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Ultrasound in Rheumatoid Arthritis: A Practical Guide

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NIHR Leeds Biomedical Research Centre / University of Leeds / Leeds Teaching Hospitals NHS Trust

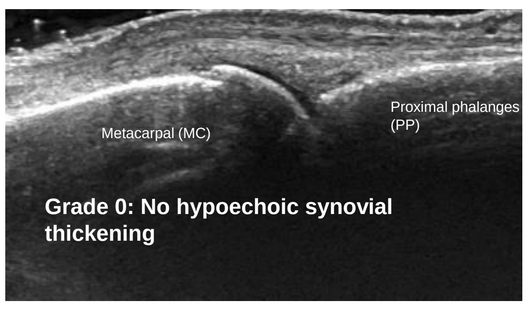
Introduction

Rheumatoid arthritis (RA) is a common, chronic disabling inflammatory arthritis. The early and accurate identification of inflammation, for both diagnosis and disease monitoring, is imperative in order to reduce structural damage and to maintain joint function. Traditional methods of evaluating joints such as clinical examination and X-ray are limited with respect to sensitivity and specificity. Ultrasound is increasingly being employed by clinicians to assess and to quantify joint inflammation (synovitis, tenosynovitis) and damage (bone erosion) in RA .

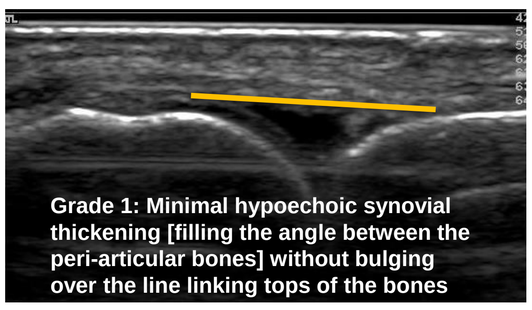
Aim

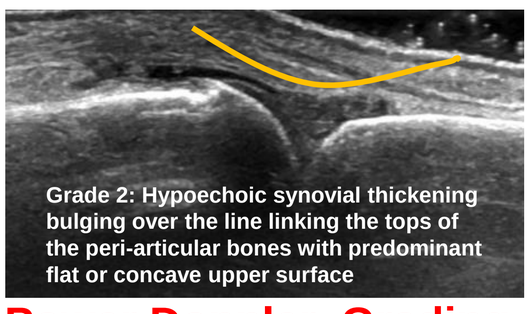
This poster introduces the current EULAR-OMERACT taskforce ultrasound definitions and semiquantative scoring systems employed at Leeds Biomedical Research Centre including images, target areas and scanning planes utilised, with a view to educating other health professionals and the standardisation of procedures.

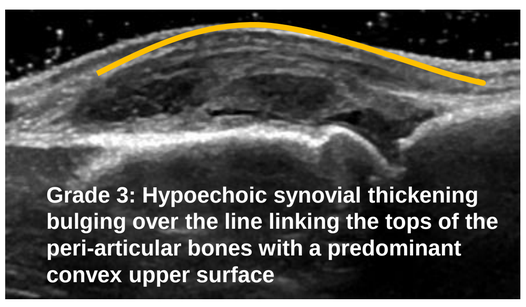
Synovitis, Abnormal hypoechoic, but may also be isoechoic or hyperechoic, intra articular tissue that is non displaceable and poorly compressible and which may exhibit Doppler signal.



Grade 0: No hypoechoic synovial thickening

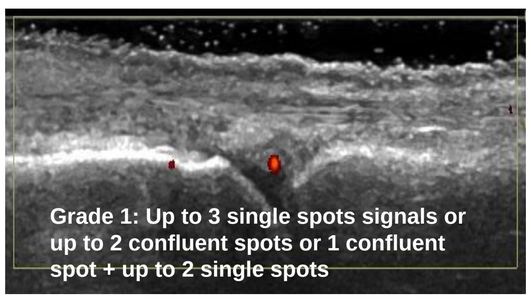

Grade 1: Minimal hypoechoic synovial thickening [filling the angle between the peri-articular bones] without bulging over the line linking tops of the bones

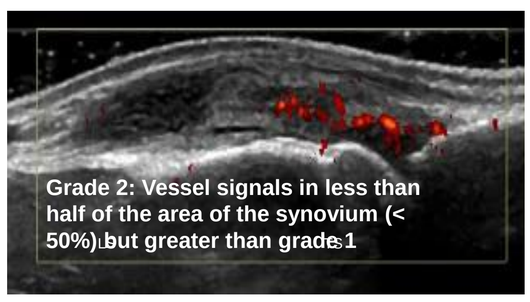

Grade 2: Hypoechoic synovial thickening bulging over the line linking the tops of the peri-articular bones with predominant flat or concave upper surface

