

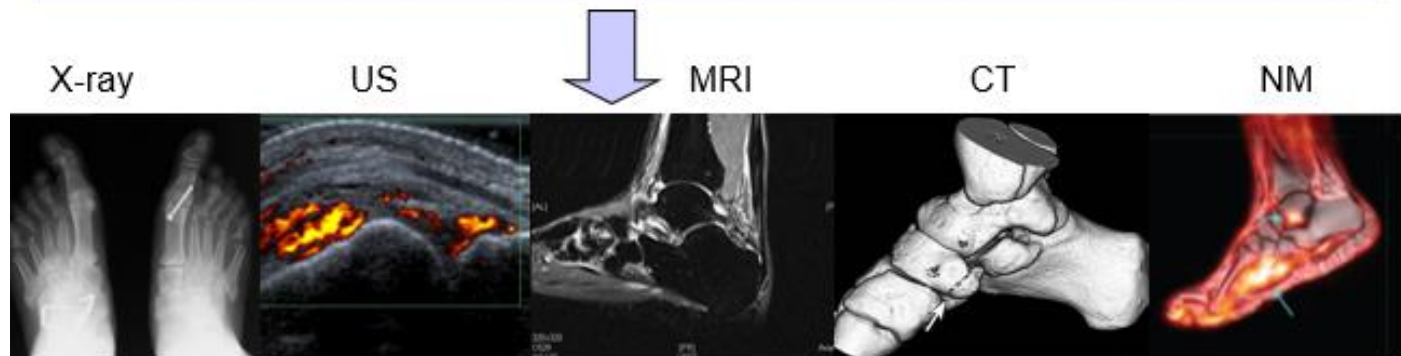
# HOCUS POCUS

Solving Cases with **P**oint **O**f **C**are **U**ltra**S**ound?

**Prof. David Kane**

Consultant Rheumatologist, Beacon & Tallaght University Hospital  
Clinical Professor in Rheumatology, Trinity College Dublin  
Clinical Lead, HSE/RCPI National Programme for Rheumatology

