

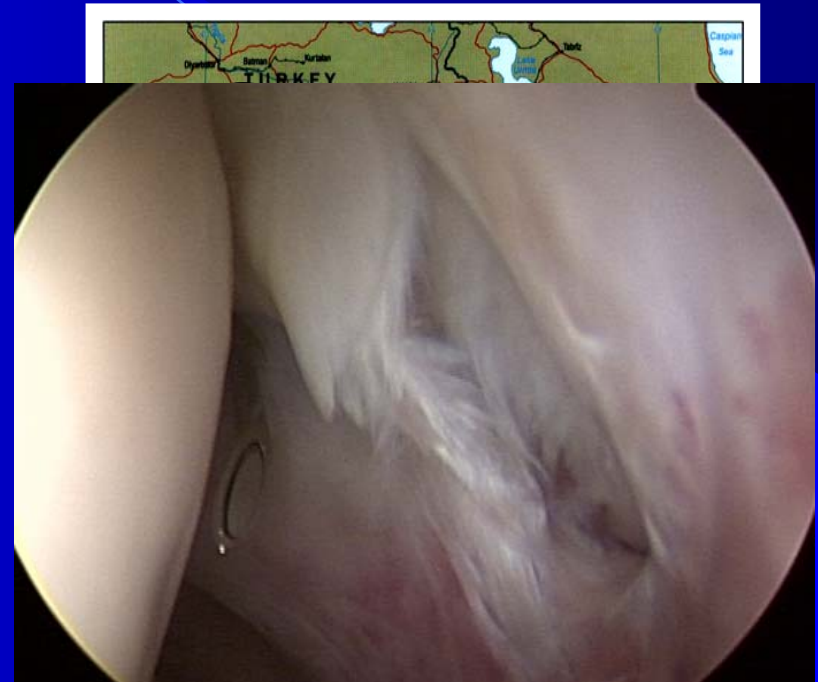
Partial Tears of the Rotator Cuff: What to do ?



Jeffrey L. Halbrecht, MD
San Francisco, CA

The Current Situation...

- We know it's a problem
- We don't have a good solution
- Everyone has an opinion
- We know we can make the problem worse....
- But- can we make it better ?



What do we really know ?



Definition:

- What is a partial RTC tear ?
 - Types
 - Bursal
 - Undersurface
 - Intrasubstance



Classification

- Ellman

- Grade I

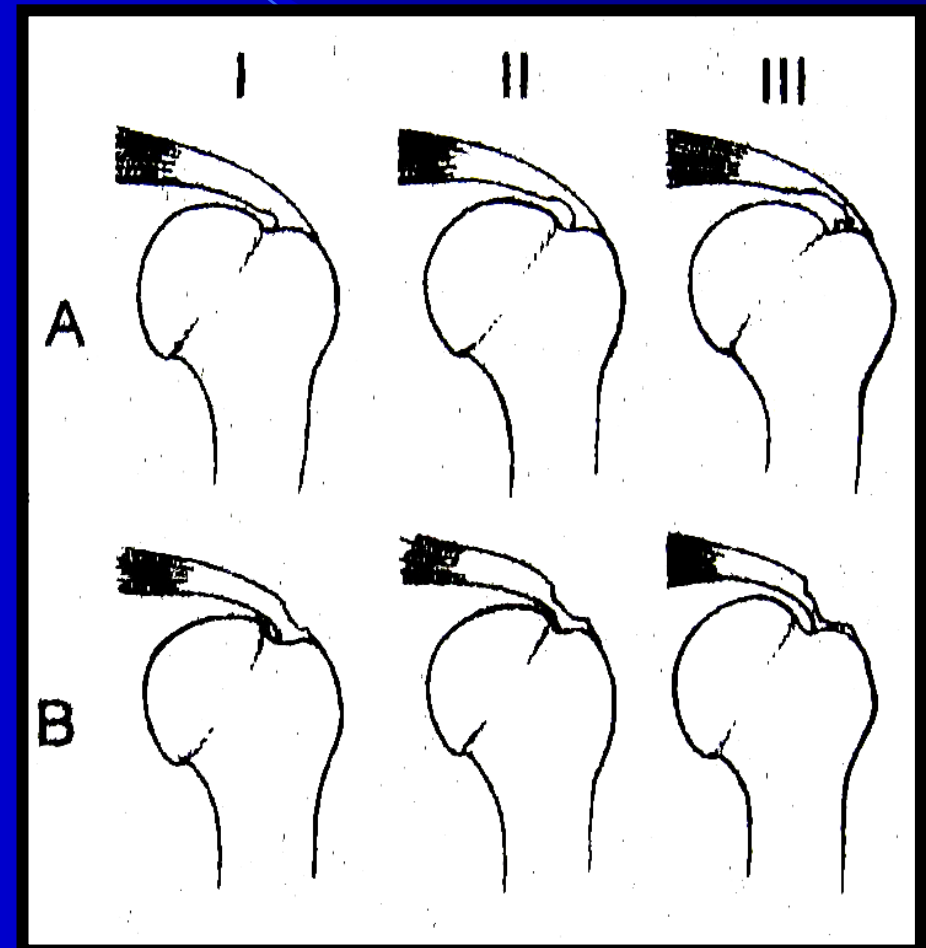
- < 25% (< 3mm)

- Grade II

- 25-50% (3-6 mm)

- Grade III

- >50% (>6mm)

