Letter to the editor: The assessment of nailfold capillaries: comparison of dermoscopy and nailfold videocapillaroscopy

DOI: 10.1093/rheumatology/key018

Document Version
Accepted author manuscript

Link to publication record in Manchester Research Explorer

Citation for published version (APA):

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.
Letter to the editor: The assessment of nailfold capillaries: comparison of dermoscopy and nailfold videocapillaroscopy

Graham Dinsdale¹, Sebastien Peytrignet¹, Tonia Moore², Michael Berks³, Christopher Roberts⁴, Joanne Manning², John Allen⁵, Marina Anderson⁶, Maurizio Cutolo⁷, Roger Hesselstrand⁸, Kevin Howell⁹, Carmen Pizzorni⁷, Vanessa Smith¹⁰, Alberto Sulli⁷, Marie Wildt⁸, Christopher Taylor³, Andrea Murray¹, Ariane L Herrick¹,¹¹

1. Division of Musculoskeletal & Dermatological Sciences, University of Manchester, Salford Royal NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, UK

2. Salford Royal NHS Foundation Trust, Salford, UK

3. Centre for Imaging Sciences, Division of Informatics, Imaging & Data Sciences, University of Manchester, Manchester, UK

4. Centre for Biostatistics, Division of Population Health, Health Services Research & Primary Care, University of Manchester, Manchester, UK

5. Microvascular Diagnostics, Northern Medical Physics and Clinical Engineering, Freeman Hospital, Newcastle upon Tyne, UK

6. Institute of Ageing and Chronic Disease, University of Liverpool, Liverpool, UK

7. Research Laboratory and Academic Division of Clinical Rheumatology, Dept. Internal Medicine, University of Genova, Italy

8. Department of Clinical Sciences, Section of Rheumatology, Lund University, Lund, Sweden

9. Institute of Immunity and Transplantation, University College London, Royal Free Campus, London, UK
10. Department of Rheumatology, Ghent University Hospital, Faculty of Internal Medicine, Ghent University, Ghent, Belgium

11. NIHR Manchester Musculoskeletal Biomedical Research Centre, Manchester University NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, UK.

Corresponding author: Dr Graham Dinsdale, Clinical Sciences Building, Salford Royal Hospital, Stott Lane, Salford, M6 8HD, UK. Email: graham.dinsdale@manchester.ac.uk. Telephone: (+44) 161 206 2935

Key message: Dermoscopy is a useful, low-cost clinical tool for the rheumatologist assessing nailfold capillary abnormalities.

Disclosure statement: The authors declare no conflicts of interest.
Sir,

Now that abnormal nailfold capillaries are one of the classification criteria for systemic sclerosis (SSc)[1], all rheumatologists diagnosing connective tissue diseases need to be familiar with the technique of nailfold capillaroscopy and to have close (or easy) access to this. High magnification nailfold videocapillaroscopy (NVC) is currently considered the 'gold standard' in the assessment of nailfold capillaries in patients with Raynaud's phenomenon and systemic sclerosis (SSc) spectrum disorders. However, it is unrealistic for all rheumatologists to have this equipment, and hand-held dermoscopy is increasingly promoted as a low-cost alternative to NVC. Dermoscopy has previously been used to image SSc-related telangiectases and correlate appearances with NVC[2]. There have been a small number of studies comparing NVC to dermoscopy directly[3-5], although the properties of dermoscopy are not yet well known. Our aim was to compare low-cost, hand-held dermoscopy to NVC in terms of (a) image ‘gradeability’ and (b) capillary pattern (‘normal, ‘non-specific’, ‘early’, ‘active’ and ‘late’[6]), to assess their ability to detect SSc.

Nailfolds of patients with SSc, primary Raynaud’s phenomenon (PRP) and healthy controls were imaged (10 nailfolds/participant) using both computerised NVC (300x magnification) and dermoscopy (10x magnification, oil drop placed on nailfold as for NVC), during the same imaging session. The images were then sent to 10 expert observers from 7 European centres for subjective grading. Each image was labelled as follows: ungradeable (due to extreme severity of capillaroscopic abnormality or image quality) or, if gradeable, with ‘normal’, ‘non-specific’, ‘early’, ‘active’ or ‘late’ patterns. The dermoscopy imaging was an addition to a study examining reliability of NVC which has been reported elsewhere[7]: all patients gave written, informed consent. The study was approved by the Greater Manchester East Research Ethics Committee (reference 11/NW/0444).