# Role of imaging in suspected clinical diagnosis



**Negative**

**Positive**

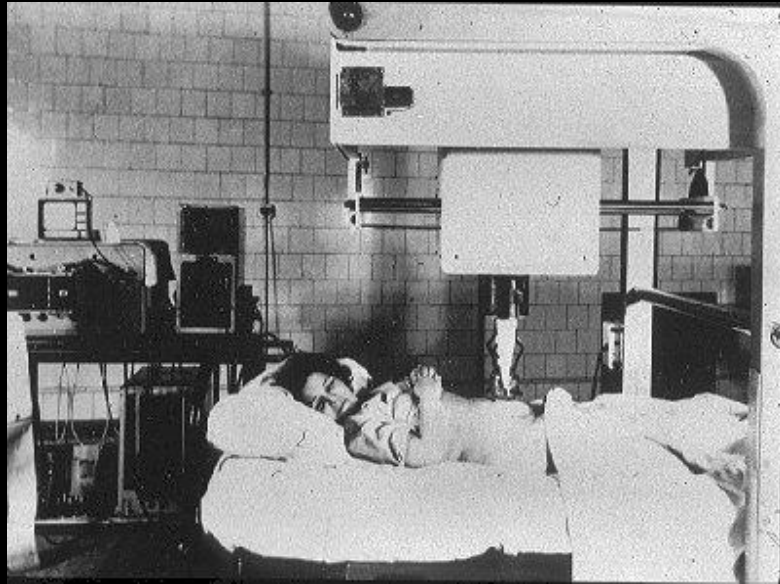
**Prognosis**

**Diagnosis**

**Intervention**

**Therapy target / Disease monitoring / Remission**

# Point Of Care UltraSound evolution

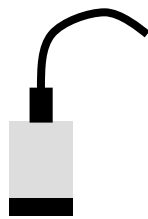


1959

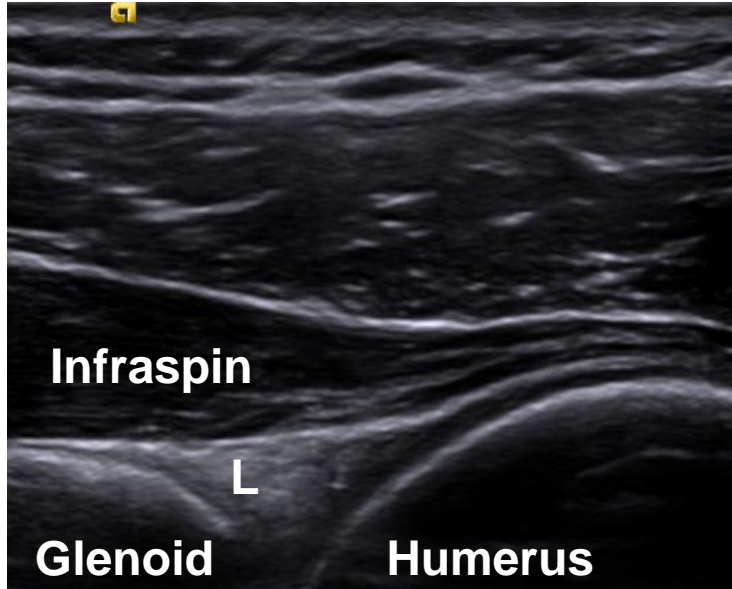
2023



Proximal

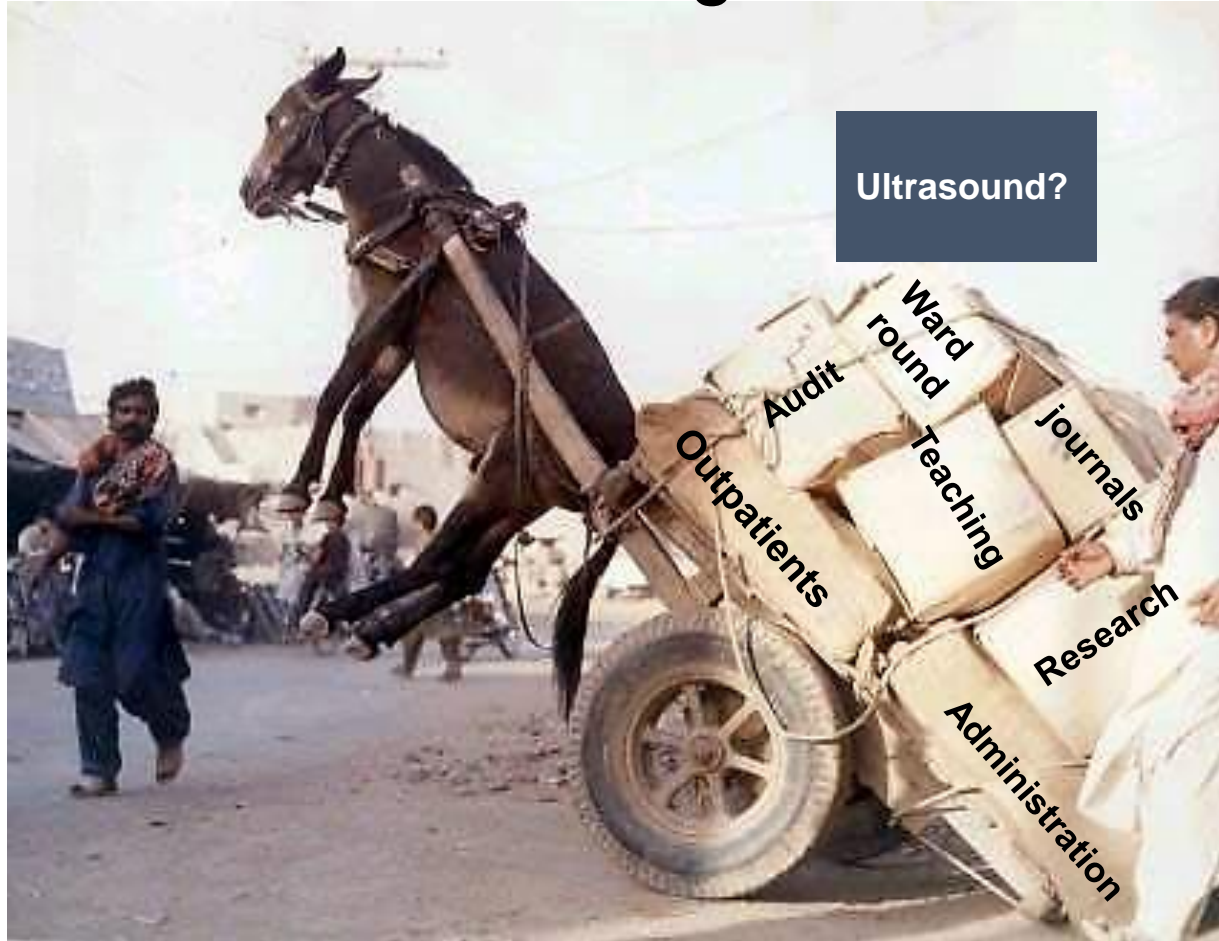


Distal



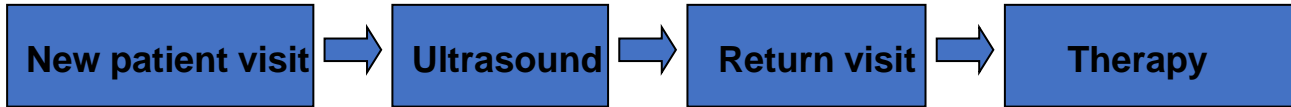
# Shoulder Ultrasound

# “The Rheumatologist’s Lot”

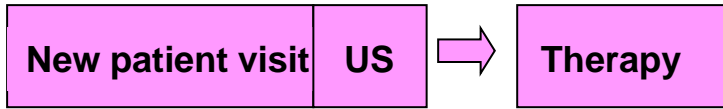


# Why **P**oint **O**f **C**are **U**ltra**S**ound?

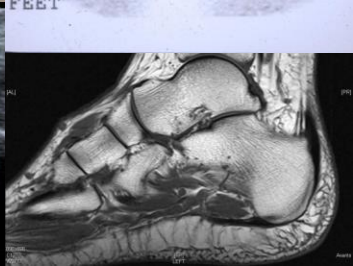
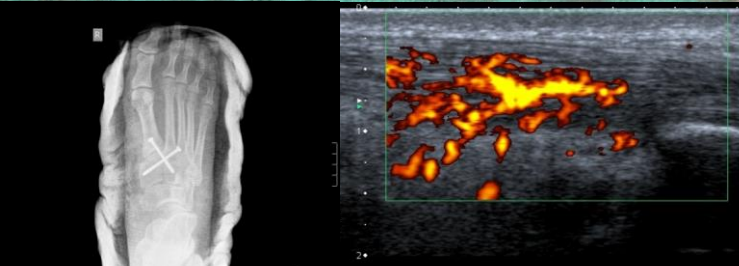
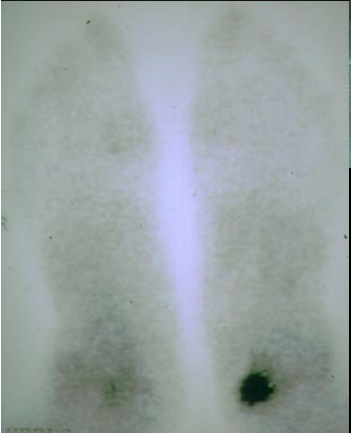
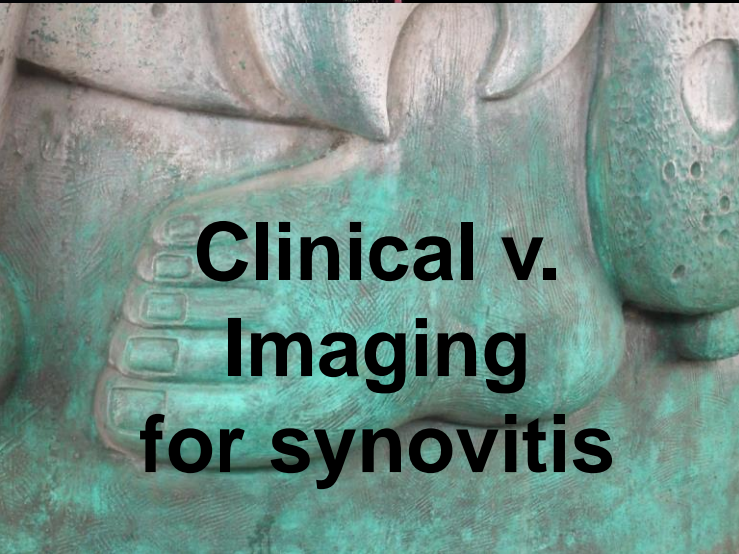
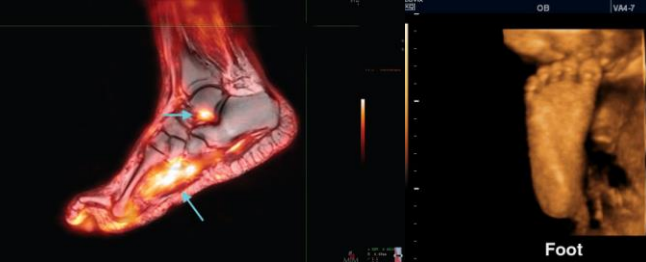
## *Traditional*



## *Innovative*

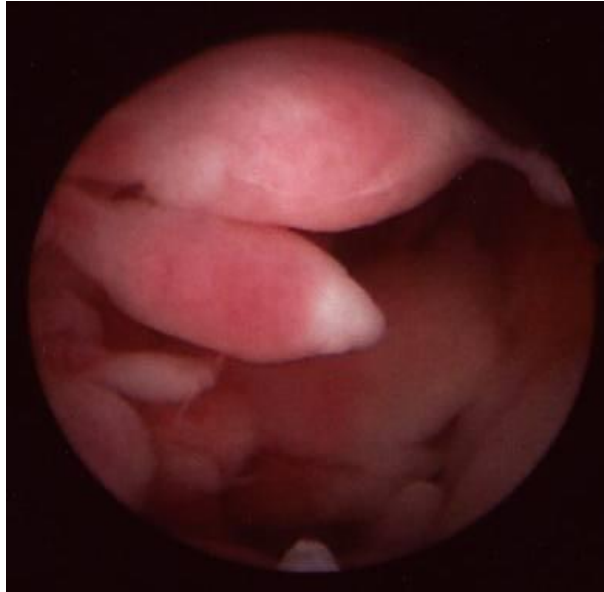


- Initial consultation is longer
- US shorter as patient already prepared
- Return consultation requires notes and patient re-evaluation
- Earlier therapy can be more effective / less time consuming
- Problem: need to persuade insurers / employers of value



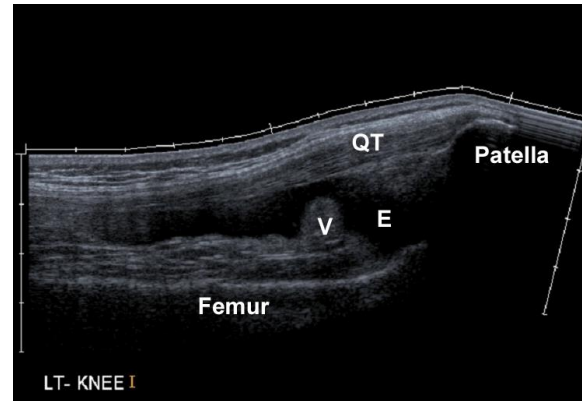


# Knee Synovitis And Ultrasound



Clinical exam 60 - 85%

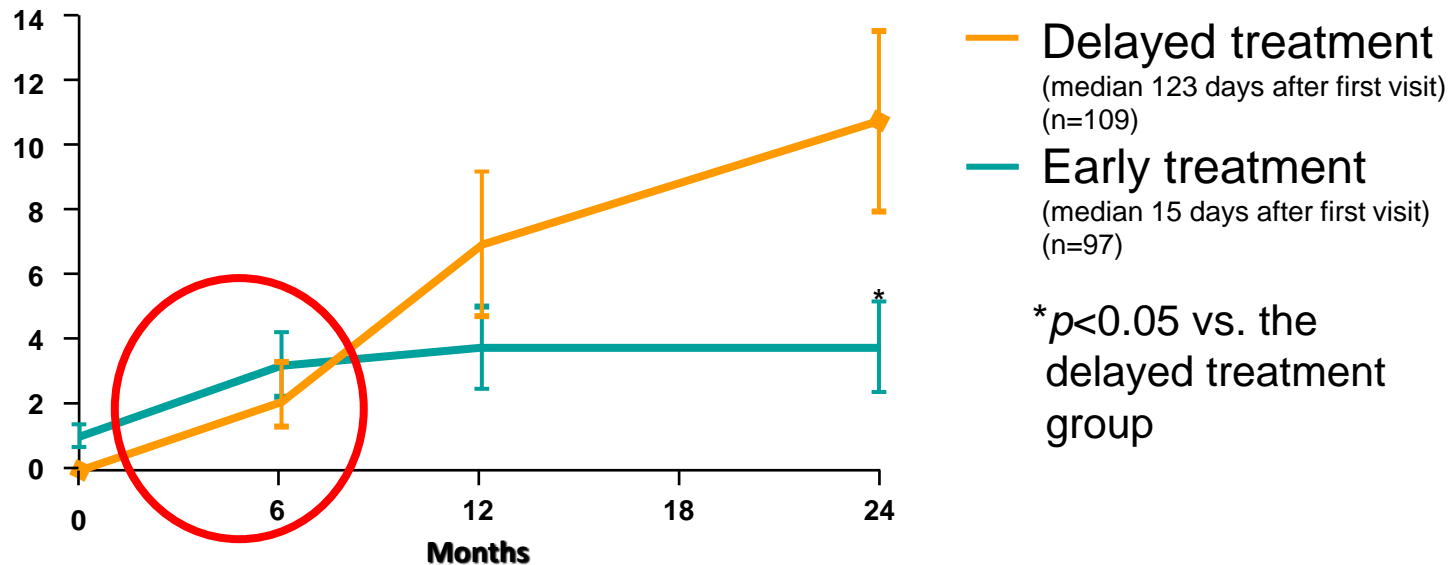
## Ultrasound



Kane et al J Rheum 2003  
Karim et al Arth Rheum 2004  
Hauzeur et al ARD 1999

# Delay in Starting DMARD Therapy Can Affect Radiographic Outcome in RA<sup>1</sup>

Treating 15 Days After First Visit Resulted in Better Radiographic Outcomes at 2 Years



