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Longitudinal nailfold capillaroscopy tracking of microangiopathic changes in systemic sclerosis

Graham Dinsdale¹, Anniek M Van Roon², Andrea Murray³, Christopher Taylor³, Ariane L Herrick¹,⁴

1. Centre for Musculoskeletal Research, The University of Manchester, Salford Royal NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, UK.
2. Dept. Internal Medicine, div. Vascular Medicine, University of Groningen, University Medical Centre, Groningen, Netherlands.
3. Centre for Imaging Sciences, Division of Informatics, Imaging & Data Sciences, The University of Manchester, Manchester, UK.
4. NIHR Manchester Musculoskeletal Biomedical Research Centre, Manchester University NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, UK.

Corresponding author: Graham Dinsdale, The University of Manchester, Clinical Science Building, Salford Royal NHS Foundation Trust, Stott Lane, Manchester, M6 8HD, UK. Telephone: 0161 206 2935. Email: graham.dinsdale@manchester.ac.uk

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A 51 year old female with a 20-year history of limited cutaneous systemic sclerosis (Raynaud’s phenomenon, sclerodactyly, digital pitting, anti-centromere autoantibody, abnormal nailfold capillaries) had no history of digital ulceration but developed calcinosis of several fingers. Raynaud’s phenomenon was relatively mild.

Regular high-magnification (300x) capillaroscopic assessment (for research purposes) was recorded from 2002; approximately 4 years post-diagnosis. The microscope system used throughout was a modified KK Technology system, with green LED illumination for maximum contrast and custom software allowing whole-nailfold mosaic images to be captured [1]. Seven images of the non-dominant ring finger were captured during the 9.9 year period ending August 2012.

The image sequence describes the progression of the nailfold microvasculature from an Early/Active scleroderma pattern [2] initially, with many enlarged and giant capillaries, through a period of relative avascularity, concluding with evidence of neoangiogenesis by the final image, and demonstrates the potential of capillaroscopy as a biomarker of microvascular disease. This tracking of change is possible via the image capture system which combines high magnification with a whole nailfold view. Capillaroscopy provides a unique non-invasive window into evolution of SSc pathogenesis over time: in this patient microvascular disease progression might be ‘driving’ development of calcinosis.

References


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Figure 1. High-magnification nailfold mosaic sequence covering a near 10 year period. Images are recorded at 300x magnification, giving a resolution of approximately 1µm/pixel. Mosaics are built up from individual camera frames and then “stitched” automatically in software to create the pan-nailfold images seen above. Vertical red lines are superimposed on the sequence as a visual aid, linking the same vessels in each image.