The modified ultrasonography scoring system integrated oral mucosa and major salivary glands is able to improve the diagnostic specificity of patients with pSS.

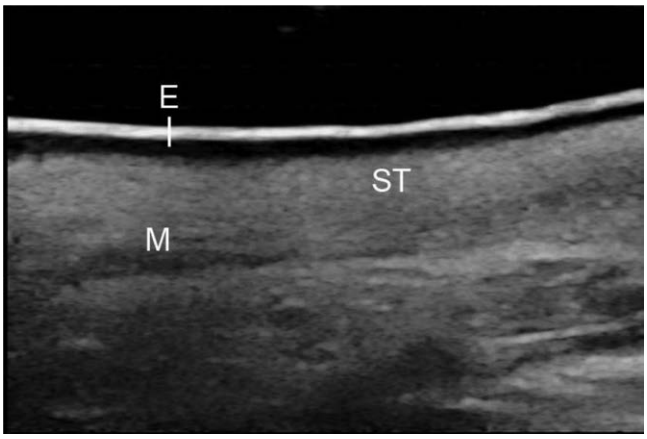

Figure 1. Ultrasonography image of the normal buccal tissue. E = epithelial membrane of buccal mucosa; ST = subepithelial connective tissue; M = buccinator muscle.

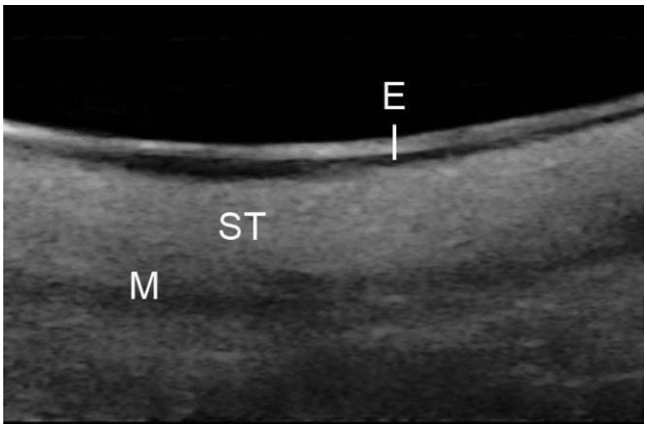

Figure 2. Ultrasonography image of pSS patient reveals decreased thickness and heterogeneous hyperechogenicity of buccal mucosa. E = epithelial membrane of buccal mucosa; ST = subepithelial connective tissue; M = buccinator muscle.

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SAT0566 ULTRASOUND DOPPLER MASEI SHOWS SENSITIVITY TO CHANGE AFTER BIOLOGICAL THERAPY IN SPONDYLOARTHRITIS AND PSORIATIC ARTHRITIS PATIENTS

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Background: The assessment of activity in spondyloarthritis (SpA) and psoriatic arthritis (PsA) involves several domains, including enthesitis. Clinical enthesitis has shown low sensitivity, specificity and reliability. The MAdrid Sonographic Enthesitis Index (MASEI) is a feasible and reliable ultrasound score, but its responsiveness to treatment has not yet been evaluated.

Objectives: The main objective of this study was to investigate the sensitivity to change of MASEI in active SpA and PsA patients.

Methods: Longitudinal study in patients with SpA and PsA with active disease (defined as patients who were going to start or switch biologic disease modifying antirheumatic drugs (bDMARD) therapy according to physician criteria and in agreement with clinical guidelines). MASEI evaluation was performed at baseline, 3- and 6-months visits. MASEI and Outcome Measures in Rheumatology (OMERACT) enthesitis Power Doppler (PD) definitions were checked. Each enthesis was scanned in both the longitudinal and transverse planes, and 5 second videos were recorded for reliability. An inter-reader analysis by three readers was performed. For statistical analysis t-Student test was used to determine changes between visits and kappa test was used for reliability.

Results: A total of 72 US evaluations of 25 patients were included, of whom 13(52%) were ankylosing spondylitis (AS) patients, 9(36%) PsA, and 3(12%) non radiographic axial spondyloarthritis (nr-axSpA). Mean age was 51.2±14.1 years and 13(52%) were females. Mean DAS28 (3.5±1.2) for peripheral involvement, mean BASDAI (5.8±2) for axial involvement, and CRP values (13.1±13.6) reflect moderate-high disease activity at baseline. US parameters at baseline and at the 3- and 6-month follow-up visits are shown in Table 1. Global MASEI score was responsive at the 3- and 6-month follow-up visit (-4.9 and -5.7, respectively) ($p<0.05$) and both MASEI and OMERACT PDUS definitions of active enthesitis improved significantly at 3- (-0.6 and -1.1) and 6-month follow-up visits (-0.7 and -1.1) ($p<0.05$). Reliability of PD MASEI definition among the three readers was excellent (kappa = 0.918).