**WINDOW OF OPPORTUNITY**

# 2010 ACR/EULAR Classification Criteria for RA

## JOINT DISTRIBUTION (0-5)

1 large joint	0
2-10 large joints	1
1-3 small joints (large joints not counted)	2
4-10 small joints (large joints not counted)	3
>10 joints (at least one small joint)	5

## SEROLOGY (0-3)

Negative RF <u>AND</u> negative ACPA	0
Low positive RF <u>OR</u> low positive ACPA	2
High positive RF <u>OR</u> high positive ACPA	3

## SYMPTOM DURATION (0-1)

<6 weeks	0
≥6 weeks	1

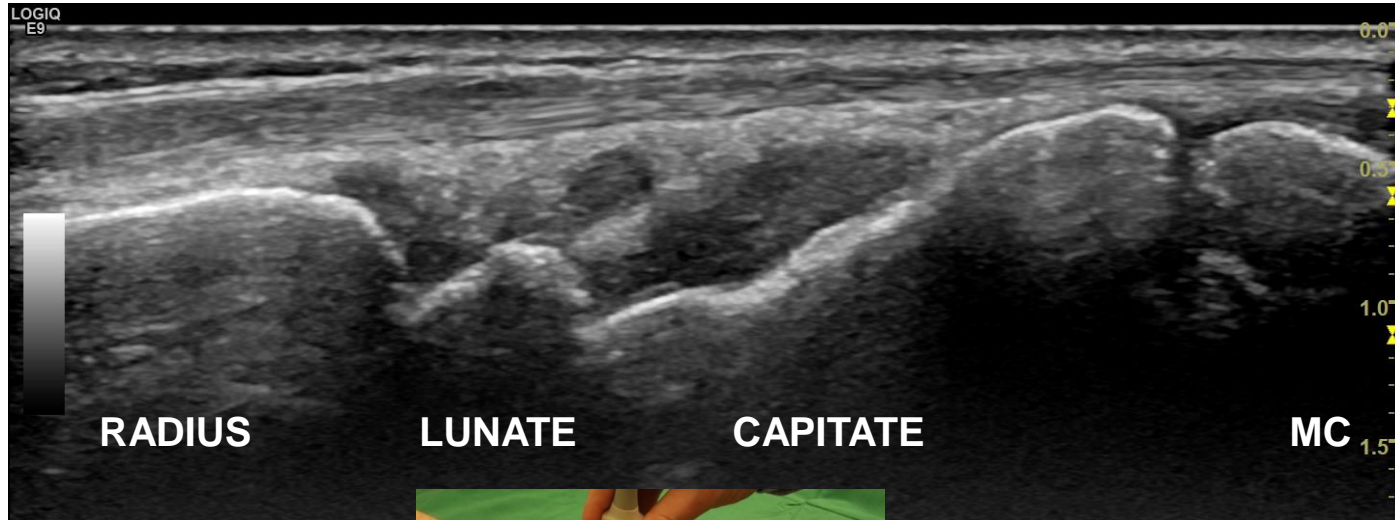
## ACUTE PHASE REACTANTS (0-1)

