

CMC Arthroscopy

Jeffrey Yao, MD

Associate Professor

Department of Orthopaedic Surgery
Stanford University Medical Center



Disclosures

- The following relationships exist:

1. Grants

American Foundation for Surgery of the Hand

2. Royalties and stock options

Arthrex, 3D Systems, McGinley Orthopaedic Innovations

3. Consulting income

Smith and Nephew Endoscopy, Arthrex, Exsomed, Cartiva, BME

4. Research and educational support

Arthrex

5. Editorial Honoraria

Elsevier, Lippincott

6. Speakers Bureaus

Arthrex, Trimed, Smith and Nephew Endoscopy

Case

- 45 year old male office worker
- 2 years of left basilar thumb pain
- Failed treatments with splinting, NSAIDs, steroid injections, even PRP!
- What now??



Open Methods of Treatment

- Trapeziectomy with hematoma distraction arthroplasty (HDA)
 - Meals, 2004
- Ligament Reconstruction Tendon Interposition (LRTI)
 - Burton, Pelligrini 1986
- APL suspensionplasty
 - Thompson, 1989
 - Soejima, Hanamura, Kikuta, Iida, Naito, 2006
- Allograft rib interposition
 - Eaton, 1984
 - Trumble, 2000
 - Implant arthroplasty -Not proven
- Unique Circumstances
 - Wilson metacarpal osteotomy – younger patients
 - CMC arthrodesis – post-traumatic DJD in young laborers

What's the Evidence?

- Cochrane Database Systemic Review (Wajon, et al)
 - 2005 (7 studies, 5 techniques, 384 patients)
 - No significant differences between techniques
 - pain, physical function, patient global assessment, range of motion or strength
 - 16% fewer complications with trapeziectomy alone



What's the Evidence?

- Cochrane Database Systemic Review (Wajon, et al)
 - 2009 (9 studies, 7 techniques, 477 patients)
 - No significant differences between techniques
 - pain, physical function, patient global assessment, range of motion or strength
 - Fewer complications with trapeziectomy alone (10 vs 22%)



From England...

- 153 thumbs, 5-18 year f/u
- Randomized into 3 groups:
 - Trapeziectomy alone
 - Trapeziectomy with PL interposition
 - Trapeziectomy with LRTI
- **No difference** in grip/pinch strength, ROM, complications, revisions



The Stanford Experience

- 61 Patients
- 1995-2005
- 3 Surgeons, 3 Techniques
 - Costochondral Allograft Interposition
 - LRTI/Trapeziectomy
 - Hematoma Distraction Arthroplasty (HDA)
- Variables studied:
 - DASH
 - Pinch strength
 - preop vs postop (% improvement)
 - postop vs contralateral side
 - Total operative time



