



Longitudinal nailfold capillaroscopy tracking of microangiopathic changes in systemic sclerosis

DOI:

[10.1093/rheumatology/key029](https://doi.org/10.1093/rheumatology/key029)

Document Version

Accepted author manuscript

[Link to publication record in Manchester Research Explorer](#)

Citation for published version (APA):

Dinsdale, G., Van Roon, A., Murray, A., Taylor, C., & Herrick, A. (2018). Longitudinal nailfold capillaroscopy tracking of microangiopathic changes in systemic sclerosis. *Rheumatology*.
<https://doi.org/10.1093/rheumatology/key029>

Published in:

Rheumatology

Citing this paper

Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

General rights

Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Takedown policy

If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [<http://man.ac.uk/04Y6Bo>] or contact uml.scholarlycommunications@manchester.ac.uk providing relevant details, so we can investigate your claim.



Longitudinal nailfold capillaroscopy tracking of microangiopathic changes in systemic sclerosis

Graham Dinsdale¹, Anniek M Van Roon², Andrea Murray¹, Christopher Taylor³, Ariane L Herrick^{1,4}

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

Word count (max 200): 198

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.

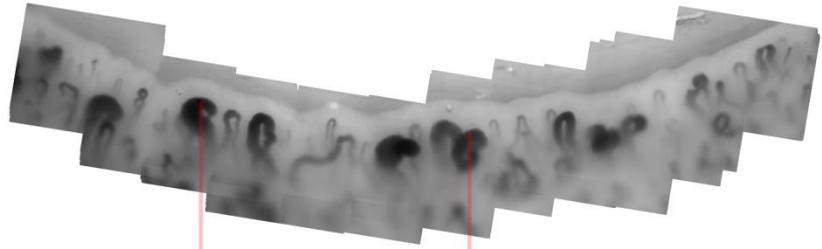
References

1. Anderson ME, Allen PD, Moore T, et al. Computerized nailfold video capillaroscopy - a new tool for assessment of Raynaud's phenomenon. *J Rheumatology* 2005; 32: 841-8.
2. Cutolo M, Sulli A, Smith V. How to perform and interpret capillaroscopy. *Best Practice Res Clin Rheumatol* 2013; 27: 237-48.

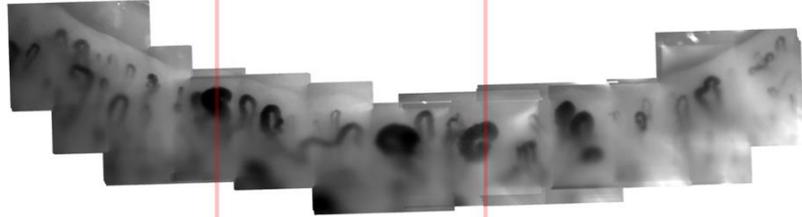
Funding: No specific funding was received to carry out the described work.

Disclosure statement: The authors declare no conflicts of interest.

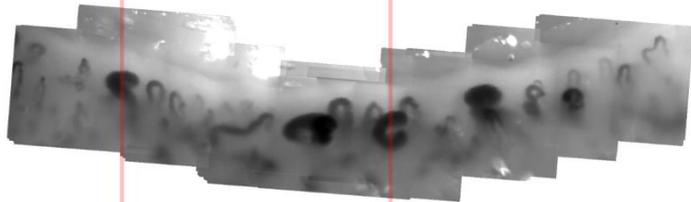
**September
2002**



**July
2004**



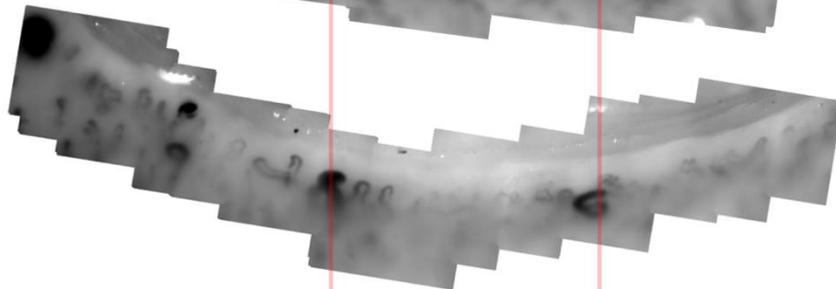
**December
2005**



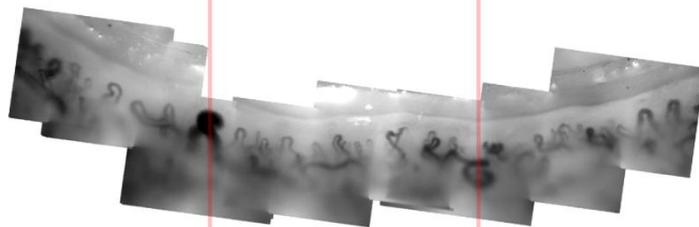
**December
2006**



**December
2007**



**December
2009**



**August
2012**

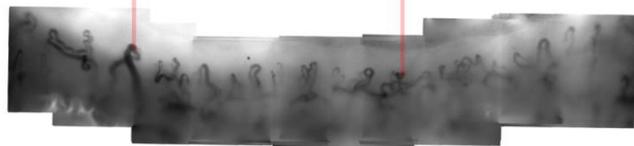


Figure 1. High-magnification nailfold mosaic sequence covering a near 10 year period. Images are recorded at 300x magnification, giving a resolution of approximately $1\mu\text{m}/\text{pixel}$. Mosaics are built up from individual camera frames and then “stitched” automatically in software to create 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.