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The 'distal-dorsal difference': a thermographic parameter by which to differentiate between primary and secondary Raynaud's phenomenon

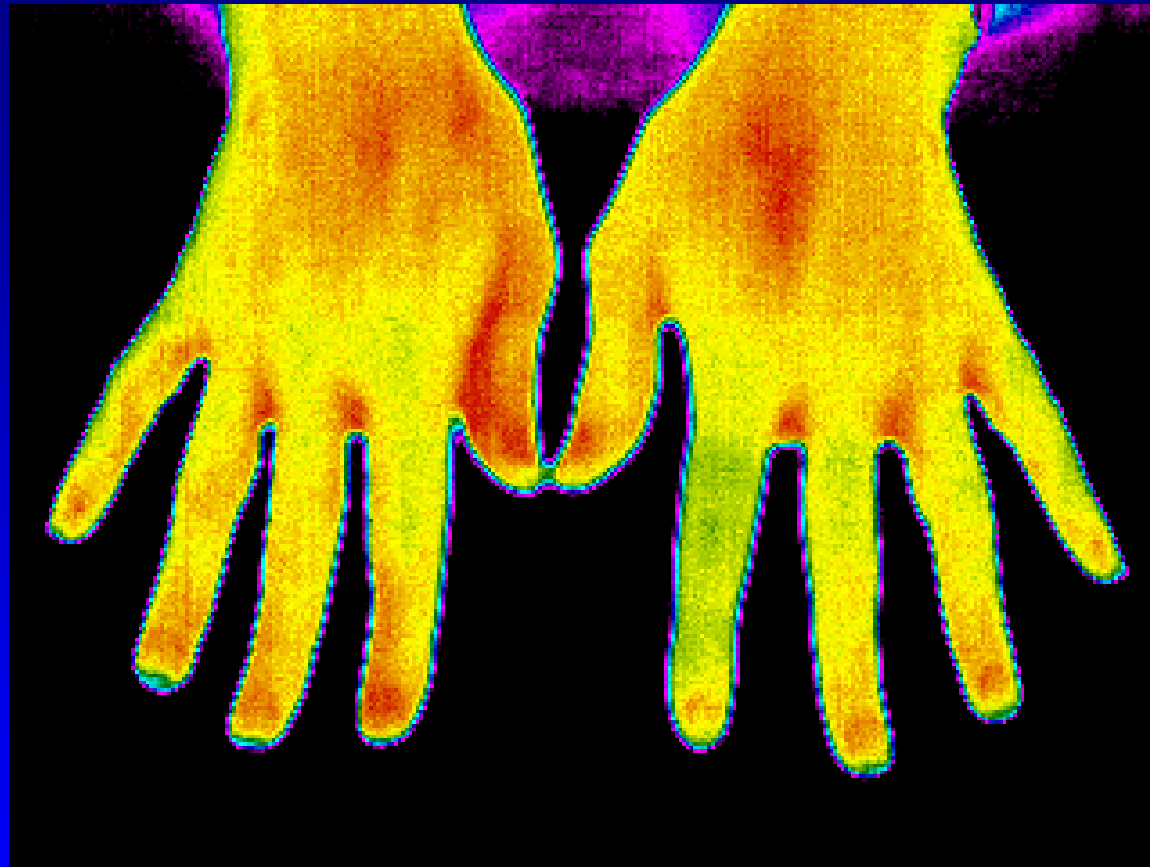
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Raynaud's Phenomenon