Normal CRP <u>AND</u> normal ESR	0
Abnormal CRP <u>OR</u> abnormal ESR	1

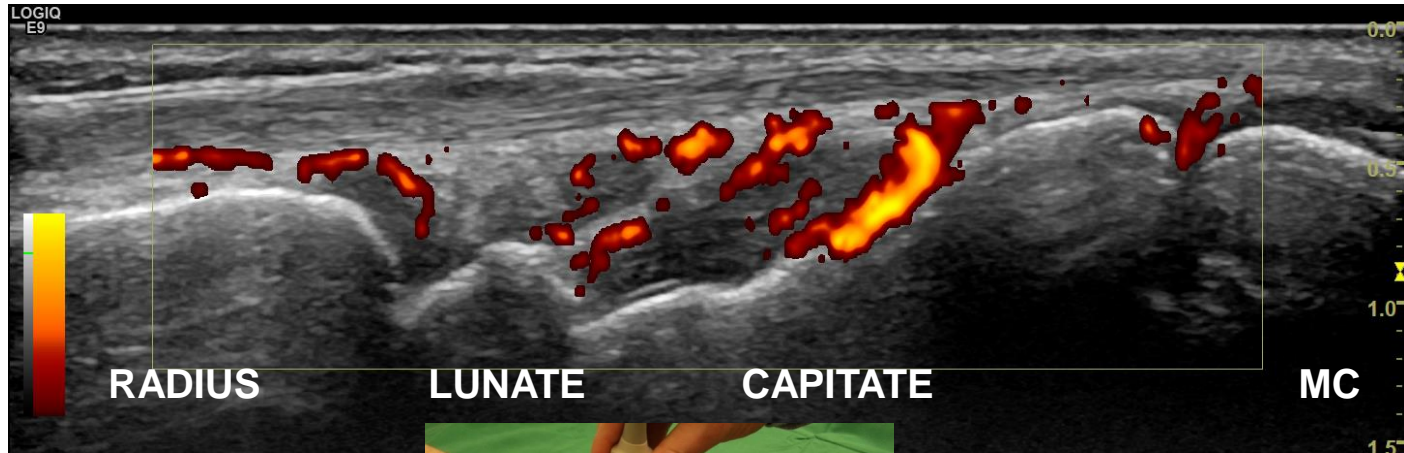
≥6 = definite RA



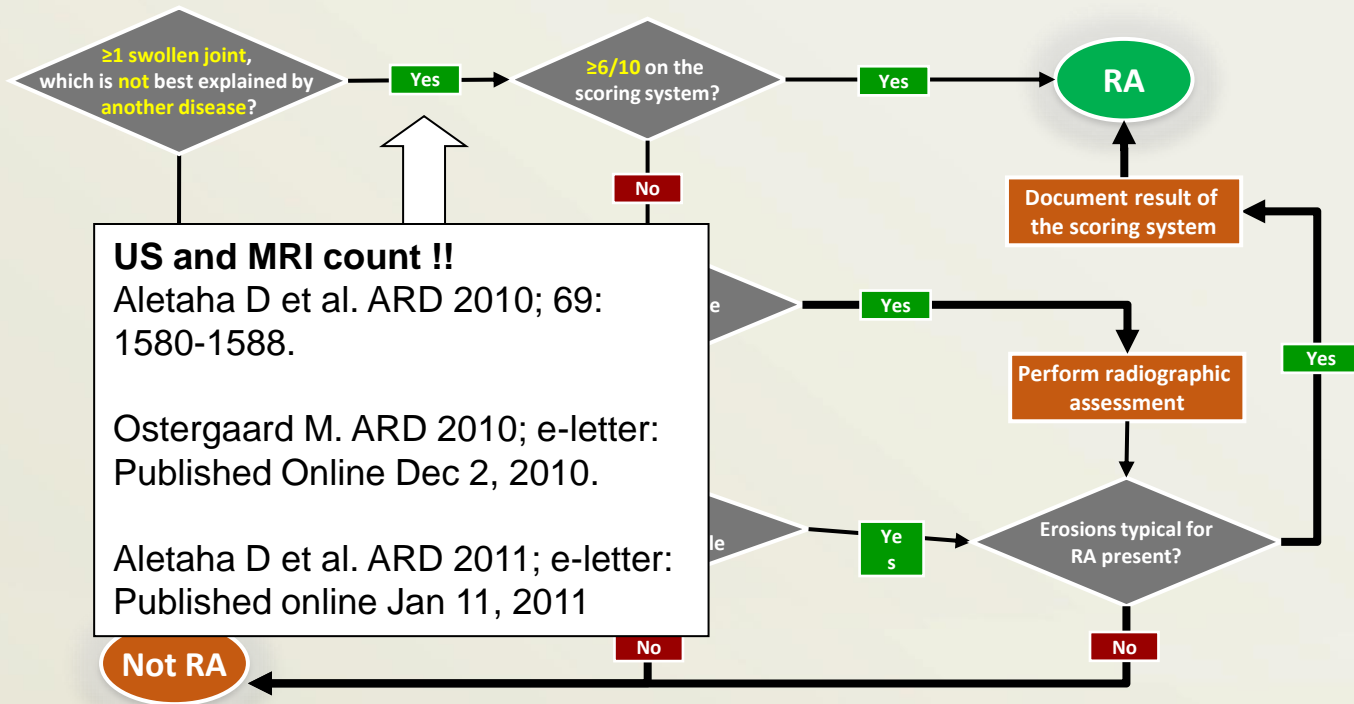
# Wrist Synovitis in RA



# Wrist Synovitis in RA

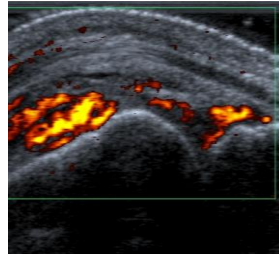


# Algorithm to Classification of RA Including Radiographs

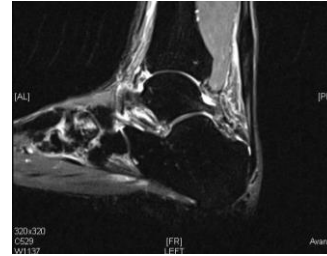


# Imaging of Synovitis in RA

US



MRI



NM



sensitivity	0.89 (PDUS)	1.0 (assume GS)	NA
specificity	0.98 (PDUS)	1.0	NA
access	++++	+++ / ++	++
score	Multiple (US7)	RAMRIS	No
reliability	synovitis 0.49-1 PDUS 0.6-1	synovitis 0.69-0.78 BE 0.79-0.95	No data
cost	€147-294	€720 (contrast)	€500-800
prognostic	PDUS	Bone Oedema	Tc99dp

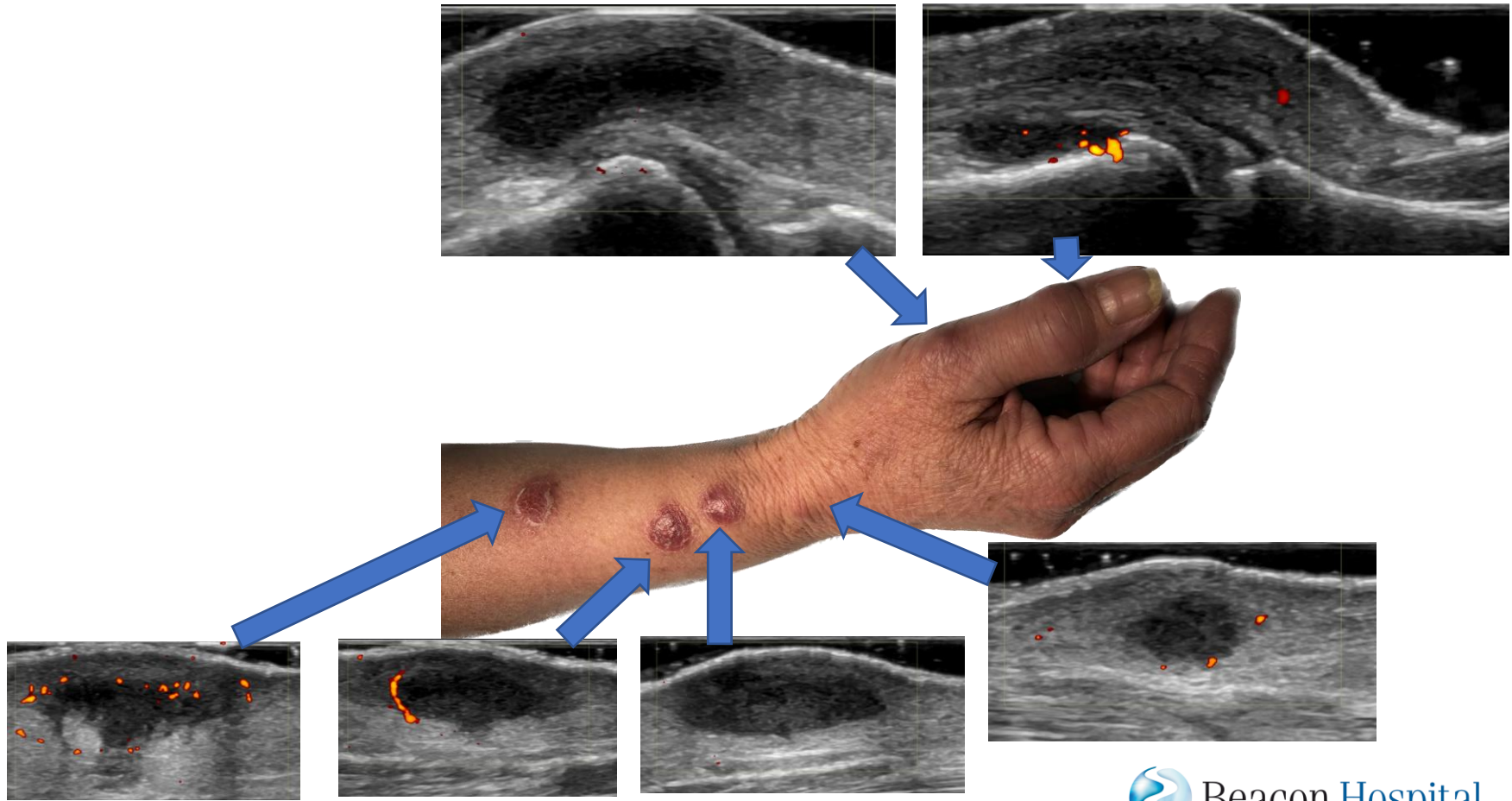
\*Adapted: McQueen BPRClinRheum 2013:499-522

# Case 1

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Internal use only by approved personnel. Unpublished Work © Beacon Hospital. All rights Reserved. In Strict Confidence.

# Mycobacterium Marinum



# Case 2

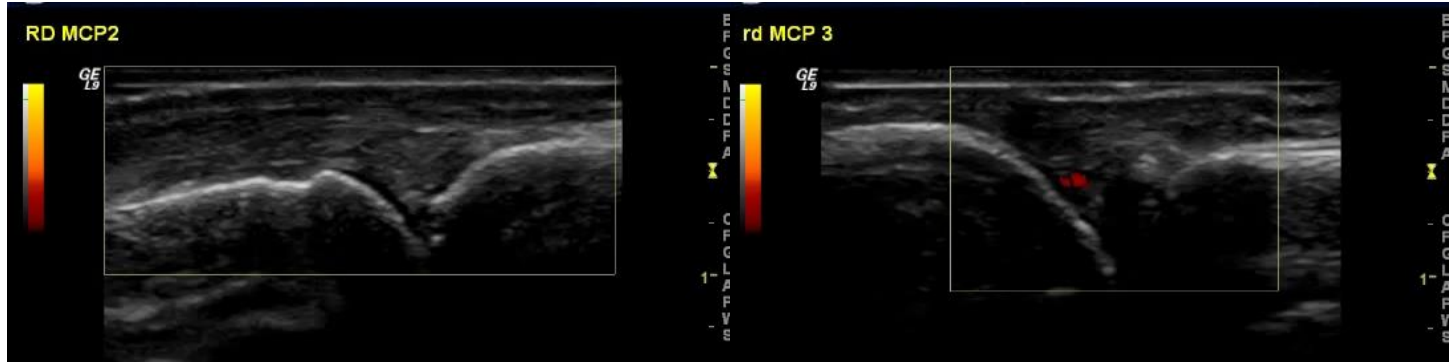
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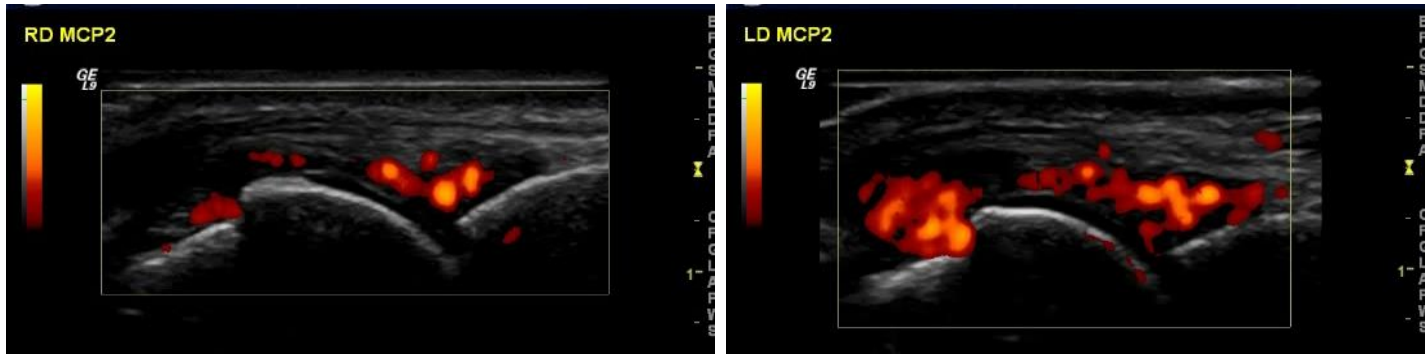