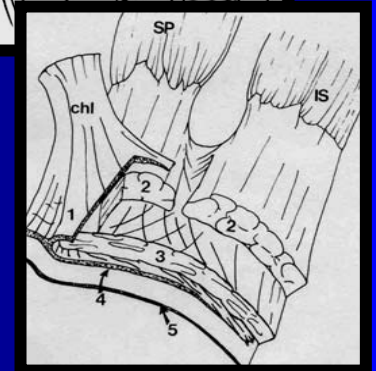
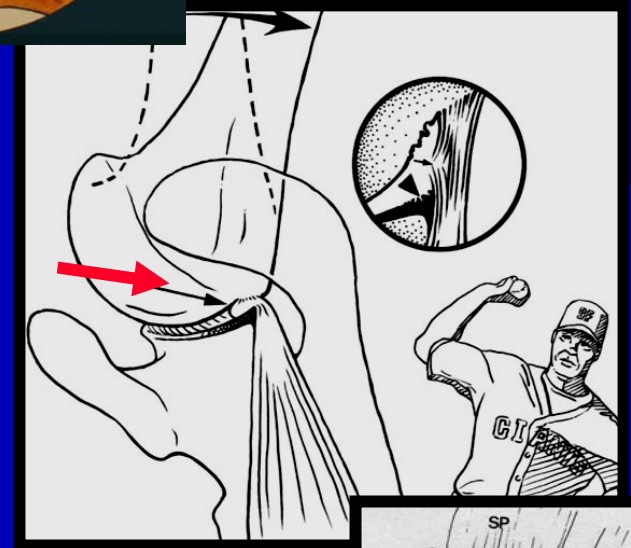


Incidence:

- Cadaver Studies:
 - Fukuda 1990:
 - 249 cadaver dissections:
 - 7% complete
 - 13% partial
 - Uthoff:
 - 306 dissections
 - 19.9% complete tears
 - 32 % partial
- Clinical studies: articular vs. bursal
 - Cordasco: 82%
 - Webber: 88%

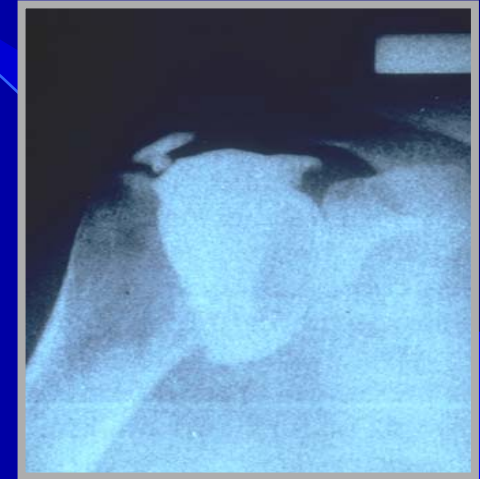
PTRCT: Pathogenesis

- Bursal:
 - outlet impingement
- Articular:
 - Internal impingement:
 - repetitive normal contact
 - tight post capsule (Morgan)
 - lax anterior capsule (Jobe)
- Intrasubstance:
 - Traction (tensile overload)
 - Degenerative
 - Vascularity



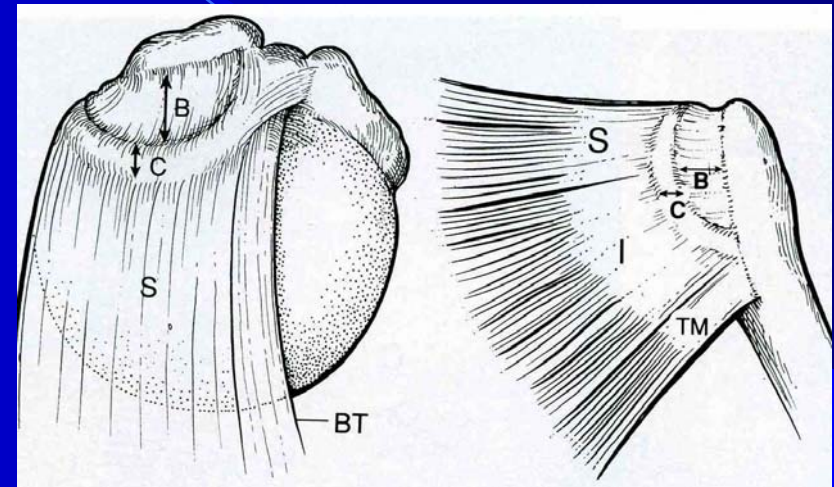
PTRTC tears: Natural History

- Yamanaka 1994- Conserv RX
 - Serial arthrography: (40 pts. articular)
 - 52% enlarged
 - 28% full thickness tears
 - 10 % smaller
 - 10% 'healed'
- Coradasco 2002- ASD Debride
 - grade I-II: no progression at 10 years
- Weber 1999: - ASD Debride
 - grade III: 3/32 progressed to full 2-7 years.
NO healing observed at second look



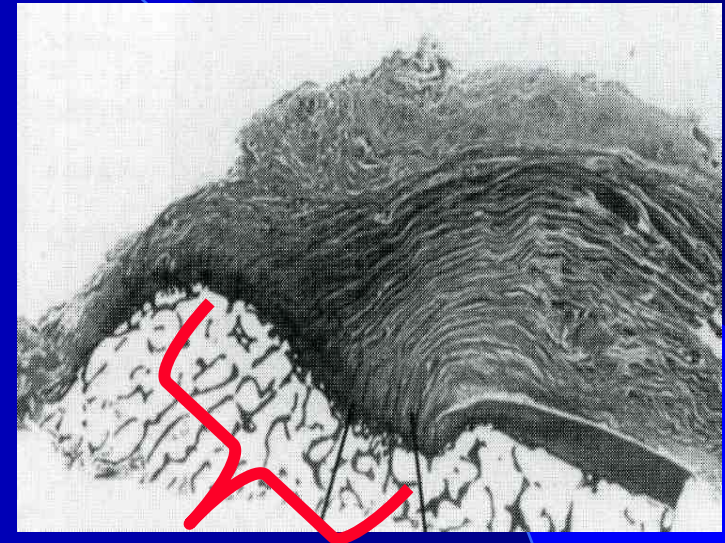
Anatomy of the RTC

- Rotator Cable:
 - thickening of cuff (biceps to TM)
- Rotator Crescent:
 - thinner cuff tissue medial to cable (poor blood supply)
- Bursal side:
 - Thicker collagen bundles
 - Parallel orientation
 - Greater tensile strength
- Articular side:
 - Thinner
 - More random orientation
 - 50% less tensile strength



