Sports Medicine & Joint Center
Funabashi Orthopaedic Hospital

Footprint Repair and Factors that Promote Healing in Rotator Cuff Repair

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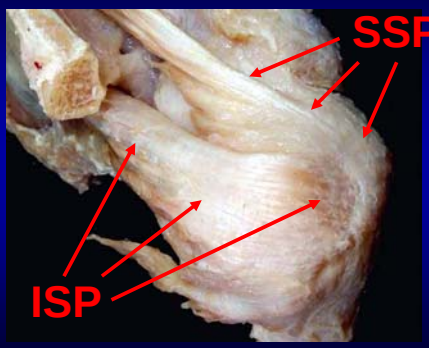
Disclosure

- Speakers bureau/paid presentations
  - ➢*DepuySynthes; Smith&Nephew*
- Unpaid consultant
  - ➢ *DepuySynthes; Smith&Nephew ;Biomet*
- Orthopaedic publications editorial
  - ➢*Journal of Shoulder and Elbow Surgery*

Large Reparable Tears

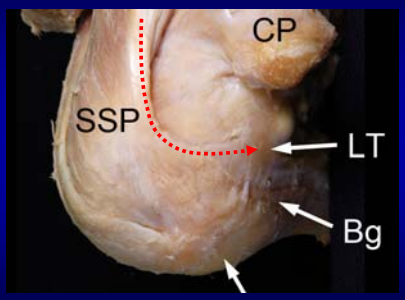
- Keys to promote healing
  - ➢Balanced less tension repair
    - ✓Understand anatomy
    - ✓Tendon mobilization
  - ➢Footprint reconstruction
  - ➢Postop care
  - ➢Biological augmentation

SSP & ISP



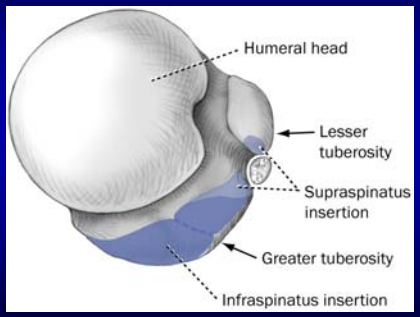
Mochizuki, Sugaya, Akita, et al. JBJS 90A, 2008

SSP inserts to the LT!



Mochizuki, Sugaya, Akita, et al. JBJS 90A, 2008

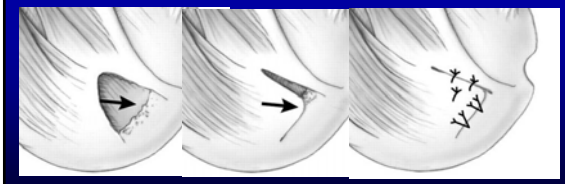
SSP & ISP Footprint



Mochizuki, Sugaya, Akita, et al. JBJS 90A, 2008; 91A, 2009

Surgical Implication

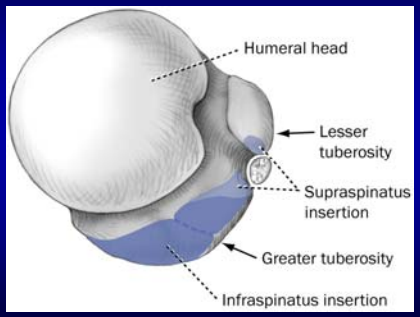
- Postero-superior tear
  - Simple side to side repair NOT recommended!



Mochizuki, Sugaya, Akita, et al. JBJS 91A, 2009

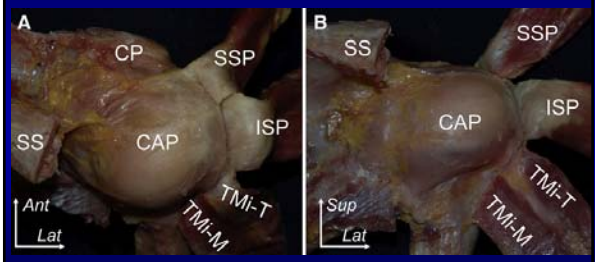
Surgical Implication

Capsular Insertion?



