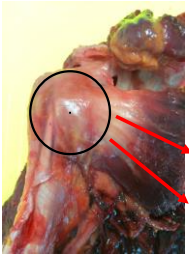




## Function



Courtesy F. Mairstschlögler

- Internal rotation
- Adduktion and abduction
- Depressor for humeral head
- Anterior part of force couples
  - ➔ Centering humeral head
- Static and dynamic stabiliser
- Stabilizes LHB

Burkhardt SS (1991) Clin Orthop Relat Res  
Haider et al. (2000) J Orthop Res  
Kato (1988) Anat Anz  
Ward et al (2006) Clin Orthop Relat Res

## Incidence

### Isolated SSC-tears

- 5,7% (Bennett et al. 2003)
- 4,9% (Lafosse et al. 2007)
- 5,3% (Nové- Josserand et al. 2012)

### Combined SSC/ SSP-tears

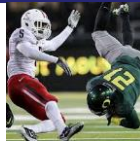
- 30% (Bennett et al. 2001)
- 29,4% (Barth et al. 2006)
- 30% (Bartsch et al. 2010)



## Etiology

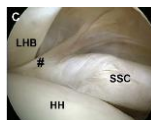
### Traumatic: isolated SSC #

- Forced ERO and abduction
- Fall on hyperextended arm
- Ant-inf. Shoulder dislocation



### Degenerative: ant.-sup RC#

- Medial lesion of pulley sling
- ASI
- Anterosuperior RC-Läsion



## MECHANISM OF INJURY

Mechanism of Injury	Number
Hyperextension of the abducted arm	8
Forced external rotation of the abducted arm	10
Fall on the backward outstretched arm	6
Traumatic anterior dislocation	1
Direct blow to anterior shoulder	2
Motorcycle accident	1
Not reproducible	2

Bartl, Habermeyer, 2010, AJSM,

## Classifications

TABLE 1. Classification of Subscapularis Tendon Tears According to Fox and Romeo<sup>13</sup> and Lafosse et al<sup>14</sup>

Classification of subscapularis tendon tears according to Fox and Romeo<sup>13</sup>

- Type I: partial thickness tear
- Type II: complete tear of the upper 25% of the tendon
- Type III: complete tear of the upper 50% of the tendon
- Type IV: complete rupture of the tendon

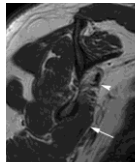
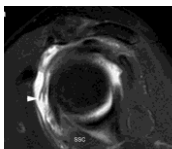
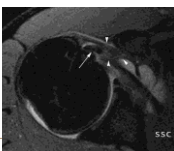
Classification of subscapularis tendon tears according to Lafosse et al<sup>14</sup>

- Type I: partial lesion of superior one third of the tendon
- Type II: complete lesion of superior one third of the tendon
- Type III: complete lesion of superior two third of the tendon
- Type IV: complete lesion of the tendon but centered humeral head and fatty degeneration classified less than or equal to Goutallier et al<sup>15</sup> stage III
- Type V: complete lesion of tendon but eccentric humeral head and fatty degeneration classified more than or equal to Goutallier et al<sup>15</sup> stage III

Martetschläger et al. (2012) Techn Shoulder Elbow Surg

## Diagnosis: MRI

- Localisation and extension of tear
- retraction
- Atrophy and fatty infiltration
- LHB and pulley



Goutallier et al. (1994) Clin Orthop Relat Res  
Morag et al (2011) Skeleta Radiol  
Plirmann et al. (1999) Radiology

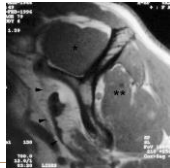
## Indication

### Indications

- Pain, loss of function
- Positive tests
- Mild SSC atrophy
- Fatty infiltration < grade III

### Contraindications

Cuff tear arthropathy  
high-grade atrophy of SSC  
fatty infiltration > grade III



Baril et al (2007) Arthroscopie

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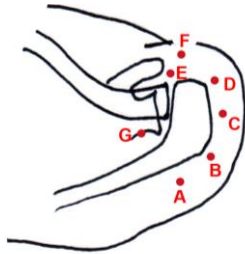
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## Portals for SC reconstruction

- Posterior portal (A)
- Anterosuperior portal (E)
- Anterolateral portal (D)



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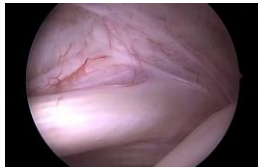
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## Arthroscopy

- SSC in neutral position and in Abd + IRO
- Identification of superolateral edge of the tear
- Static and dynamic evaluation of LHB + pulley



Martetschlager et al., Tech Shoulder Surg, 2012

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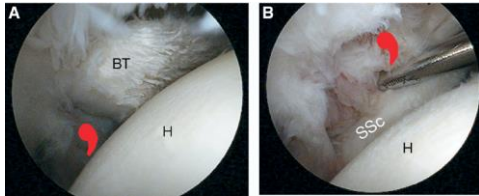
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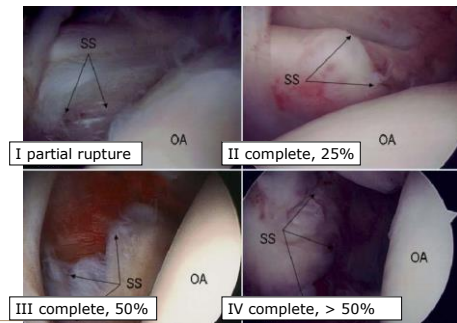
## „Comma sign“



