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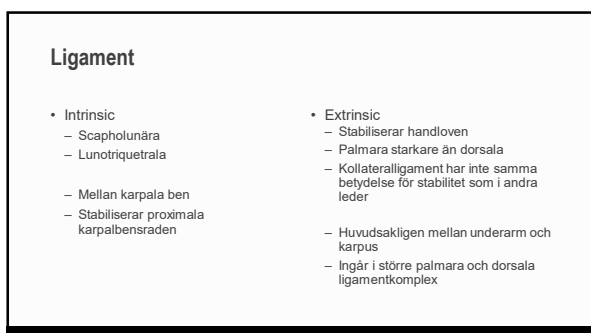
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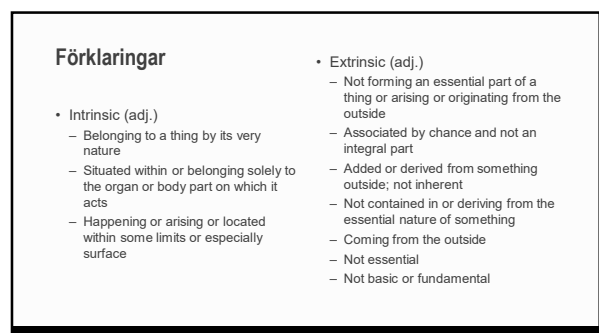
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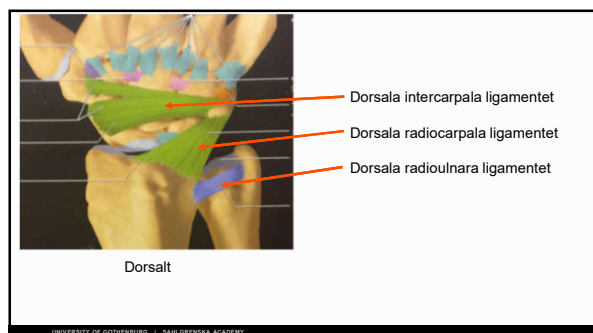
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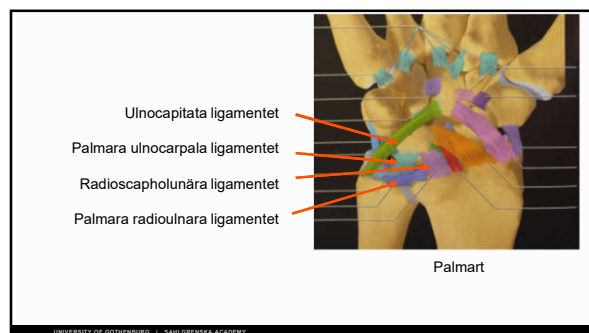
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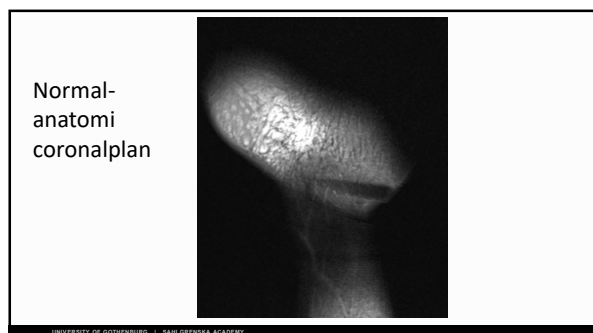
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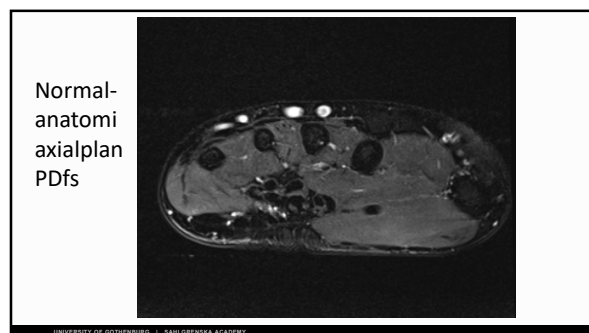
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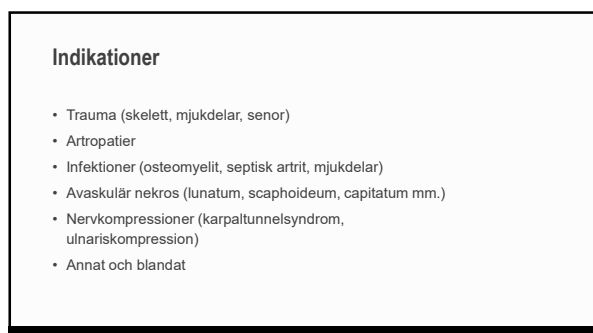