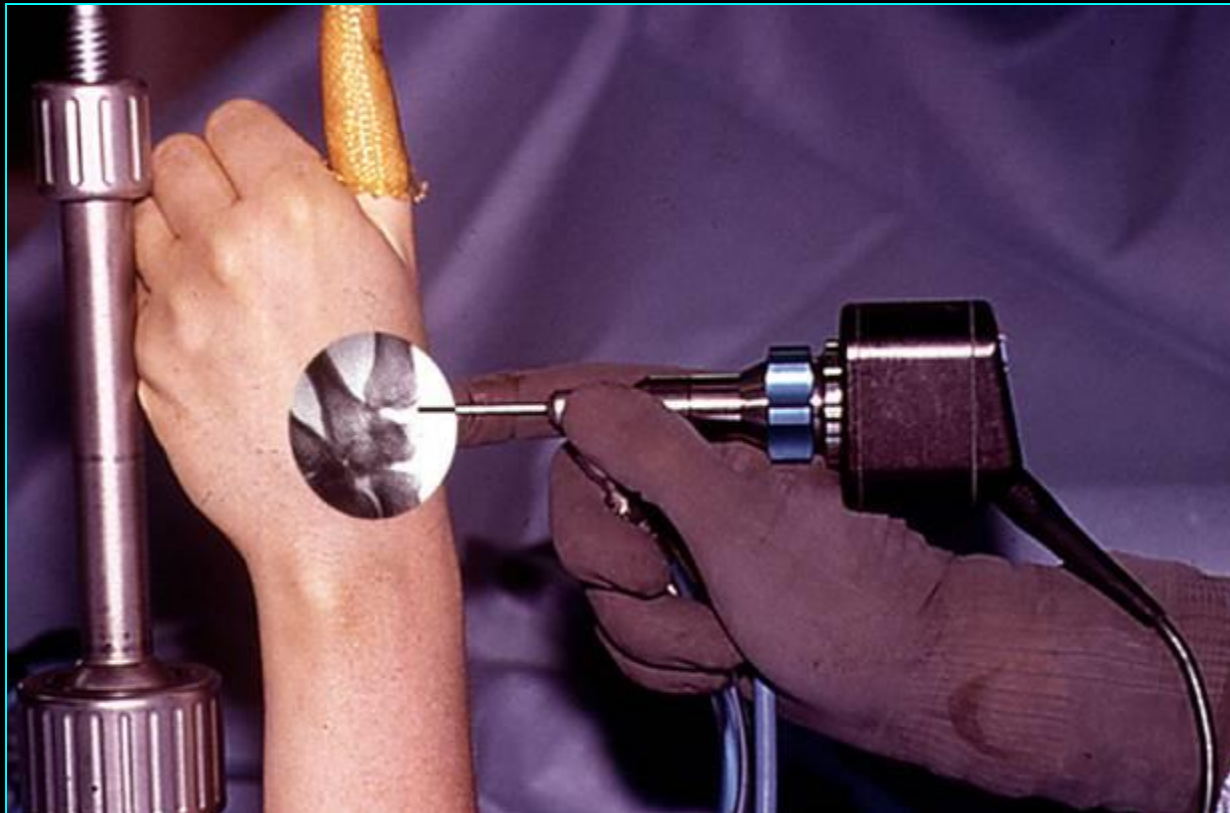
The Stanford Experience

- RESULTS?
 - NO SIGNIFICANT DIFFERENCE BETWEEN TECHNIQUES FOR ALL VARIABLES
 - EXCEPT:
 - Total operative time
 - Trapeziectomy (mean 77.45 min) vs LRTI (mean 129.41)
 - » $p = 0.01$
 - Costochondral Allograft Interposition (mean 90.45 min) vs LRTI
 - » $p = 0.02$

The Stanford Experience

- Conclusions:
 - Patients treated with all techniques do well
 - Treatment is largely based on surgeon preference
 - Need for ligament reconstruction??
 - Need for interposition?
 - Some secondary criteria may drive future trends
 - Operative time
 - Complications
 - Accelerated recovery
 - ? Role for Arthroscopy

Thumb Carpometacarpal (CMC) Joint Arthroscopy



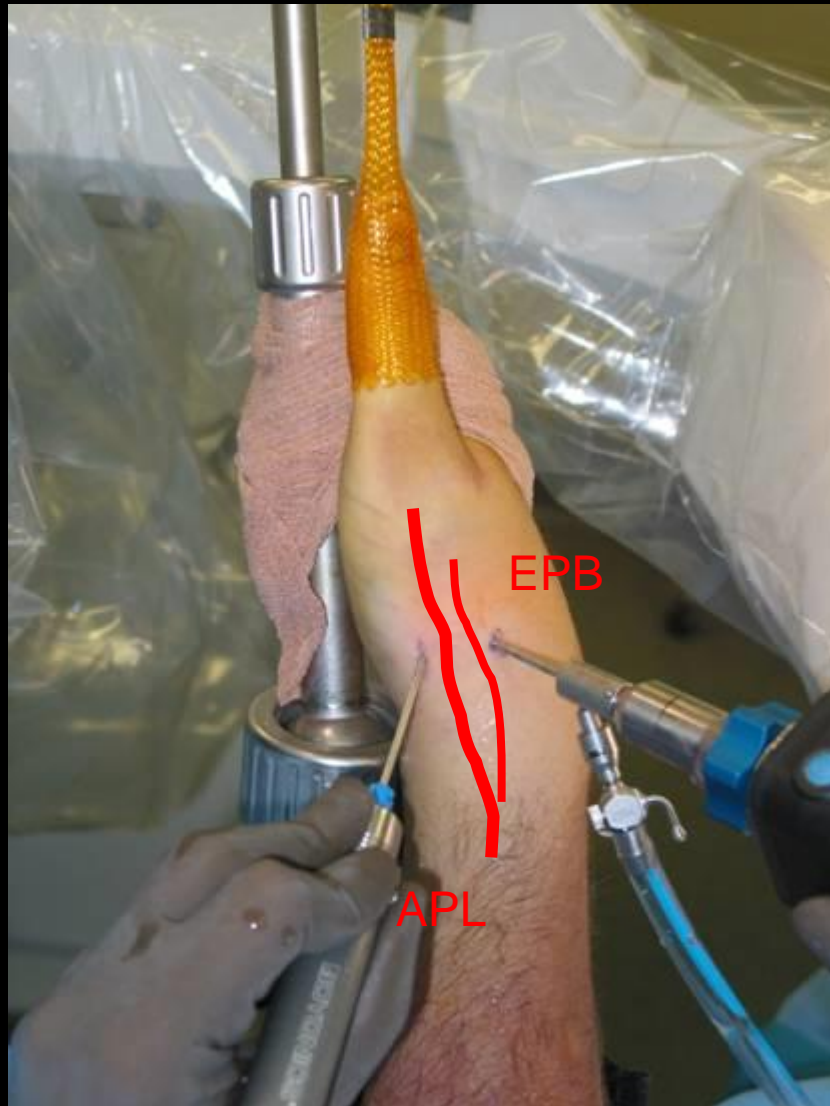
Arthroscopic Hemitrapeziectomy and Interposition

