Conclusions: RA patients without active inflammation of the hands demonstrate a significantly higher mean temperature compared to healthy individuals. These findings provide evidence that baseline thermal data in RA differs significantly from healthy individuals. Thermal imaging may have the potential to become an adjunct assessment method of disease activity in patients with RA.

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FRI0558 FURTHER VALIDATION OF THE US7 SCORE IN A LARGE COHORT OF PATIENTS WITH RHEUMATOID ARTHRITIS WITH DIFFERENT DISEASE STAGES

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Background: Musculoskeletal ultrasound (US) is increasingly used in rheumatology clinical practice and research. Standardisation of US scanning techniques and definitions of pathologies is driven forward by the EULAR and OMERACT (Outcome measures in rheumatology) definitions and guidelines. However, no international consensus on a globally accepted US score system on patient level has been achieved so far. The US7 score, first published in 2009, assesses soft tissue lesions (synovitis, tenosynovitis/paratenonitis) as well as bone erosions of 7 preselected joints in one score.¹

Objectives: The aim of this retrospective analysis was to further validate the US7 score by a detailed analysis of affected joint regions in patients with different RA disease stages.

Methods: The US7 score¹ examines the most commonly affected joints in RA, including the wrist, MCP2,3, PIP2,3 and MTP2,5 joints, for synovitis and tenosynovitis/paratenonitis and bone erosions from dorsal, palmar, ulnar (wrist), radial (only MCP2) and lateral (only MTP5) by greyscale (GS) and power Doppler (PD) US. In this retrospective analysis, our population of 524 patients with RA was divided into 3 subgroups – 69 patients (13.2%) with very early RA (max. 6 months disease duration), 98 patients with early RA (>6 month, ≤2 years of disease duration), and 343 patients (65.5%) with established RA (>2 years disease duration). Patients were examined at baseline, 3, 6 and 12 months after starting or changing therapy (csDMARD/bDMARD).

Results: MCP2 and the wrist (especially from dorsal) were most frequently affected by GS/PDUS synovitis in all groups. PDUS showed a slight tendency towards the dorsal versus the palmar joint side being more often affected in all groups. The group of established RA was more often affected by synovitis, while tenosynovitis/paratenonitis appeared more frequently in very early RA. Significant sensitivity to change within 12 months was detected by GSUS in the group of very early RA in all hand joint regions (for synovitis: $p < 0.001$ MCP2,3 and wrist; $p = 0.046$ PIP2; $p = 0.001$ PIP3) and MTP2 ($p = 0.024$), but not in MTP5 ($p = 0.313$). PDUS demonstrated that the palmar sides of MCP2, PIP2 ($p < 0.001$ for all) as well as the dorsal sides of MCP2 ($p = 0.019$), MCP3 ($p = 0.008$), PIP2 and 3 ($p = 0.029$ both), MTP5 ($p = 0.025$) and all wrist sides ($p < 0.001$, $p = 0.013$, $p = 0.001$, respectively) responded significantly to therapy, while MCP3, PIP3 palmar and MTP 2 dorsal did not show significant response ($p = 0.054$, $p = 0.494$, $p = 0.172$, respectively). In established RA, all joint regions included significantly responded to therapy (PIP2 GS: $p = 0.004$, all others $p < 0.001$) in GS as well as PDUS.

Conclusions: Based on these results, we recommend to include wrist and MCP2 joints in a global US score on the patient level to monitor RA, independent of the disease stage, since they are¹ most commonly affected by synovitis and² most responsive to therapy. Tenosynovitis/paratenonitis is frequent in very early RA and should therefore be implemented in an US score monitoring early disease stages.

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FRI0559 BIOMECHANICAL PROPERTIES OF RADIAL BONE ARE DIFFERENT BETWEEN AUTO-ANTIBODY POSITIVE AND NEGATIVE RHEUMATOID ARTHRITIS

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Background: Functional properties of bone in rheumatoid arthritis (RA) are still not well characterised.

Objectives: This study aimed to define the impact of anti-citrullinated antibodies (ACPA) on biomechanical properties in RA.

Methods: Based on on high-resolution peripheral quantitative computed tomography (HR-pQCT) data from the distal radius of ACPA-positive RA (RA+), ACPA-negative RA (RA-) and healthy controls (HC) micro-finite element analysis (μFEA) was carried out to measure failure load and stiffness of bone. (¹ Comparisons of μFEA parameters between groups was calculated and multivariate models were used to determine the role of demographic, disease-specific and structural data of bone strength.

Results: A total of 276 subjects (96 RA+, 84 RA- and 96 HC) were analysed. Age and sex distributions were not significantly different between the three groups. In RA +but not in RA- failure load and stiffness were significantly decreased compared to HC (both $p < 0.001$). Lower bone strength affected both female and male RA +patients and was related to longer disease duration. Impaired bone strength was correlated with altered bone density and microstructural parameters, which were all decreased in RA+. Multivariate models showed that ACPA status ($p = 0.007$) and sex ($p < 0.001$) were independently associated with reduced biomechanical properties of bone in RA.

Conclusions: In summary, μFEA showed that bone strength is significantly decreased in RA +but not in RA- disease.

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FRI0560 QUANTITATIVE CT INDEXES IN THE EVALUATION OF INTERSTITIAL LUNG DISEASE RELATED TO RHEUMATOID ARTHRITIS

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Background: In rheumatoid arthritis (RA), interstitial lung disease (ILD) is the most common pulmonary complication and it is associated with poor prognosis.

The gold standard to detect ILD is the chest Computed Tomography (CT). CT semiquantitative scoring and quantitative methods are used to estimate the extension of ILD; however the first ones are time consuming and they have a considerable inter/intra-observer variability. Quantitative scores are based on the detection of the parameters of distribution of lung attenuation (also called quantitative CT indexes – QCTi).

Previously a good correlation between QCTi calculated through an open-source program (OsiriX) and semi-quantitative score performed by experienced radiologists was demonstrated in a cohort of systemic sclerosis (SSc) patients. Furthermore, the QCTi were demonstrated to be able to discriminate between SSc subjects with different mortality risk based on ILD extent (<20% vs >20%) or lung functional values.

Objectives: Main aim is to investigate if in RA-ILD there is a correlation between QCTi and semiquantitative scores. Secondary aims are: a) to verify if there is a difference of QCTi distribution in RA-ILD patients with severe vs mild ILD extent; b) to evaluate the discriminative ability of QCTi in identifying patients with severe ILD.

Methods: Two experienced radiologists assessed the ILD on chest CT of 45 patients with RA according to the semiquantitative score proposed by Goh et al. ILD extent <and >20% were considered mild and severe, respectively.