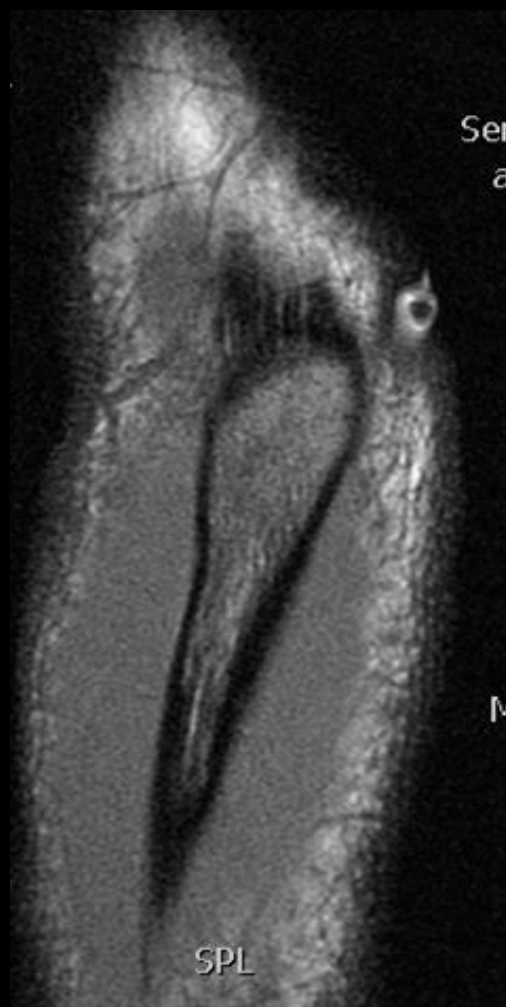


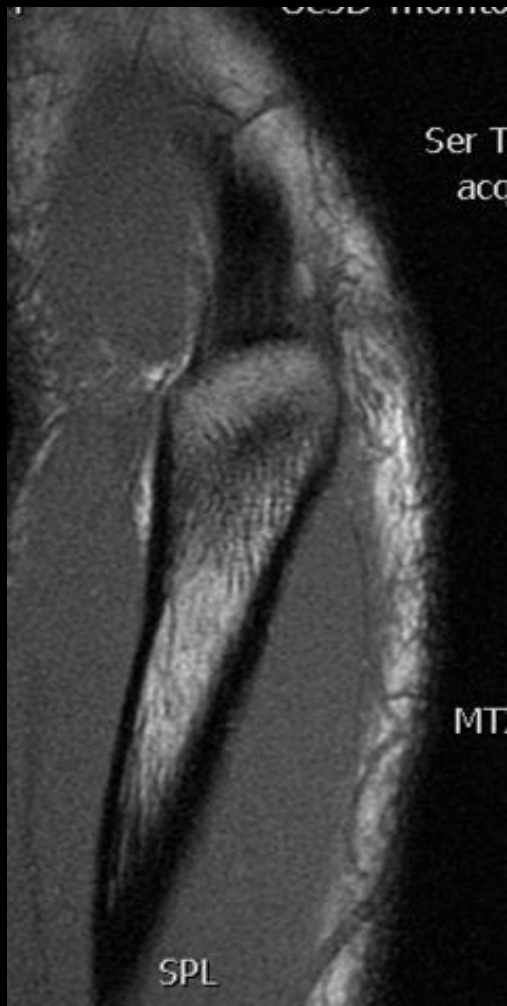


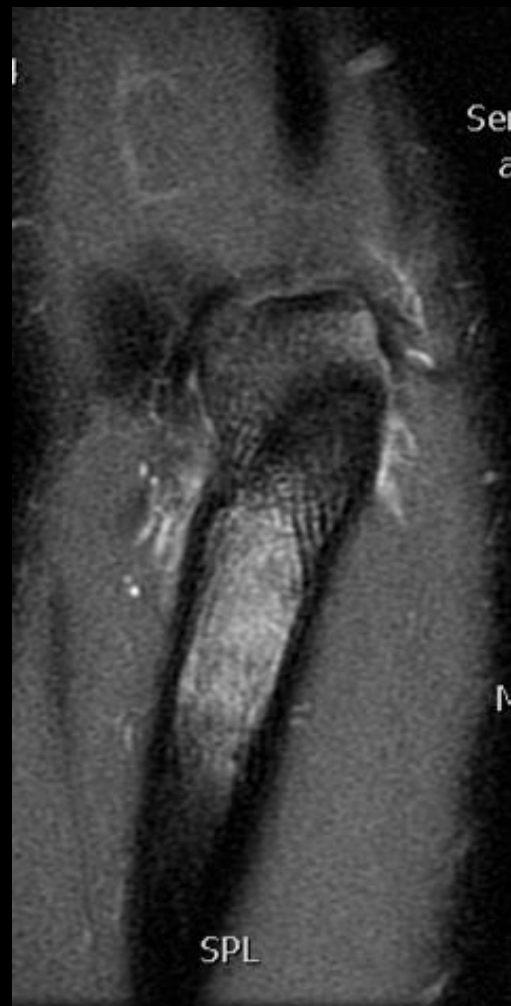
17 year old male with 2-3 months of
right elbow pain, clicking, and
weakness

