

Lumps and Bumps: Soft Tissue and Bony Masses of the Wrist

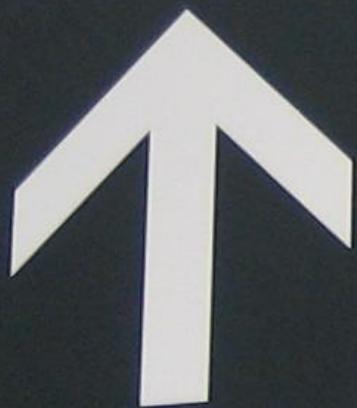
Brady Huang
4/27/2010

BACKGROUND

- ▶ Masses of the wrist (and hand) are common indications for patients to be referred for imaging
- ▶ Some patients may present with painless or painful masses; others present with pain from occult masses

LEARNING OBJECTIVES

- ▶ Discuss the clinical features of wrist masses and approach to the work-up and evaluation
- ▶ Understand pertinent anatomy pertaining to these masses
- ▶ Become familiar with some wrist masses with characteristic features
- ▶ Focus is on wrist, but will discuss some hand



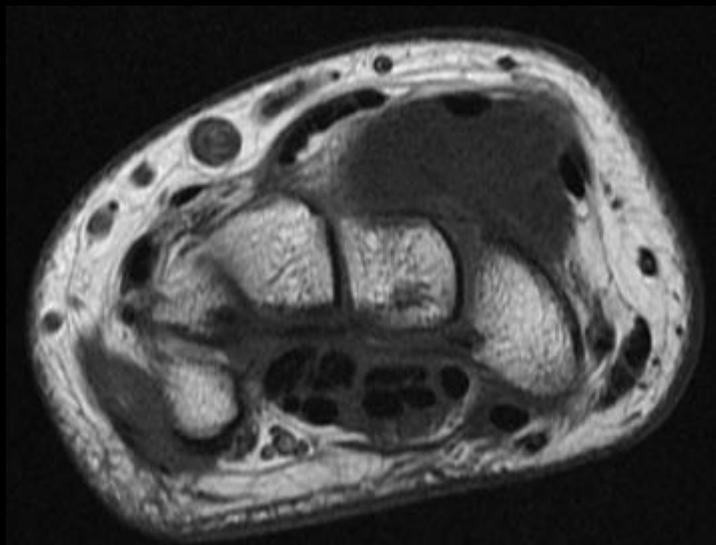
順 路

Usual Route

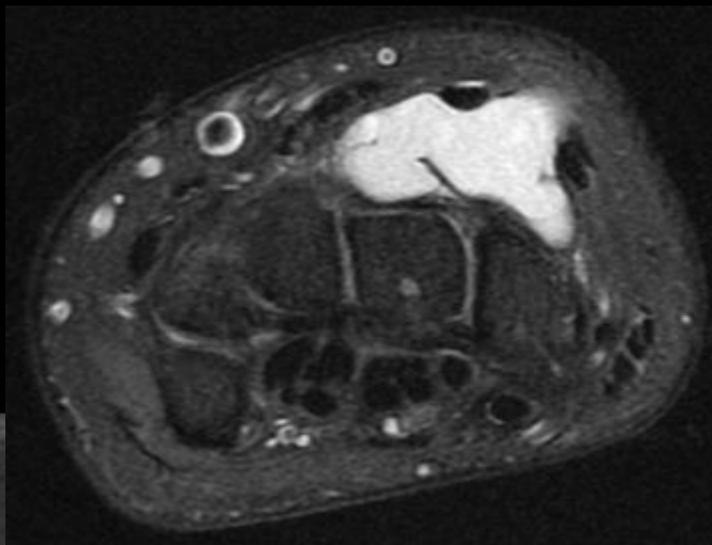
순로

参观路线

UNKNOWNNS

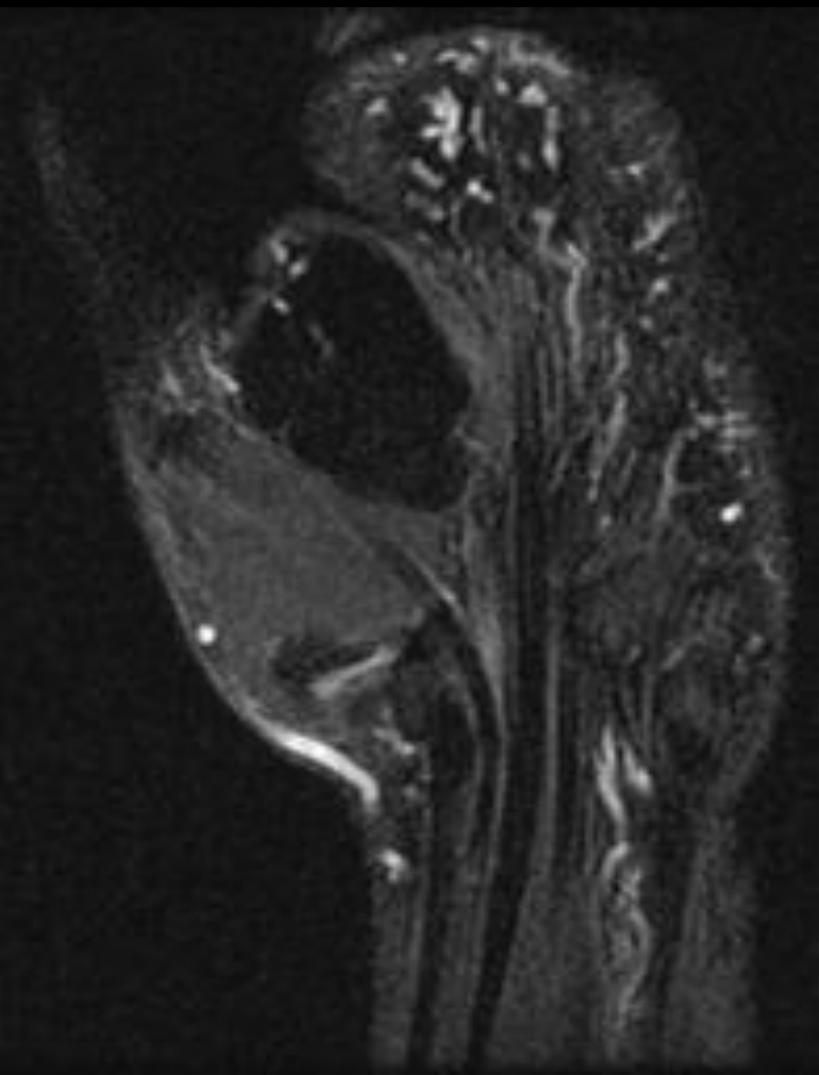


T1

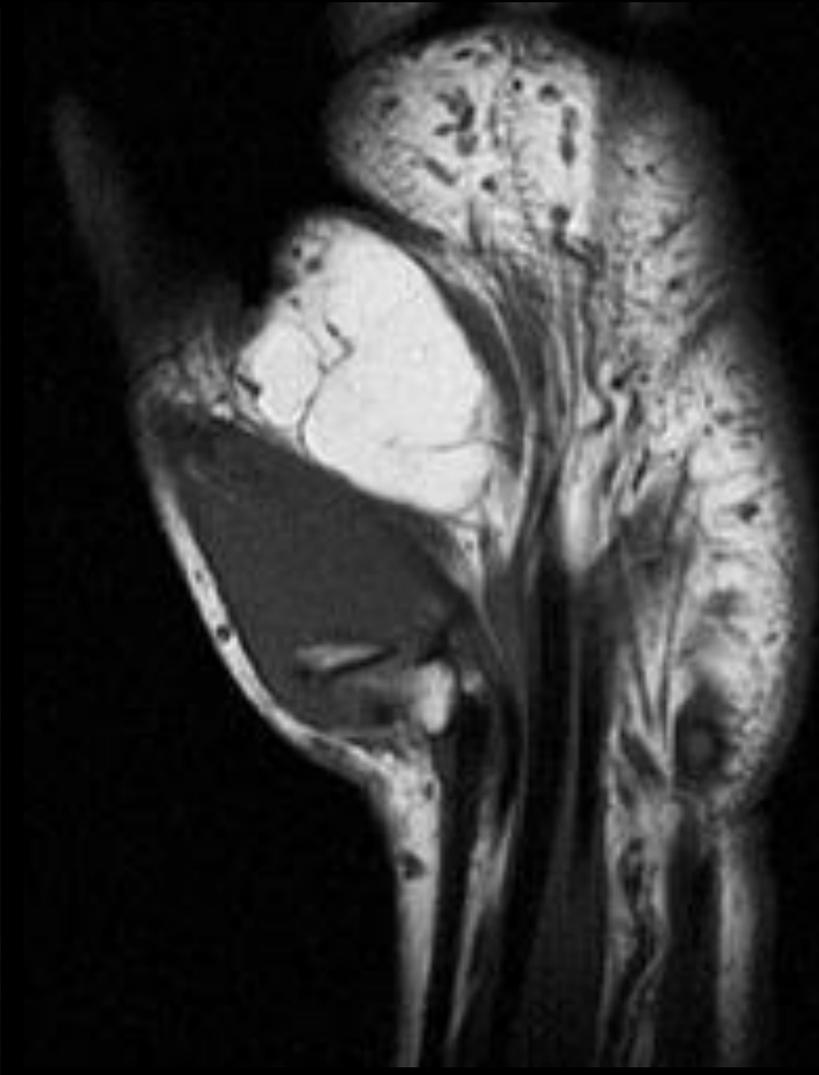


T2 FS

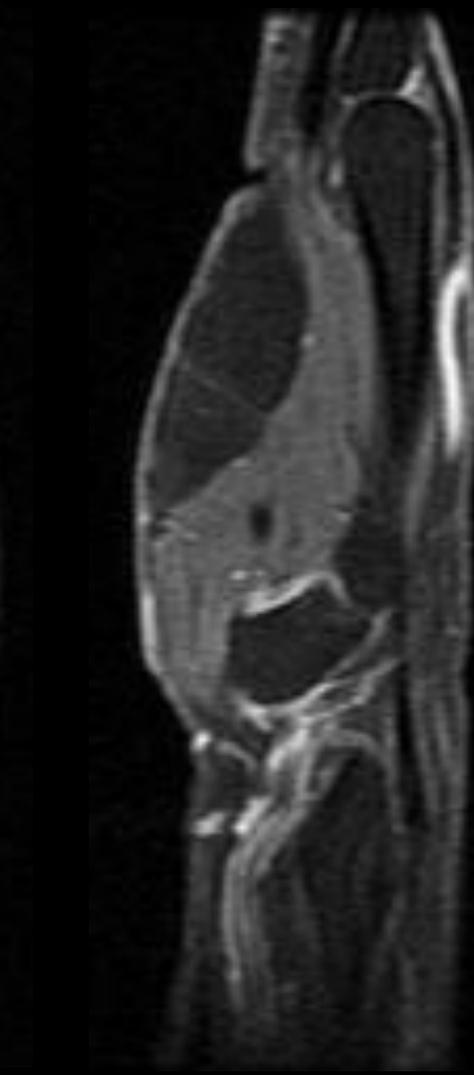




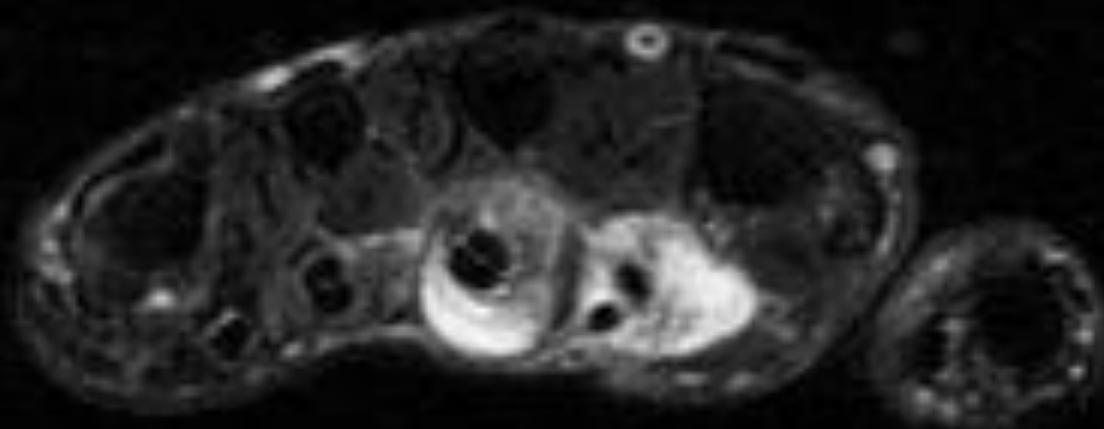
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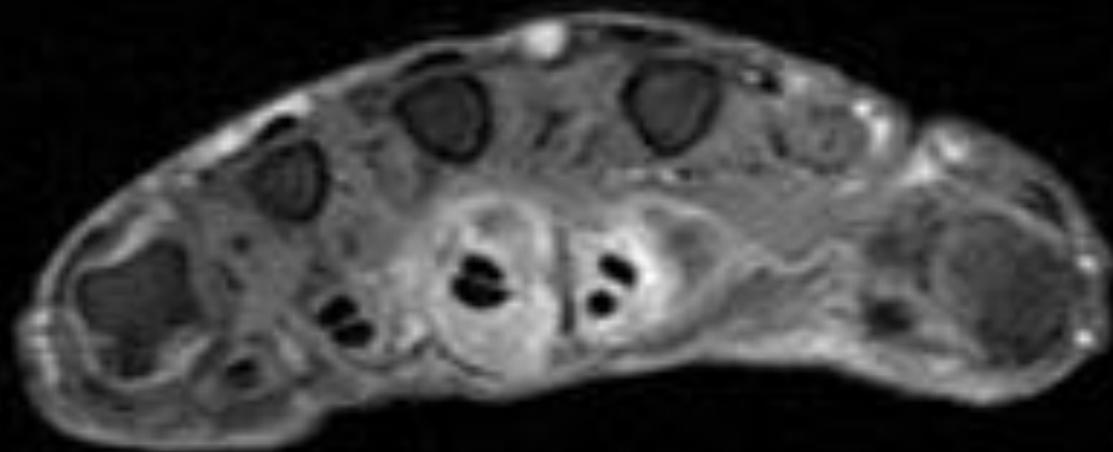
T1



T1FS +



T2 FS



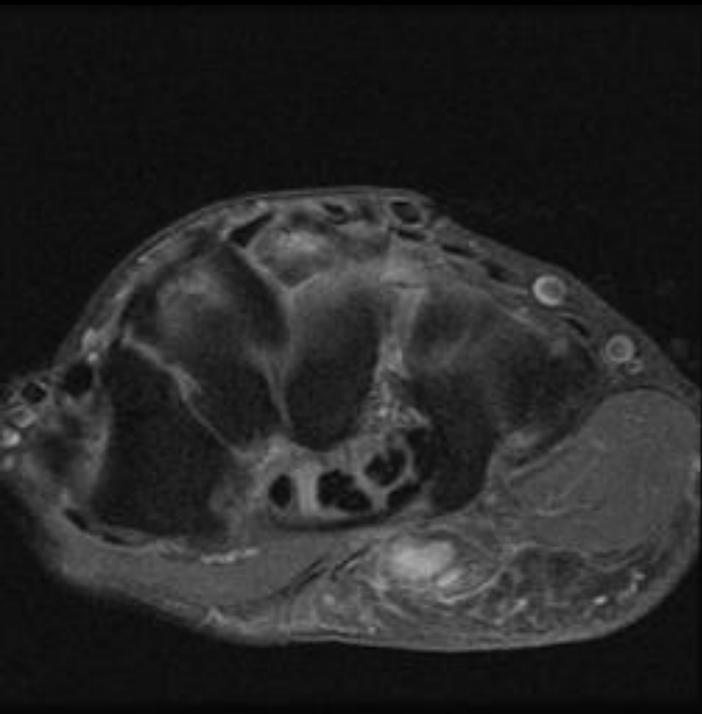
T1 FS +



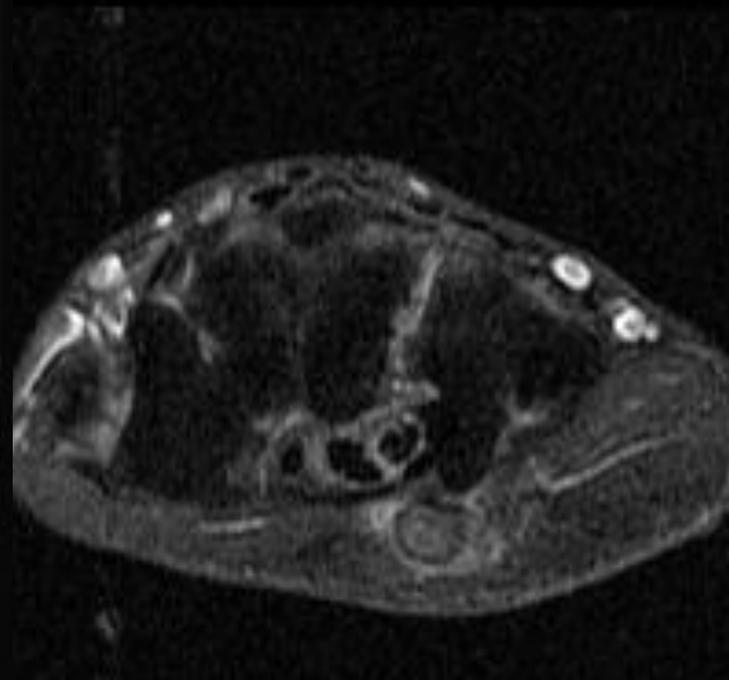




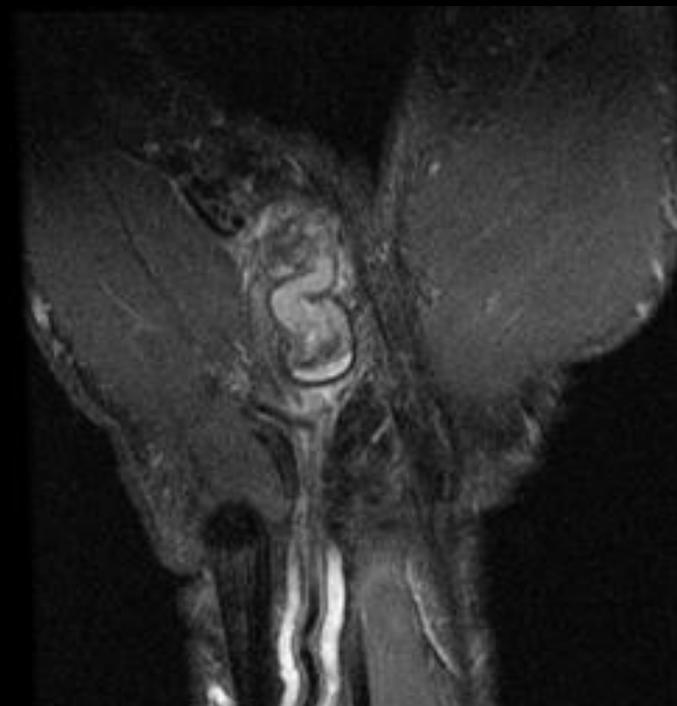




Intermediate FS



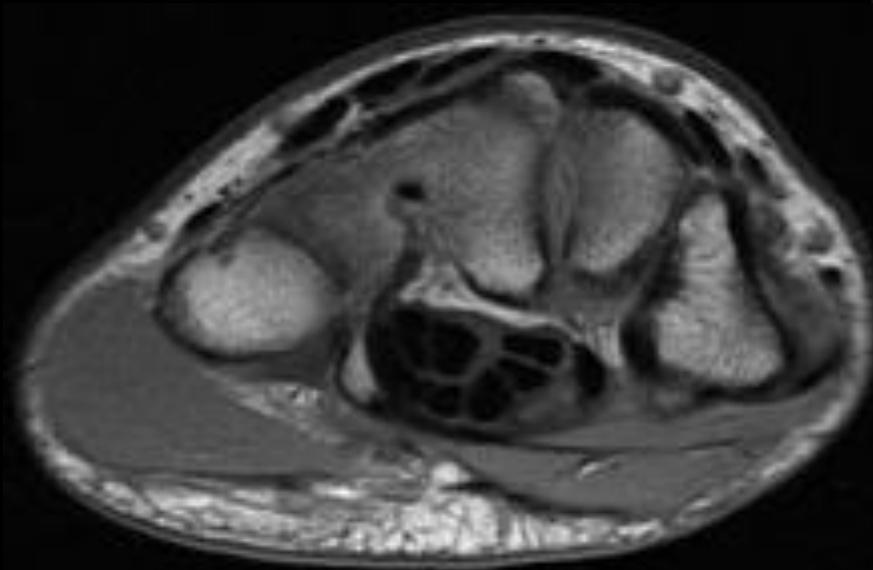
T1 FS +



Intermediate FS



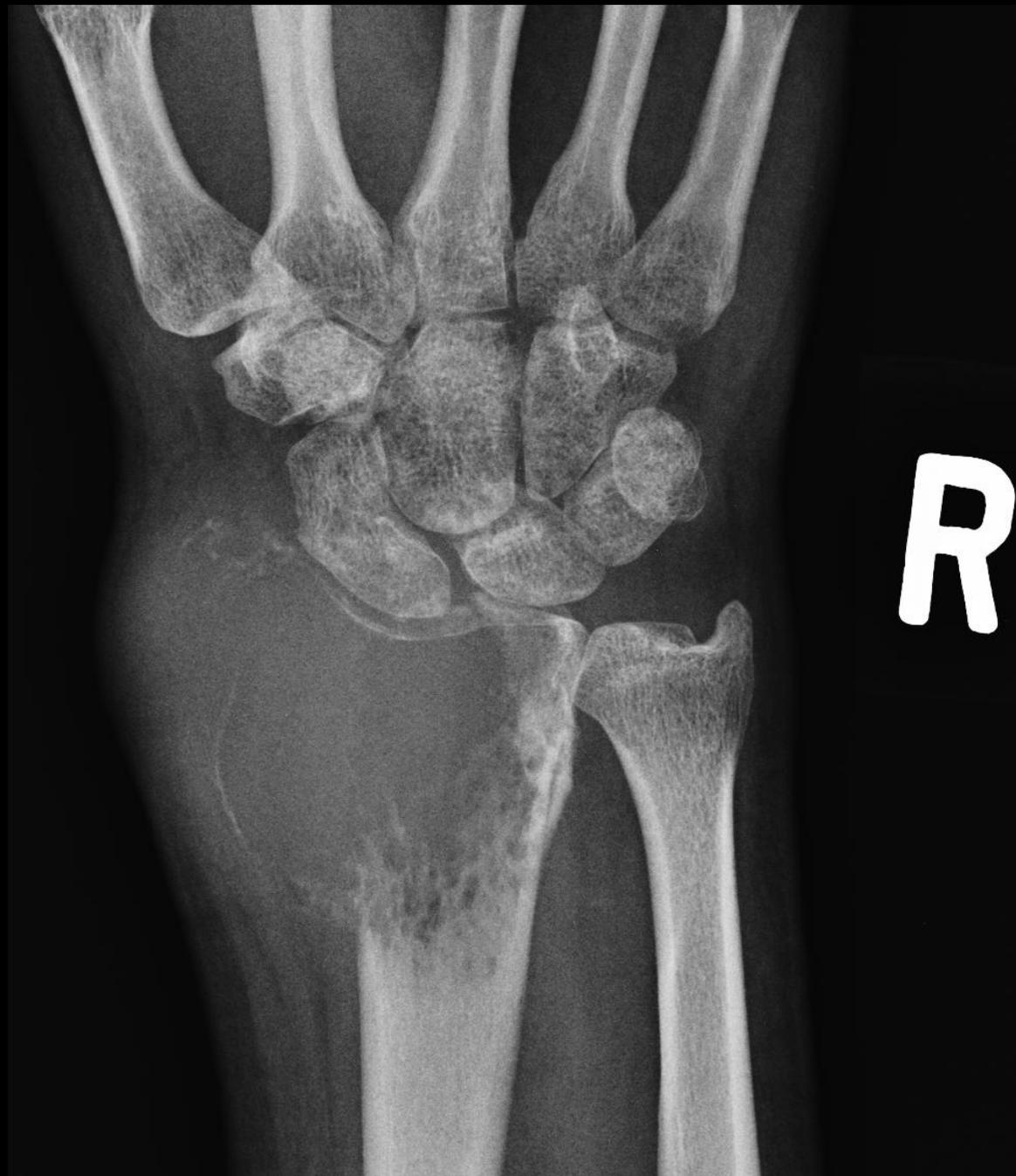
PD



PD



PD FS



Sag R16.0

11:
MF: 1

Ro:270

S
3
6

SE/V/cs
TR:2000
TE:20
EC:1/2 16kHz

SMH
FOV:8x8



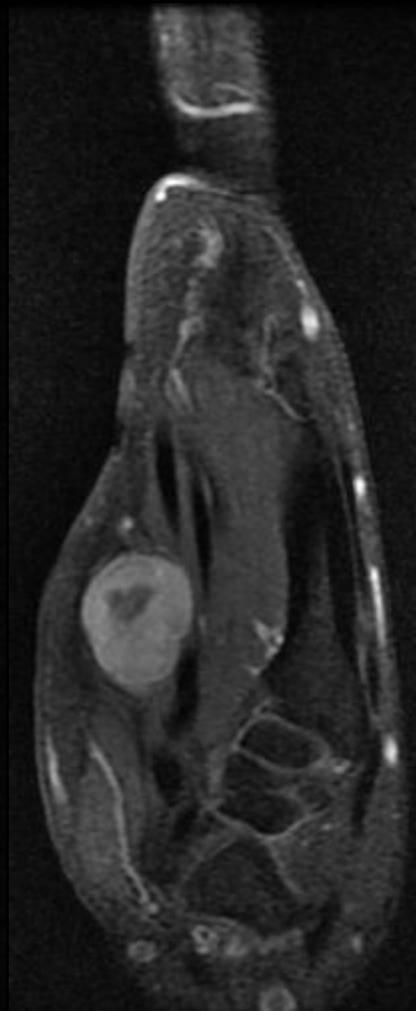
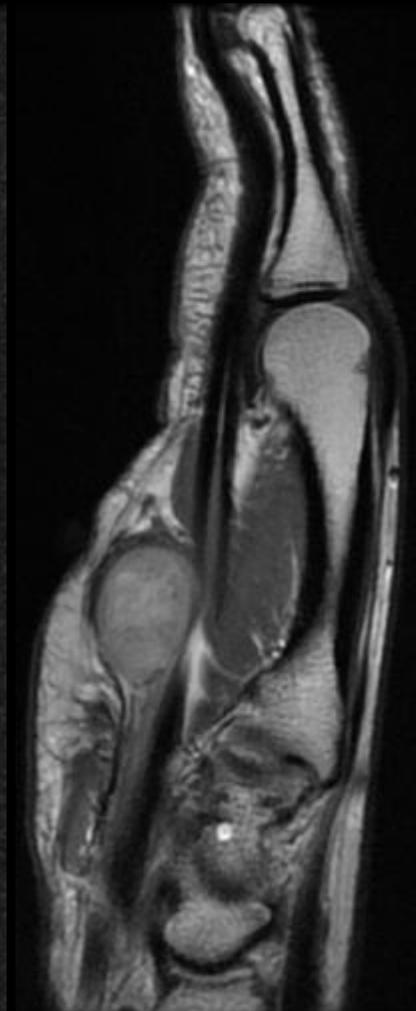
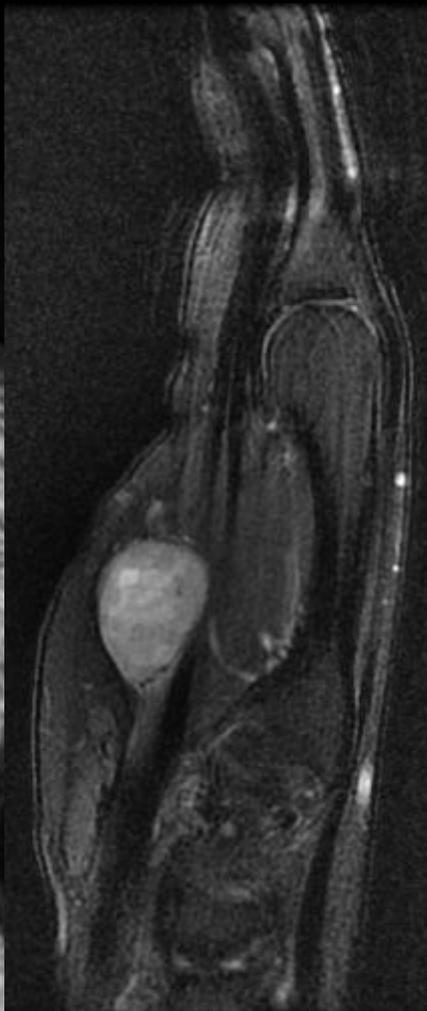
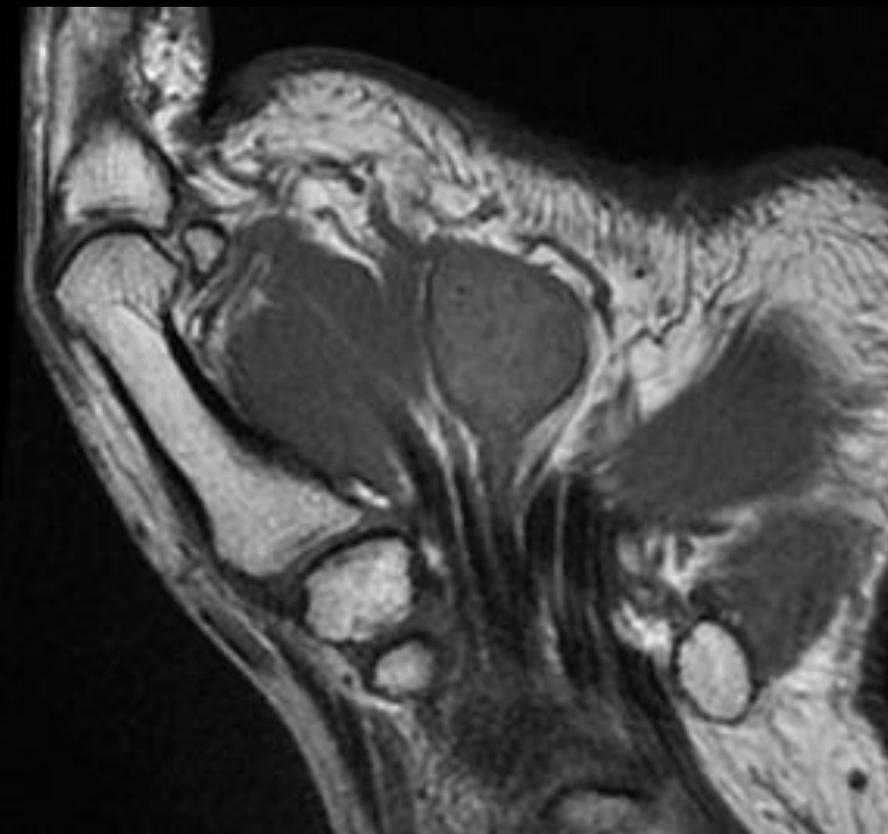
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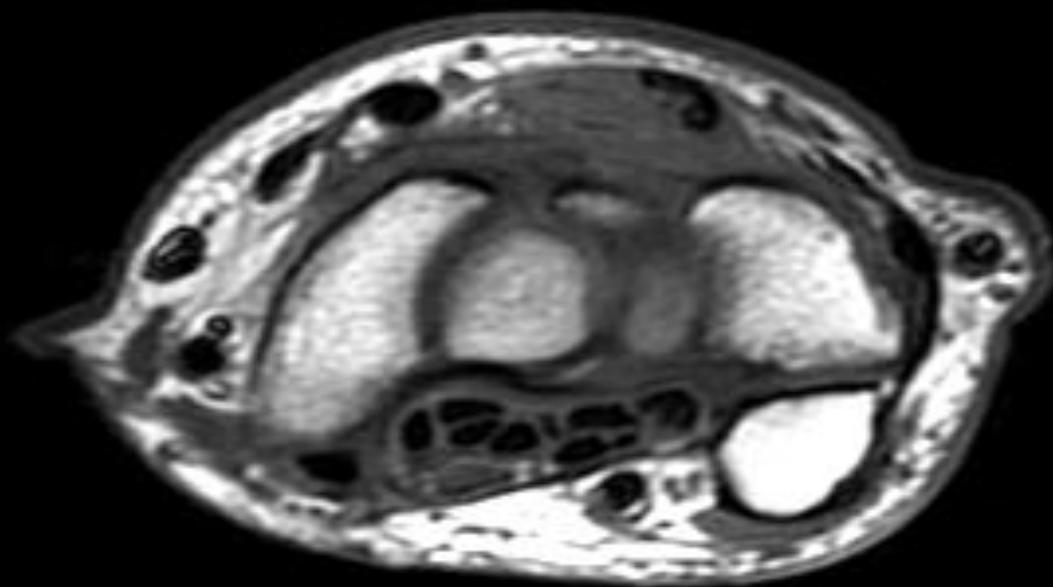
Int FS

PD

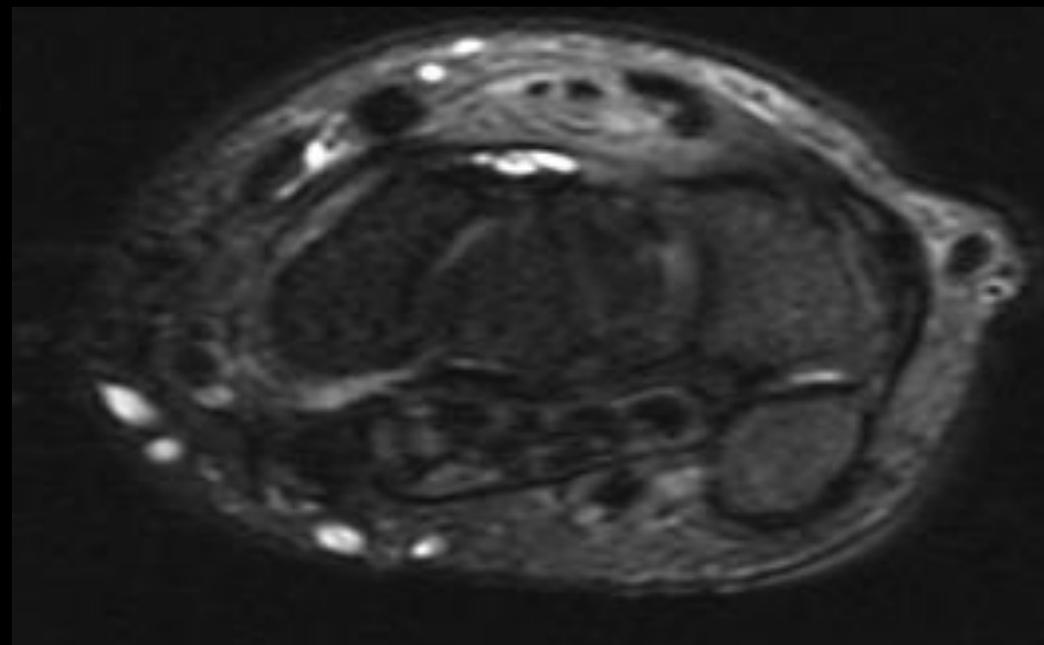
T1 FS +

T1





T1

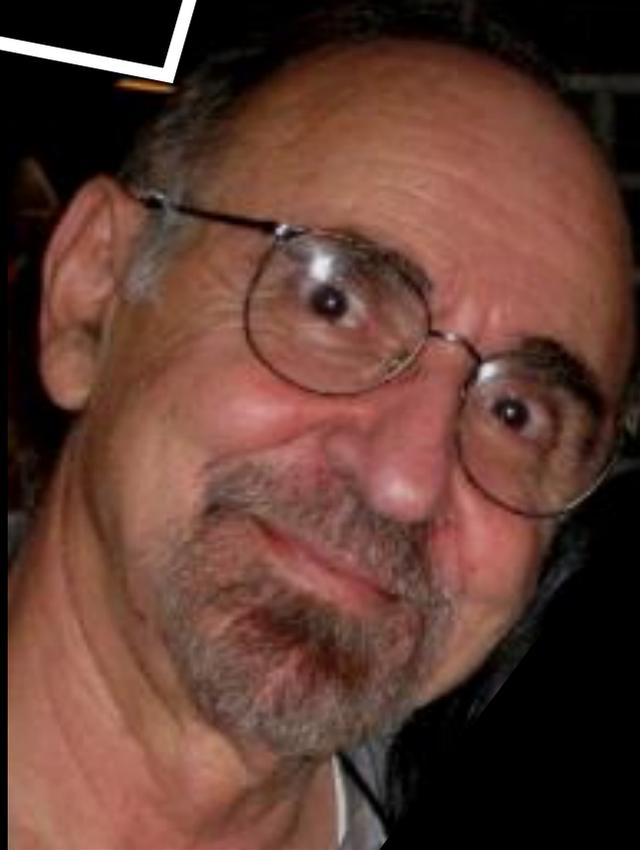


T2FS

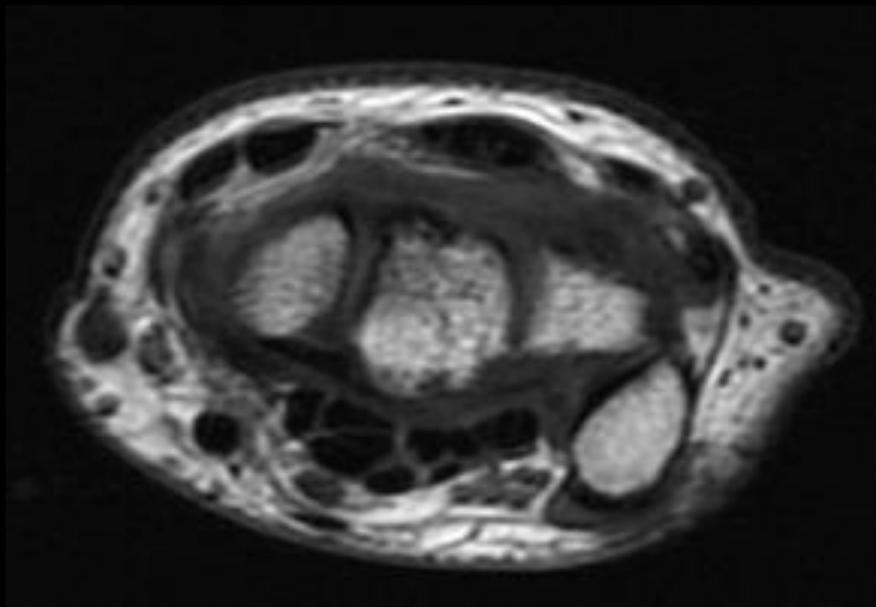
TISSUE ORIGINS

- ▶ Soft tissue
 - ◆ Connective Tissue
 - ◆ Adipose
 - ◆ Synovial
 - ◆ Neural
 - ◆ Vascular
 - ◆ Muscle
 - ◆ Mixed
- ▶ Osseous

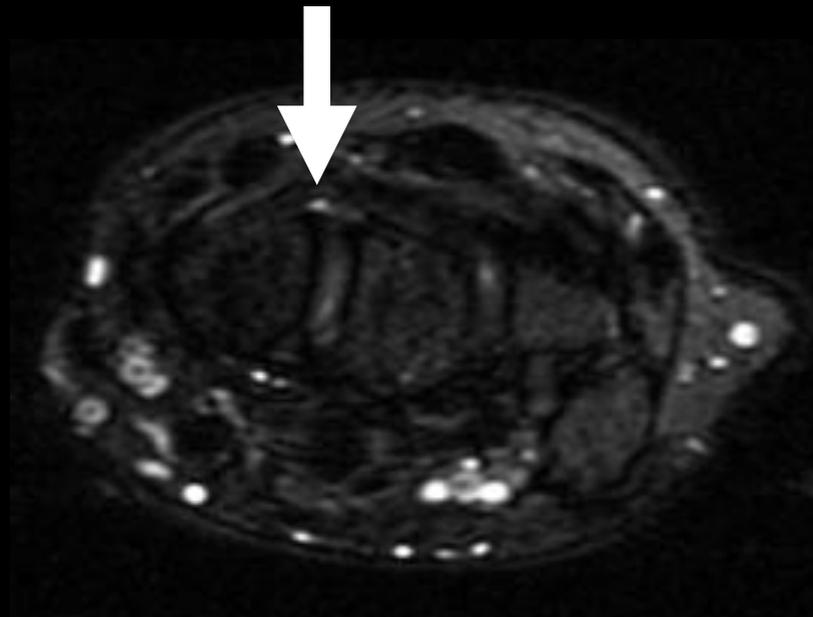
THERE WAS NEVER A GANGLION IN THE
WRIST THAT I COULDN'T FIND



22 M s/p “wrist sprain”



T1



T2 FS

“A very small ganglion cyst is seen just dorsal to the dorsal aspect of the scapholunate interosseous ligament, where it likely arises (series 4, image 11), and measures less than 1 mm in size.”