Anatomy: Supraspinatus Footprint

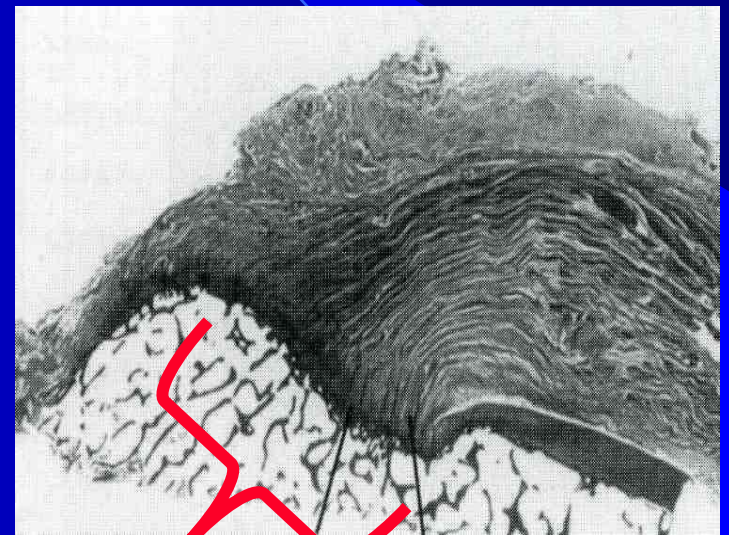
- Warren: *AOSSM 2004*
 - 12.7-16.3 mm
- Curtis *AANA 2002*
 - 16mm (12-22)
- Nottage *Arthroscopy 2004:*
 - Tendon thickness
 - 12.1mm at midtendon
 - 11.6 ant
 - 12.5 post



Footprint

Footprint: Summary

- Approximately 12-16mm
- reasonable estimate:
6-8 mm = 50%



12-16 mm

Diagnosis: Physical Exam

- Bursal:
 - imp tests (Neer, Hawkins, SA inj)



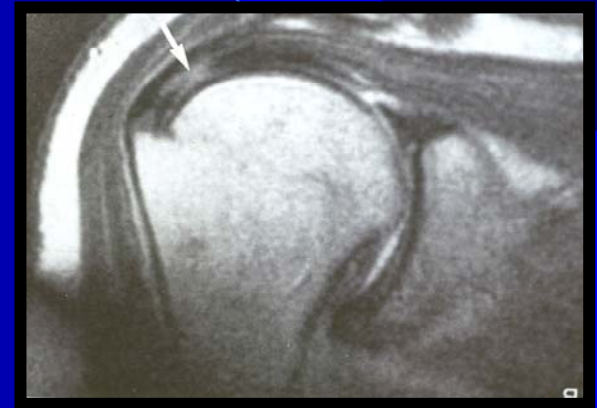
- Articular:
 - int imp test, relocation test



- Intrasubstance: MRI diagnosis

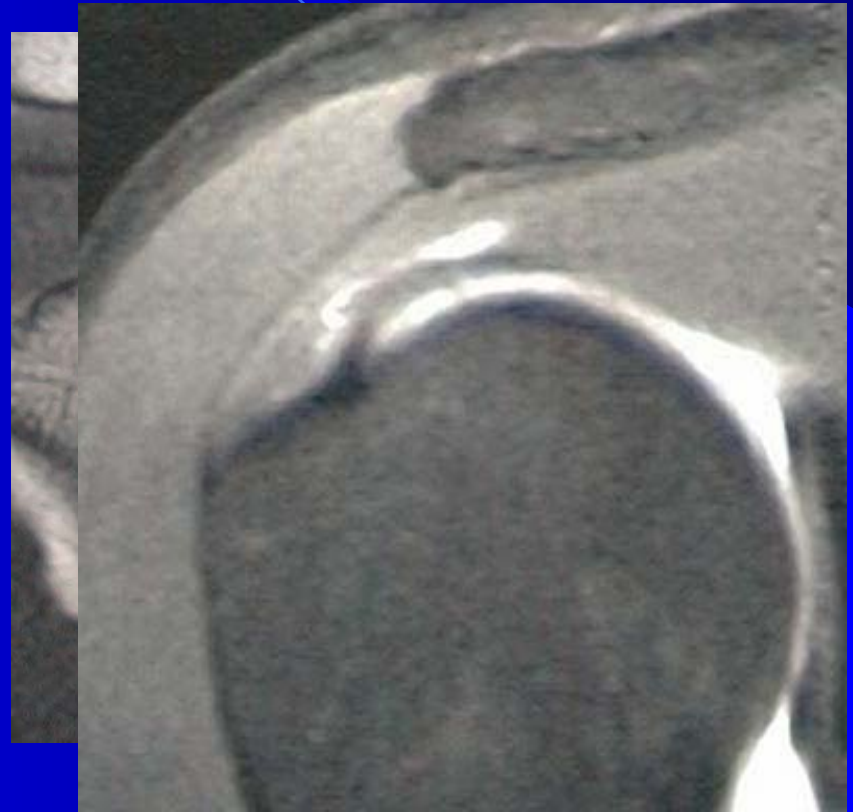
Diagnosis: Imaging

- Innacurate !!!
 - MRI:
 - Gartsman- 1995 83% false negative
 - MRI Arthrog:
 - Hodler 1992: 40% false neg
 - U/S:
 - Traugher 56% sensitive



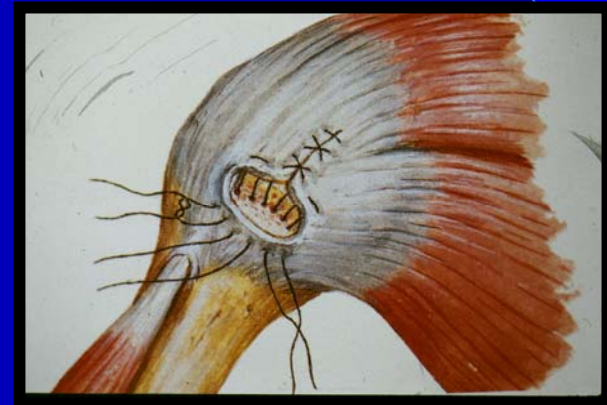
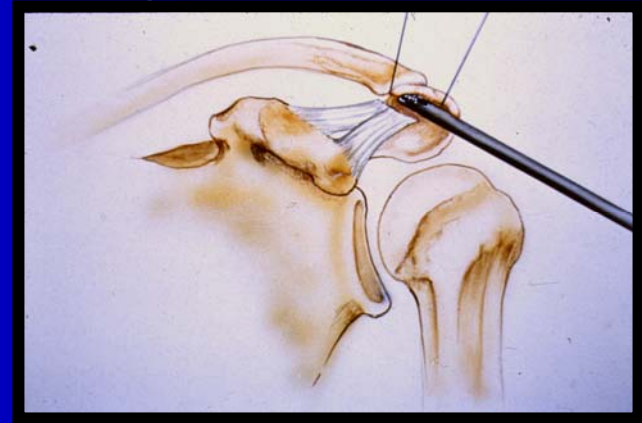
Diagnosis: MRI Examples