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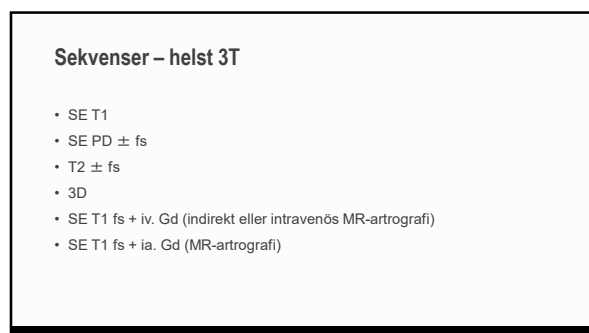
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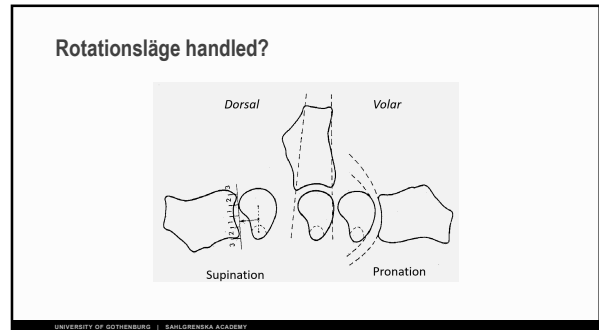
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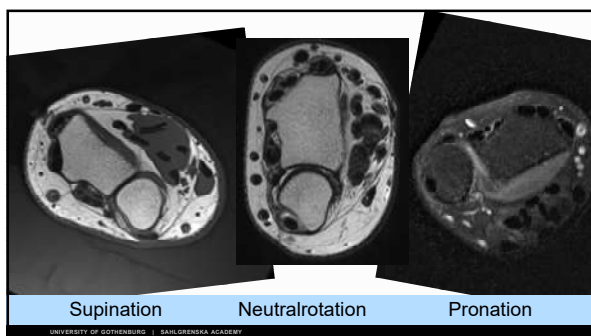
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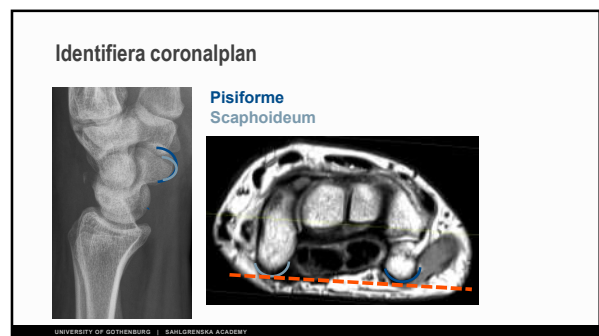
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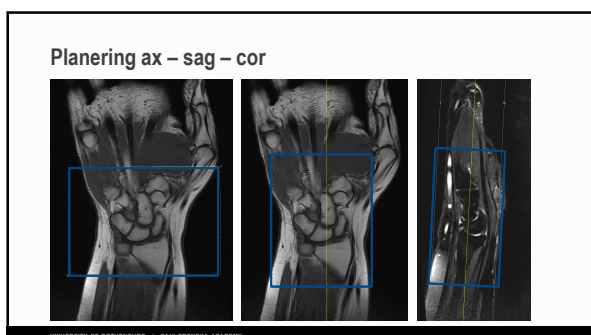
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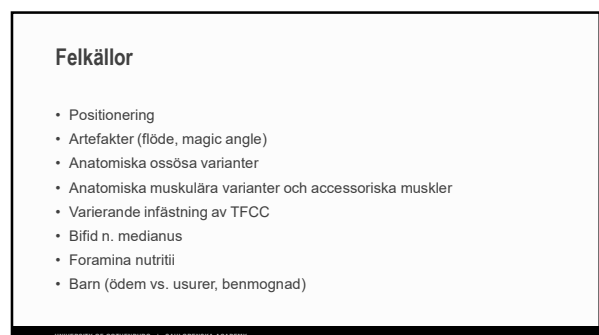
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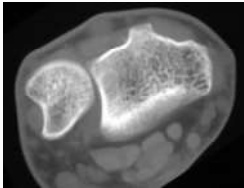