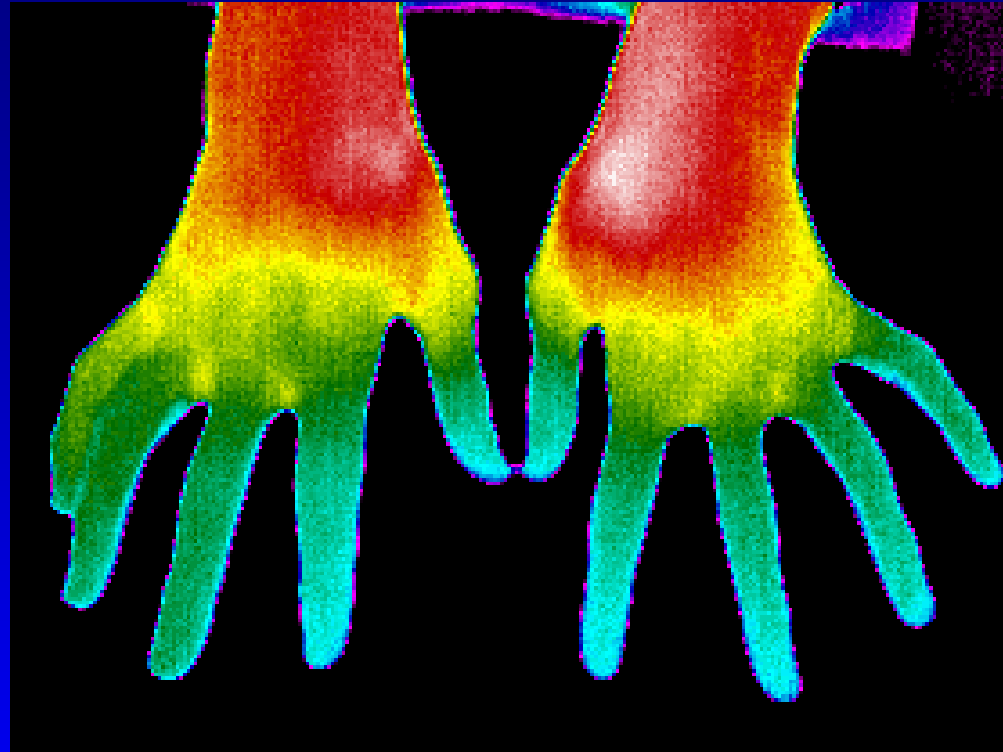
Primary or secondary?

