Lateral Epicondylitis (Tennis Elbow)

Lateral Epicondylitis

- Originally described in *Lancet,* 1882 as "Lawn Tennis Arm".

Epidemiology

- 10-50% of tennis players will suffer from lateral epicondylitis
- Tennis players account for less than 5% of overall cases
- Common in construction, gardening
- 4^{th} to 5^{th} decade of life
- Overall incidence 1-2% over course of lifetime

Epidemiology

- Gruchow, et al. *AJSM* (1979)
  - Risk of lateral epicondylitis 2.0-3.5 times greater with playing time more than 2 hours per week
  - Age greater than 40 years associated with 4 fold increase in incidence vs. younger cohort

Natural History

- Most cases last 6 months to 2 years until complete resolution
- 93% will recover without surgery
- Open debridement of ECRB is successful in 85% of cases

Nirschl and Pettrone, Tennis Elbow: The surgical treatment of lateral epicondylitis JBJS (61) 1979.

Symptoms

- Tenderness and pain localized to the lateral epicondyle
- Pain with activities involving wrist extension
- Difficulty with grasping objects

Physical Exam

- Tenderness over the conjoined tendon origin
- Maximal tenderness 2-5 mm distal and anterior to the midpoint of the lateral epicondyle
- Wrist and finger extension with elbow extended should worsen pain

Imaging Studies

- 22-25% will have radiographic evidence of calcification in the soft tissue about the lateral epicondyle
- Ultrasound imaging
  - bowing of the common tendon, presence of hypoechoic fluid adjacent to the common tendon, thickening, decreased echogenicity, and ill-defined margins of the common tendon

Imaging Studies

- Miller, et al. *J Clin Ultrasound*. (2002):
  - 10 affected elbows, 11 unaffected elbows
  - Ultrasound
    - Sensitivity 64-82%
    - Specificity 67-100%
  - MRI
    - Sensitivity 90-100%
    - Specificity 83-100%

Imaging Studies

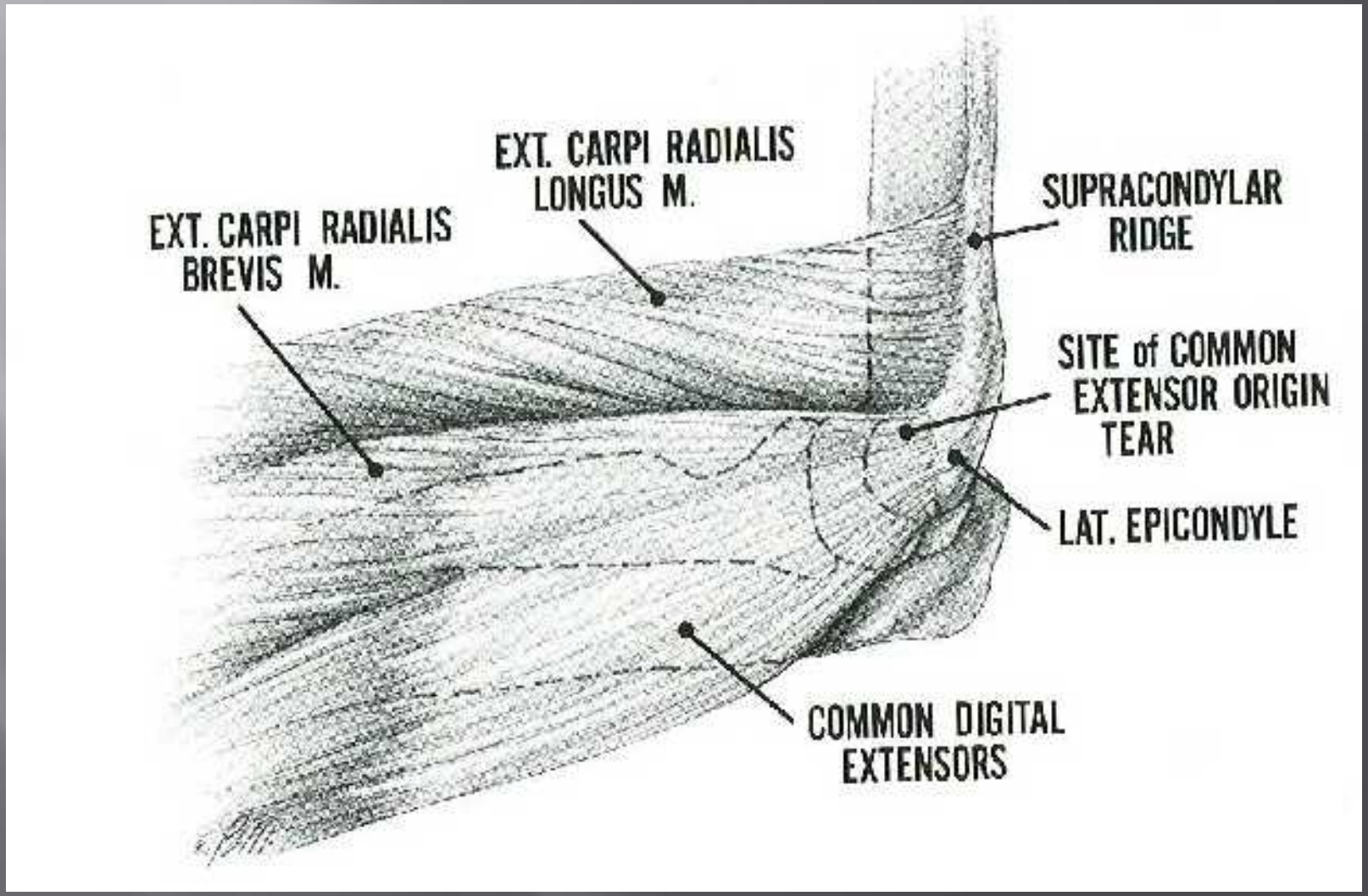
Normal

Signal change in ECRB tendon

Differential Diagnosis

- Elbow bursitis
- Elbow arthritis
- Medial epicondylitis (Golfer's elbow)
- Radial tunnel syndrome
- Cervical spine disease

Anatomy


EXT. CARPI RADIALIS LONGUS M.
EXT. CARPI RADIALIS BREVIS M.
SUPRACONDYLAR RIDGE
SITE of COMMON EXTENSOR ORIGIN TEAR
LAT. EPICONDYLE
COMMON DIGITAL EXTENSORS