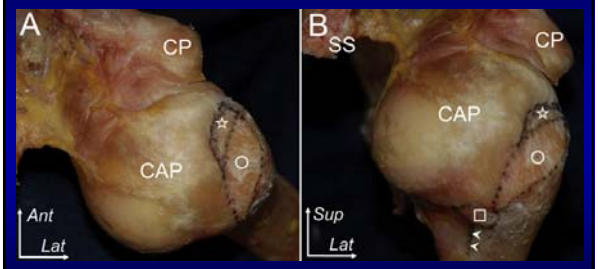
Mochizuki, Sugaya, Akita, et al. JBJS 90A, 2008; 91A, 2009

Capsular Insertion



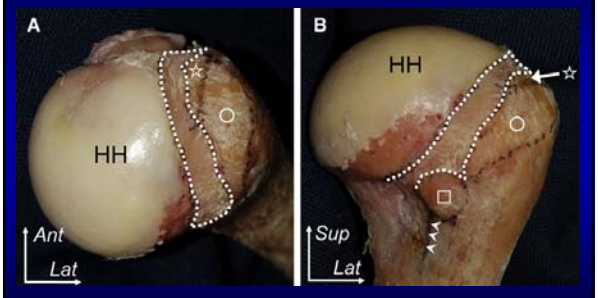
Nimura, Sugaya, Akita, et al, JSES, 2012

Capsular Insertion



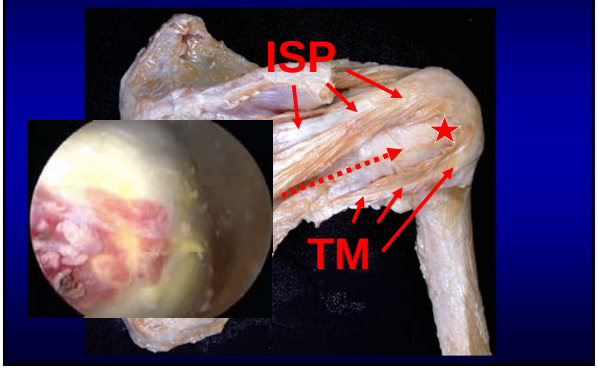
Nimura, Sugaya, Akita, et al, JSES, 2012

Capsular Insertion



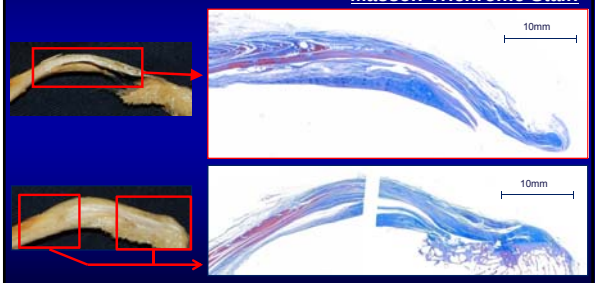
Nimura, Sugaya, Akita, et al, JSES, 2012

