IC18: Elbow Arthroscopy is Actually REALLY Useful...How to Get There (Safely)

Moderator: Michael R. Hausman, MD

Faculty: Mark E. Baratz, MD and Rick F. Papandrea, MD

Session Handouts

77TH ANNUAL MEETING OF THE ASSH
SEPTEMBER 29 – OCTOBER 1, 202

822 West Washington Blvd
Chicago, IL 60607
Phone: (312) 880-1900
Web: www.assh.org
Email: meetings@assh.org

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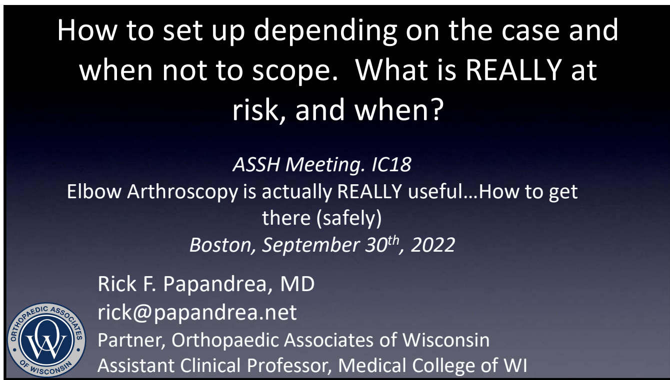

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Kelly, E. W., et al. (2001). "Complications of elbow arthroscopy." JBJS

- retrospective review of 473 consecutive elbow arthroscopies performed in 449 patients over an eighteen-year period was conducted
- osteoarthritis (150 cases), loose bodies (112), and rheumatoid or inflammatory arthritis (seventy-five).
- serious complication (a joint space infection) occurred after four (0.8%) of the arthroscopic procedures.
- Minor complications occurred after fifty (11%) of the arthroscopic procedures. These complications included prolonged drainage from or superficial infection at a portal site after thirty-three procedures, persistent minor contracture of 20 degrees or less after seven, and **twelve transient nerve palsies** (five ulnar palsies, four superficial radial palsies, one posterior interosseous palsy, one medial antebrachial cutaneous palsy, and one anterior interosseous palsy) in ten patients.
- There were no permanent neurovascular injuries, hematomas, or compartment syndromes in our series, and all of the minor complications, except for the minor contractures, resolved without sequelae.

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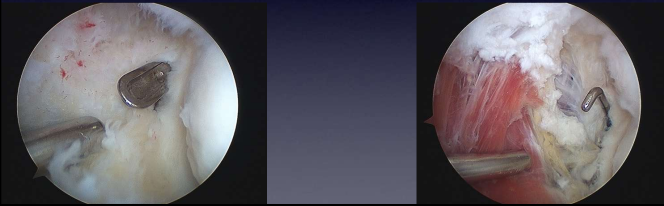
Visualization should exceed open



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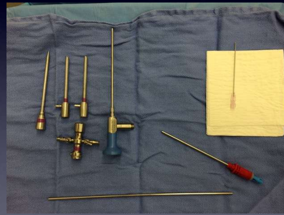
Fixed set up

4mm, 30 degree scope
Switching sticks (3)

Positioner



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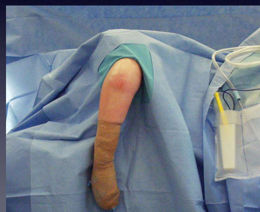
Requirements

Understanding some diff's
- Working both side of joint
  - Not b/t joint(s)
- Retractors
- Multiple portals

Proper set up
- low flow/fluid mgmt
- access
- Fluoroscopy (PRN)

Special equipment
- Variable wire guide
- Angled/ring currettes
- Chondral and dental picks

I use Lateral decubitus position
Use what works well for you
- prone
- Supine – arm holder



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Control swelling

dedicated 30deg, no fenestrations

7

Arthroscopic Set up

Access from either side must be open
Mark the ulnar nerve

* “the head is by the head”

Elbow must project away from torso
to allow for flexion, key for OCD lesion

8

Failure to execute may start with position/prep

I use Lateral decubitus position
Use what works well for you

- prone
- Supine – arm holder

Antecubital fossa
Needs clearance

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Supine with static elbow holder

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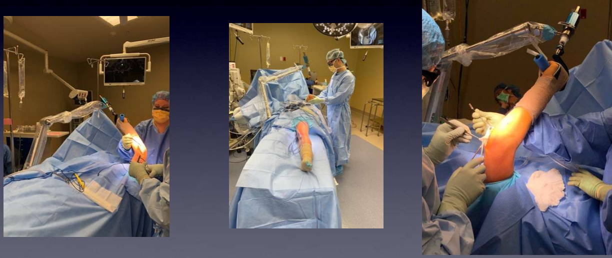
Supine with adjustable positioner

may be better if opening (OCD capitellum)



