With respect to distribution, 122 patients (95.3%) had at least one joint with US synovitis and 76 patients (59.3%) had at least one joint with PD. The wrist, 2nd MCPJ and 2nd metatarsophalangeal joint (MTPJ) were the most affected in terms of synovitis whereas the 5th MTPJ showed more erosions (37.7%) and the extensor fingers tendons showed more tenosynovitis (23.02%).

Conclusions: US demonstrated to play an important role in the treatment decision of RA patients. The impact was more frequent in patients with active disease but also affected the decision in patients considered in clinical remission.

Disclosure of Interest: None declared

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FRI0661 CAPILLAROSCOPY IN PATIENTS WITH SILICA EXPOSURE. A CASE CONTROL STUDY

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Background: Exposure to silica dust has been associated with different autoimmune diseases and immunological abnormalities in which microvascular involvement is very common, as systemic sclerosis, systemic lupus erythematosus, rheumatoid arthritis or dermatomyositis.

Objectives: To show capillaroscopic findings in patients exposed and not exposed to silica and to analyze the differences between both groups.

Methods: A case control design was made. Cases (Si+) were subjects exposed to silica (with and without silicosis). Controls (Si-) were healthy subjects not exposed to silica. Capillaroscopy was made with both Zuzi® Optical stereo microscope with Optikam® camera adapted and with USB Digital Microscope Video epiluminiscence Dino-Lite® in each patient. The capillaroscopic alterations were evaluated according to a semiquantitative method. Background data on CVRF and variables related to capillaroscopy were collected. A comparative study was done.

Results: Capillaroscopy was performed on 61 Si+ and 12 Si- subjects. Mean age of Si+ was 52.6 years (SD: 7.3) and 54 years (SD: 6.6) in Si-. There were no significant differences in CVRF: hypertension (13.1% Si+ and 8.3% Si-), diabetes mellitus (3.3% Si+ and 8.3% Si-) and tobacco exposure (18.0% Si+ and 25.0% Si-). It was observed capillary dilation in 24 (33.9%) Si+ and only in 3 (25.0%) Si-. The dilation score was mild in all Si- while in Si+ was mild in 41.7%, moderate in 37.5% and extreme in 12.5%. 42.7% of Si+ had a degree of tortuosity higher than 33% (score 2) whereas in all Si- the degree of tortuosity was <33% (score 1). Capillaroscopic general pattern showed differences between both groups: it was normal in 24 (42.1%) Si+ and 9 (75%) Si-; slightly irregular in 30 (52.6%) Si+ and 3 (25%) Si- and unstructured in 3 Si+ (5.3%) and in none Si-.

Conclusions: The current study shows significant differences between the capillaroscopy of subjects exposed and not exposed to silica, with a trend in more frequency and severity of capillary dilatation, greater frequency of tortuosity in a severe degree and more frequent irregular capillaroscopic pattern in the exposed patients.

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FRI0662 ASSESSMENT OF BONE DENSITY, STRUCTURE, AND CORTICAL INTERRUPTIONS OF FINGER JOINTS IN PATIENTS WITH RHEUMATOID ARTHRITIS USING HIGH-RESOLUTION PERIPHERAL QUANTITATIVE CT

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Background: Rheumatoid arthritis (RA) is characterized by peri-articular bone loss. In patients with RA, lower bone density and structural integrity, and an increased number of erosions compared to healthy controls (HCs) has been demonstrated using High-Resolution peripheral Quantitative CT (HR-pQCT) (1,2). To further characterize RA-related changes, we recently introduced a method for quantifying small cortical interruptions in finger joints (3).

Objectives: To investigate the cortical and trabecular bone density, structure, and cortical interruptions in MCP joints in early and late RA patients compared to HCs using HR-pQCT imaging.

Methods: The 2nd and 3rd MCP joint of 70 subjects (mean age 53.1 (SD 9.2) years) were evaluated by HR-pQCT (82µm isotropic voxel size): 38 HCs, 10 early RA (diagnosis ≤2 years ago) and 22 late RA (diagnosis ≥10 years ago). Images were analyzed for cortical interruptions, and for cortical and trabecular bone density and structure. Descriptives were analyzed per joint by one-way ANOVA with Bonferroni post-hoc testing or Kruskal-Wallis with Mann-Whitney post-hoc testing, as appropriate.