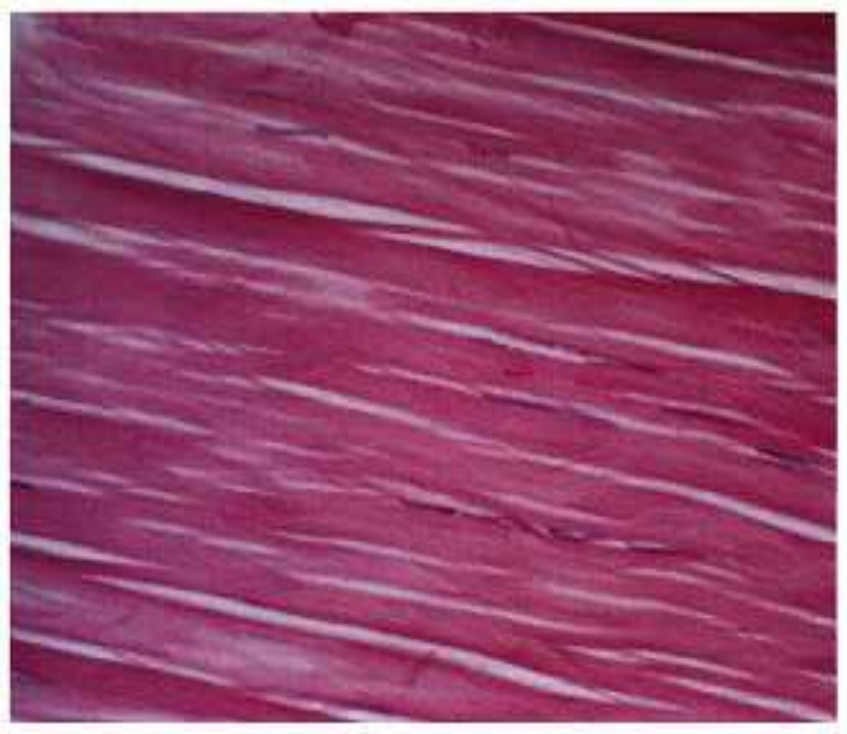
Pathophysiology

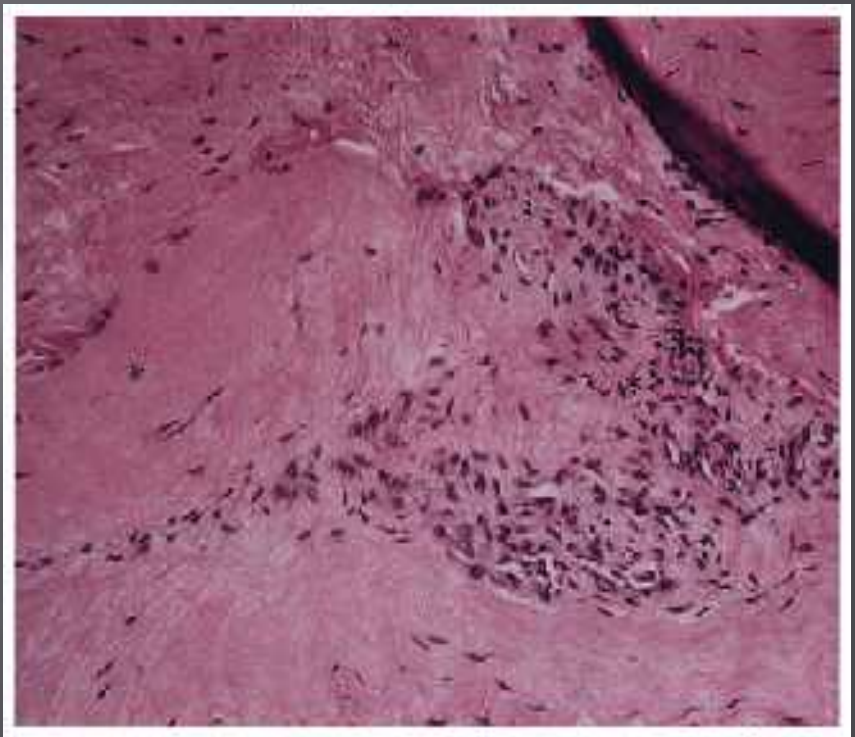
- ECRB microtears
- Tendon is grayish, friable, edematous
- Fibrillation of tendon
- 35% with gross tendon rupture

Pathophysiology

- Nirschl, et al. *JBJS Am* (1979):
  - 1213 cases over 9 years
  - 87 procedures
- "The lesion that was consistently identified at surgery was immature fibroblastic and vascular infiltration of the origin of the extensor carpi radialis brevis. "
  - Angiofibroblastic dysplasia

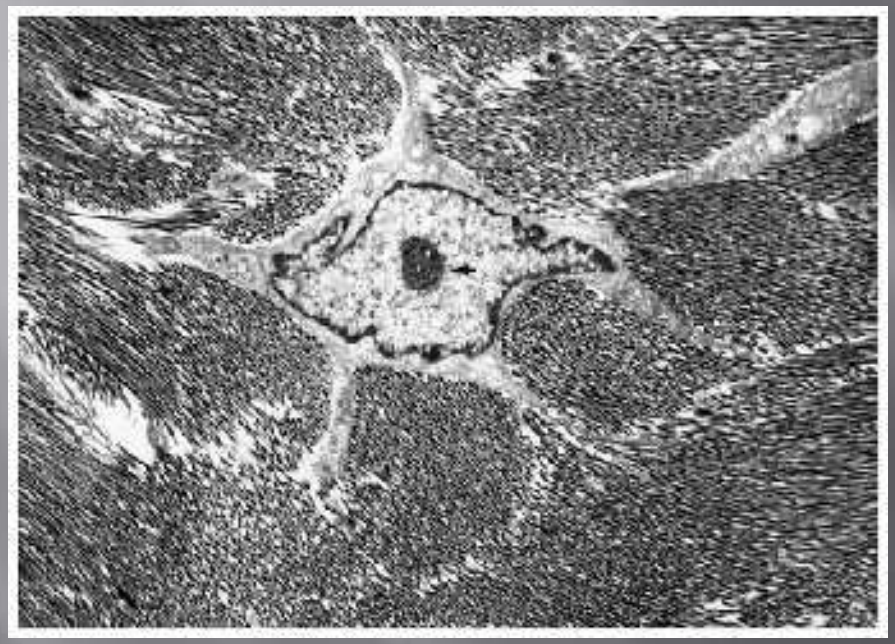
Pathophysiology





Krauschaar, BS and Nirschl, RP. Tendinosis of the Elbow. Clinical features and findings of histological , immunohistochemical, and electron microscopy studies. JBJS, 1999. Vol 81.

