

A graphic of a notepad with a pen and a checkmark. The notepad is white with a grey border and a grey checkmark at the bottom. The text is written in blue, bold, sans-serif font. The pen is black and lies vertically to the right of the notepad.

Reporting Ultrasound Findings and Diagnosis



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ULTRASOUND REPORT

COLLECTION

DESCRIPTION

RECORDING

INTERPRETATION



US REPORT GENERAL COMMENTS



The ultrasound report should be written and issued by the sonographer undertaking the ultrasound examination and viewed as an integral part of the whole examination



MSUS report Steps

- Before US examination
- During US examination
- After US examination



Before US examination

A clinical history should be taken prior to any examination

- **Clinical question or motivation to be addressed should be indicated at the beginning of the report**

*Bene diagnoscitur, bene curatur.
Well diagnosed, well cured.*

1. For a patient with articular pain, swelling, or mechanical symptoms, without definitive diagnosis on clinical examination, it is reasonable to use MSUS to further elucidate the diagnosis at the following joints:

glenohumeral, acromioclavicular, sternoclavicular, elbow, wrist, metacarpophalangeal, interphalangeal, hip, knee, ankle, midfoot, and metatarsophalangeal. However, performing MSUS at the TMJ and costochondral joints will not add to the clinical assessment.

2. For a patient with mono- or oligoarthralgia, current or historical, without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate for evidence of subclinical inflammatory arthritis or enthesitis at the following asymptomatic joints or regions: glenohumeral, acromioclavicular, sternoclavicular, elbow, wrist, metacarpophalangeal, interphalangeal, hip, knee, ankle, midfoot, and Metatarsophalangeal.

3. For a patient with diagnosed inflammatory arthritis and new or ongoing symptoms without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate for inflammatory disease activity, structural damage, or emergence of an alternate cause at the following sites: glenohumeral, acromioclavicular, elbow, wrist, metacarpophalangeal, interphalangeal, hip, knee, ankle, midfoot and metatarsophalangeal, and enthesal.

4. For a patient with pain or mechanical symptoms of the hip region without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate effusion, intraarticular and periarticular lesions, and adjacent regional soft tissue structures.

5. For a patient with periarticular pain without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate tendon and soft tissue pathologies and the nature and localization of adjacent swelling at the shoulder, elbow, hand, hip, knee, ankle, and forefoot.

7. For a patient with shoulder pain or mechanical symptoms, without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate underlying structural disorders, but not for adhesive

capsulitis or as preparation for surgical intervention.

8. For a patient with regional mechanical symptoms, without definitive diagnosis on clinical examination, it is reasonable to use MSUS to evaluate for inflammation, tendon, and soft tissue pathologies at the

regions: shoulder, elbow, hand, wrist, hip, knee, ankle, and foot.

9. It is reasonable to use MSUS to evaluate the parotid and submandibular glands in a patient being evaluated for Sjogren's disease to determine whether they have typical changes.

10. For a patient with symptoms in the region of a joint whose evaluation is obfuscated by adipose or other local derangements of soft tissue, it is reasonable to use MSUS to facilitate clinical assessment at the glenohumeral, acromioclavicular, elbow, wrist, hand, metacarpophalangeal, interphalangeal, hip, knee, ankle/foot and metatarsophalangeal joints.

11. For a patient with regional neuropathic pain without definitive diagnosis on clinical examination, it is reasonable to use MSUS to diagnose entrapment of the median nerve at the carpal tunnel, the ulnar nerve at the cubital tunnel, and the posterior tibial nerve at the tarsal tunnel.

12. It is reasonable to use MSUS to guide articular and periarticular aspiration or injection at sites that include the synovial, tenosynovial, bursal, peritendinous, and perienthesal areas.

13. Use of MSUS may be reasonable for guidance during synovial biopsy procedures.

14. It is reasonable to use MSUS to monitor disease activity and structural progression at the glenohumeral, acromioclavicular,

During US examination



During US examination

1. Examination method

Equipment

US mode

**List of anatomic
areas examined**

**Scanning
technique**

**Scanning
Guidelines
followed
/EULAR/**



During US examination

1. Examination method

For each position and structure:

Patient position

Probe placement

Bony landmarks

Sonographic image

During US examination

2. Detailed description of US findings: checklist

Echogenicity

- Hyperechoic
- Hypoechoic
- Anechoic

Location

- Related to:
skin, bones,
adjacent
anatomical
structures

Shape & Contour

- Well defined or
not
- Regular,
irregular



During US examination

2. Detailed description of US findings: checklist

Internal echotexture

- Homogeneous
- Heterogeneous

Reaction to compression

- Displaceable
- Non.....

Doppler signal

- Presence or not
- Inside/Around



During US examination

2. Detailed description of US findings: checklist

Artifacts

- Posterior acoustic shadowing
- Posterior acoustic enhancement



During US examination

2. Detailed description of US findings: checklist

Quantification /measurement/

- **Semiquantitative scale**
- **Quantitative scale**



During examination

2. Detailed description of US findings

- **International standardised terminology and definitions**

The J. Rheumatology 2005;32(12):2485-7

OMERACT 7 Special Interest Group

Musculoskeletal Ultrasound Including Definitions for Ultrasonographic Pathology

RICHARD J. WAKEFIELD, PETER V. BALINT, MARCIN SZKUDLAREK, EMILIO FILIPPUCCI, MARINA BACKHAUS, MARIA-ANTONIETTA D'AGOSTINO, ESPERANZA NAREDO SANCHEZ, ANNAMARIA IAGNOCCO, WOLFGANG A. SCHMIDT, GEORGE BRUYN, DAVID KANE, PHILIP J. O'CONNOR, BERNHARD MANGER, FRED JOSHUA, JUHANI KOSKI, WALTER GRASSI, MARISSA N.D. LASSERE, NANNO SWEN, FRANZ KAINBERGER, ANDREA KLAUSER, MIKKEL OSTERGAARD, ANDREW K. BROWN, KLAUS P. MACHOLD, and PHILIP G. CONAGHAN

During examination

2. Detailed description of US findings

RA Bone Erosion

An intraarticular discontinuity of the bone surface that is visible in 2 perpendicular planes

Synovial Fluid

Abnormal hypoechoic or anechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular material that is displaceable and compressible, but does not exhibit Doppler signal

Synovial Hypertrophy

Abnormal hypoechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular tissue that is nondisplaceable and poorly compressible and which may exhibit Doppler signal

During examination

2. Detailed description of US findings

Tenosynovitis

Hypoechoic or anechoic thickened tissue with or without fluid within the tendon sheath, which is seen in 2 perpendicular planes and which may exhibit Doppler signal.

During examination

2. Detailed description of US findings

Enthesitis

Abnormally hypoechoic (loss of normal fibrillar architecture) and/or thickened tendon or ligament at its bony attachment (may occasionally contain hyperechoic foci consistent with calcification), seen in two perpendicular planes that may exhibit Doppler signal and/or bony changes, including enthesophytes, erosions, or irregularity.