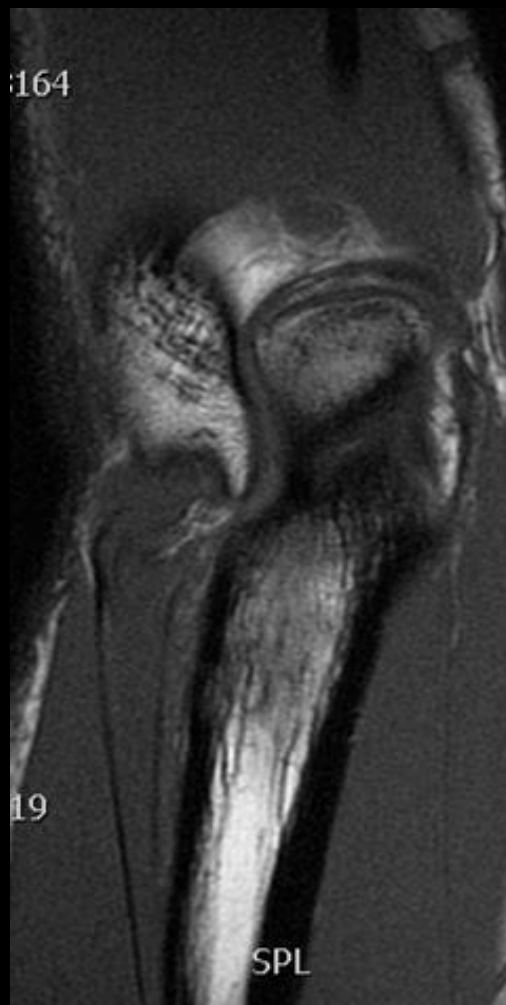
Jeremy Grubin











017Y M

UCSD Thornton MRI-

MD

68164

10/31

Ser Time:17

acq tm:17

5:30

MTX:0 384

SLP

UNC





017Y M

UCSD

Thornton MRI-

MD

68164

10/31

Ser Time:17

acq tm:17

5:30

MTX:0 384

SLP

UNC



017YM

UCSD Thornton MRI-

MD

68164

10/31

Ser Time:16

acq tm:17

7:44

MTX:0 384

SLP

UNC



017Y M

UCSD Thornton MRI-

MD

68164

10/31

Ser Time:17

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UNC

017Y M

UCSD Thornton MRI-

MD

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10/31

Ser Time:17