Capsular Insertion



Delaminated Shoulder

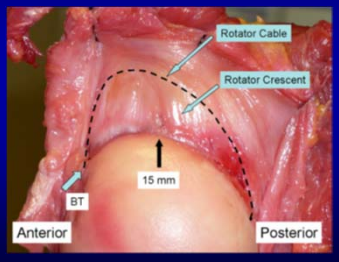
Masson Trichrome Stain



Kato, Sugaya, Akita, et al, JJSS, 2011

Rotator Cable

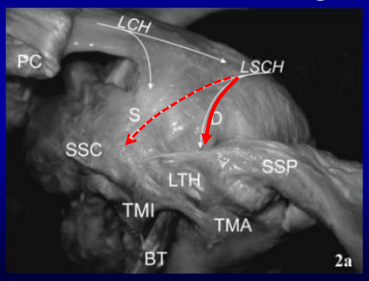
- Proposed by Burkhart in 1993



Kim, et al, JBJS-Am, 2010

Rotator Cable

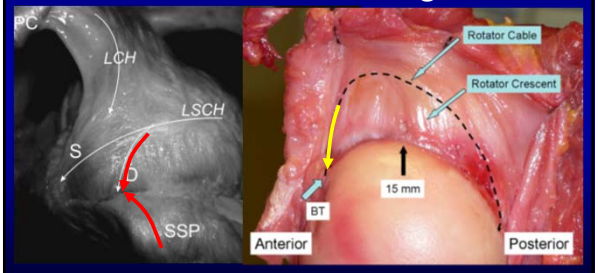
- Humeral semicircular ligament



Kask, et al, Clinical Anatomy, 2008

Anterior Cable

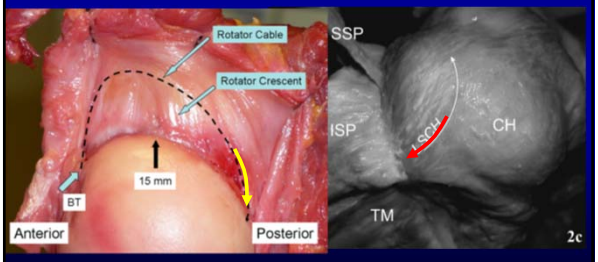
- Humeral semicircular ligament



Kask, et al, Clinical Anatomy, 2008

Posterior Cable

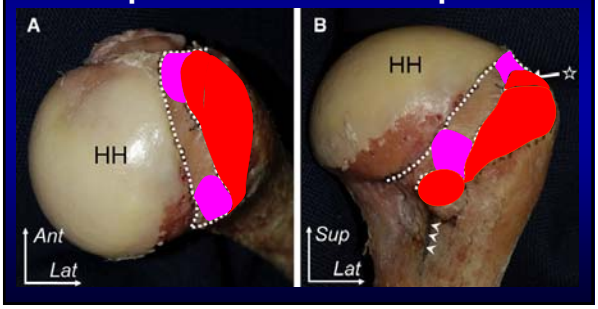
- Humeral semicircular ligament



Kask, et al, Clinical Anatomy, 2008

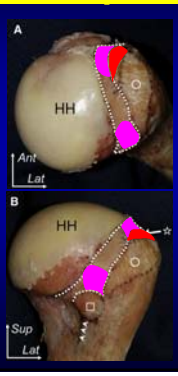
Capsule or Tendon?

- Footprint of tendon & capsule

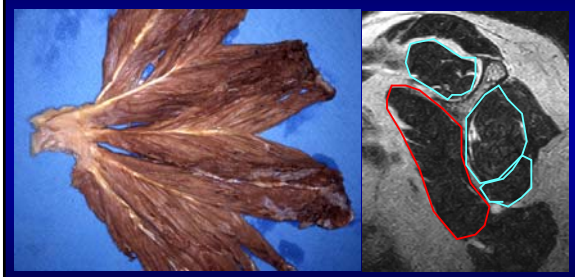


Summary: SSP & ISP Footprint

- IMT of the SSP lines the anterior cable and works complementary
- Posterior cable supplements the thinnest tendon insertion and works as a tendon



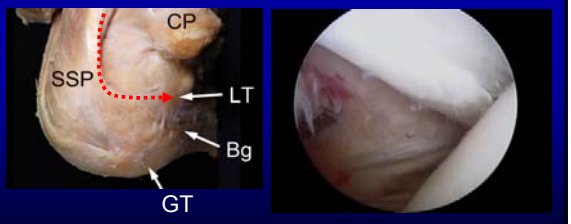
SSC Anatomy



Courtesy of Y. Minagawa, MD

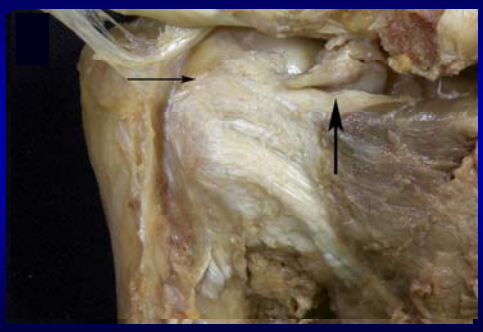
What is the “comma”?

- The “comma” is a group of fibers which connects SSP & SSC



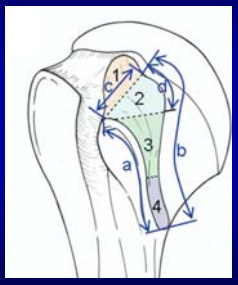
Mochizuki, Sugaya, Akita, et al. JBJS 91A, 2009

SSC Anatomy



Arai, Sugaya, Akita, et al., Arthroscopy, 2008

SSC Footprint



Whole footprint

a: Lat. margin: 37.6mm

b: Med. margin: 40.7mm

Superior insertion

c: Lat. margin: 12.5mm

d: Med. margin: 6.5mm

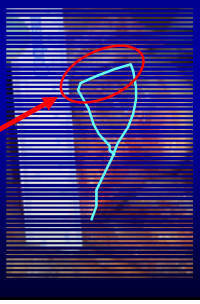
Data from 34 Japanese cadaveric specimens