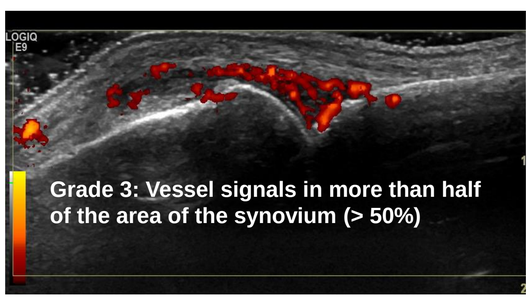

Grade 3: Hypoechoic synovial thickening bulging over the line linking the tops of the peri-articular bones with a predominant convex upper surface

Power Doppler Grading


Grade 0: No flow in the synovium

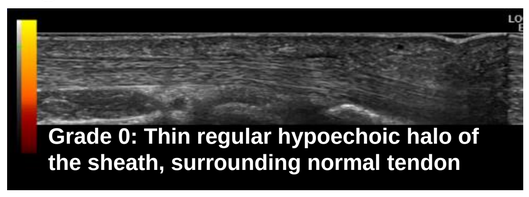

Grade 1: Up to 3 single spots signals or up to 2 confluent spots or 1 confluent spot + up to 2 single spots

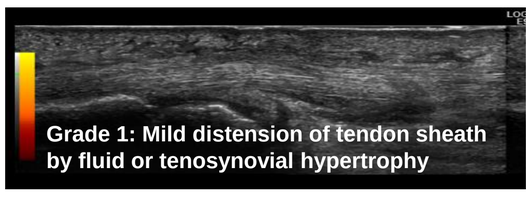

Grade 2: Vessel signals in less than half of the area of the synovium (< 50%) but greater than grade 1

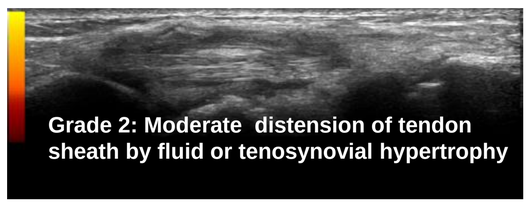

Grade 3: Vessel signals in more than half of the area of the synovium (> 50%)

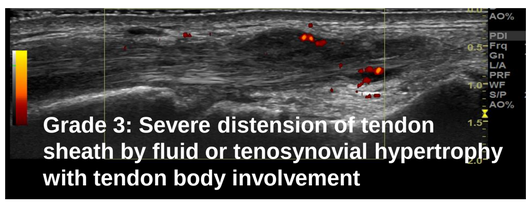
Tenosynovitis

A 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.


Grade 0: Thin regular hypoechoic halo of the sheath, surrounding normal tendon

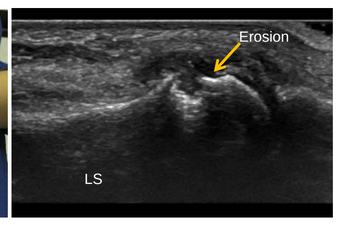

Grade 1: Mild distension of tendon sheath by fluid or tenosynovial hypertrophy

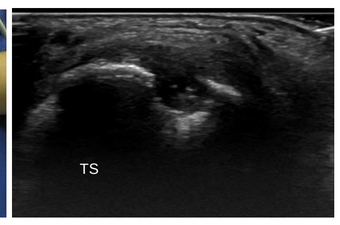

Grade 2: Moderate distension of tendon sheath by fluid or tenosynovial hypertrophy


Grade 3: Severe distension of tendon sheath by fluid or tenosynovial hypertrophy with tendon body involvement

RA Bone Erosion

A bony erosion is an intra-articular discontinuity of the bone surface that is visible in 2 perpendicular planes.





Target Areas

As demonstrated by the adjacent diagram, RA can affect multiple joints, however some joints, such as the 2nd and 3rd metacarpal phalangeal joints (MCPJ) are high risk, and should always be evaluated in RA diagnosis, these and other high risk areas are indicated by ■

All joints, but especially high risk areas should be evaluated with Power Doppler, (PD) these are indicated by ■

Any joint with active synovitis is at risk of developing bony erosions, (E) but target areas for RA are 2nd and 5th MCPJ, 5th metatarsal phalangeal joints (MTPJ) and distal ulnar. ●

Conclusion

This poster can be used to educate health care professionals in the process of defining and quantifying inflammatory and structural pathology seen in RA, to facilitate the early diagnosis and accurate monitoring of disease. It highlights high risk areas in joints for ultrasound evaluation and demonstrates scanning planes required.

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References

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