Shoulder Pain and Orthopaedic DDX: Sports Medicine

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ANTERIOR / LATERAL

HOW AGGRESSIVE / INVASIVE?

SHOULDER GIRDLE

SUPRASPINATUS

Courtesy of Lajtai G, Klagenfurt, Austria

Engraving of Label G. Wagner, Austria
INFRASPINATUS

SUBSCAPULARIS + BICEPS

LABRUM AND CAPSULE

GH, ST AND AC JOINT

NEUROVASCULAR STRUCTURES

WHAT IS FREQUENT?

- „rotator cuff lesions”
- „impingements”, SLAP and biceps lesions
- instabilities

Courtesy of Lajtai G, Klagenfurt, Austria
HISTORY ROTATOR CUFF

- Traumatic versus non traumatic
- Answer of the Tribunal Federal:
  - [Link to website]

PHYSICAL EXAMINATION

- Force of the ABD, ER and IR
- ER-Lag  IR-Lag

X RAY

- 3 views
  - a.p., Neer, axial

X RAY: WHAT I HAVE TO LOOK

- ACHD

X RAY: WHAT I HAVE TO LOOK

- Exzentr. OA, Zentr. OA

ULTRASOUND OR MR ARTHROGRAM
ULTRASOUND OR MR ARTHROGRAM

- Similar Sensitivity, Specificity, PPV und NPV
- Ultrasound less expensive
- MR Arthrogram better regarding...
  - Size of the rupture
  - Retraction
  - Lengths of the tendon
  - Fatty infiltration of the muscle
  - Reproducibility

MRI: WHAT I HAVE TO LOOK

A-MRI/A-CT
1.) Partial versus full thickness tear
2.) Retraction of the tendon
3.) Fatty infiltration of the muscle

TEAR

<table>
<thead>
<tr>
<th>Full thickness</th>
<th>Partial</th>
</tr>
</thead>
</table>

RETRACTION

Classification „Patte“

1. Retraction behind the glenoid → Refix not possible
2. Traumat. SSC rupture → “EMERGENCY”

FATTY INFILTRATION

- Parasagittal
  - Grade 0: normal
  - Grade 1: loss of fat
  - Grade 2: more muscle than fat
  - Grade 3: mixed muscle and fat
  - Grade 4: more muscle

- Same amount of fat and muscle → not repairable!

traumatic
non traumatic
WHAT IS FREQUENT?

- "rotator cuff lesions"
- "impingements", SLAP and biceps lesions
- Instabilities

EXTRAARTICULAR SUBACROMIAL CONFLICT

- Pain
  - Due to increase of overhead activity
  - Night
  - Dominant arm
  - Associated with...
SCAPULAR DYSKINESIA: FREQUENCY

- In almost all shoulder injuries 68 - 100% ...

Kibler B, JAAOS, 2003

SCAPULAR DYSKINESIS

- "dys" = alteration, "kinesis" = movement
- Classification:
  - Typ I:
    - medial border
  - Typ II:
    - inferior angle prominence
  - Typ III:
    - superior scapular prominence

Kibler B, 1993

SCAPULAR DYSKINESIA: EXCLUDE CAPSULAR RESTRICTION

- Strengthening of scapular retractors
- Exclude capsular tightness
- Increase strength of external rotators
  - ISP > increase clearance
- Occasionally subacromial infiltration

THERAPY: EXTRAARTICULAR SUBACROMIAL CONFLICT

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EXTRAARTICULAR SUBACROMIAL CONFLICT

INTRAARTICULAR POSTERO-SUPERIOR CONFLICT

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INTRAARTICULAR POSTERO-SUPERIOR CONFLICT

MR: IMPINGEMENTS IN THROWING SHOULDERS

During After the Career

<table>
<thead>
<tr>
<th></th>
<th>6.8 y</th>
<th>21 y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post.Sup. Walch</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Ant. Sup. Imp.</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

* = sign.