# Power Doppler Scoring



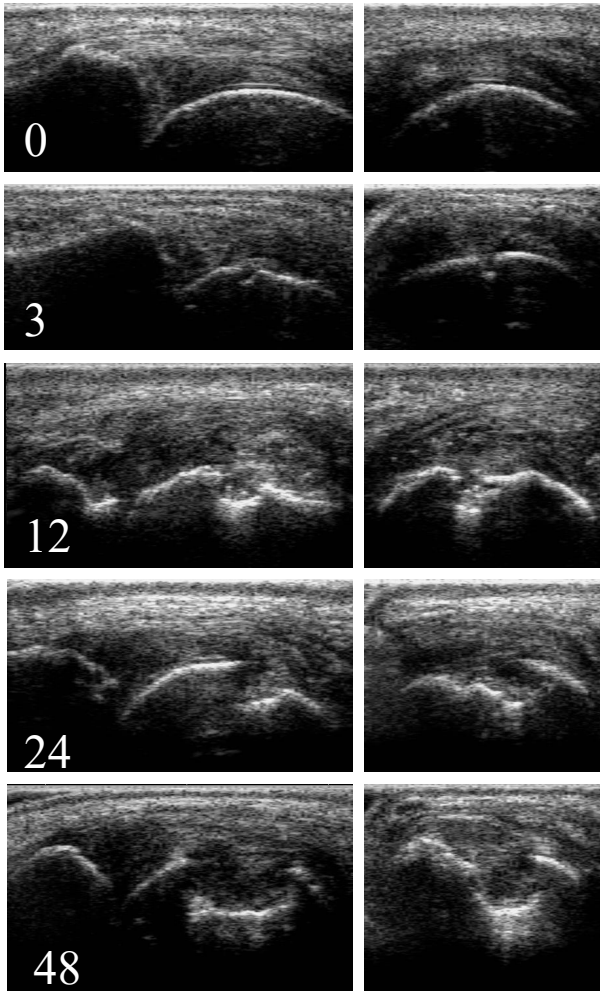
Grade 0

Grade 1



Grade 2

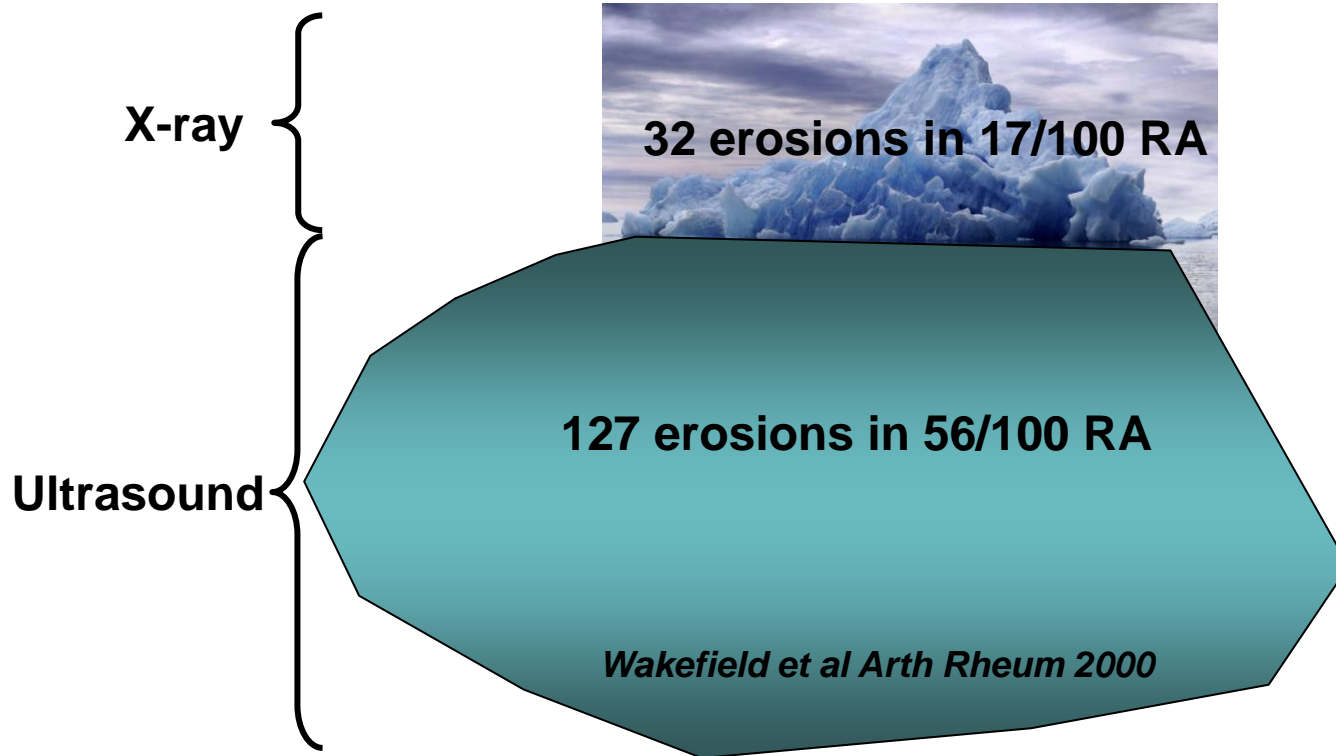
Grade 3



**TOO LATE!**

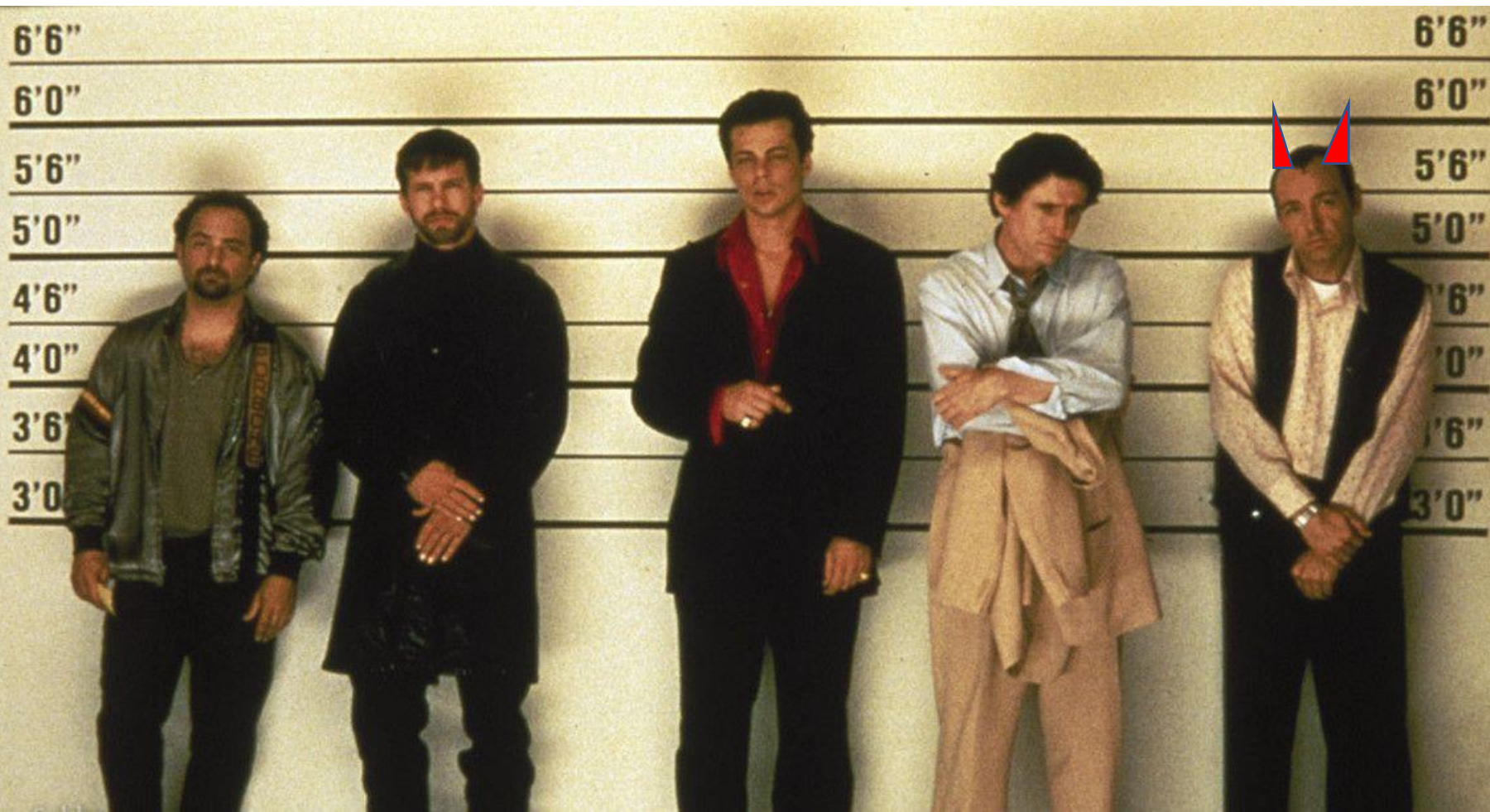


# X-ray & Iceberg model of RA erosion





# Spoiler Alert



# Role of Ultrasound in Rheumatology

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- Effusion
- Synovium
- Bursa
- Tendon / Ligament
- Muscle
- Bone (surface)
- Cartilage
- Vascular
- Nerve
- Salivary Glands
- Skin