Pathophysiology



Krauschaar, BS and Nirschl, RP. Tendinosis of the Elbow. Clinical features and findings of histological , immunohistochemical, and electron microscopy studies. JBJS, 1999. Vol 81.

Treatment Options

BALCO
BAY AREA LABORATORY
CO-OPERATIVE

Treatment Options

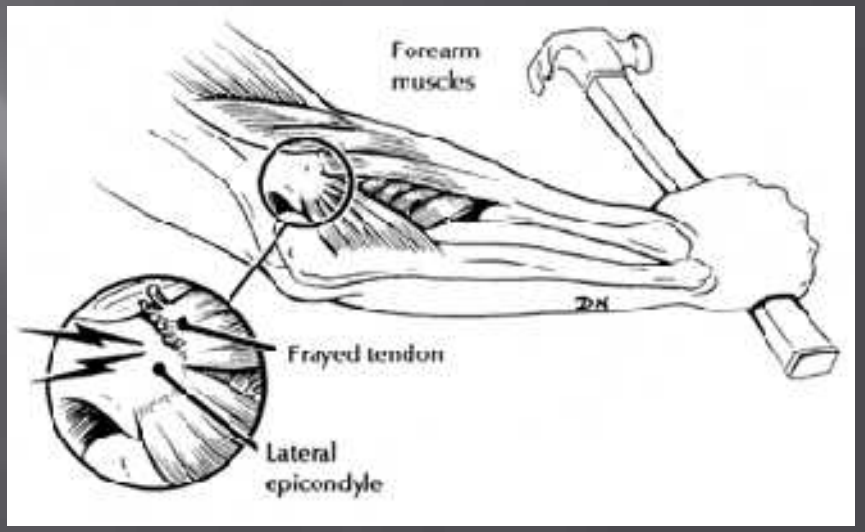
- Phase I—acute
  - Cessation of activity
  - Medications (Oral vs. Topical NSAIDS)
  - Corticosteroid injections
- Phase II—recovery
  - Ultrasound
  - Counterforce bracing
  - Physical therapy

Topical NSAIDS

- Burnham, et al. *Clin J Sport Med.* (1998):
  - Compared 2% topical dicofenac to placebo in 14 symptomatic patients.
    - Randomized, double blinded
  - Improved pain on VAS at 3 and 14 days
  - No difference in scores at 1 month
  - Wrist extension strength significantly greater (8.4 kg vs. 5.9 kg)

Burnham, et al. The effectiveness of topical diclofenac for lateral epicondylitis. Clin J Sport Med. 1998; 8: 78-81.

Steroid Injections



Steroid Injections

- Newcomer, et al. *Clin J Sport Med* (2001):
  - Compared PT alone vs. 6 mg betamethasone in early onset LE
  - Outcomes at 4, 8, and 26 weeks
  - Improved VAS at 8 weeks and 6 months with both groups, not statistically different
  - No difference in grip strength

Newcomer, et al. Corticosteroid injection in early treatment of lateral epicondylitis. Clin J Sport Med. 2001:11;214-22.

Steroid Injections

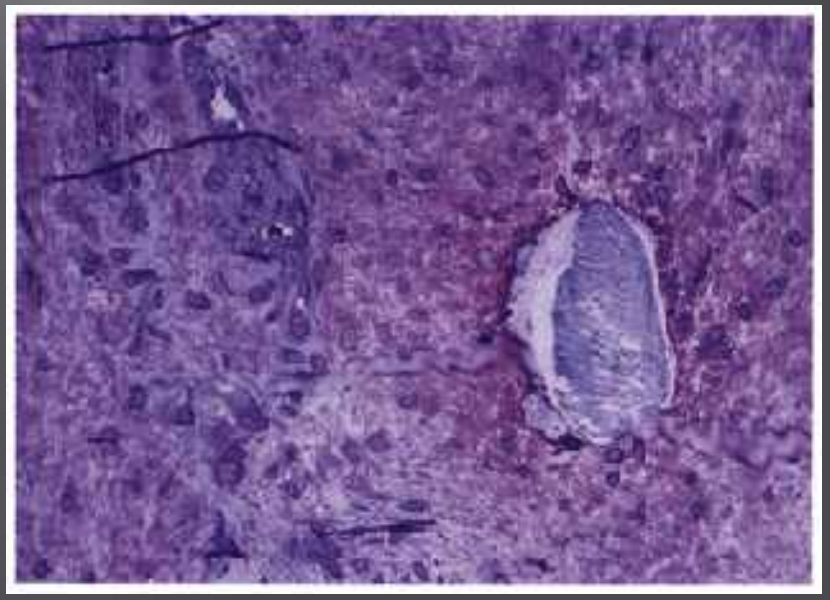
- Price, et al. *Br J Rheumatology* (1991):
  - Short term study of steroid injxn in LE (100 patients, 3 different steroids)
  - Pain relief in 55-89% of patients
  - Recurrence in 18-54% by 6 months

Steroid Injections

- Nirschl, et al. *AJSM* (2003):
  - Iontophoretic administration of steroids to 199 patients
    - Randomized, double blinded, placebo controlled
  - Improved VAS by patient and physician
  - Side effects included skin reactions (n=12 in treatment, n=11 in placebo)