Schaer, M., Zumstein, M.A.; CORR: 2018

THROWING / OVERHEAD ATHLETE

- highly repetitive
- throwing or hitting
- increased ER
- 190 throws / game
- 48,000 throws / yr
- ball < 1 pound
- v = 80 -160 mph

BONY CHANGES

Humerus
- retorsion of the head decreases during growth, peak 8-12 yrs
- this process is retarded in pitchers

Glenoid
- increased retroversion in throwers

Edelson, 1980

Yamamoto, 2006

Crockett, 2000

Wyland, AJSM: 2012
CLINICAL: GIRD VS TOTAL ARC OF ROM ?

- Swimmers
  - sympl. = asympl. Patients = same ROM -> No GIRD
  - asympl. Patients = different ROM

- Throwers
  - clinical signs = loss of TROM = GIRD
  - "Torsion difference" TS > RTS
  - GIRD is referred to "torsion difference"
  - GIRD 25°, Torsion +30°, GIRD-torsion 0°
  - GIRD 25°, Torsion + 0°, GIRD-torsion 25°

Bak K, Magnusson, AJSM: 1998
Armin N, JAAOS: 2015

TREATMENT OPTIONS

- Rest and rehabilitation
- GH injection
- Stretching Pl capsule / strengthening of scapular stabilizers
- Restore ROM
  - Modification late cocking phase

PATIENTS

<table>
<thead>
<tr>
<th>During after the Career</th>
<th>6.8 y</th>
<th>21 y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr of subjects (n)</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Age (y)</td>
<td>29</td>
<td>36</td>
</tr>
</tbody>
</table>

MRI FINDINGS IN SHOULDERS OF PROFESSIONAL HANDBALL PLAYERS

Lehu, CEBR, 2012, 170:157-8
Schaer M, Zumstein MA; CEBR: 2018

PAIN IN THE THROWING SHOULDER

<table>
<thead>
<tr>
<th>Pain (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 3-tendon RC abnorm. n=10</td>
</tr>
<tr>
<td>- 3-tendon RC abnorm. n=1</td>
</tr>
<tr>
<td>- SSP abnorm. n=14</td>
</tr>
<tr>
<td>No pain (n=19)</td>
</tr>
<tr>
<td>- 3-tendon RC abnorm. n=1</td>
</tr>
</tbody>
</table>

Partial tears and tendinopathy of the SSP not a predictor for pain

Jost B, Zumstein M et al., CEBR: 2005
QUESTION?

- Pain does not come from the supraspinatus...
- Pain does not come from the partial tears...
- ... where could the pain come from?...

?

THROWING SHOULDER PAIN

... correlated with ...
- active career
- long head of the biceps pathologies
- SSC + ISP pathologies
- edema of the greater tuberosity

LHB = A MAJOR CAUSE OF PAIN

- Proximal desinsertion
  (SLAP)
- Tenosynovitis
- Hypertrophy
- Delamination
- Pre-rupture
- Subluxation
- Dislocation

PROXIMAL INSERTION: SLAP LESIONS

Snyder S, Arthroscopy: 1990
Maffet MW, AJSM: 1995

PULLEY LESIONS

... may be because of evolution of humans!

CHALLENGE IN THE HORIZONTAL PLAN
CHANGE OF ORIENTATION

STRESS ON PULLEY -> LESION OF BICEPS

... IN THE VERTICAL PLANE

HYPERTROPHY -> ENTRAPMENT

FINDINGS ON MRI

TREAT THE BICEPS LESIONS?

-> SLAP repair -> 50% probability to fail
WHAT IS FREQUENT?

- „rotator cuff lesions”
- „impingements”, SLAP and biceps lesions
- instabilities

BONY STABILITY

INFERIOR GLENOHUMERAL LIGAMENT

- always present
- consists of:
  - anterior band
  - axillary recess
  - posterior band

CLINICAL PRESENTATIONS

- Acute dislocation
- Chronic instability
- Unstable painful shoulders (= UPS)

NATURAL HISTORY AFTER FIRST TIME DISLOCATION (F-UP 25 J)

RISK FACTORS FOR RECURRENT

- Age
- Male
- Contact- and overhead sport
- 60% redislocations up to 2 y f-up
- 75% redislocations up to 5 y f-up
- Over 1/3 redislocations after 2 years f-up!