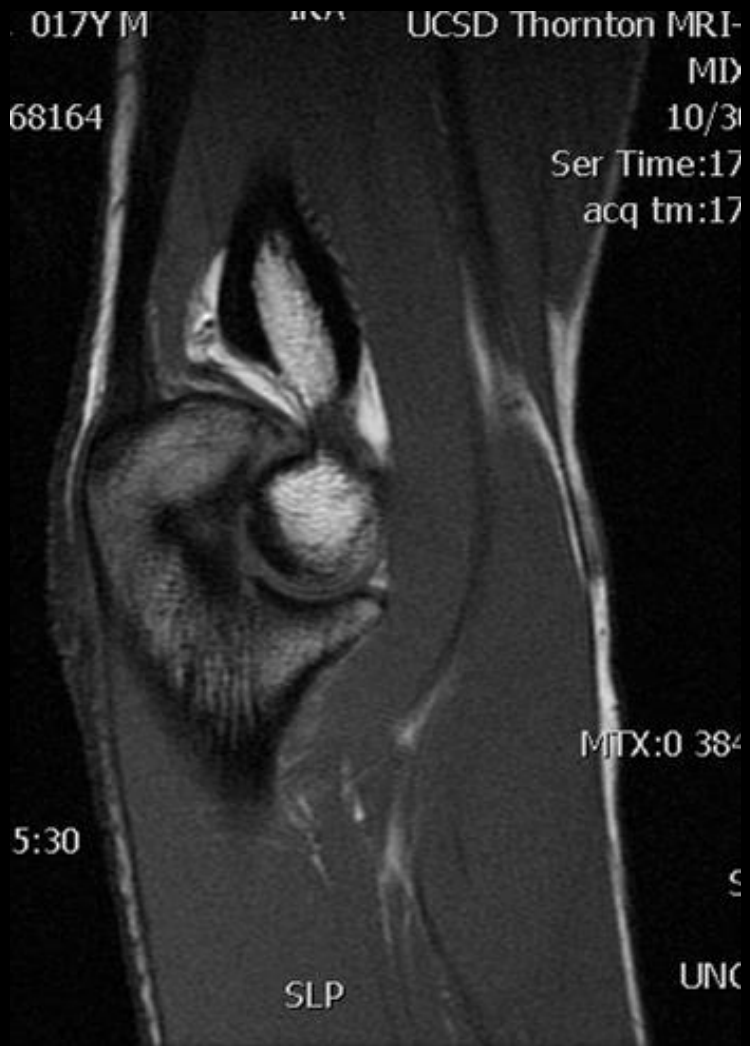
acq tm:17

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MTX:0 384

SLP

UNC





017Y M

UCSD Thornton MRI-

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10/31

Ser Time:17

acq tm:17

MTX:0 384

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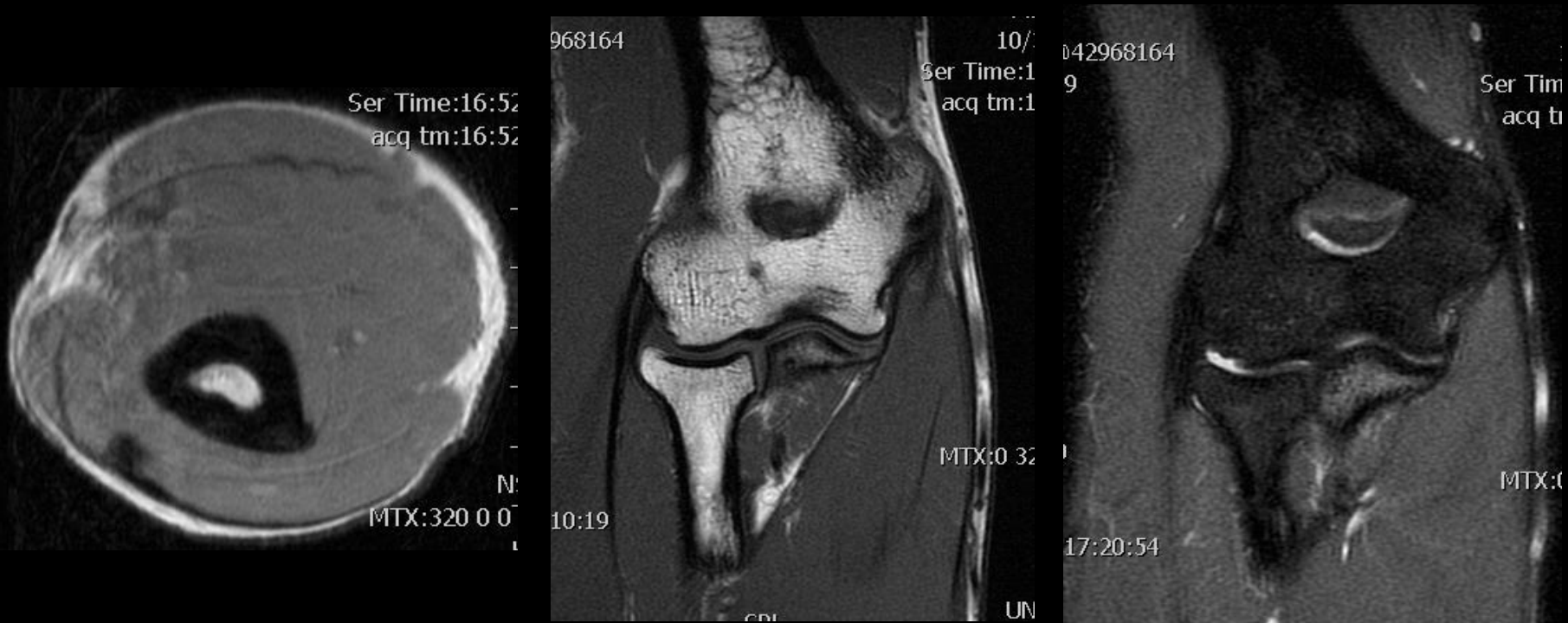
Olecranon stress fracture

- Incomplete, oblique, non-displaced
- Deep aspect of olecranon at trochlear groove



Other findings

- Diffuse cortical thickening of distal humeral shaft
- Minimal thickening of the anterior band of the medial collateral ligament