1. History
2. Examination
3. Investigations





Healthy control subject at 23°C room temperature

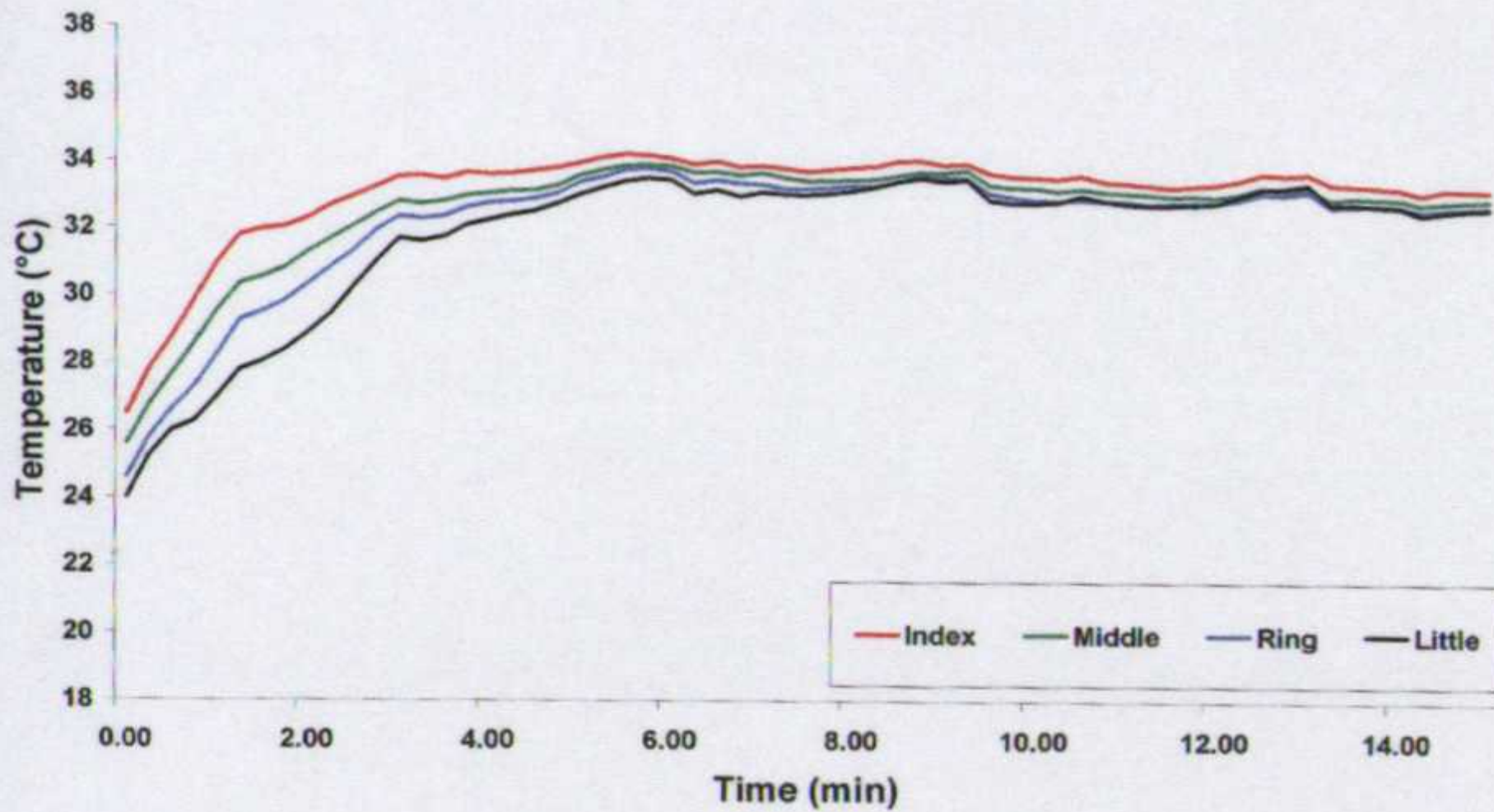


Raynaud's phenomenon patient at 23°C
room temperature

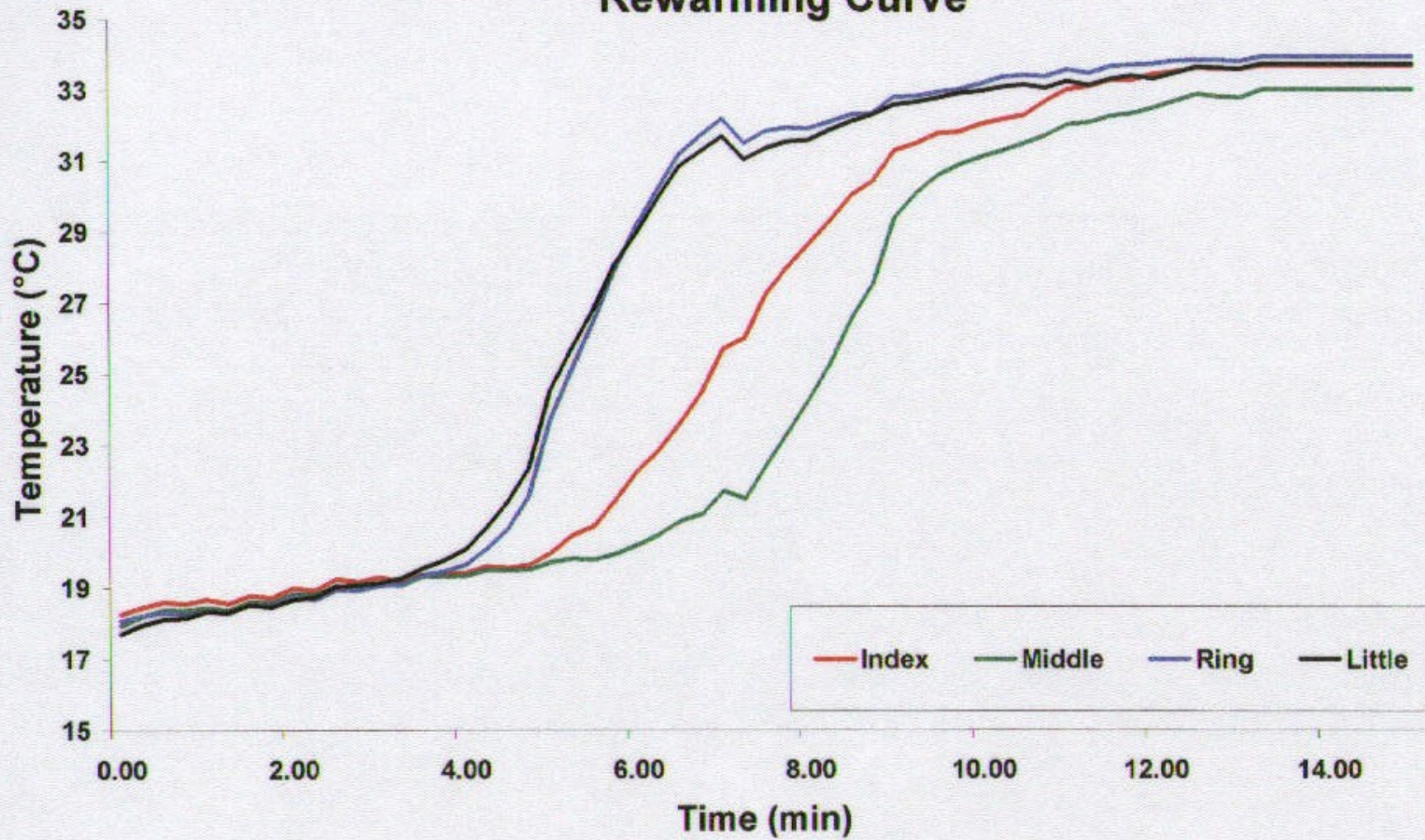




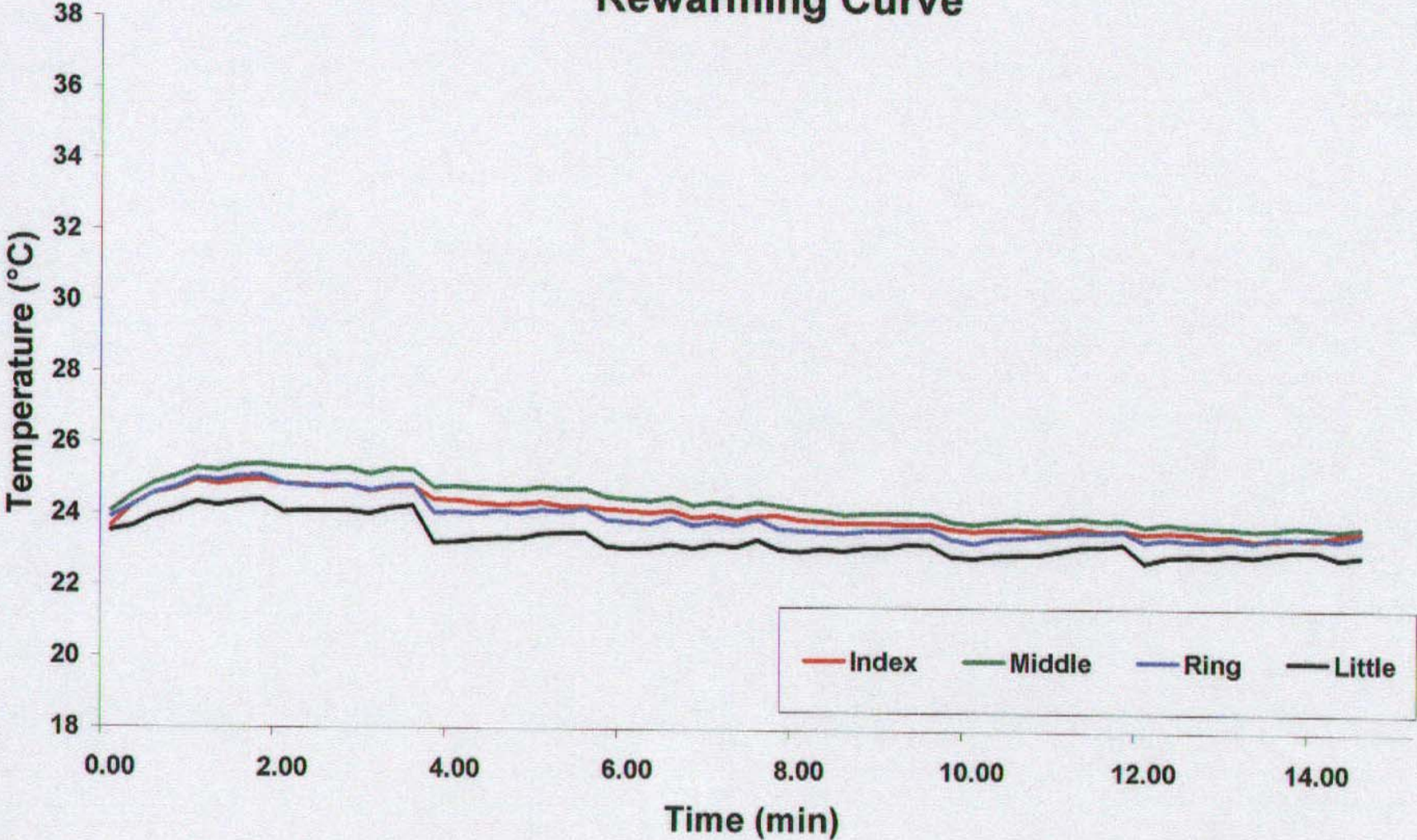
Normal Rewarming Curve

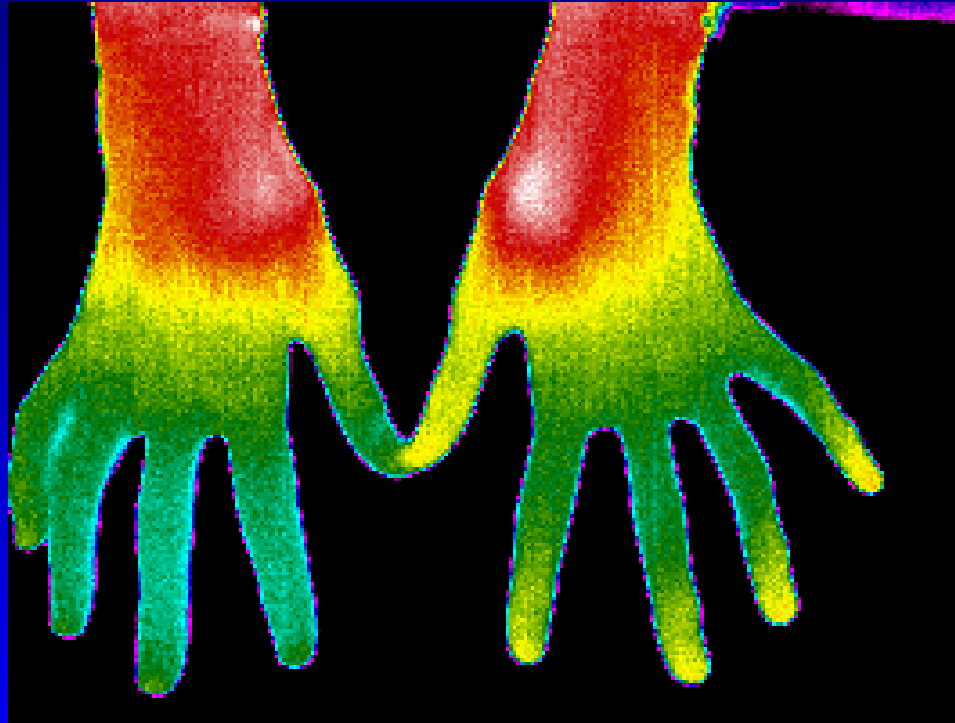


Primary Raynaud's Phenomenon Rewarming Curve



Secondary Raynaud's Phenomenon Rewarming Curve





Systemic sclerosis patient at 30°C
room temperature

Hypothesis

The presence of a temperature difference of $>1^{\circ}\text{C}$ (fingers cooler than dorsum) between the