## *Inflammatory Arthritis*

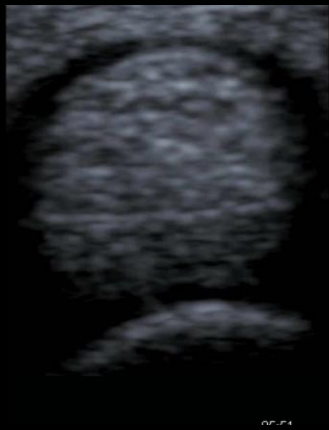
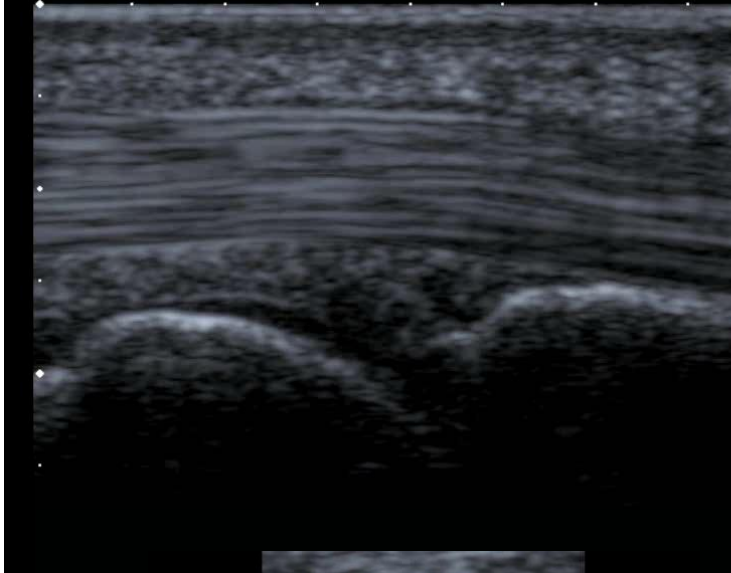
- RA/Spondyloarthropathy
- Infective / Crystal
- Systemic Autoimmune

## *Degeneration / Trauma*

- Osteoarthritis
- Soft Tissue disorders
- Nerve & Muscle disease

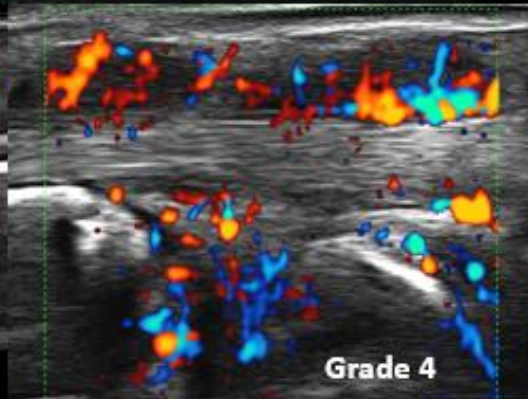
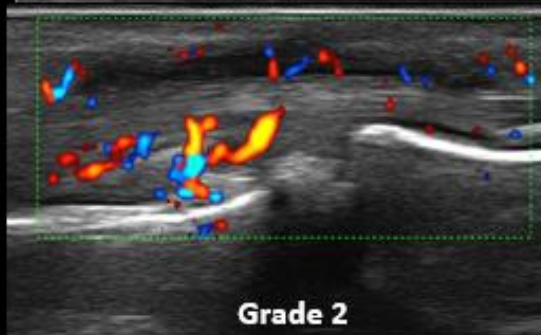
## *Intervention*

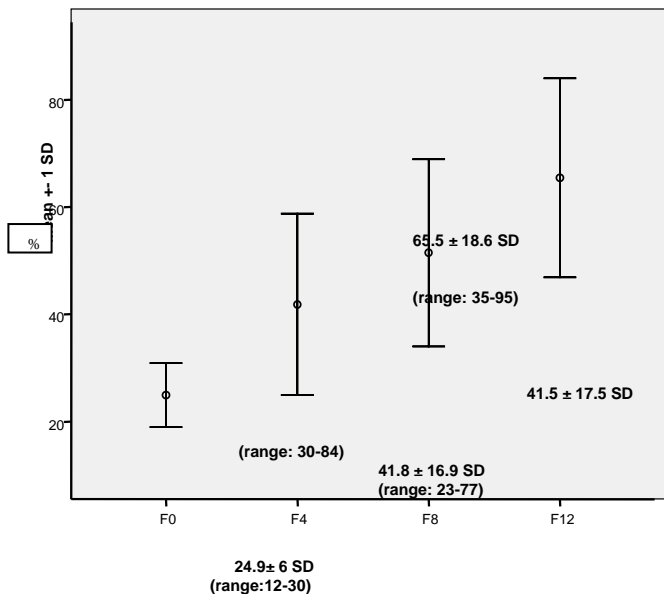
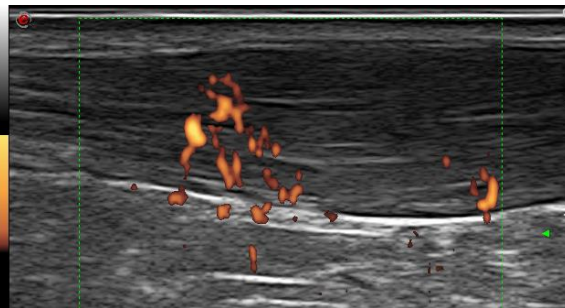
- Joint/soft tissue injection



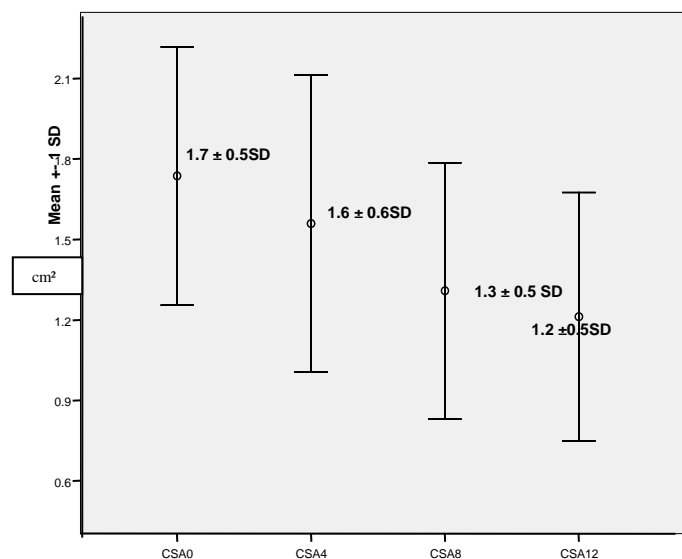
# OMERACT scoring system for tenosynovitis