More history

- HS senior baseball pitcher
- Felt fatigue in arm at first
- Began feeling pain and clicking
- TTP at triceps tendon insertion, posterior olecranon



Olecranon stress fracture

- Occur predominantly in throwing and overhead athletes
- Fourth most common location in athletes (case series, n=196)

Table 4. Stress fracture sites

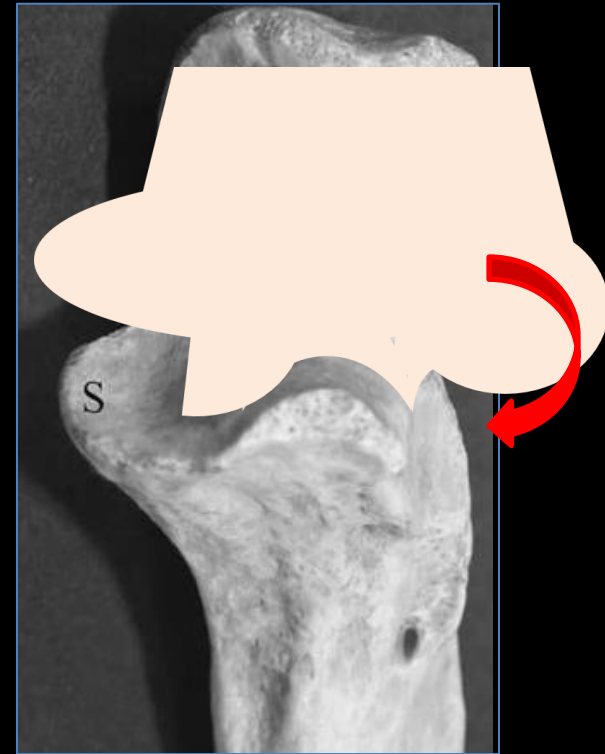
Fracture site	No.	%	M/F
Tibial shaft	79	40.3	48/31
Rib	31	15.8	28/3
Metatarsal bone	19	9.7	9/10
Ulnar olecranon	16	8.2	15/1
Pubic bone	11	5.6	4/7
Fibular shaft	9	4.6	5/4
Tibial medial malleolus	8	4.1	4/4
Big toe sesamoid	6	3.1	2/4
Others	17	8.7	10/7
Total	196	100	125/71

Table 5. Proportion of stress fracture sites for each sporting activity

Activity	Tibial shaft	Rib	Metatarsal bone	Ulnar olecranon	Pubic bone	Tibial malleolus	Big toe sesamoid	Others
Basketball (<i>n</i> = 44)	47.7	2.3	18.2	2.3	0	15.9	9.1	4.5
Baseball (<i>n</i> = 24)	16.7	25.0	0	58.3	0	0	0	0
Track and field (<i>n</i> = 20)	25.0	0	10.0	0	35.0	0	0	30.0
Rowing (<i>n</i> = 17)	0	88.2	5.9	0	0	0	0	5.9
Aerobics (<i>n</i> = 13)	84.6	7.7	7.7	0	0	0	0	0
Soccer (<i>n</i> = 11)	36.4	9.1	9.1	0	18.2	0	9.1	18.1
Classical ballet (<i>n</i> = 9)	88.9	0	0	0	0	0	0	11.1
Volleyball (<i>n</i> = 6)	50.0	0	0	0	0	16.7	16.7	16.6
Rugby (<i>n</i> = 5)	40.0	0	0	0	20.0	0	0	40.0
Tennis (<i>n</i> = 5)	80.0	20.0	0	0	0	0	0	0

Mechanism

- Elbow hyperextension and valgus forces prior to ball release



Mechanism

- Elbow hyperextension and valgus forces prior to ball release
- Hyperextension and valgus drives capitellum into lateral aspect of the trochlear groove