During examination

2. Detailed description of US findings

Tenosynovitis on B-mode

Abnormal anechoic and/or hypoechoic (relative to tendon fibers) tendon sheath widening which can be related both to the presence of tenosynovial abnormal fluid and/or hypertrophy

Tenosynovitis on Doppler mode

Presence of peri-tendinous Doppler signal within the synovial sheath, seen in two perpendicular planes, excluding normal nutrient vessels in mesotenon or vinculae, only if the tendon shows peri-tendinous synovial sheath widening on B-mode

During examination

2. Detailed description of US findings

Tendinosis

Focal or global thickening and hypoechogenicity of the tendon with abnormal heterogeneous echotexture (hypoechoic areas) which may exhibit a hypervascular pattern at CD/PD (neovascularization)

During examination

2. Detailed description of US findings

Paratenonitis

**Abnormal hypoechoic
halo (transverse) or line
(longitudinal)
surrounding a tendon
without synovial sheath
(and contour
irregularities)**

During examination

2. Detailed description of US findings

Tendon tear

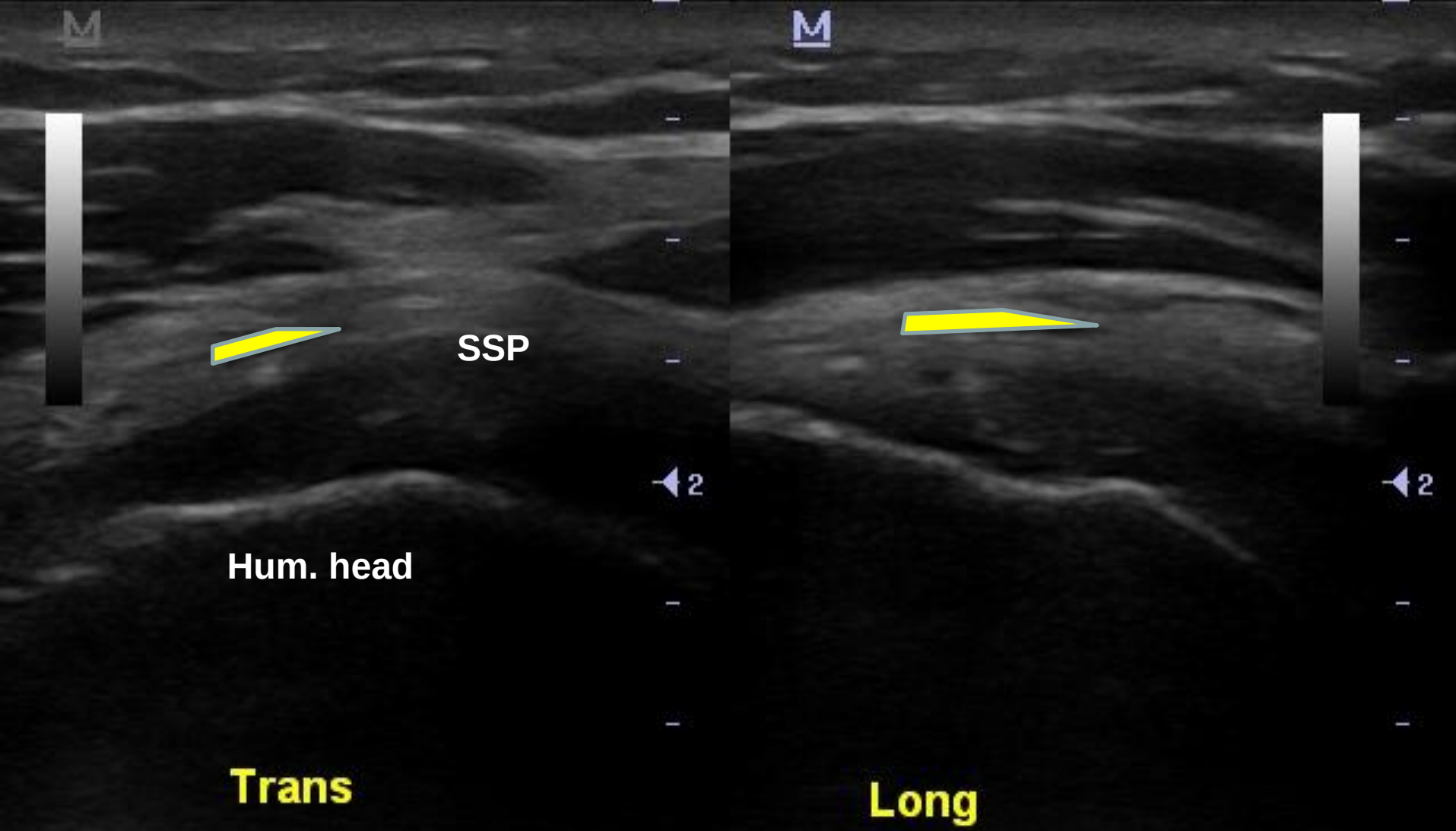
Partial or full-thickness tendon defect/interruption of the tendon fibres