Which 50% - 60% should we operate after 1. dislocation?
RISK FACTORS FOR RECURRENCE

(n=20'719)

- Age
- Male
- Contact- and overhead sport
- 60% redislocations up to 2 y f-up
- 75% redislocations up to 5 y f-up
- Over 1/3 redislocations after 2 years f-up!

Leroux T: AJSM; 2014
Handoll HHG: COCHRANE; 2004

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RISK FACTORS FOR RECURRENCE

(n=20'719)

- Age
- Male
- Contact- and overhead sport
- 60% redislocations up to 2 y f-up
- 75% redislocations up to 5 y f-up
- Over 1/3 redislocations after 2 years f-up!
- Only 5 yrs f-up studies are ± informative!

Leroux T: AJSM; 2014
Castagna A: AJSM; 2010
Gerber C: JBJS; 2016

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RISK FACTORS FOR RECURRENCE

(n=20'719)

- Age
- Male
- Contact- and overhead sport
- 60% redislocations up to 2 y f-up
- 75% redislocations up to 5 y f-up
- Over 1/3 redislocations after 2 years f-up!
- Only 5 yrs f-up studies are ± informative!
- Additional 25% redislocations after 5 yrs f-up!

Gerber C: JBJS; 2016

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CHRONIC INSTABILITY:
RADIOGRAPHIC EXAMINATION

Arthro-CT superior to Arthro-MRI

WHY?

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ARTHRO-CT IS SUPERIOR: VISUALIZE THE IMPORTANT BONY STRUCTURES

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DETACHED LABRUM IN > 93%

ARTHROSCOPIC BANKART-REPAIR

RISK FACTORS FOR RECURRENCE GLENOID DEFICIENCIES

- High rate of recurrence (48 of 53 patients) if there is a Perthes Bankart avulsion....
  Taube DC, JASA; 1997

- even after Bankart stabilization
  Burkhart SS: Arthroscopy; 2000
  Tauber M: JSES; 2004
  Boileau P: JAES; 2006

- often underestimated...
  Auffahrt A, JSES; 2013

BONE DEFECT AT THE SOCKET

COMBINATION OF GLENOID AND HUMERUS DEFECT FREQUENTLY 60-90%
BONE DEFECTS

10-20%  60-90%

BONE AUGMENTATION

TAKE HOME MESSAGES ROTATOR CUFF

- X Ray: ACHD and OA
- Arthro-MRI: Rupture? Retraction? Fatty infiltration?

TAKE HOME MESSAGES

- Ant. Sup extraarticular versus posterosuperior intraarticular impingement
- Often associated...
  - ...with scapular dysinesia
  - ...with biceps pathologies
    - SLAP
    - Tendinopathy
    - BIC
- Conservative versus tenodesis

Partial  conservative (physio, infiltration)
Full thickness  conservative versus surgical
- well comp  surgical
- not comp
Full th. Subscapularis  immediate referral
- > modern treatment is arthroscopic repair

TAKE HOME MESSAGES
ORIGIN IS FREQUENTLY AT THE BACK

TAKE HOME MESSAGES: INSTABILITY

- IGHL and bony congruency -> most important
- Think at the “unstable painful shoulder”
- Arthro-CT superior to Arthro-MRI
- Risk for recurrence and Bankart failure
  - young, men, overhead and contact sports, competition
  - bony lesions
- Studies of value only at > 5 years f-up

TAKE HOME MESSAGES THROWERS

- increased humeral retrotorsion
  - influences the GIRD
  - clinical signs – loss of TROM - GIRD
  - GIRD tension difference

- increased glenoid version

TAKE HOME MESSAGES: INSTABILITY

- Arthroscopic Bankart procedure in selected patients

- In most bony lesions
  - Bone augmentation (Latarjet)
  - Good results at long-term follow up
  - Repair the labrum -> extrarticular bone block

Thank you for your attention

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