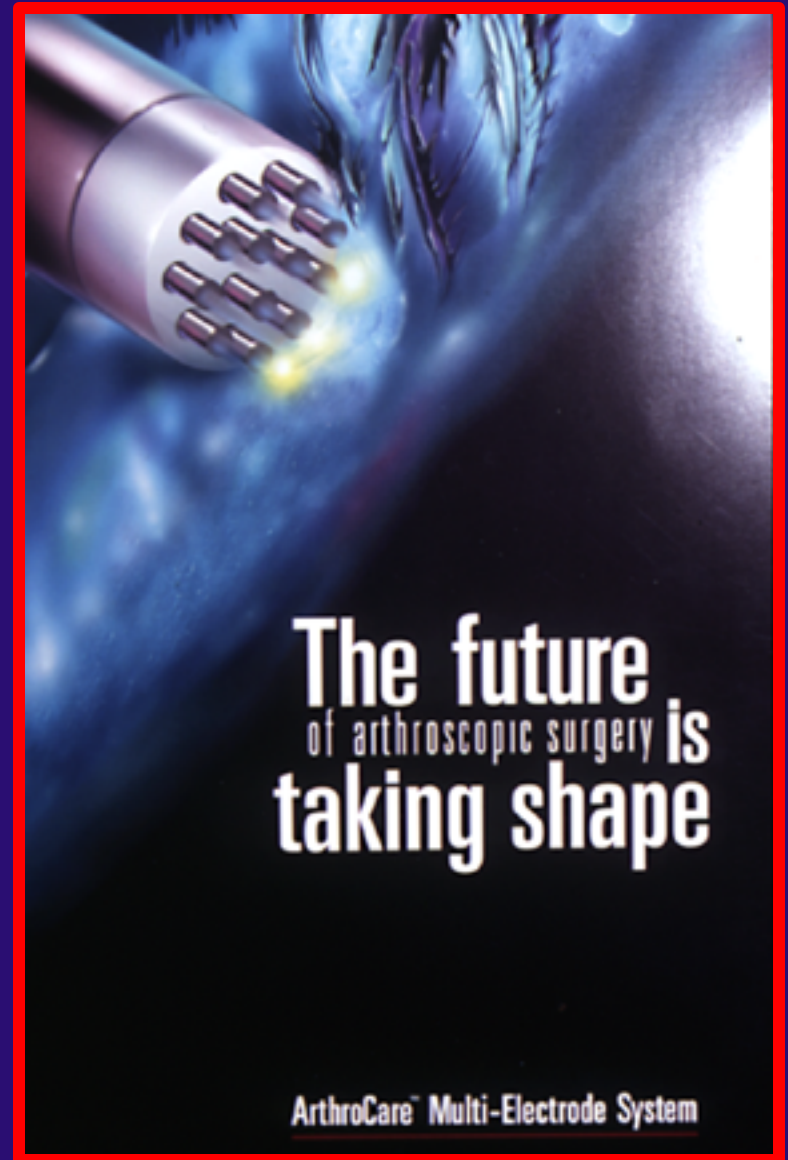
New Techniques

Equipment

- LASER
- Robotics

Implants

- Cartilage
- Allografts
(Ligament/Meniscus/Cartilage)
- Fixations
(Metal/Absorbable)



Arthroscopy allowed better understanding of biomechanics of failure of tissues, and improved methods of repair reconstruction.

- **Don't implant a device that you would not put into your own body!**

What hasn't changed is anatomy. . .

Know the anatomy, open and arthroscopic.

What Doesn't Change

- Examining Patients



What doesn't change? (1980s to present)

- Communication
- Understanding techniques of history-taking and Physical Exam
- Communication with entire medical team and families



Who Teaches Ethics?

- Parents Initially
- In Practice:
Ethics Taught by
Way We Practice
Role Models
- Should Communicate
More with Other Physicians



Always practice ethically . . .

Do the right thing, always, no exceptions!



Thomas D. Brower, MD

(March 15, 1924–Nov. 16, 1998)



- First Chief of Orthopaedics at UK, until 1989
- First to show that both epiphyseal and articular cartilage chondrocytes can divide
- Showed that the nutrition support of articular cartilage is through perfusion of intra-articular fluid

Many Changes in UK Orthopaedics/Sports Medicine

UKHealthCare



UK Residency Program



UK Sports Medicine Symposium 2014



Fellowship Societies



Communicate with peers Don't stay in your foxhole.



“Even if you are on the right track, you will get run over if you just stand there.”

-- Will Rogers



**ACL Study Group, Bangkok, Thailand
2010 – Dr. Chenin**

**Practice makes Better....
The More touches with the Arthroscope The Better.....
Always Keep Learning...OR**



The ever vigilant and hunter lioness



Protecting, Feeding, Stay the Journey



Stay on the Path...Coming and Going