Old complete tear

An absence of the tendon at its anatomic location

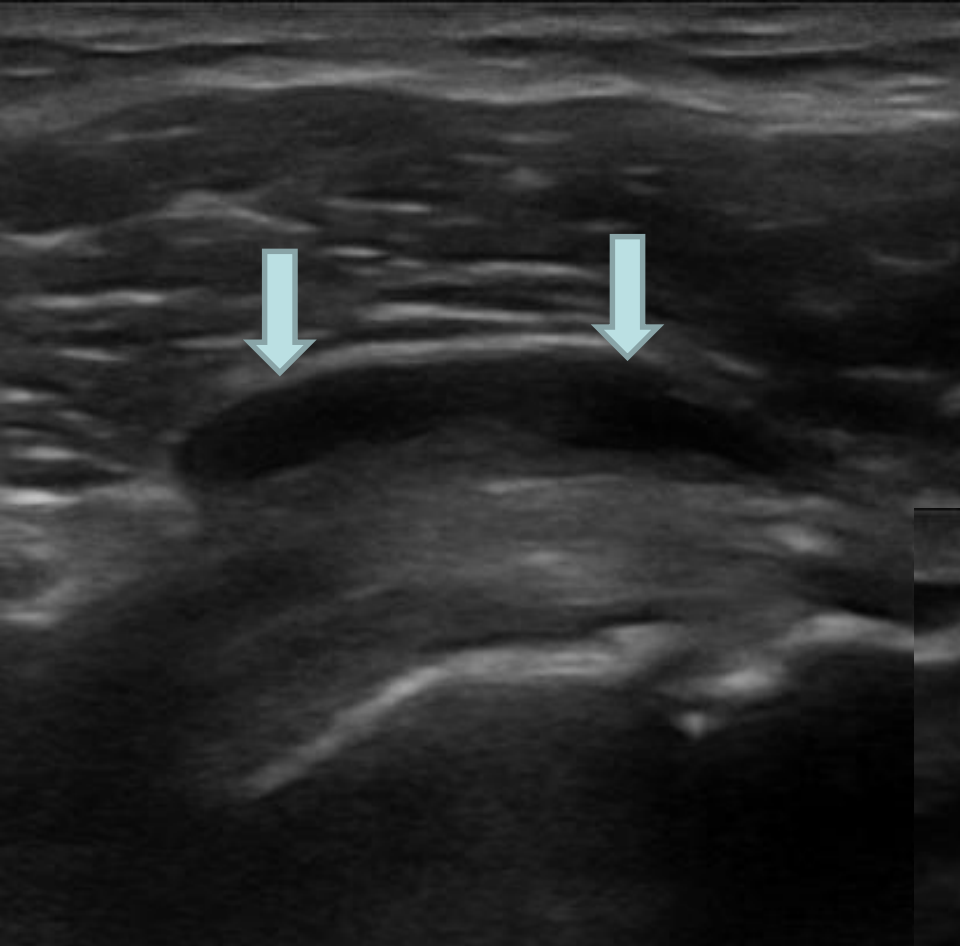
During examination Some examples





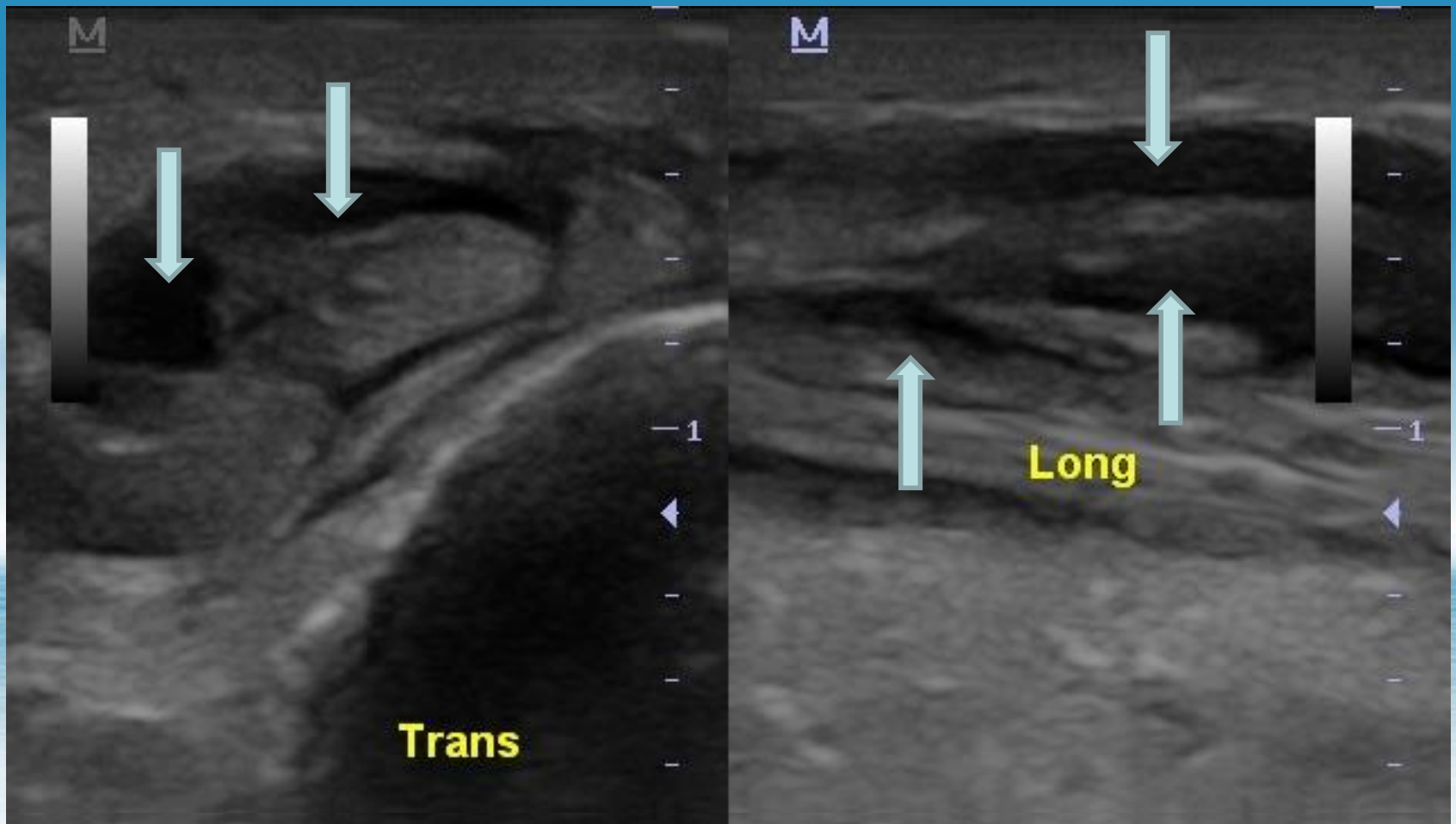
How to describe the SSP tendon?

- ✓ *Normal: the supraspinatus tendon shows normal shape and internal echotexture... OR*
- ✓ *Abnormal: the supraspinatus tendon shows a hypoechoic defect....*



Additional pathology in this case ?

+ Dist 0.25 cm



How to describe the Peronei tendons?

- ✓ **Normal:** the peronei tendons show normal shape and internal echotexture...
- OR
- ✓ **Abnormal:** the peronei tendons show a hypoechoic thickened tissue within the tendon sheath with or without fluid, visible in 2 perpendicular planes (may exhibit Doppler signal)

During examination

- Description of all examined structures (i.e. normal or abnormal) should appear in the report
- Any limitations for the examination should be stated and the reason indicated

Eg

- ✓ *The thick subcutaneous tissue of the patient prevented the examination of the anterior recess of the hip (transducer frequency 10-15 MHz)*
- ✓ *The impossibility of shoulder internal rotation and adduction prevented complete visualization of the supraspinatus tendon*



During examination

- Description of all examined structures (i.e. normal or abnormal) should appear in the report
- Anatomic structures that cannot be properly or entirely visualized (e.g. knee menisci, wrist triangular fibricartilage, ...) should not be reported as normal
- If present, pathological findings should be reported



How to describe the Medial meniscus?

- ✓ *Normal: the outer part of medial meniscus shows normal shape and internal echotexture... OR*
- ✓ *Abnormal: hypoechoic defect in the peripheral aspect of the medial meniscus...*



During examination

2. Detailed description of US findings

Quantification/Measurement

- **Semiquantitative**
 - **Quantitative**





During examination Scoring the degree of pathology

**Effusion/synovial
hypertrophy**

**Doppler
signal**

**Bone
erosions**

**Nerve
thickness**

**Tendon and
muscle tears**

When a follow up is planned



During examination

2. Detailed description of US findings

Quantification/Measurement

Quantitative

A quantitative measure of the lesion can be provided, accompanied by the normal values according to the literature and the clinical relevance of the measure, if applicable

Qvistgaard ARD 2001, Terslev Acta Rad 2003, Versaminidis Med Biol 2005



During examination

2. Detailed description of US findings

Quantification/Measurement

Quantitative

- A numeric measure is not strictly necessary in many MSUS examinations
- High anatomical variability!
- Quantitative measurement is recommended/mandatory: tendon tears, muscle ruptures, nerve thickness, cortical erosions
- Sometimes quantitative measures are useless for diagnosis but may be useful for monitoring