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Felkällor - positionering



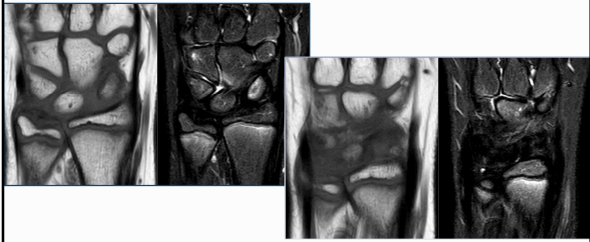
Undersökning i pronation kan ge falskt intryck av subluxation i DRU-leden

TFCC blir mycket svårbedömt

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Foramen nutritium



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9-årig flicka

Kärkanaler i scaphoideum, ingen fraktur
"Ödem" i pisiforme, brosk som inte mineraliserats

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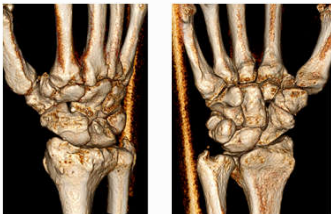
Scaphoideumfraktur

- I genomsnitt 16 % missas på röntgenundersökning
- Frakturspalt 1-2 mm = felställd fraktur med risk för pseudartros
- Radiologisk uppföljning vid klinisk misstanke viktigt – kanske inte lika viktigt vad man gör
- CT hög sensitivitet, hög specificitet
- MRT troligen ännu högre sensitivitet, måttlig specificitet
- Snabbt protokoll cor T1 + cor STIR

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Scaphoideums yta till stora delar broskklädd




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Allvarliga komplikationer förekommer

- Pseudartros
 - I princip endast endostal callusläkning
 - Låker långsamt
 - Svårbedömt radiologiskt
- Avaskulär nekros av proximala fragmentet
 - Intraosseös blodförsörjning av proximala fragmentet
- Slutresultat
 - SNAC (scaphoid non-union advanced collapse) – liknar SLAC (scapholunate advanced collapse)
 - Radiocarpaledartros

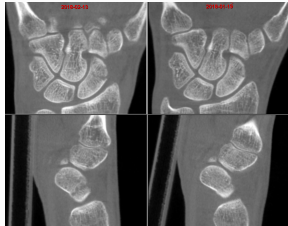


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CT scaphoideumfraktur

- Tunna snitt
- Ingen lågdos
- Bedömning längs scaphoideums längsaxel
- Bedömning i minst två plan

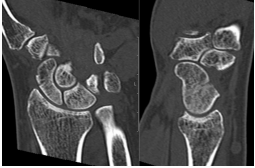


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CT scaphoideum läkningskontroll

1. Högupplöst CT med hög bildkvalitet, handen utsträckt över huvudet. Dos 0,02 – 0,03 mSv
2. Rekonstruktioner i scaphoideums längsaxel i sagittalplan och coronarplan med 1/1 mm snittjocklek
3. Mät läkningen i andel av scaphoideums bredd. Ange läkningen som medelvärdet av två rekonstruktioner i respektive rekonstruktionsplan (fyra st), i graderna 0-24%, 24-49%, 50-74%, 75-99%, 100%


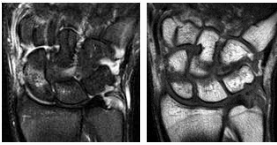


Singh 2005 Partial union of acute scaphoid fractures
Clemenson 2015 Union of scaphoid waist fractures assessed by CT scan

