Repairing the Subscapularis Or How to Create an Iatrogenic Horn Blower's Sign

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Conflict of Interest

- Design team Exactech Equinoxe System – royalties
- Research institutional support - Exactech

Introduction

- French (Giles Walch and company) - biceps killers
- Now subscap killers – protectors RTSA external rotation
  – Enemy of Horn Blowers Sign

Horn Blower's Sign

- Horn Blower's Sign
- Drink coffee = Groin Burner

Introduction

- Stability take precedence over mobility and function
- Certain RTSA designs more stable with subscap repair

When do you need it repaired?

- Inferior or posterior contact between humeral component and glenoid
  - Some implants more prone (Grammont Style)
    - High neck angle
    - Medial glenosphere
    - Medial humerus
- Anytime medial glenoid wear
  - No lateralization options

Why Kill the Subscap!!!!

- RTSA - subscap adductor and internal rotator
  - Deltoid - works harder
  - Remaining external rotators work harder
  - Results in iatrogenic Horn Blower's Sign

Where would you place your money?

- Internal rotators
  - Subscapularis
  - Pec major
  - Latissimus dorsi
  - Teres major
  - Long forearm lever arm

»VS

- External rotators
  - Nothing
  - Teres minor

My personal journey as Subscap Killer

- 7 years ago noted RTSA pts repaired with non compliant subscap struggled get ER and worse elevation
  - Started repairing only compliant subscap
  - Functional Horn Blower's sign decreased

My personal journey as Subscap Killer

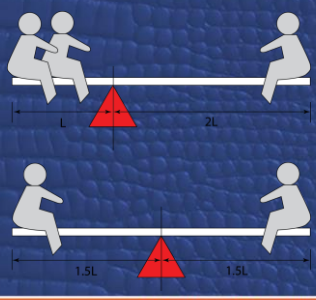
- 5 years ago started killing subscap all RTSA
  - No dislocations primaries that time (knock on wood)
  - Horn Blower's virtually a thing of past
  - No need for Latissimus transfer

Is there any science to this BS?

- Yes it is all about lever arms related to new center of rotation established by RTSA

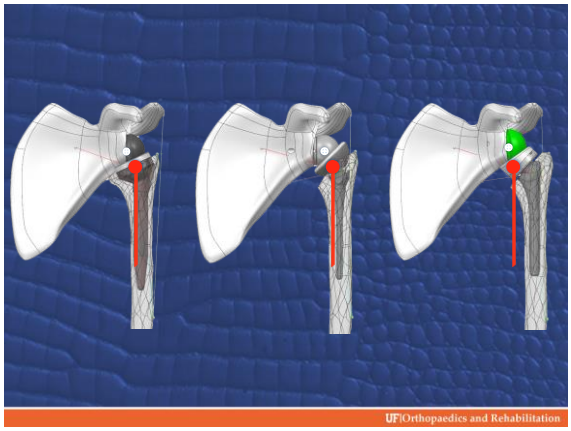
Moment Arm Basics

The key point is a longer lever arm means it requires less force to balance the weight. In this case, the weight of the arm

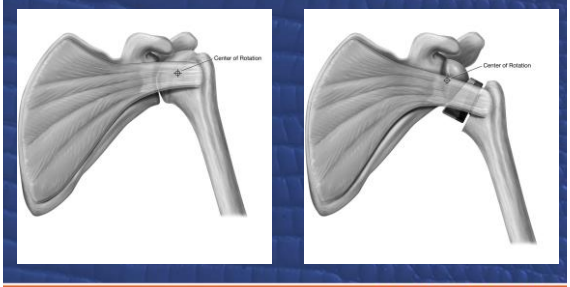


Lever Arm

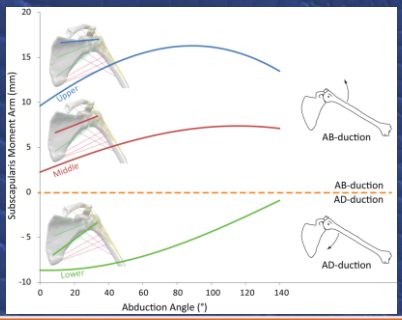
- Longer distance between COR and location of applied force, force is magnified by that distance.
- P= force X distance



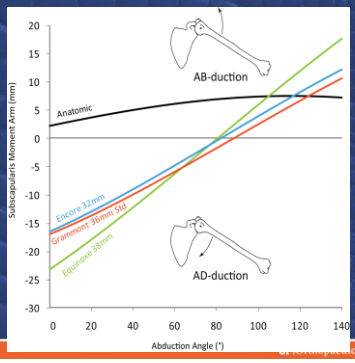
Rotator Cuff Muscles



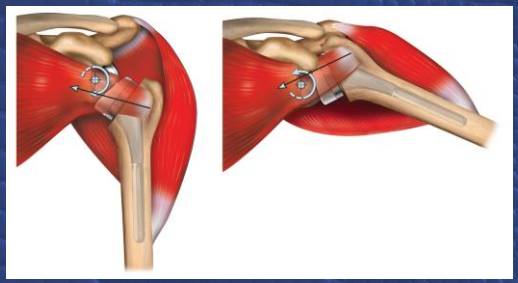
Subscapularis Breakdown



Crossover is Later



RTSA Repaired Subscap - Adductor and Iatrogenic Hornblower

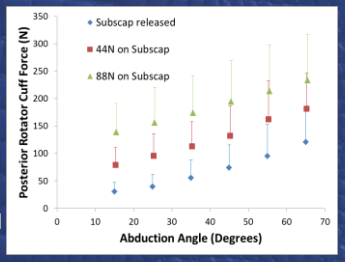


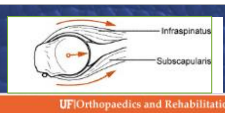
Clinical Relevance: Subscapularis

- Intact Subscapularis - force Deltoid work harder achieve abduction
  - First 80 degrees.
- Intact Subscapularis - forces posterior cuff work harder avoid Horn Blower's Sign
  - Concept supported by Hansen's Data
- Not repairing Subscapularis associated instability in some designs
  - Obligatory Subscap repair - consequence

Hansen, et al ORS 2012

- Hansen et al - effect of subscapularis on loading posterior cuff
- Up to 460% increase in Posterior cuff load
- Up to 130% deltoid load





Conclusions

- Post RTSA - muscles do not function anatomically vary by design
- Repair Subscap increase Horn Blower's Sign
  - Worse - subscap is non compliant
  - Worse - if teres minor or nothing remaining posterior cuff

Conclusion

- However if needed – stability should get priority over function – repair it
- Obligatory subscap repair not free
  - External rotation in abduction will be impaired
  - Higher incidence Iatrogenic Horn Blower's Sign

Conclusion

- **Repair Subscap**
- **Learn to treat Groin burns !!!**