- Menon, 1996 - 25/33 complete pain relief with various interposition tissues (PL, FCR, Goretex)
- Berger, 1997 (1995)
- Culp, 2001 - Less subsidence of the metacarpal (2-4 mm), comparable improvements in pinch strength (22%)
- Adams, 2007 (GraftJacket) - 94% partially/completely satisfied
- Badia, 2007 (Artelon) - 13/13 patients satisfied
- Hofmeister, 2009 - 18/18 satisfied at 7.6 years despite 1.8 mm subsidence
- Edwards, 2010 - 19/23 satisfied
- **Shorter recovery**

Our Case (Eaton 2/3)



Setup



Standard Portals:

1R

1U

Thenar (Walsh)

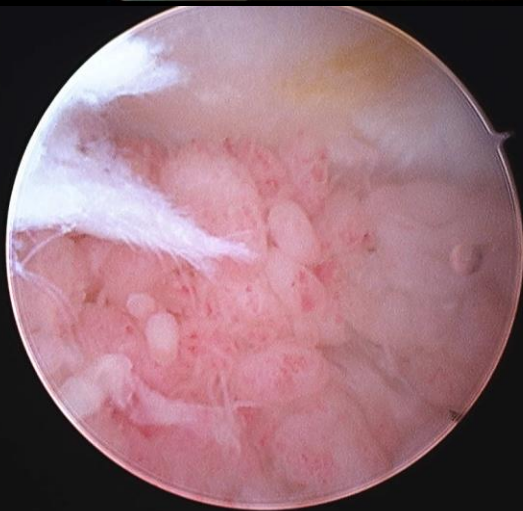
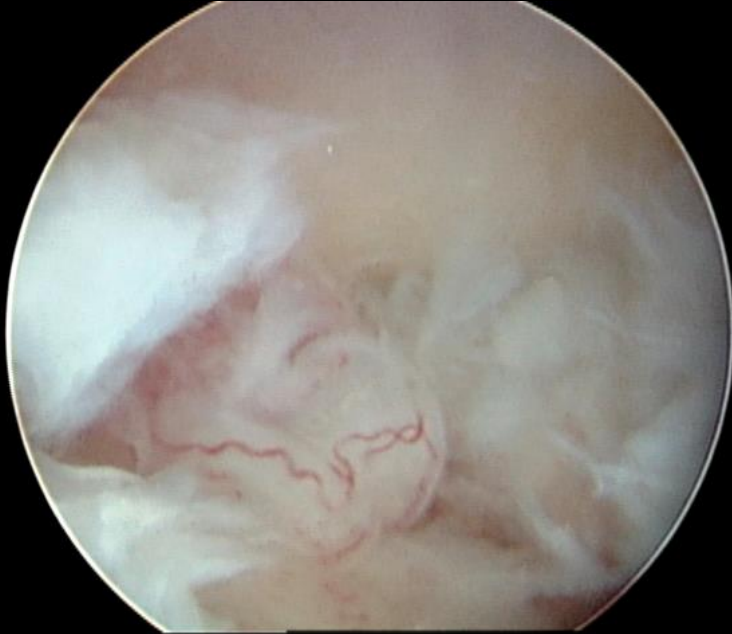
Volar Radial (Chow)

Dorsal Distal (Slutsky)