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Midjfraktur scaphoideum

17-årig man, ockult midjfraktur
Snabbprotokoll: Cor STIR, Cor T1

Mallee 2011 Comparison of CT and MRI for diagnosis of suspected scaphoid fractures

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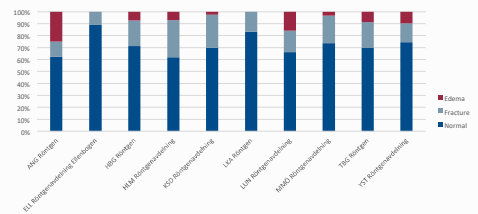
Kriterier för scaphoideumfraktur på MRT

- The MRI findings taken to represent a fracture were the presence of both marrow oedema (demonstrated best by the STIR images) and a trabecular fracture line (shown by the T1 and T2 images).
- A bone bruise was diagnosed when there was marrow oedema but no fracture line.
- Fowler 1998 A comparison of bone scintigraphy and MRI in the early diagnosis of the occult scaphoid waist fracture
- Criteria for a bone fracture on MR images included the presence of a cortical fracture line, a trabecular fracture line, or a combination of both (14). Such a fracture line had to be evidenced by linear disruption of the normal trabecular pattern and had to be hyperintense on STIR and T2-weighted images and hypointense or hyperintense on T1-weighted images.
- Evidence of a zone of diffusely increased signal intensity on STIR images was interpreted as bone marrow oedema but not as a manifest fracture.
- Memarsadeghi 2006 Occult scaphoid fractures comparison of multidetector CT and MR imaging—initial experience

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Vi tolkar bilderna olika




Metod	Edema (%)	Fracture (%)	Normal (%)
MRI Skottplan	~10	~10	~80
CT Skottplan	~10	~10	~80
MRI Sagittalplan	~10	~10	~80
MRI Coronarplan	~10	~10	~80
CT Sagittalplan	~10	~10	~80
CT Coronarplan	~10	~10	~80
MRI Sagittalplan	~10	~10	~80
MRI Coronarplan	~10	~10	~80
CT Sagittalplan	~10	~10	~80
CT Coronarplan	~10	~10	~80

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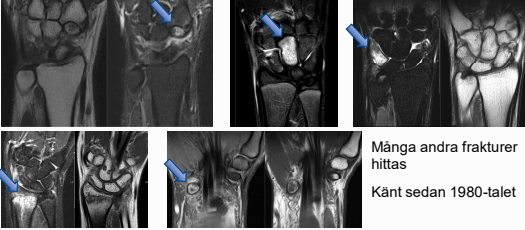
Avulsion tuber scaphoidei (missad på rgt)



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Tillfällighetsfynd vid MR scaphoideum



Många andra frakturer hittas
Känt sedan 1980-talet

Bismar 1988 Skeletal scintigraphy of the wrist in suggested scaphoid fracture
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Benmärgsödem - ospecifikt

- Posttraumatiskt
- Ödem och/eller blödning
- Lunatummalaci
- Infektion
- Inflammation

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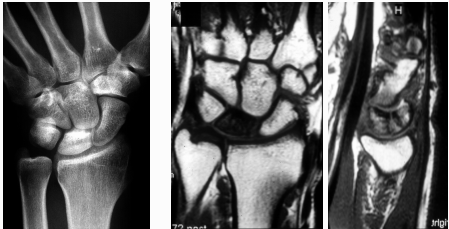
Lunatummalaci (Mb. Kienböck)



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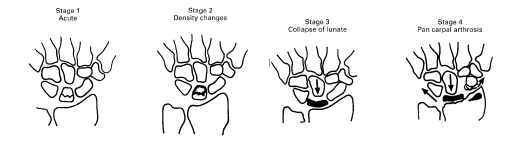
Lunatummalaci, sent skede



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Lichtman classification



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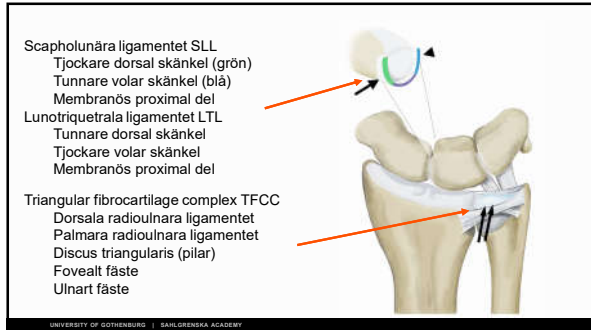
Tillämpning av ligamenttest