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A 4mm scope will still work for pediatric patients

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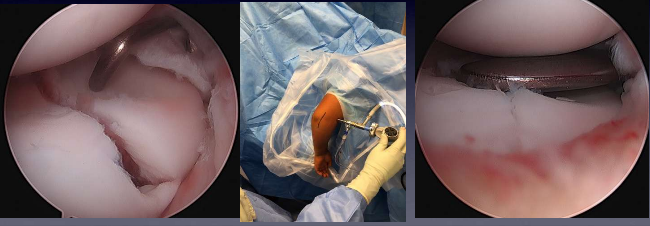
A 4mm scope will still work for pediatric patients



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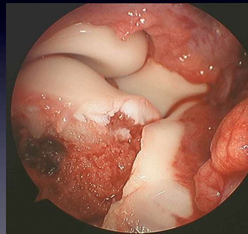
Control Swelling with set up

- Know your pump
  - Consider gravity
  - Keep it low
- Can go dry
- Coban distal
- Tourniquet proximal



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Control Swelling with set up

- Know your pump
  - Consider gravity
  - Keep pressure low (20-30)
- Can go dry
- Coban distal
- Tourniquet proximal

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Portals

- Anterior
  - Medial/lateral
    - Proximal/distal
- Midlateral (soft spot)
- Posterior
  - Multiple

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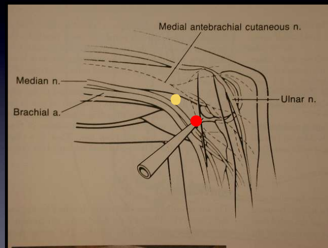
Portals

- Anterior
  - Medial/lateral
    - Proximal/distal

One option is to start

Proximal/medial

Skin only, protect cutaneous nerves



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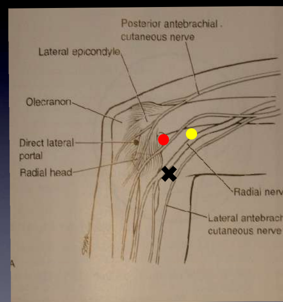
Portals

- Anterior
  - Medial/lateral
    - Proximal/distal

Do not go distal to RC joint ✖



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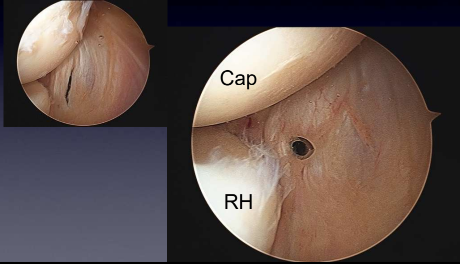
Low (distal) Anterolaterl portal



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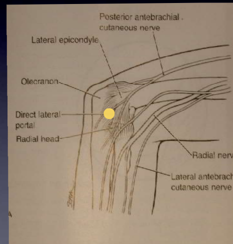
Portals

- Midlateral (soft spot)

Remember, the scope won’t “enter” the joint



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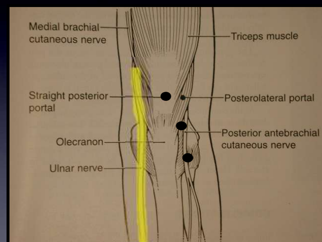
Portals

- Posterior
  - Multiple



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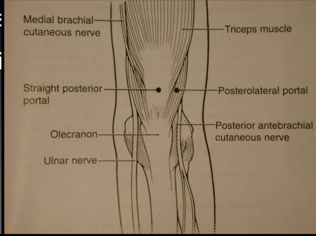
Portals

- Posterior Portals
  - At risk: nothi[ng] medial!



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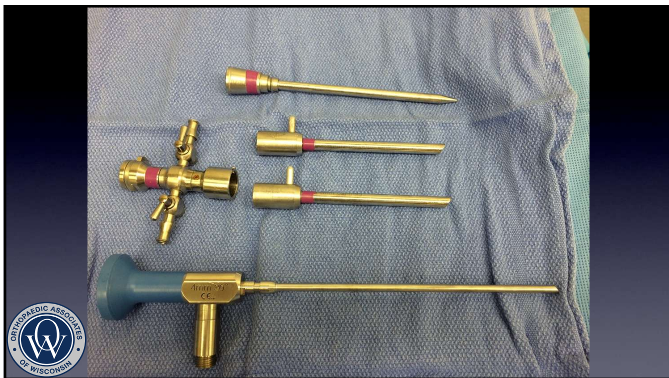