fingertips and dorsum of the same hand (distal-dorsal difference or DDD) at a room temperature of 30°C is specific for underlying structural vascular disease [1]

1. Clark S, Hollis S, Campbell F, Moore T, Jayson M, Herrick A. The 'distal-dorsal difference' as a possible predictor of secondary Raynaud's phenomenon. *J Rheumatol* 1999;26:1125-8

Aim

- A. To test this hypothesis and
- B. Evaluate all parameters measured during infra-red thermographic testing of patients with RP,
in the setting of a tertiary referral centre for RP,
in order to ascertain the sensitivity and specificity of thermography in differentiating between patients with PRP and patients with RP secondary to SSc.

Methods -1

Retrospective analysis of case notes and thermography results of patients attending the Hope Hospital vascular lab for thermographic testing: 01/01/98 to 31/12/99

Methods - 2

- Of 161 patients, case notes available on 152 patients
- To expand number of patients in the SSc group, all patients added to the SSc database who had had thermographic testing between 31/12/99 & 10/01/01 (14 SSc patients) were included in analysis

Methods - 3

Of 164 patients:-

- 56 PRP
- 45 SSc
- 21 UCTD
- 10 RP secondary to another condition
- 34 unclassifiable

Methods - 4

- Maximum DDD ($^{\circ}\text{C}$): A) @ 23°C , and B) @ 30°C
- No. of fingers with DDD $> 1^{\circ}\text{C}$: A) @ 23°C , and B) @ 30°C
- No. of patients with any finger with DDD $> 1^{\circ}\text{C}$: A) @ 23°C , and B) @ 30°C
- Rewarming lag time (min)
- Maximum rewarming gradient ($^{\circ}\text{C}/\text{min}$)
- Rewarming recovery achieved after 15 min (%)
- Maximum rewarming recovery achieved (%)

Results - 1

	DDD @ 30°C, no. of patients (%)	Rewarm curve gradient, mean (95% CIs)
PRP (n=56)	8 (14%)	2.8 (2.3, 3.4)
SSc (n=45)	31 (69%)	1.1 (0.8, 1.4)
UCTD (n=21)	5 (24%)	3.2 (2.2, 4.2)