Results: Significant differences with respect to all parameters were found across the groups (Table 1). In early and late RA, the percentage of joints with at least

1 interruption was higher, and number of trabeculae, cortical thickness, total density and cortical density were lower than in HC. In addition, in late RA, number of interruptions, interruption volume and trabecular separation were higher, and trabecular density was lower than in HC. Bone loss at the cortical and trabecular bone was primarily observed at the rim of the joint (Figure 1, arrows).

Table 1. Comparison of cortical interruptions, and bone density and structure parameters across early RA patients, late RA patients and HCs

	HC	Early RA	Late RA	p-value
Cortical interruption parameters	n=82	n=39	n=73	
Percentage of joints ≥1 interruption, %	69.5	89.7 *	82.2	0.025
Number of interruptions	1.50 (1.49)	2.64 (2.95)	5.22* (6.32)	<0.001
Interruption volume, mm ³	1.49 (5.16)	2.05 (6.76)	39.31* (78.51)	<0.001
Bone density parameters	n=50	n=31	n=68	
Total vBMD, mg HA/cm ³	327.3 (35.3)	295.8* (38.9)	286.4* (65.1)	<0.001
Trabecular vBMD, mg HA/cm ³	202.1 (20.6)	185.0 (21.6)	177.3* (42.0)	<0.001
Cortical vBMD, mg HA/cm ³	685.8 (42.8)	643.7* (58.2)	634.0* (73.3)	<0.001
Bone structure parameters	n=50	n=31	n=68	
Trabecular number, mm ⁻¹	1.68 (0.31)	1.45* (0.29)	1.52* (0.37)	0.004
Trabecular thickness, µm	102.3 (15.3)	109.1 (17.8)	98.6 (14.7)	0.009
Trabecular separation, µm	513.9 (116.9)	608.4 (132.3)	611.4* (220.6)	0.007
Distribution of trabecular separation, µm	550.6 (287.0)	728.5 (306.1)	689.4 (368.8)	0.029
Cortical thickness, µm	440.0 (99.2)	363.2* (90.2)	357.5* (132.8)	<0.001

Values are displayed as mean (SD) or otherwise described. *Significantly different from HC, p<0.05. †p-value obtained across the groups. vBMD, volumetric bone mineral density.

Figure 1. Typical examples of MCP joints; (a) HC, (b) early RA patient, and (c) late RA patient. The total 3D reconstructions are shown (I) with corresponding 20-slices thick axial slices (II). The arrows indicate locations of loss of trabecular and/or cortical structure in the early and late RA patients compared to the HC.

Conclusions: Bone density and structural integrity were impaired in early and late RA patients compared to HCs whereas the number of cortical interruptions is increased. The assessment of such parameters using HR-pQCT is, therefore, a promising tool for the follow-up of bone involvement in MCP joints in patients with RA.

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[2] Stach et al., *A&R* 2010.

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FRI0663 EVALUATION OF A FLUORENZYME IMMUNOASSAY (ELIA-CTD) IN THE SCREENING OF PATIENTS SUSPECTED FOR AUTOIMMUNE CONNECTIVE TISSUE DISEASES

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Background: Detection of auto-antibodies directed against nuclear antigens (antinuclear antibodies or ANA) have important diagnostic and prognostic implications in connective tissue diseases (CTD). The conventional indirect immunofluorescence assay on Hep-2 cell line (ANA-IIF) is the most commonly used method to detect ANA. The ANA-IIF can be labor intensive and suffers from lack of specificity.

Objectives: To evaluate the utility of a new fluoroenzyme Immunoassay "EliA-CTD" as an alternative for screening patients suspected for autoimmune connective tissue diseases.

Methods: Sixteen Hundred (1600) consecutive patients' sera submitted for anti-nuclear antibodies were tested using the ANA-IIF (Diasorin S.P.A, Saluggia, Italy) and the new EliA-CTD screen (Phadia GmbH, Frieberg, Germany). ANA testing was ordered by both primary and secondary care physicians. The EliA-CTD screening assay is a fluoroenzyme immunoassay which is performed on the Phadia-250 automated platform. The EliA-CTD assay contains ANA-targeted recombinant antigens including dsDNA, Sm-D, Rib-P, PCNA, U1-RNP (70, A, C), SS-A/Ro, SS-B/La, Centromere B, Scl-70, Fibrillarin, RNA Polymerase III, Jo-1, Mi-2, and PM-scl. The test results are expressed as ratio, with >1.0 considered positive. For ANA-IIF, the cut off for positive results was 1:40 or greater. Additionally, further testing for dsDNA and other extractable nuclear antigens (ENA) was undertaken on a subset of sera that were ANA-IIF+ or whenever there was discrepancy between the two methods.