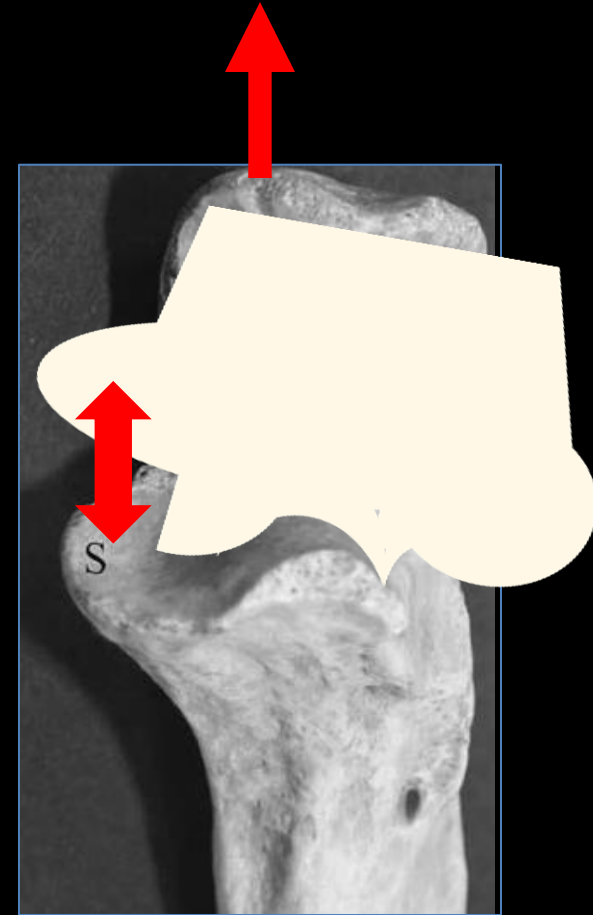
Mechanism

- Elbow hyperextension and valgus forces prior to ball release
- Hyperextension and valgus drives capitellum into lateral aspect of the trochlear groove
- Results in tensile forces at medial aspect of trochlear groove



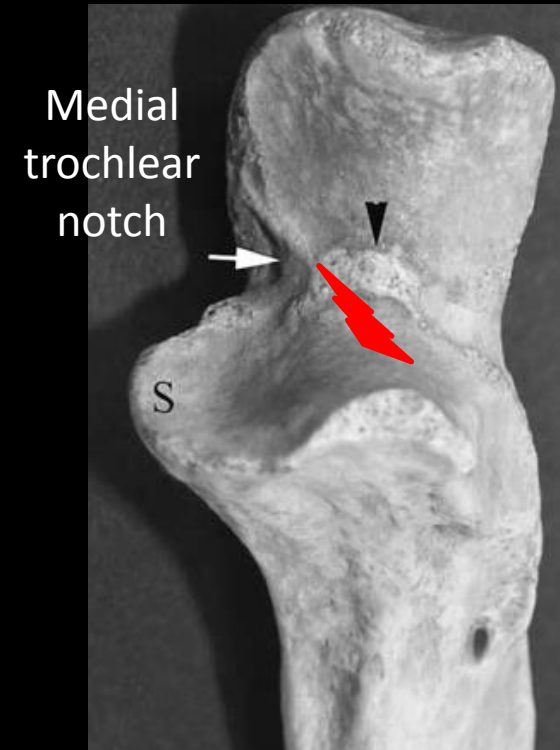
Mechanism

- Elbow hyperextension and valgus forces prior to ball release
- Hyperextension and valgus drives capitellum into lateral aspect of the trochlear groove
- Results in tensile forces at medial aspect of trochlear groove
- Tensile forces from triceps tendon



Mechanism

- Elbow hyperextension and valgus forces prior to ball release
- Hyperextension and valgus drives capitellum into lateral aspect of the trochlear groove
- Results in tensile forces at medial aspect of trochlear groove
- Tensile forces from triceps tendon
- Chronic overload leads to stress fracture at medial aspect of trochlear groove
 - Medial trochlear notch is structural weak point
 - Cortical bone more likely to fail with tensile forces