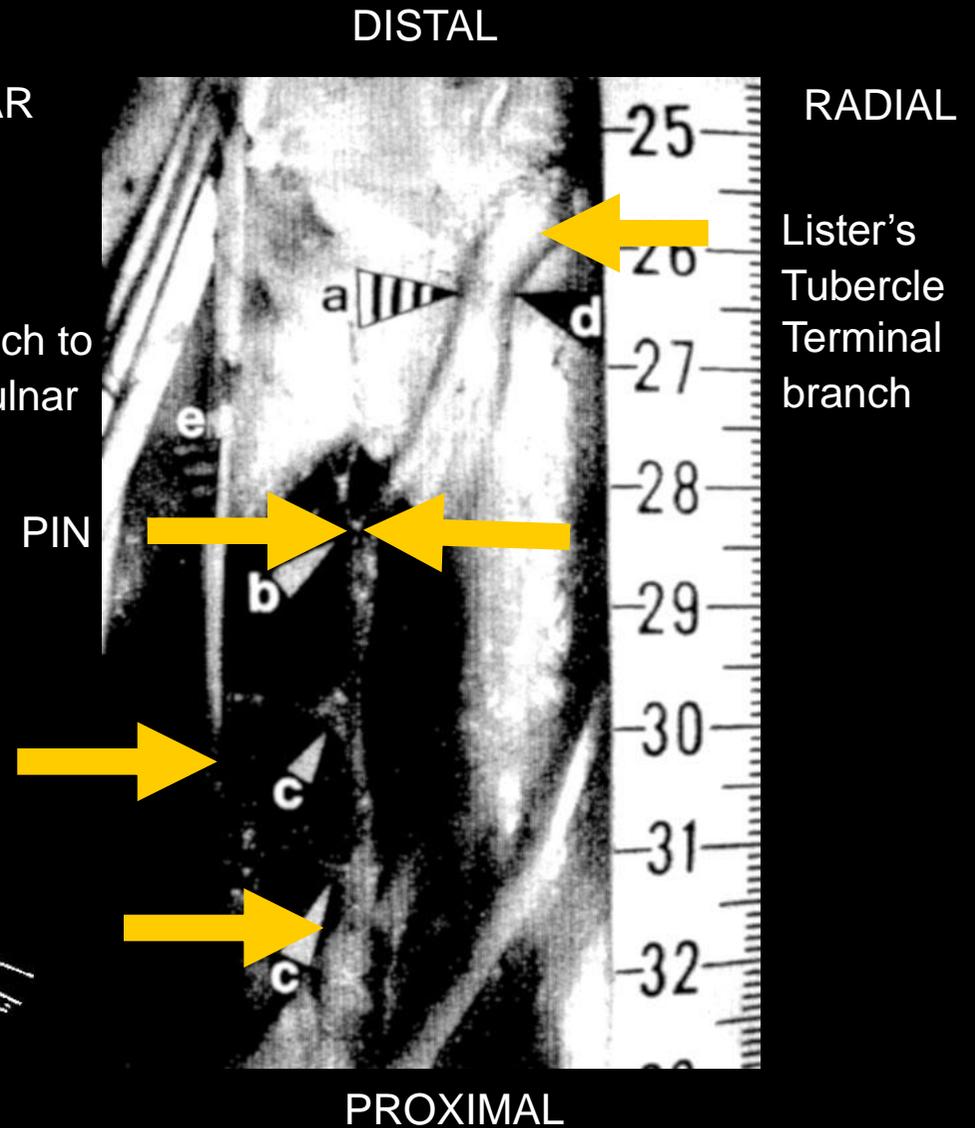
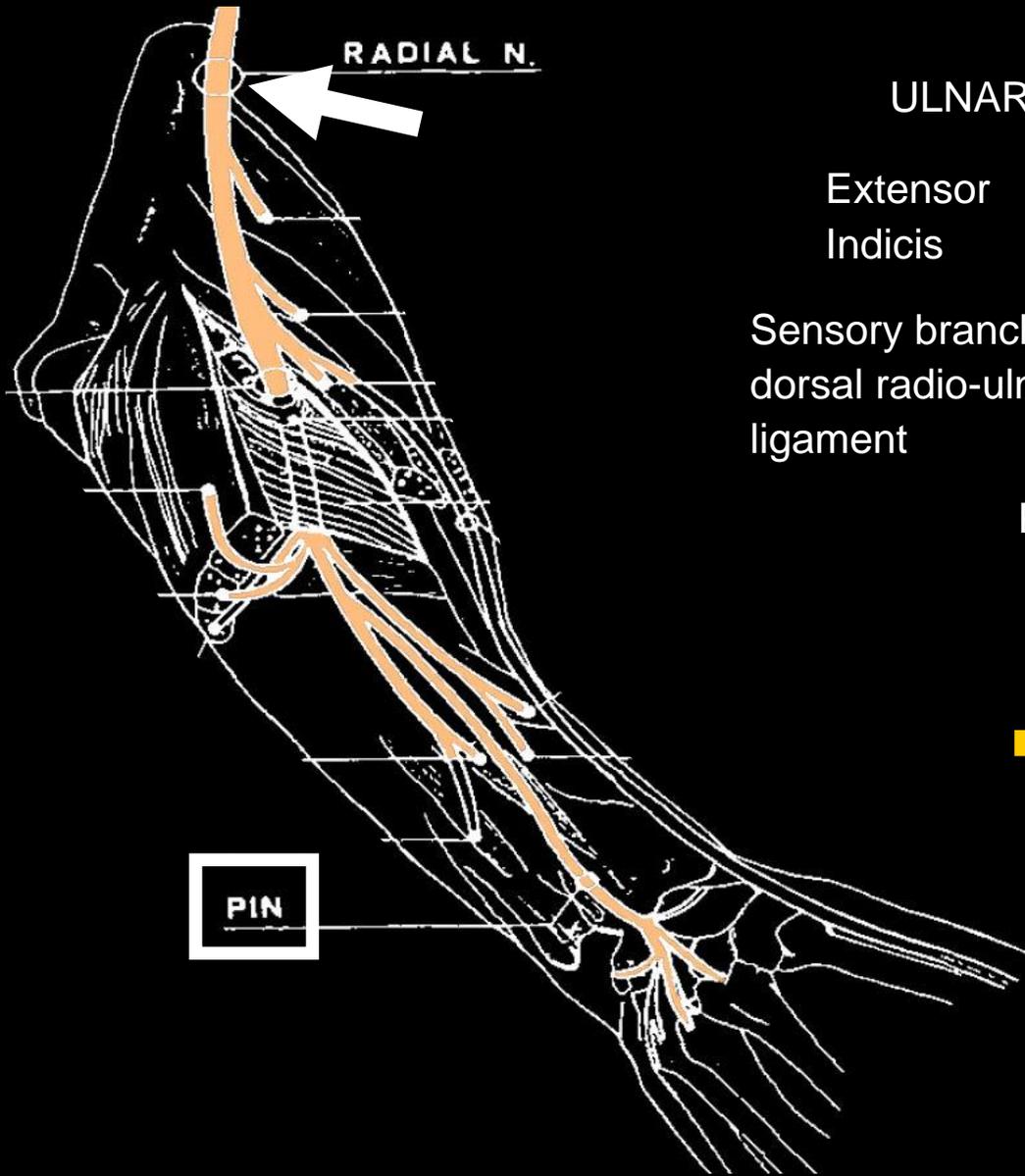
GANGLION CYST

- ▶ Most *common* soft-tissue mass in the hand & wrist (60%)¹
- ▶ Thought to arise from myxoid degeneration of connective tissue, commonly after minor trauma
- ▶ Contain mucinous fluid of glucosamine, albumin, globulin, & hyaluronic acid
- ▶ Wall is acellular with randomly oriented collagen
- ▶ *Lack of* synovial lining distinguishes ganglion from a *true* synovial cyst

GANGLION CYST

- ▶ **Location:** Commonly at dorsal scapho-lunate interval
 - ◆ 75% connect with dorsal S-L interosseous ligament in area of capsular attachment
 - ◆ Also volar radiocarpal joint
 - ◆ Can be intraosseous
- ▶ Dorsal ganglion may present with dull aching pain due to a constant relationship to terminal branches of the posterior interosseous nerve²
- ▶ Terminal sensory branch of PIN in deep radial aspect of 4th dorsal compartment³
- ▶ Larger ganglions can compress branches of the superficial radial nerve¹

GANGLION CYST



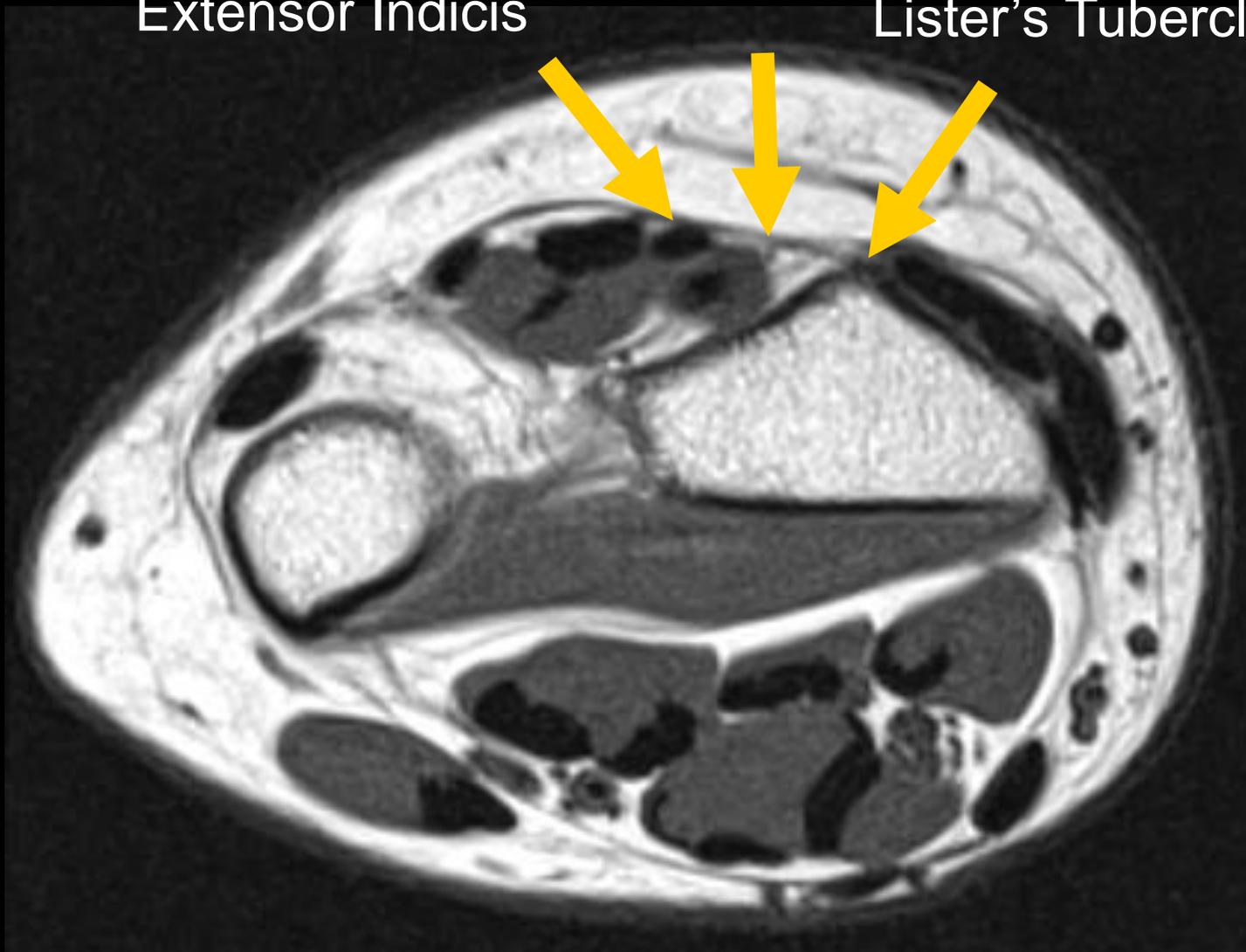
Lo Monaco M. Acta Neuro Scand 1985
Reissis. J Hand Surg Br 1992

Volar Ganglions

Terminal PIN?

Extensor Indicis

Lister's Tubercle



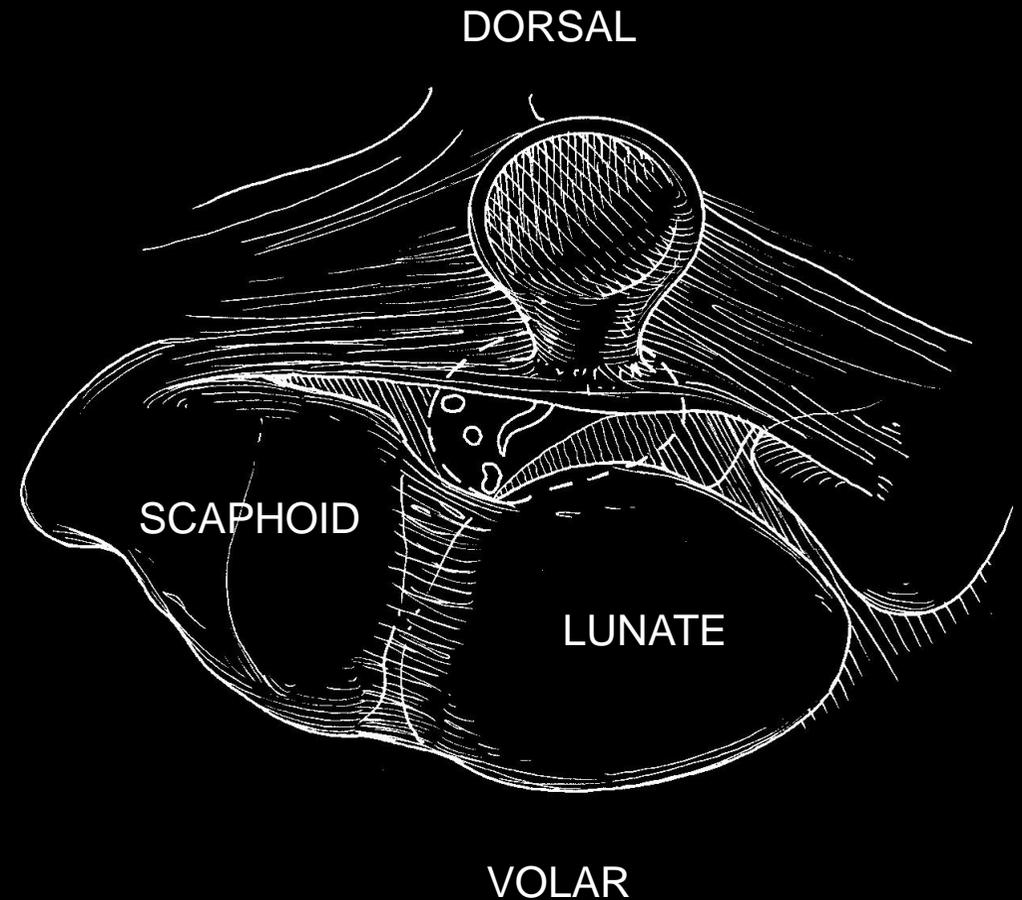
GANGLION CYST

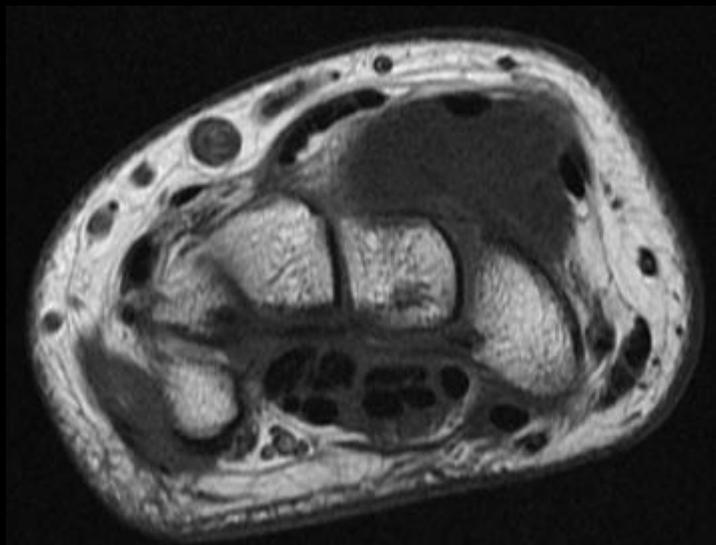
▶ US & MRI:

- ◆ Both show a defined *cystic* lesion with a thin wall; often multilobulated
- ◆ Intracystic hemorrhage or infection can complicate appearance

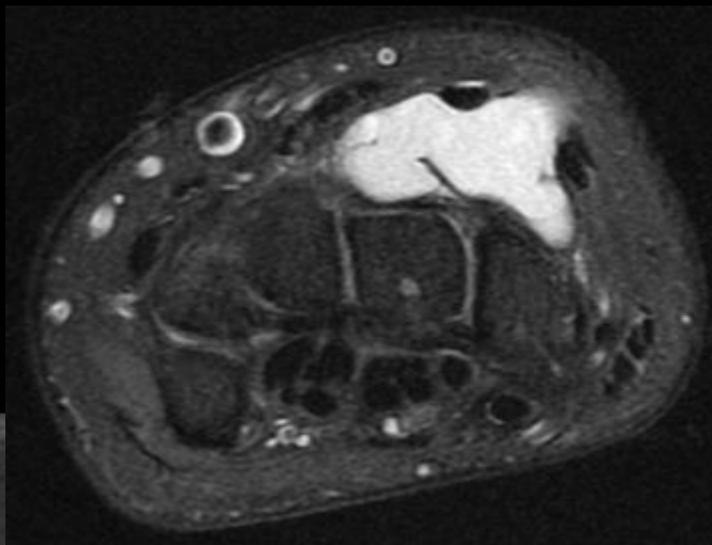
▶ **Arthrography:** Cyst should not (technically) communicate with joint space

▶ **Treatment:** Observation, closed rupture, cyst aspiration, surgical excision; can recur





T1



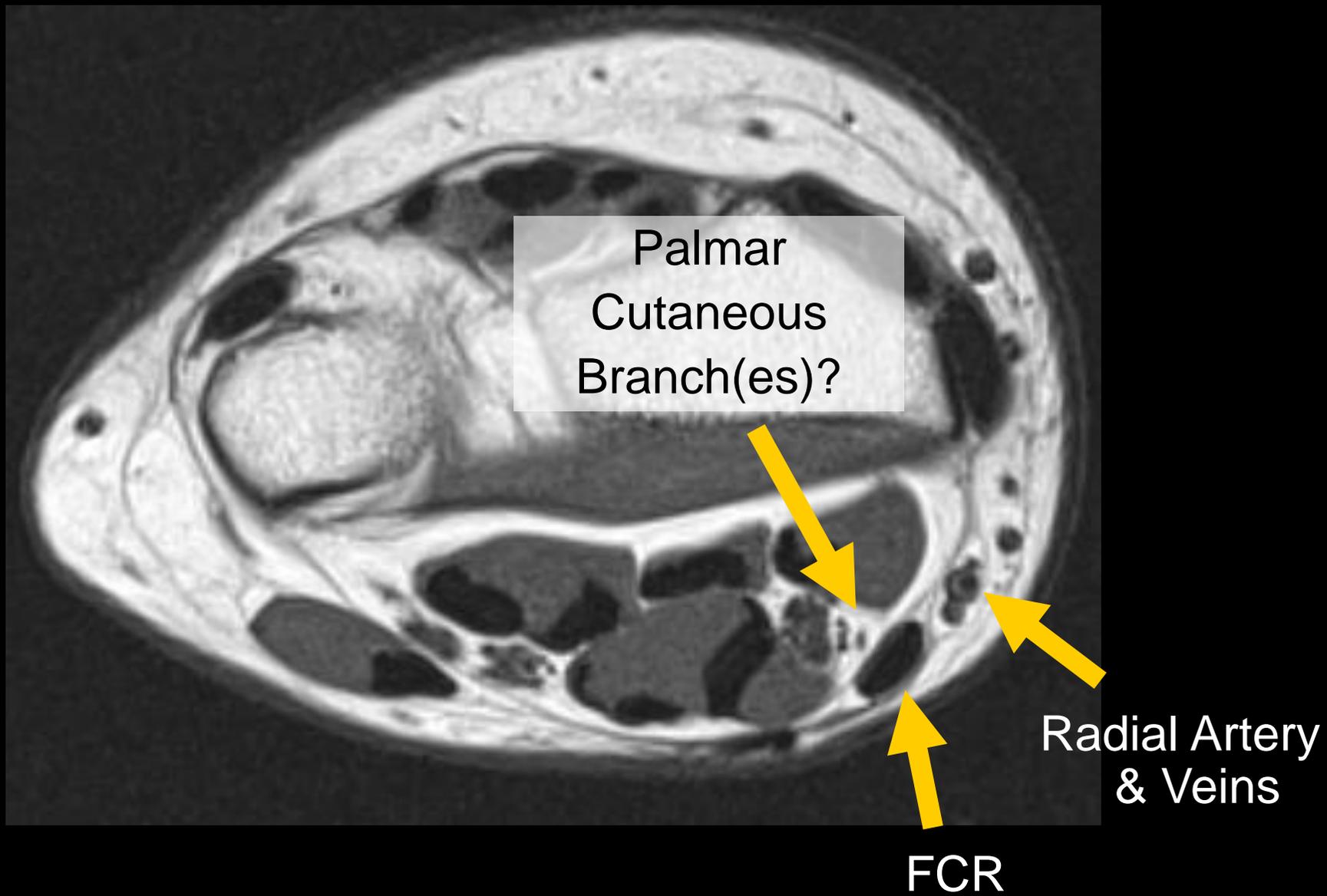
T2 FS



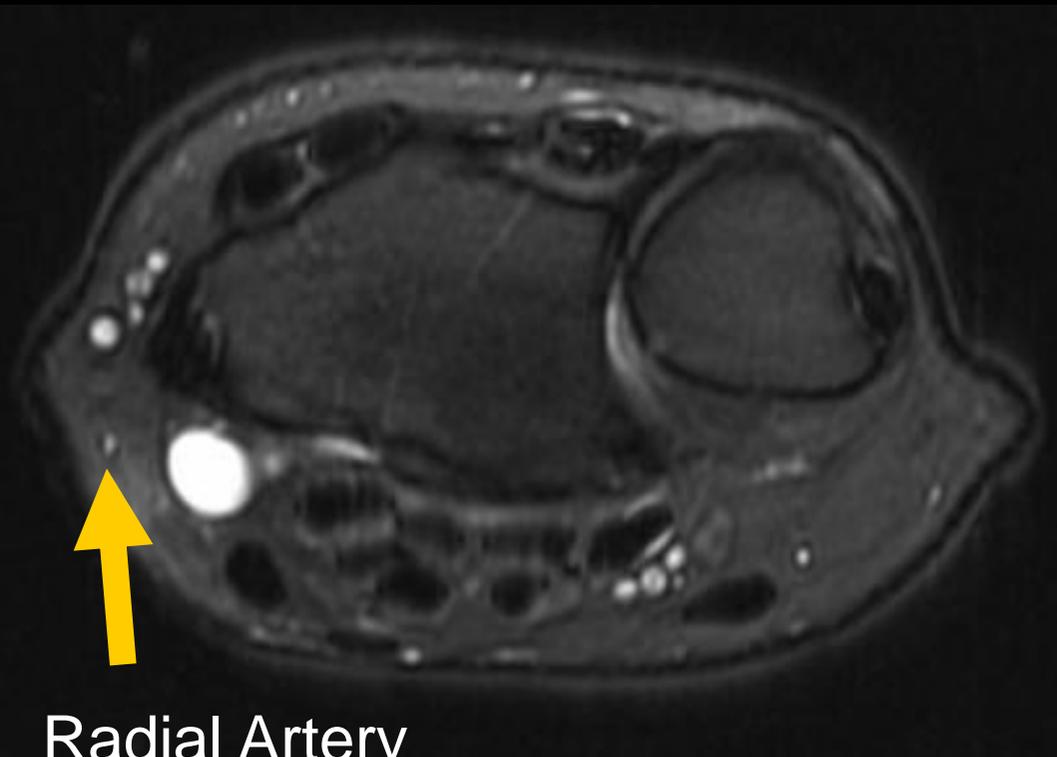
Volar Ganglions

- ▶ 13-20% of hand/wrist ganglions¹
 - ◆ 2/3 = radio-scaphoid
 - ◆ 1/3 = scapho-trapezial
- ▶ Occult presentation less common than dorsal
- ▶ May present with sensory or motor symptoms of the median or ulnar nerves
- ▶ High recurrence with aspiration
- ▶ Higher recurrence with surgery than dorsal cysts

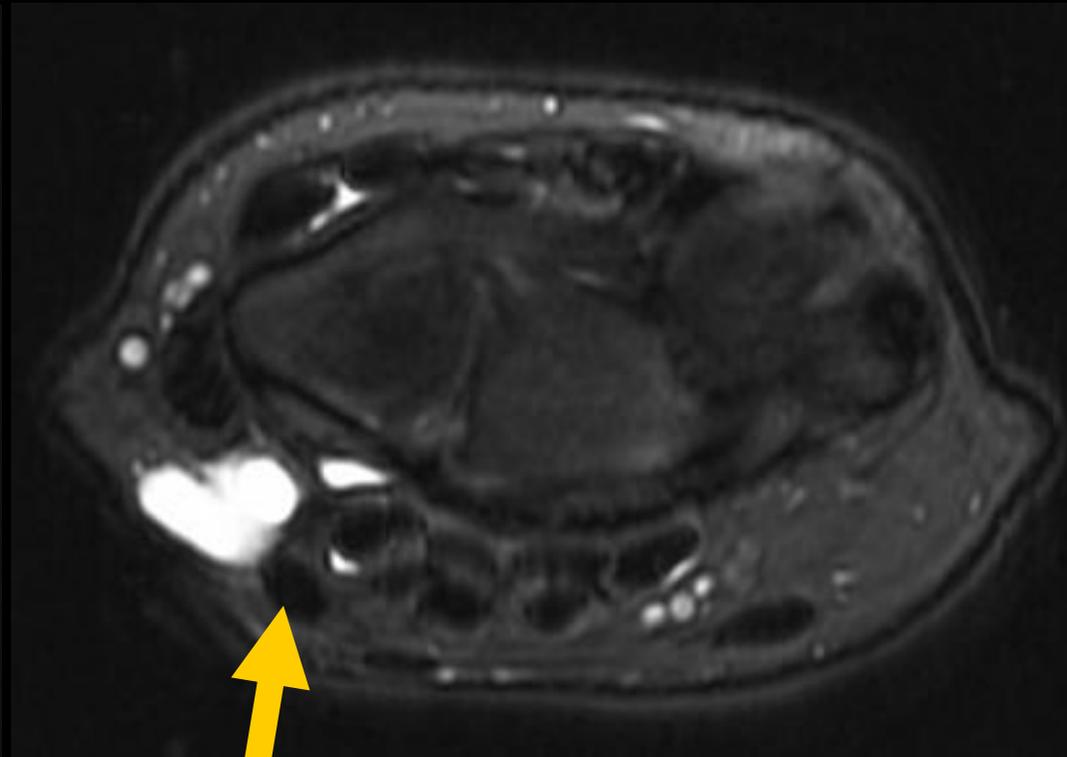
Volar Ganglions



35 F w/ recurrent cysts



Radial Artery
and Veins?



FCR

51 F w/ Enlarging Volar Wrist Mass After Minor Trauma



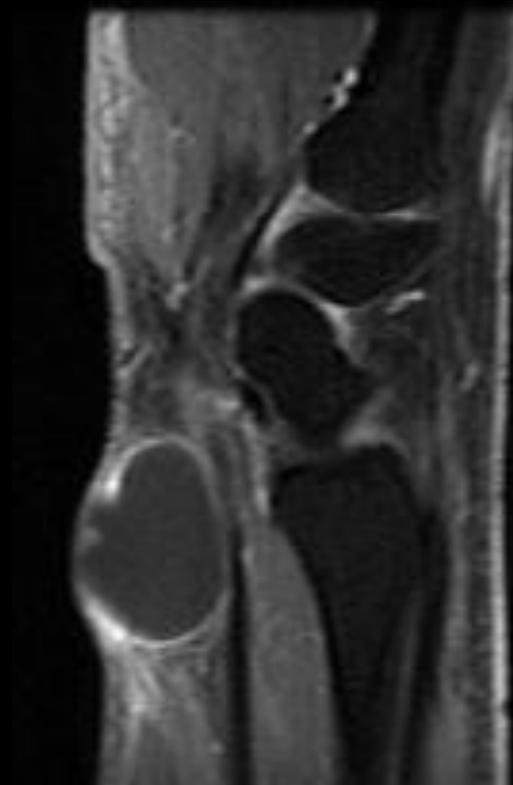
51-year-old Female w/ Enlarging Volar Wrist Mass After Minor Trauma



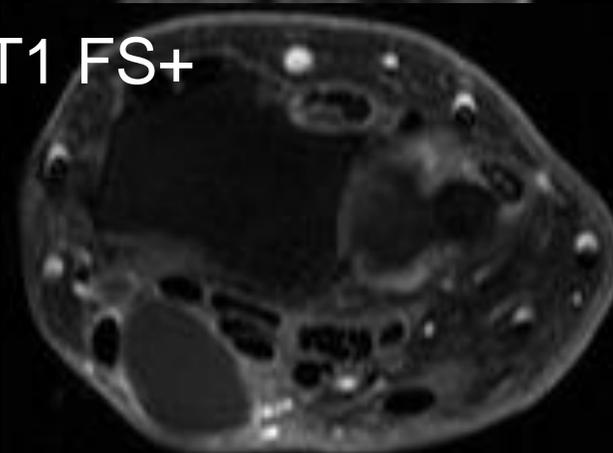
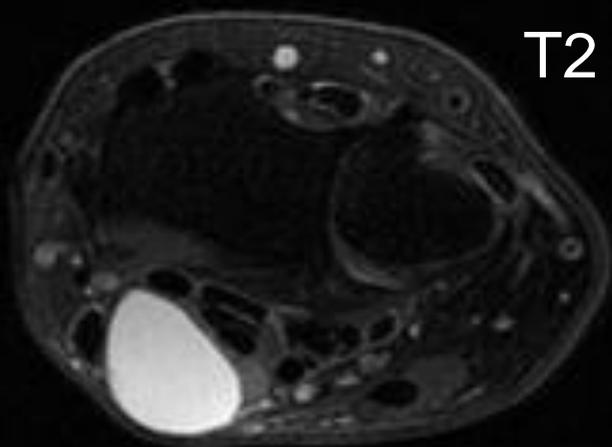
T2 FS



T1



T1 FS+



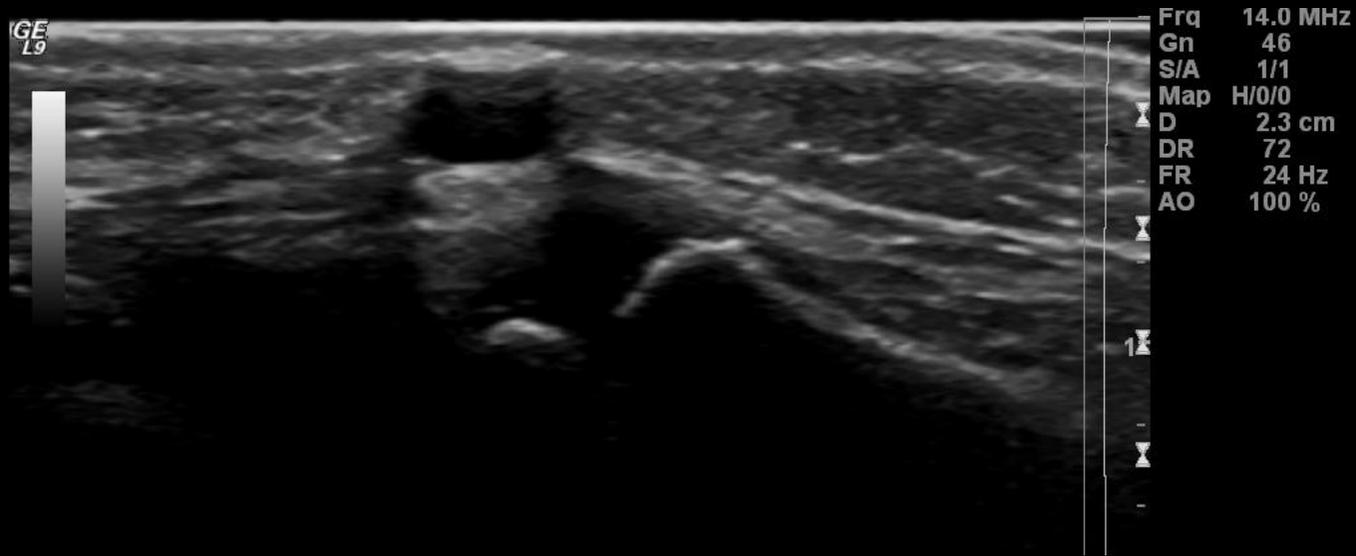
40 F w/ a Palpable Wrist Mass



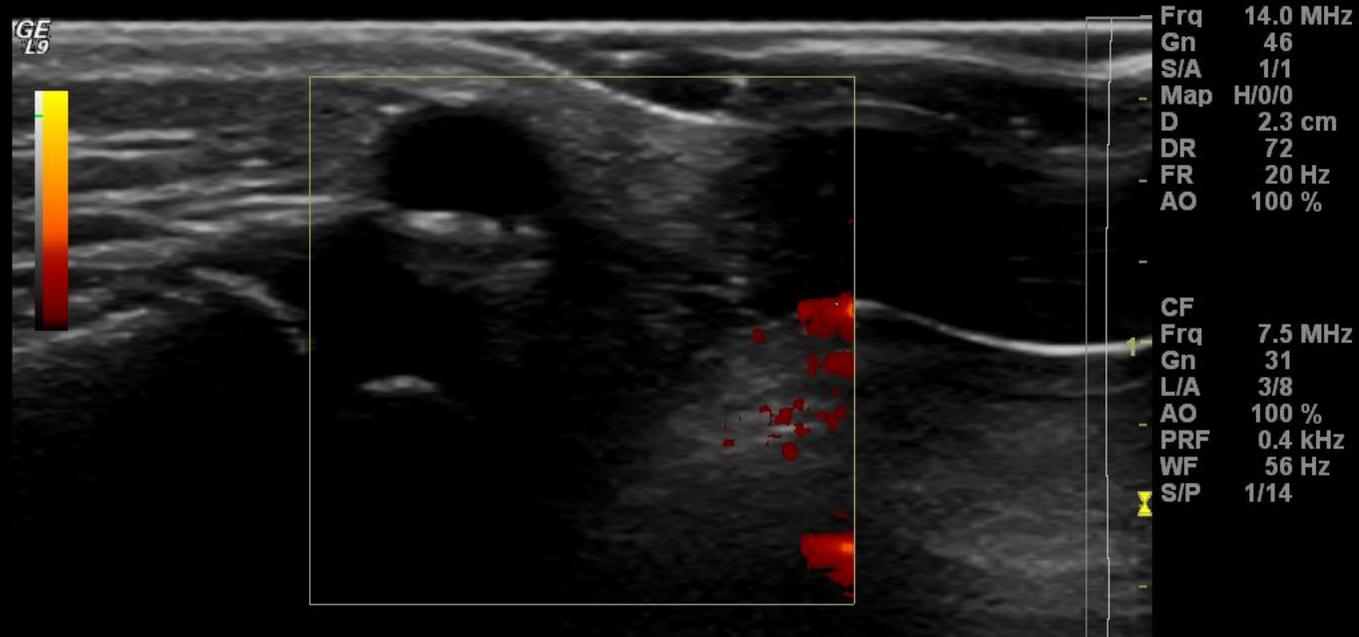
40 F w/ a Palpable Wrist Mass



3 F w/ incidental wrist lump



SAG LEFT WRIST



Intraosseous Ganglion Cysts

- ▶ Commonly scaphoid and lunate
- ▶ May be primarily in bone or juxta-osseous with intra-osseous extension
- ▶ May be a cause of unexplained wrist pain⁴
- ▶ MRI/CT helps with surgical planning
 - ◆ Curettage and bone grafting for large lesions