Results: The overall agreement between the two methods was 84.2%. Three hundred and eight (308) out of 1600 (19.3%) samples tested positive by ANA-IIF positive as compared to 101/1600 (6.6%) for the EliA-CTD assay. Additional testing showed that 105 samples were positive for ENA including dsDNA. Of those, 101 were EliA-CTD positive and 81 were ANA-IIF positive. By incorporating the ENA results, the calculated sensitivity and specificity for the EliA-CTD were 97.1% and 99.7% respectively with positive and negative predictive values for the EliA-CTD assay of 96.1% and 99.8%, respectively. The corresponding sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for the ANA-IIF assay at different dilutions is shown below:

Titer	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
≥1:40	77.7	84.8	26.0	98.2
≥1:80	60.3	95.3	32.4	98.4
≥1:160	57.4	97.4	41.3	98.4
≥1:320	46.5	98.7	48.8	98.5

Conclusions: The new automated EliA-CTD assay shows superior sensitivity and specificity compared to the conventional labor intensive ANA-IIF. The EliA-CTD can be used as an upfront screening tool for connective tissue diseases. Depending on the clinical details, any EliA-CTD positive results could be reflexly followed by additional testing including ANA-IIF testing to elucidate the titer and pattern.

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FRI0664 INFLUENCE OF JOINT PATHOLOGY ON OPTICAL SPECTRAL TRANSMISSION IMAGING, ASSESSING INFLAMMATION IN HAND AND WRIST JOINTS OF RHEUMATOID ARTHRITIS PATIENTS

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Background: Rheumatoid arthritis (RA) patients benefit from treat-to-target strategies, aiming for remission or low disease activity¹. Clinical disease activity measures like the Disease Activity Score (DAS28) have questionable reproducibility and lack sensitivity for low disease activity states; MRI and ultrasound (US) are sensitive, but scanning multiple joints is time-consuming. Optical spectral transmission (OST) is stronger than DAS28 associated with inflammation assessed by both US and MRI². OST measures the blood-specific absorption of light transmitted through tissue, which is reduced in presence of joint inflammation, but also influenced by other joint pathology.

Objectives: Evaluating the influence of joint pathology on the misclassification of joint inflammation, in the hand and wrist joints of RA patients, determined by OST, as compared to US, the reference standard.

Methods: Fifty RA patients with at least one swollen joint, generally with low disease activity were included in this cross-sectional study. Assessments were US, OST, and DAS28, performed according to established guidelines³ by separate experienced examiners, blinded for other study outcomes. US joint inflammation was defined as a gray-scale score >1 or a power Doppler score >0 (scales 0–3), assessed in MCP, (P)IP, and wrist joints. Using US as reference, diagnostic performance of OST in detecting inflammation at joint level was evaluated using receiver operating characteristic (ROC) analyses; at patient level, DAS28 and OST were correlated to US. Joint pathology potentially influencing misclassification of OST (erosions, osteophytes, tendon (sheet) inflammation, abnormal vasculature, and triangular fibrocartilage complex injuries) were evaluated for significance in a multivariate nominal logistic regression model.

Results: OST performed well at joint level, separately for the MCP (ROC-AUC:0.85), PIP (ROC-AUC:0.79) and wrist (ROC-AUC:0.72) joints and for all

joints together (ROC-AUC:0.83). On patient level, DAS28 correlated poorly with US (r=0.29), but OST correlation was good (r=0.72). The presence of joint pathologies per misclassification group is shown in table 1. In the regression model, inflammation in MCP and PIP joints had a higher risk of false negative misclassification in the presence of dorsal bone erosions (OR:3.5, 95% CI:1.7–7.3), volar erosions (OR:5.0, 95% CI:1.8–14.1), flexor tenosynovitis (OR:2.5, 95% CI:1.4–4.5), osteophytes (OR:1.9, 95% CI:1.2–2.8), and extensor tendonitis (OR:3.7, 95% CI:1.6–8.5), and a higher risk of false positive misclassification in the presence of osteophytes (OR:2.3, 95% CI:1.6–3.2).