- MRI – cuff degen.,
bursal fluid
- MRA – filling defect;
- MRA- ABER view
- MRA -Intrasubstance



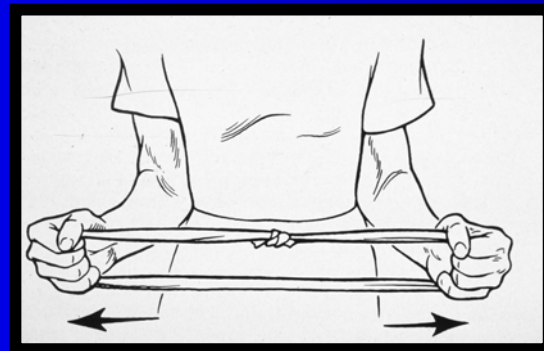
What are available treatment Options ?

- Non- surgical
- Debride
- Debride + ASD
- Repair in situ
- Complete and repair



Non surgical Management

- Try First !!
 - MRI may be wrong !
 - 40% success (Breazeale, and Craig- 1997 OCNA)
 - McConville , Ianotti 1999 JAAOS
 - Morrison: Burkhead (ed) 1997



Non Surgical Management

- Bursal side tears:
 - NSAID
 - RTC strengthening
 - Cortisone inj
- Articular side tears:
 - Treat tight posterior capsule (stretching)
 - Stabilization exercises

Surgical Management:

- What do we know ?
- Review of the literature.....



Surgical Results: Debridement Alone

| | |
|----------------------|------------------------------------|
| Andrews 1985: | 85% |
| Oglivie-Harris 1986: | 50% |
| Snyder 1991: | 84% no corr to size/no progression |
| Budoff 1998: | 87% satisfied, 85% G/E by UCLA |

Surgical Results: Debridement + ASD

● Short Term

- Ryu 1991: 84% satisfactory (debrid=ASD)
- Gartsman 1990 82.5% sig improved
- Olsewski 1994 81% satisfactory
- Esch 1988 82% satisfied (1 year)

● Longer Term

- Weber 1997 Grade III (2-7 yrs)
 - 6/32 reops
 - No exc, 14 good, 8 fair, 9 poor
- Cordasco: 2002 Grade I-II (4.5 years)
 - grade 1 & 2A 95% success (same as no tear !)
 - grade 2B: 38% failed

Be Careful What you Debride....

- You may regret it later.....



Surgical Results: ASD & Open Repair

| | |
|----------------|-----|
| – Itoi 1992: | 82% |
| – Miller 1996: | 95% |
| – Weber 1999: | 94% |
| – Fakuda 1996 | 94% |
| – Wright 1996 | 85% |

DATA: Summary

- Debridement works for small partial tears
Grade 1AB, 2A
- No significant difference between
debridement and ASD for these tears
- Completing tear + repair gives better results
for more significant partial tears especially
bursal sided 2B, all grade 3
- *NOTE: NO GOOD DATA YET ON
ARTHROSCOPIC PARTIAL REPAIRS !!*

Treatment Recommendations

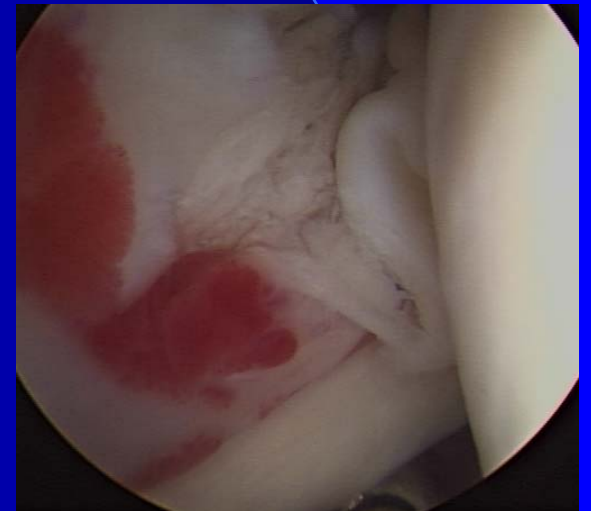
- Articular:
 - <50% Debride
 - > 50% Consider Repair
- Bursal:
 - <25% Debride
 - >25 % Consider Repair
- *Consider: activity level, dominant arm and morbidity of repair !*