- Medial retraction of complete tears
- Torn medial pulley forms scar tissue at the superolateral edge of the tendon = „comma sign“

*Lo et al. (2003) Arthroscopy*

## Classification

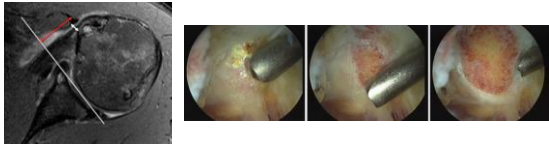


*Fox et al. (2003) Techn Shoulder Elbow Surg*

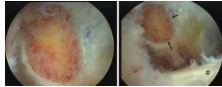
## Arthroscopic repair



## Coracoplasty – when and how?



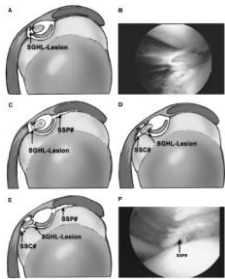
Normal coraco-humeral distance approx. 11mm  
Correlation: reduced CHD  $\leftrightarrow$  ant-sup pathologies  
CP when ant.-sup. pathology and narrowed interval



**But: Personally i have never performed CP**

*Martetschläger, KSSTA, 2013*

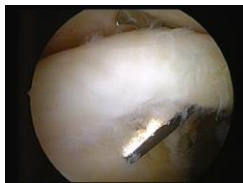
## Additional Pulley lesions



- Fraying
- Tear
  - anteromedial (AM)
  - posterolateral (PL)
- LHB instability
- LHB subluxation/ dislocation

*Habermeyer et al., JSES, 2008*

## Arthroscopic tenotomy



## Tenotomy or Tenodesis?

- Tenotomy: good functional results

- **but:**

- Often „Popeye Biceps“
- Elbow: Pro-/Supination little weaker



Gill et al., JSES, 2001  
Wolf et al., Arthroscopy, 2005

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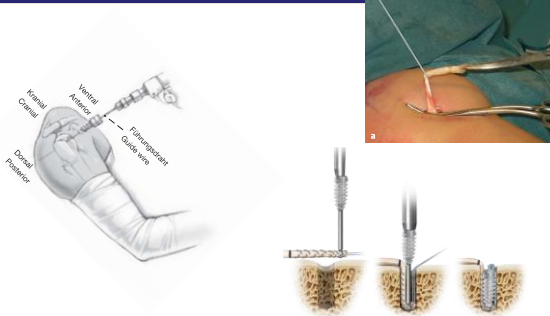
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## Arthroscopic Tenodesis



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## Subpectoral tenodesis



Mazzocca et al et al. (2005) Arthroscopy

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## When do I open it?

Do Not Open  
Alarm will Sound

do not open  
with  
sharp object



Do not open  
with a blade

OPEN

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## Open surgery: Complete SSC tears(4&5)

- ➔ Chronic & complete SSC tears with high-grade retraction
- ➔ Massive combined SSC + SSP tears in the younger P.
- ➔ Advantages:
  - \* time sparing,
  - \* refixation of HAGL Lesion
  - \* pec. major transfer can easily be added

*Habermeyer et al., Schulterchirurgie, Elsevier, 2010*

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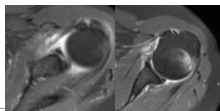
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## Rare: Isolated inferior SSC lesion



Traumatic isolated tear of caudal SSC  
Easily overlooked

Thorough clinical, radiological and  
arthroscopic evaluation necessary



*Achtnich, Martetschläger, KSSTA, 2016*

➔ **Open repair !**

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## Results isolated SSC - arthroscopic

- Good short- and midterm results following arthroscopic repair of isolated SSC tears
- Small case series
- Constant: ~ 50-60 → ~ 75-85
- Small re-tear rate (< 10%)
- Remaining positive SSC tests in 13-25%

Bartl, AJSM, 2011  
Mall, Arthroscopy, 2012  
Kuntz, JAAOS, 2014  
Lanz, Arthroscopy, 2013  
Adams et al, Arthroscopy, 2008  
Burkhard & Tehrany, Arthroscopy, 2002  
Heikenfeld et al, Arthroscopy, 2012  
Lafosse et al, JBJS Am, 2007  
Nové-Josserand et al, JBJS Am, 2012

## Open Repair of Isolated Traumatic Subscapularis Tendon Tears

Christoph Bartl,<sup>1</sup> MD, Markus Scheibel,<sup>1</sup> MD, Petra Magosch,<sup>1</sup> MD, Sven Lichtenberg,<sup>1</sup> MD, and Peter Habermeyer,<sup>1</sup> MD  
Investigation performed at the Department of Shoulder and Elbow Surgery, ATOS-Clinic, Heidelberg, Germany

- N=30; age 43y; Fup: 90%
- 7 grade II° ; 11 III° ; 12 IV° (Fox & Romeo)
- FU 46 months (25-72)
- Constant: 51p → ~ 82p
- Small re-tear rate (7%)
- Remaining positive SSC tests in 20%

AJSM 2011

## Conclusion

### **SUBSCAPULARIS TEARS – Indications?**

- Pain, loss of function
- especially in the young

### **Open or arthroscopic?**

Partial tears – arthroscopic

Complete and chronic, retracted tears – u pick!

Thank you!



**PETER HABERMEYER**

ATOS-KLINIK  
SCHULTER- & ELLBOGENCHIRURGIE  
Habermeier P, Martetschläger F, Tauber M



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