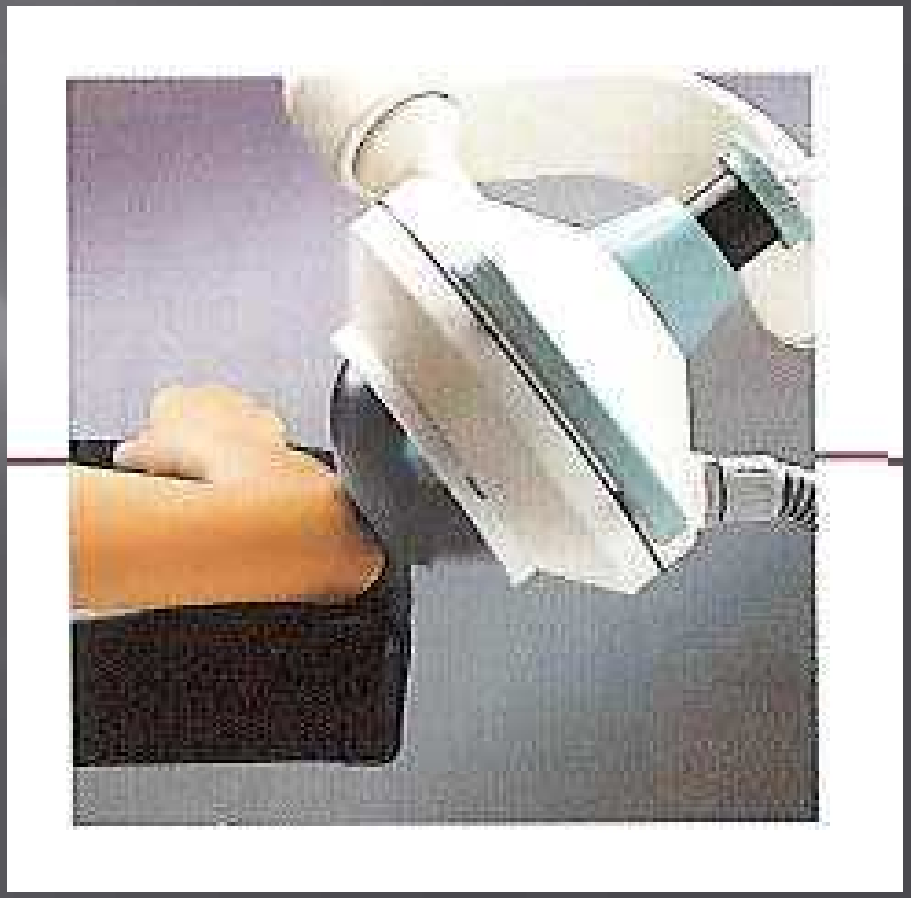
Steroid Injections

- Complications
  - Subcutaneous atrophy, skin lesions
  - Crystal deposition
  - Permanent tendon changes



Shock Wave Therapy

- Exact mechanism unclear
- “shock waves can provoke a painful level of stimulation that leads to pain relief or analgesia through hyperstimulation and increased vascularity.”
- Short term success 58-73% at 12 weeks



Shock Wave Therapy

- Wang, et al. *AJSM* (2002):
  - Long term (1 to 2 yr) f/u of 43 LE patients
    - Improved pain scores
    - Improved grip and wrist extension strength
    - No device related complications
    - Poor control group (6 patients)

Wang, et al. Shock wave therapy for patients with lateral epicondylitis of the elbow. AJSM 2002: 30;422-430.

Shock Wave Therapy

- Haake, et al. JBJS-Am (2002):
  - Randomized, multicenter trial:
  - SWT vs. placebo (272 patients)
    - Roles and Maudsley score; VAS; grip strength
    - Pain relief: 25.8 %(SWT) 25.4% (placebo)

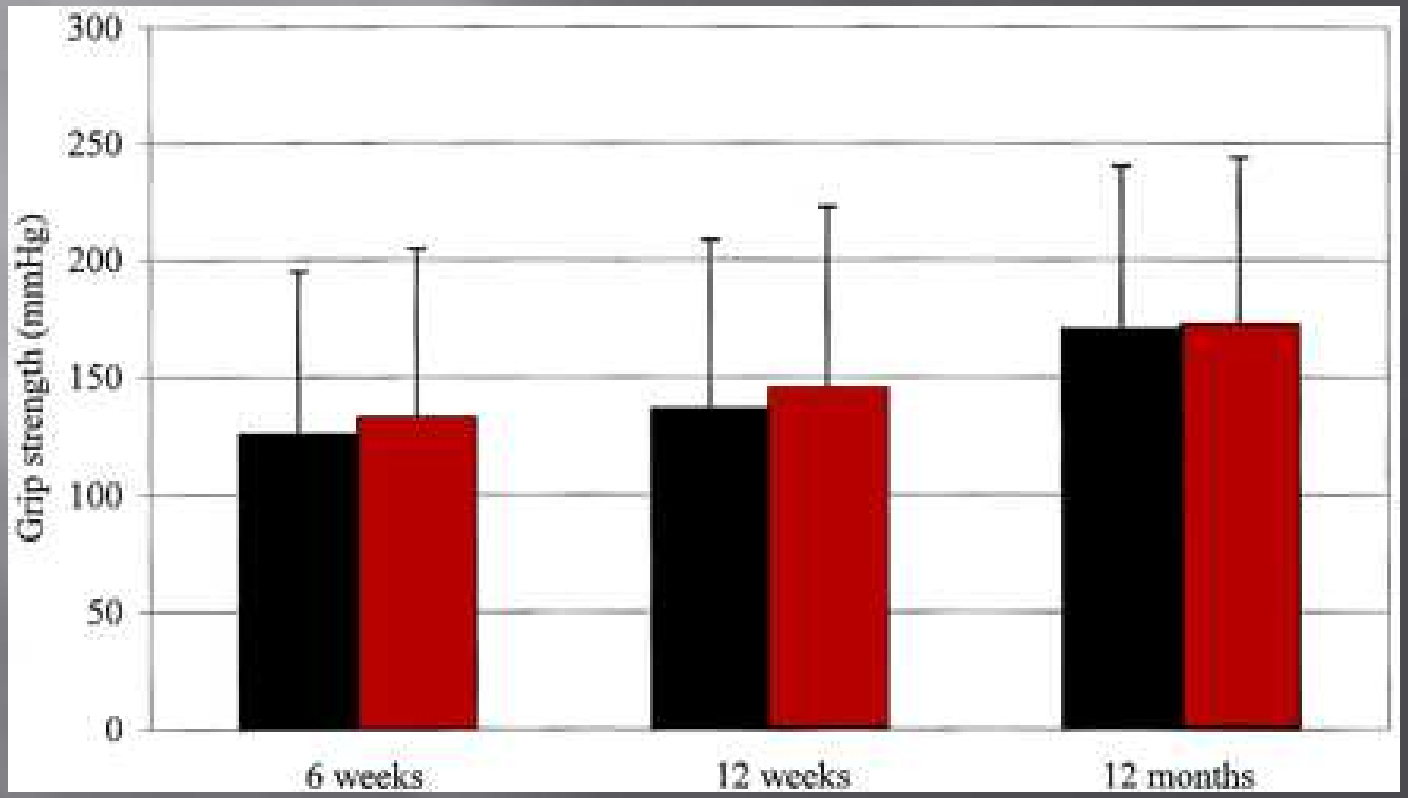
Shock Wave Therapy

- Haake, et al. JBJS-Am (2002):

	SWT	Plac.
Success	32 (25.8%)	31 (25.4%)
Failure		
Total	92 (74.2%)	91 (74.6%)
Due to additional treatment alone	10 (8.1%)	10 (8.2%)
Due to Roles and Maudsley [14] score of 3 or 4 alone	53 (42.7%)	44 (36.1%)
Due to additional treatment and Roles and Maudsley [14] score of 3 or 4	29 (23.4%)	37 (30.3%)
Total	124 (100.0%)	122 (100.0%)

Shock Wave Therapy

- Haake, et al. JBJS-Am (2002):



Surgical Indications

- 5-10% of patients will require surgical management
- Failure of non-operative measures for 6-12 months
- Less waiting time for high level athletes, skilled craftsmen

Surgical Procedures

- Extra-articular procedures that lengthen the ECRB tendon distally (Garden, 1961)
- Extra-articular release of the common extensor origin (Hohmann, 1926)
- Extra-articular excision of the pathologic tendon with reattachment
- Intra-articular excision of the synovial fringe and portion of the orbicular lgt.