52 M casino dealer w/ dorsal wrist pain, no provided h/o trauma

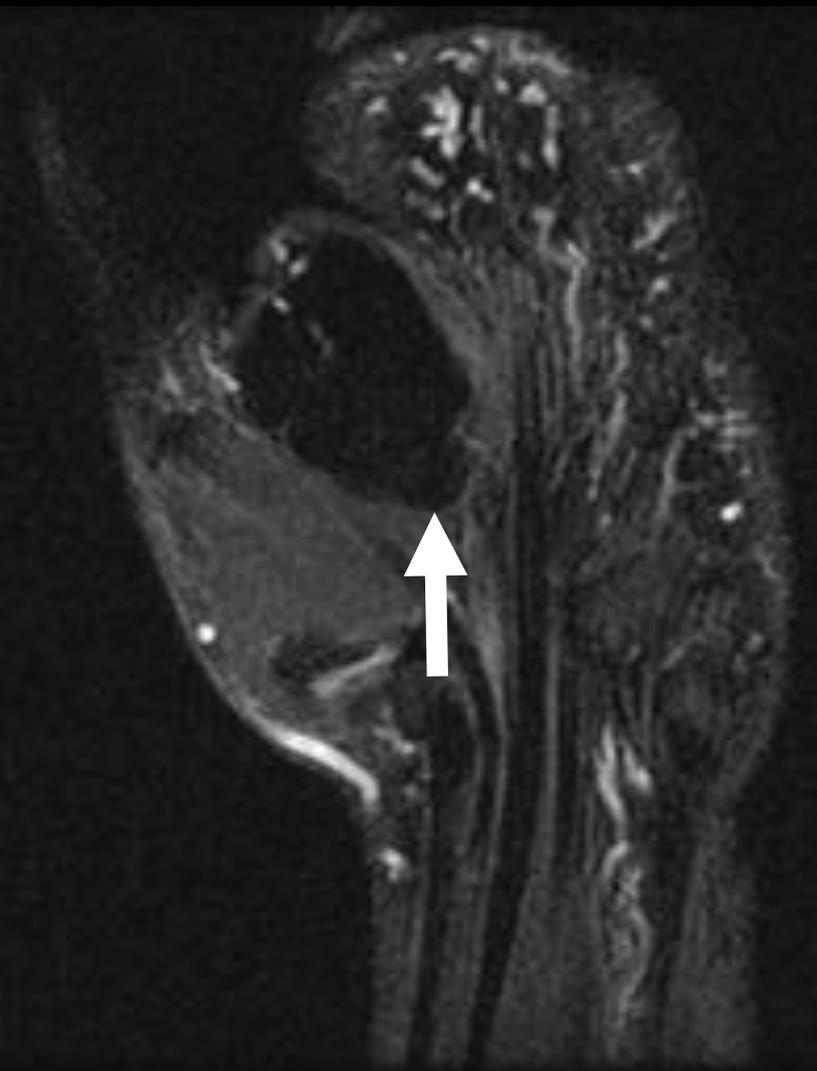


GANGLION CYST

- ▶ When is imaging actually helpful?
 - ◆ Smaller or occult carpal ganglia, which can be very painful
- ▶ How accurate are we? ⁵
 - ◆ 160 patients w/ carpal ganglia:
 - 156 = ganglia
 - 4 = synovial tissue x 3; reactive changes w/ no cyst
 - ◆ Savings = \$352 / pt = \$55,263

FAT

35 M painless thenar mass



T2 FS



T1

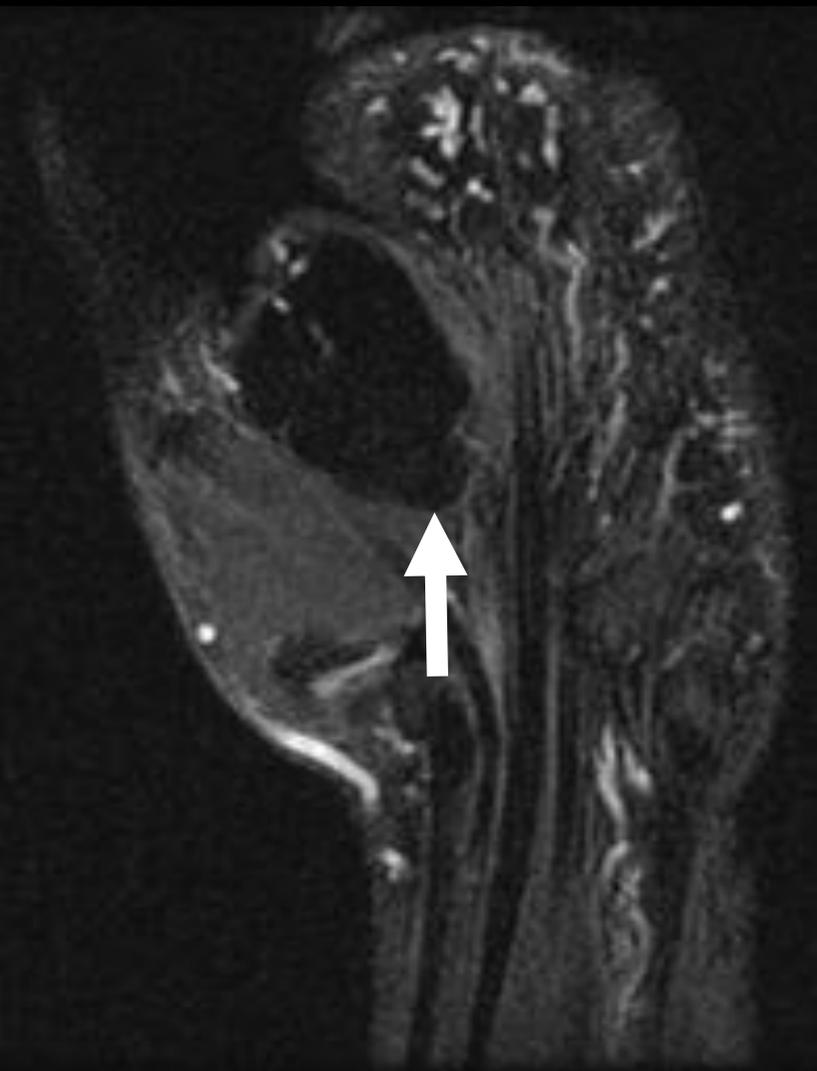


T1 FS +

LIPOMA

- ▶ Common solid cellular tumor with mature fatty tissue that can occur almost anywhere in the musculoskeletal system
- ▶ The wrist/hand is a common site for lipomas!
- ▶ Fibrous capsule usually too small to resolve w/ imaging
- ▶ **Locations:**
 - ◆ Thenar eminence most common site ⁶
 - ◆ Superficial > Intramuscular
 - ◆ Guyon canal or carpal tunnel or anywhere!!
- ▶ **CT:** Low fatty attenuation (-65 to 120 HU)
- ▶ **MRI:** High T1/T2, low SI on FS images, no internal enhancement although may see rim enhancement of displaced tissue or vessels
- ▶ **Treatment:** Excision if symptomatic; Recurrence rare

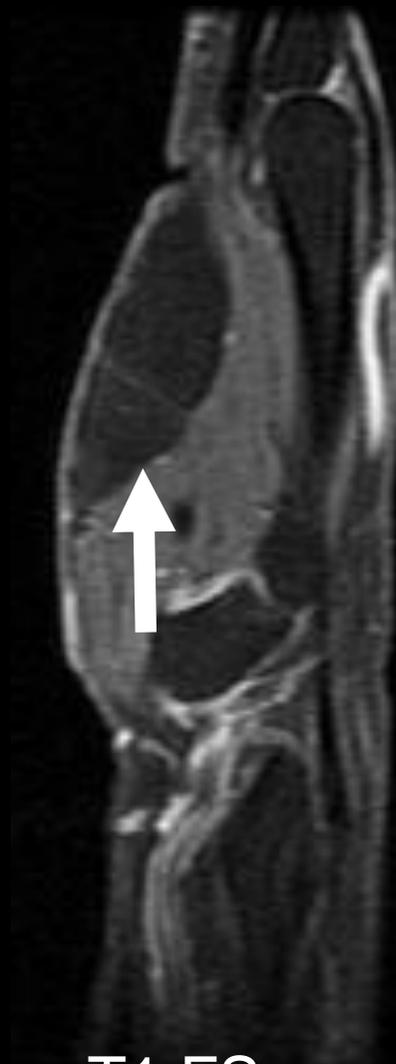
Thenar Eminence: Superficial



T2 FS

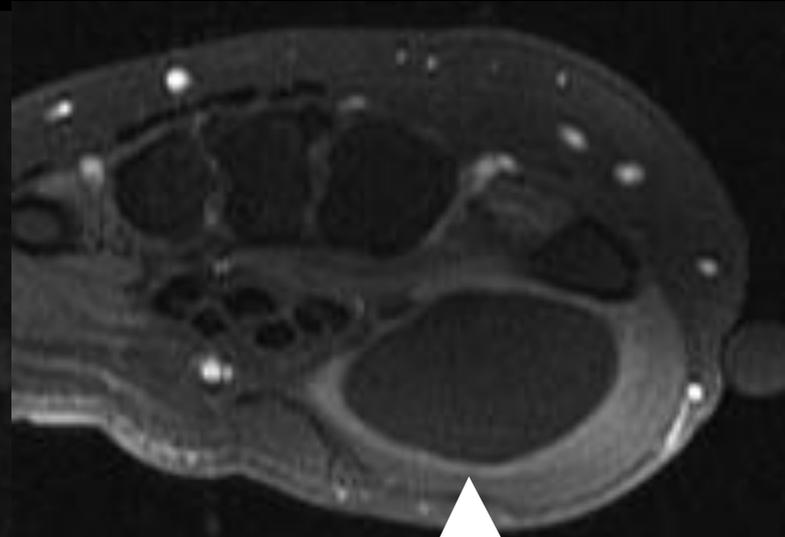
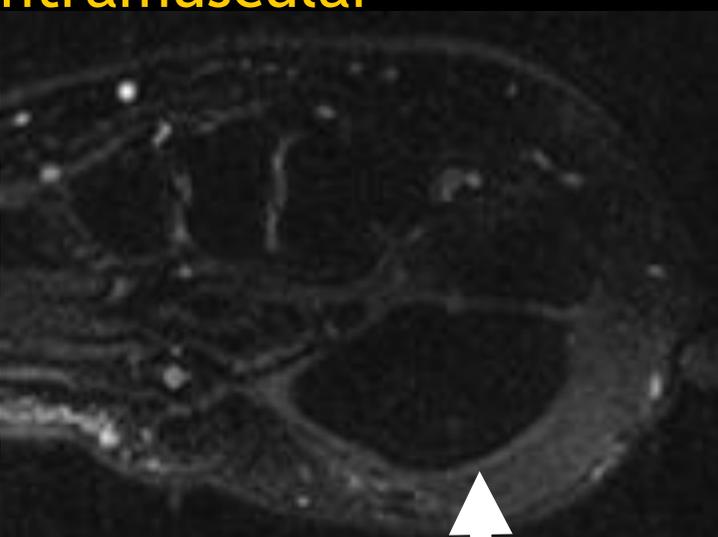
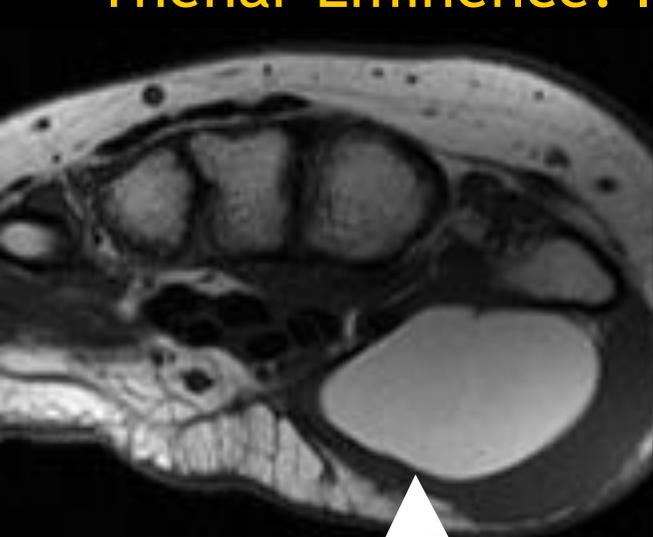


T1



T1 FS +

Thenar Eminence: Intramuscular



T2

T1

T1 FS +

62 F with snuffbox mass



T2 FS



T1



T1 FS +

ARTHRITIDES/SYNOVIAL PROCESSES

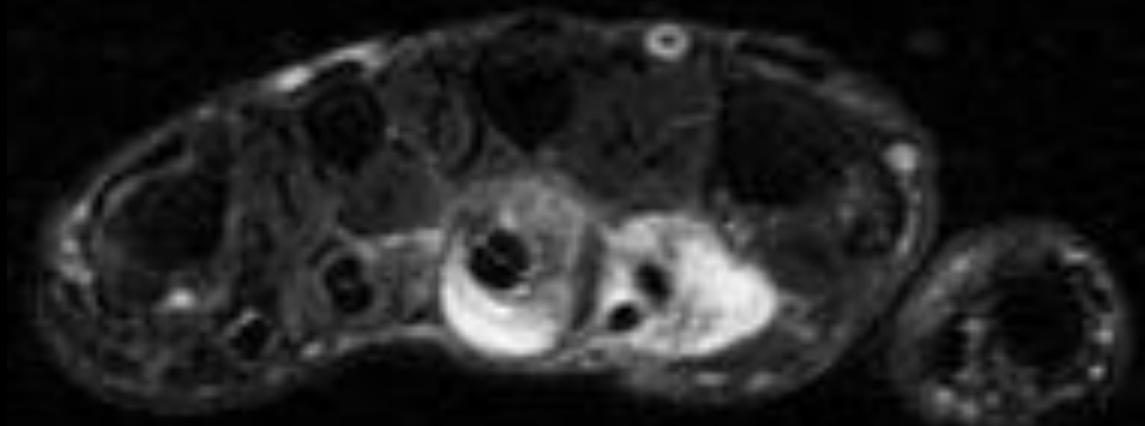
ARTHRITIDES & SYNOVIAL PROCESSES

- ▶ OA: osteophytes
- ▶ Arthritides:
 - ◆ Joint effusions
 - ◆ RA synovial proliferation = synovitis, tenosynovitis, bursitis
 - ◆ Gout: Tophi, tenosynovitis, bursitis
- ▶ Others:
 - ◆ Overuse tendonitis/tenosynovitis
 - ◆ Synovial (osteo)chondromatosis
 - ◆ PVNS/GCTTS
 - ◆ Infection

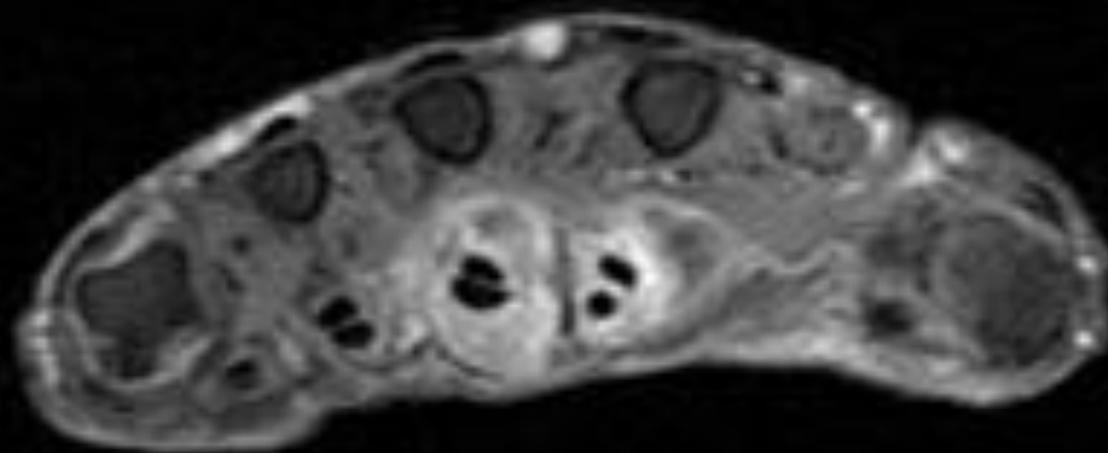
RHEUMATOID ARTHRITIS

- ▶ Synovial hypertrophy (pannus) with erosions, joint space narrowing and soft tissue swelling
- ▶ Tenosynovitis often presenting symptom, preceding erosive changes⁷
- ▶ CT: Detects early subchondral erosions, insensitive for chondral lesions; Pannus enhances
- ▶ **MRI:**
 - ◆ Tenosynovitis
 - ◆ Erosions +/- marrow edema
 - ◆ Chondral loss
 - ◆ Joint effusions
 - ◆ Enhancing pannus

72 F with RA, growing “mass” in the palm of the hand



T2 FS



T1 FS +

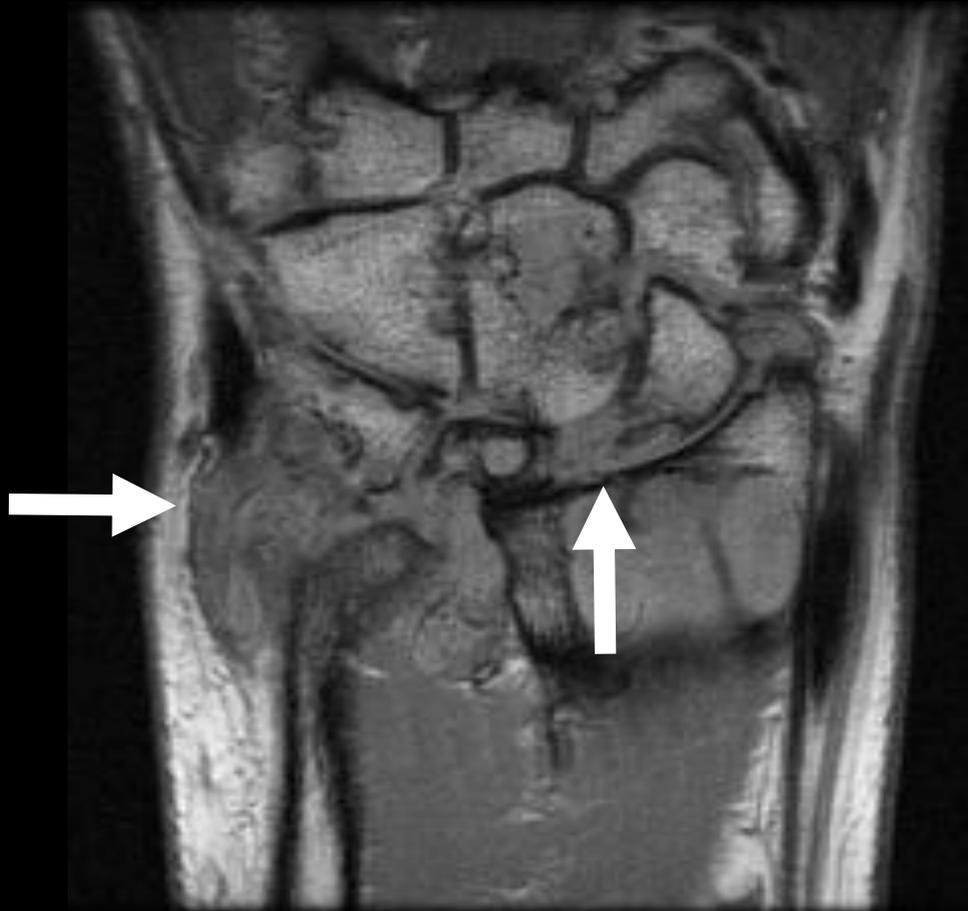
47 F with pain, tenderness, & fullness



47 F with pain, tenderness, & fullness

PD

T2 FS

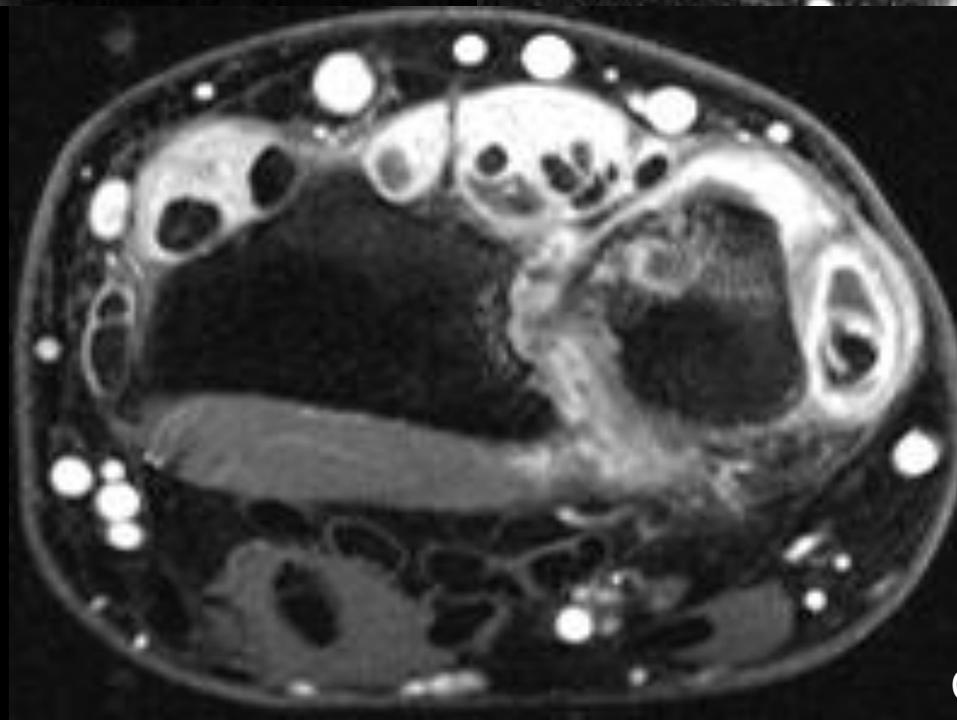
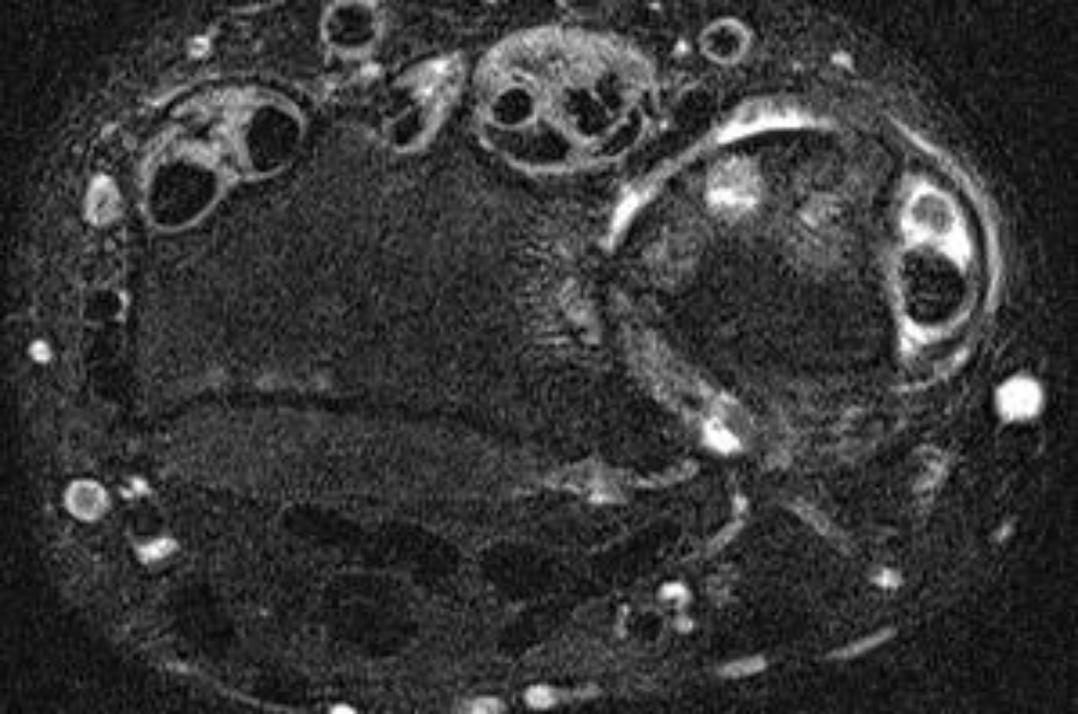
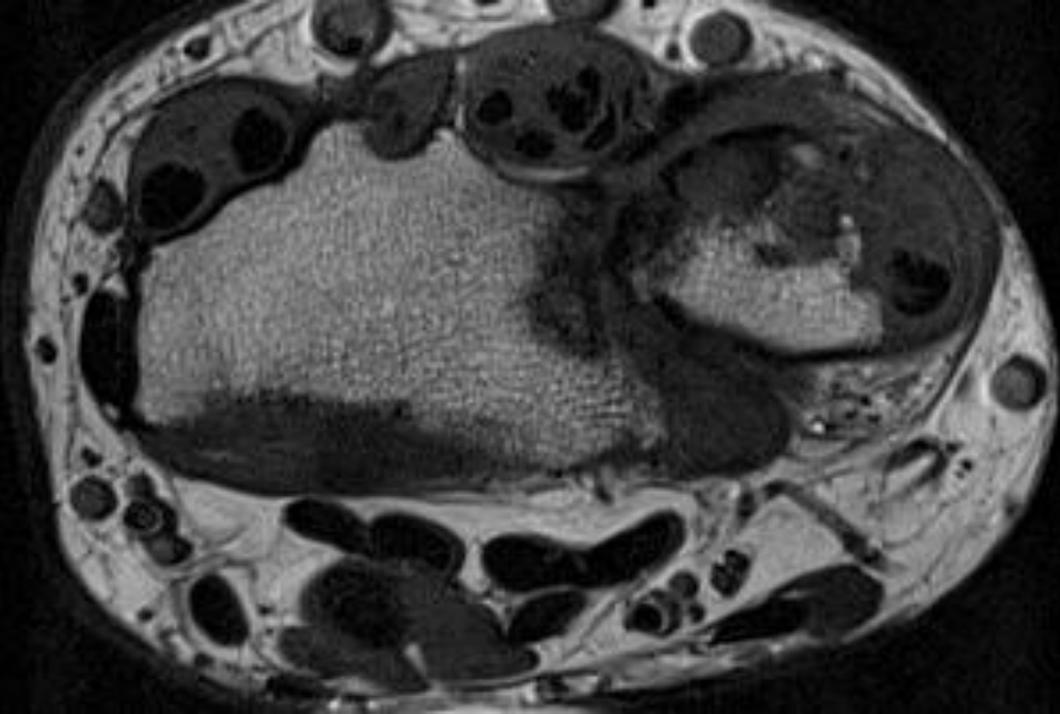


Synovial
Hypertrophy

Bony
Erosions

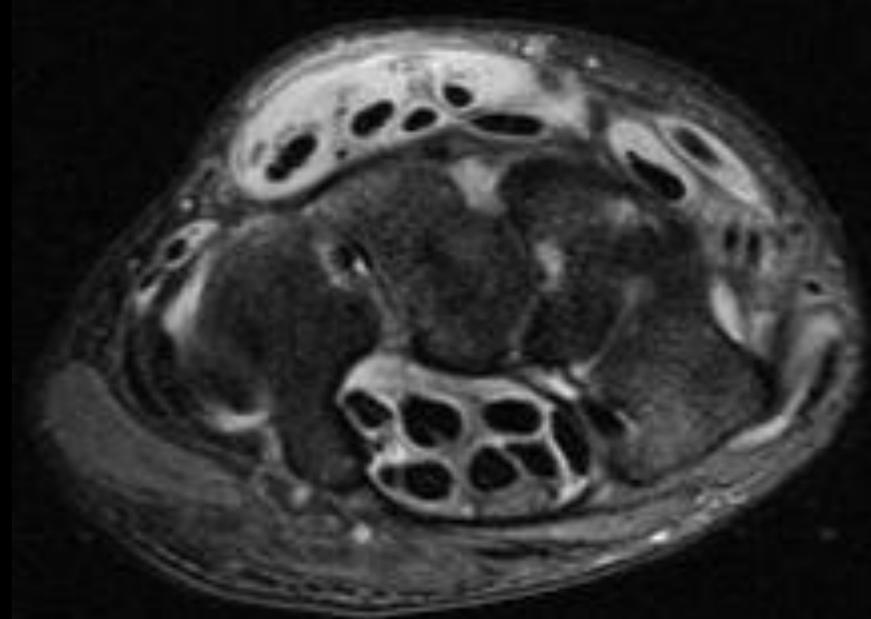
No Normal
TFC



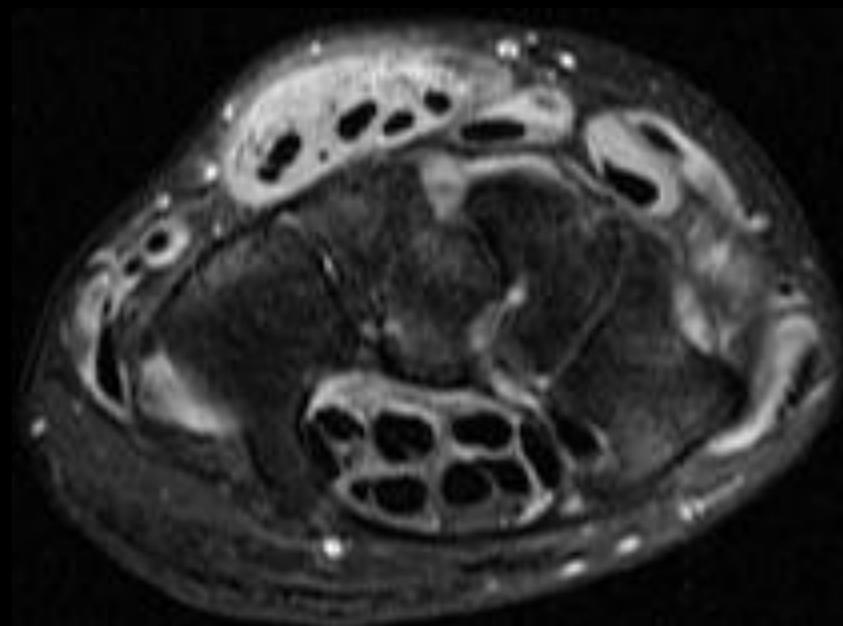


Case Courtesy of K. Chen, MD

25 F w/ dorsal tenosynovitis



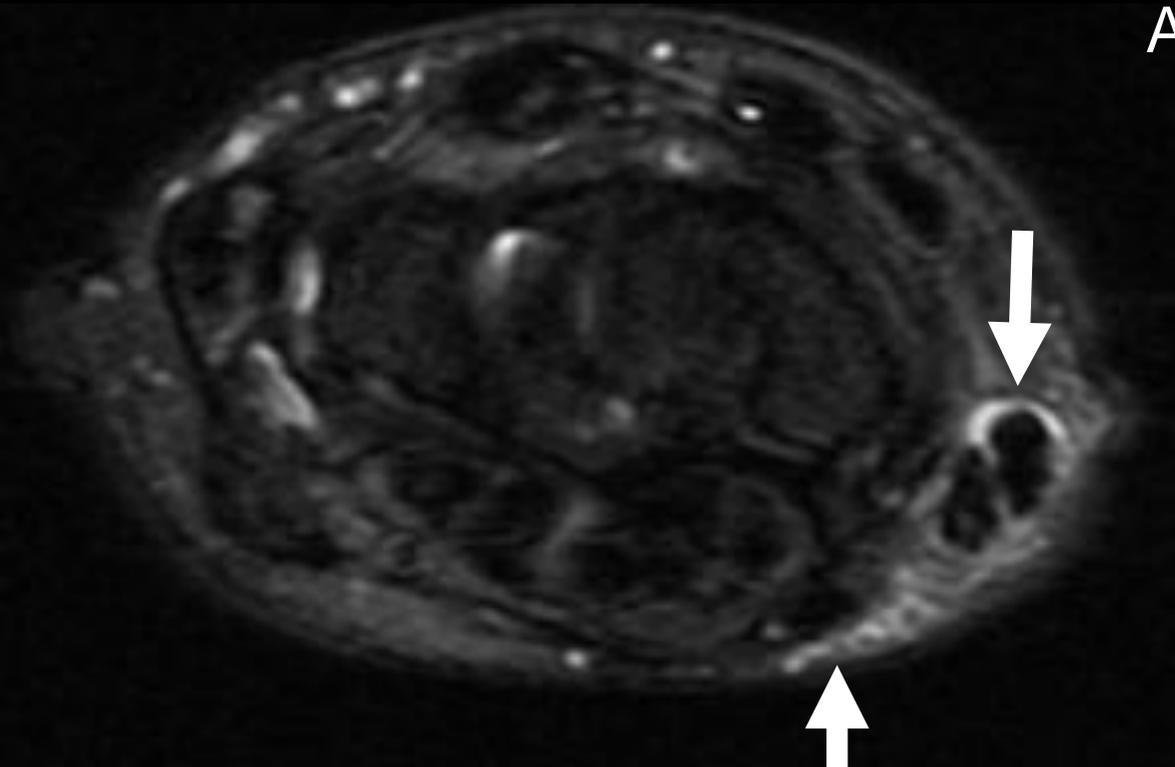
Intermediate FS



T1 FS +

53 F w/ dorsal and radial-sided pain/swelling: De Quervain's

Tendinosis/Tenosynovitis
APL & EPB



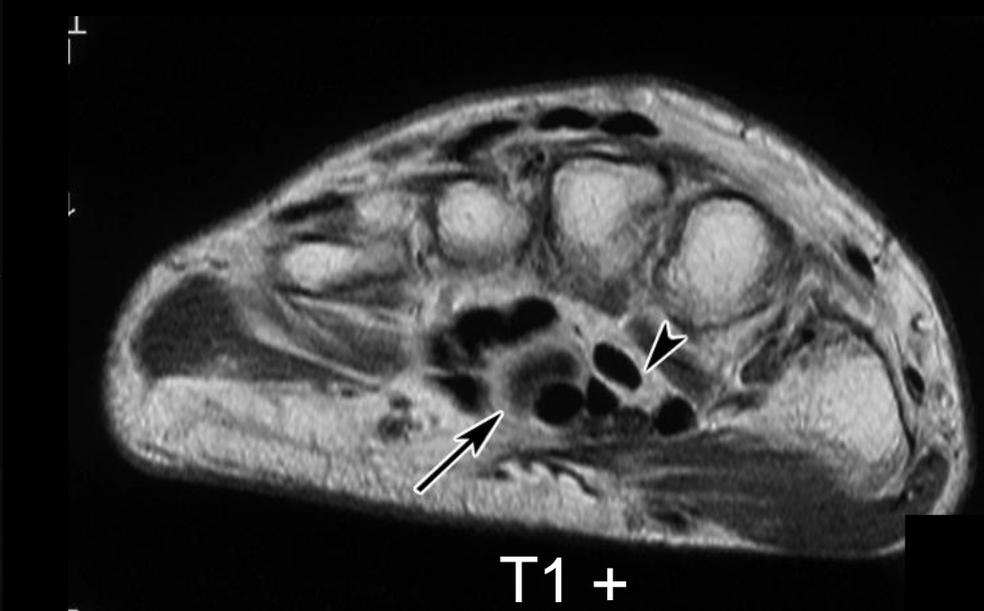
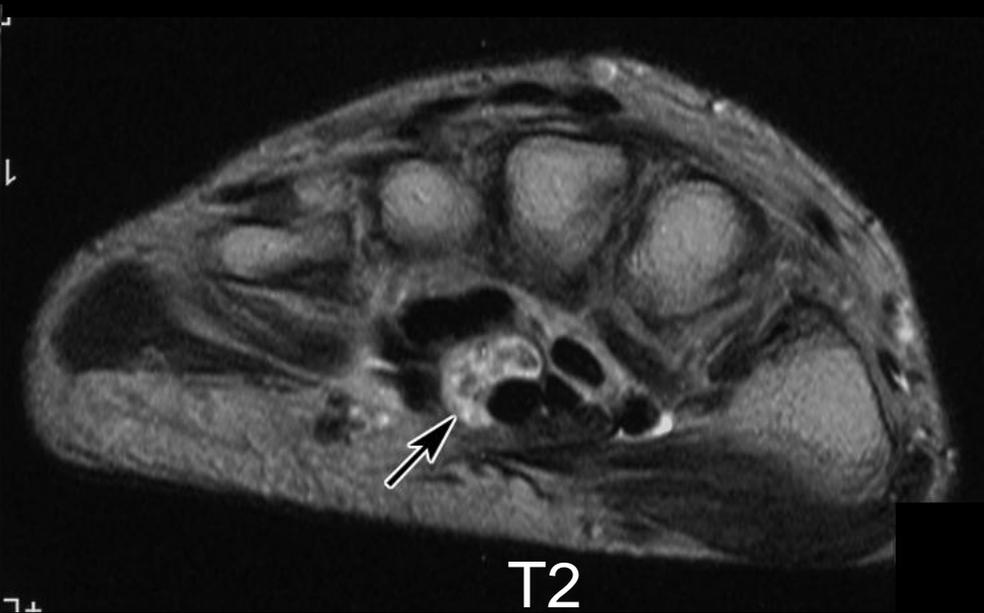
T2 FS