Arai, Sugaya, Akita, et al., Arthroscopy, 2008

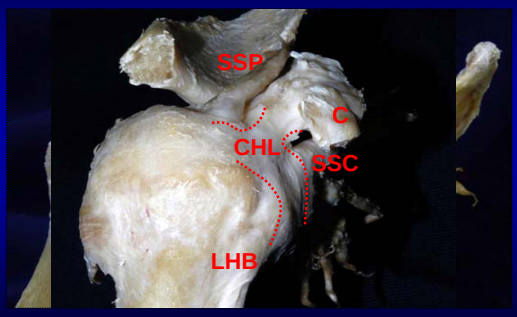
SSC Repair

- Footprint reconstruction type repair preferable!

Increase initial fixation strength



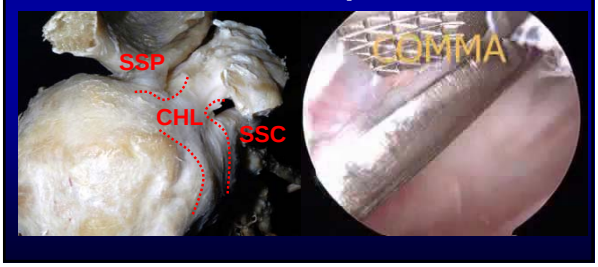
Anatomy: CHL



Yoshimura, Akita, et al, JJSS, 2010

Anatomy: CHL

- CHL restricts the mobility of retracted antero-superior cuff



Tendon Mobilization

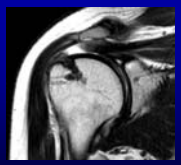
- Reparable retracted tears
  - ◆ CHL release
    - ➢ Expose the base of coracoid
  - ◆ Capsular release
    - ➢ Release tissues between the cuff and glenoid

Footprint Reconstruction

- ◆ Standard Double-row
  - ➢ *Sugaya, JBJS-89A, May, 2007*
  - ➢ *Huijsmans, JBJS-89A, Jun, 2007*
  - ➢ *Lafosse, JBJS-89A, July, 2007*
- ◆ Suture Bridge
  - ➢ *Kim KC, Arthroscopy, 2007*
  - ➢ *Frank JB, AJSM, 2008*
- ◆ Transosseous
  - ➢ *Garofalo, Krishnan, et al, KSSTA, 2012*
  - ➢ *Ishige, Kuroda, et al, JJSS, 2011*

Footprint Reconstruction

- Medial-row failure
  - ➢ *Yamakado, et al, Arthroscopy 2010*
  - ➢ *Cho, Lee, Rhee, AJSM, 2011*
    - ✓ Suture bridge
    - ✓ Medial tying first
      - ► Strangulation



- ✓ Muscle-tendon junction failure

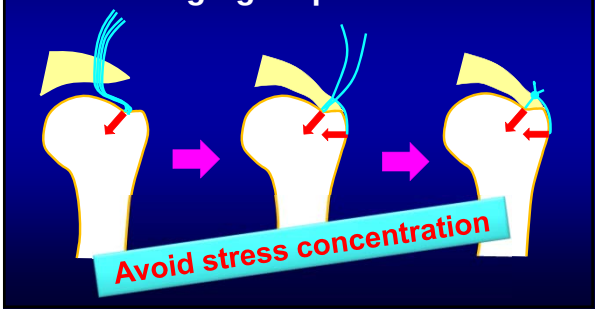
Footprint Reconstruction

- Standard suture bridging

Cho, Lee, Rhee, AJSM, 2011

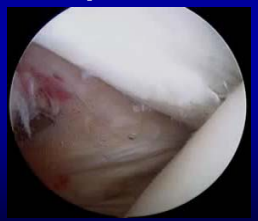
Footprint Reconstruction

- Our bridging sequence



SSC Repair

- Preserve “comma” and utilize it for repair!



Inside view

Outside view

Take Home Messages

To promote healing

- Anatomically balanced repair
  - Retracted tears
    - ✓CHL & capsular release
  - Subscap tears
    - ✓Preserve & utilize comma for repair
- Postop care & biology