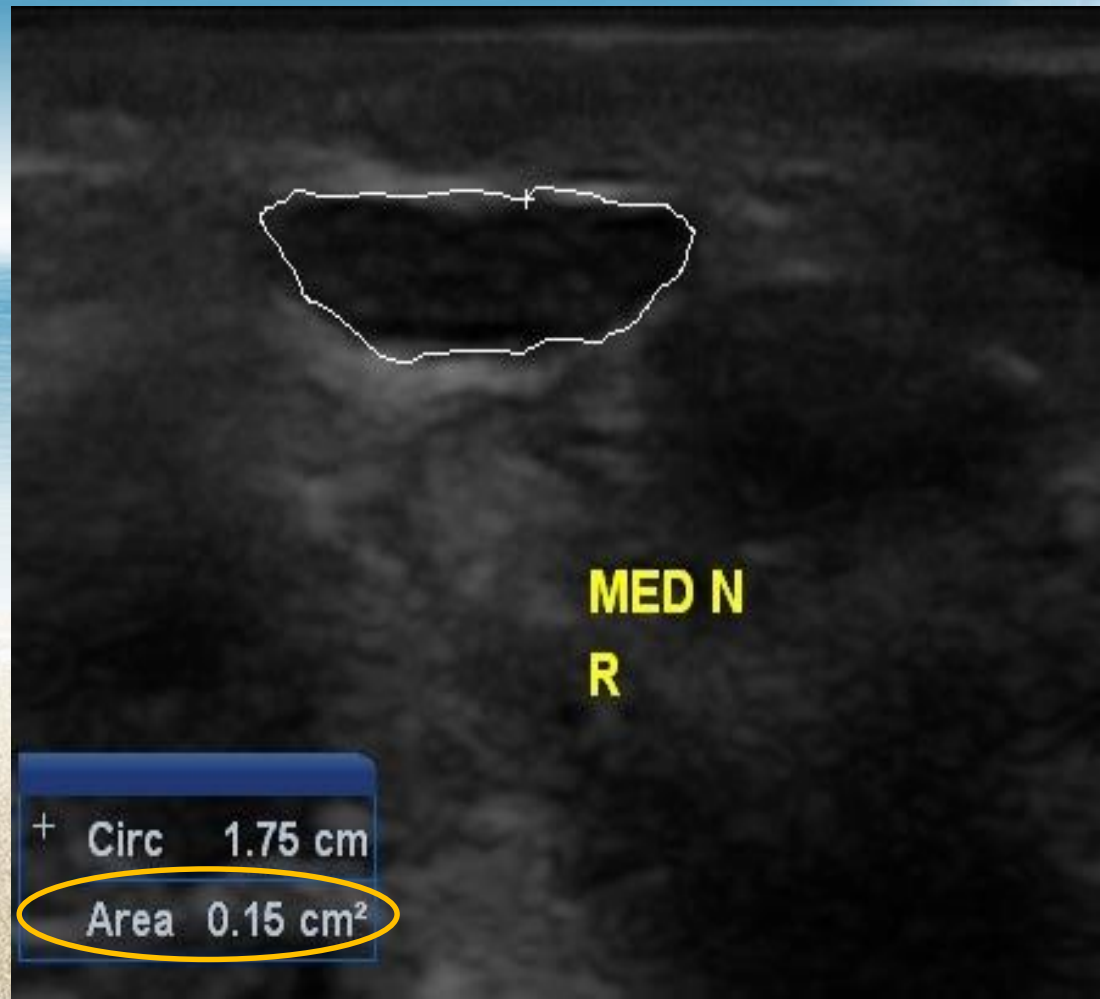


How to describe the Median nerve?

✓ *Normal: the Median nerve shows normal cross section and internal echotexture...*

OR

✓ *Abnormal: the Median nerve shows abnormal cross section and internal echotexture...*



During examination

2. Detailed description of US findings

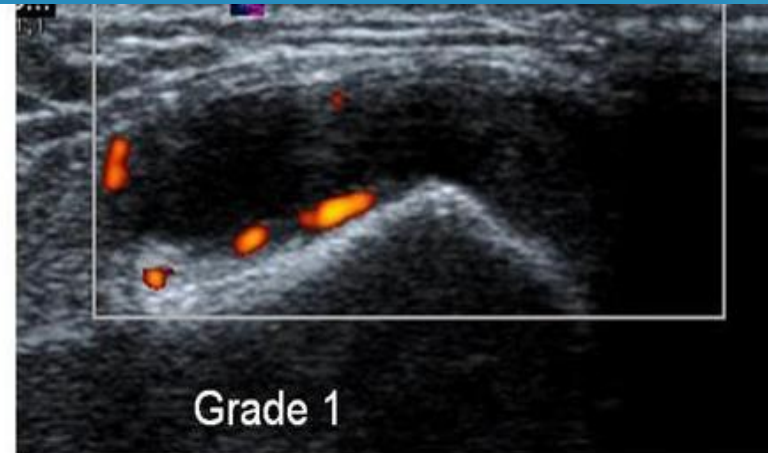
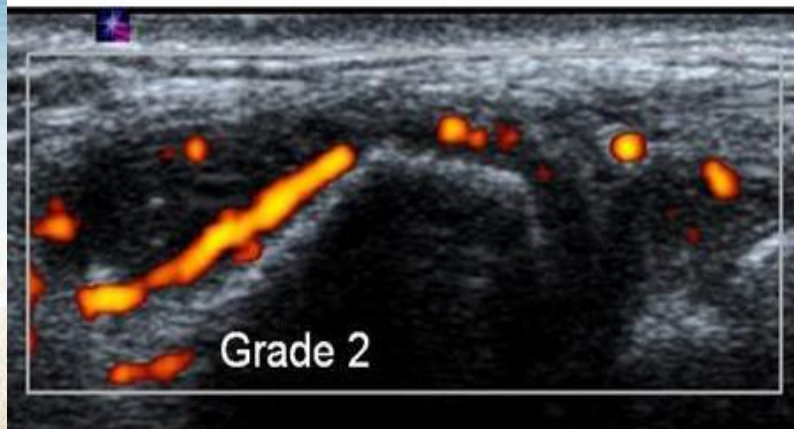
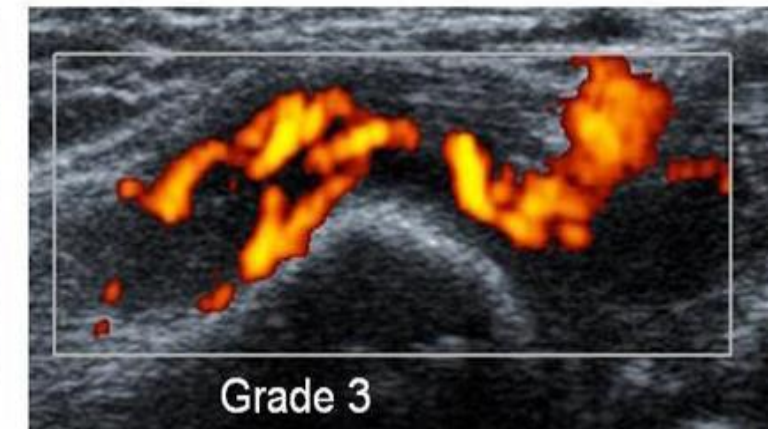
Quantification/Measurement

Semiquantitative

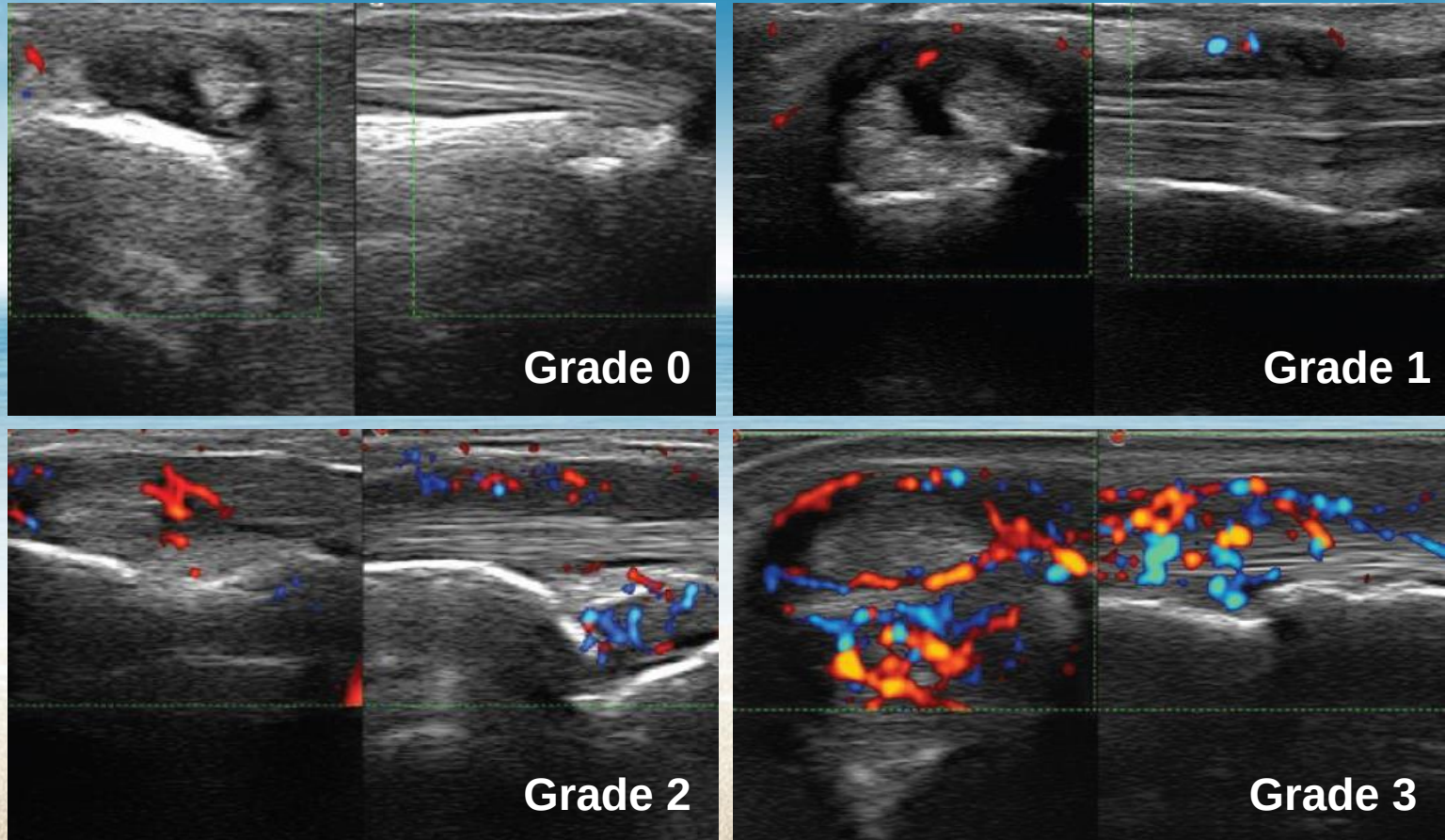
A semiquantitative grading of the pathological findings can be provided, if applicable and described in the literature