Soft Tissue
Edema



PD FS

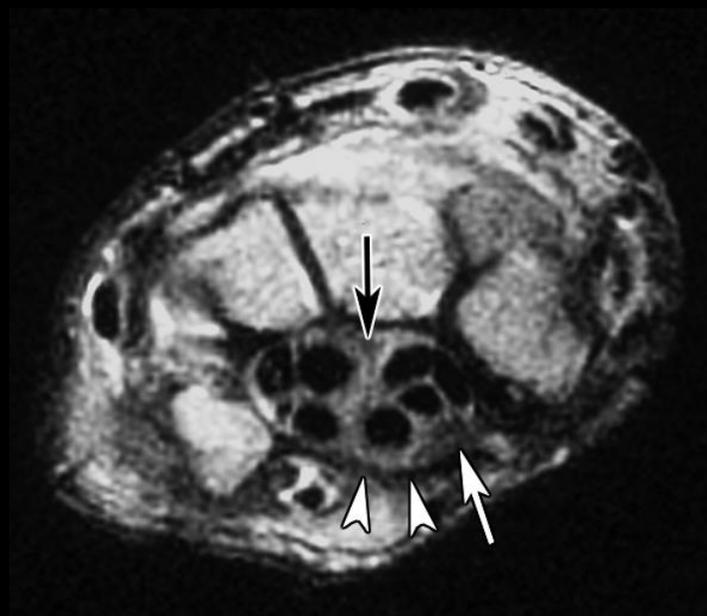
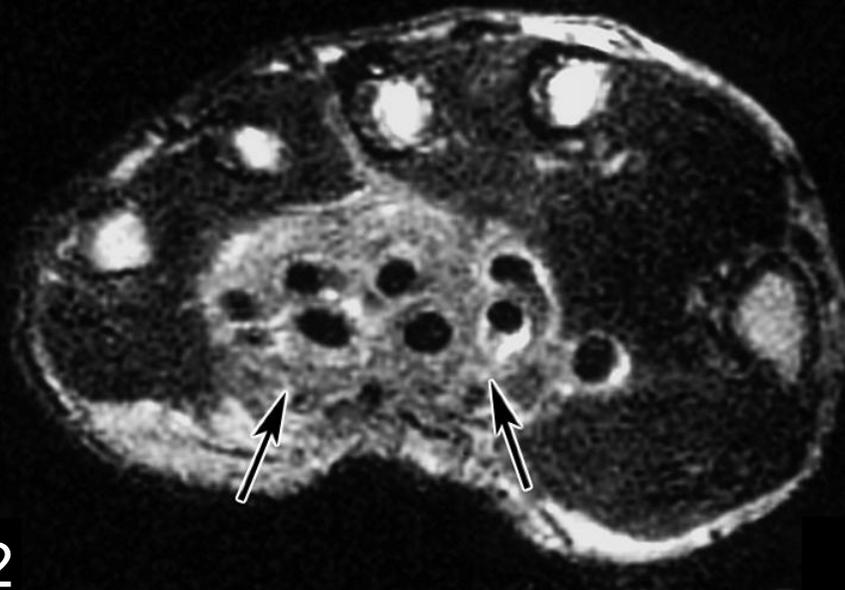
64 F w/ swelling & carpal tunnel x 8 mo's: TB⁹



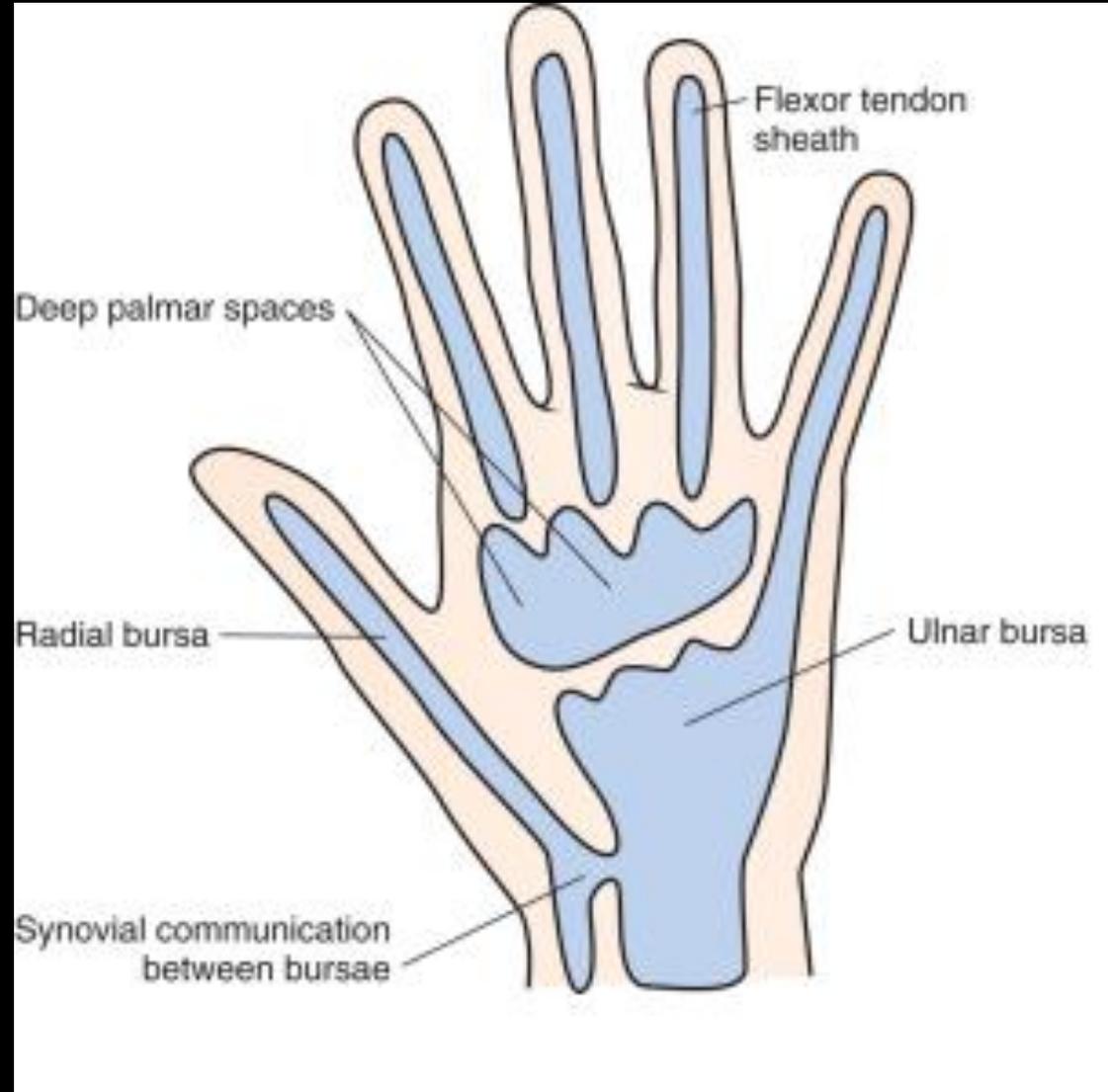
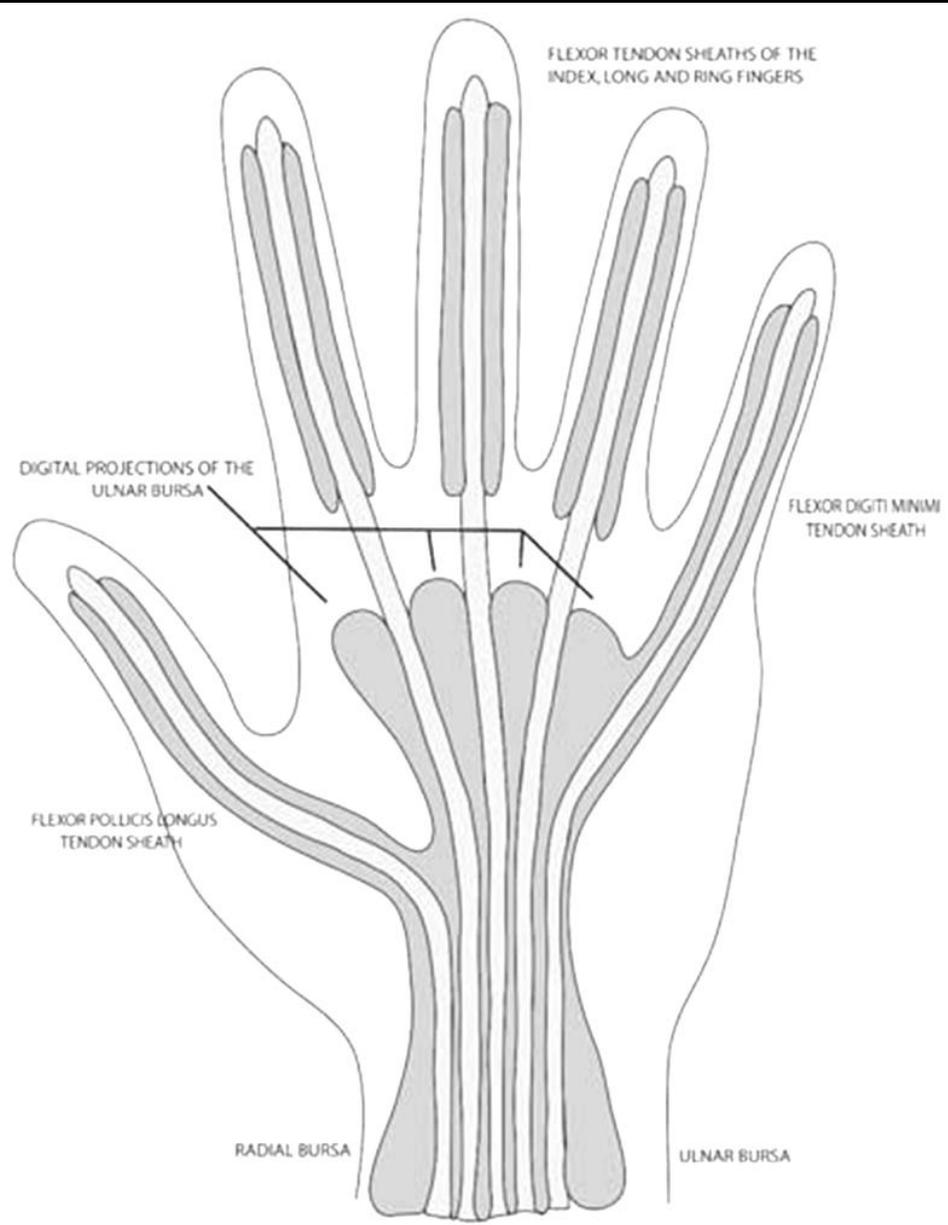
58 M w/ TB infection of right wrist ⁹



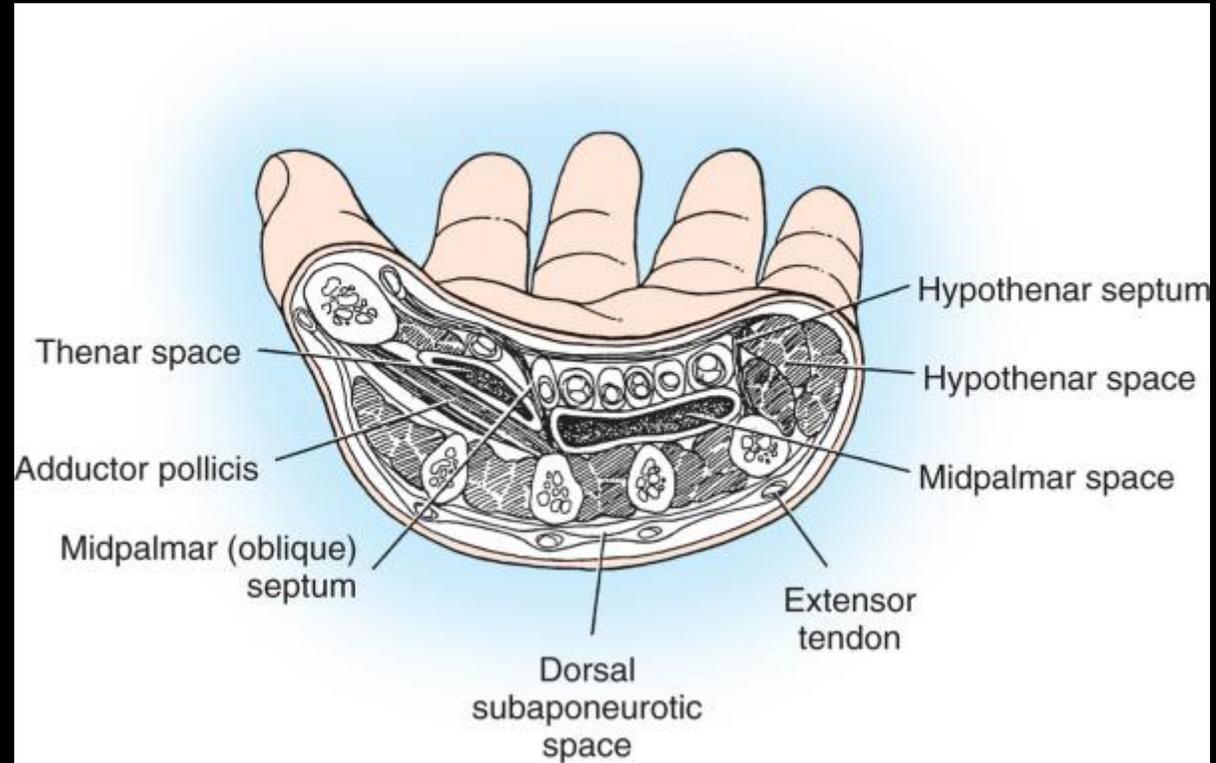
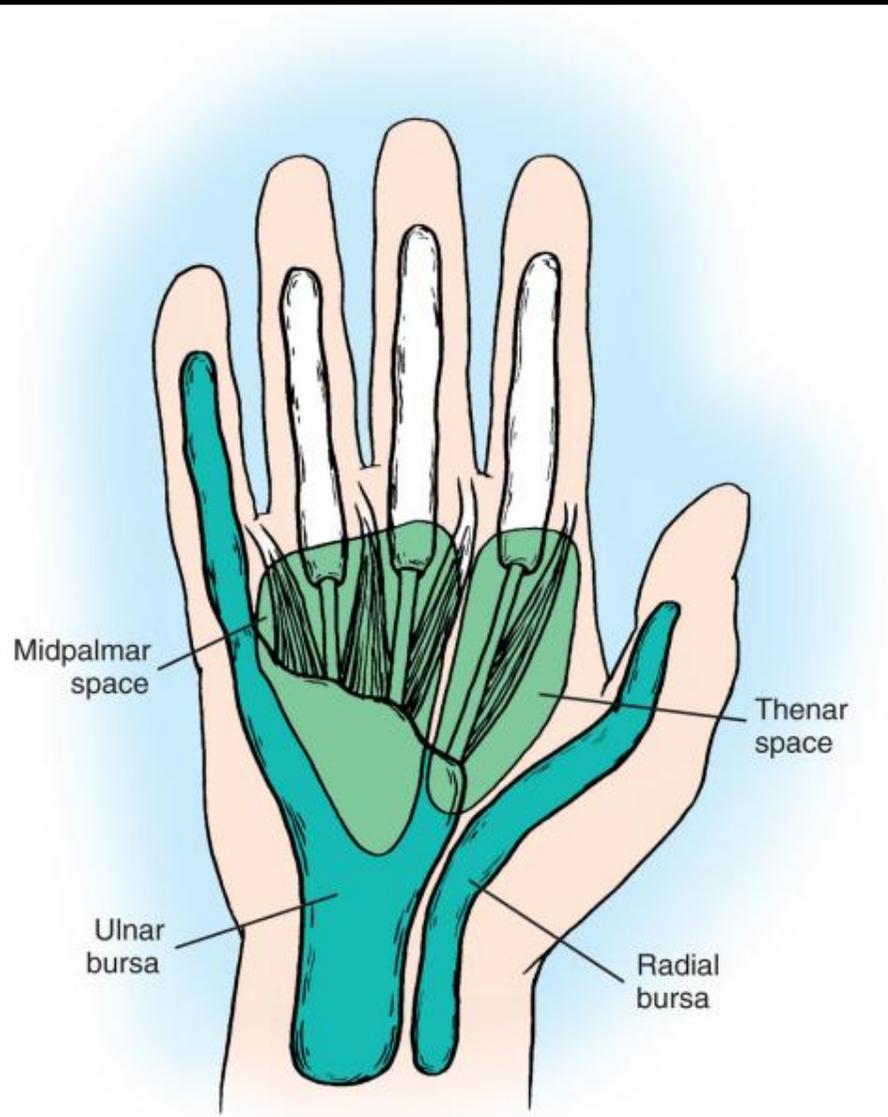
T2



PALMAR SPACES



PALMAR SPACES



59 M w/ left wrist swelling & decreased ROM



Articular Erosions
w/ Overhanging
Margins

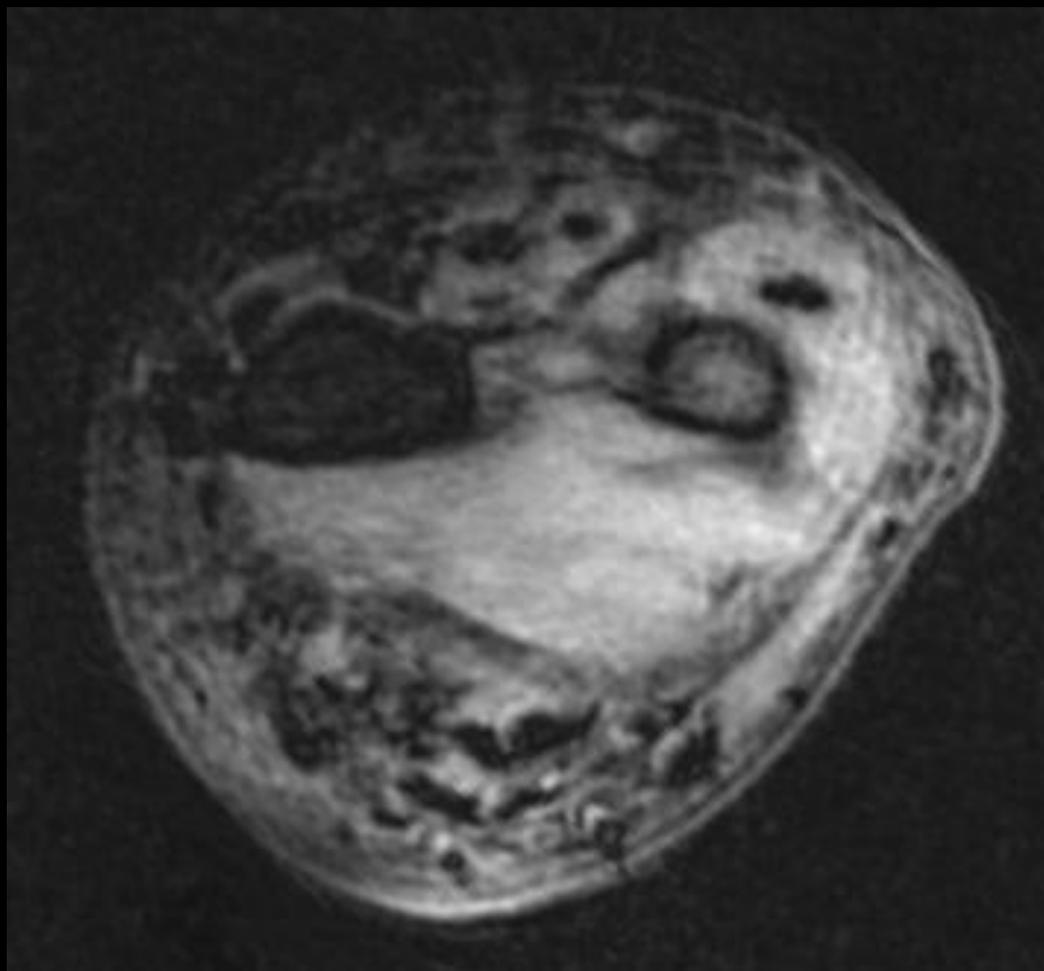
Vascular
Calcifications

Soft Tissue
Mass

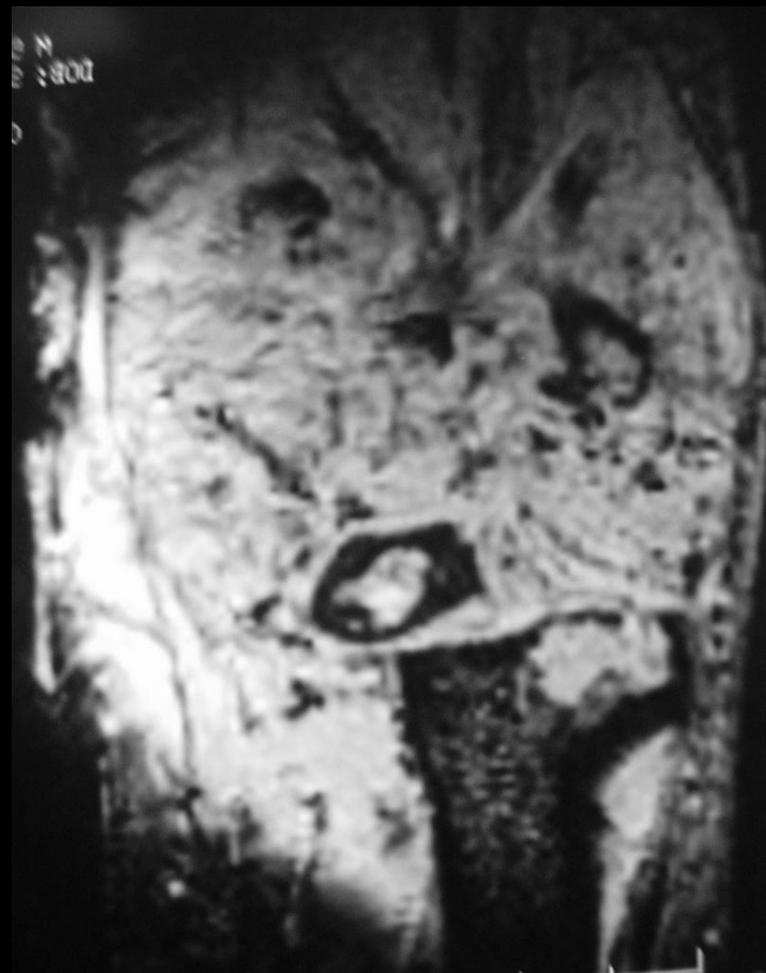
59 M w/ left wrist swelling & decreased ROM

Extensor Tendon Tenosynovitis

T2 Intense Mass w/ Carpal
Bones Erosion/Destruction



PD



T2 FS

TOPHACEOUS GOUT

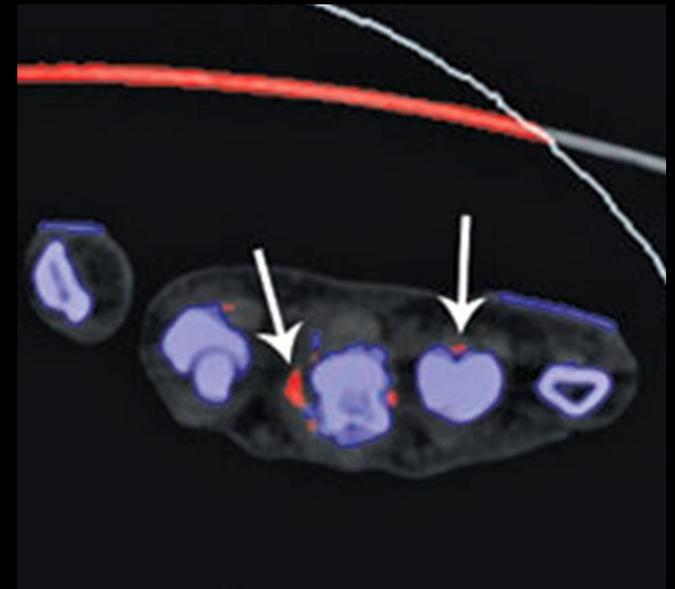
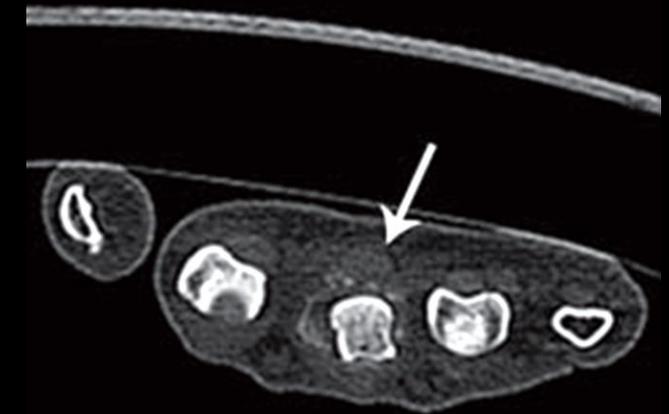
- ▶ Marginated erosions with overhanging edges and soft tissue tophi
- ▶ Can often *mimic other processes*
- ▶ Commonly due to underexcretion of urate (90%) vs. overproduction; This patient had diabetes & renal failure
- ▶ **MRI:** Low T1/Heterogenous T2 tophi with variable enhancement
- ▶ **CT:** Gouty tophi
 - ◆ HU = 160
 - ◆ Dual energy CT (80/140 kV) may obviate joint aspiration, assess disease burden (rheumatologist's love this!) ¹²

50 M s/p FOOSH¹²



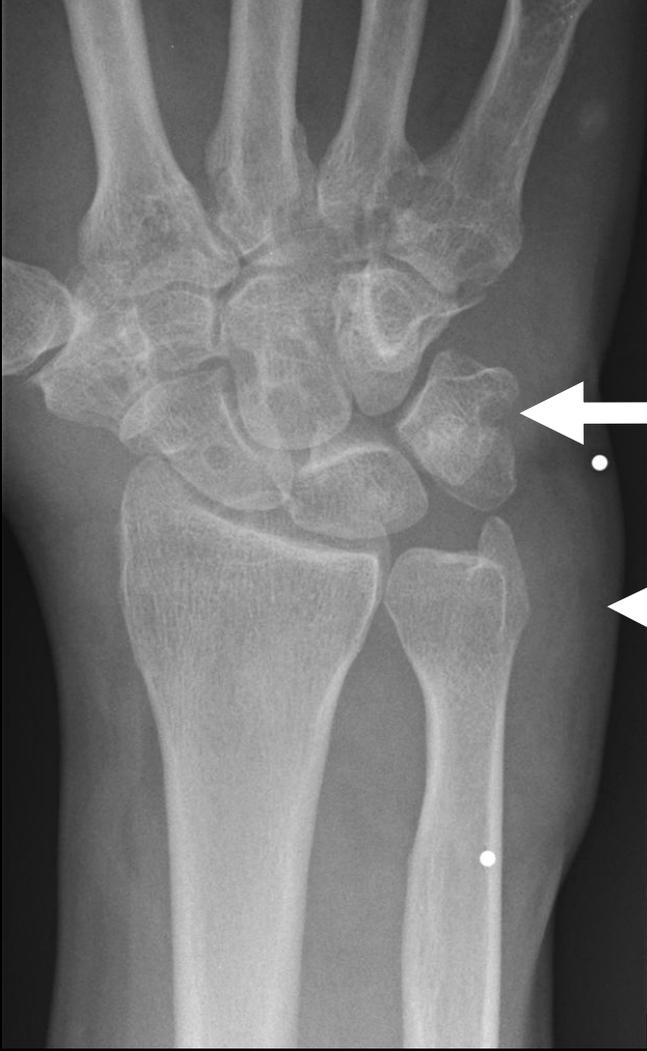
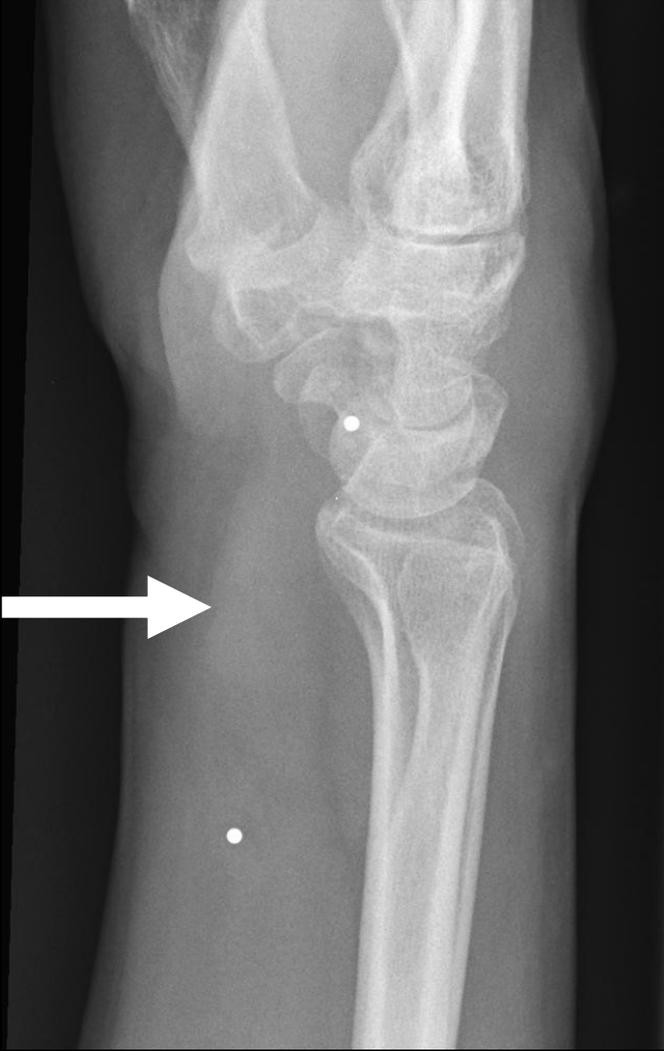
Resnick. IDJ 2007
Nicolaou. AJR 2010

71 M painful Lt hand¹²



60 M w/ right hand mass

Volar Soft
Tissue
Density?

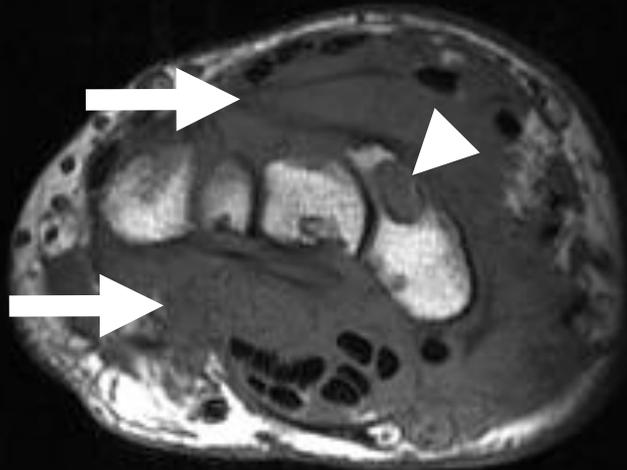


Bony
Erosions

Soft
Tissue
Density

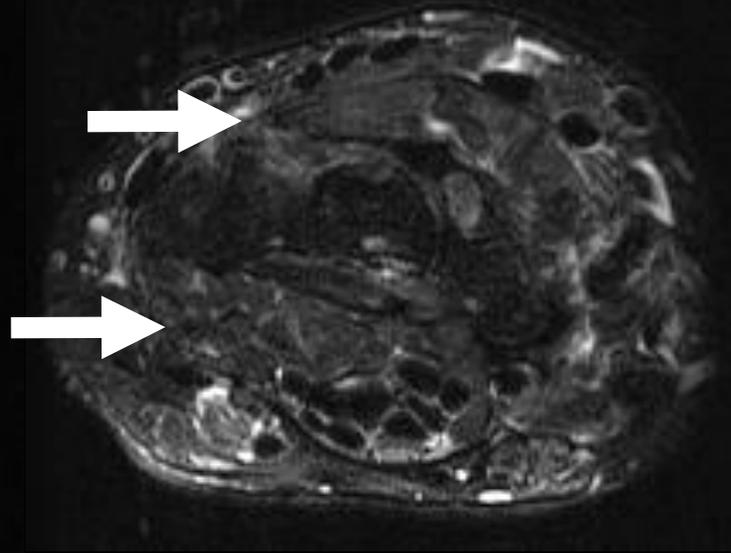
60 M w/ right hand mass

T1



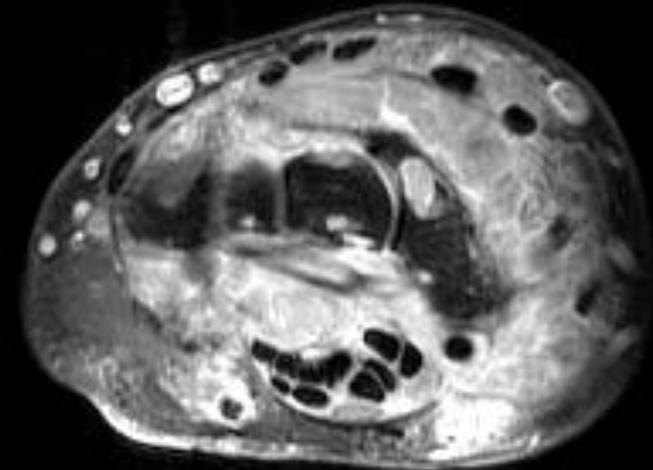
Masses T1
Isointense to Muscle
Displacing Tendons;
Bony Erosions
(arrowhead)

T2 FS



Masses Have Low
T2 SI on Fat-
Suppressed Images

T1 FS +

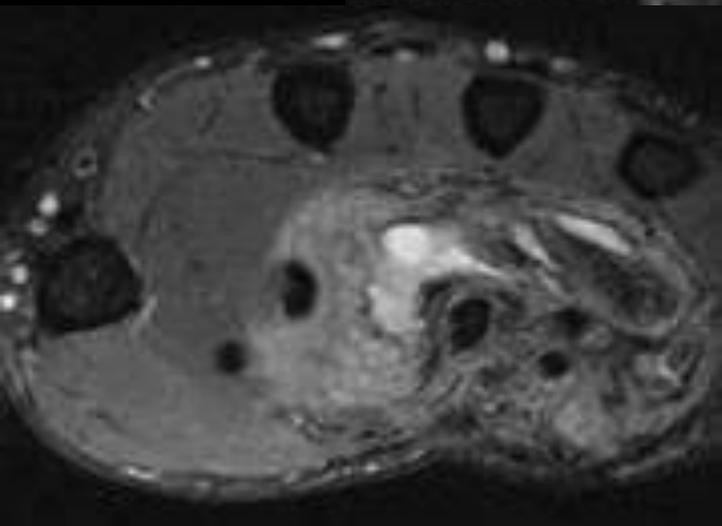
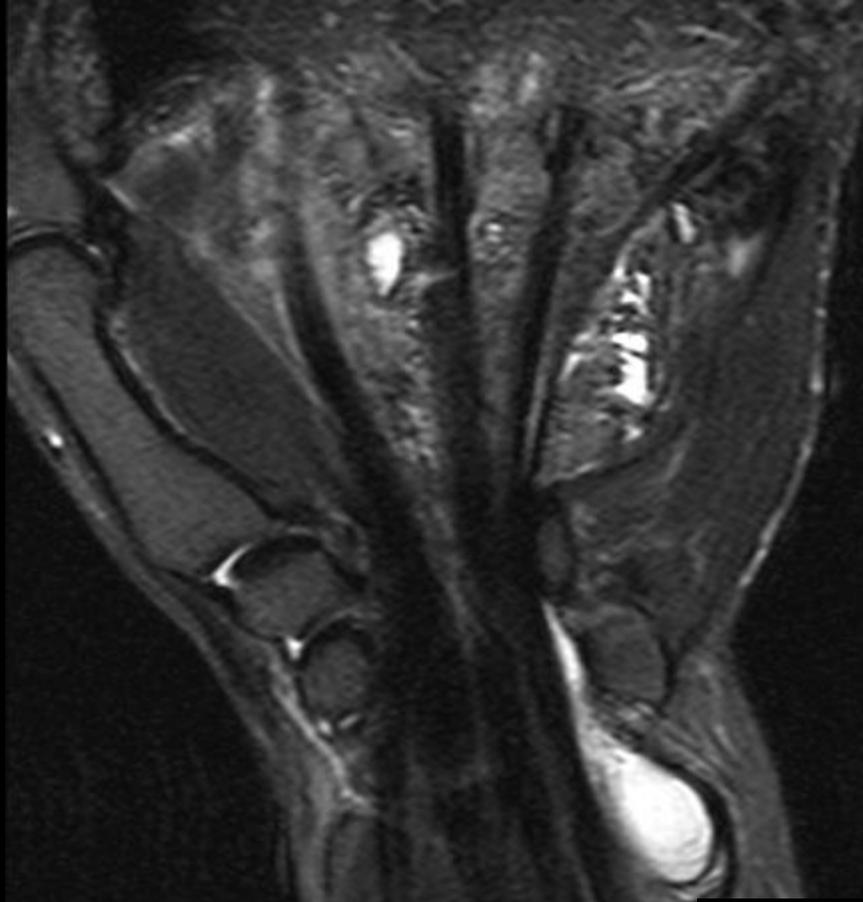