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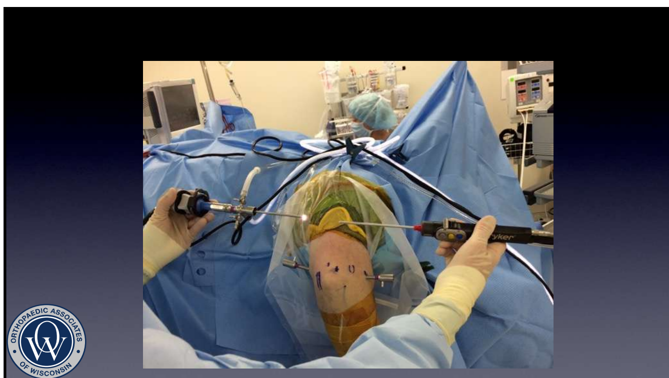

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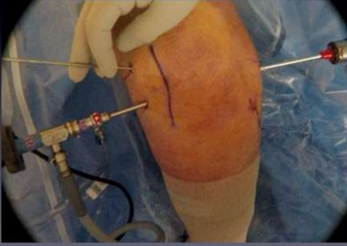
Portal Salvage (O'Driscoll)



A bigger arm may not do well with cannulas

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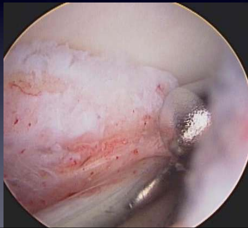
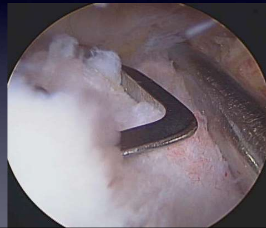
Avoid injury

- You must see what you are cutting
- Retractors can be indispensable





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Know your anatomy

- Nerves have been will continue to be cut...
  - Haapaniemi, T., M. Berggren, et al. (1999). "Complete transection of the median and radial nerves during arthroscopic release of post-traumatic elbow contracture." Arthroscopy 15(7): 784-7.
- Expose Ulnar nerve PRN

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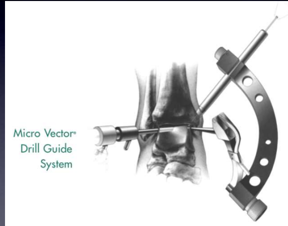
Wire guides are helpful

- ACL guides
  - single plane
- Variable angle guides
  - more flexible in elbow
  - Designed for ankle
    - 0 or 2mm offset



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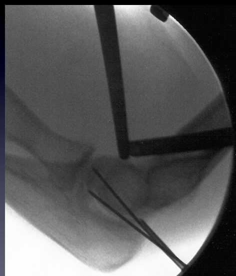
- Image guided wires
- cannulated variable pitch screws for compression



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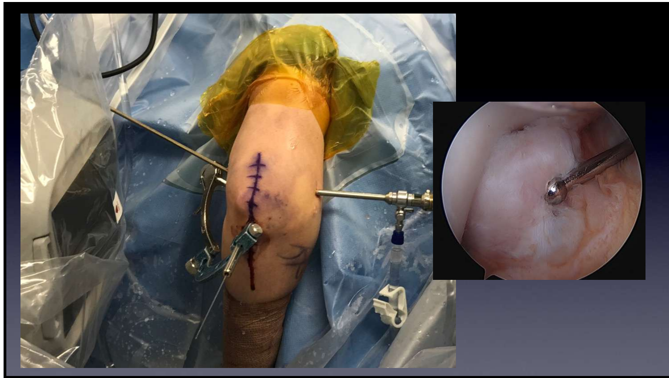

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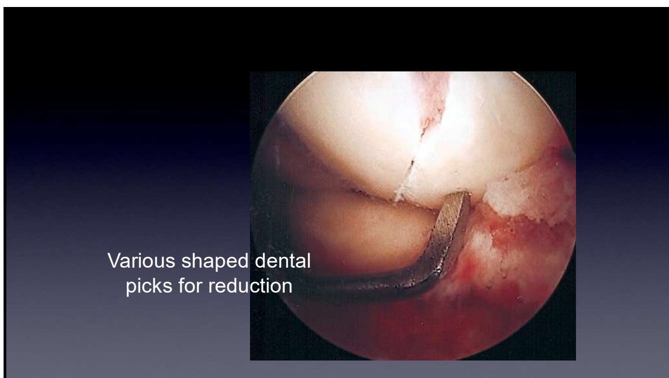

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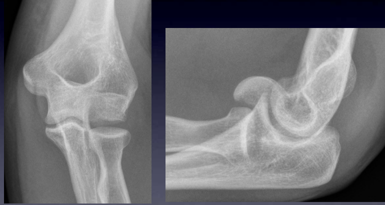
My start:
Displaced Capitellar fracture
Instruments – switch stick