Carro, et al. *Arthroscopy*, 2006

Thumb CMC Synovitis

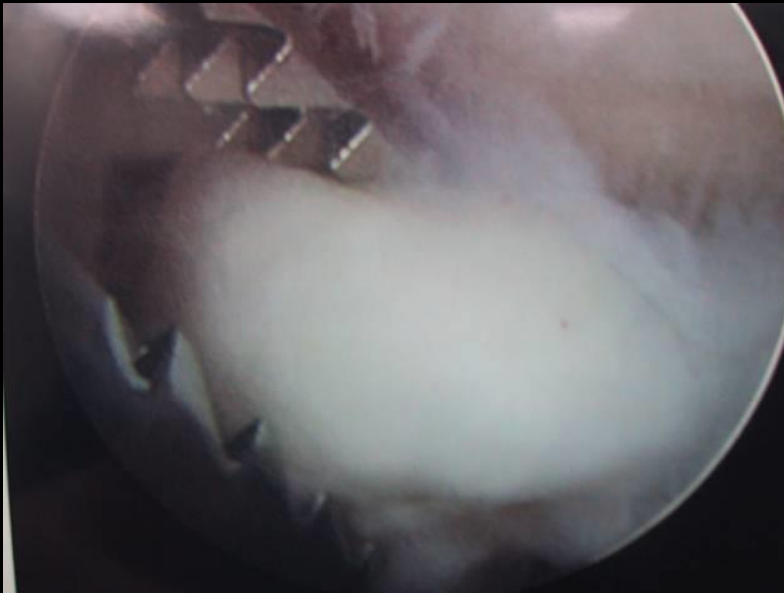


Debridement of CMC Joint



5

Excision of Loose Bodies



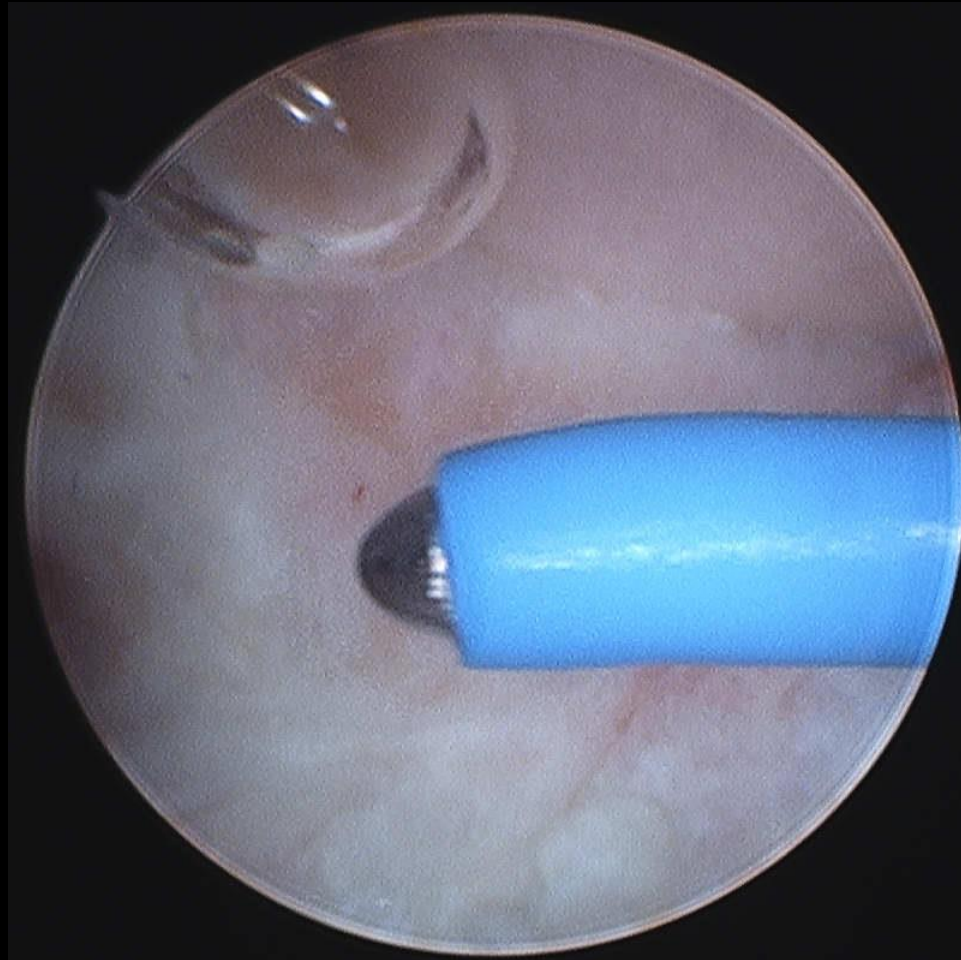
Arthroscopic Hemitrapeziectomy



Fluoroscopic Guidance



Thermal Shrinkage of Beak Ligament



A word on shrinkage....

MOTIVATIONALBUCK.C



SHRINKAGE

SOMETIMES IT HIDES LIKE A FRIGHTENED TURTLE

Ligament/Capsular Shrinkage

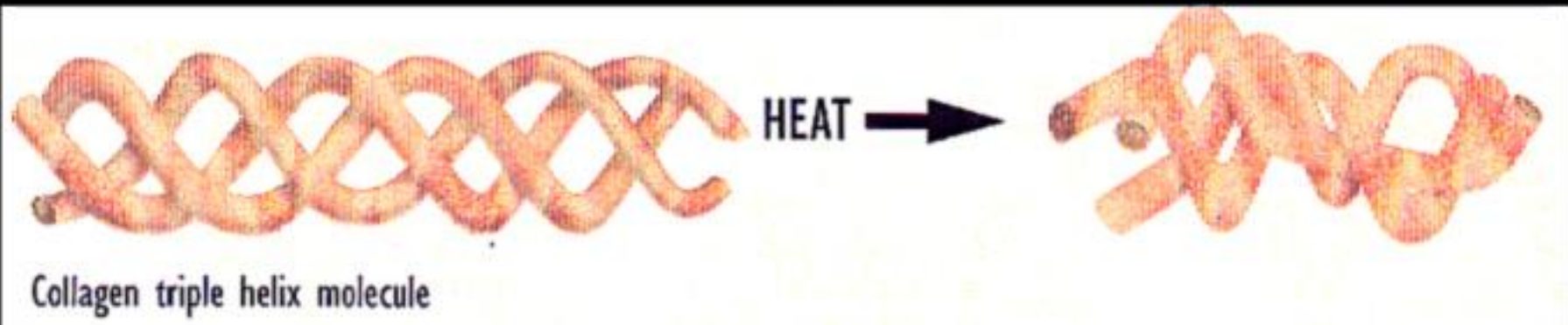
- Restore stability by thermal shrinkage
- Secondary fibroplasia and scarring
- Destruction of sensory receptors



