Disclosure

• Off-label use for gadolinium
Pediatric Sports Injuries

- 30-45 million children between the ages of 6 and 18 participate in organized sports, with more than half playing in more than one sports team
- Over 4 million sports or recreational injuries are incurred by school-age children each year
- Injury prevalence has lead to increased interest in prevention, improved diagnosis and characterization of injury as well as means of treatment

Shoulder Arthrography for Sports Evaluation

- Indications
- Brief Technical Consideration
- Anatomy and Variants
- SLAP/ Instability/ Rotator Cuff
MR Arthrography

- MRA vs Conventional MR imaging*
  - Labrum
  - Rotator cuff
- MRA vs Conventional MR imaging and CT arthrography**
  - Labrum

**Chandnani et al., AJR 161:1229-1235, 1993
MRA Professional Baseball Player

- Anterior inferior labral signal change and subtle marrow edema in glenoid
MRA Professional Baseball Player
MR Arthrography

- Placement of contrast (dilute gadolinium solution) into the joint
MR Arthrography

- Improve visualization of intraarticular structures
- Articular distension with fluid
  - Allow fluid intravasation into recesses and tears
- Improve contrast between joint fluid, intraarticular, and osseous structures
ABduction
External Rotation
Through change in arm position and alteration of capsule dynamics

- Place capsulolabral complex under tension
- Force fluid into redundant superior capsule and RC
ABduction External Rotation
ABduction External Rotation
Abduction  External  Rotation
Glenoid Labrum

• Cuff of fibrous and fibrocartilaginous tissue surrounding glenoid fossa
  – Normal anatomic variations
    • Signal intensity
    • Morphology
    • Presence or absence
    • Attachment

• Attachment site
  – Long head of biceps
  – Glenohumeral ligaments
Characterization of Labral Findings
Glenoid Labrum

- Variation in morphology and signal intensity
Glenoid Labrum
Buford Complex
Variation in Presence

- Cordlike middle glenohumeral ligament associated with absent anterosuperior labrum
Buford Complex
Variation in Presence
Sublabral Recess
Variation in Attachment

- Occurs between anterosuperior labrum and glenoid
- Frequency 10%
- Simulates labral pathology
Sublabral Recess (Sulcus)
Variation in Attachment
Sublabral Foramen (Hole) Variation in Attachment
SLAP Lesions

- Description of superior labral lesions in throwing athletes by Andrews et al. in 1985
- Prior to arthroscopy, lesions of the superior labrum virtually undescribed
- Introduction of the acronym SLAP (superior labrum anterior and posterior) by Snyder et al. in 1990
- Prevalence in the range of 3.9-6% in all patients undergoing shoulder arthroscopies
Assessment of Morphology of Biceps Labral Complex
Assessment of Morphology of Biceps Labral Complex
Assessment of Superior Labral Signal Intensity
SLAP Lesions

16 year old pitcher/ Method of Failure - Detachment
SLAP Lesions
16 year old pitcher – 11 months post-op
SLAP Lesions
16 year old pitcher – 11 months post-op
Isolated Anterior Labral Lesions

16 year old football player

16 year old water polo player
Unstable Capsulo-Labral Lesions

- Glenoid Failure (70-75%)
  - Bankart
  - ALPSA
  - Perthes

- Capsular Failure (15-20%)
  - Tear/Laxity

- Humeral Failure (5-10%)
  - HAGL
  - BHAGL

- Humeral + Glenoid Failure
  - Floating
  - AIGHL
Bankart Lesion

Bankart
Osseous Bankart
16 year old wrestler re-injury after Bankart repair
Soft Tissue Bankart
16 year old football player

Perthes Lesion
15 year old little leaguer
Chronic ALPSA
Anterior Labral Ligamentous Periosteal Sleeve Avulsion (ALPSA)
Rotator Cuff Injury

- Typically seen in adolescent pitchers as shoulder subjected to higher stresses
- Majority of injuries consist of supraspinatus tendinopathy or strain
- Rotator cuff tendon tears rare and typically occur during vigorous throwing activity
- MRI highly effective at detecting rotator cuff injuries and excluding other causes of shoulder pain

Itoi, et al. Orthopedics, 1993
Intrinsic Impingement

- Posterosuperior Internal Impingement
  - Jobe CM, Shoulder Elbow Surgery 1993; 2: S19

- Clinical Presentation
  - Athletes
  - Overhead throwing motion

- Imaging findings
  - Cystic change greater tuberosity
  - Articular surface tear RC
  - Posterosuperior labral abnl
Traumatic Rotator Cuff Tear
15 year old football player
Shoulder Arthrography for Sports Evaluation

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