- Scapholunära ligamentet SLL**
 - Tjock dorsal skänkel
 - Tunnare volar skänkel
- Lunotriquetrala ligamentet LTL**
 - Tjock volar skänkel
 - Tunnare dorsal skänkel

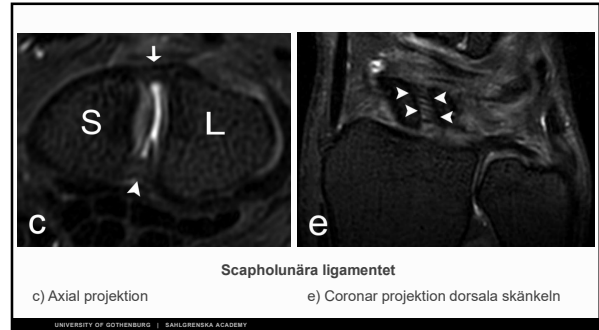
Använd axiala sekvenser, helst 3D

Gridtizer 2016 Optimal detection of scapholunate ligament tears with MRI
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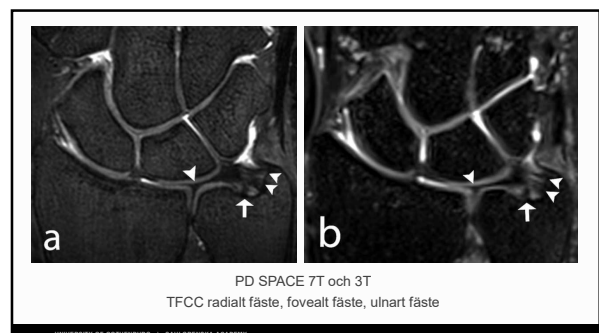
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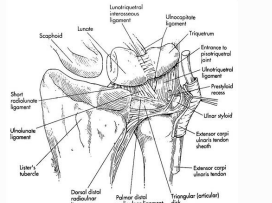
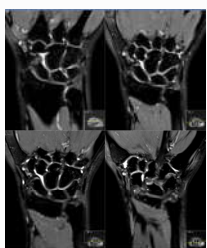
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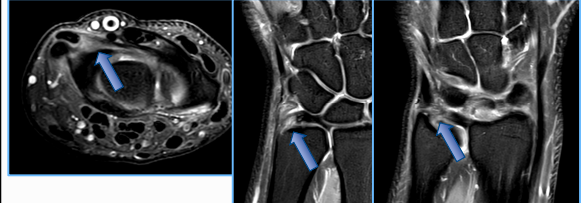
TFCC anatomi

- TFCC bildas av:
 - Discus triangularis
 - Radioulnara ligament
 - Ulnokarpala ligament

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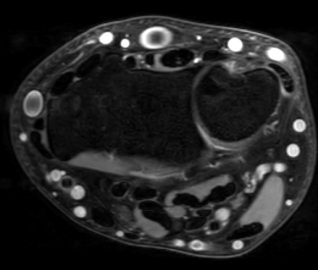
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33-årig man. Ruptur TFCC dorsala skänkeln

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Extensor carpi ulnaris subsheath injury

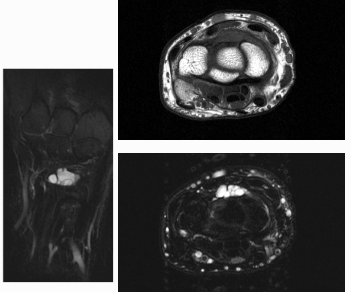
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Ganglion

Posttraumatiskt
Överansträngning
Spontan?