Strong Enhancement

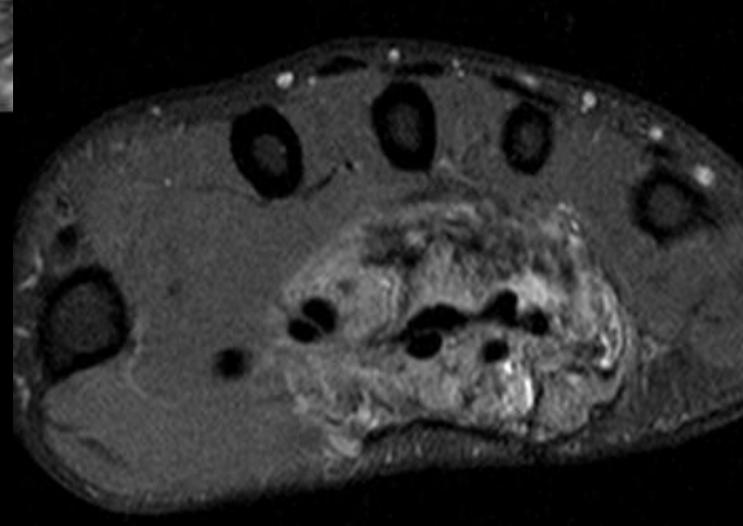
GIANT CELL TUMOR OF THE TENDON SHEATH (GCTTS)

- ▶ Reported to be second most common soft tissue mass of the hand
- ▶ Benign tumor of giant cells near joints/tendons, w/ intra- & extracellular *hemosiderin*
- ▶ Finger involvement >> wrist
- ▶ Extra-articular form of PVNS (same thing histologically and cytogenetically) ^{13,14}
- ▶ Commonly asymptomatic & slow-growing
- ▶ **Location:** Volar > Dorsal
- ▶ **Radiography:** ±soft tissue mass; marginated pressure erosions of bone
- ▶ **CT:** High density mass from iron content, enhancing synovium
- ▶ **MRI:** low/intermediate SI on T1 & T2 SI w/ areas of low SI from hemosiderin, especially on T2*/GRE (causes blooming); intense contrast enhancement
- ▶ **Treatment:** Excision difficult, recurrence common (10-50%)

29 F

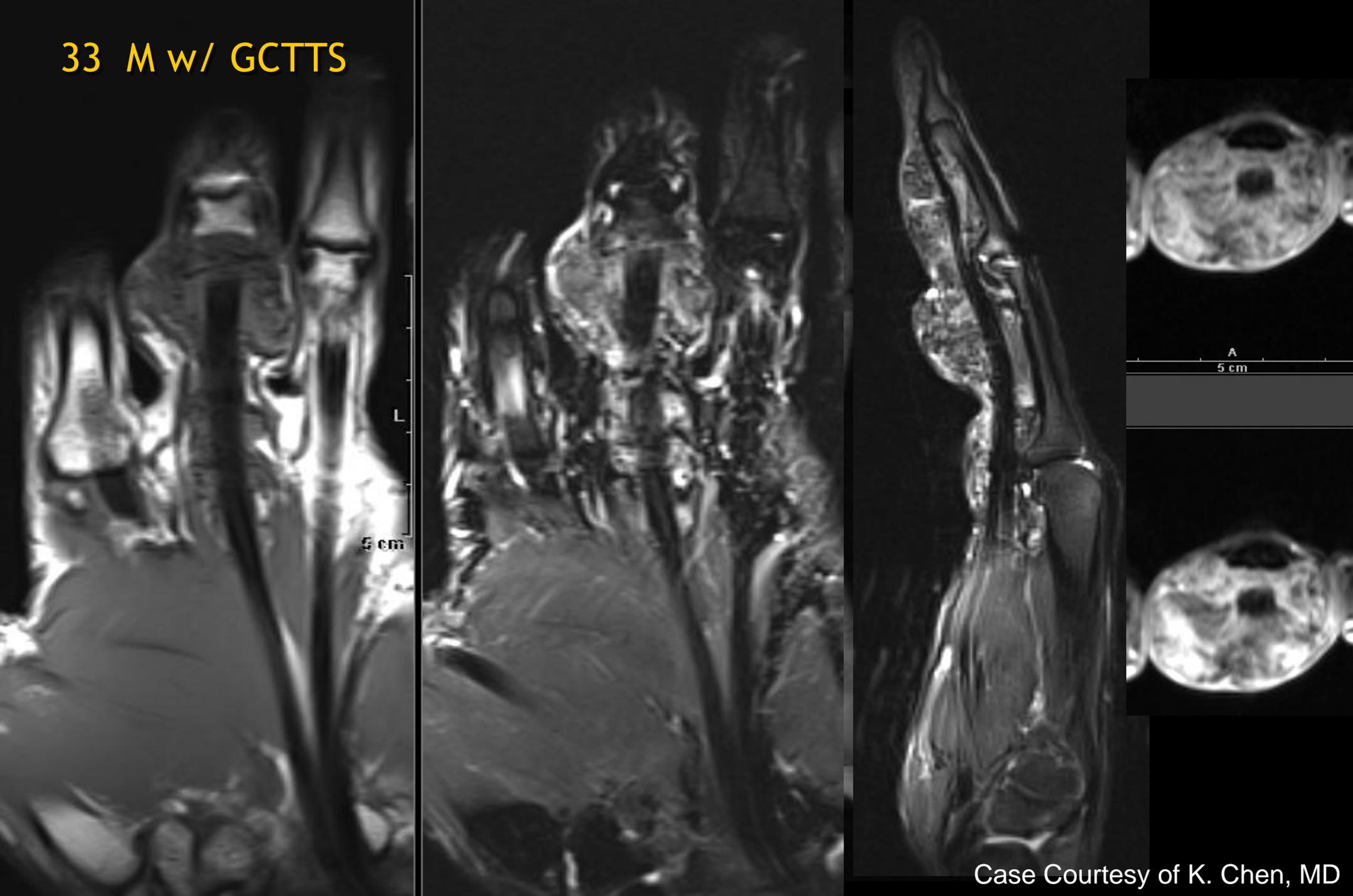


PD FS



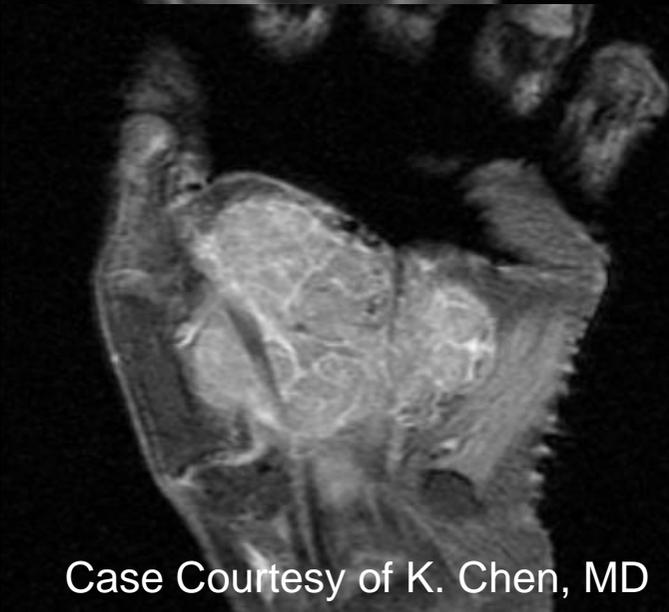
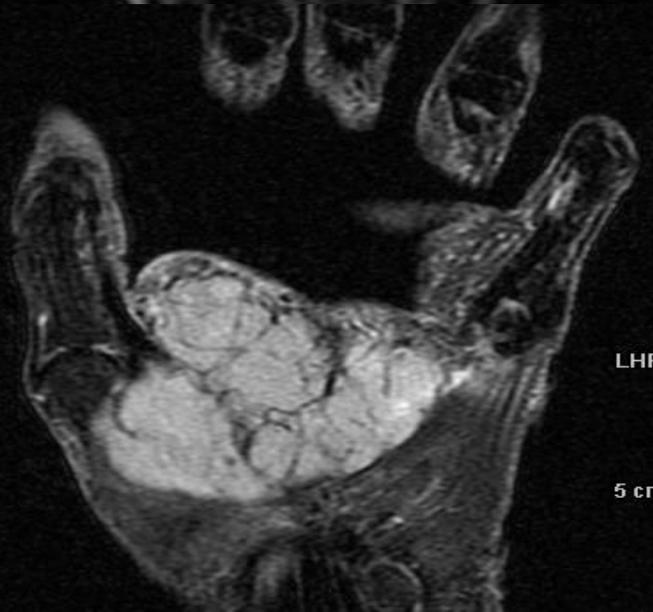
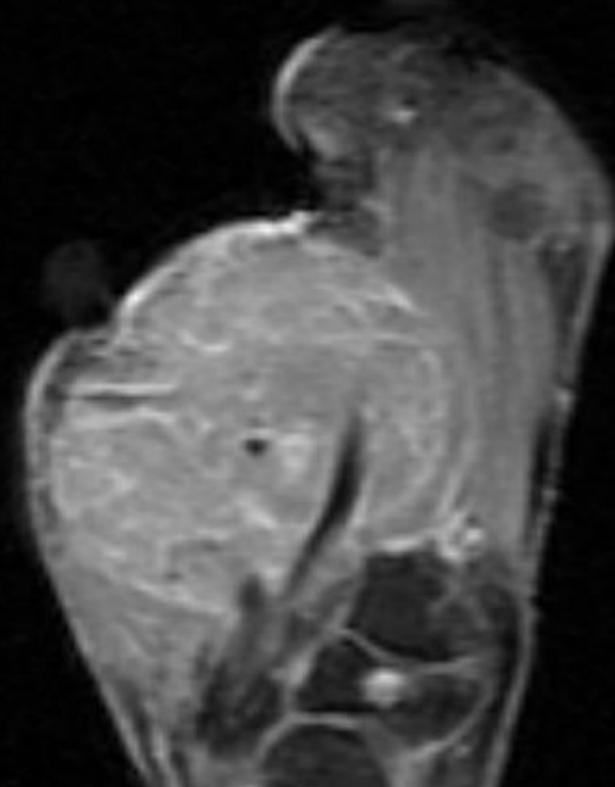
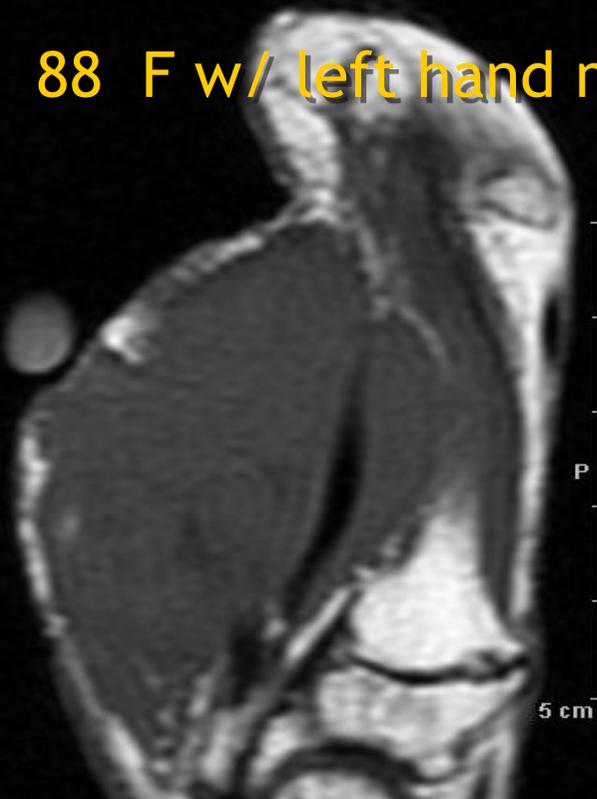
T1 FS +

33 M w/ GCTTS

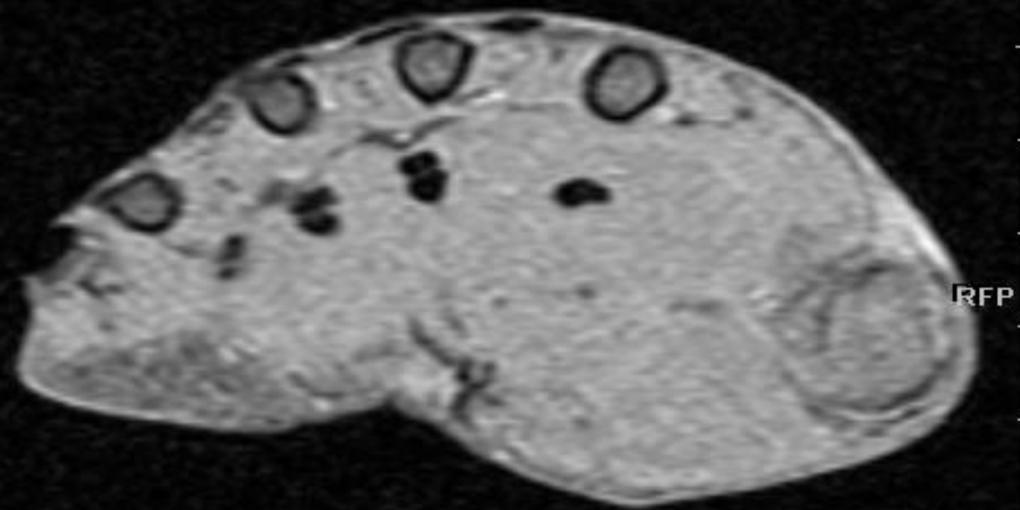


Case Courtesy of K. Chen, MD

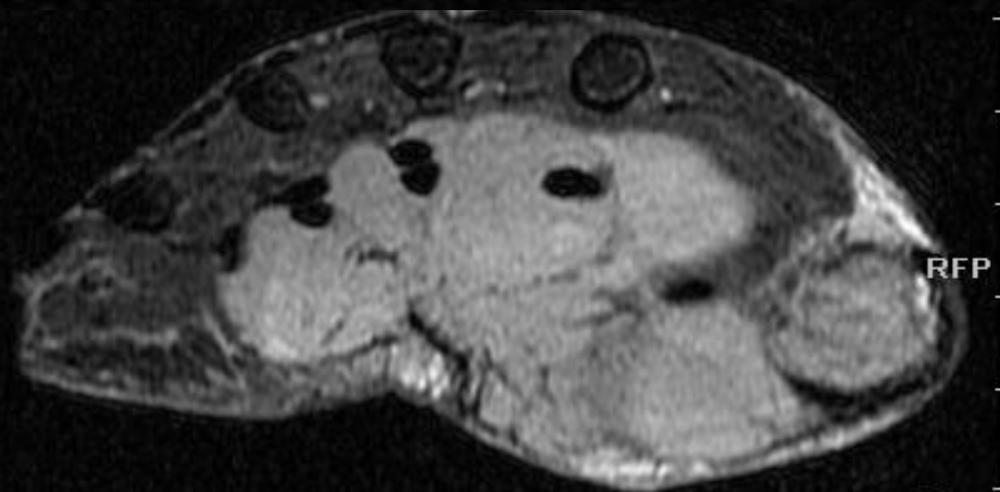
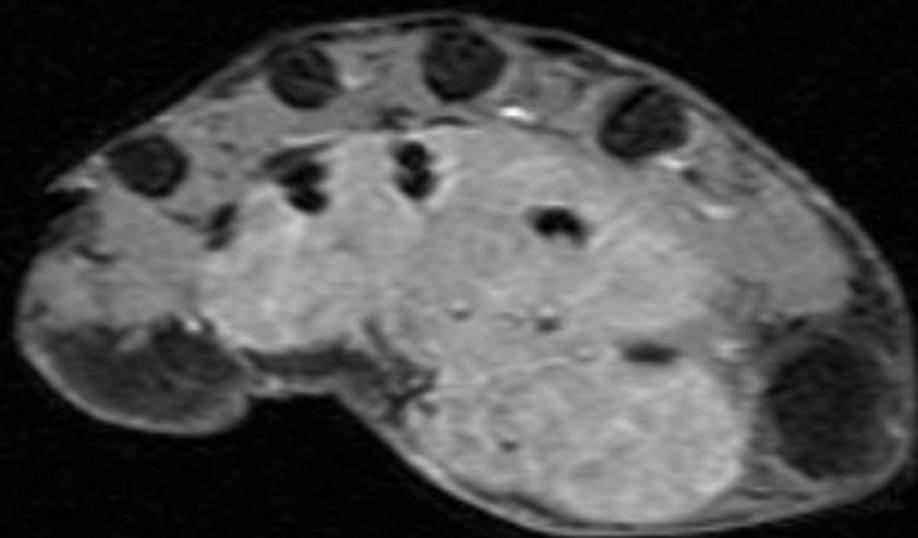
88 F w/ left hand mass



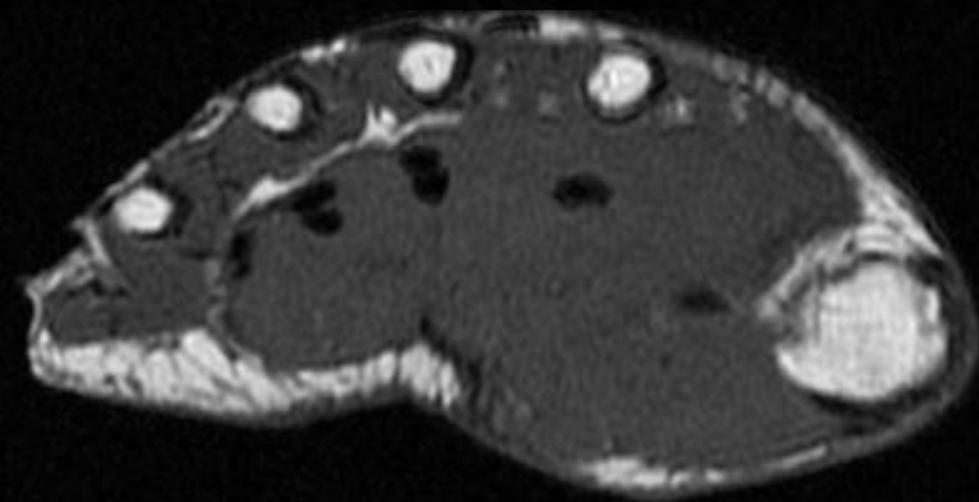
Case Courtesy of K. Chen, MD



5 cm



5 cm



60 M w/ wrist swelling



SYNOVIAL (OSTEO)CHONDROMATOSIS

- ▶ Non-neoplastic proliferation of cartilaginous nodules in the synovium of joints, bursae or tendon sheaths
- ▶ Monoarthropathy: knee > hip > shoulder > elbow
- ▶ In the wrist, extra-articular involvement is common (tenosynovium, bursa)
- ▶ **Radiography:**
 - ◆ Multiple calcified nodules of uniform size
 - ◆ Calcifications absent in 1/4 to 1/3
 - ◆ Pressure erosions
- ▶ **MRI:**
 - ◆ Low signal nodules if mineralized
 - ◆ High signal fatty elements centrally if present
- ▶ Treatment: synovectomy & removal of loose bodies

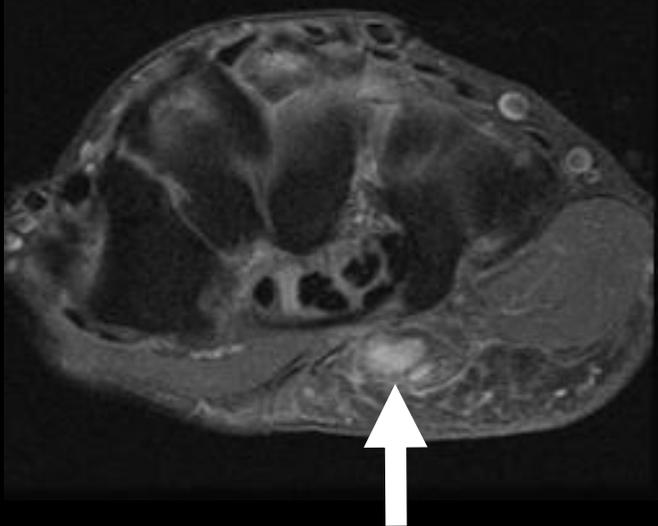
60 M w/ wrist swelling



VASCULAR

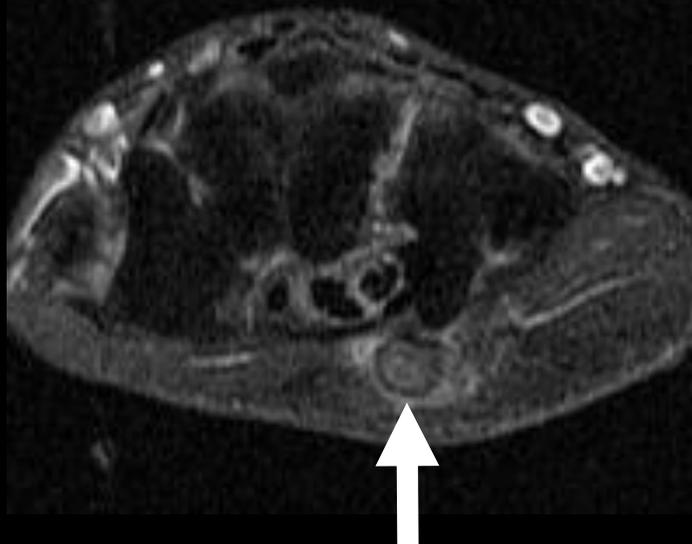
41 M with proximal wrist & palmar mass

Intermediate FS



Increased SI in dilated ulnar artery

T1 FS +



Perivascular enhancement with no intravascular enhancement

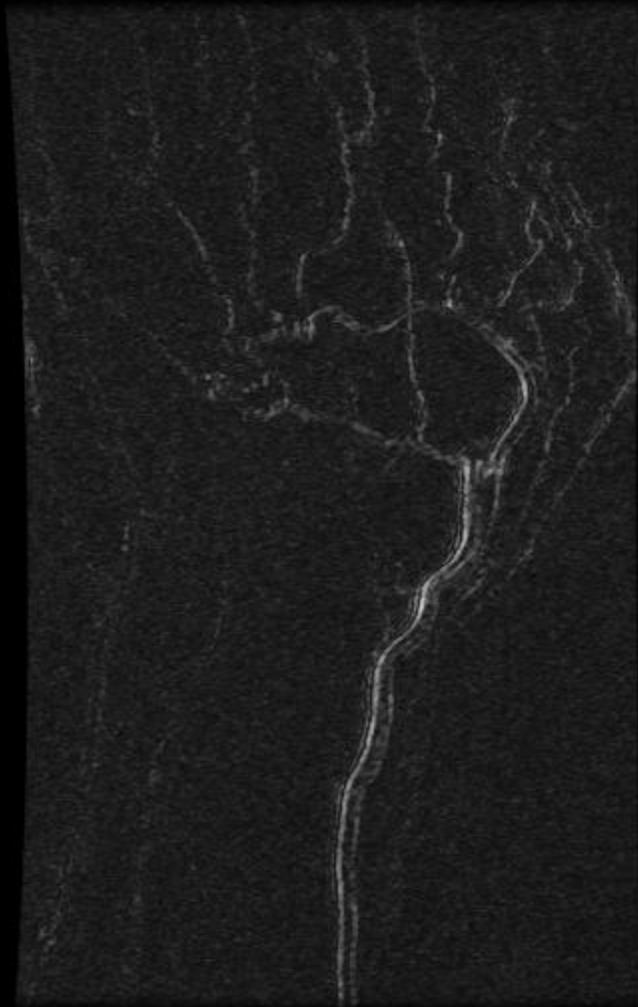
Intermediate FS



Tortuous, aneurysmal ulnar artery; proximal ulnar artery w/ normal flow void

41 M with proximal wrist & palmar mass

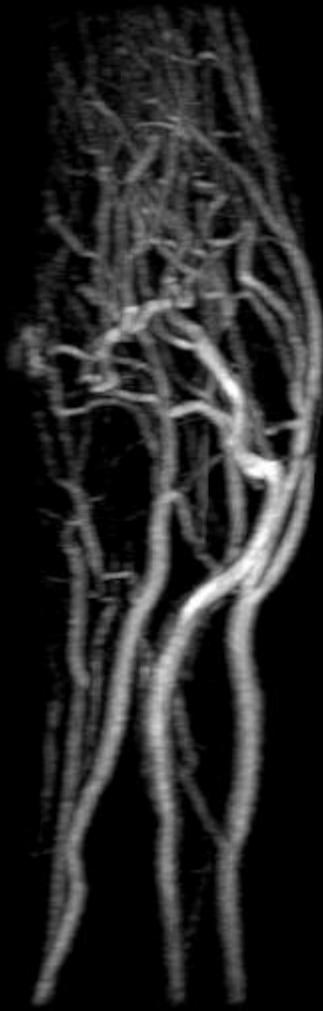
01/10



MRA

41 M with proximal wrist & palmar mass

02/10



MRA

41 M with proximal wrist & palmar mass

03/10



MRA

41 M with proximal wrist & palmar mass

04/10



MRA



41 M with proximal wrist & palmar mass

05/10



MRA

41 M with proximal wrist & palmar mass

06/10



MRA



41 M with proximal wrist & palmar mass

07/10



MRA



41 M with proximal wrist & palmar mass

08/10



MRA

41 M with proximal wrist & palmar mass

09/10



MRA

41 M with proximal wrist & palmar mass

10/10



MRA

41 M with proximal wrist & palmar mass



Palmar arches and digital arteries supplied by radial artery

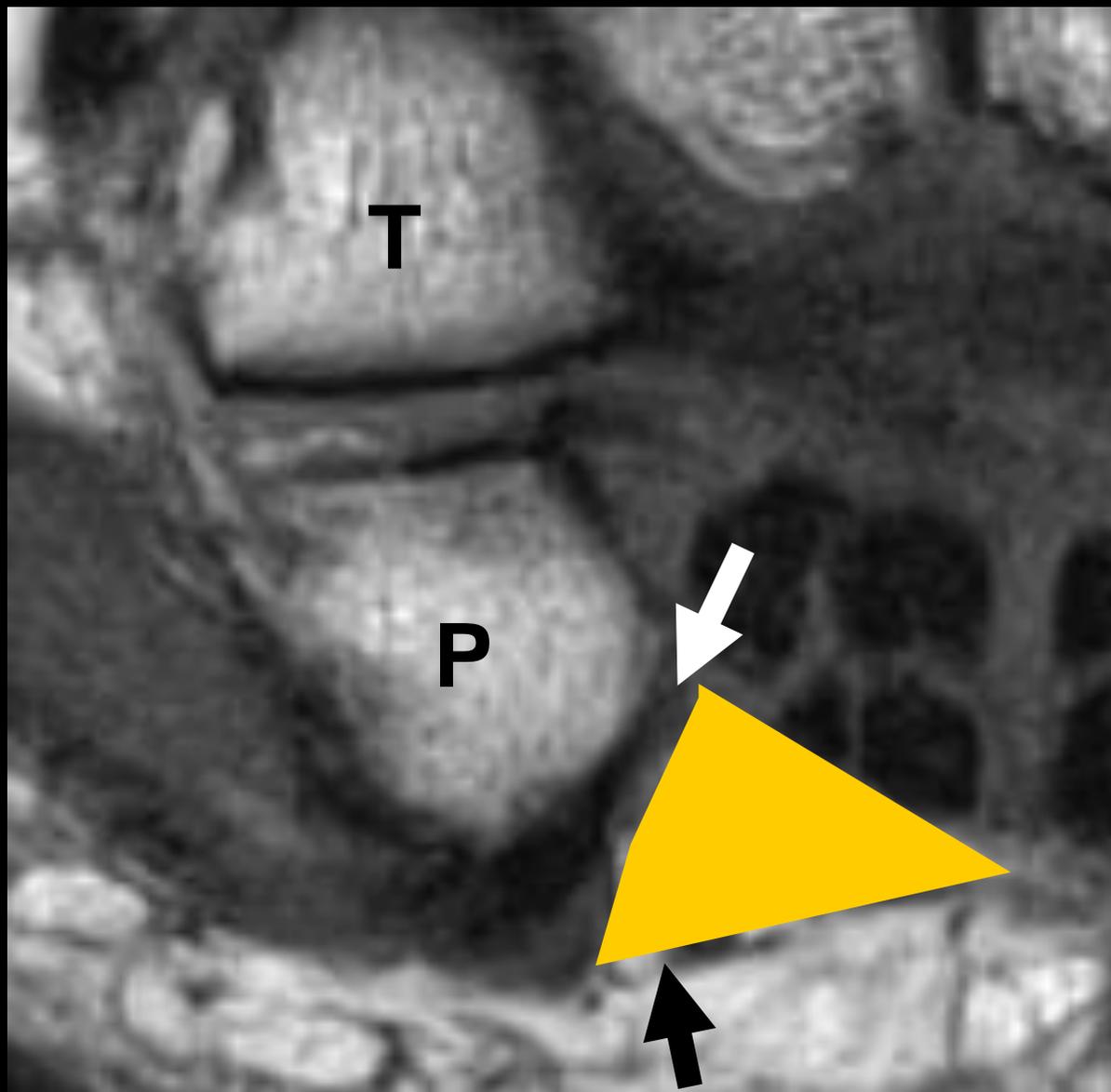
Abrupt termination of ulnar artery at the wrist



HYPOTHENAR HAMMER SYNDROME

- ▶ Due to chronic trauma to the hypothenar eminence, such as using the palm as a hammer or catching a baseball
- ▶ Leads to *aneurysm formation* and/or *thrombosis* of the ulnar artery in the Guyon Canal, usually at the *level of the hamulus*; can compress branches of the ulnar nerve & cause digital ischemia
- ▶ **Angiography:** Two appearances
 - ◆ Ulnar artery aneurysm with “corkscrew” appearance; digital artery emboli can be seen, especially 3rd through 5th fingers
 - ◆ Focal ulnar artery occlusion at hypothenar eminence
- ▶ **US:** Can help determine size of aneurysm, particularly when *occluded*
- ▶ **CT:** CTA useful for vascular mapping & can define bony lesions (including hamate fracture & relationship to hamulus)
- ▶ **MRI:**
 - ◆ Delineates extent of aneurysm/thrombosis
 - ◆ MRA shows similar findings as traditional angiography, but resolution is limited in the digital arteries
- ▶ **Treatment:** conservative, thrombolysis, resection, or vein graft interposition