Gradeability was compared between methods. A subset of images was retained, where gradeability was achieved using both techniques. In that subset, capillaroscopy status
('normal' or 'SSc' ['early', 'active' or 'late']) was compared with the disease status of the individual providing each image (non-SSc or SSc), after further excluding non-specific cases for each technique. This allowed estimates of sensitivity and specificity to be provided for each method. For this analysis, healthy controls and patients with PRP were combined to form the 'non-SSc' group, since one of the defining features of PRP is normal nailfold capillaries[8].

One thousand, three hundred and seventy-six nailfolds from 170 participants (a mean of 8.1 fingers (SD 2.5) per participant) were assessed: 99 SSc (58.2%) and 71 (41.8%) healthy controls/patients with PRP (50 healthy controls and 21 patients with PRP). Nine hundred and seventy-five (70.9%) images recorded with dermoscopy were assessed as gradeable compared to 1091 (79.3%) using NVC - with an overlap in 64.3% of nailfolds (885/1376 gradeable using both techniques) (Figure).

As seen in the Figure, with dermoscopy, 47.2% of gradeable images were classed as normal (29.1% with NVC), 9.2% as early (9.6% with NVC), 11.0% as active (15.6% with NVC), 7.1% as late (9.5% with NVC) and 25.5% as non-specific (36.2% with NVC). Of those images graded non-specific, the majority were from patients with SSc (65.9% with dermoscopy, 56.6% with NVC).

Among the 659 retained dermoscopy images (885 gradeable minus 226 non-specific), sensitivity was 60.2% (219/364 of SSc images correctly identified) and specificity was 92.5% (273/295 of non-SSc images correctly identified). Conversely, in the 565 retained NVC images (885 gradeable minus 320 non-specific), sensitivity was 81.6% (271/332) and specificity was 84.6% (197/233).

These findings are consistent with a previous study comparing dermoscopy to NVC but with a different study design: 48 rheumatologists graded images using a web-based interface and were asked to grade images not using the 'non-specific', 'early', 'active', late' classification but rather using a 0-3 scale of severity (normal, mildly, definitely, and grossly abnormal).
Results for 'gradeability' were 84% of NVC and 70% for dermoscopy (very similar to in the current study), and images were scored more highly (more severely) with NVC than with dermoscopy[5]: further evidence that dermoscopy is less sensitive, but more specific, than NVC in detecting abnormality.

Although a limitation of this analysis was that a single observer assessed over half of the images (55.7% or 767/1376), our earlier reliability study, using the same observers and participants, concluded that inter-observer reliability for image grade was good (subject to evaluable) [7].

This comparison of dermoscopy and NVC has two messages for the rheumatologist. First, despite the lower magnification, dermoscopy images have a high level of subjective gradeability (70.9%, albeit lower than the 79.3% for NVC). Second, although specificity was high for both methods (above 80%) it was higher for dermoscopy, whereas sensitivity was lower for dermoscopy (60.2% compared to 81.6%). Although recognising that differences exist between the two techniques, nonetheless dermoscopy is a very useful clinical tool for those without access to NVC: rheumatologists should be encouraged to familiarise themselves with the technique.

Funding

This work was supported by Scleroderma & Raynaud’s UK [grant number MU3].
REFERENCES


Figure. Gradeability of nailfold images with dermoscopy and NVC, and (lower panel) grades given to gradeable images according to method.

<table>
<thead>
<tr>
<th>Among images gradeable with both techniques</th>
<th>Grade with NVC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Grade with dermoscopy</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Normal</td>
<td>224</td>
</tr>
<tr>
<td>Non-specific</td>
<td>21</td>
</tr>
<tr>
<td>Early</td>
<td>10</td>
</tr>
<tr>
<td>Active</td>
<td>1</td>
</tr>
<tr>
<td>Late</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>258</td>
</tr>
</tbody>
</table>

(Percentages in parentheses)