Doppler mode semiquantitative score 0-3, long





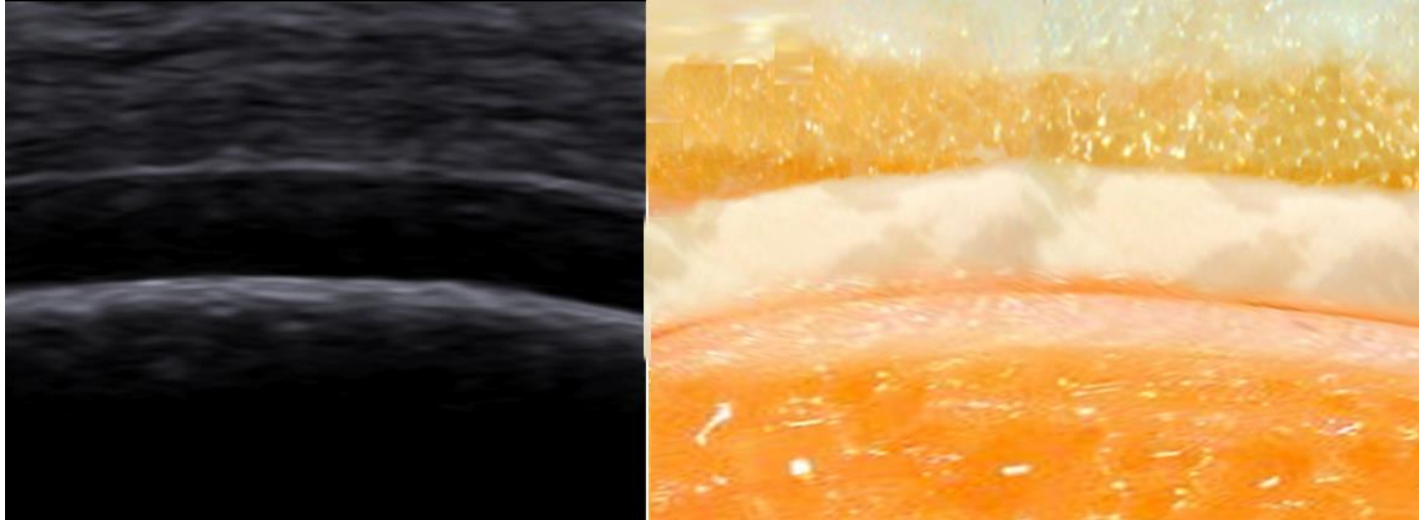
**Function (VISA)**

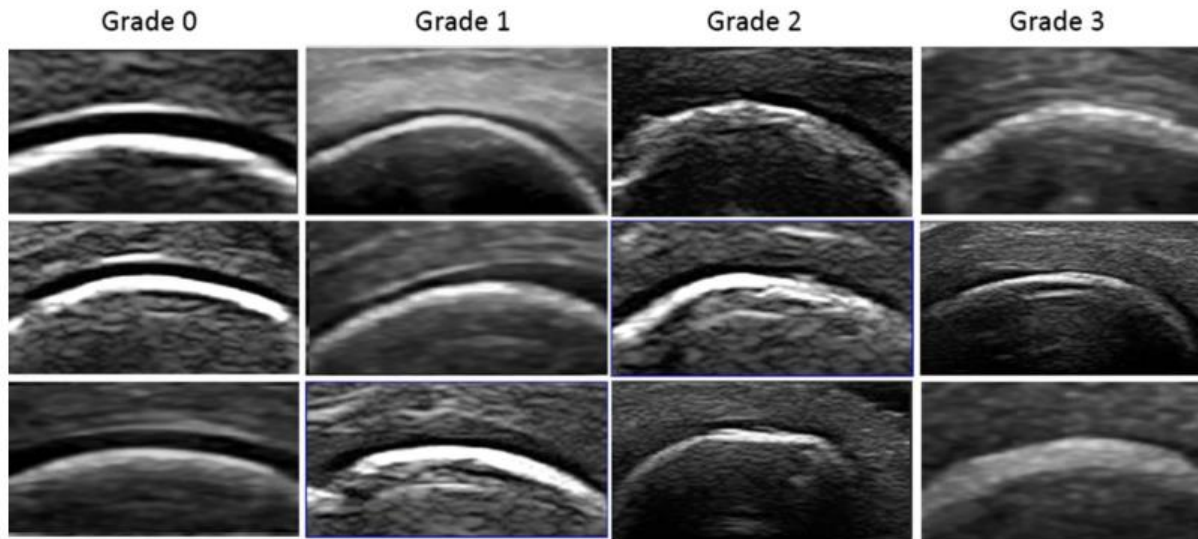


**Cross Sectional Area (CSA)**

# Ultrasound And Cartilage Damage

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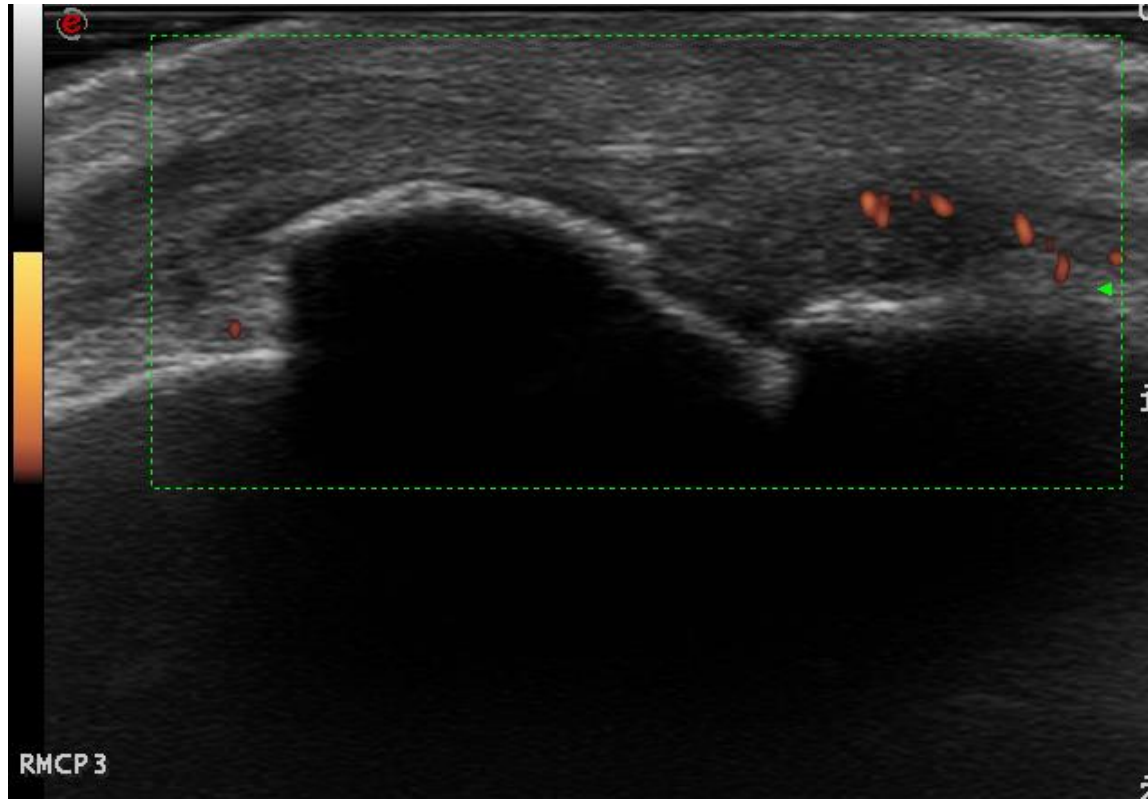


**Figure 2** Atlas for scoring of cartilage abnormalities at metacarpophalangeal (MCP) joints level in hand osteoarthritis (OA), used for the website scoring.

## Global ultrasound assessment of structural lesions in osteoarthritis: a reliability study by the OMERACT ultrasonography group on scoring cartilage and osteophytes in finger joints

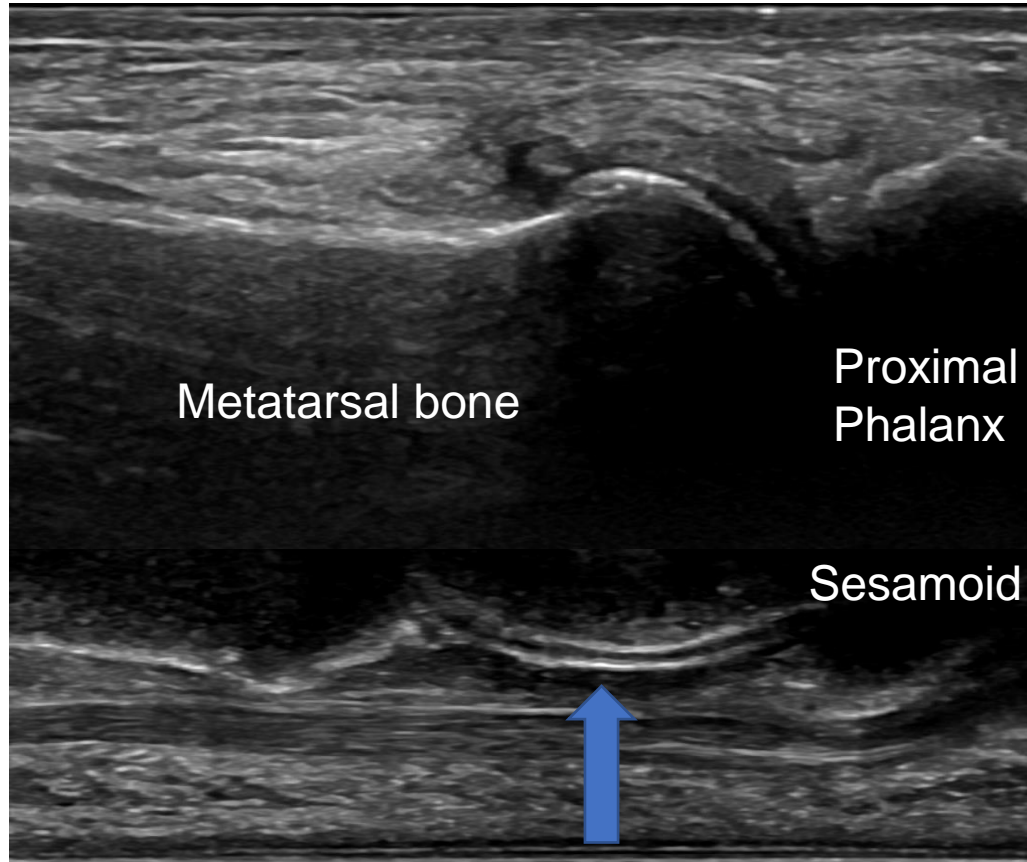
H B Hammer,<sup>1</sup> A Iagnocco,<sup>2</sup> A Mathiessen,<sup>1</sup> E Filippucci,<sup>3</sup> F Gandjbakhch,<sup>4,5</sup>  
M C Kortekaas,<sup>6,7</sup> I Möller,<sup>8</sup> E Naredo,<sup>9</sup> R J Wakefield,<sup>10</sup> P Aegerter,<sup>11,12</sup>  
M-A D'Agostino<sup>13,14</sup>