Articular Partial Thickness Tears of the RTC: Decision Making

- Evaluate type/shape of tear
- Evaluate Footprint
- Measure depth of tear



Articular Tear Classification

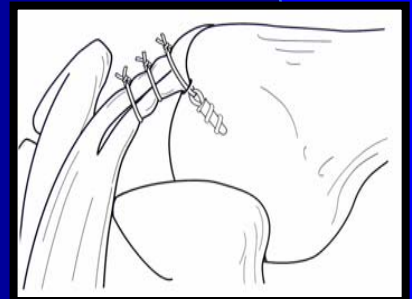


Delamination

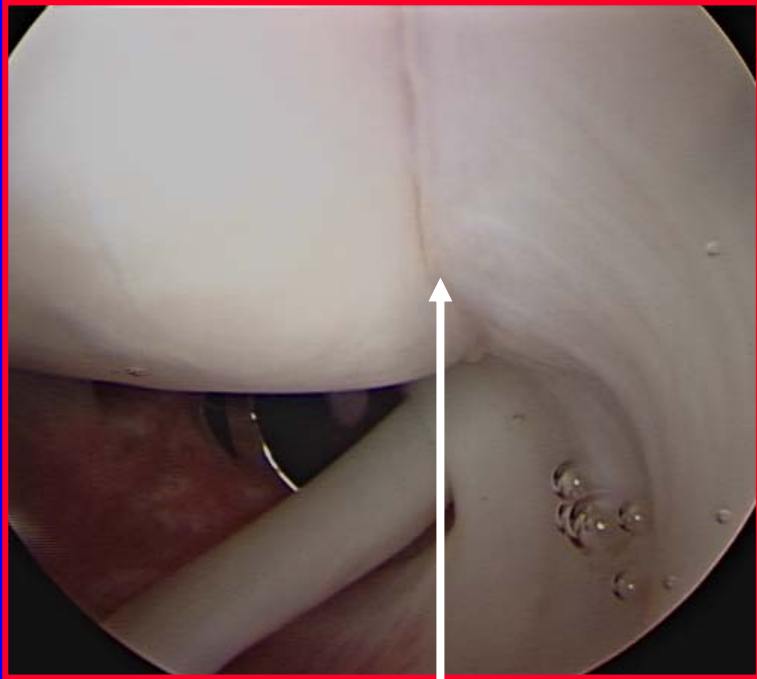
“T” shaped Tear

Articular Tears: Partial Repair

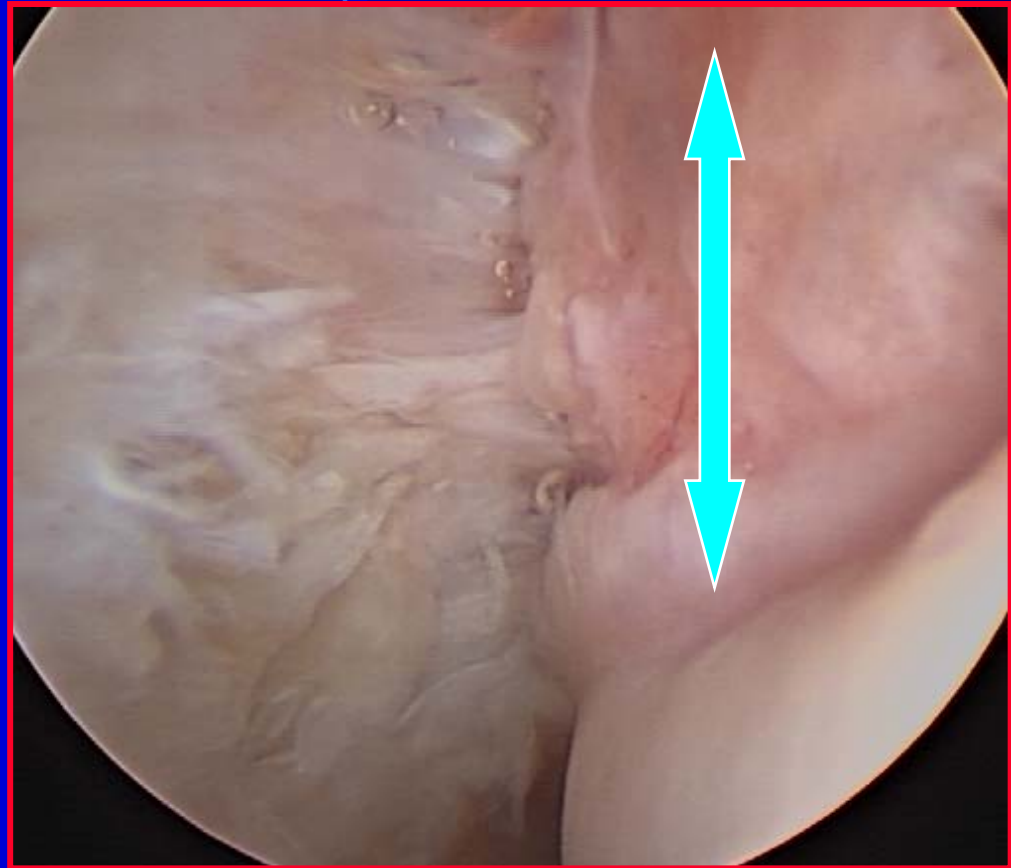
- Delamination:
 - Repair to remaining bursal cuff
- Split:
 - Side to side repair
- Avulsion
 - Measure thickness
 - Abrade bony bed
 - Repair footprint
 - Do not over tighten undersurface only !



Measuring Depth of Tear



Footprint

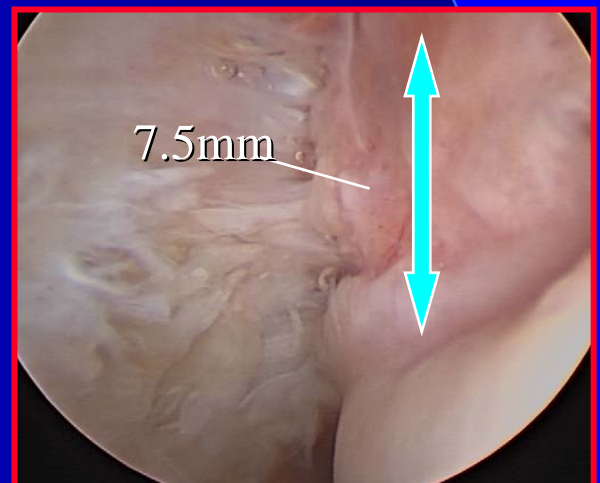
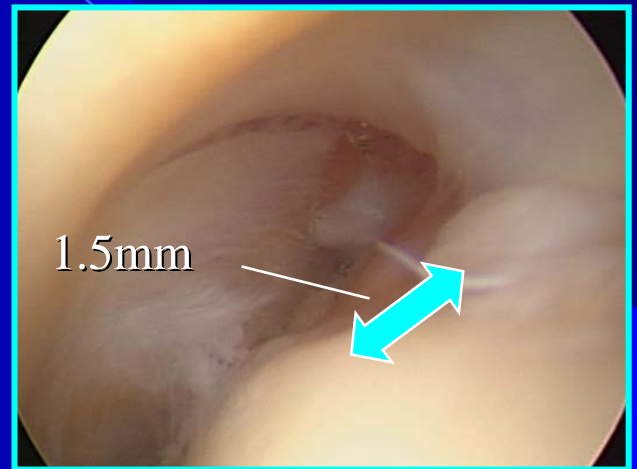


How to Measure Depth of Tear: Avulsion

Nottage Method *(Arthroscopy 2004)*

- Avg normal distance from tendon to articular margin:
1.5mm
- Measure distance from undersurface tear to articular margin
7.5mm
- Subtract 1.5mm
= 6mm
- This # divided by normal tendon thickness = % torn

$$6 \text{ mm}/12\text{mm} = 50\% \text{ tear}$$



How to Measure Depth of Tear?