Failed closed reduction

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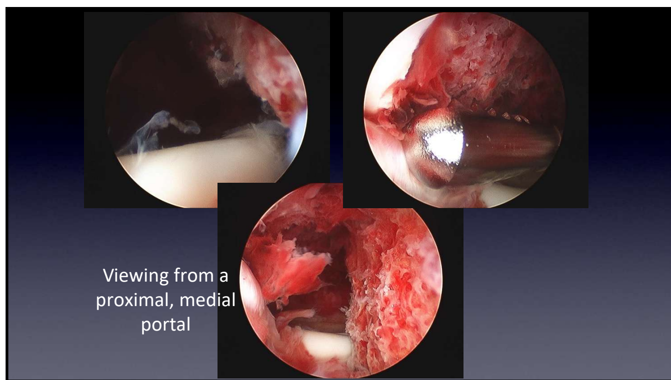

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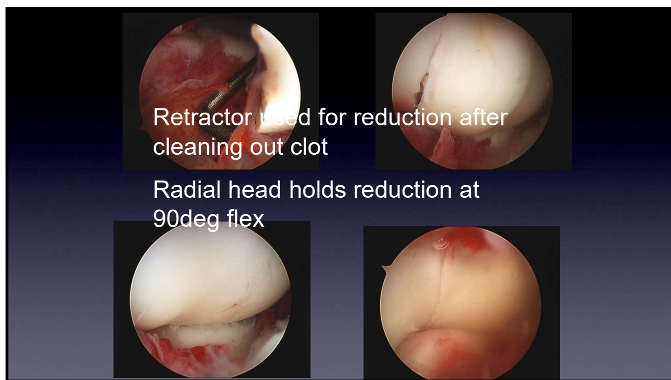

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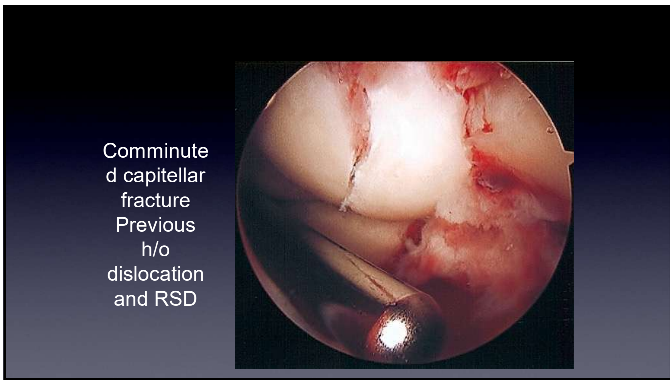

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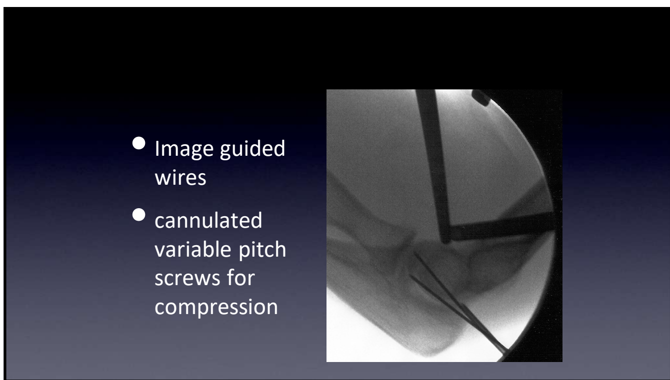

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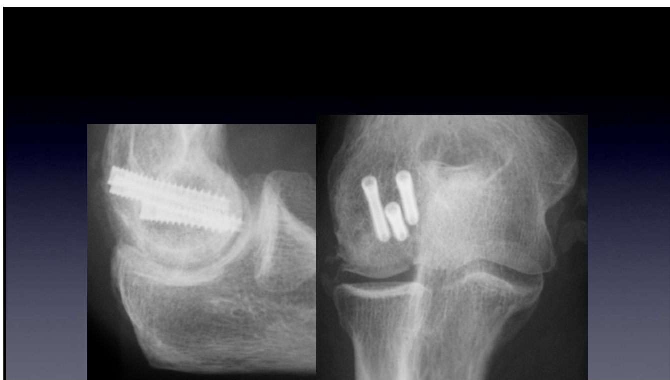

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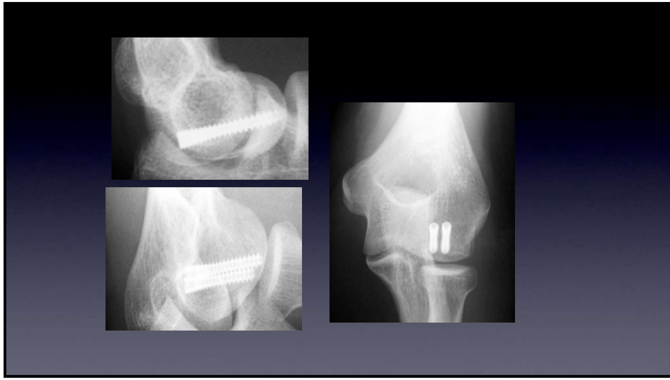