# Osteoarthritis: Osteophyte in a MCP jt





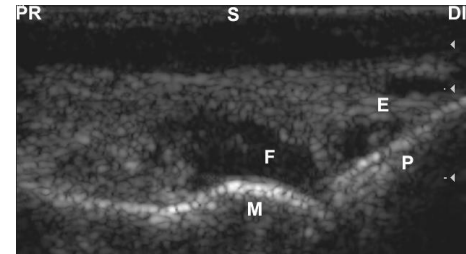
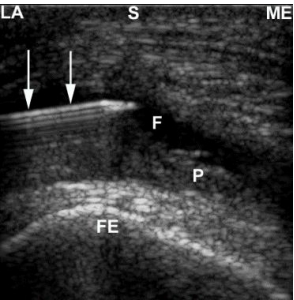
# Gout – Double Contour Sign



# US Guided Injection

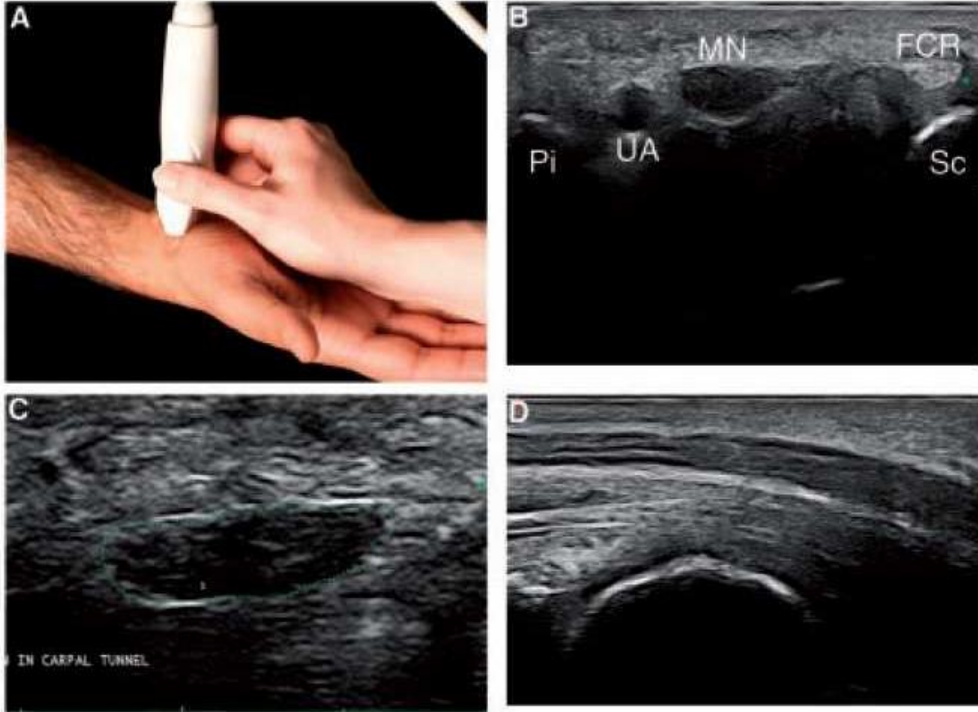


- US guided aspiration 2-3 times more successful than clinical.....Balint, Kane 2003, Raza 2003
- US guided injection of shoulder superior to clinical .....Naredo 2004
- Clinical injection 42% v US 95% success .....Saadeh EULAR 2005
- Clinical injection 66% v US 83% success .....Cunnington, Kane Arth Rheum 2010



# Carpal Tunnel Syndrome

- transverse area  $>10\text{mm}^2$
- with typical symptoms



C McDonagh, M Alexander, D Kane – The role of ultrasound in the diagnosis and management of carpal tunnel syndrome. Rheumatology 2015

# ***Establishing Ultrasound as the 1<sup>st</sup> line diagnostic and monitoring test for Giant Cell Arteritis.***

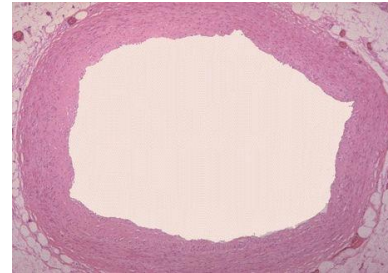
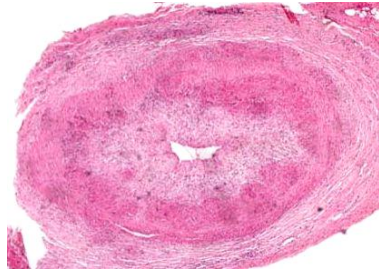
**Lead Investigator:** *Dr Colm Kirby*

**Principal Investigator:** *Prof David Kane*

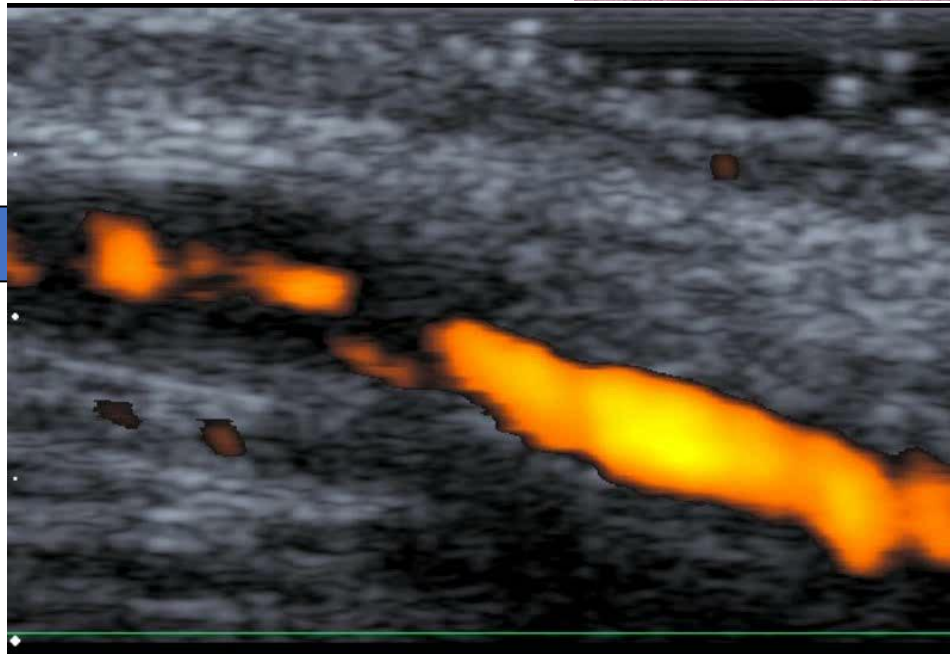
**Co- Investigators:** *Prof Ronan Mullan,  
Dr Grainne Murphy*



# Ultrasound of Temporal Arteritis



Abnormal



Normal

# Point Of Care UltraSound

---

- The Rheumatology Standard of Care @ Beacon
- Rapid diagnosis in clinical setting
- Equivalent to MRI in most peripheral joint indications
- Future relevance to Primary Care
- US guidance of joint and soft tissue injections
- New technique for diagnosis of gout
- Alternative to Temporal artery biopsy in GCA
- Alternative to Nerve conduction in Carpal Tunnel Syndrome

# Thank you