Mechanism

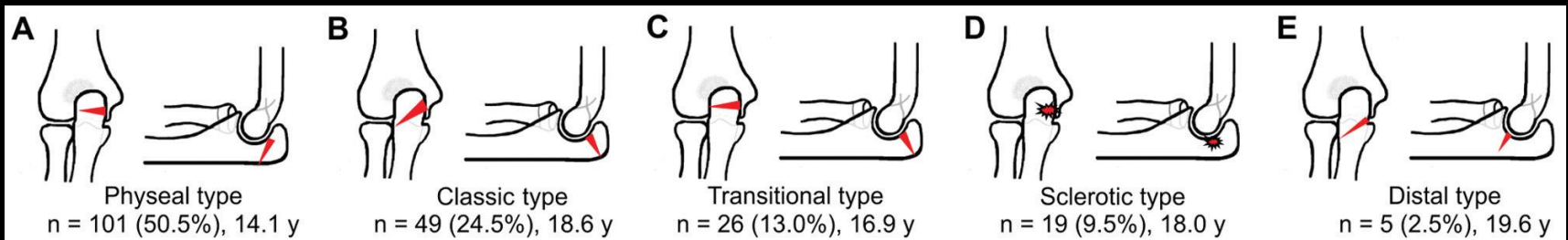
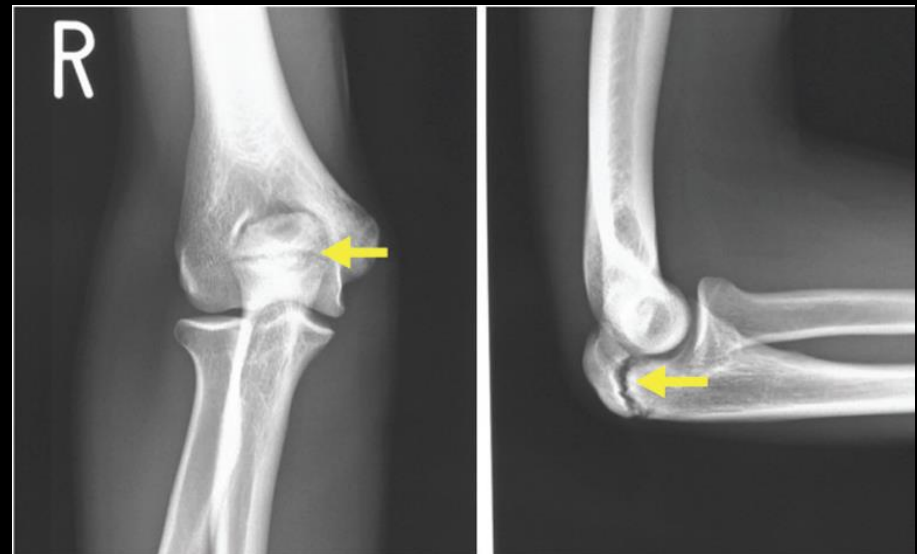
- Elbow hyperextension and valgus forces prior to ball release
- Hyperextension and valgus drives capitellum into lateral aspect of the trochlear groove
- Results in tensile forces at medial aspect of trochlear groove
- Tensile forces from triceps tendon
- Chronic overload leads to stress fracture at medial aspect of trochlear groove
 - Medial trochlear notch is structural weak point
 - Cortical bone more likely to fail with tensile forces



Classification

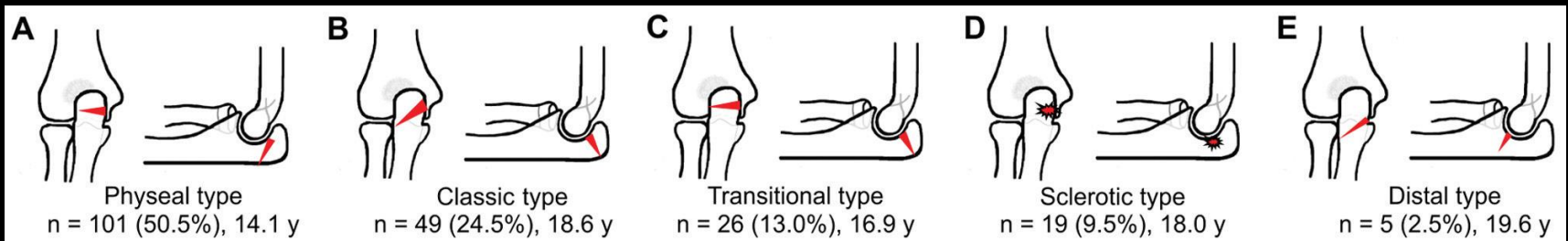
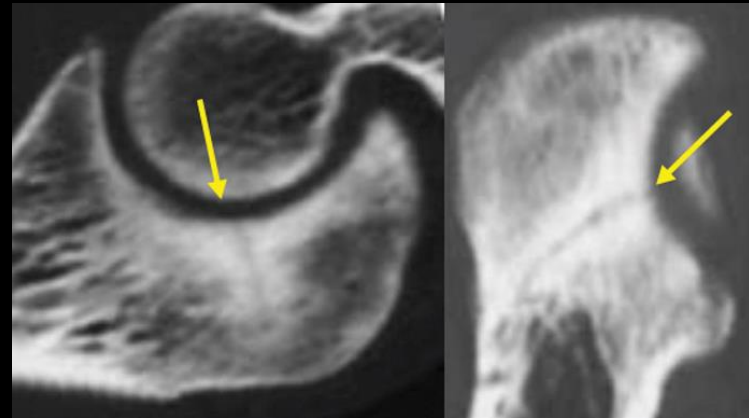
- Fracture line appearance based