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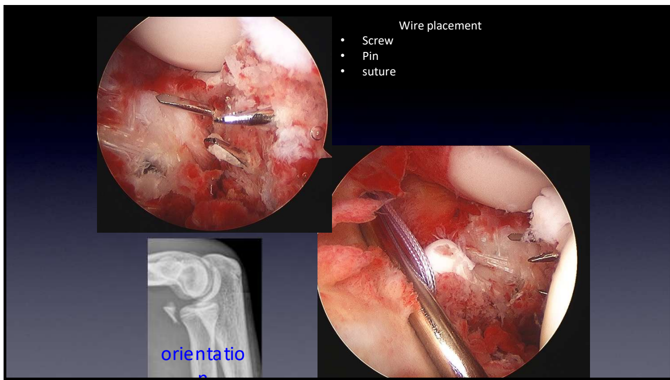

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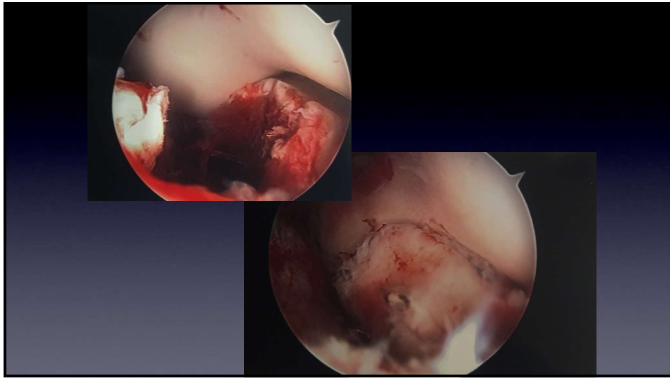

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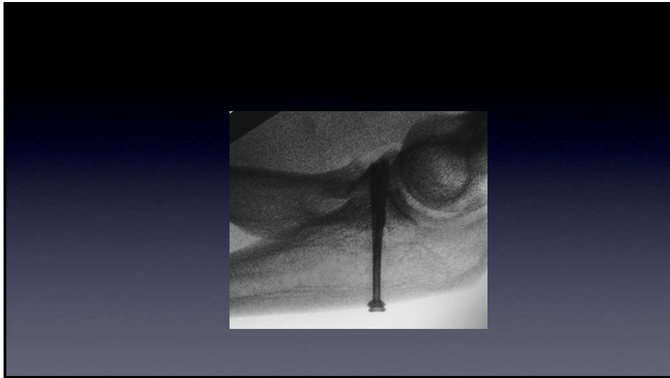

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Rules

- Choose the right procedure, ensure you know how to do it
- Get the job done with as little collateral damage as possible
- Know your anatomy
- Get adequate exposure/visualization
- Have a back up plan

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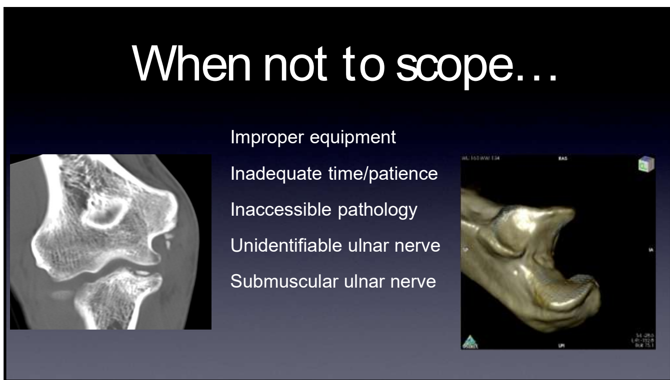

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Choose the right procedure

- Practice (lab)
- Observe an experienced surgeon
- Know your limitations
  - Start small
- Decide if anything else needs to be done

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Staying/getting out of Trouble

- Recognize
- Reorganize
  - Retractors
  - Salvage or use add'l portals
- Scope only one compartment
  - Open the rest
- Convert to open
- Plan to battle another day (MacArthur)

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Thank you

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Staying Out of Trouble
with Elbow Arthroscopy

Mark Baratz
University of Pittsburgh Medical Center

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Disclosures

- Integra: Royalties. Speaker's Bureau
- Past-President AAHS
- Board AFSH

None relevant to the content of this talk

2

The Problem…

- Risk of major nerve injury
  - Survey of ASSH members
    - Injuries observed over 5 year period
    - 372 responses
    - 222 nerve injuries
    - 50% required operative intervention

Desai et al. Arthroscopy 2016

3

All Radial and Ulnar Nerves

4

How do we avoid?