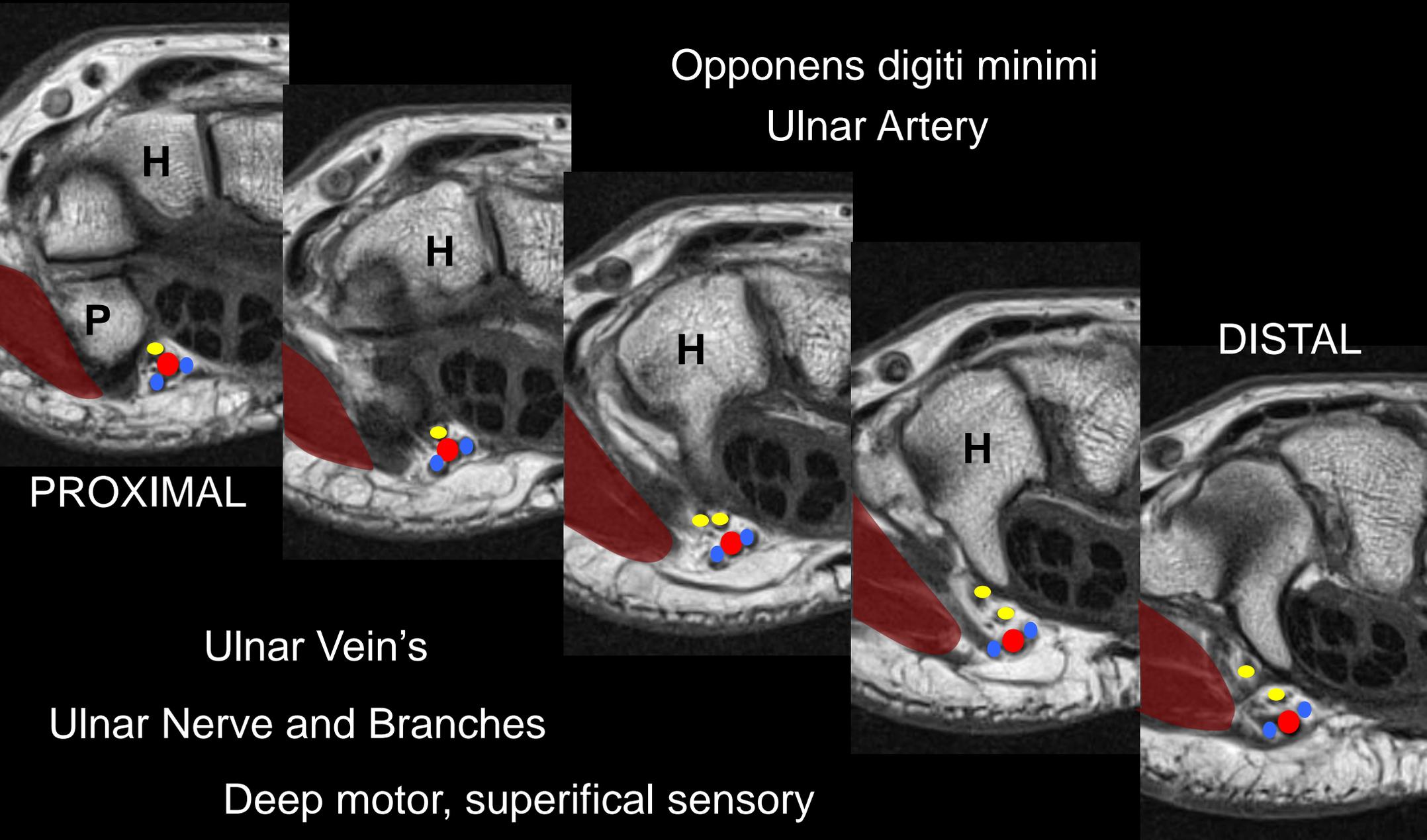
GUYON'S CANAL AND ULNAR NEUROVASCULAR BUNDLE



Ligamentum Flexorum

Ligamentum Carpi Palmare

GUYON'S CANAL AND ULNAR NEUROVASCULAR BUNDLE



Opponens digiti minimi
Ulnar Artery

PROXIMAL

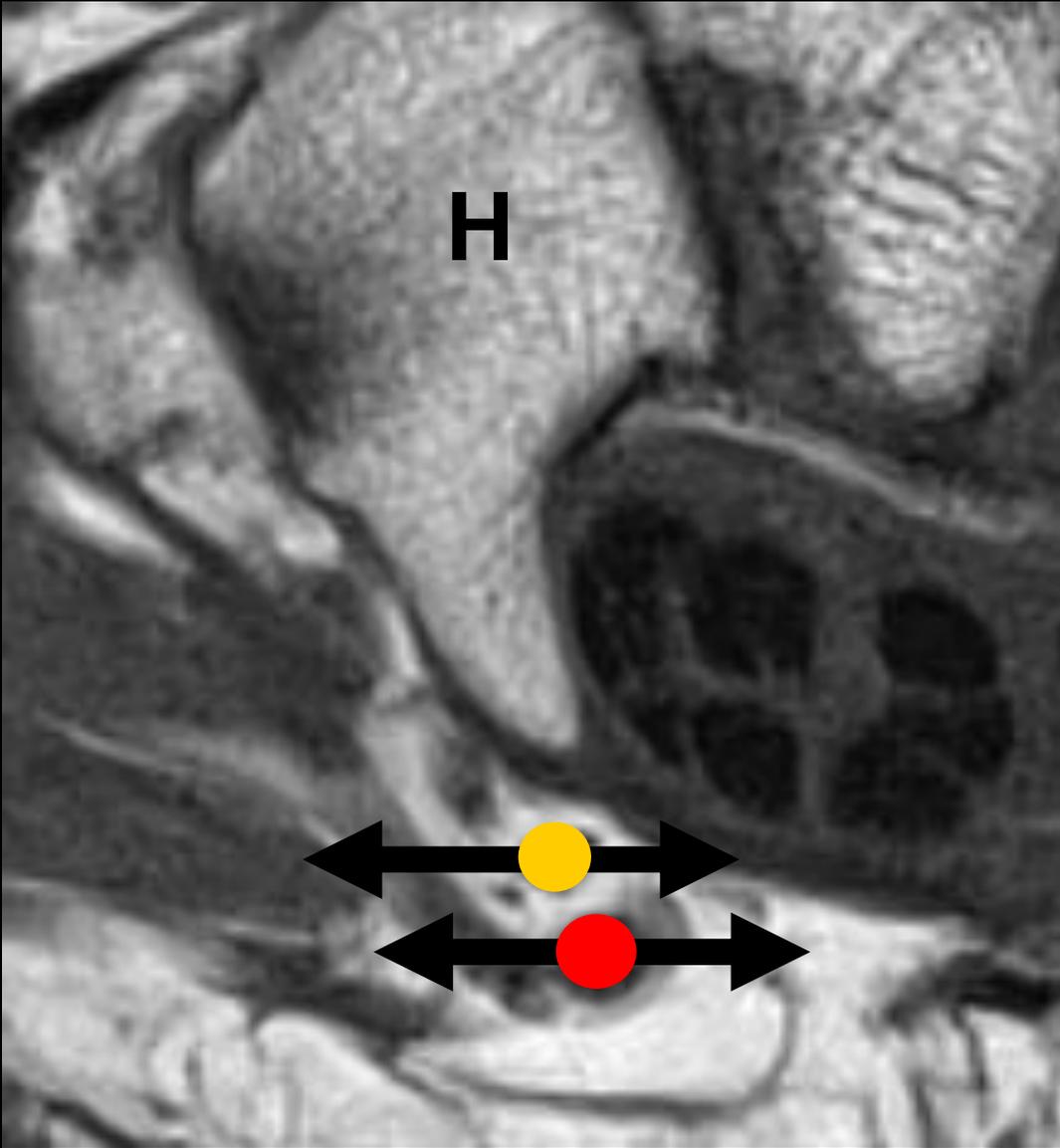
DISTAL

Ulnar Vein's

Ulnar Nerve and Branches

Deep motor, superficial sensory

GUYON'S CANAL AND ULNAR NEUROVASCULAR BUNDLE

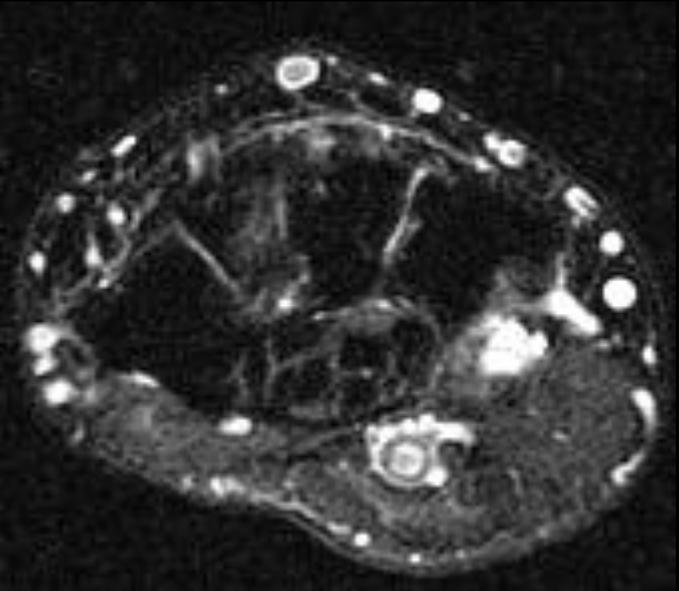


7.5 mm
3 - 7 mm

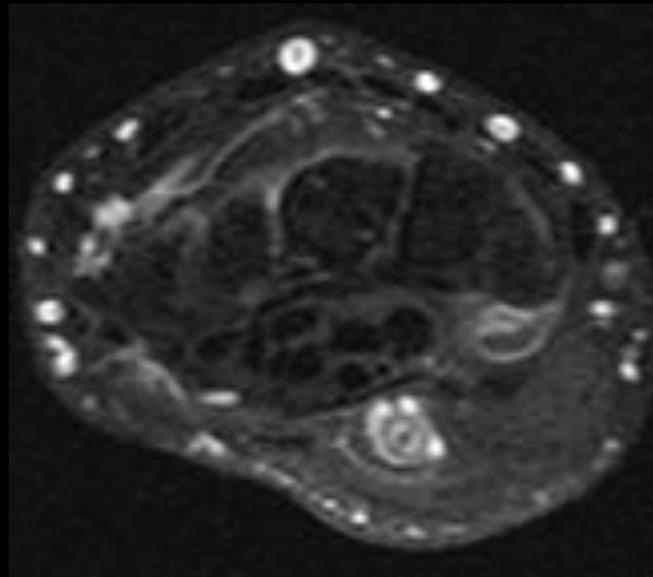
5.8 mm
2 - 8 mm

46 M with mass in the palm and proximal wrist with flexion

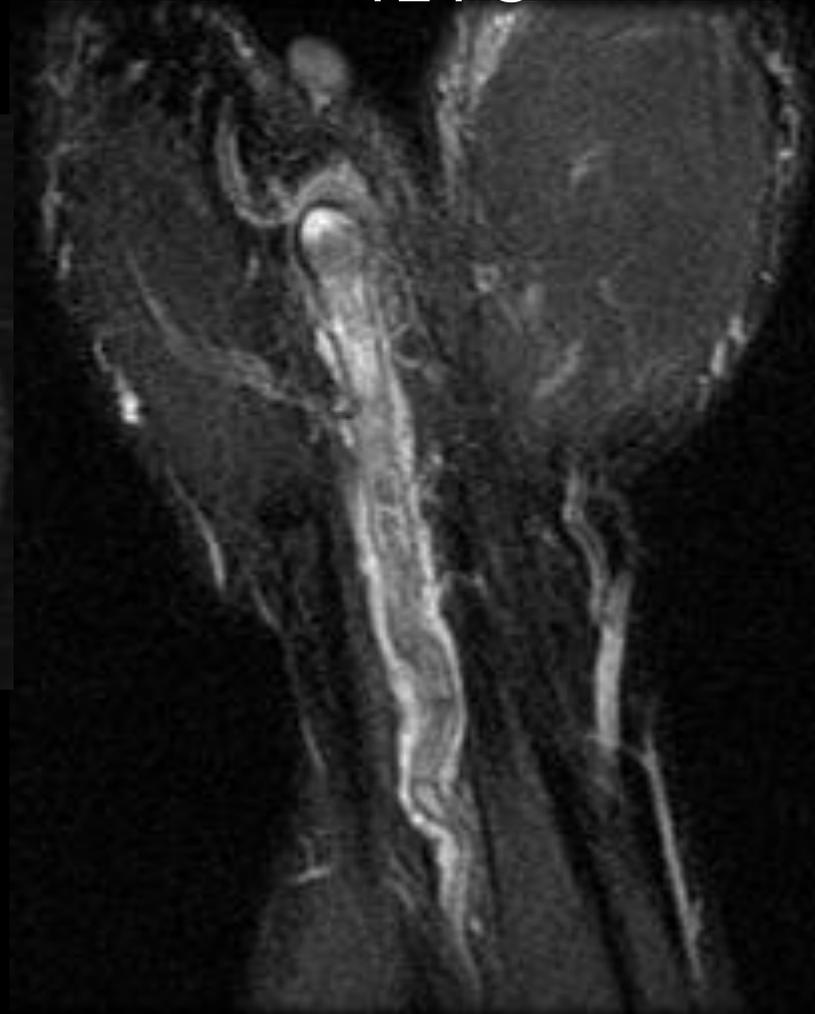
T2 FS



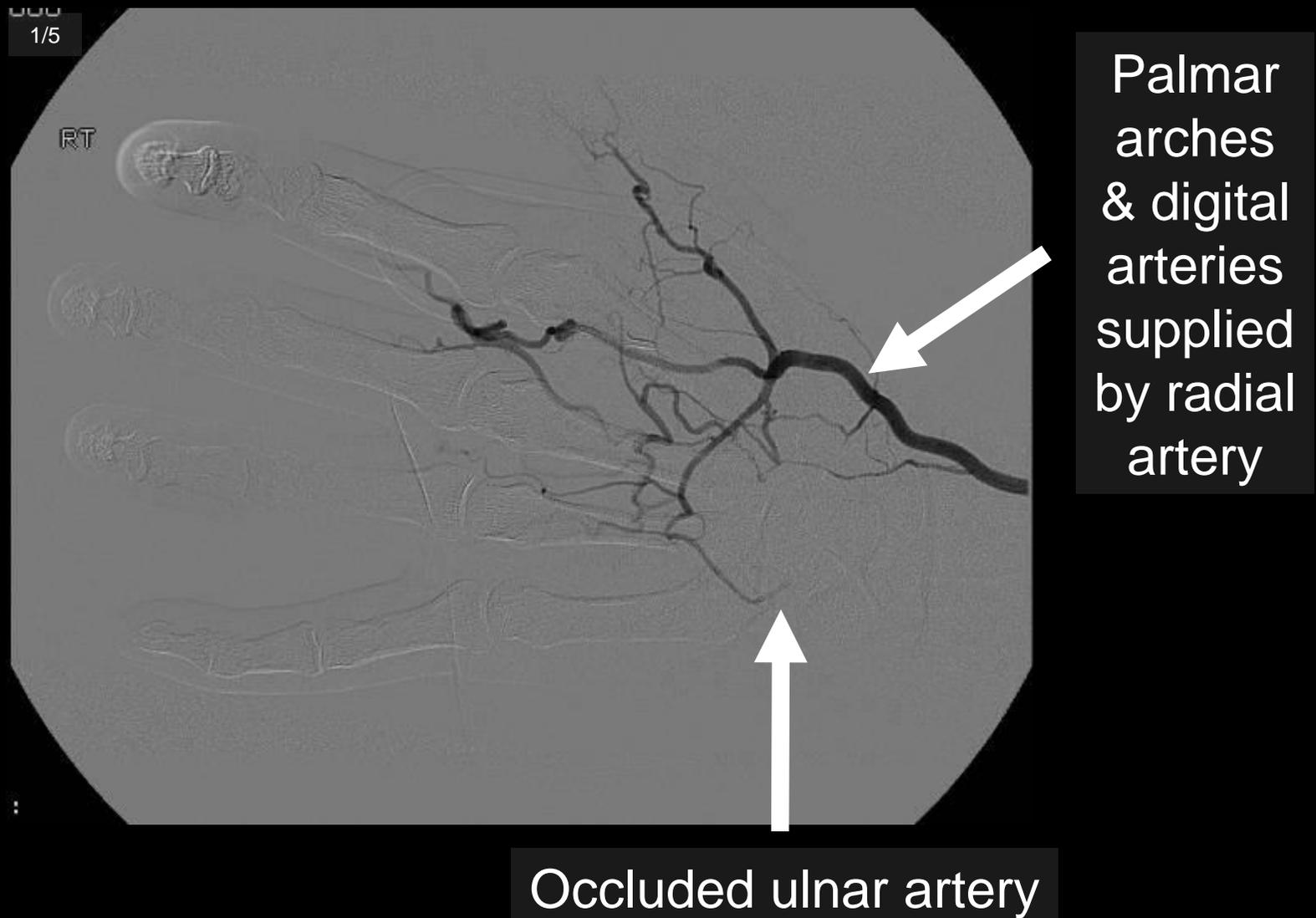
T1 FS +



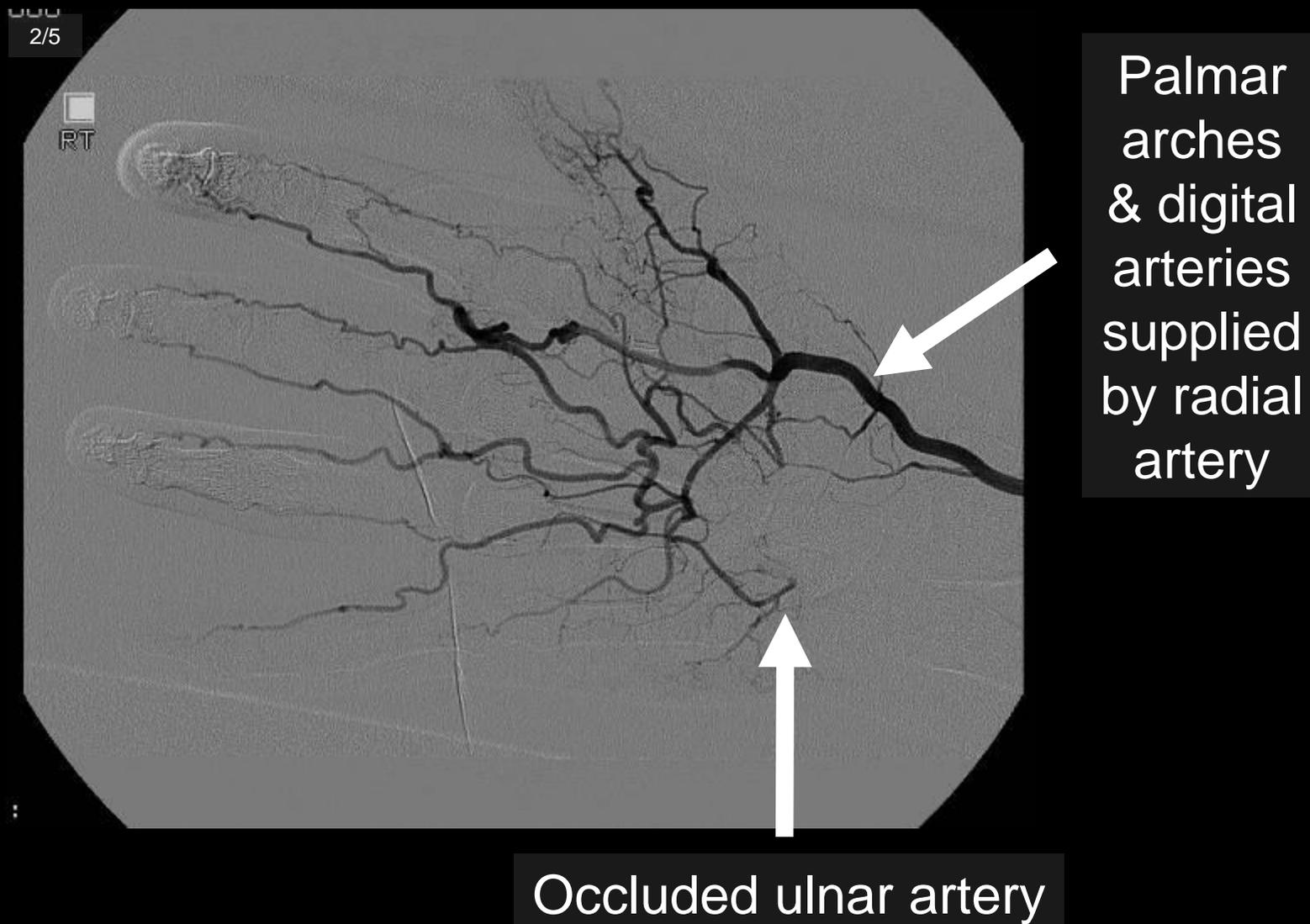
T2 FS



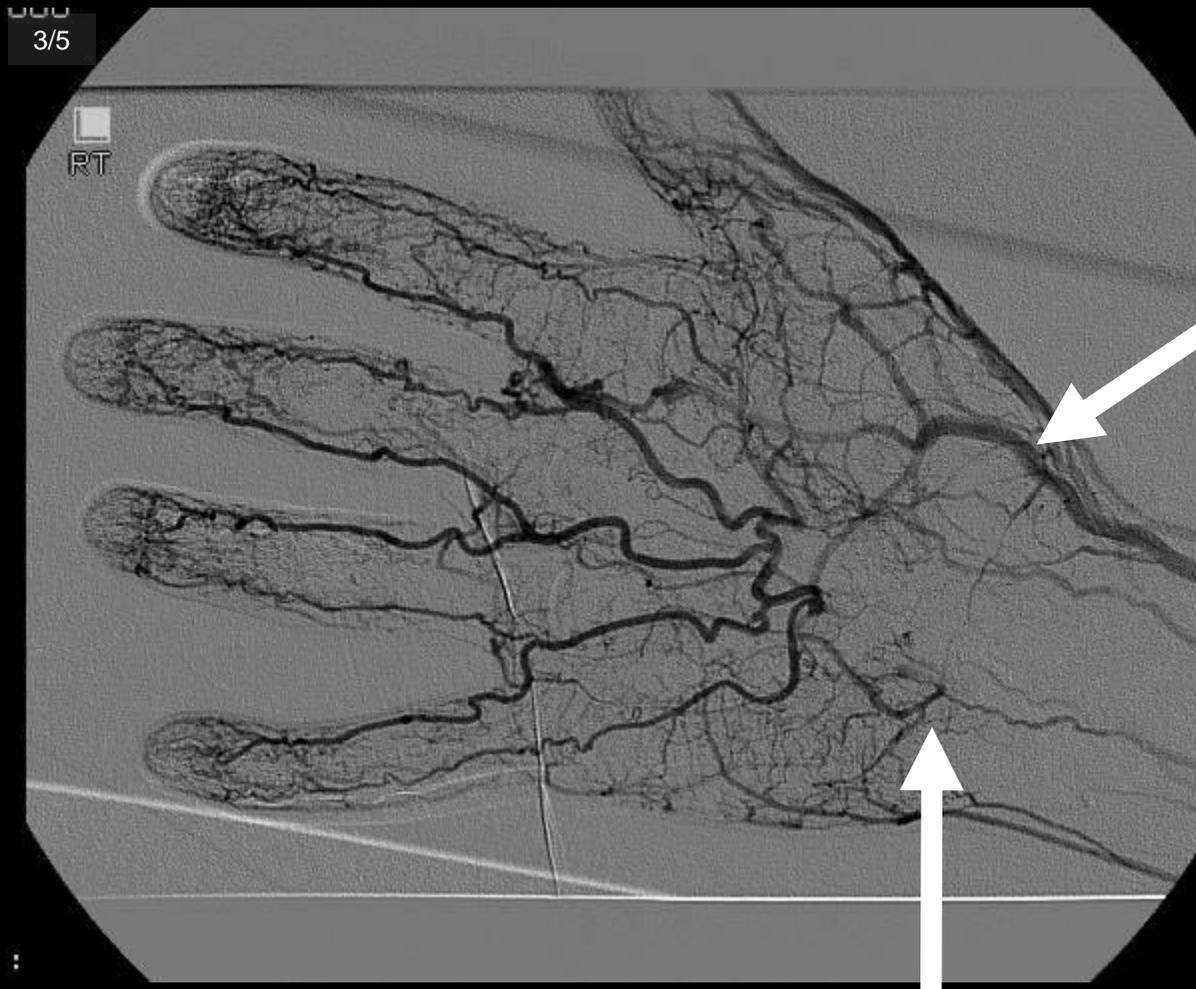
46 M with mass in the palm and proximal wrist with flexion



46 M with mass in the palm and proximal wrist with flexion



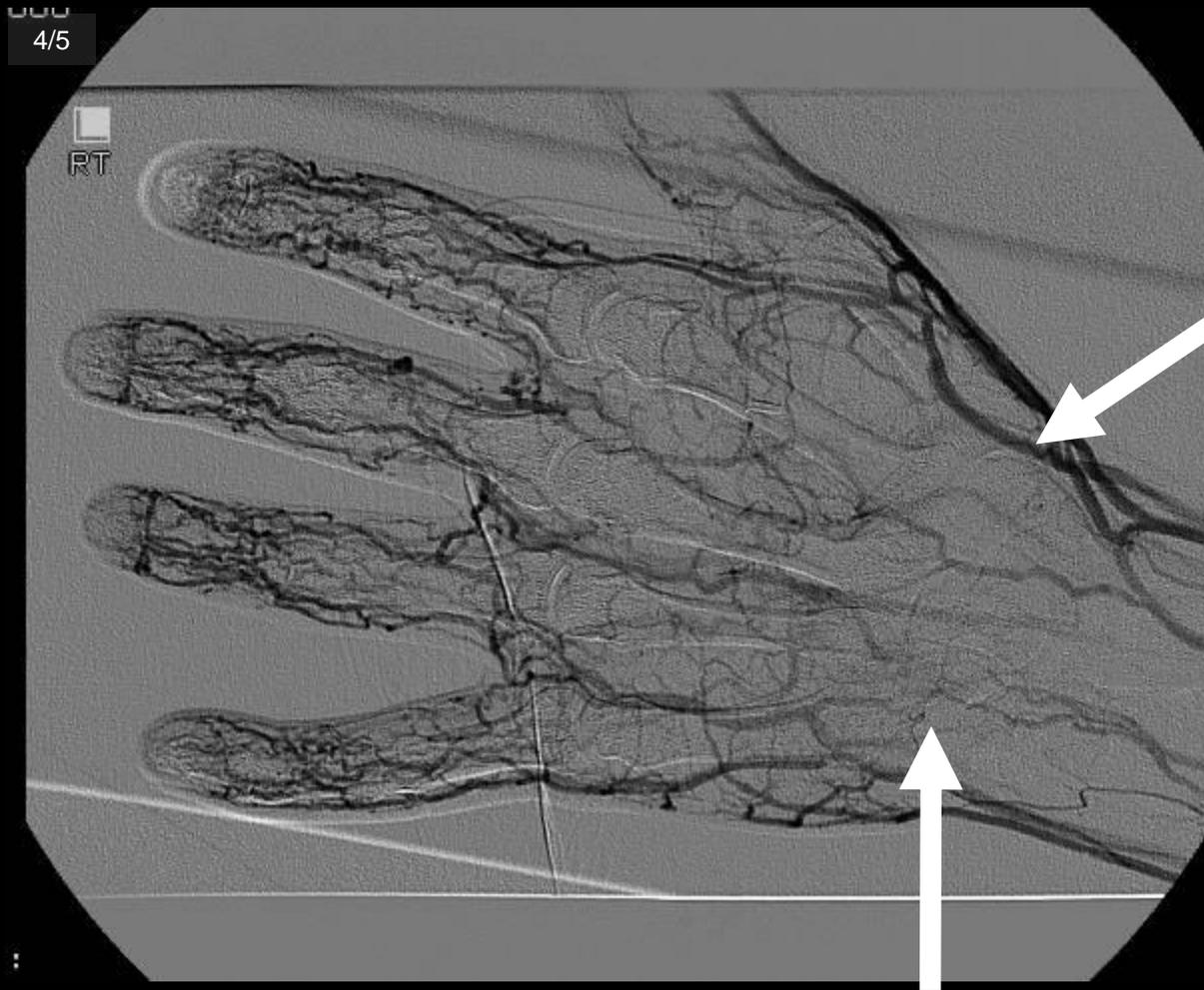
46 M with mass in the palm and proximal wrist with flexion



Palmar arches & digital arteries supplied by radial artery

Occluded ulnar artery

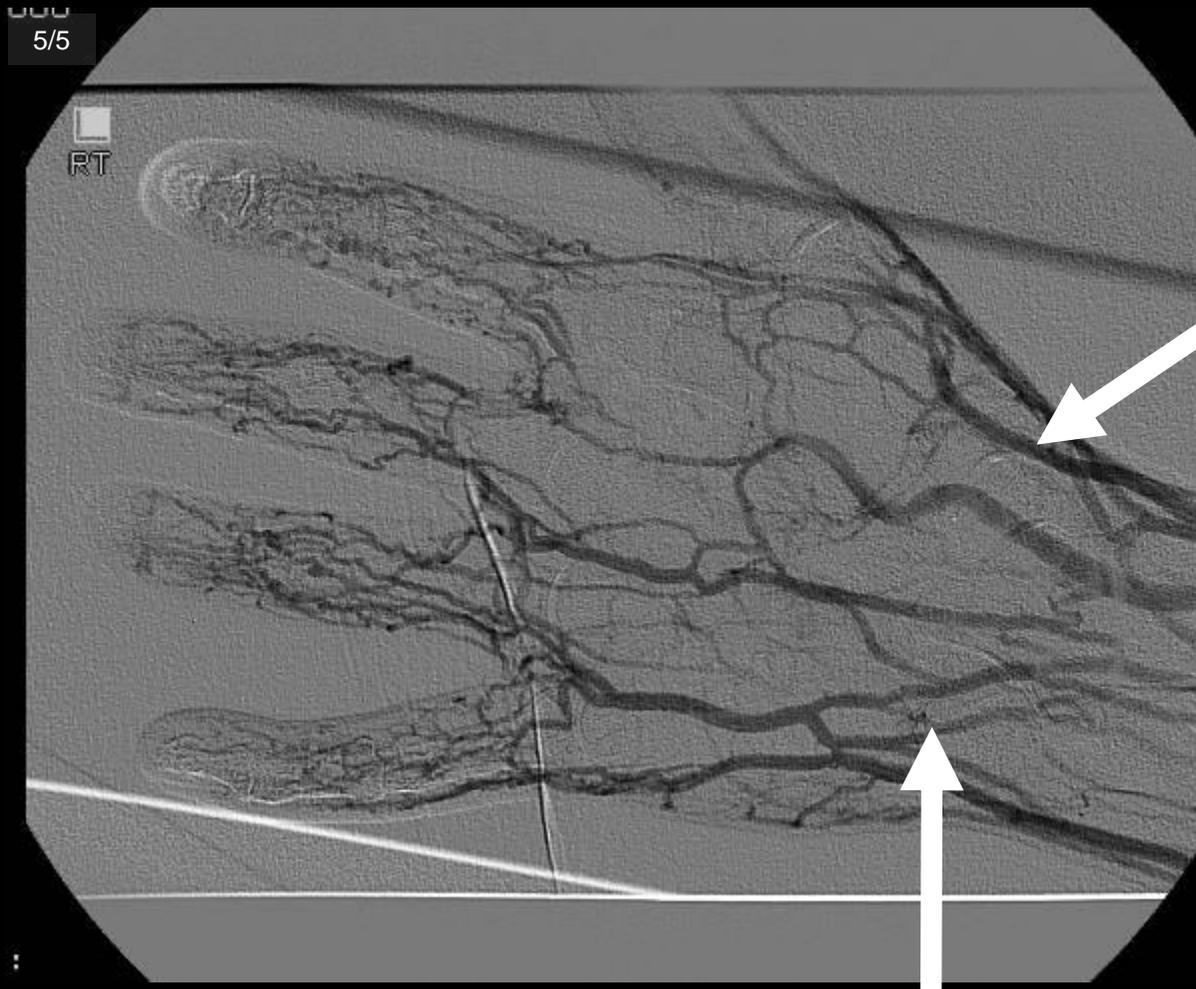
46 M with mass in the palm and proximal wrist with flexion



Palmar arches & digital arteries supplied by radial artery

Occluded ulnar artery

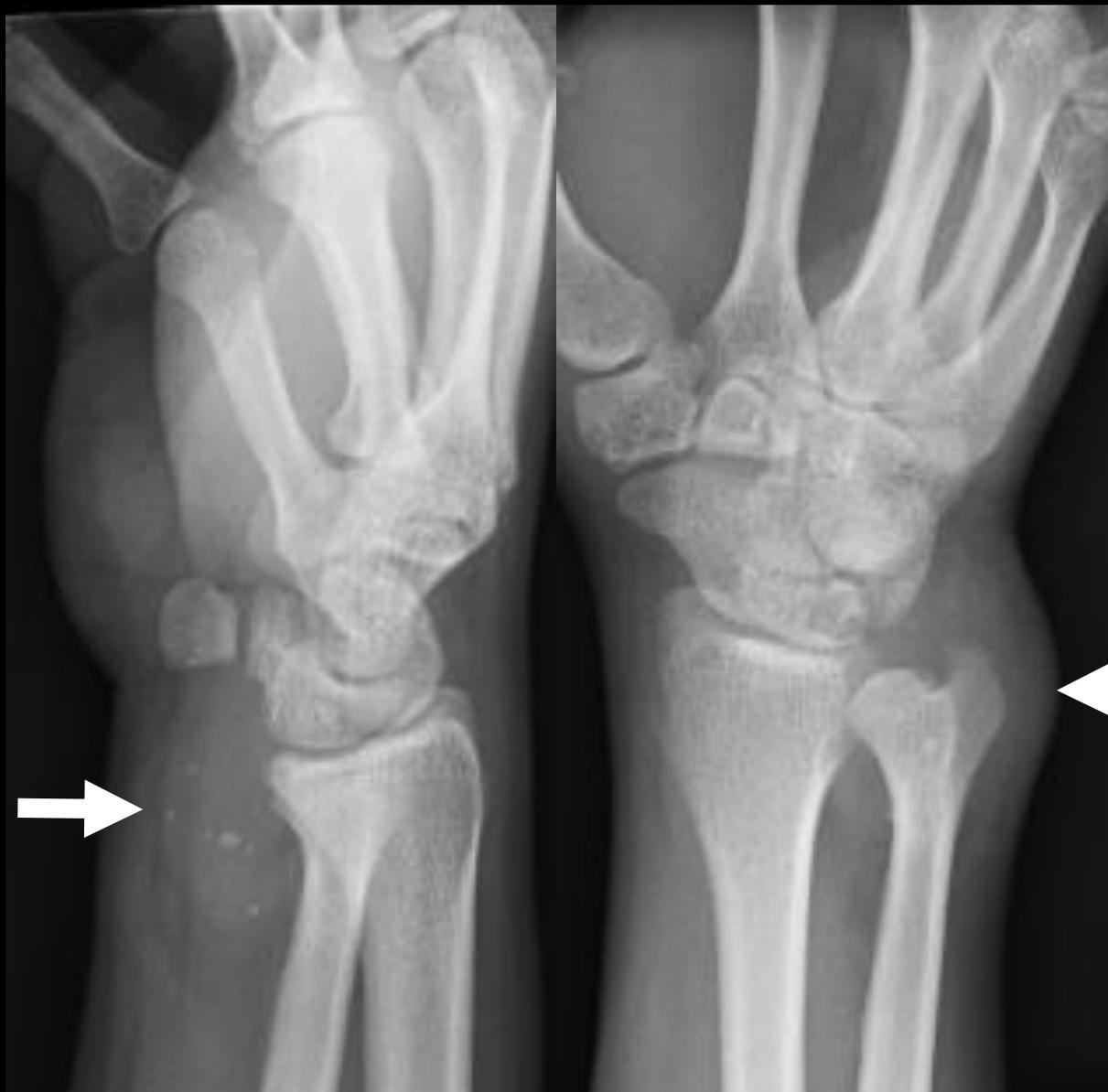
46 M with mass in the palm and proximal wrist with flexion



Palmar arches & digital arteries supplied by radial artery

Occluded ulnar artery

23 M violinist w/ right ulnar-sided right wrist mass



Soft Tissue
Density w/
Small Round
Calcifications

Soft Tissue
Density w/
Small Round
Calcifications

23 M violinist w/ right ulnar-sided right wrist mass

PD



T2 FS



T1 FS +



Mass Isointense to
Muscle w/
Scattered Focal
Hypointensities

Increased T2 SI
w/ Scattered
Focal
Hypointensities

Strong Enhancement

VASCULAR MALFORMATION

- ▶ Vascular lesions = hemangioma & vascular malformations
- ▶ Hemangioma = true neoplastic endothelial proliferation
 - ◆ Hand is 3rd most common site
- ▶ Vascular malformation = not tumors, but errors of vascular morphogenesis, 2 possible classification schema
 - ◆ Vessel type: capillary, venous, arterial, & lymphatic
 - ◆ Flow type: high, low

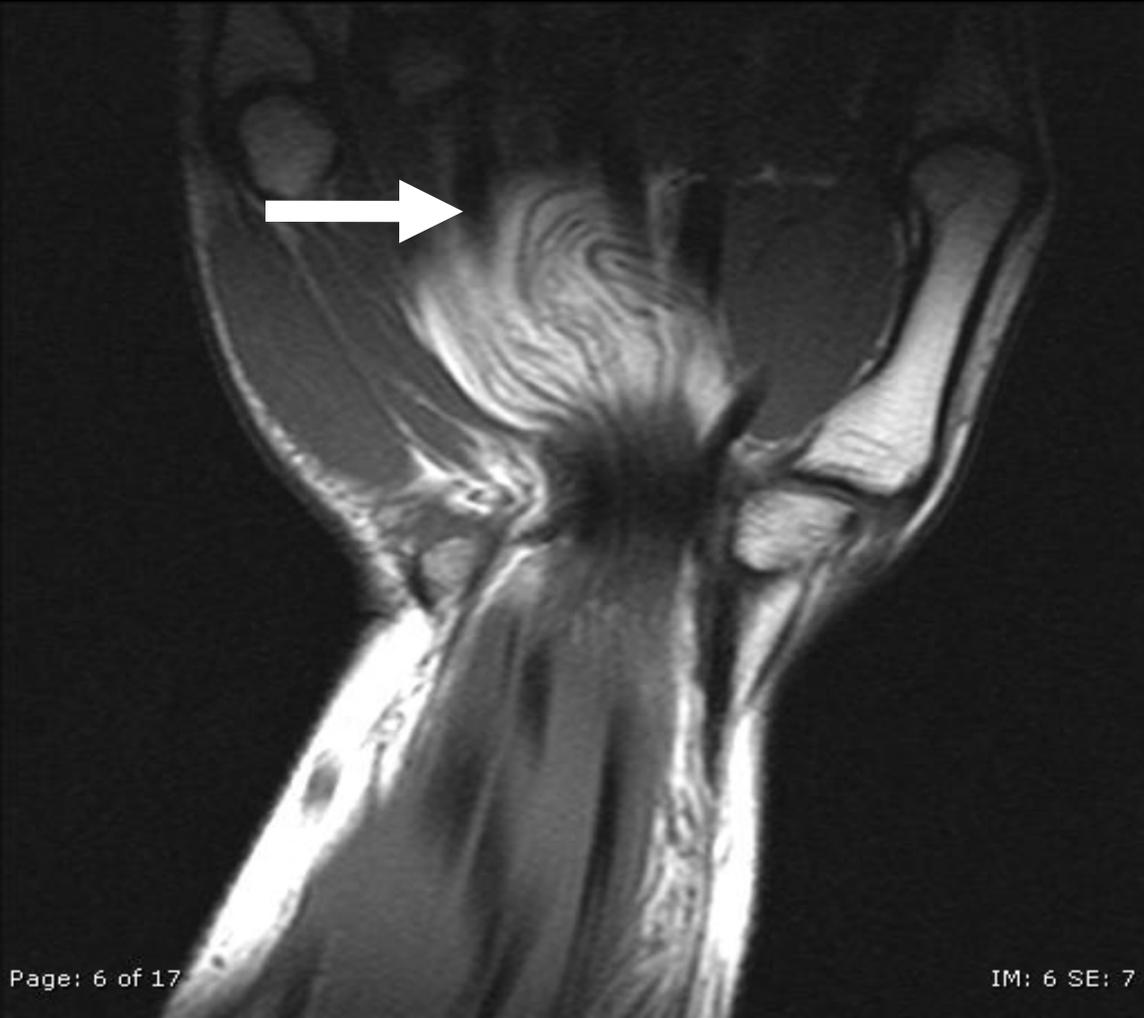
VASCULAR MALFORMATION

- ▶ **Radiography:** *Phleboliths pathognomonic* for venous malformations (VM's)
- ▶ **CT:**
 - ◆ Precontrast: Soft-tissue attenuating mass, phleboliths, \pm fat
 - ◆ Postcontrast: Serpentine enhancement
- ▶ **MRI:**
 - ◆ High T2 in slow flow lesions, flow voids in AVM's
 - ◆ low SI from phleboliths
 - ◆ Fluid/fluid levels in lymphatic malformations
- ▶ **US:** heterogeneous mass w/ +Doppler flow & shadowing phleboliths (VM's)
- ▶ **Angiography:** vascular mass, can perform therapeutic embolization
- ▶ **Treatment:** If resection is performed, wide margins necessary to minimize recurrence

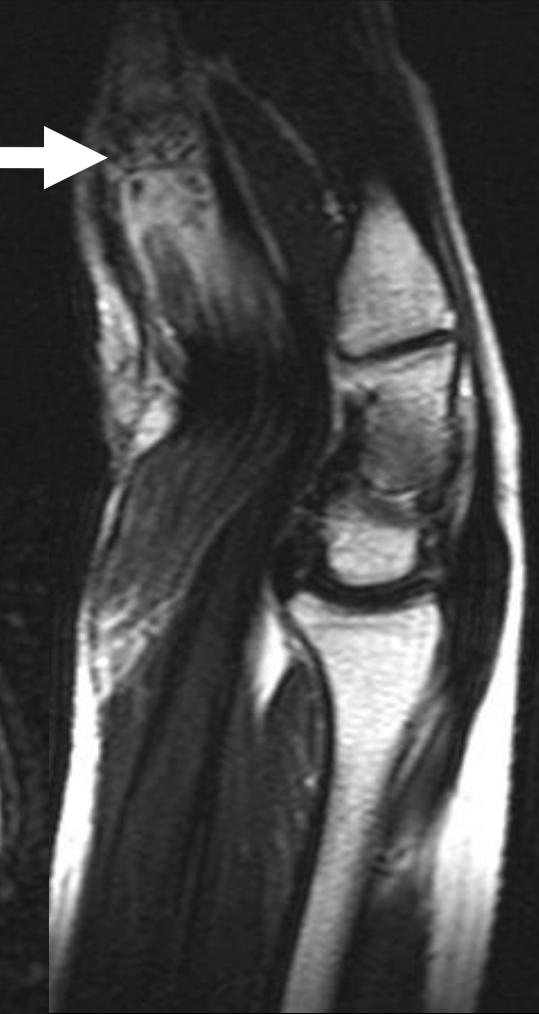
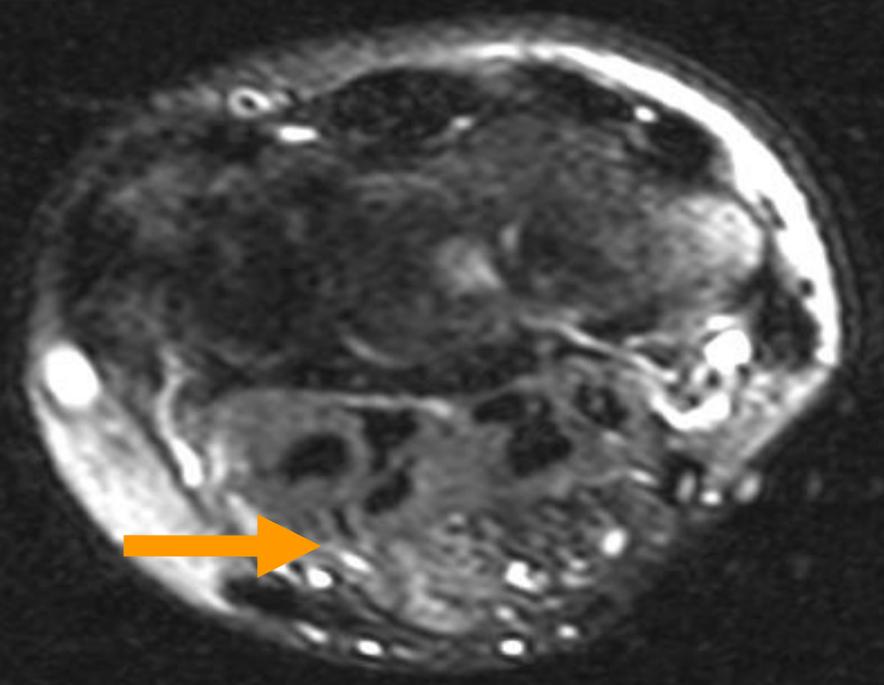
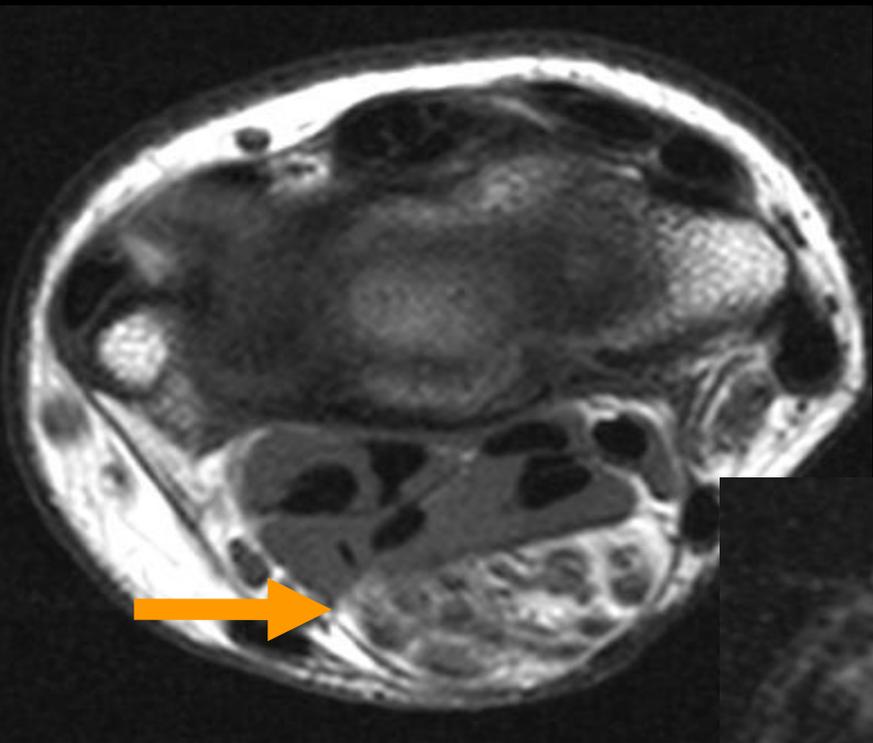
NERVES