Table 1. MASEI evaluation at baseline, 3- and 6-month follow-up visits

Parameter	Baseline n=25	3 months n=25	P[a]	6 months n=22	P[a]
MASEI score	28±9.3	23.2±7.6	**0.002**	24.7±8.1	**0.01**
PD US MASEI score	1.8 ±1.3	1.1±1.1	**0.046**	1±0.9	**0.004**
PD US OMERACT score	1.6±1.2	0.9±0.9	**0.024**	0.8±0.9	**0.006**

[a]t-Student test for comparison to baseline

Conclusion: MASEI score significantly improves at 3 and 6 months of follow up in patients under bDMARD treatment and both MASEI and OMERACT Doppler definitions of active enthesitis reflects treatment response. These findings support the usefulness of PD US in the assessment of bDMARD treatment response in SpA and PsA.

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SAT0567 USE OF THERMOGRAPHY OF HANDS AND MACHINE LEARNING TO DIFFERENTIATE PATIENTS WITH ARTHRITIS FROM HEALTHY SUBJECTS

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Background: The early diagnosis of rheumatic diseases improves their prognosis. However, patients take several months to reach the rheumatologist from the beginning of the first symptoms. Thermography is a safe and fast technique that captures the heat of an object through infrared photography. The inflammation of the joints causes an increase in temperature and, therefore, can be measured by thermography. Machine learning methods have shown that they are capable of analyzing medical images with an accuracy similar or superior to that of a healthcare professional.

Objectives: Develop an algorithm that, based on thermographic images of hands and machine learning, differentiates healthy subjects from patients with rheumatoid arthritis (RA), psoriatic arthritis (PA), undifferentiated arthritis (UA) and arthritis of hands secondary to other diseases (SA).

Methods: Multicenter observational study conducted in the rheumatology and radiology service of two hospitals. Patients with RA, PA, UA and SA who attended the followup visit and healthy subjects (companions and healthcare proffesionals) were recruited. In all cases, a thermal image of the hands was taken using a Flir One Pro or Thermal Expert TE-Q1 camera connected to the mobile and an ultrasound of both hands. The degree of synovial hypertrophy (SH) and power

doppler (PD) was assessed for each joint (score from 0 to 3). Inflammation was defined as the presence of SH> 1 or PD> 0. Machine learning was used to classify patients with RA, PA, UA and SA with inflammation evidenced by ultrasound and healthy subjects from thermographic images. The evaluation of the classifier was performed by leave-one-out cross-validation and the area under the ROC curve (AUCROC) in those subjects whose thermal image was performed with the Thermal Expert TE-Q1 camera. The study was approved by the Clinical Ethics and Research Committee of the centers.

Results: 500 subjects were recruited from March 2018 to January 2020, of these 73 were excluded due to poor quality in the thermal image (moved or absence of temperature contrast between hand and background). Of the 427 subjects analyzed, 129 corresponded to healthy subjects, 138 to patients without evidence of inflammation and 160 to patients with inflammation evidenced by ultrasound (116 RA and 44 PA, UA or SA). Of these, 42% were taken using the Thermal Expert TE-Q1 camera. An AUCROC of 0.73 (p-value <0.01) was obtained for the healthy classifier vs RA and 0.72 (p-value <0.01) for the healthy classifier vs PA, UA and SA.

Conclusion: A classification model has been developed capable of differentiating patients with RA, PA, UA and SA with evidence of inflammation from healthy subjects. These results open an opportunity to develop tools that facilitate early diagnosis.

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SAT0568 PERSISTENT VASCULAR 18F-FDG UPTAKE DESPITE CLINICAL-ANALYTICAL REMISSION IN PATIENTS WITH LARGE VESSEL VASCULITIS UNDER TOCILIZUMAB THERAPY. SINGLE UNIVERSITARY CENTER EXPERIENCE OF 30 PATIENTS.

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Background: Tocilizumab (TCZ) has shown efficacy in large vessel vasculitis (LVV) **(1-3)**. Disease activity assessed by laboratory markers (ESR,CRP) may be of less value with TCZ. ^{18}F-FDG PET/CT may be useful to monitor LVV disease activity **(4-5)**.

Objectives: To assess **a)** evolution of disease activity in LVV treated with TCZ by PET/CT and **b)** its correlation with clinical/serological markers.