- Physeal
- “Classic”
- Transitional
- Sclerotic
- Distal



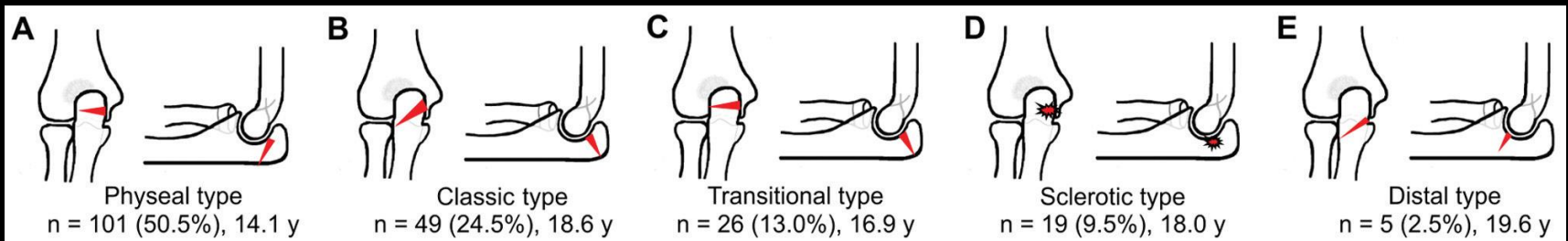
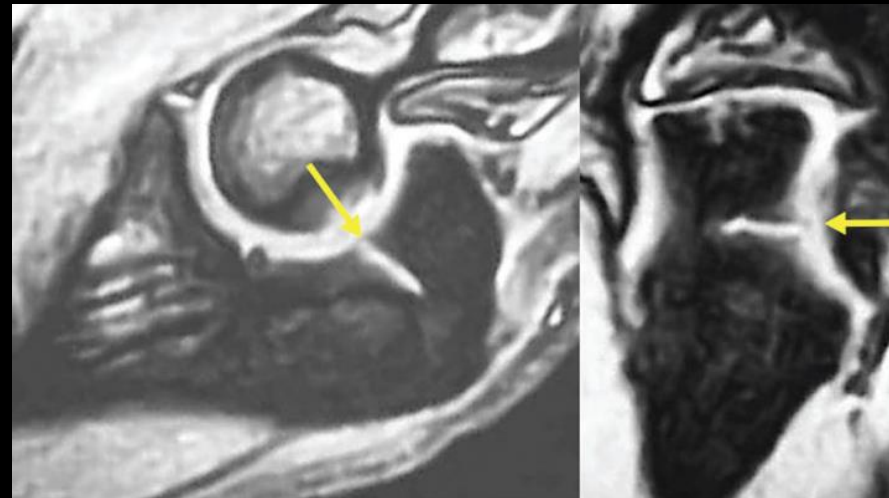
Classification

- Fracture line appearance based
 - Physeal
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 - Distal



Classification

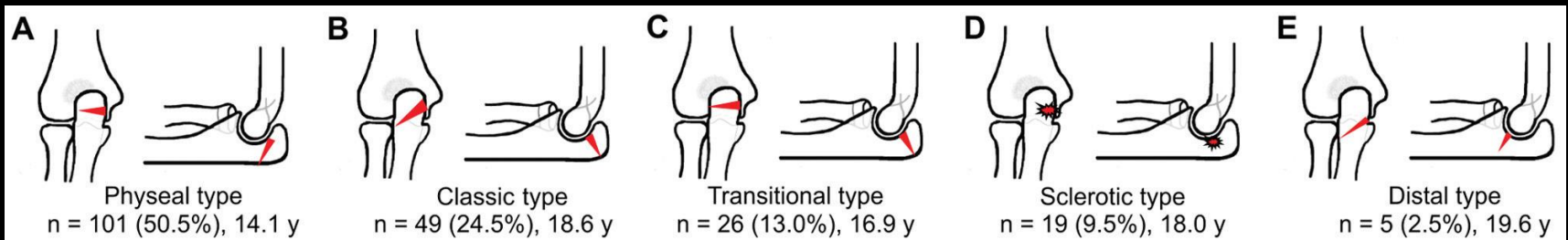
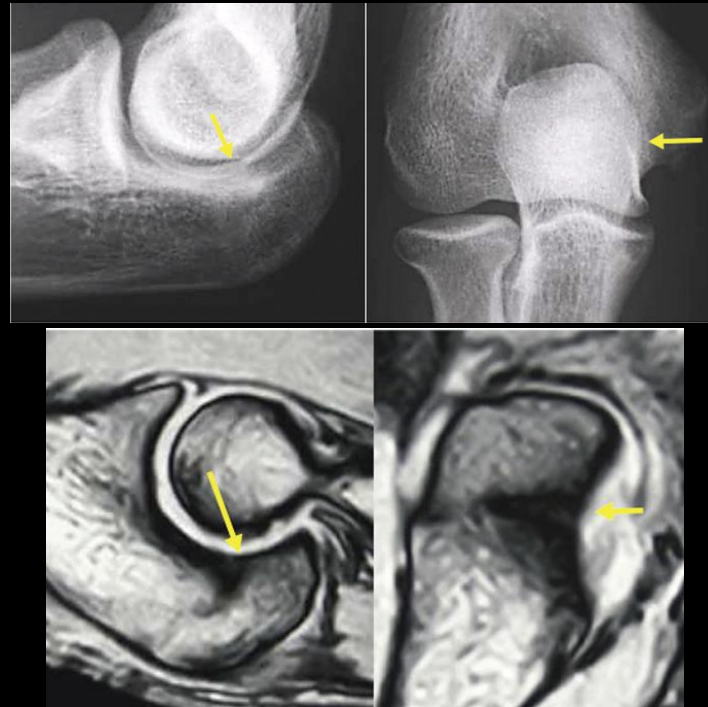
- Fracture line appearance based
 - Physeal
 - “Classic”
 - **Transitional**
 - Sclerotic
 - Distal