Tissue loss

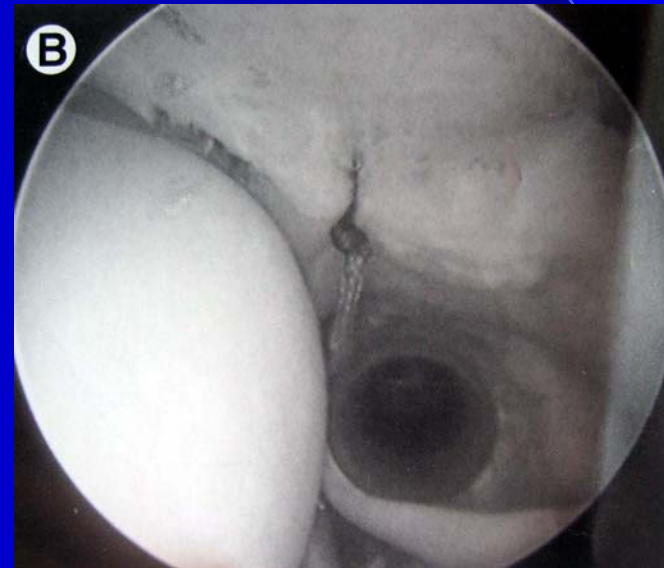
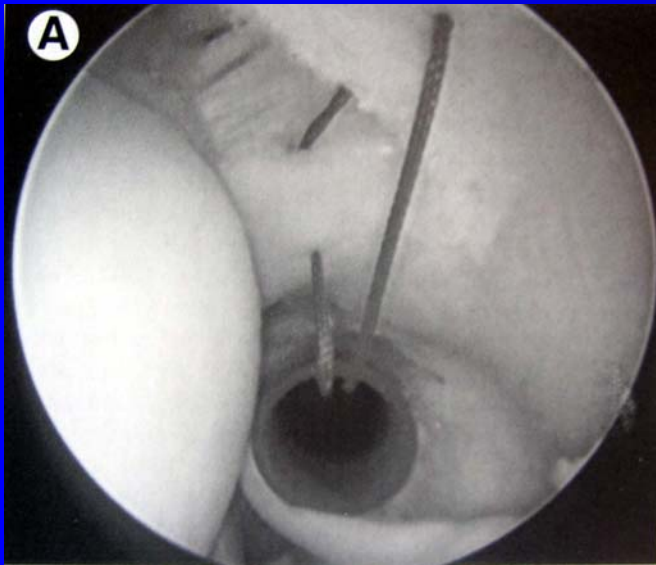
- 1) Debride damaged tissue
- 2) Suture marker
- 3) “Poor man’s” depth guage



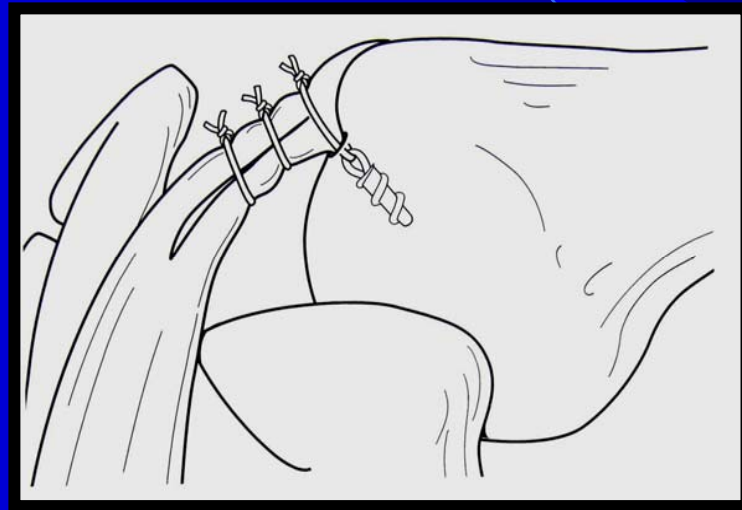
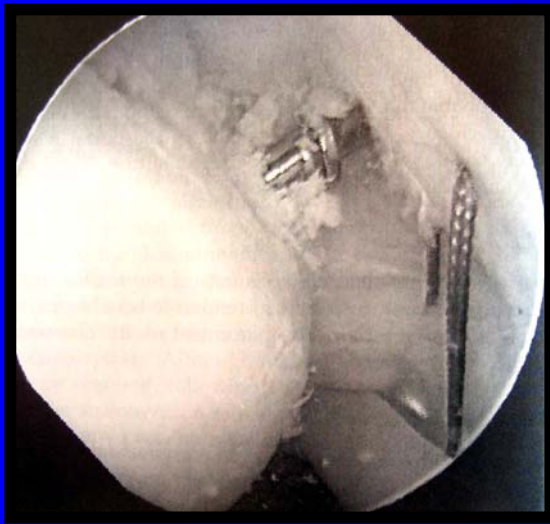
Case Examples