Distal Z-lengthening of ECRB

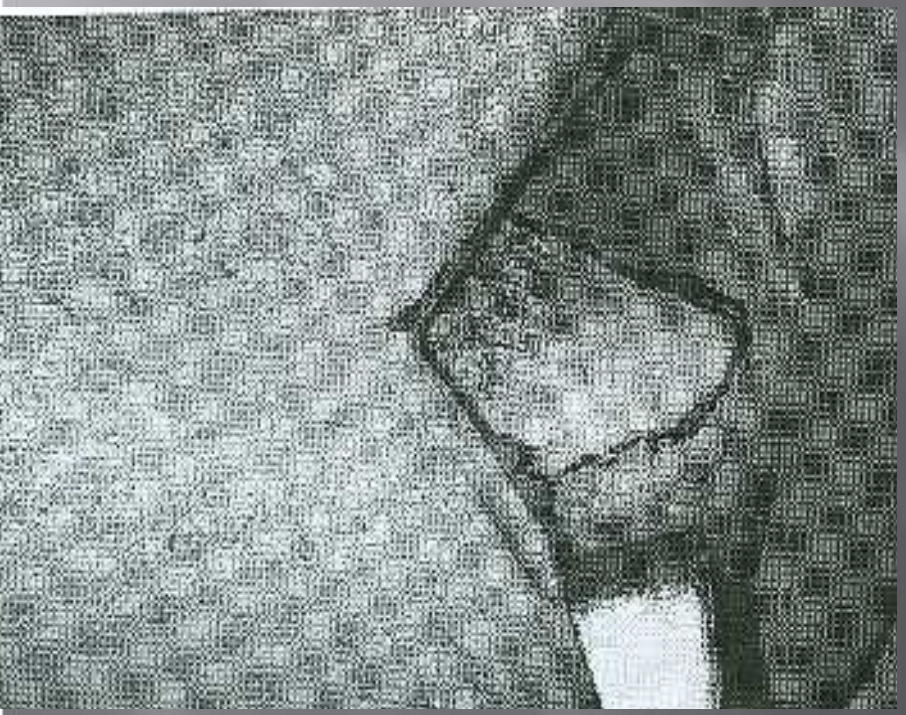
- Proposed by Garden in 1961
  - Goal to reduce tension at origin by lengthening at distal musculotendinous junction
  - Reported 100% success
  - Other studies show 80% recurrence

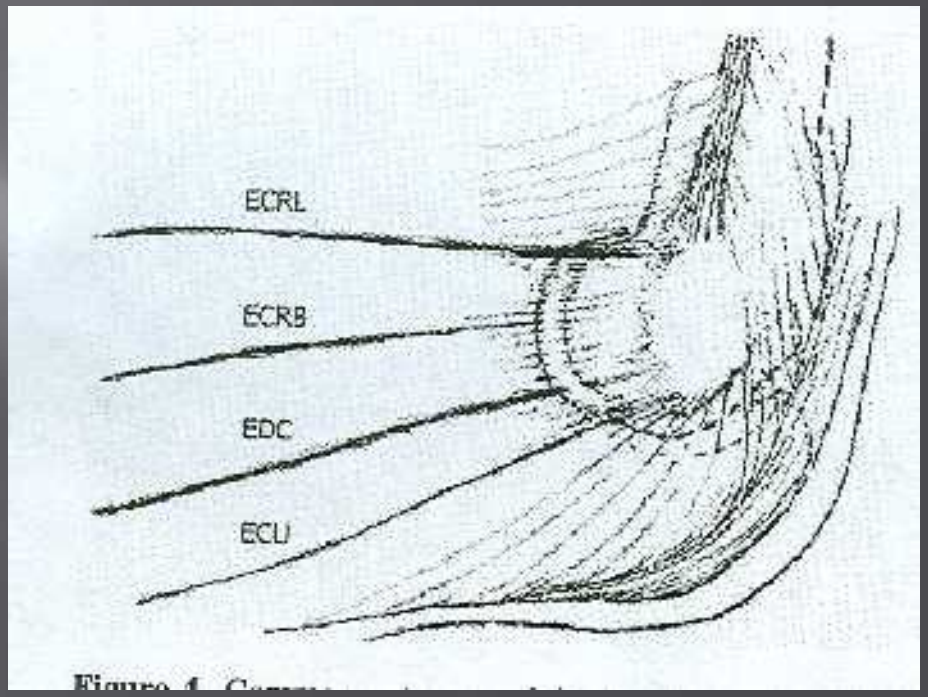
V-Y advancement

- Rayan, et al. *JHS* (2002):
  - 22 patients, 16 followed up at 3 ½ years
  - VAS improved from 9 to 1
  - Grip strength 57 to 99 lbs
  - 95% no limitations with normal activities
  - 32% limited with high demand activities

Rayan, et al. V-Y Slide of the common extensor origin for lateral elbow tendinopathy. JHS 2001; 26A: 1138-45.

