INPLASY

Nailfold capillaroscopy using a dermatoscope in systemic sclerosis – systematic review and meta-analysis protocol

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ADMINISTRATIVE INFORMATION

INTRODUCTION

Review question / Objective The aim of this systematic review and meta-analysis is to analyze the diagnostic accuracy (sensitivity and specificity) of dermatoscope-used nailfold capillaroscopy (DNC) in SSc compared to widely used standard examinations.

Condition being studied Nailfold capillaroscopy is a pivotal non-invasive tool for the assessment of microvascular abnormalities in systemic sclerosis (SSc), with nailfold videocapillaroscopy (NVC) considered the gold standard. However, the availability and practicality of NVC are limited in routine clinical settings, prompting interest in dermatoscope-used nailfold capillaroscopy (DNC) as an accessible alternative.

METHODS

Search strategy A search of the databases PubMed, Scopus, and Web of Science was performed on 21st of June 2025 using the following search phrases: ("nailfold capillaroscopy" OR capillaroscopy) AND (der-matoscope OR dermatoscopy OR dermoscopy OR "nailfold dermoscopy") AND ("system-ic sclerosis" OR scleroderma OR "Raynaud syndrome" OR Raynaud OR "Raynaud's dis-ease").

Participant or population Systemic sclerosis patients typically show progressive capillary loss, giant capillaries, and microhemorrhages on nailfold capillaroscopy. In advanced disease, extensive avascular areas and severe architectural derangement become evident, reflecting high microvascular damage and poorer prognosis. Raynaud's phenomenon associated with systemic sclerosis reveals these abnormal capillaroscopic patterns, in contrast to primary Raynaud's, which usually shows normal capillary morphology. Capillaroscopy is thus a key diagnostic tool for differentiating systemic sclerosis from other causes of Raynaud's and for assessing disease severity and progression.

Intervention Dermatoscopy, particularly with polarized handheld devices, has emerged as a practical and affordable alternative for initial NFC screening. Though it offers lower magnification (typically around 10×), it has demonstrated reasonable accuracy in identifying key capillary abnormalities. This review and meta-analysis will analyze the accuracy of dermatoscopy in standard clinical practice.

Comparator Nailfold videocapillaroscopy or stereomicroscope-used capillaroscopy will be used as a reference standard and comparator.

Study designs to be included Clinical trials, randomized controlled trials, cohort studies, or observational studies.

Eligibility criteria Studies including human participants over 18 years old, studies available online, and studies with appropriate data availability.

Information sources Database search, contact with authors for more detailed information, reference search of important publications.

Main outcome(s) The primary outcome of this evaluation was to assess the sensitivity and specificity of a capillaroscopy to detect systemic sclerosis-pattern of capillaries using a dermatoscope versus a reference standard in systemic sclerosis patients.

Quality assessment / Risk of bias analysis To assess the quality of the included studies, the Revised Tool for the Quality As-sessment of Diagnostic Accuracy Studies (QUADAS-2) was used. The QUADAS-2 assesses risk of bias and applicability of studies through four domains of questions: patient selection, index test, reference standard, and flow and timing.

Strategy of data synthesis Random-effects univariate meta-analysis model was applied, and the mean specificity, sensitivity, and diagnostic odds ratio (DOR) with a 95% confidence interval (CI) were ob-tained. Heterogeneity between studies was evaluated using the I2 statistics, and if the test for heterogeneity was significant (p-value < 0.05), it meant that there was significant heterogeneity between the studies.

Subgroup analysis Subgroup analysis will be done if there is sufficient data available.

Sensitivity analysis Considering that specificity and sensitivity are mutually connected, in the second phase, a bivariate meta-analysis model was applied, and the summary receiver operating characteristic (SROC) curve area was additionally calculated to examine the overall performance of the diagnostic test (usually, area under the curve (AUC) values higher than 0.8 represent good diagnostic tests).

Country(ies) involved Croatia, University Hospital of Split.

Keywords nailfold capillaroscopy; nailfold videocapillaroscopy; dermatoscope-used capillaroscopy; systemic sclerosis; Rayanoud disease.

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