Repair of Partial Thickness Tears

Articular Split Tear: Partial Articular Repair Side to Side



Articular “T” Tear: Partial Articular Repair Undersurface to bone

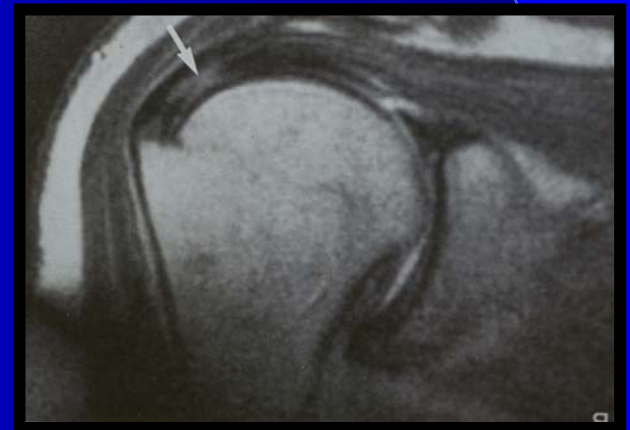
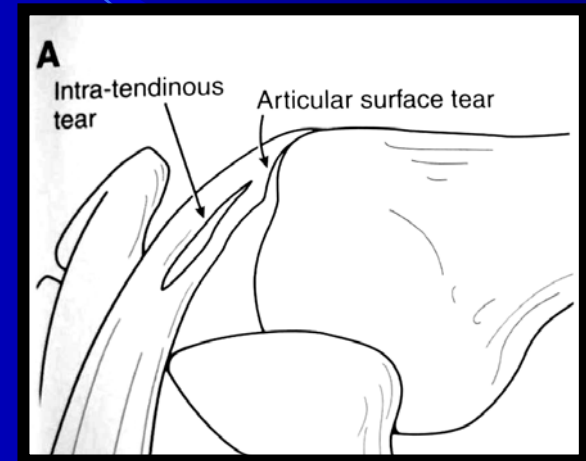


Articular Avulsion: Partial Articular Repair: Transtendon

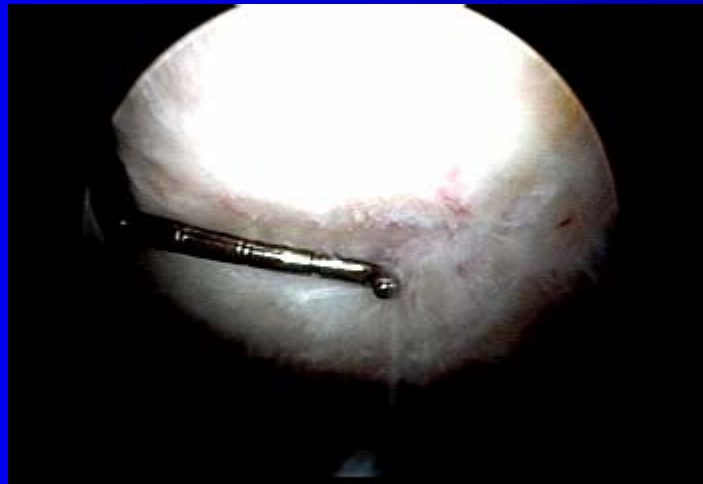


Type of Tear: Intrasubstance

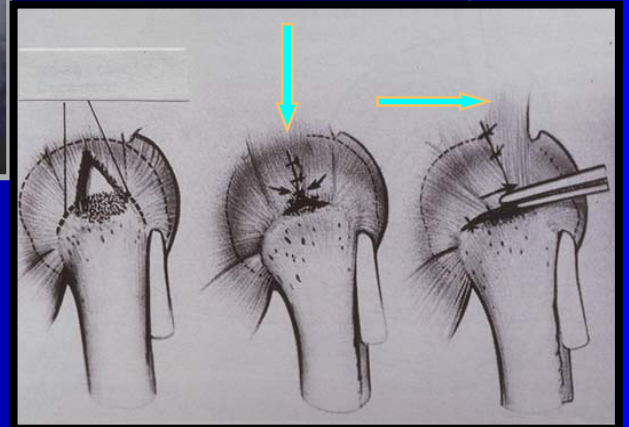
- When is this significant ?
- When/how do you treat ?
- MRI inaccurate:
- Intra-operative DX