A semiquantitative score for Doppler synovitis

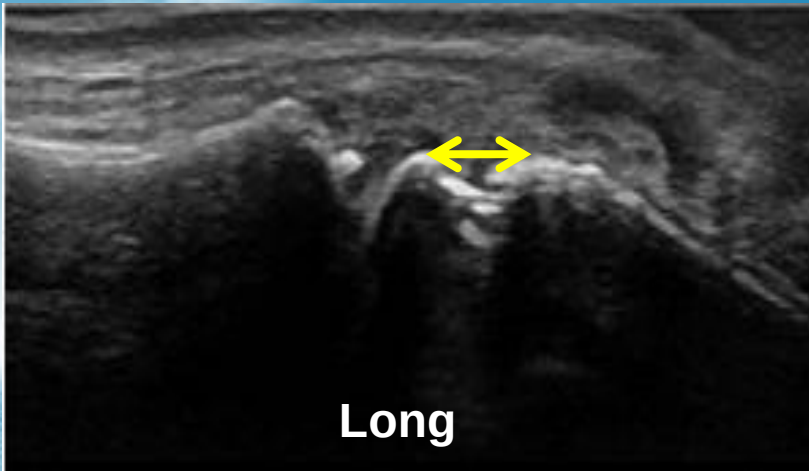
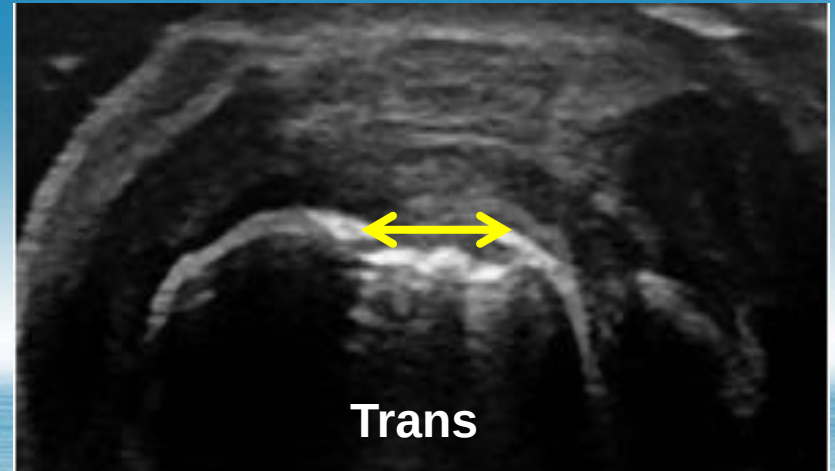


A semiquantitative score for Doppler tenosynovitis



Naredo E, et al. Reliability of a consensus based US score for tenosynovitis in RA. Ann Rheum Dis. 2013;72(8):1328-34

Bone erosions



Very small < 1 mm
Small 1-2 mm,
Moderate 2–4 mm
Large >4 mm

**Always evaluate all the
bone surface available,
not only with
standardized scans**

3. Interpretation of US findings, US diagnosis and conclusions

- Do not make ambiguous US diagnosis.
- If you are unsure of the diagnosis:
 - ✓ Be honest and accept this
 - ✓ Ask a colleague for opinion/help
 - ✓ Explain patient-, disease- or machine-dependent limitations
 - ✓ Suggest alternative diagnostic methods



3. Interpretation of US findings, US diagnosis and conclusions

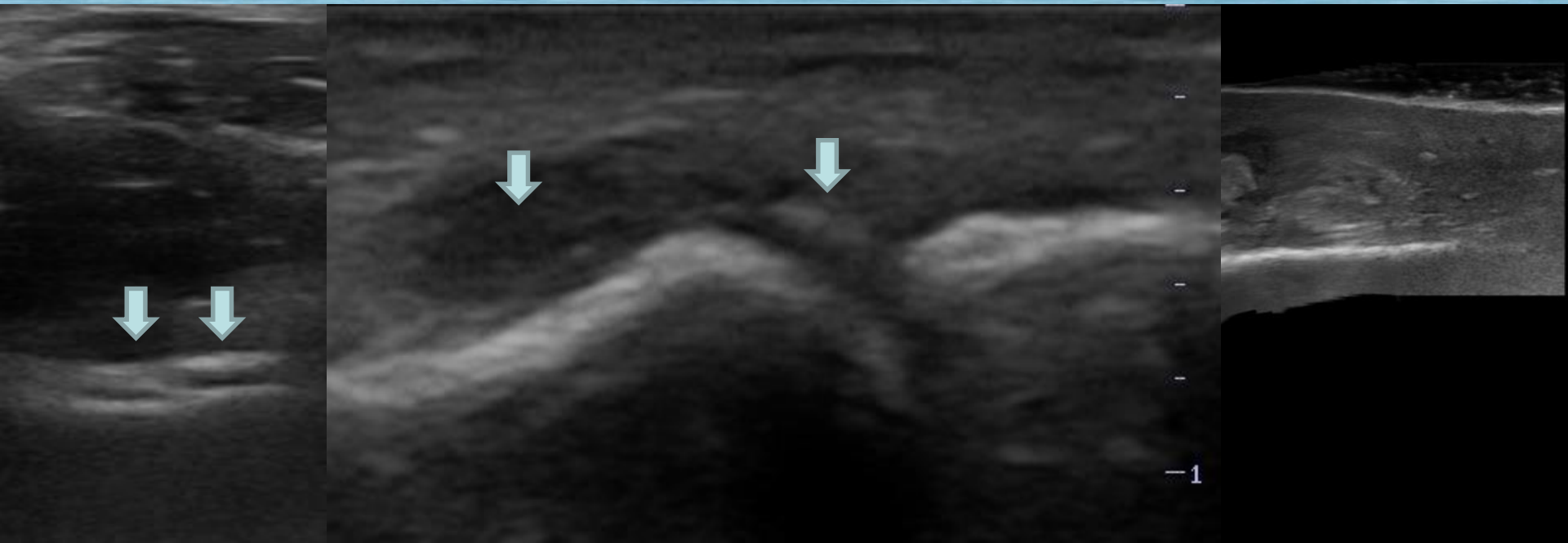
Some examples



3. Interpretation of US findings, US diagnosis and conclusions

42 yrs old male; Pain, swelling, (no redness) in the posterior elbow/right/.