18 yo waitress with severe wrist pain



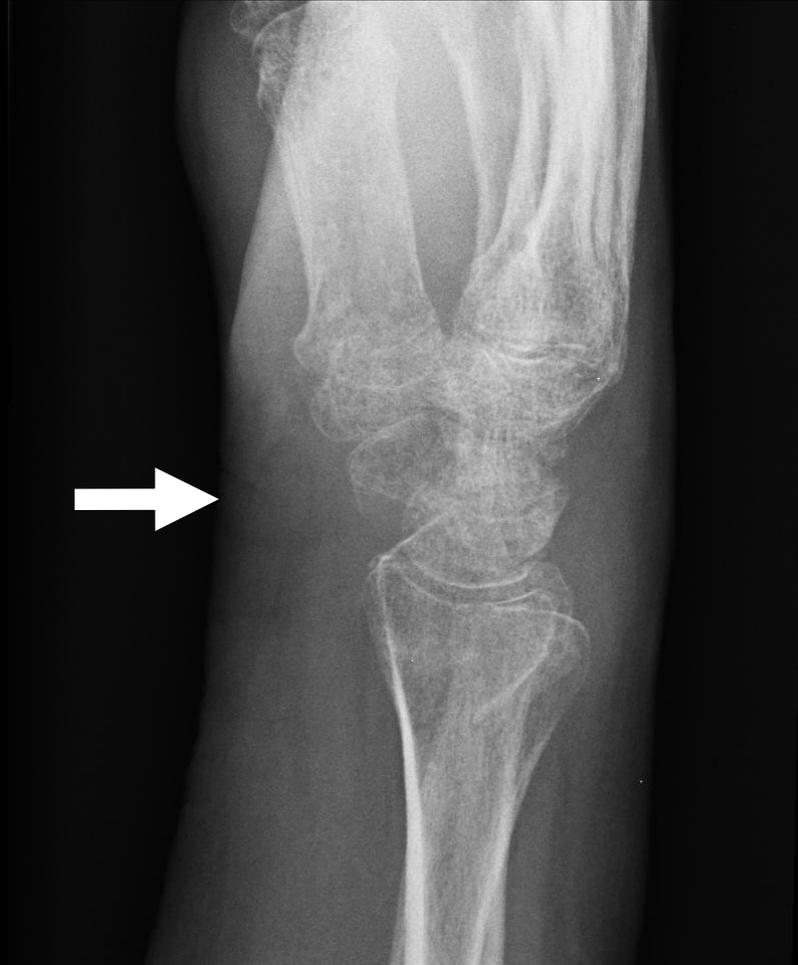
18 yo waitress with severe wrist pain



LIPOFIBROMATOUS (FIBROLIPOMATOUS) HAMARTOMA

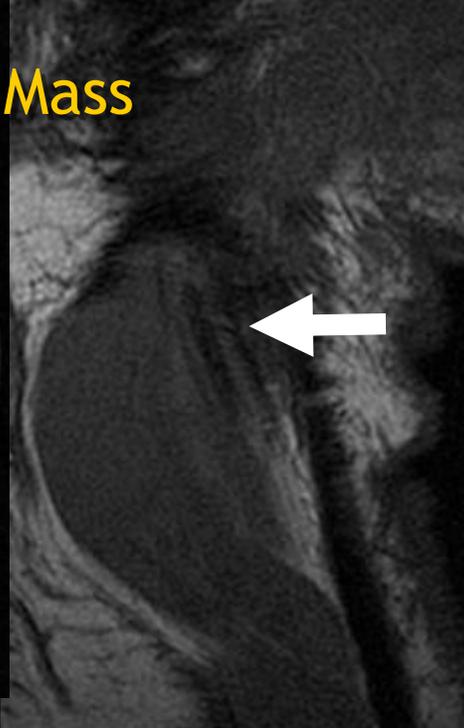
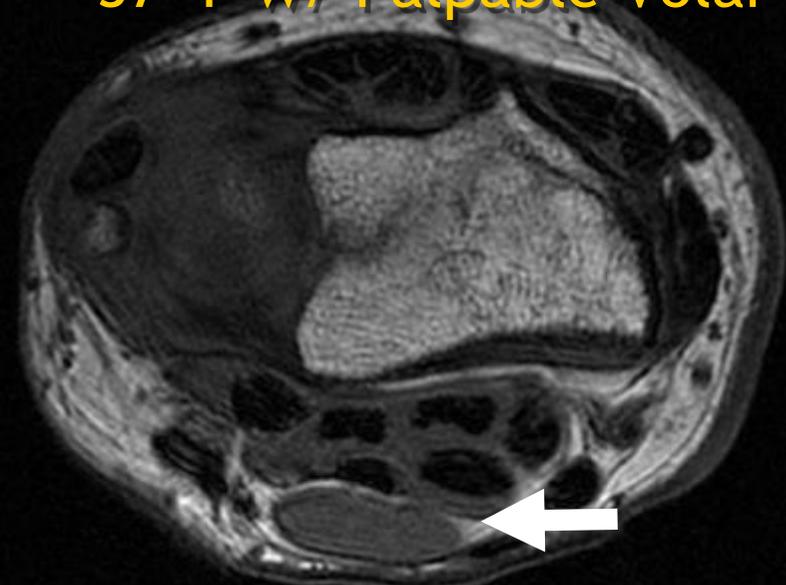
- ▶ Infiltration of *mature fat* in the nerve & separating axonal bundles w/ thickening of the individual bundles by perineural/endoneural fibrosis
- ▶ **Imaging Findings:** Enlarged nerve with numerous axon bundles surrounded by a substratum of fibrofatty tissue
- ▶ **Presentation:** Macrodactyly (25%), mass lesion, or compressive neuropathy; ±history of trauma
- ▶ **Location:** Median nerve > Ulnar nerve
 - ◆ Rarely in lower extremity
 - ◆ Can be multifocal
- ▶ **MRI:** Exam of choice & *considered diagnostic*
 - ◆ Classically: Enlarged cable-like axonal bundles (2-3mm) surrounded by T1 hyperintensity (lipid) in substratum
 - ◆ Atypical Appearance: T1 SI can be low in substratum if there is altered distribution of fibrous & fatty elements ¹⁶
- ▶ **US:** Longitudinally oriented alternating hyperechoic & hypoechoic bands
- ▶ **Treatment:** Excision not recommended as LFH is inseparable from nerve

57 F w/ Palpable Volar Mass

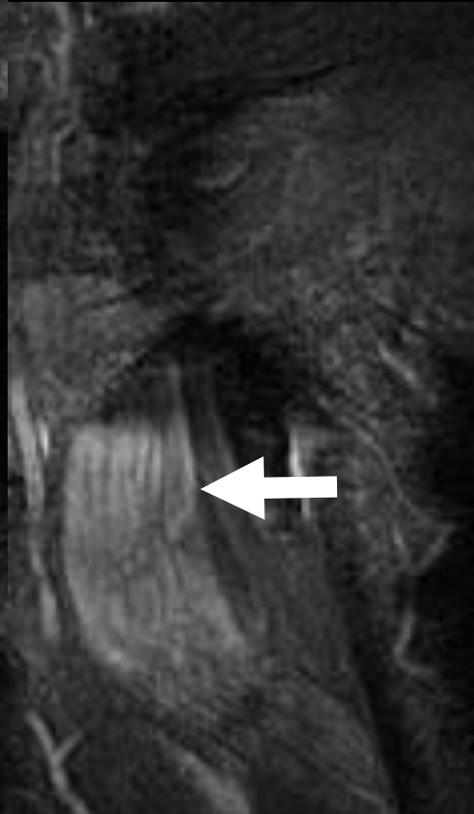


No Volar Mass
Appreciated

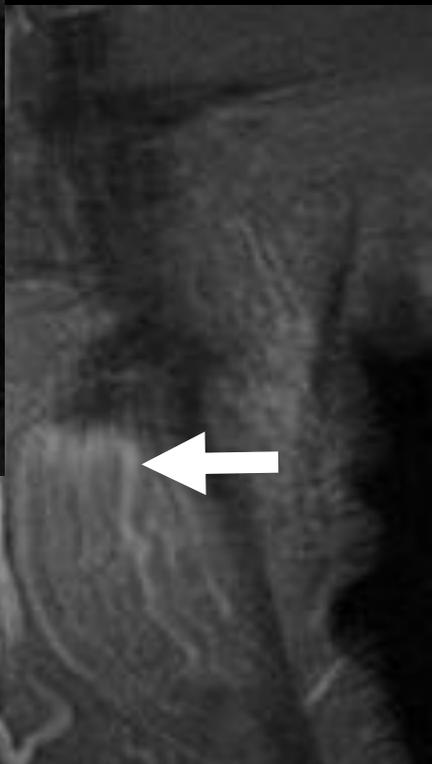
57 F w/ Palpable Volar Mass



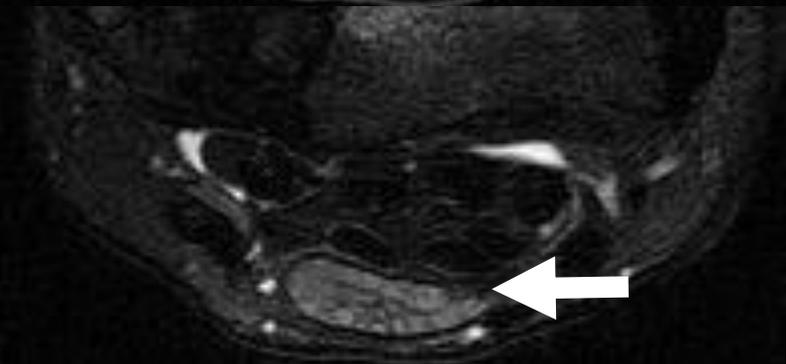
T1



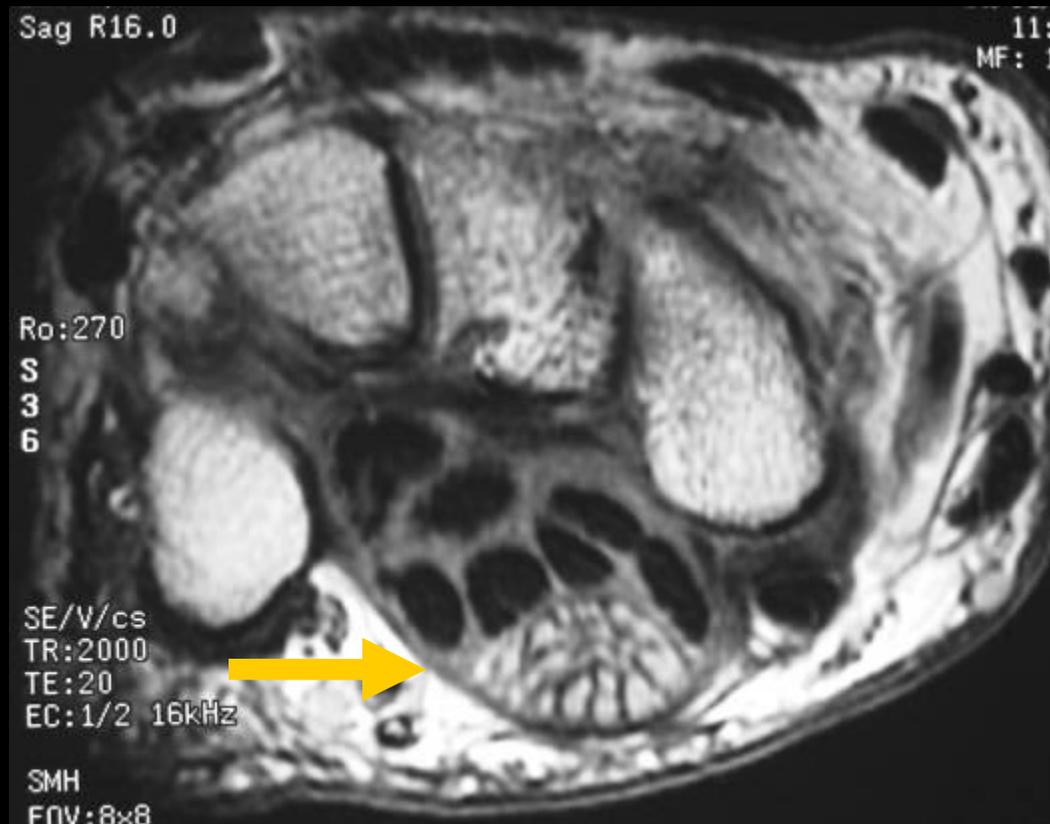
T2 FS



T1 FS +

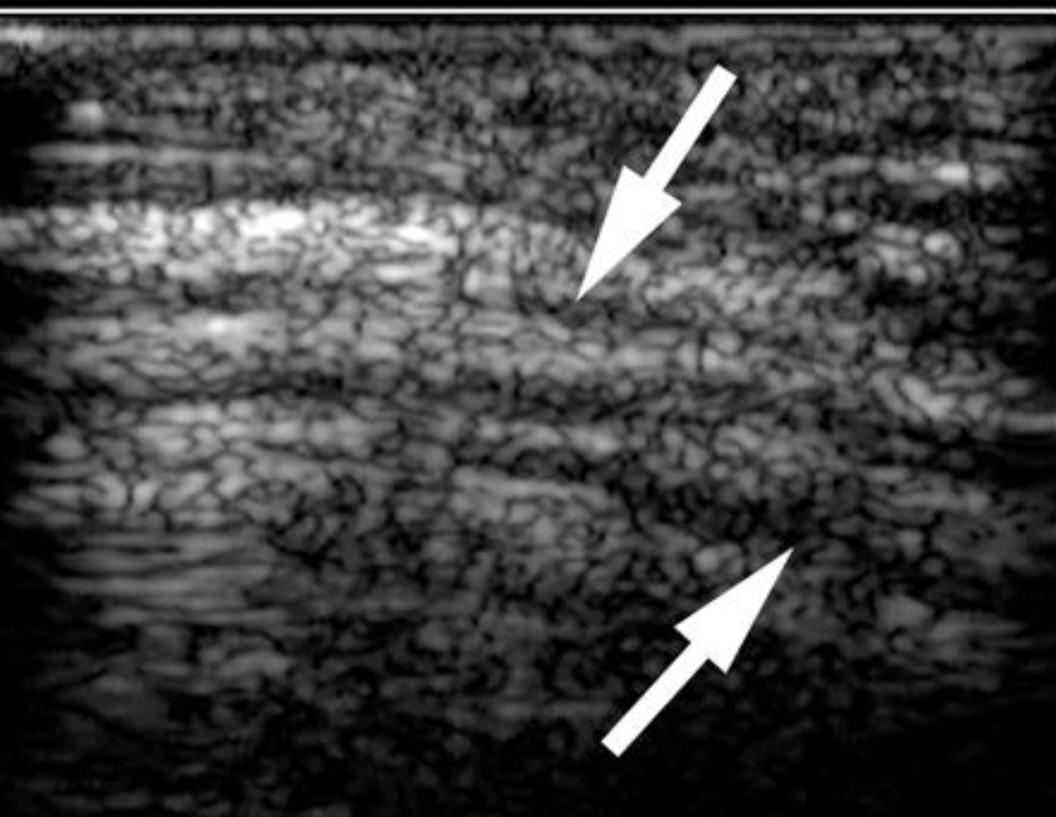


46 M w/ right wrist pain and LFH

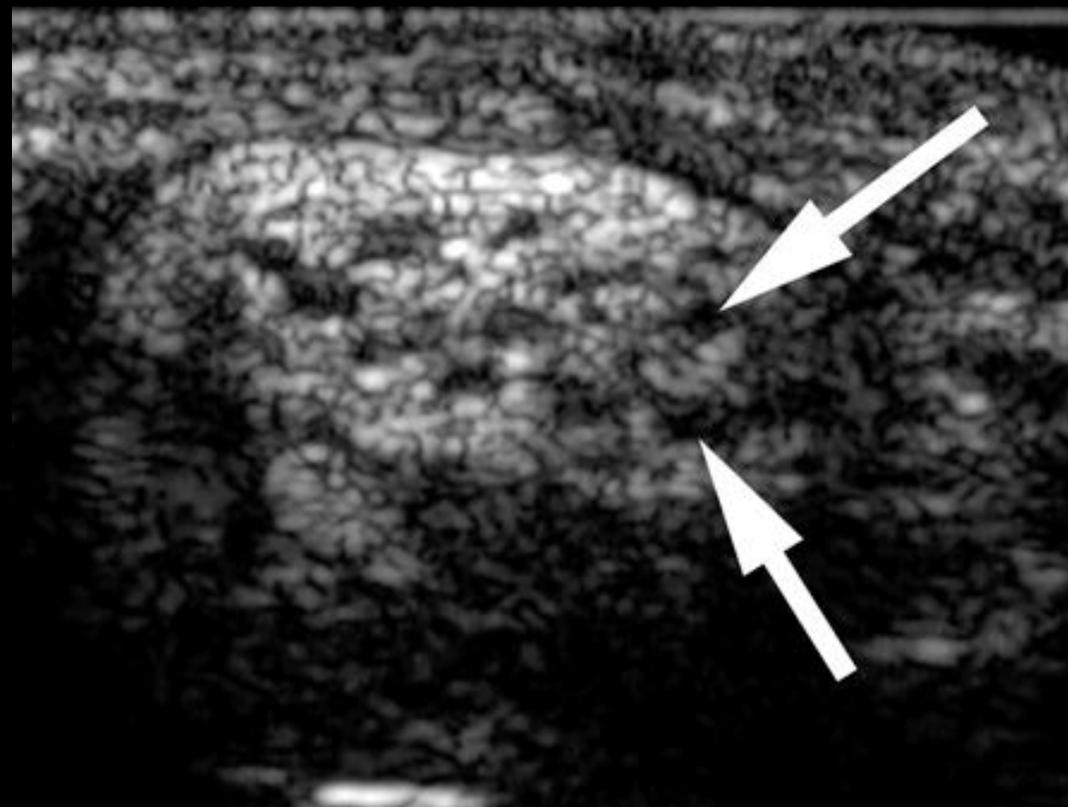


Typical Appearance, axial PD: Cylindrical longitudinally-oriented thin curvilinear zones of low signal (axon bundles) within a background of intermediate-high signal (lipid)

31 yo F w/ LFH: US Findings



LONG



TRANS

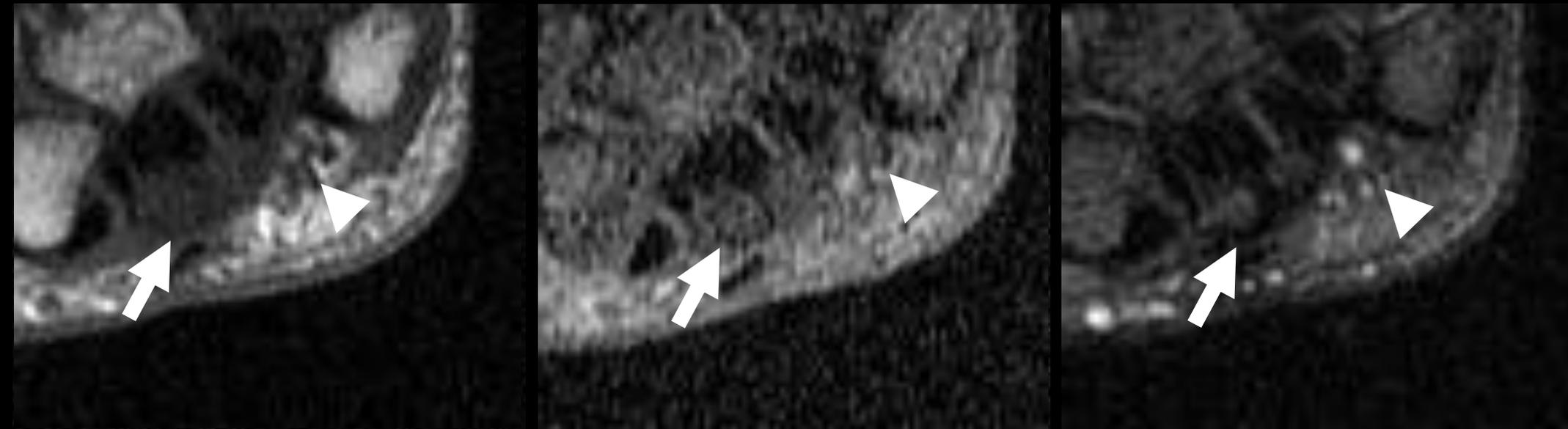
Hypoechoic cablelike neural bundles separated by hyperechoic fat.

46 M w/ Right Wrist Pain

T1

T1 FS

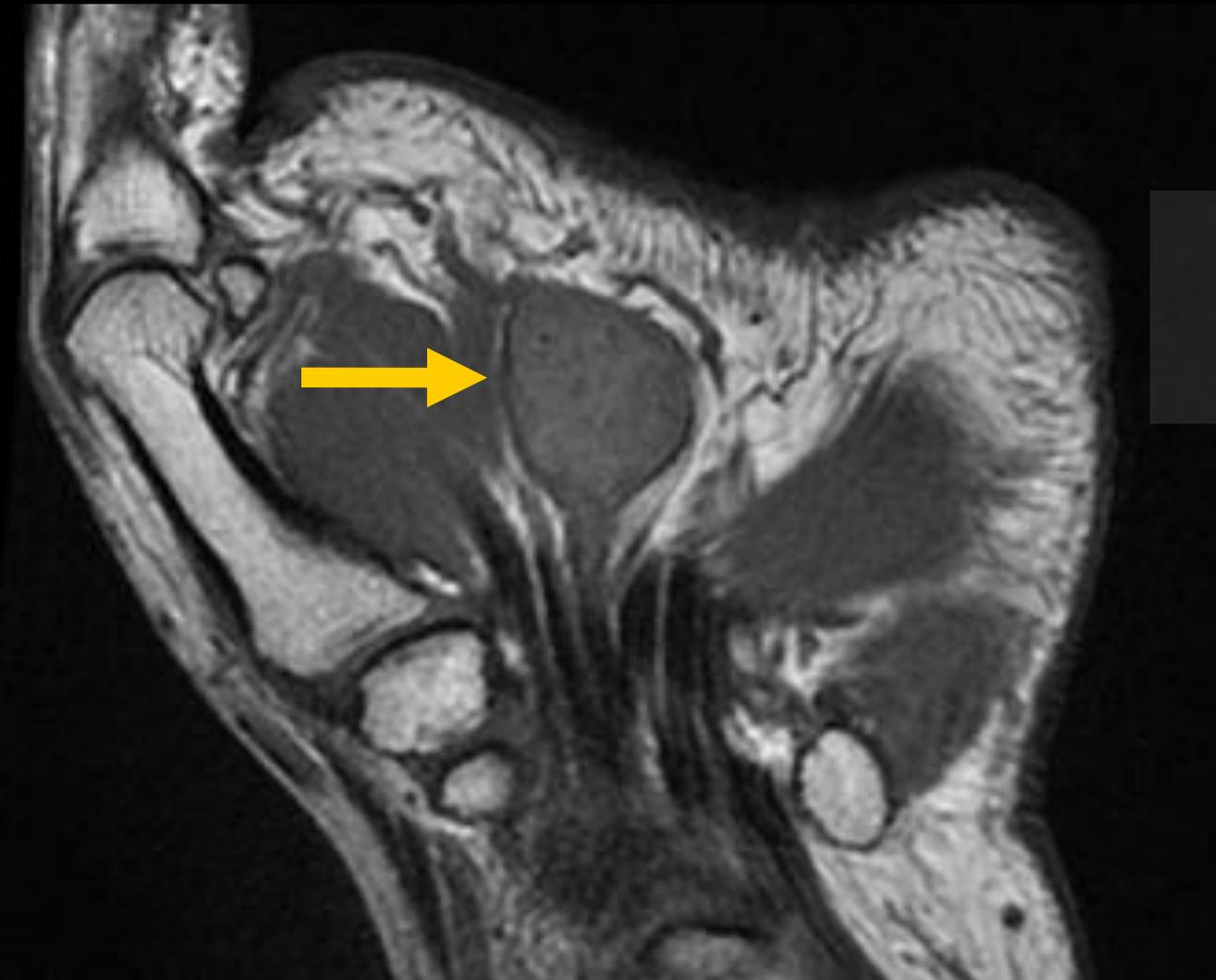
T2 FS



Median Nerve (Arrow): Normal Low/Intermediate SI on All Sequences

Ulnar Nerve (Arrowhead): Multiple Thickened Low SI Axonal Bundles w/ Interspersed Fat (High T1 & Low SI on Fat-Suppressed Images)

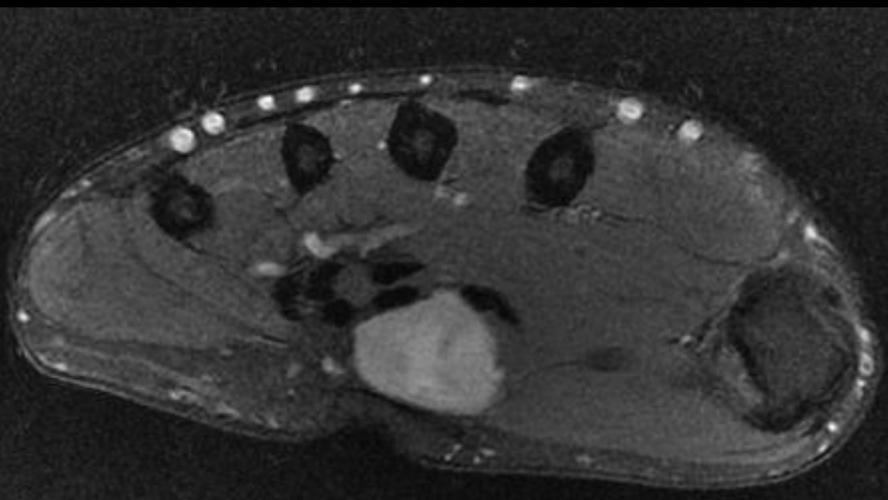
35 M w/ palmar mass



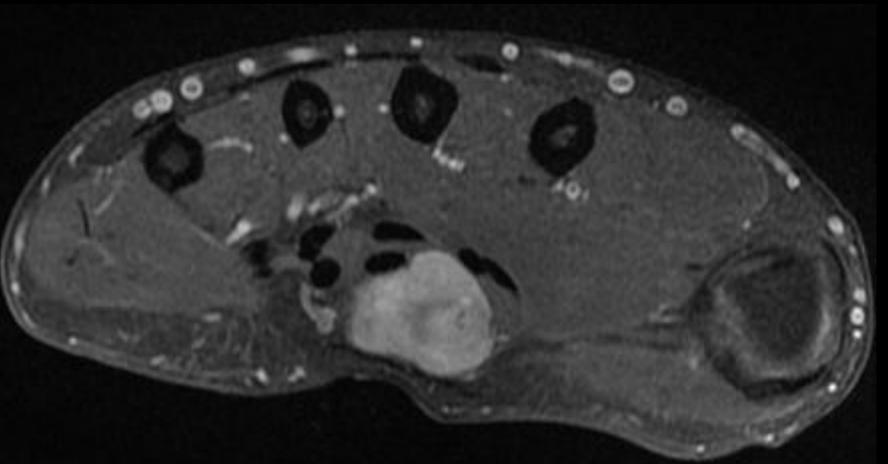
T1 intermediate fusiform
mass arising from the
median nerve

T1

35 M w/ palmar mass

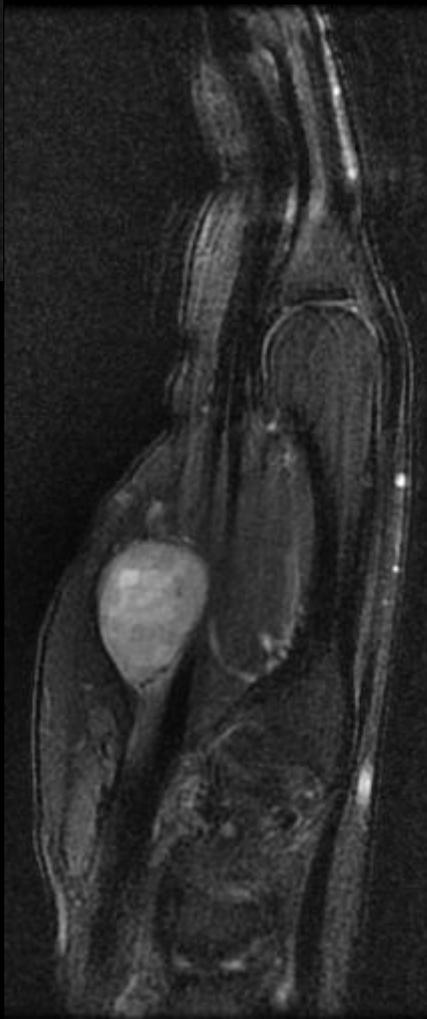


Intermediate FS

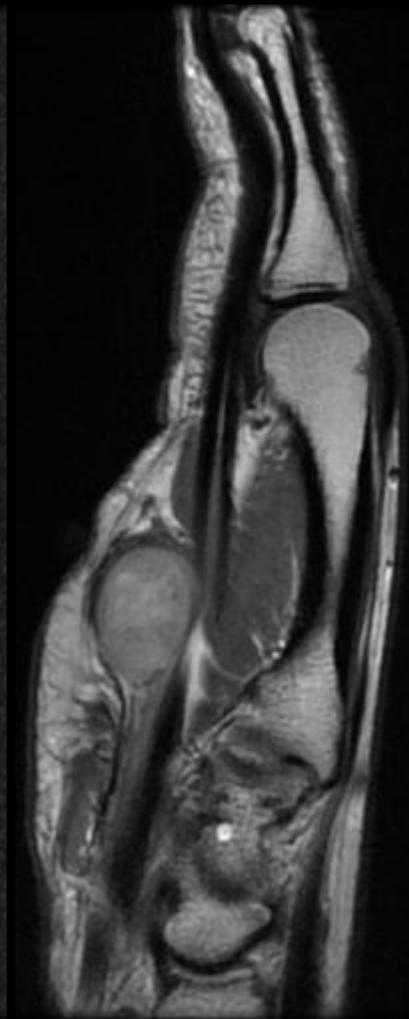


T1 FS +

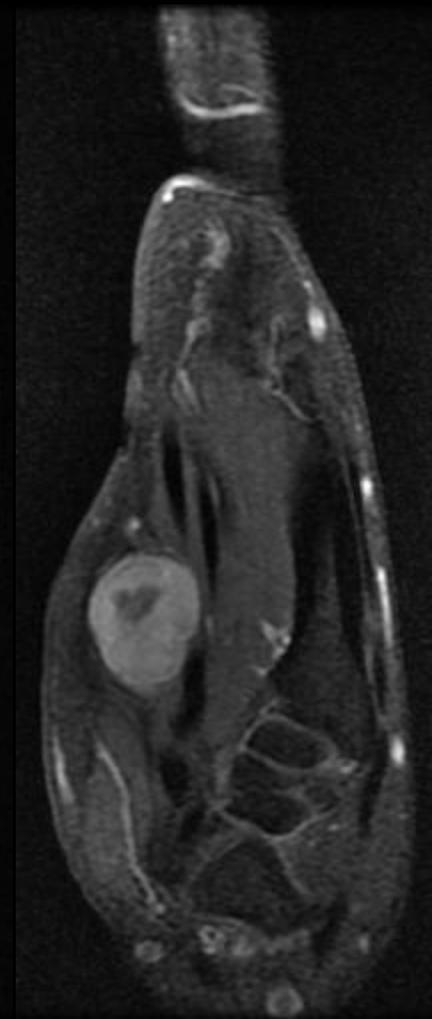
Int FS



PD



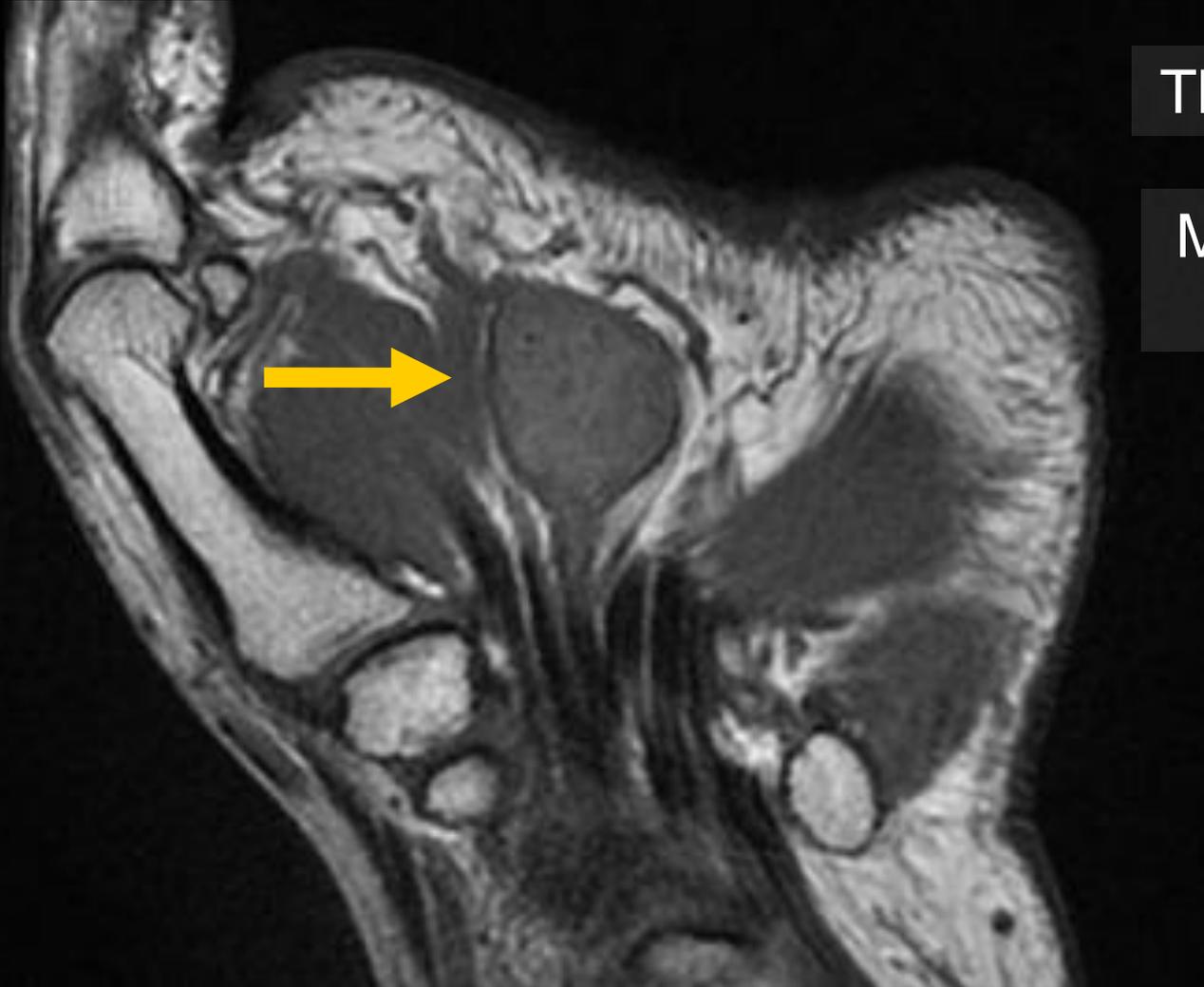
T1 FS +



PERIPHERAL NERVE SHEATH TUMORS

- ▶ Schwannoma & neurofibromas
- ▶ 8-9% found in the hand and wrist
- ▶ Schwannomas most frequently encountered neural tumor in the hand ¹⁷
- ▶ Schwannomas = encapsulated, from Schwann cells
- ▶ Neurofibromas = (usually) unencapsulated, from Schwann cells, fibroblasts, perineurial cells
- ▶ **MRI:**
 - ◆ Schwannomas = low T1, high/hetero T2, low signal capsule, eccentric with nerve
 - ◆ Neurofibromas = Target T2 appearance, fusiform with nerve
- ▶ **Treatment:** Schwannomas enucleated, neurofibromas left