Initial loss of stiffness requires protection against elongation post-op
6-8 weeks immobilization

Thermal Modification of Collagen

- Heat sensitive bonds break at 60°C
- Crystalline extended structure begins to uncoil
- As molecule contracts, it's diameter increases



Thanks, Lee Osterman

Pinning of CMC Joint



Final Radiograph



Before



After

Post-Operative

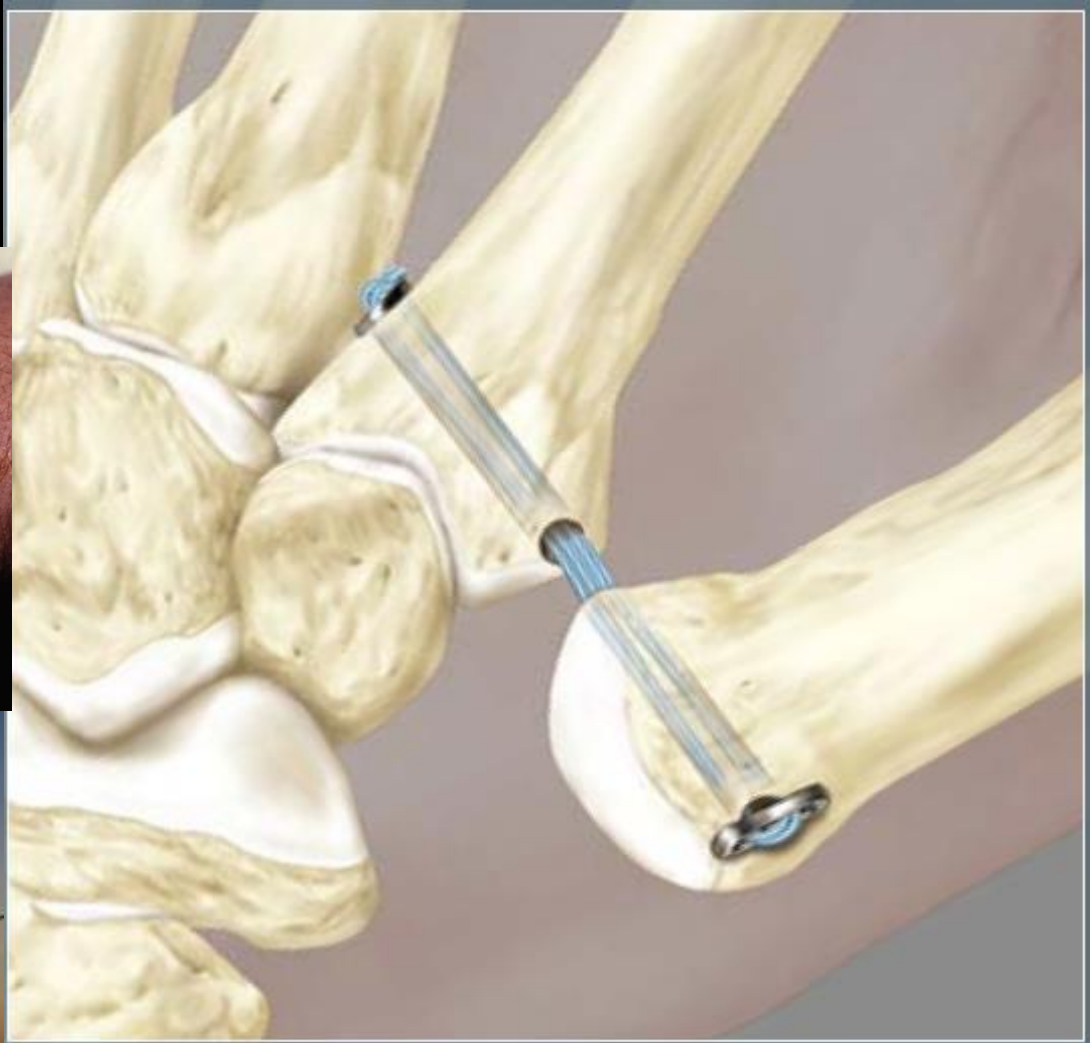
- Thumb spica splint for 2 weeks
- Suture removal and thumb spica cast for an additional 2 weeks
- Pin removal, OT for ROM exercises; splint for lifting and sleep

Results of Arthroscopic Hemitrapeziectomy with Interposition

- Park, Lee and Yao
 - 23 patients
 - Mean 14 month follow-up
 - Very little pain after a few days!
 - Full ROM achieved at 3 months in all patients
 - Pinch strength improved to 70% contralateral
 - Grip strength improved to 84% contralateral
 - Mean DASH: 14
 - Mean PRWE: 30
 - Mean return to full activity: 6 months