- Selection
- Pre-op exam
- Technique
- Exam prior to post-op block
- Explore if you're not sure

5

Selection: Tough Cases

- Post-trauma
- Transposed ulnar nerve
- Inflammatory arthritis
- Obesity
- Short brachium

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Think open surgery for:

- > 1 prior ulnar nerve decompression
- Elbow dislocation with disruption of anterior capsule

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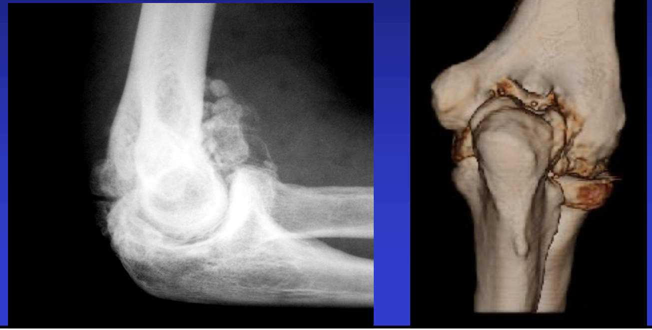
Anticipating problem areas



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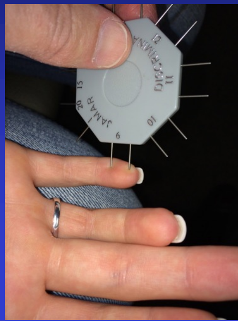
Ulnar nerve?

- Pre-op
  - Tinel's
  - Elbow flexion test
  - Two-point



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7 Pearls

- *Good positioning*
- *Safe portal placement*
- Retractors

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Pearls

- *Arthroscopic calisthenics*
- Shavers point away from trouble
- If in doubt, expose ulnar nerve to protect

Open if you're lost

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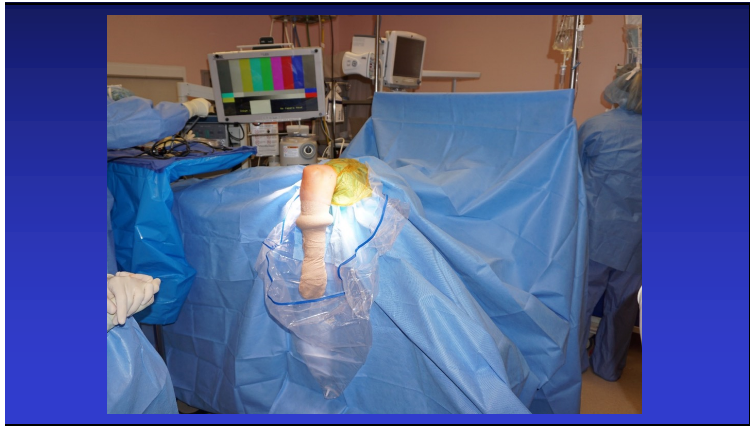

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Inflow pressure @ 35 mm

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Ulnar nerve decompression For:

- The 3 Ss
  - Symptoms
  - Subluxation
  - Stiffness (Loss of elbow flexion 100 degrees or less)

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Ulnar nerve exploration

For previously transposed nerve

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Lateral Starting Portal

Cheat anterior
Aim posterior

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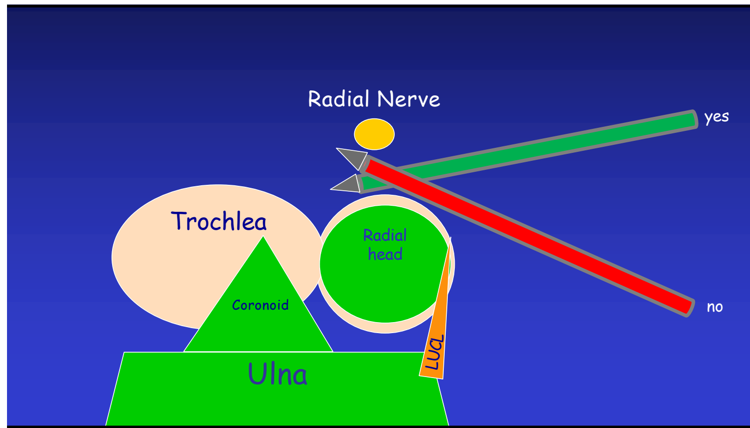

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Portal Placement

- Feel
- Needle
- Knife
- Hemostat
- Instrument

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Understand location PIN

21

Create anterolateral retractor portal

22

Arthroscopic Calisthenics

23

Safe steps: Anterior Compartment

- Shaver (no suction)
- Strip capsule to expand view
- Remove Loose Bodies
- Burr Osteophytes
- Capsulotomy

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Establish Posterior Portals

- Posterolateral starting portal
- Trans-triceps working portal
- Optional Posterolateral retractor portal
- Direct shaver away from medial side.
- Soft-spot portal for posterolateral gutter
- Optional

