**Title of Abstract:** Correlation of muscle BOLD MRI with laser Doppler flowmetry and transcutaneous oxygen pressure for assessing microcirculation in patients with systemic sclerosis

**Abstract Category:** Other

**Purpose:** To prospectively evaluate calf muscle BOLD MRI with cutaneous calf microcirculation by laser Doppler flowmetry (LDF) and transcutaneous oxygen pressure (TcPO2) in patients with systemic sclerosis (SSc) in comparison with healthy volunteers.

**Methods:** 12 patients with systemic sclerosis (SSc) (6 men, mean age 56 years) and 12 healthy volunteers (4 men, mean age 45 years) were examined using muscle BOLD MRI, LDF and TcPO2. A cuff compression at mid-thigh level was performed using the same paradigm for all modalities. Muscle BOLD measurements were acquired on a 3T whole body-scanner in the upper calf using a multi-echo EPI-sequence with four echo-times (TE: 9/20/31/42 ms) and a repetition time of 2 s (matrix size: 192x96; FOV: (384x192) mm2; slice thickness: 5 mm). For each subject T2* time courses were obtained from soleus and gastrocnemius muscle and extrapolated to the acquisition-intervals used for LDF- and TcPO2-measurements (10 s). LDF measurements were obtained at the calf using a PeriScan PIM II Imager and a TcPO2-monitoring system was applied. Correlation coefficients (CCs) for associations were calculated.

**Results:** In the healthy volunteer group CCs for muscle BOLD MRI in comparison to LDF and TcPO2 were 0.88 and 0.70, respectively. In the SSc patient CCs for muscle BOLD MRI in comparison to LDF and TcPO2 were 0.88 and 0.73, respectively.

**Conclusion:** Calf muscle BOLD MRI correlated very well with LDF- and TcPO2 as two methods routinely used in clinical settings. The results demonstrate that patients with SSc not only have changes in the muscle BOLD signal but also similar alterations in the cutaneous calf microcirculation. Furthermore the results reveal that the muscle BOLD signal reflects perfusion as well as oxygenation changes. Muscle BOLD MRI can be a useful and valuable clinical tool for detection of impaired microcirculation in this disease entity.

**Educational Poster** N/A