V-Y advancement





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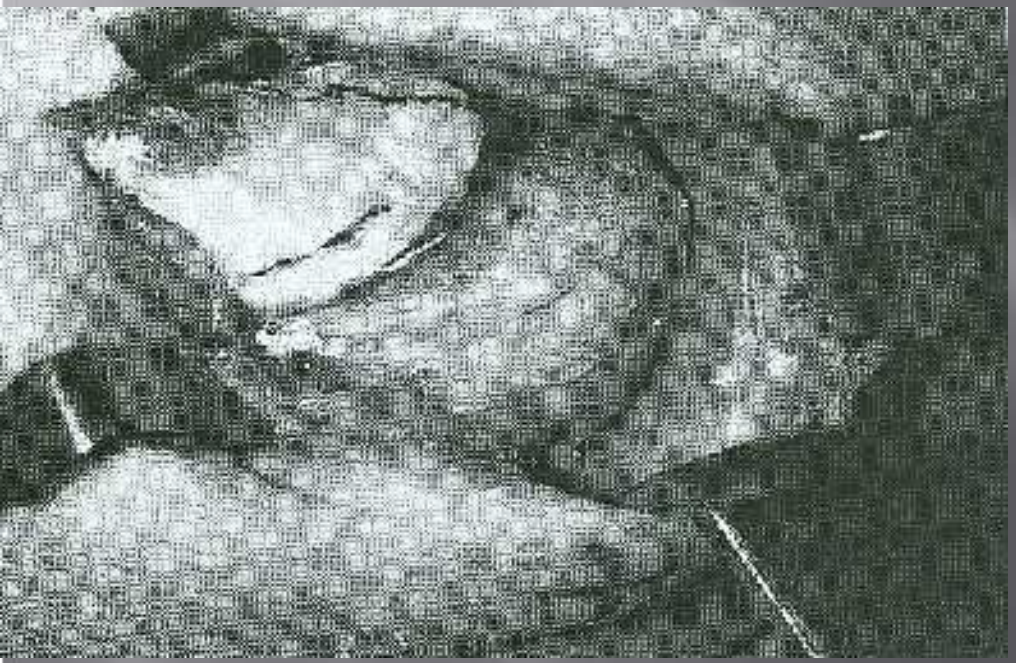

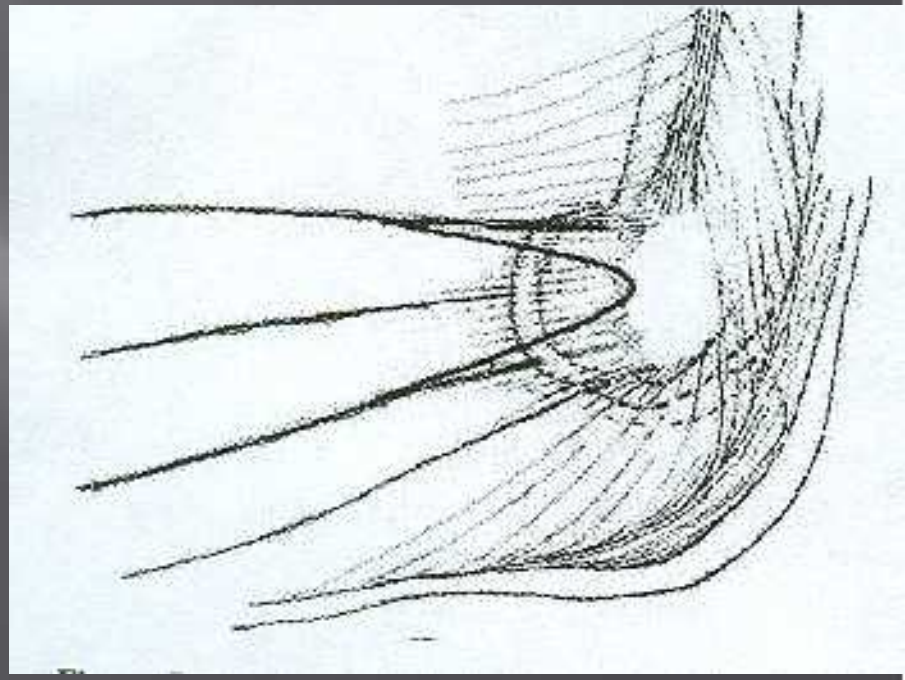

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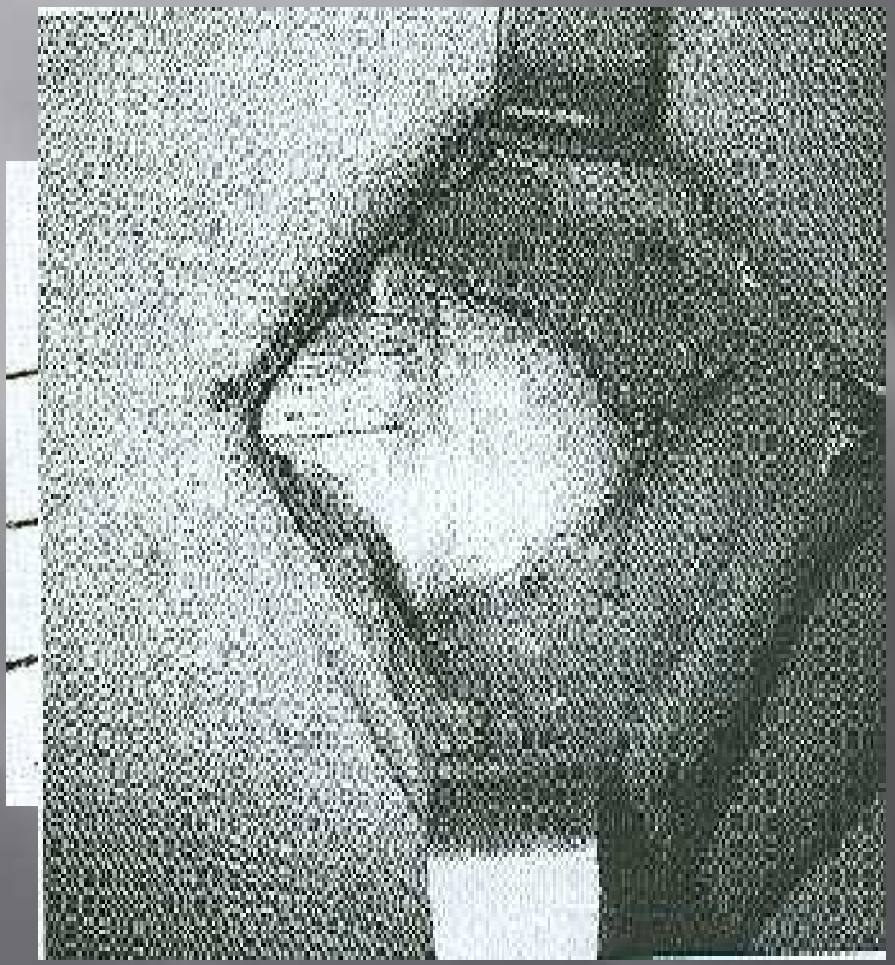
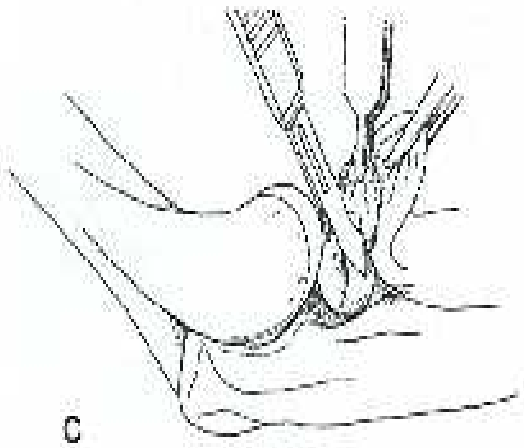
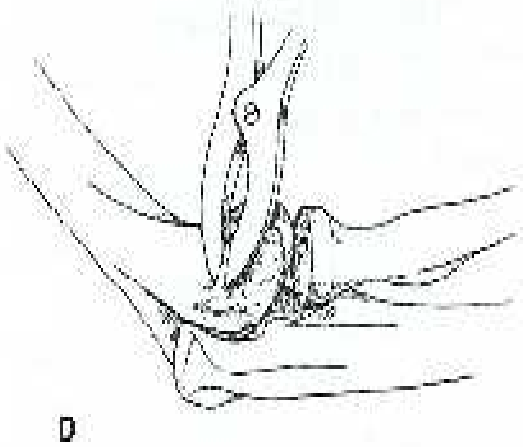
V-Y advancement