Classification

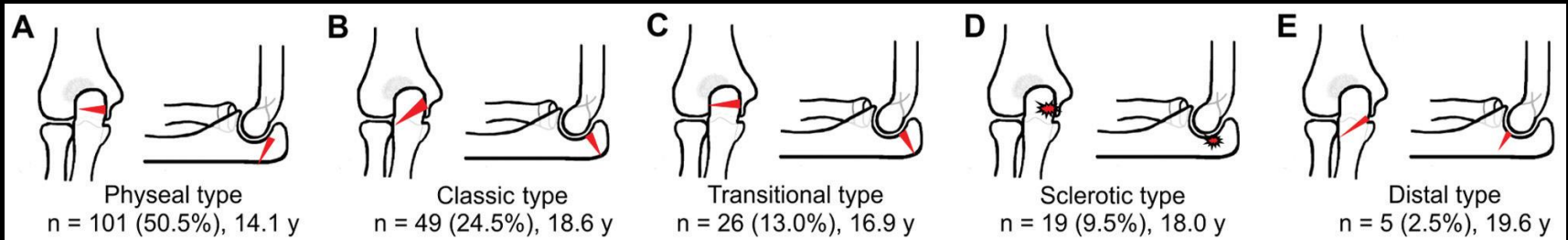
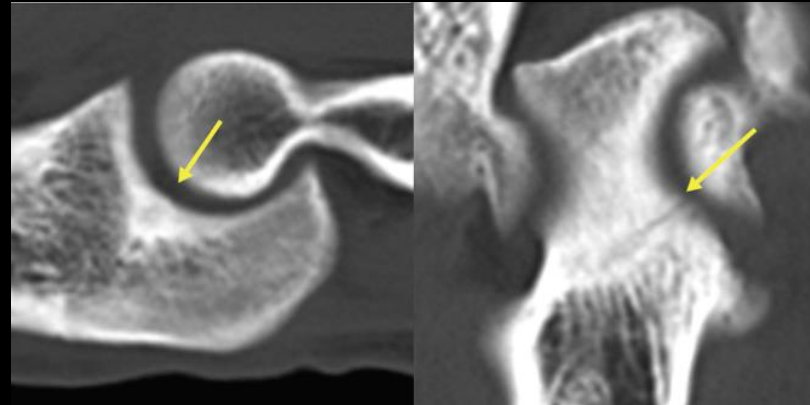
- Fracture line appearance based

- Physeal
- “Classic”
- Transitional
- Sclerotic
- Distal



Classification

- Fracture line appearance based
 - Physeal
 - “Classic”
 - Transitional
 - Sclerotic
 - **Distal**



Treatment

- Initial treatment is nonoperative
 - Rest
 - Immobilization for 4 weeks
 - Throwing cessation
 - Rehab at 6 weeks
 - Throwing program at 8 weeks
- Failure -> operative treatment
 - Cannulated screws favored
 - Dr. James Andrews:

“We have found that olecranon stress fractures in the competitive overhead throwing athlete often fail to respond to extended nonoperative treatment and require surgical fixation, similar to stress fractures at the proximal diaphysis of the fifth metatarsal (Jones fracture). Therefore, we have been aggressive at performing early internal fixation of these lesions. “



Follow-up

- Obtained after four weeks of conservative treatment
- Plan – continued conservative treatment



References

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6. Cain EL Jr, Dugas JR, Wolf RS, Andrews JR. Elbow injuries in throwing athletes: a current concepts review. *Am J Sports Med*. 2003 Jul-Aug;31(4):621-35.