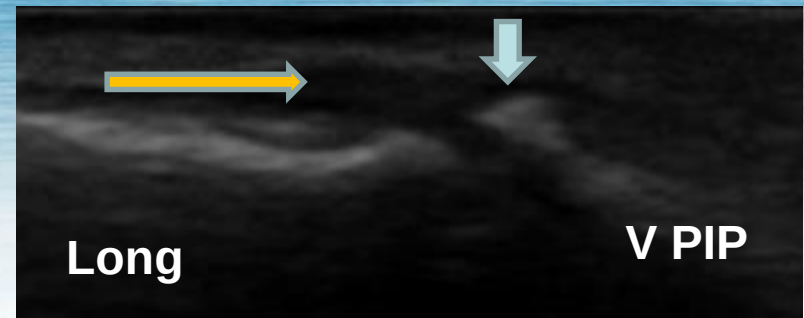
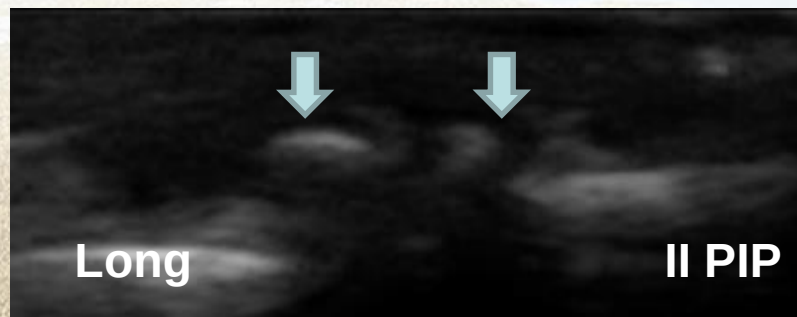
▪US examination, Diagnosis, Therapy?



3. Interpretation of US findings, US diagnosis and conclusions

55 yrs old female; Pain, stiffness, swelling in some small joints of the hands.

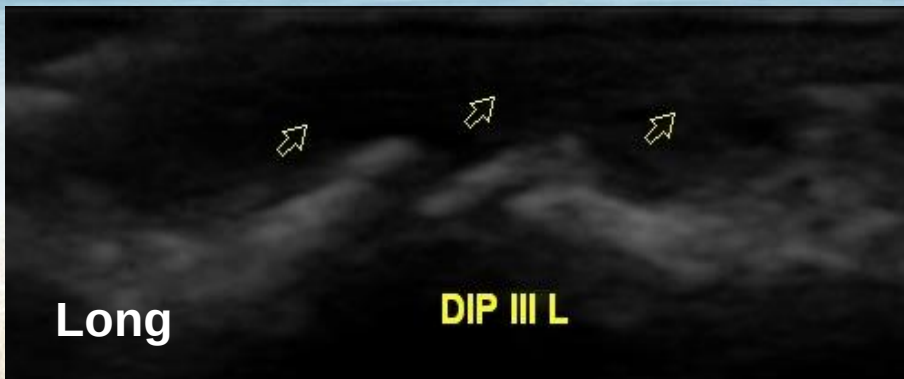
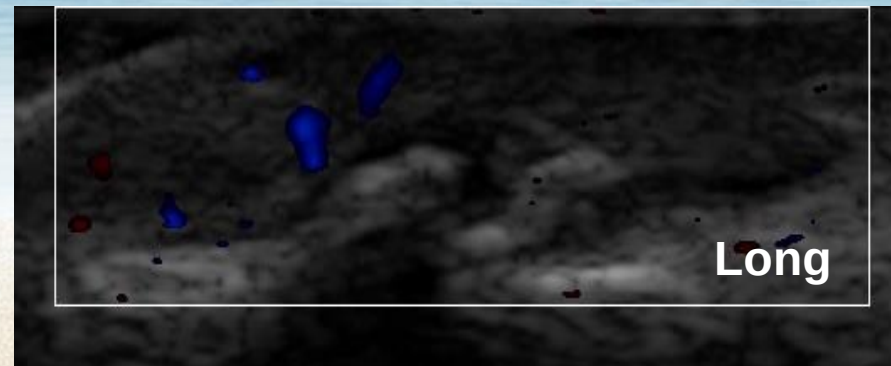
▪US examination, Diagnosis, Therapy?



3. Interpretation of US findings, US diagnosis and conclusions

55 yrs old female; Pain, stiffness, swelling in some small joints of the hands.

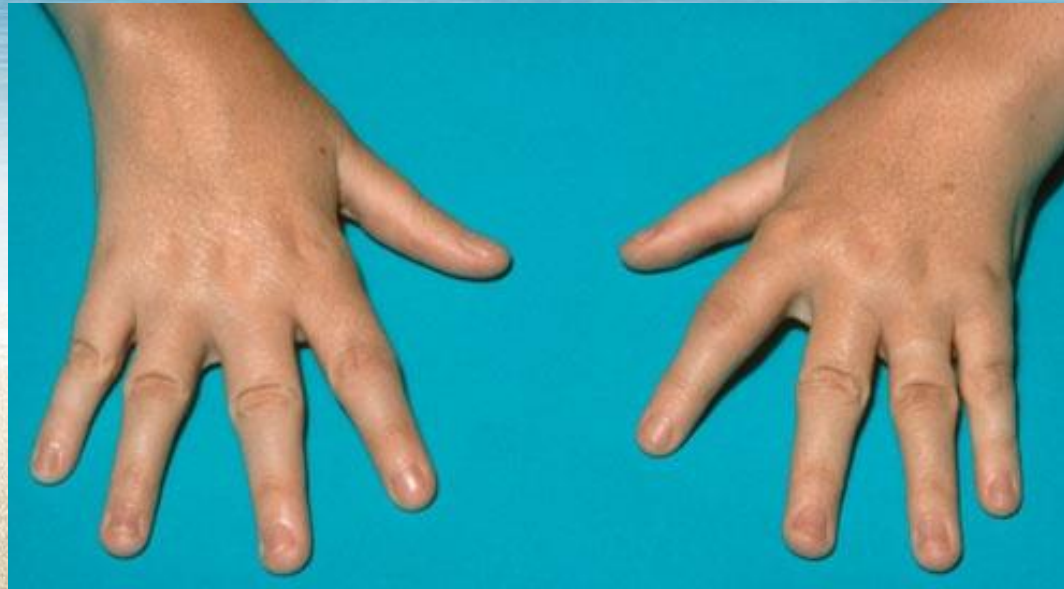
▪US examination, Diagnosis, Therapy?