Table 1: Frequency of joint pathologies, per misclassification group.

Misclassification	Erosions dorsal		Erosions volar		Osteophytes		Flexor tenosynovitis		Extensor tendonitis		Vascular pattern		TFCC	
	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present
True positives & true negatives	1546	34	1569	12	1265	315	1502	79	1556	25	1349	231	121	2
	84.4%	66.7%	84.2%	63.2%	86.6%	74.8%	84.3%	78.2%	84.3%	65.8%	84.6%	80.5%	65.4%	50.0%
False negatives	116	13	122	7	85	44	114	15	121	8	109	20	13	1
	6.3%	25.5%	6.5%	36.8%	5.8%	10.5%	6.4%	14.9%	6.4%	21.3%	6.4%	7.0%	7.0%	25.0%
False positives	169	4	173	0	111	62	166	7	168	5	137	36	51	1
	9.2%	7.8%	9.3%	0.0%	7.6%	14.7%	9.3%	6.9%	9.1%	13.2%	8.6%	12.5%	27.6%	25.0%
Total	1831	51	1864	19	1461	421	1782	101	1845	38	1595	287	185	4

Conclusions: OST is a sensitive and specific technique to assess inflammation in hand and wrist joints of RA patients with low disease activity, nonetheless, joint pathology like erosions, tendonitis, and osteophytes increase the risk of misclassification of inflammation by OST.

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FRI0665 ANTI-HETEROGENOUS NUCLEAR RIBONUCLEOPROTEINS (ANTI-HNRNP) AND OTHER AUTOANTIBODIES FOR DETECTION OF EROSION ARTHROPATHY IN SYSTEMIC LUPUS ERYTHEMATOSUS WITH JOINT INVOLVEMENT IN COMPARISON BY JOINT X-RAY

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Background: Joint involvement in SLE is very common, affecting 90% of patients at some stage in the course of their disease (1). Arthritis featuring prominent radiological erosion in SLE is less common; however, in a small subset of patients an erosive pattern similar to RA develops (2).

Anti-heterogenous nuclear ribonucleoprotein A2 (anti-hnRNP-A2) occur in about one-third of patients with RA but rarely in other arthritides such as OA, PsA or reactive arthritis. Interestingly, in SLE patients anti-hnRNP-A2 autoantibodies were found to be significantly associated with erosive arthritis (3).

Objectives: To investigate joint involvement in SLE and its relationship with autoantibodies to the hnRNP Ab A1 and A2, rheumatoid factor (R.F), Antinuclear antibody (A.N.A) and Anti-double stranded DNA (Anti-DSDNA) and correlation with articular involvement by joint x-ray.

Methods: Case series study comparing diagnosis of arthritis by hand and wrist x-ray with anti-hnRNP A1 and A2 in Forty SLE patients aged 17–60 years old with disease duration 1–17 years complaining of arthralgia or arthritis. A controlled group of 21 clinically normal persons, age and sex matched and blood

Table 1. Comparison of serological features in SLE patients with and without erosive arthritis (EA)*

Characteristic	SLE patients with EA	SLE patients without EA	Total	P value
Rheumatoid Factor, N (%) ^b	5 (50)	6 (20)	11 (27.5)	0.079
ANA, N (%) ^b	8 (80)	14 (46.7)	22 (55)	0.069
Anti-double stranded DNA, N (%) ^b	9 (90)	13 (43.3)	22 (55)	0.011*

Table 2. Comparison of radiological findings of hand X-ray in SLE patients with and without erosive arthritis (EA)*

Characteristic	SLE patients with EA	SLE patients without EA	Total	P value
Juxta-articular osteoporosis, N (%)	9 (90)	21 (70)	30 (75)	0.204
Narrowing of joint space, N (%)	9 (90)	9 (30)	18 (45)	0.001*
Subchondral cysts, N (%)	4 (40)	1 (3.3)	5 (12.5)	0.010*
MCP subluxation, N (%)	7 (70)	3 (10)	10 (25)	0.001*
Interruption of cortical surface, N (%)	7 (70)	1 (3.3)	8 (20)	<0.0001*
New bone formation, N (%)	1 (10)	0	1 (2.5)	0.250
AVN, N (%)	0	1 (3.3)	1 (2.5)	0.750