Methods: Single centre study of 30 patients with refractory LVV treated with TCZ who had a baseline and follow-up PET/CT scan. Vascular uptake was assessed quantitatively and qualitatively. Quantitative analysis was assessed as a target to background ratio (TBR)=SUVmax thoracic aorta/SUVmax aortic vascular pool. For qualitative analysis, FDG uptake at vessel wall was visually grading compared to the liver. We defined a total vascular score which included 5 vascular areas (supra aortic trunks, thoracic, abdominal, iliac and femorotibial arteries) ranging from 0 to 15. Clinical improvement (no improvement/partial/complete), analytical (CRP mg/dL; ESR mm/1st hour) and reduction of prednisone dose (mg/day) were also assessed.

Results: 30 patients (24 w/6 m); mean age 65.3 ± 10.6 yrs. TCZ was started after 6.5 [2.0-20.0] months from LVV diagnosis. Most patients received TCZ as intravenous infusions (70%) and almost half of them (46.7%) received combined therapy with MTX. Clinical/analytical evolution and quantitative/qualitative uptake assessment is shown in **TABLE**. After a mean follow-up of 37.0±18.5 months, 92.3% of patients experienced complete clinical/analytical improvement. Complete quantitative normalization of vascular uptake (TBR< 1.34) was achieved in 30.8%. Qualitatively, 23.1% of patients showed normalization (total vascular score =0) at the end of the study period.

Conclusion: Most patients with LVV under TCZ experienced rapid and effective clinical and analytical response. Decrease of vascular uptake was also observed both quantitatively and qualitatively assessed. However, complete normalization of vascular uptake despite clinical remision was only observed in less than one-third of patients.

TABLE.

	Basal (n=30)	6 months (n=9)	12-18 months (n=21)	>18 months (n=13)
Clinical improvement				
Complete, *n (%)*		7 (77.8)	16 (76.2)	12 (92.3)
Laboratory markers				
ESR (mm/1sth), *median [IQR]*	24.0 [9.8-53.0]	2.0 [2.0-3.0] *	2.0 [2.0-4.0] *	2.0[2.0-3.5] *
CRP (mg/dL), *median [IQR]*	1.5 [0.5-2.4]	0.1 [0.1-0.2] *	0.1 [0.1-0.1] *	0.1 [0.1-0.1] *
ESR/CRP normalization, n *(%)*		9 (100)	21 (100)	13 (100)
FDG vascular uptake				
TBR, *mean ± SD*	1.69 ± 0.52	1.56±0.41 *	1.46±0.16 *	1.40 ± 0.18 *
Total vascular score, *mean ± SD*	5.0 ± 2.6	3.7 ± 2.2	3.3 ± 1.7*	2.7 ± 2.4*
Quantitative normalization, n *(%)*		4 (44.4)	5 (23.8)	4 (30.8)
Qualitative normalization, n *(%)*		1 (11.1)	1 (4.8)	3 (23.1)

*test Wilcoxon: p < 0.05. Quantitative normalization when TBR <1.34. Qualitative normalization when total vascular score =0.

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SAT0569 "IMAGES ARE MORE THAN PICTURES, THEY ARE DATA" [1] – EXPLORATION OF RADIOMICS ANALYSIS FOR SYSTEMIC SCLEROSIS-ASSOCIATED INTERSTITIAL LUNG DISEASE

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Background: Interstitial lung disease (ILD) affects 60% of patients with systemic sclerosis (SSc) and is the primary cause of death. Medical imaging is an integral part of the routine work-up for diagnosis and monitoring of SSc-ILD and includes high-resolution computed tomography (HRCT). Radiomics is a novel research area that describes the in-depth analysis of tissue phenotypes in medical images with computational retrieval of quantitative, mineable metadata appropriate for statistical analyses.

Objectives: To explore the performance of HRCT-derived radiomic features for the assessment of SSc-associated ILD (i.e. diagnosis, staging, and lung function).

Methods: Radiomics analysis was performed on HRCT scans from 98 SSc patients, including n=33 SSc patients without ILD, n=33 with limited and n=32 with extensive ILD as defined by 0%, <20% and ≥20% visual extent of fibrosis on HRCT, respectively. Following semi-automated segmentation of lung tissue on 3D reconstructed HRCT scans, 1386 radiomic features, including 17 intensity, 137 texture, and 1232 wavelet features were extracted using the in-house developed software Z-Rad (Python 2.7). In order to identify robust features, we conducted intra- and inter-reader correlation analysis (ICC) in a subgroup of patients. Only features with good reproducibility (ICC ≥ 0.75) entered subsequent analyses. We applied the Wilcoxon test, followed by Receiver Operating Characteristic ROC) curve analyses, to identify features significantly different between a) ILD