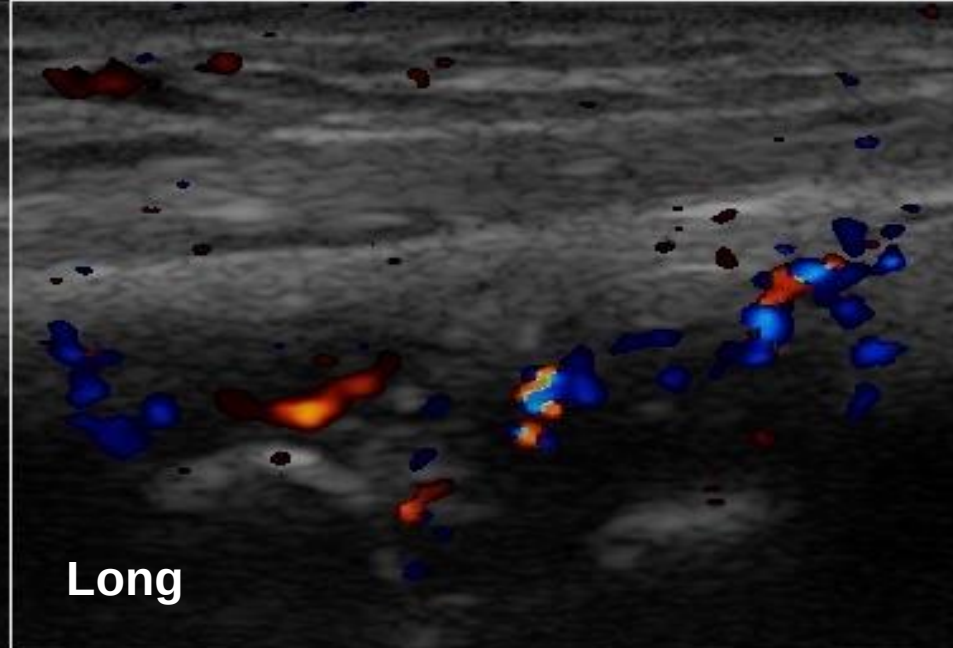
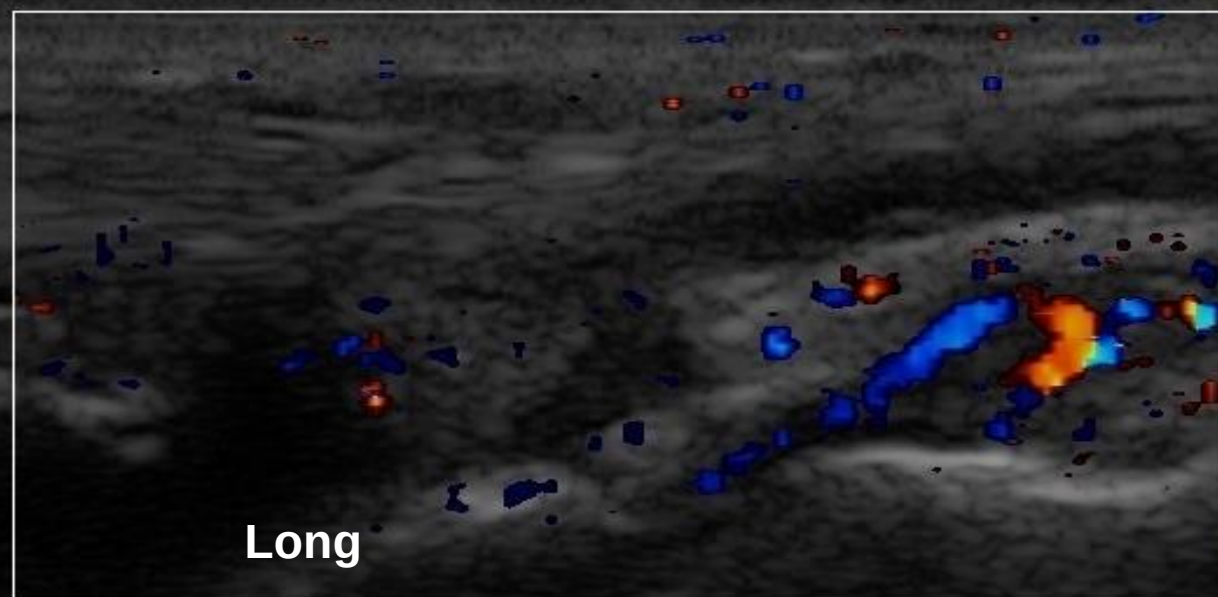


3. Interpretation of US findings, US diagnosis and conclusions

34 yrs old female; 15 months history of RA. MTX during the last 6 months (20 mg weekly)

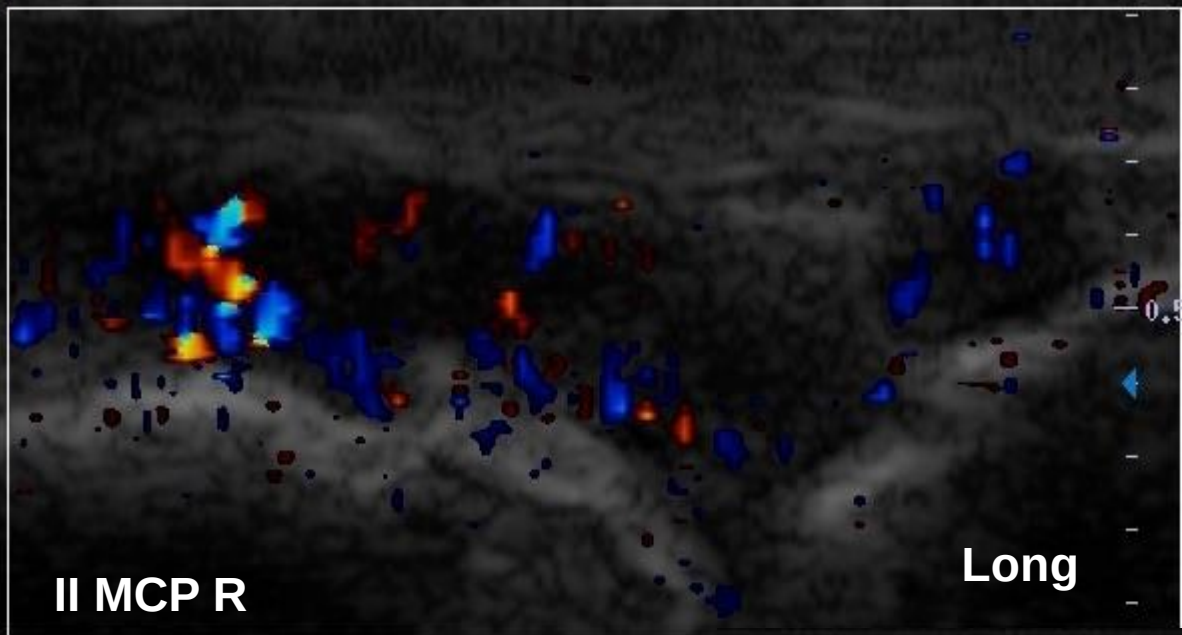
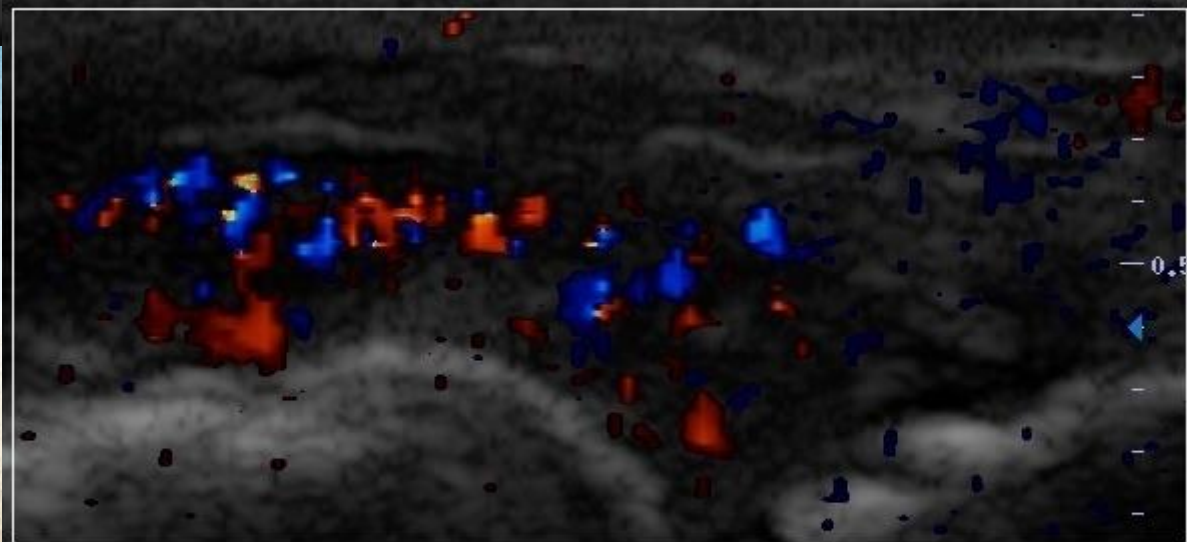
▪US, NewTherapy?