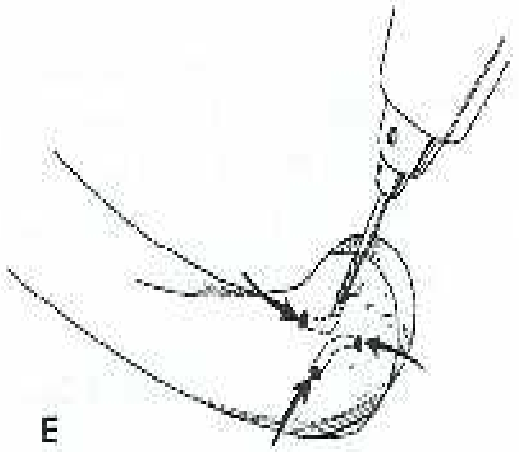


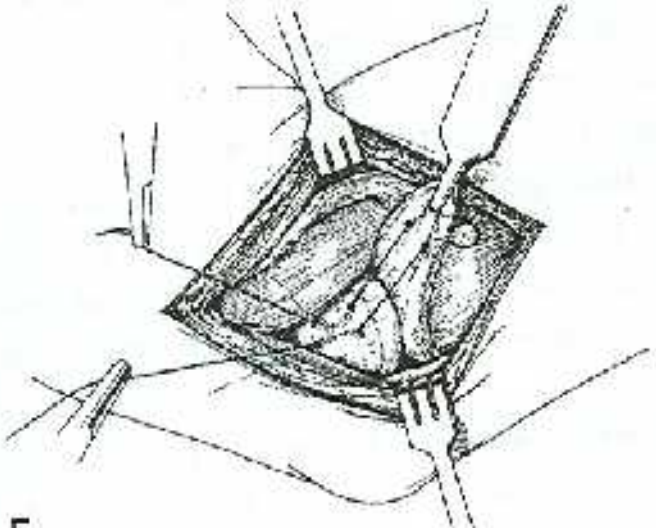
Rayan, et al. V-Y Slide of the common extensor origin for lateral elbow tendinopathy. JHS 2001; 26A: 1138-45.

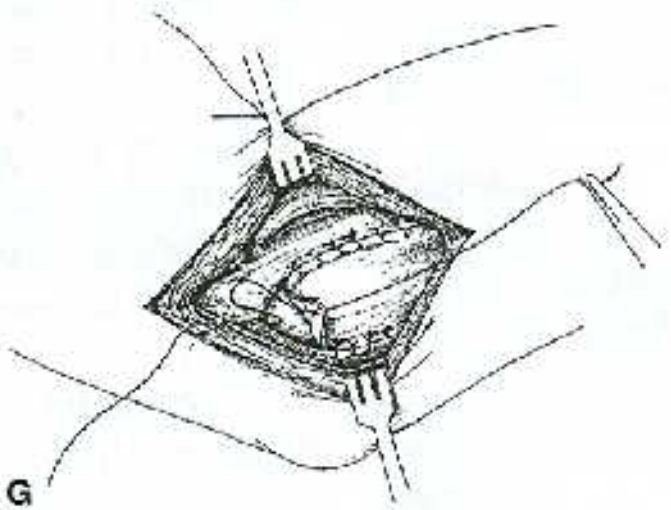
Debridement and Reattachment







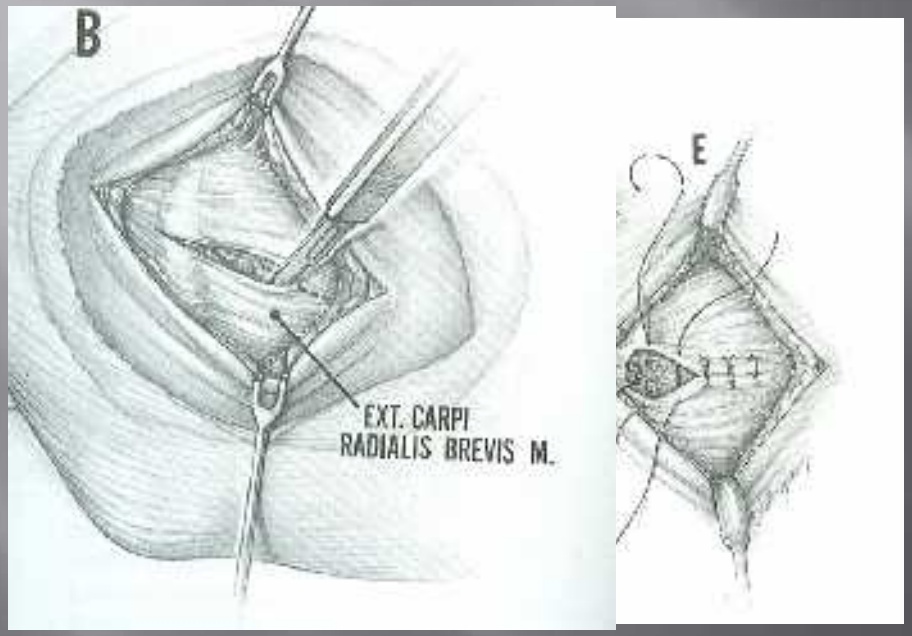




Debridement and Reattachment

- Results (Kerlan-Jobe, 1997):
  - 1200 patients, 60 operative (95%)
  - 94% dramatic improvement 2-10 yrs follow-up
  - 36% with limitations with heavy lifting
  - 15% with grip strength weakness

Debridement



Debridement

- Verhaar, et al. *JBJS* (1993):
  - 57 patients, 5 year follow-up
    - 91% no pain
    - All had improvement compared to 1 year after surgery
    - No association between preoperative findings and outcome were found

Verhaar, et al. Lateral extensor release for tennis elbow: A prospective long-term follow up study. JBJS-Am 1993; 75:1034-43.