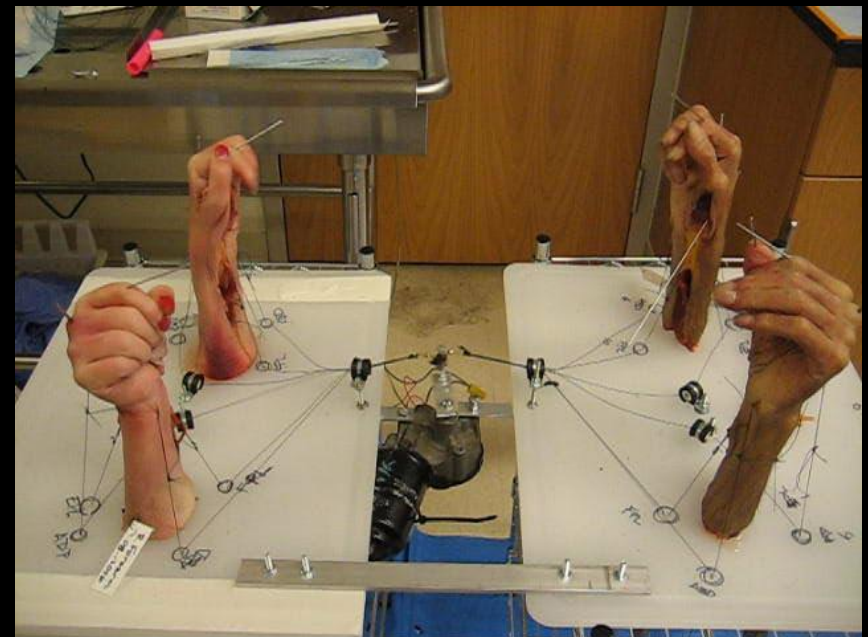
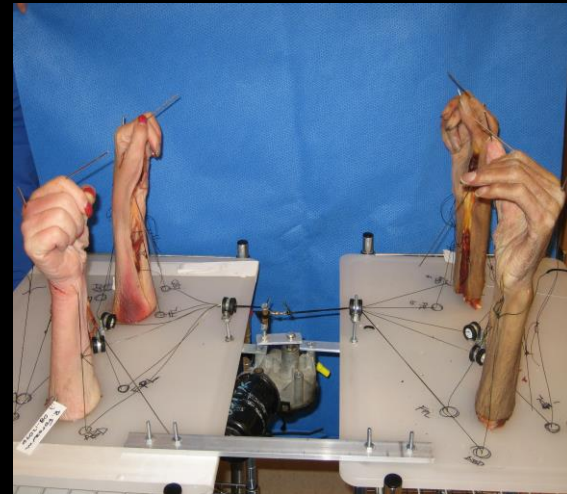
Pin Complications?

- Suture Button Suspension



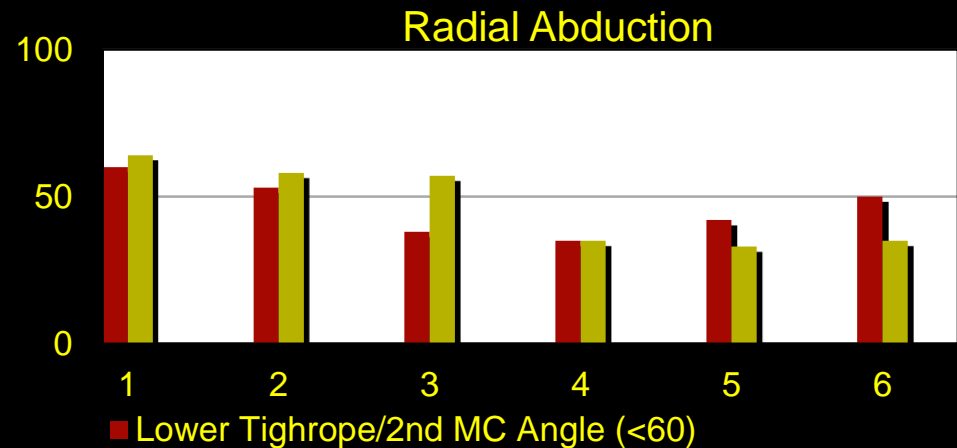
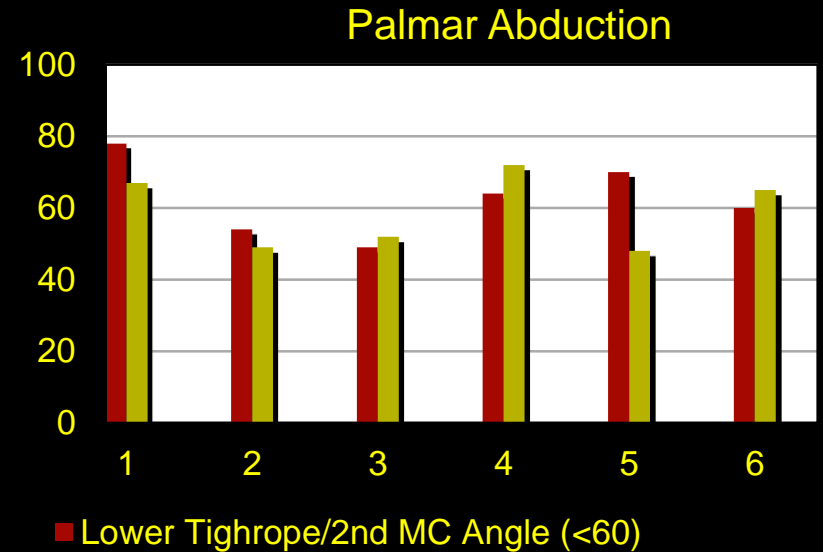
Biomechanical Study