35 M w/ palmar mass



Thin hypointense fibrous rim

Maintenance of a thin rim of surrounding fat

T1

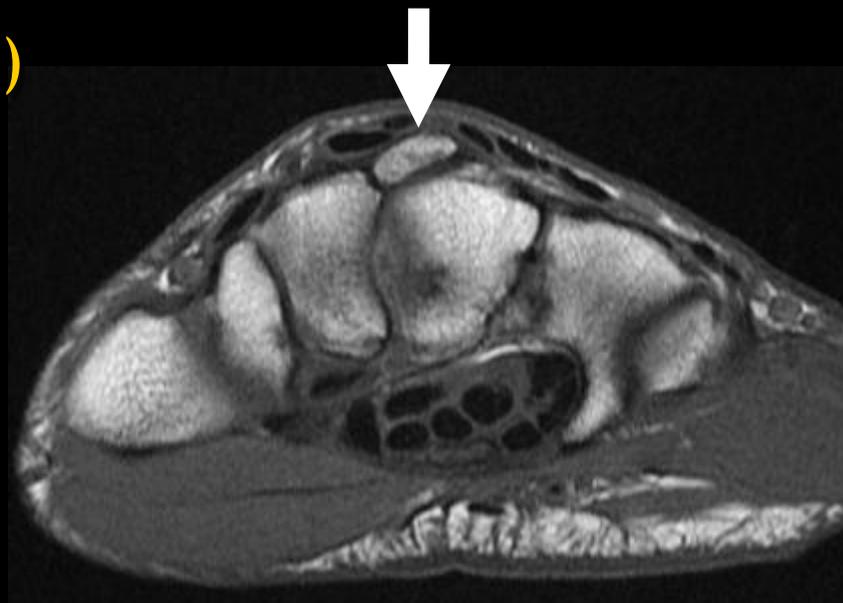
BONES



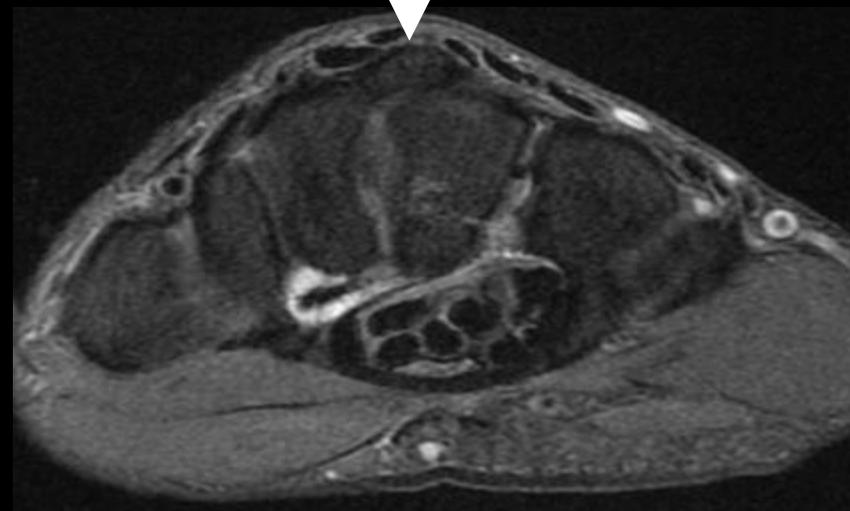
44 M s/p injury (driving a sign post)



T1



T1

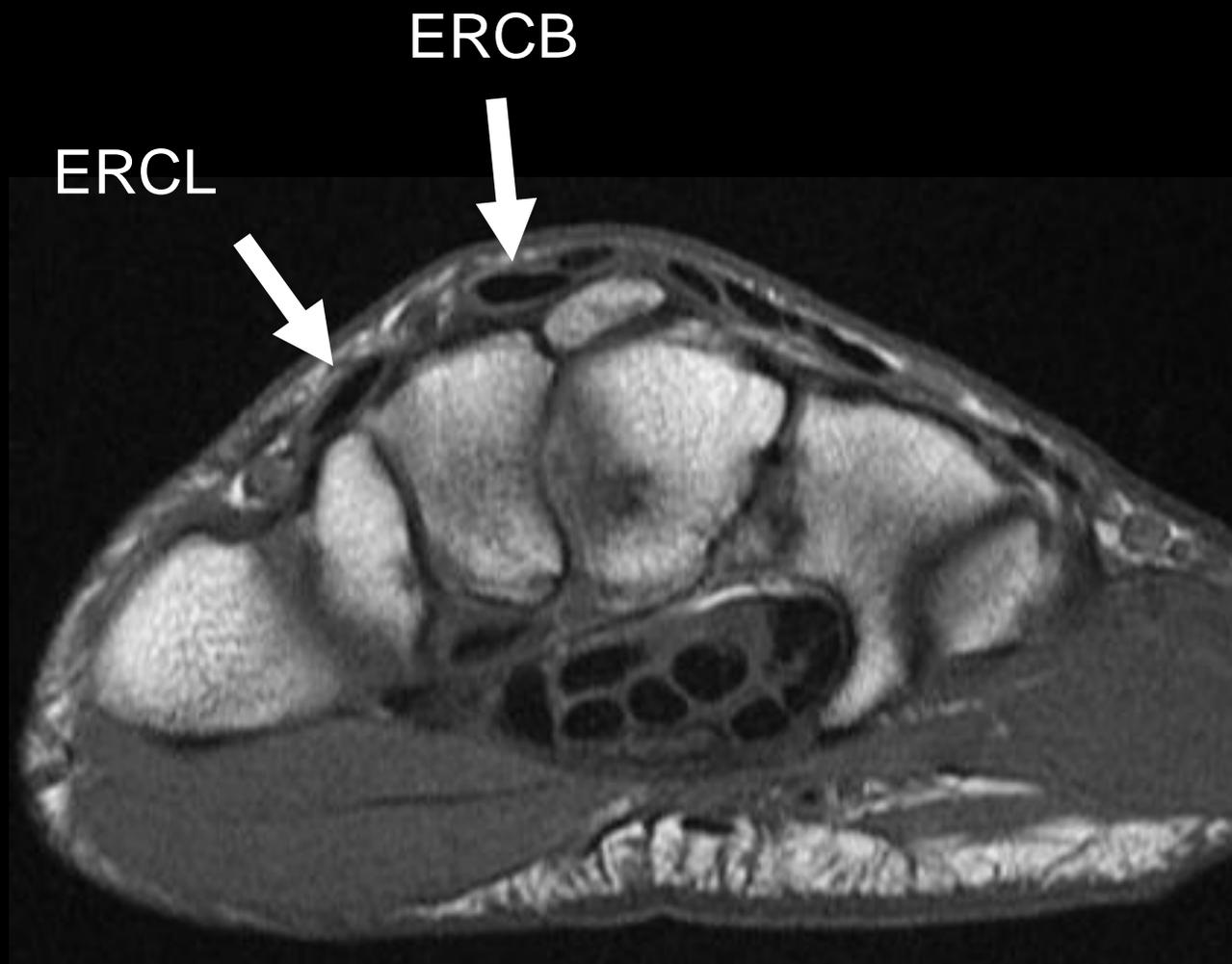


T2 FS

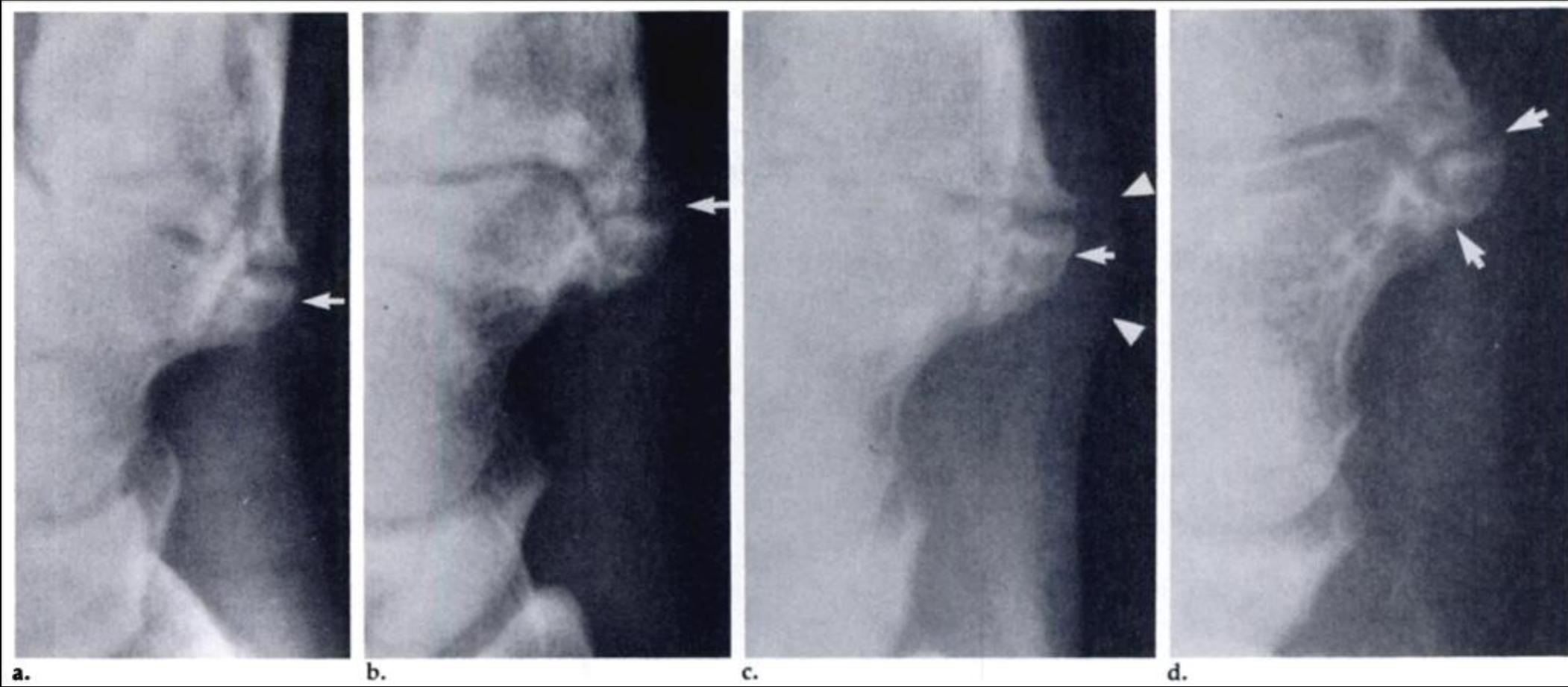
CARPAL BOSS

- ▶ Common anomalous osseous structure, b/w trapezoid, capitate, and 2nd and 3rd MC's
- ▶ From accessory ossification = os styloideum?
 - ◆ More often fused to bone, than separate ossicle
- ▶ Predisposes to localized OA
- ▶ May be confused clinically and coexist w/ ganglia
- ▶ Assoc. w/ ECRB and ECRL tendonitis/tenosynovitis
- ▶ Dorsal bony protuberance 2 & 3rd MCPJ's
 - ◆ Special carpal boss view may be helpful
- ▶ MRI may demonstrate bone edema in symptomatic cases
- ▶ **Treatment:** Conservative (rest, NSAID, steroid injections), excision

44 M s/p injury (driving a sign post)



Radiography: Carpal Boss View



a. Straight Lateral

b. 30° Supination

c. 30° Ulnar Deviation

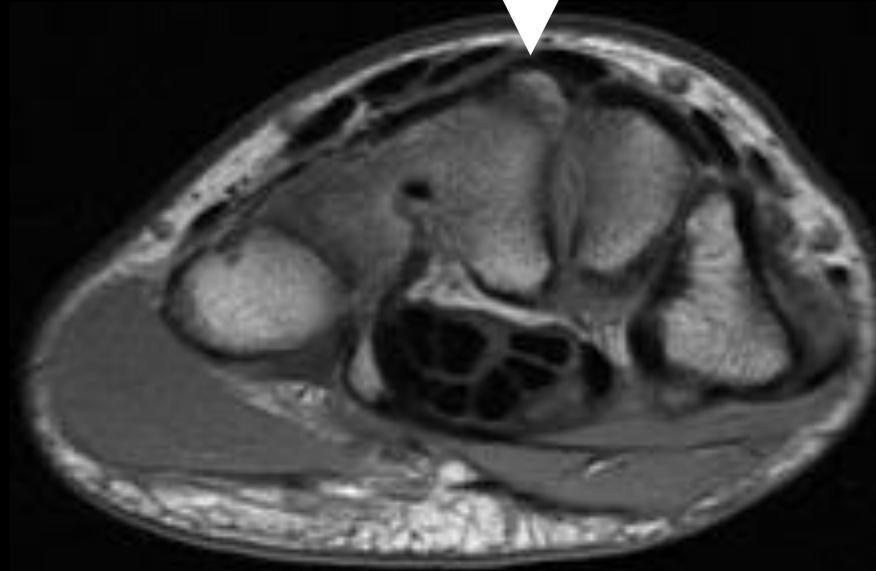
d. 30° Supination & Ulnar Deviation

19 F gymnast w/ bilateral symptomatic carpal boss(es)



PD

Dorsal ossicle: Carpal boss



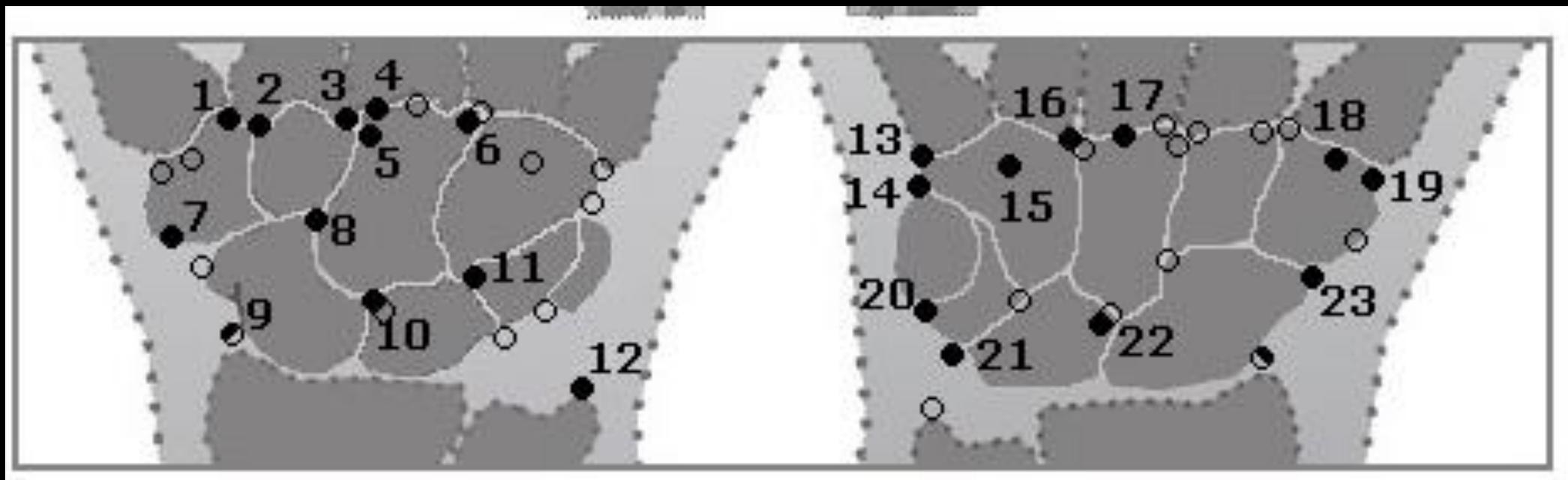
PD

BM Edema



PD FS

ACCESSORY OSSICLES OF THE CARPALS!!!



1=Os trapezium secundarium; 2=Os trapezoideum secundarium; 3=Os parastyloideum; 4=Os styloideum; 5=Os metastyloideum; 6=Os capitatum secundarium; 7=Os epitrapezium; 8=Os carpi centrale; 9=Os parnaviculare (intercalary bone between scaphoid and radius); 10=Os epilunatum; 11=Os epitriquetrum; 12=Os ulnostyloideum; 13=Os vesalianum manus; 14=Os ulnare externum; 15=Os hamulare basale & Os hamuli proprium; 16=Os gruberi; 17=Os subcapitatum; 18=Os praetrapezium; 19=Os paratrapezium; 20=Os pisiforme secundarium (os ulnare antebrachii); 21=Os triquetrum secundarium (os intermedium antebrachii, os triangulare); 22=Os hypolunatum; 23=Os radiale externum

PRIMARY OSSEOUS TUMORS

- ▶ Carpal bones: osteoid osteoma > osteoblastoma > chondroblastoma ¹⁹
 - ◆ Capitate and scaphoid more common
- ▶ Hand: Enchondromas predominate (>90%) ²⁰
 - ◆ Proximal phalanges > MC's
 - ◆ Chondrosarcoma most common malignant bone tumor
- ▶ Distal Radius/Ulna:
 - ◆ GCT's (wrist 3rd most common site, radius most common bone in wrist)

Osteoid osteomas

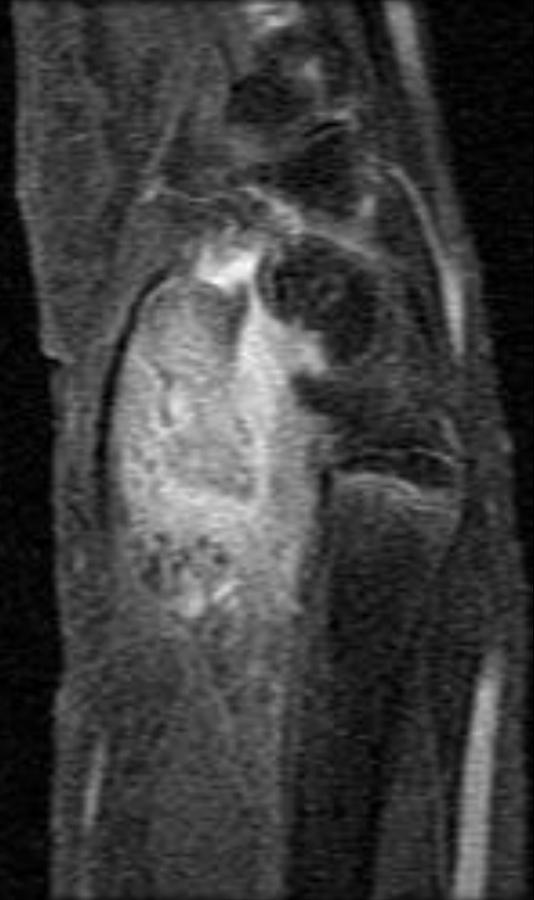


Radiolucent nidus with surrounding sclerosis

13 F Rt wrist pain x 2 months



T1



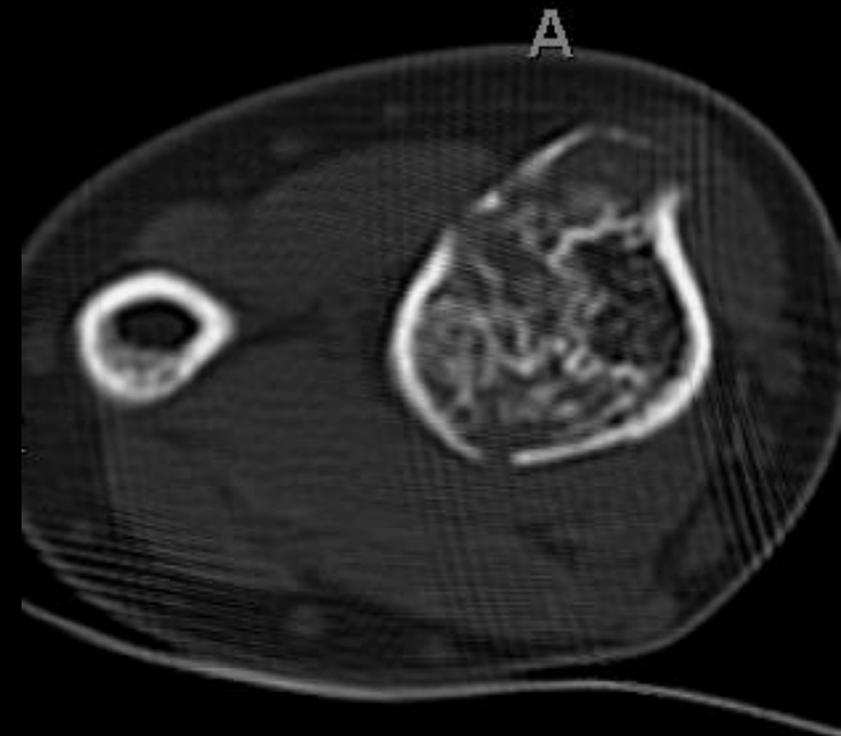
T1 FS +



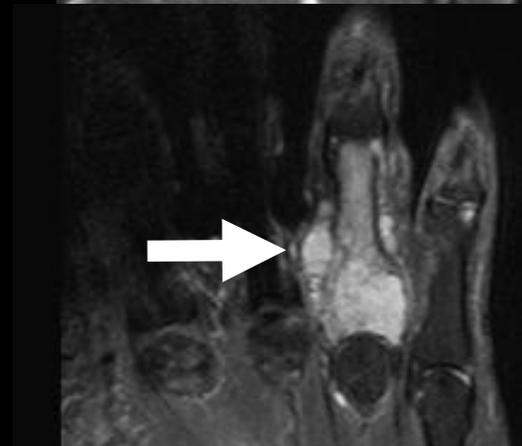
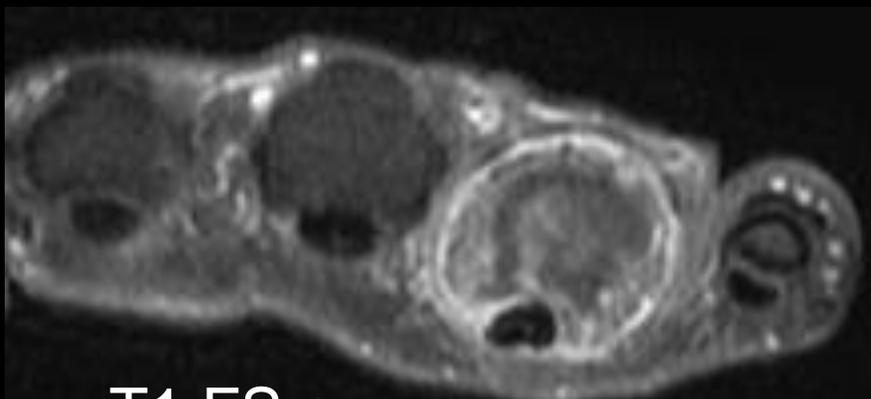
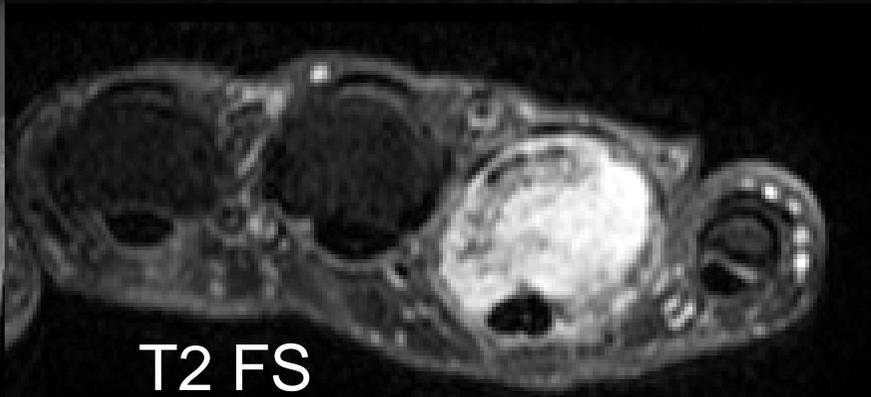
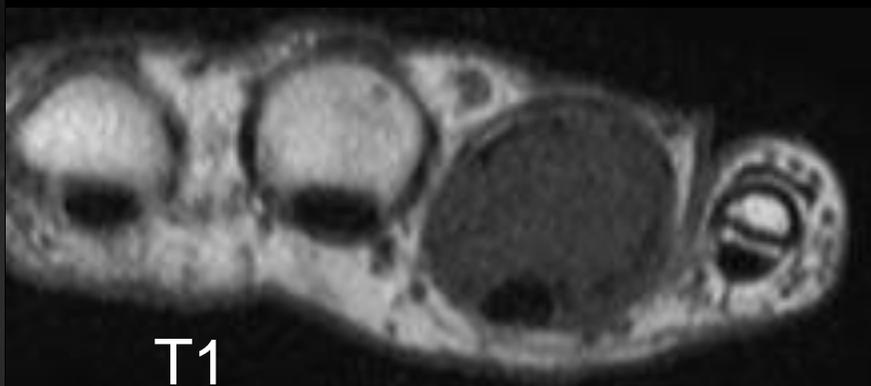
T2 FS

Diagnosis: Osteoblastoma of the Pisiform

Enchondromas



59 M w/ palpable, painful mass of the right 4th finger



59 M Palpable, painful mass of the right fourth finger

Diagnosis:
Chondrosarcoma

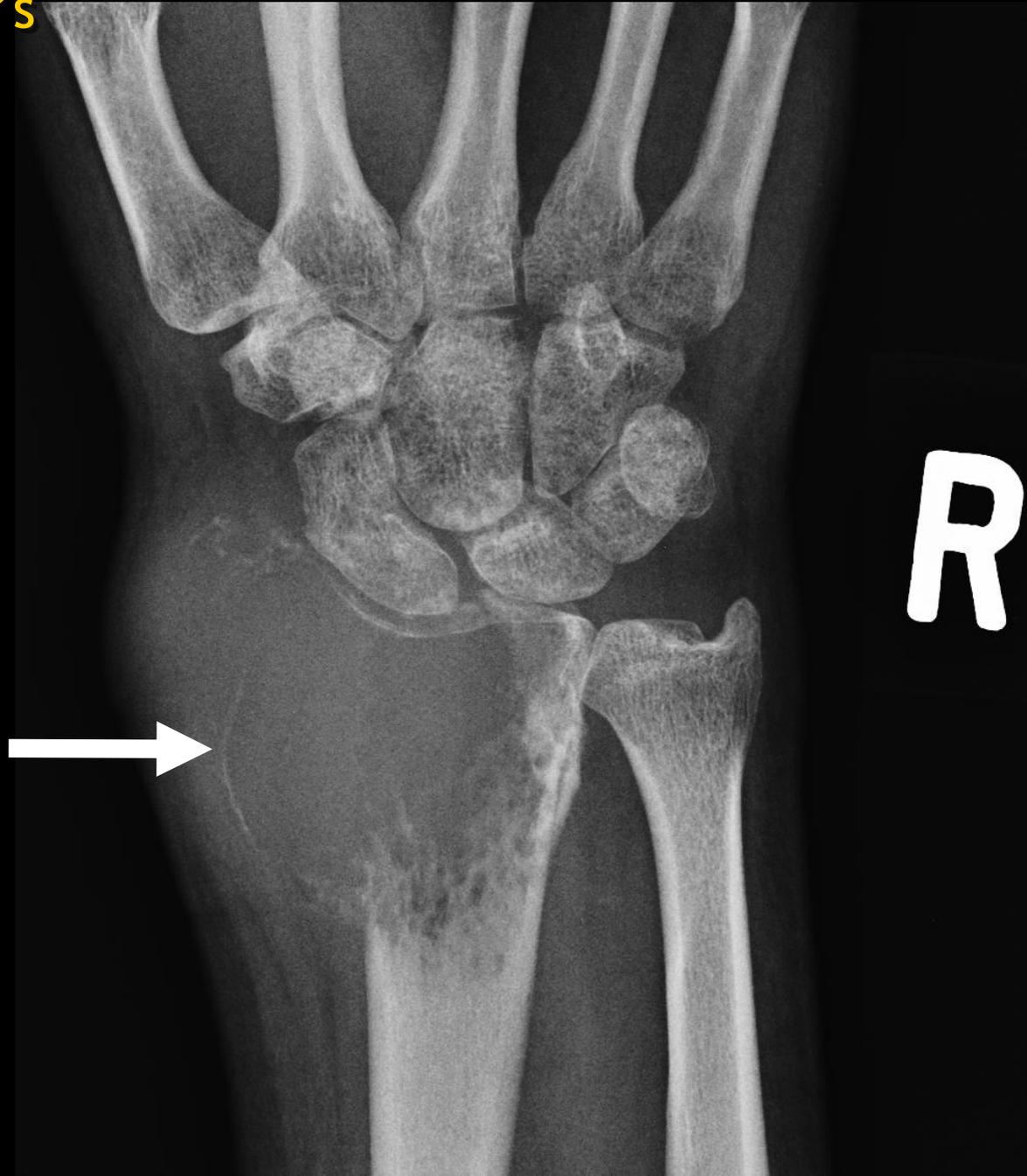


30 M distal radius mass x 2 mo's

Geographic lytic lesion, ill-defined transition zone;

Cortical expansion and thinning

Soft tissue component



30 M distal radius mass x 2 mo's

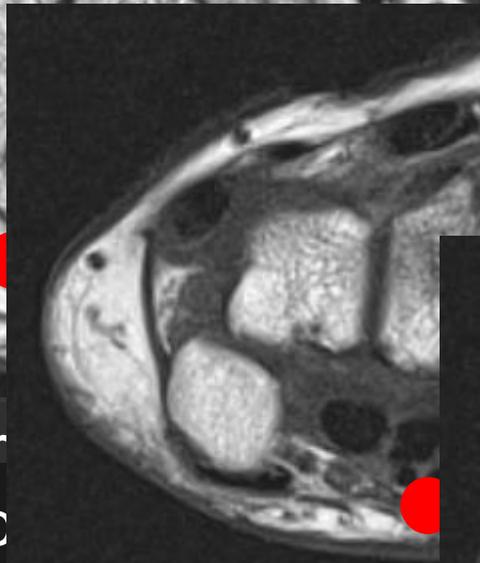
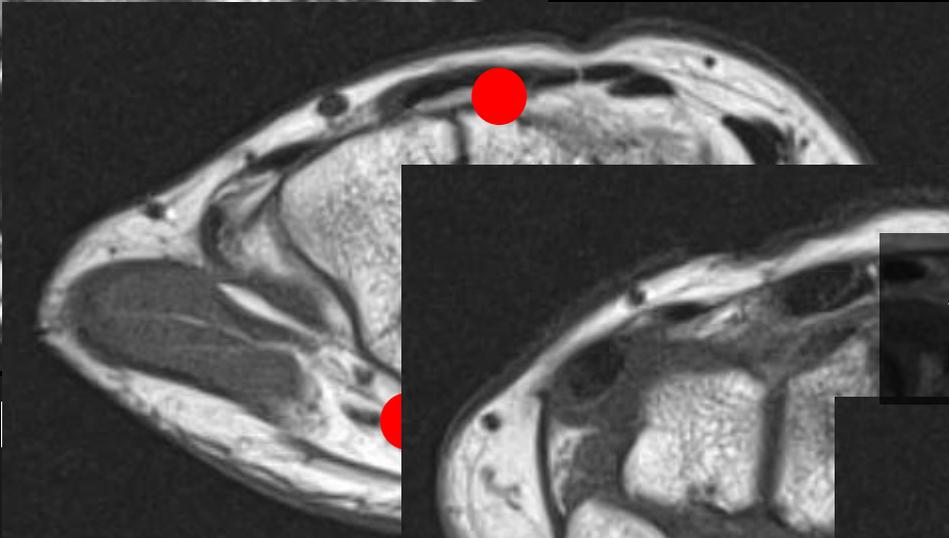
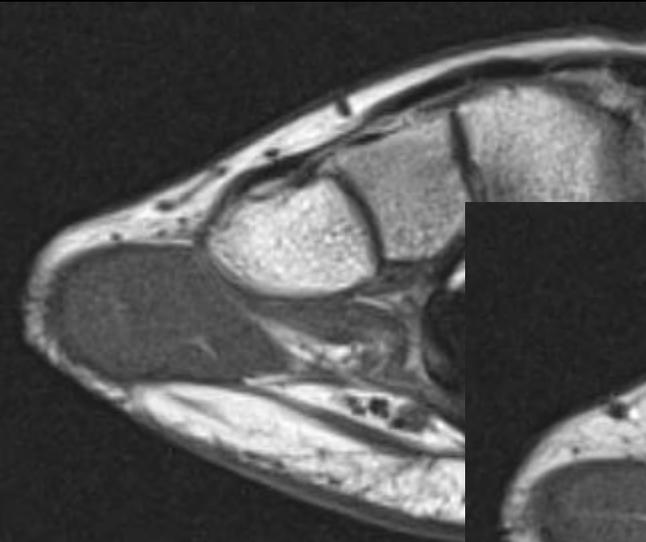


Diagnosis: Giant Cell Tumor of Bone w/ Secondary ABC

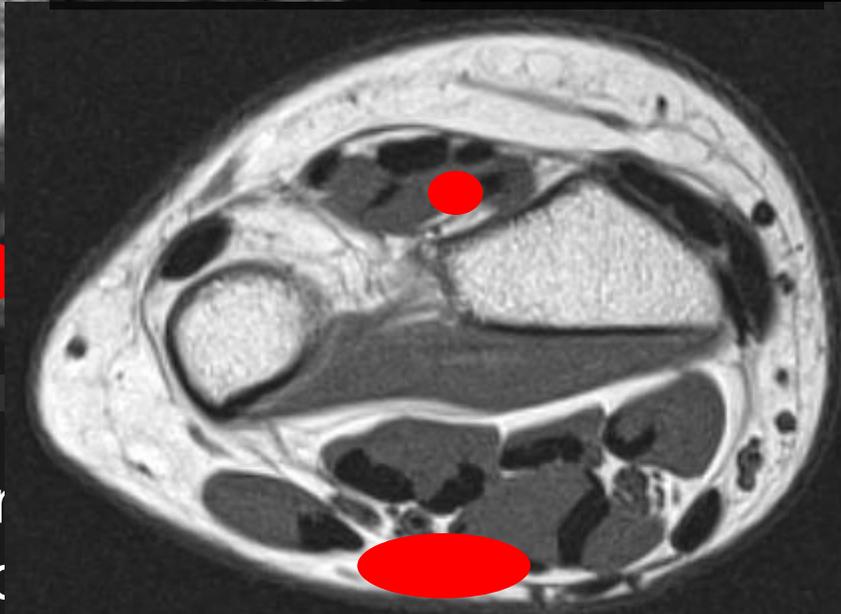
MUSCLES

Accessory/Anomalous Muscles

Ext. Dig. Brevis Manus:
Tender Mass/PIN
compression



Accessory Ext. Pollicis
Longus: tender mass



Lumbrical
in carpal
tunnel syndrome

Abber
minimi c

compression

Accessory
Palmaris longus: low
minimi: Ultr
lying muscle nerve c
bellies/multiple slips

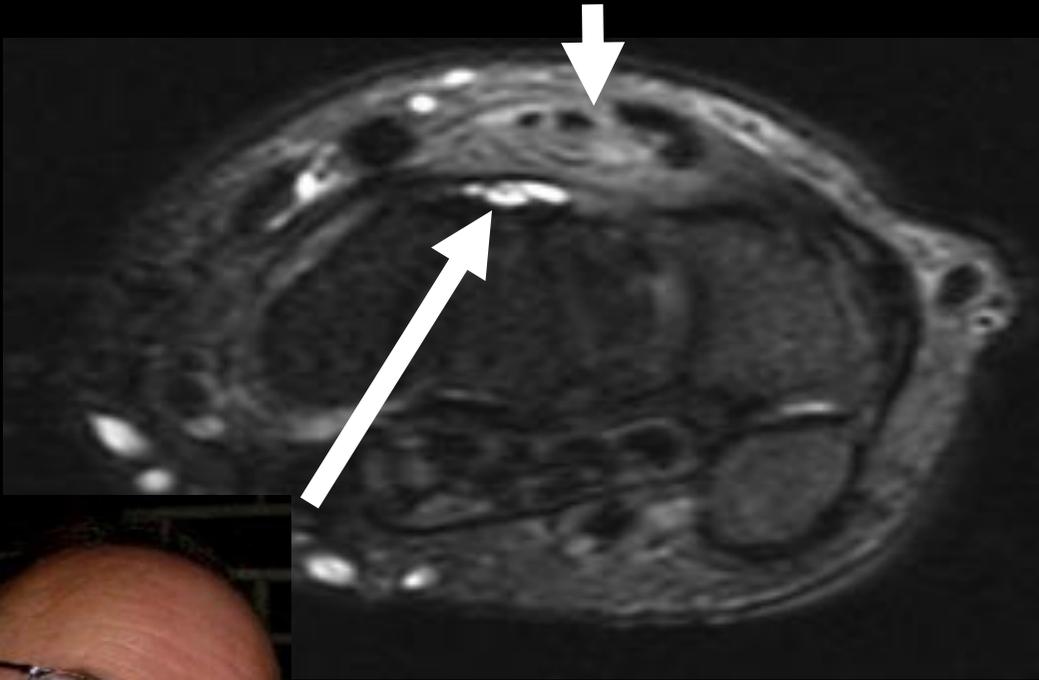
Extensor Digitorum Brevis Manus

Accessory muscle at the 4th dorsal compartment



T1

Muscle & Soft Tissue Edema



T2FS



Accessory Muscles

- ▶ Clinically confused with ganglia, soft tissue tumors, or tenosynovitis
- ▶ Can coexist with ganglia, confusing the clinical picture
- ▶ Dorsal accessory muscles prone to symptomatology due to limitation of space from a tight extensor retinaculum
 - ◆ Anomalous ext. indicis proprius
 - ◆ EDBM
 - ◆ Ext. medii proprius & ext. indicis et medii communis
- ▶ Volar muscles rarely may cause compression neuropathies:
 - ◆ Aberrant lumbrical in carpal tunnel
 - ◆ Accessory abductor digiti minimi
 - ◆ Palmaris longus variations

SUMMARY

- ▶ Wrist masses can be the result of benign tumors *and* non-neoplastic processes
- ▶ Radiography may be helpful in lesions with very characteristic features, but can often be nonspecific
- ▶ MRI is an excellent modality for problem solving and can definitively diagnose *some* conditions



No Tail

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尾

ネズミの仲間ですが、
尾はありません。



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