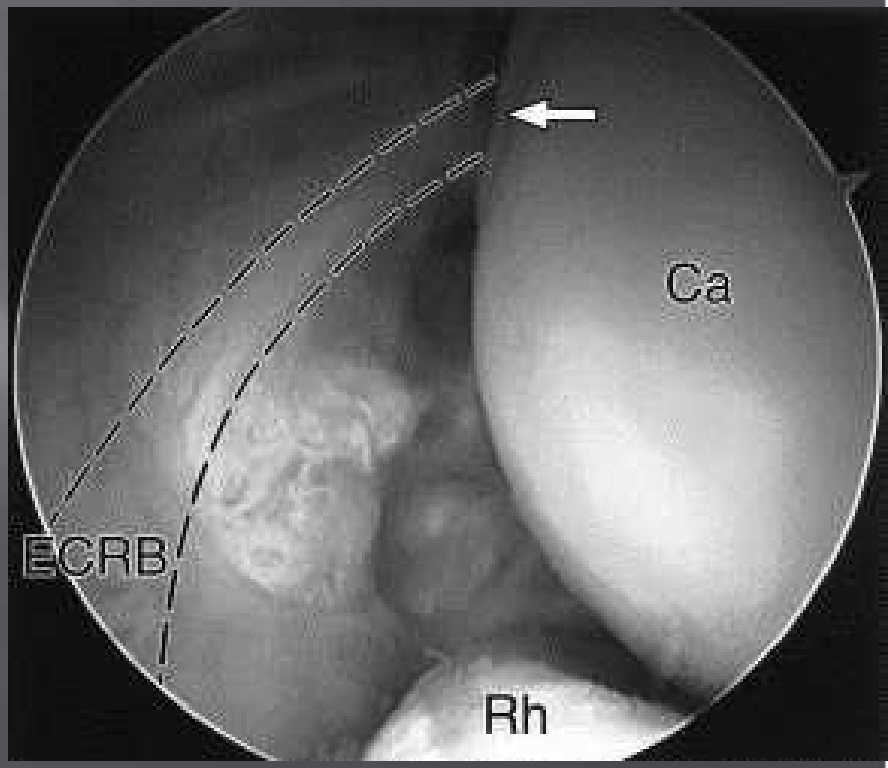
Percutaneous Release

- *JBJS-Br*, (2004):
  - Prospective, randomized trial of 45 patients
    - Significant improvements for patient satisfaction ($p = 0.012$),
    - Time to return to work ($p = 0.0001$),
    - Improvements in DASH score ($p = 0.001$)
    - Improvement in sporting activities ($p = 0.046$)
    - Quicker return to work (3 weeks)

Dunkow, et al. A comparison of open and percutaneous techniques in surgical treatment of tennis elbow. JBJS-Br. 2004. 86:701-4.

Arthroscopic Release

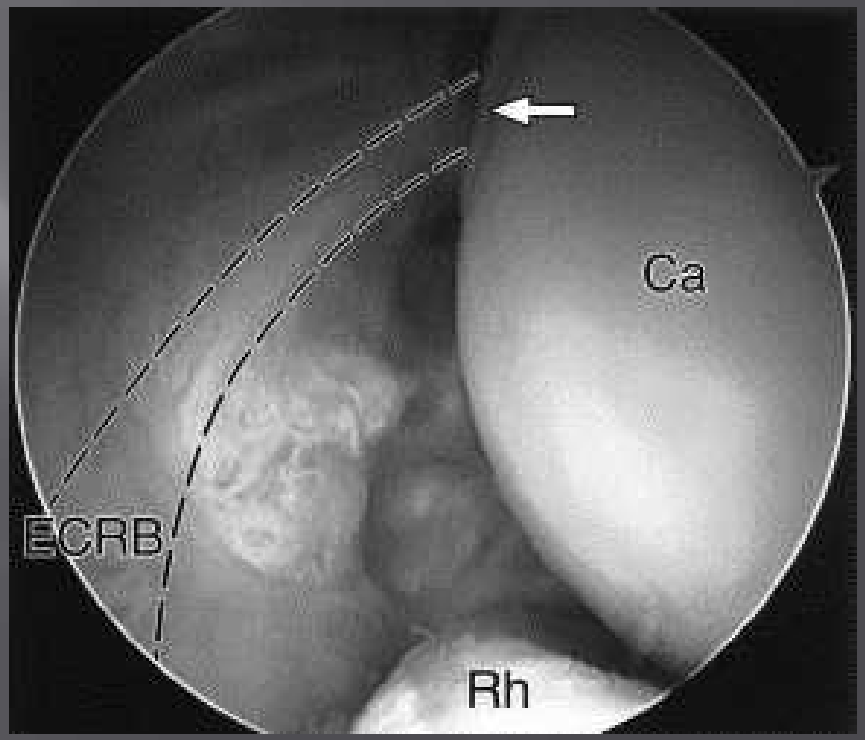
- Baker, et al. JSES (2000):
  - 40 patients, 1 year of pain, 2.8 year follow up
    - Type I lesion (frayed undersurface) 31%
    - Type II lesion (linear tears) 38%
    - Type III lesion (partial/complete avulsion) 33%
  - Average pain 1.4/10
  - Function 11.1/12
  - Return to work 2.2 weeks
  - Grip strength 96% vs. unaffected limb



Baker, et al. Arthroscopic classification and treatment of lateral epicondylitis: two year Results. JSES. 2000;9:475-82.

Arthroscopic Release

- Owens, et al. Arthroscopy (2001):
  - 16 patients, failed conservative management
  - 2 year follow up
    - Type I lesion (frayed undersurface) 31%
    - Type II lesion (linear tears) 38%
    - Type III lesion (partial/complete avulsion) 33%
  - All patients noted improvement in symptoms
  - Avg return to work=6.0 days



Owens, et al. Arthroscopic release for lateral epicondylitis. Arthroscopy. 2001;17;582-7.

Conclusions

- Lateral elbow pain with point tenderness
- Angiofibroblastic dysplasia
- 95% success with conservative treatment
- 90% success with surgical treatments with patients failing conservative treatment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