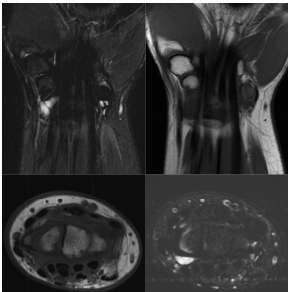
Oftast dorsalt
Mindre ofta volart om
processus styloideus
radii



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Ganglion volart om proximala scaphoideum
Ofta hos gymnaster
Handstående



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Senskideganglion

Kallat "väskeökning"

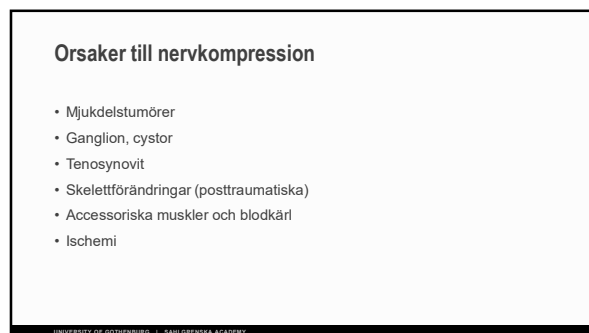


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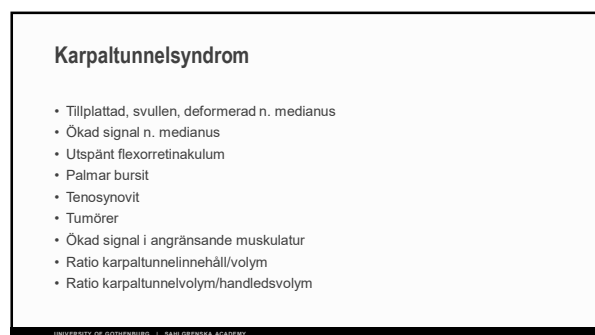
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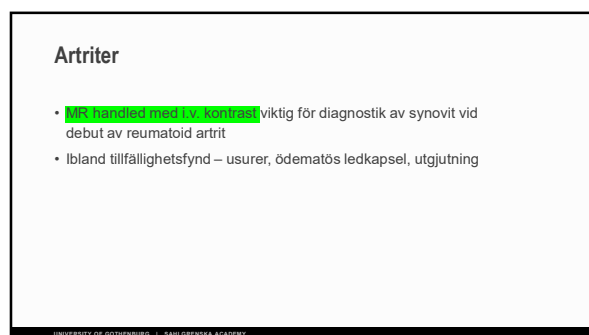
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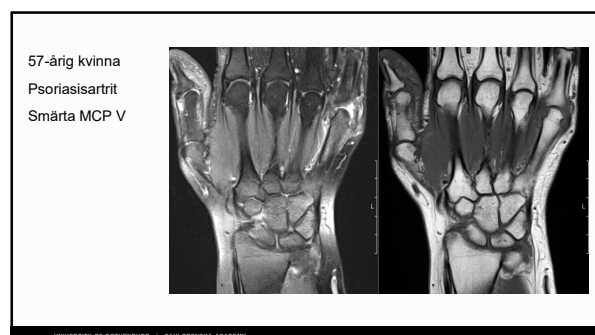
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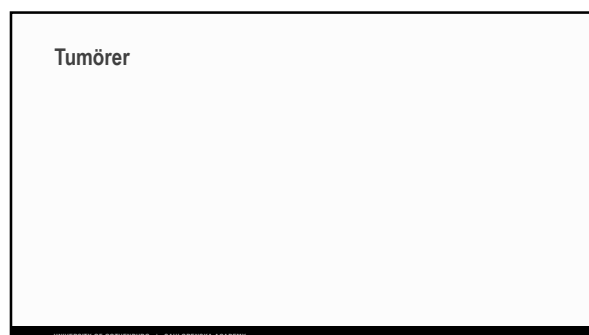
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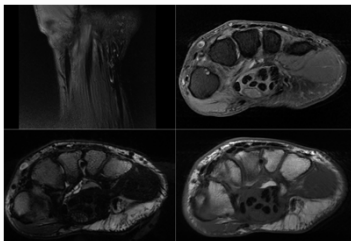


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Fibrolipomatöst hamartom n. medianus



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Sammanfattning MR handled

- Viktig undersökning – scaphoideum, ligament
- Scanplan
- Bra standardprotokoll, gärna med 3D
- Använd PACS
- Läs på i samband med fall

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