Orthopaedics in Boxing/MMA

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Cervical Spine

• Any boxer with head trauma, doctor *must* first protect the spine.
  – Do not move boxer and *never* move boxer’s head
  – Do not let trainer/corner/referee move injured boxer
    • *You must protect the boxer*
  – ABCs
MRI C-Spine (normal)

Vertebral body
Disc space
Spinal cord
Herniated Disc
Cervical Herniated Disc
Cervical Herniated Disc

Axial and sagittal CT myelogram showing cervical disc herniation
Cervical Subluxation
C-5 Fracture
Evander Holyfield
Shoulder joint

Acromio-clavicular (A-C) joint

Scapula

Humerus

Clavicle
A-C Separation
Clavicle Fracture
Proximal Humerus Fracture
Shoulder Dislocation

• 95% dislocations are anterior
• Inability to lift arm
• Inability to bring arm across chest (touch other shoulder)
• May tear cuff!
  – Especially in boxers older than 40
Shoulder Dislocation
George “Skinless” Jones
Rotator Cuff

• 4 muscles - SITS
  – Supraspinatous
  – Infraspinatous
  – Teres Minor
  – Subscapularis

• Depress shoulder and stabilize joint
Rotator Cuff Muscles

Anterior view

subscapularis

supraspinatus

infraspinatus

teres minor

Posterior view
Rotator Cuff Tendonitis/Impingement

• Definition
  – Crushing of rotator cuff muscles between acromion and humeral head (within subacromial space)
  – More likely in boxers older than 35-40 years old
Impingement sign
Rotator Cuff Injury - Exam

- ROM - forward flexion, abduction, external rotation, internal rotation (vs. contralateral)
- Impingement sign/test
- Test all muscles - especially rotator cuff
- Rule-out other pathology
  - c-spine
Surgical scar

Bronx “organization” scar
Supraspinatous test

- 90° abduction
- 30° forward flexion
- Full internal rotation
ER strength

- Elbow 90° against side
- 45° internal rotation
Rotator Cuff Tear
“Boxer’s Fracture”

- Fracture of 4th or 5th metacarpal
- Not common in professional boxers
“Boxer’s Fracture”
4th Metacarpal Fracture
Professional Boxer’s Fracture

- Fracture of 2\(^\text{nd}\) or 3\(^\text{rd}\) metacarpal
- More typically in professional boxers
- Usually dominant hand
Professional Boxer’s Fracture
Bennett’s Fracture (Base Thumb)
Ruling-Out Fractures

- **Acute**
  - Tender to palpation
  - Obvious deformity (rotation/bend)
  - Crepitus/pain with motion
- **Sub-acute**
  - Ecchymosis/swelling
  - Tenderness
Ruling-Out Fractures

Only way to rule-out fracture 100% is with appropriate x-rays!
Distal Bicep Tendon Rupture

- Pain/tenderness in anterior elbow
- Defect and retracted bicep muscle (popeye sign)
- Weak elbow supination/flexion
Distal Bicep Rupture
Bicep Tendon Repair
Bernard Hopkins
Knee Anatomy

• 4 important ligaments
  – ACL - resists ant translation and hyperextension
  – PCL - resists post translation
  – MCL - resists valgus
  – LCL - resists varus
ACL

LCL

PCL

MCL

lateral meniscus

medial meniscus
Menisci of the Knee

lateral meniscus

medial meniscus
Lachman Test for ACL
ACL Reconstruction

screw

ACL graft
Menisci of the Knee

- lateral meniscus
- medial meniscus
- typical tear site
Physical Exam - Meniscus

- Joint line tenderness
- McMurray flexion rotation test
- Flexion pinch test
- Pain with squatting
Meniscus Tear

torn piece

med fem condyle

meniscus

tibia
Partial Meniscectomy
medial meniscus tear

s/p partial meniscectomy
Meniscus Tear and Repair

medial meniscus tear
Arthroscopy Portal Scars
Gerry Cooney
Ankle Injuries

- Typically inversion injury
- Lateral ankle sprain is most common
Ottawa Rules for Ankle Fractures

- Able to bear-weight on affected foot
- Able to take 3 steps unassisted
- No bony tenderness at posterior lateral malleolus

n.b.-must be fully conscious to apply rules
Ankle Dislocation
Bimalleolar Ankle Fracture

[Image: X-ray of an ankle showing a bimalleolar fracture.]
Orthopaedic Pearls

• Immobilize/Protect suspected c-spine injuries

• *Firmly* palpate any suspected injured areas
  – Check ROM and strength
  – Pre-fight exam always push on MPs and check finger extension

• Compare to contralateral extremity

• Deep squat to test knee
Senator John McCain
• http://www.youtube.com/watch?v=HbejYeHwBVc
Mixed Martial Arts Injuries

- Joints are a weak point of the human body
- One of the basic tactics of MMA is to stress a joint to point of submission or dislocation
Finger Dislocation
Elbow Dislocation
Thank You!