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Posterolateral Gutter

- The Baratz Cheat: Switching stick
- Soft-spot portal
- Distal ulnar portal

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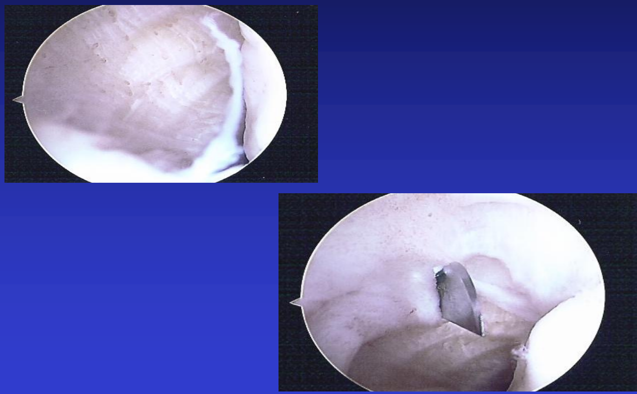

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Exam as soon as awake

And prior to post-op block

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Nerve Out?

If you're not sure, explore

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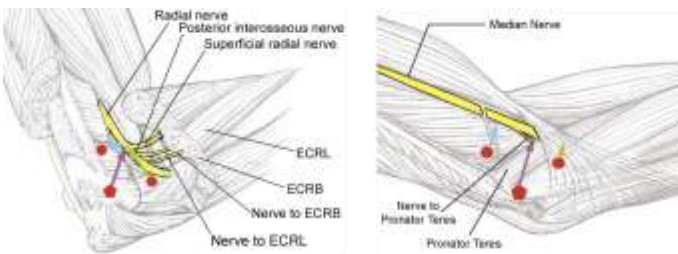
IC 18
ASSH 2022

Portals to Better, Safer Elbow Arthroscopy
IC 18

Michael Hausman, M.D.
Mount Sinai
New York City

POSITION:
Supine
Lateral decubitous
Prone

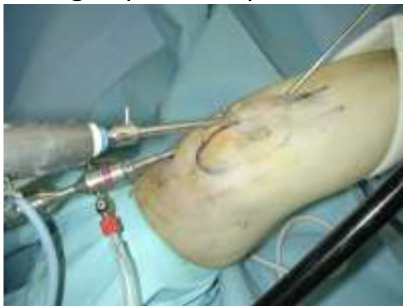
Standard portals:



POSTERIOR
Transtriceps
Distal posterolateral
Proximal posterolateral
Posterior radiocapitellar (“soft spot”

ANTERIOR
Proximal anteromedial
Distal anteromedial
Proximal posterolateral
Distal posterolateral (anterior radiocapitellar)

SPECIALTY PORTALS
Distal paraulnar
Enlarged proximal paraulnar



Portal difficulty and danger determinants:
Deformity (anterior heterotopic bone or malunion)
Capsular fibrosis
Nerve transposition
“tight” joint
Incision placement (proximal anteromedial portal grequently placed too posterior and instruments are directed anteriorly, which is dangerous, rather than making the incision more enterior and directing the trocar posteriorlyh into the coronoid fossa

THE IMPENETRABLE JOINT
Outside-in access

APPROPRIATE INSTRUMENTATION

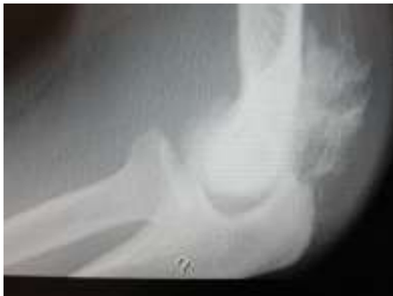
Variety of trocar tips
Use of a bridge system
Allows insertion of trocar only, followed by cannula; minimizes resistance and risk of pushing capsule off tip of trocar
Oblique cannula tip
No side fenestrations
Delay for fracture cases

ONCE YOU HAVE A GOOD PORTAL, DON'T GIVE IT UP (especially proximal anteromedial or anterolateral portals)

Recognize that change in flexion/extension will cause loss of alignment of portal trajectory through different layers

LOW INFLOW PRESSURES (<30 mm)

APPROPRIATE INDICATIONS:


don't even think of it…

NERVE INJURY: it happens and it has happened to all nerves
Kelly (2001) serious compl 4/473 (0.8%, minor compl in 50 (11%), no permanent neurovasc injuries transient median n (2)
Kim, Ascopy, 1995)

radial n (Park, Savoie, Ascopy, 1993)
radial and median xsection (Haapaniemmi, Ascopy, 1995)

HETEROTOPIC OSSIFICATION
Unpredictable
No truly effective prophyllaxis (including radiation)

INFECTION
#1 complication
TIGHT portal closure (no leakage)

ORDER OF PROCEDURE
Variable according to author
My preference:

1) Trans-triceps
2) Distal posterolateral
3) Debride olecranon fossa
4) Move distal, elbow partially extended, to find olecranon tip
5) Debride along olecranon down lateral gutter
6) Now, the dangerous part…arthroscope in distal posterolateral portal, SMALL shaver (3.5mm) debriding along medial olecranon; blade ALWAYS facing laterally, no suction
7) Arthroscope down lateral gutter from a posterior portal, make "soft spot" portal and debride radiocapitellar joint
8) Now, anterior. Variable preference for medial or lateral first. Placement of the anterolateral portal is critical to be able to access the coronoid, etc. so I place proximal anteromedial portal first
9) Incision anterior…always direct trocar posterior. If you can't, you've made your incision too posterior, so make another incision
10) Use "needle and knife" technique to precisely localize and make proximal anterolateral portal

Andelman SM, Walsh AL, Sochol KM, Rubenstein WM, Hausman MR. Arthroscopic Elbow Contracture Release in the Pediatric Patient. J Pediatr Orthop. 2018 Jun 30. Epub ahead of print PMID 29965934

Andelman SM, Meier KM, Walsh AL, Kim JH, Hausman MR.
Pediatric elbow arthroscopy: indications and safety. J Shoulder Elbow Surg. 2017 Oct;26(10):1862-1866.

Koehler, S , Walsh, A, Lovy, A, Pruzansky, J, Shukla, D, Hausman, M; Outcomes of Arthroscopic Treatment of Osteochondritis Dissecans of the Capitellum and Description of the Technique; J Shoulder Elbow Surg. 2015 Oct;24(10):1607-12

Koehler, S, Hausman, M.; Arthroscopic Correction of a Supracondylar Malunion in a Child; Arthroscopy Techniques, 4(3):e215-21, 2015

Hausman MR, Klug RA, Qureshi S, Goldstein R, Parsons BO.; Arthroscopically-Assisted coronoid fracture fixation: a preliminary report.; Clin Orthop Relat Res.;466(12):3147-52, 2008

Hausman, M.R., Quereshi, S., Goldstein, R., Radomisli, T.; Arthroscopically-Assisted treatment of pediatric lateral condyle fractures; J. Ped. Ortho., 27:739-42, 2007

Previous ulnar nerve transposition is an absolute contraindication to elbow arthroscopy.

1) True
2) False

Ans. False

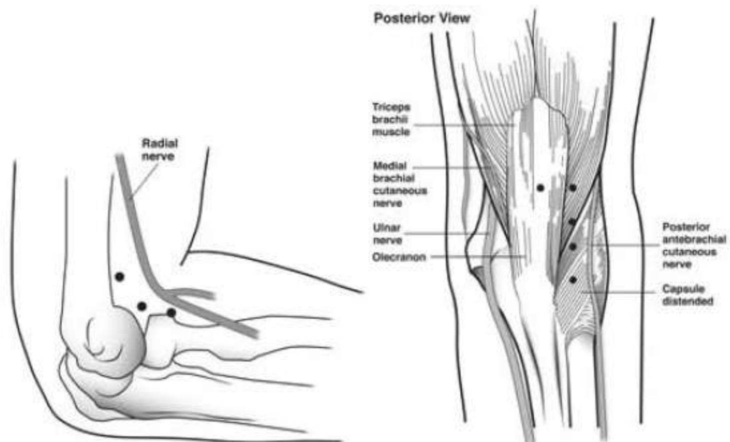
Previous submuscular transposition is considered an absolute contraindication unless all work can be done from the lateral side. Previous subcutaneous anterior transposition is considered a relative contraindication. IF the nerve can be clearly and unmistakably identified, palpated and imaged, it may be safe to create an anteromedial portal. Alternatively, the nerve can be dissected, identified and protected. One must be careful not to crush the nerve with foreful manipulation of the arthroscope or instruments.

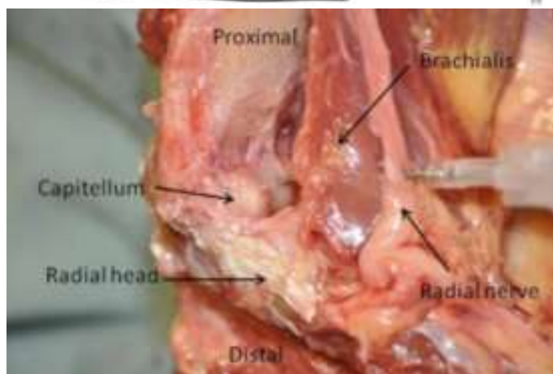
The most common complication of elbow arthroscopy is:

1) Ulnar nerve injury
2) Radial nerve injury
3) Heterotopic ossification
4) Persistent drainage and infection

Ans. 4 Persistent drainage from the distal posterolateral portal.

This portal can be problematic because


Radial nerve
Posterior View
Triceps brachii muscle
Medial brachial cutaneous nerve
Ulnar nerve
Olecranon
Posterior antebrachial cutaneous nerve
Capsule distended


Proximal
Brachialis
Capitellum
Radial head
Radial nerve
Distal