- Yao and Zlotolow, et al., JHS 2010
 - 10 matched pairs of fresh-frozen cadaveric wrists
 - Trapeziectomy performed
 - Wrists randomized to suture button fixation versus K-wire fixation
 - Loaded using a simulated active ROM protocol
 - **NO difference in subsidence**

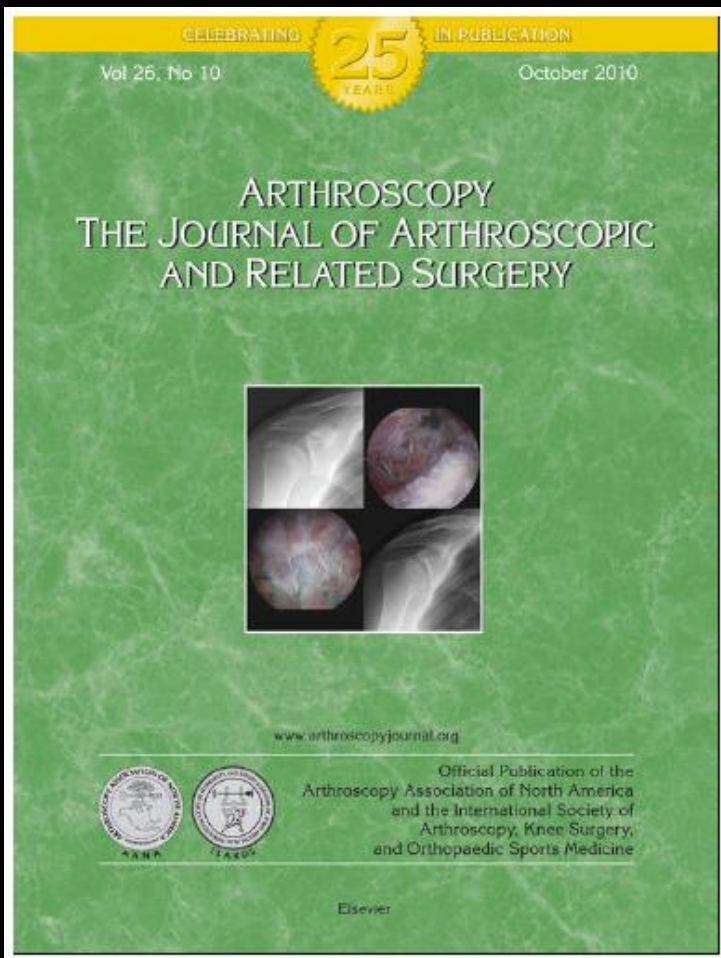


Safety and Trajectory

- 6 matched pairs
- Mean distance to nerve to 1st DI
 - 10.8 and 16.6 mm
- No significant differences in subsidence, radial/palmar abduction



Technique



Suture Button Suspensionplasty After Arthroscopic Hemitrapeziectomy for Treatment of Thumb Carpometacarpal Arthritis

Christopher A. Cox, M.D., Dan A. Zlotolow, M.D., and Jeffrey Yao, M.D.

Abstract: A myriad of techniques for reconstruction of the arthritic thumb carpometacarpal joint have been described. In the modern era, there has been a push, driven by both clinicians and patients, for more rapid rehabilitation after these procedures. A majority of the historically described techniques require pinning of the thumb ray for 4 weeks. Suture button placement between the thumb and index ray metacarpals has been shown in biomechanical studies to effectively resist subsidence of the thumb ray. We describe a novel technique of using a suture button for suspensionplasty of the thumb ray after arthroscopic partial trapeziectomy. This technique allows for early mobilization and may offer a potential improvement on current techniques. Early results of use of this technique are encouraging, but well-conducted follow-up studies are necessary.