Decision Making: Probing Intrasubstance tears



Complete the Tear & Repair

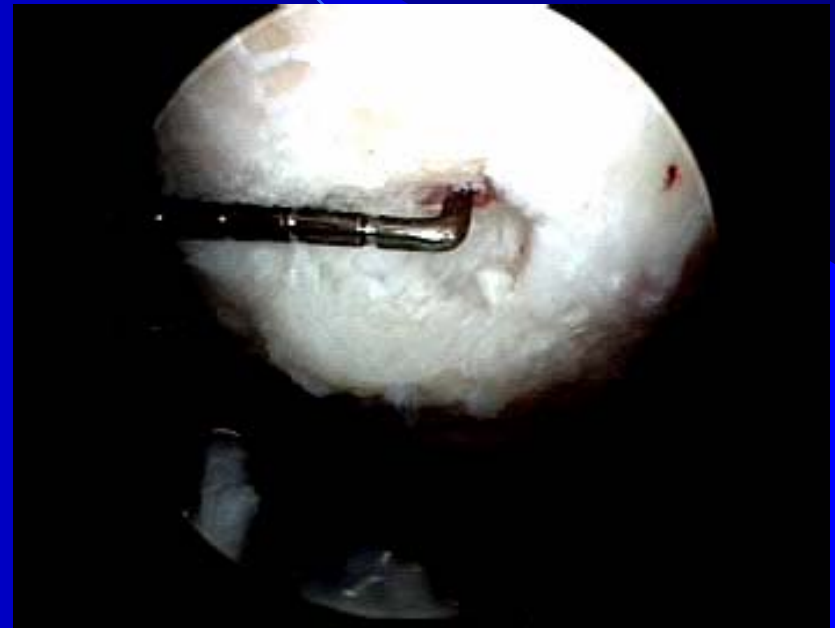


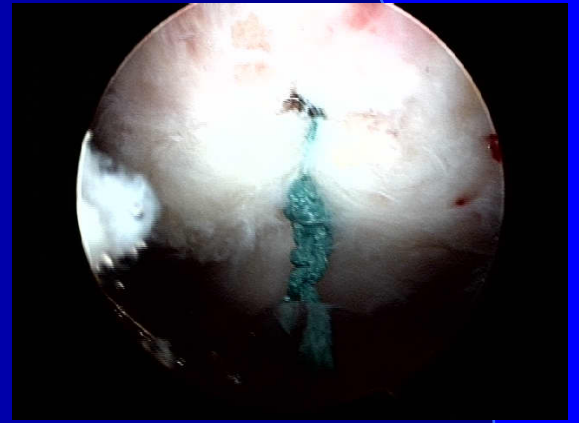
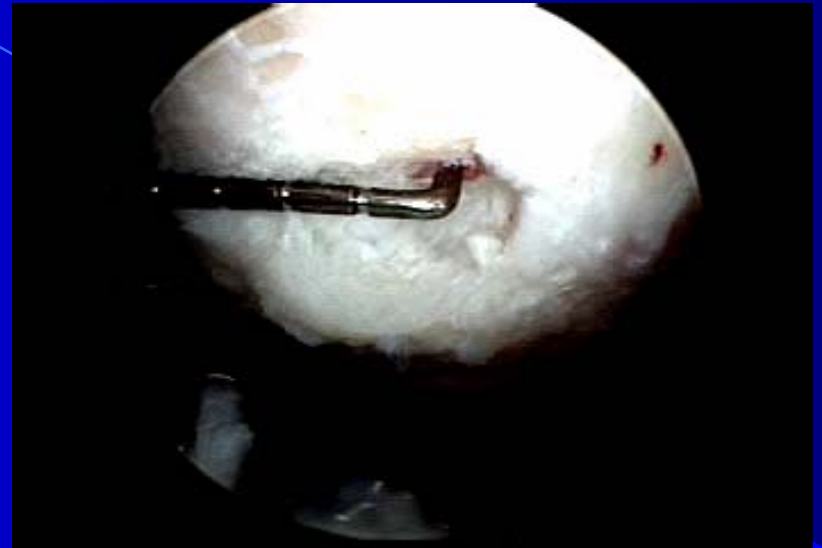
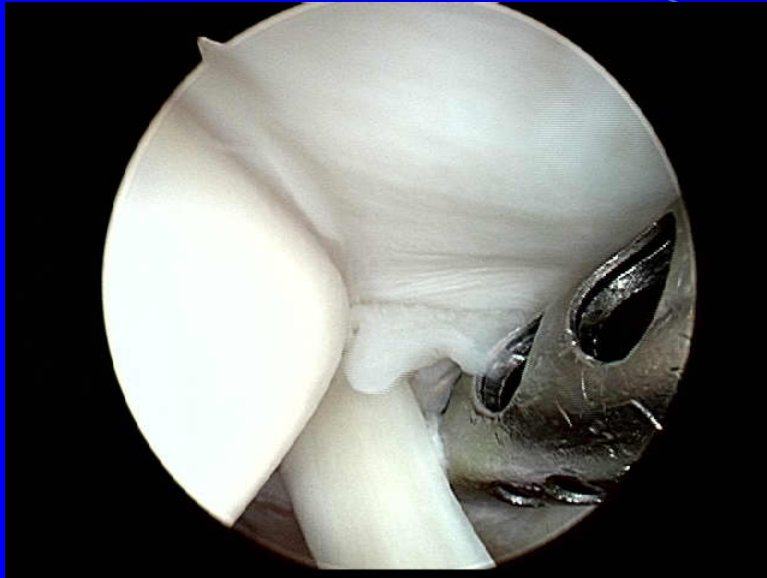
IntrasubstanceTear: Video

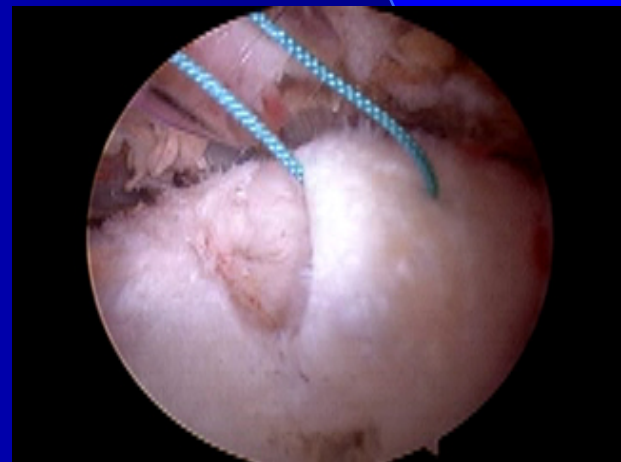


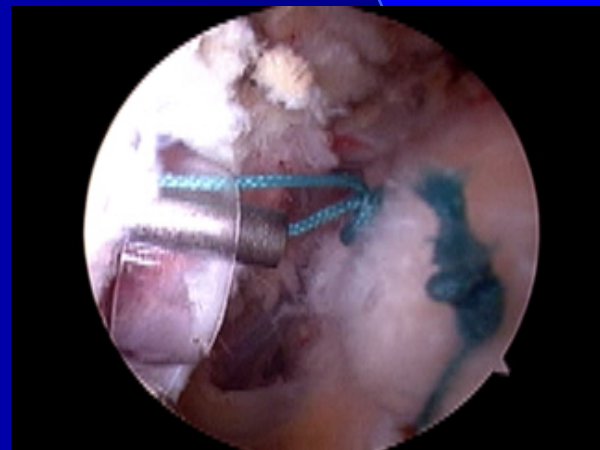
Partial Bursal Side Tear: Repair Technique

- same as full thickness tear











Conclusion:

- Significant partial tears do not heal and probably enlarge
- Results of repair are better than ASD + debridement for significant partial tears
- Repair most Type 3 tears
- Consider repair Type 2 B tears

However.....

- Remember
 - Many patients still do well with debridement
 - Consider morbidity of repair vs. debridement
 - Take into account age, activity level, dominant arm
- Unanswered questions....
 - Completing tear and repair seems to work- BUT...
 - Does partial repair improve results ?
 - Effect of uneven tension on repaired partial tear ?

Sometimes repairing is worse...



Than removing.....

THANK YOU