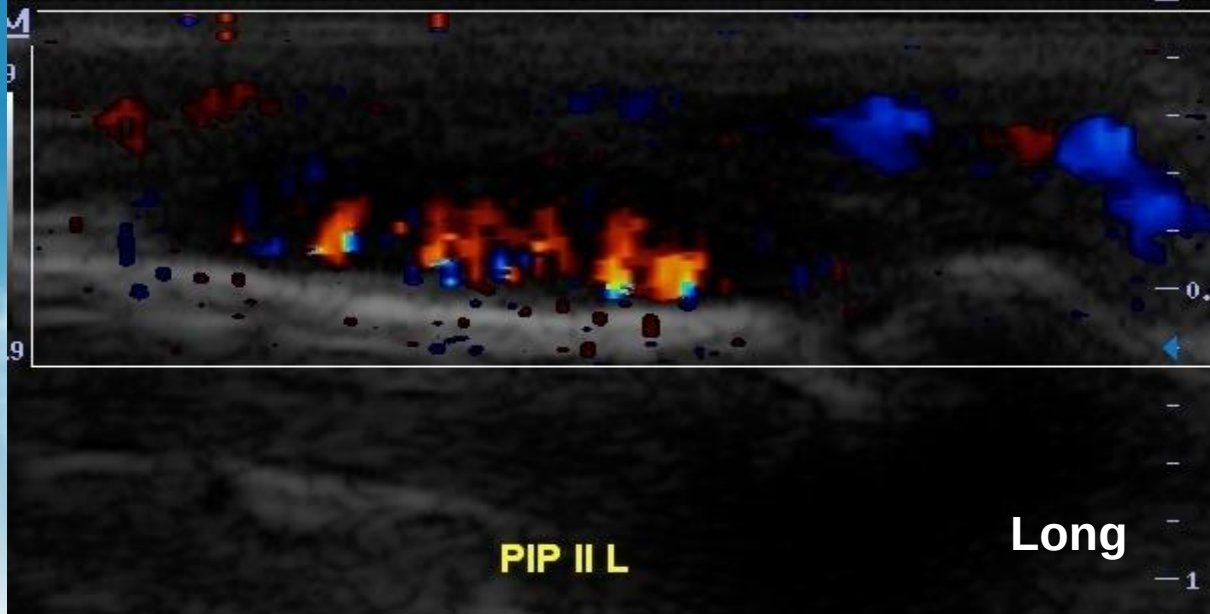




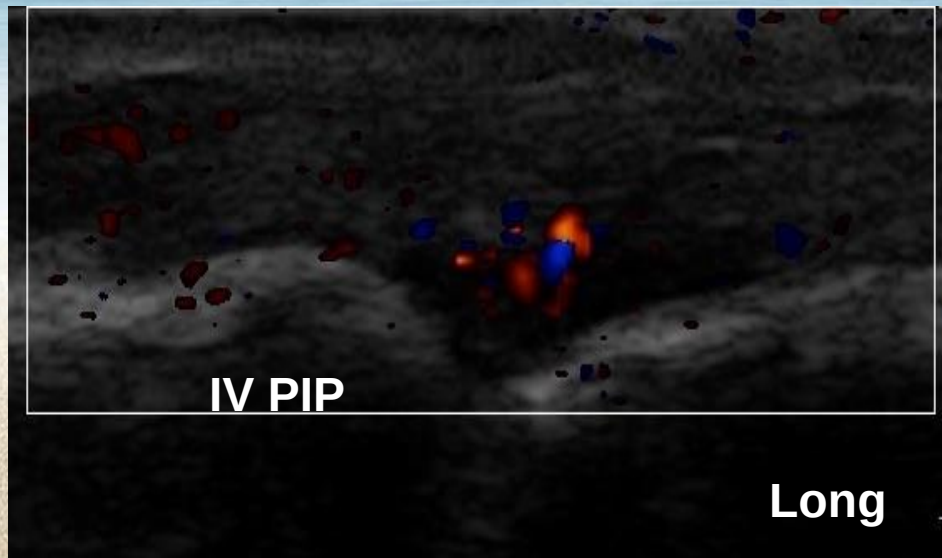
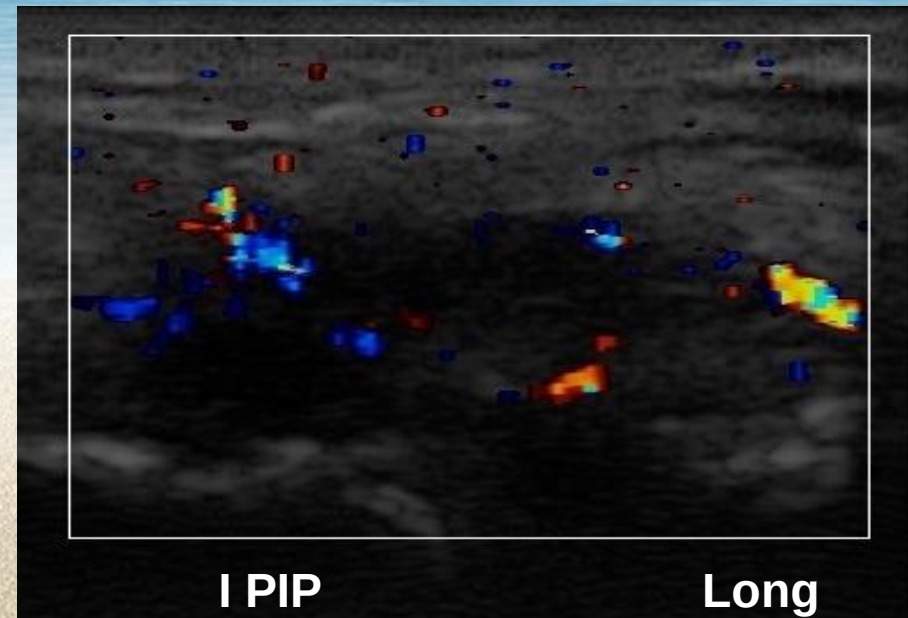
radio-carpal

mid carpal





MSUS is my tool to make a decision!



Third step

Write the report!

The responsibility for the accuracy of the report is yours!



US REPORT

All images should have the following information correctly recorded on them

Obligatory data

1. Patient identification
2. Date of examination
3. Hospital/department identification
4. The name and status of the sonographer issuing the report



US REPORT GENERAL COMMENTS

**Write the report
as soon as
possible after the
examination**

**Overwrite in all
documented US images:**

- 1. The anatomic area**
- 2. The scan (transverse,
longitudinal, oblique)**
- 3. The name of the visible
bones**



US REPORT

Documentation and Image recording

Take a proper number of scans with normal and pathological findings (jpeg images, videoclips)

Store images as:

- * printed images,
- * on a tape or
- * electronic medium



US REPORT

Documentation and Image recording

**All written reports
and recorded
images of
ultrasound studies
keep in the patient's
record**

**Take every
opportunity to
maintain and
develop your
knowledge, skills
and competence**



Conclusions

**HELP THE CLINICIAN
TO DIAGNOSE AND
TAKE THERAPEUTIC
DECISIONS!**



NEVER FORGET

**YOUR REPORT IS YOUR
BUSINESS CARD!**



Acknowledgement

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