Arthroscopy, 2010

Our Case



STANFORD NORTH CAMPUS

5/12/2009

12:09:00 PM



NS: High

kV: 61

mA: 0.073

dt: 0.02

DAP: 0.23 cGy cm²

1

4" Mode



Hemitrapeziectomy

STANFORD NORTH CAMPUS

5/12/2009

12:22:45 PM



NS: High

KV: 58

mA: 0.067

dt: 0.15

DAP: 2.36 cGy cm²

6

4" Mode



STANFORD NORTH CAMPUS

5/12/2009

12:23:27 PM



NS: High

KV: 60

mA: 0.071

dt: 0.19

DAP: 2.92 cGy cm²

8

4" Mode



Without Suspension



Insertion of Guidewire

STANFORD NORTH CAMPUS

5/12/2009

12:50:33 PM



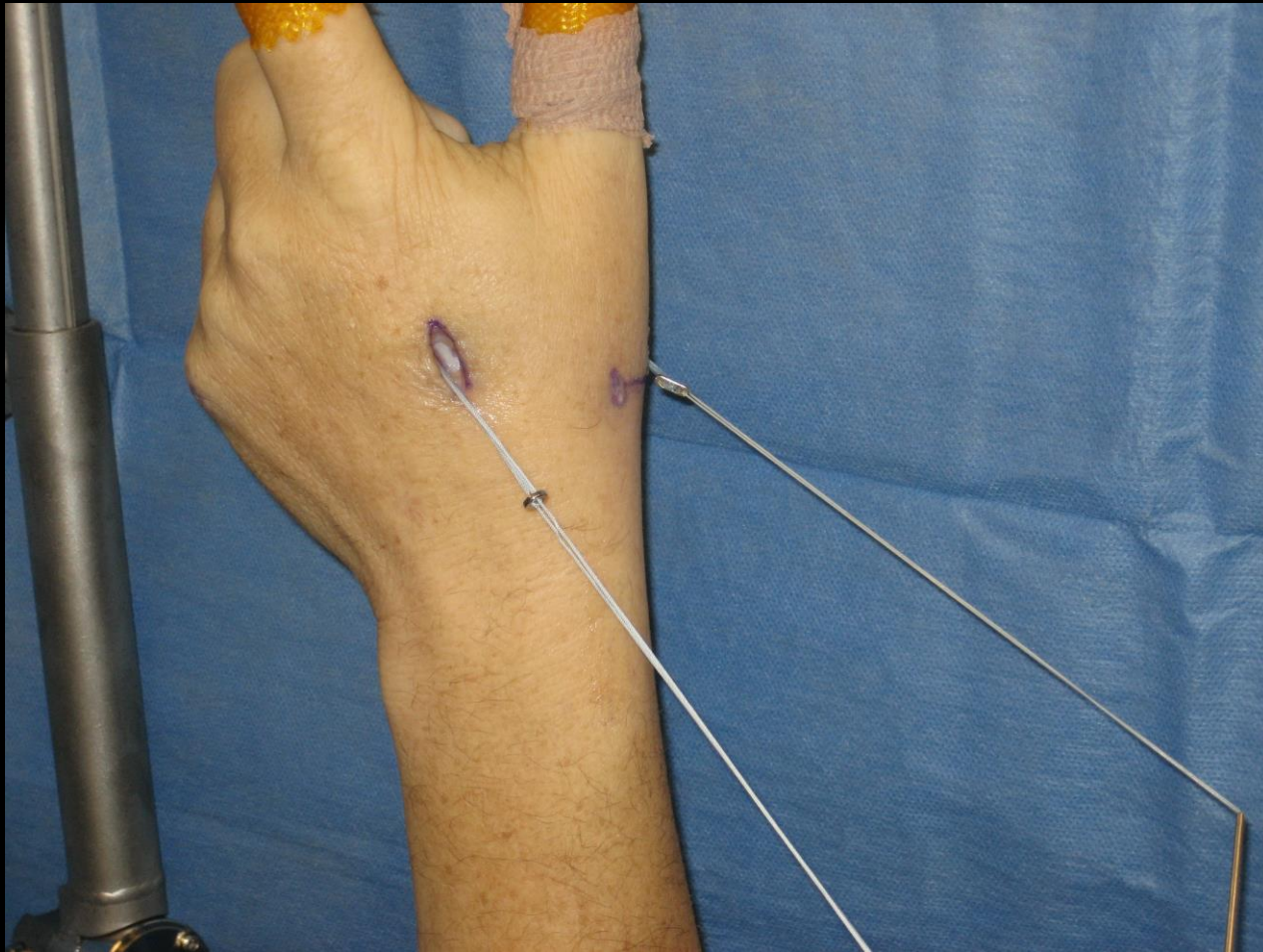
NS: High
KV: 56
mA: 0.069
dt: 0.47
DAP: 9.16 cGy cm²

31

6" Mode



Suture Button Passed



With and Without Suspension



Post-Operative

- Thumb spica splint for 7-10 days
- Suture removal and scar massage
- Start ROM exercises at 7-10 days
 - AROM for 4 weeks, advance to strengthening as tolerated



Our Guy 2 Months Post-Op



Our Guy 12 Months Post-Op



What I tell my patients

Arthroscopic Hemitrapeziectomy:

Less pain post-operatively

Much earlier return to activity

Comparable results to open

No morbidity from tendon autograft

May be able to eliminate pin complications

No bridges burned

Thank You!