Results - 2

‘Distal-dorsal difference’ (DDD) $>1^{\circ}\text{C}$ at 30°C room temp:-

- 86% specificity
- 69% sensitivity

in identifying the patient with RP secondary to SSc

Results - 3

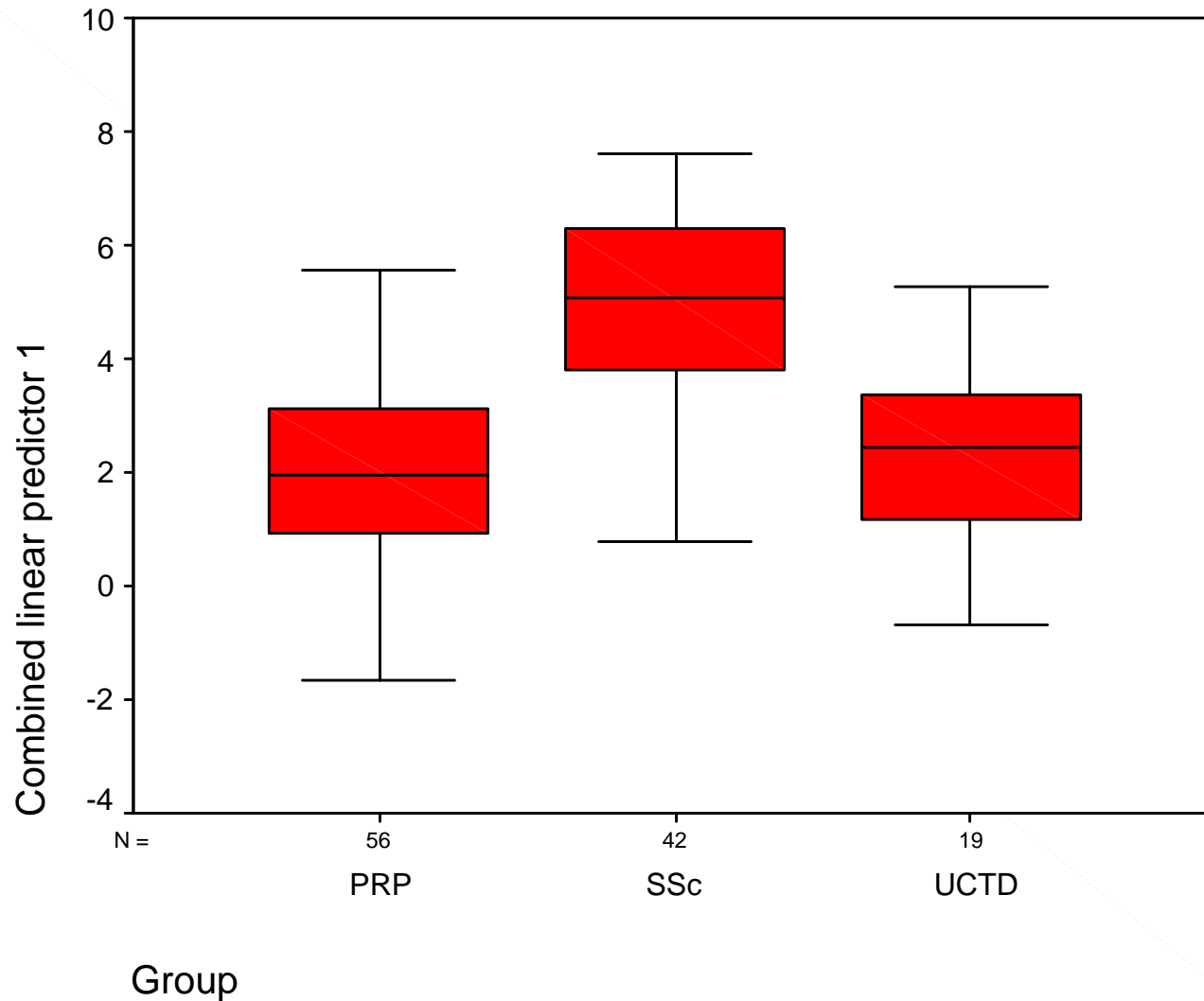
Using combined logistic regression of all DDD and rewarming curve variables plus age :-

1. DDD $>1^{\circ}\text{C}$ at 30°C room temp
2. Older age, and
3. Smaller maximum gradient of rewarming curve

were of greatest value in identifying the patient with RP secondary to SSc.

Results - 4

Combined linear predictor



Results - 5

A simple score based on $DDD > 1^{\circ}\text{C}$ at 30°C , age and maximum rewarming curve gradient provided good discrimination between PRP and SSc groups, as evidenced by:

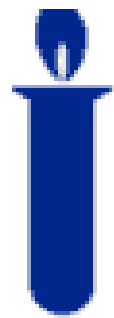
1. Area under ROC curve = 0.888, and
2. 81% sensitivity, 79% specificity for the appropriate score cut-off point.

Conclusions - 1

1. Thermography is a useful investigative tool in assessment of the patient with RP

Conclusions - 2

2. DDD $>1^{\circ}\text{C}$ at 30°C room temp
 - a) Is specific for underlying structural vascular disease
 - b) In combination with age of patient studied improves on the ability of the thermographic test to identify the patient with RP secondary to systemic sclerosis



Arthritis Research Campaign