ASSESSMENT OF THE EFFECTS OF FIR TECHNOLOGY ON THE MICROCIRCULATION BY CAPILLAROSCOPY (BY APPLICATION OF FIT MINERALS)

Dr. F.Battistella, *Director of Human Performance Lab (Milan)*

Dr. M.Scarpellini, *Director of Rheumatology Operative Unit, Hospital of Magenta*

INTRODUCTION: scientific studies based on spectroscopy have shown that a special composition of minerals (metal dioxides) in powder form, called AT5.05, is able to refract the far infrared portion (between 4-21 micron) of the infrared spectrum (see CNR study). According to recent scientific theories, use of this technology can therefore be applied to the human body, exploiting the refractivity of the infrared rays normally emitted with the dispersal of body heat. This would cause a change in the microcirculation of surface tissue with presumed improvement of the various muscle functions.

PURPOSE OF THE WORK: to assess any effects of using FIR technology through direct application on the skin of the metal dioxide compound AT5.05 contained in the FIT plaster. It was therefore decided to evaluate the effect that it can have on the skin microcirculation, planning a complex scientific study divided up into more than one stage. The first stage is based on the use of video-capillaroscopy, while the second phase is based on the use of laser Doppler flowmetry.

STUDY DESIGN STAGE I: double blind randomised observational clinical study.

MATERIALS AND METHODS:

Capillaroscopy is a scientifically validated and standardised technique, which allows direct observation of the skin microcirculation.

Capillaroscopy is a non-invasive, fast method that is fundamental in diagnosing many multiorgan autoimmune pathologies characterised in particular by microvascular alterations.

The capillaroscopic examination provides access to a fascinating morphological dimension of the architecture of the cutaneous capillary network. This method also allows the effect of specific therapies to be monitored, checking the response to drugs directly at microvascular level.

Capillaroscopy is not only a morphological microscopic method for assessing skin surface capillaries, but can also be used in combination with more sophisticated technologies for

physiological and pharmacological studies measuring, for example, the speed of the erythrocytes in the microvessels, blood pressure, the permeability of the microvessels and when using laser-Doppler flowmetry.
We have therefore planned an observational clinical study through periungual videocapillaroscopy of the hand, recruiting 20 healthy volunteers (age 25-60 years).

The criteria of exclusion from the study were: patients with risk factors of micro/macro angiopathy, patients currently undergoing pharmacological therapies, patients with cardiocirculatory pathologies, autoimmune and rheumatologic pathologies and in general patients with any illness in progress. Patients with pathological periungual capillaroscopic picture.

The experiment started with a standard capillaroscopic examination carried out by video capillaroscope (Video-Cap) of the periungual site of the non-dominant hand, with 100X enlargement and with application of linseed oil to eliminate the refraction of the air.

Fig.1 – video capillaroscope (Video-Cap)

All the parameters that are normally examined to establish the state of normality of the basic periungual microcirculation were then assessed.

These parameters were:

- Degree of visibility
- Planes of visibility (normal range 2-3)
- Number of loops per mm^2 (normal range 14-17)
- Diameter of the loops (normal range 4-14 µ)
- Length of the capillary loops (normal range 100-300 µ)
- A/V ratio between arterial and venous arm (normal range 1.2-1.3)
- Colour of the loops (normal scarlet red)
- Arrangement of the loops in relation to the dermal papillae
- Shape of the capillary loops
- Distance between loop and dermal papilla
- Venous plexus
- Colour of the venous plexus
- Colour of the interstitial connective tissue (vessel bed)

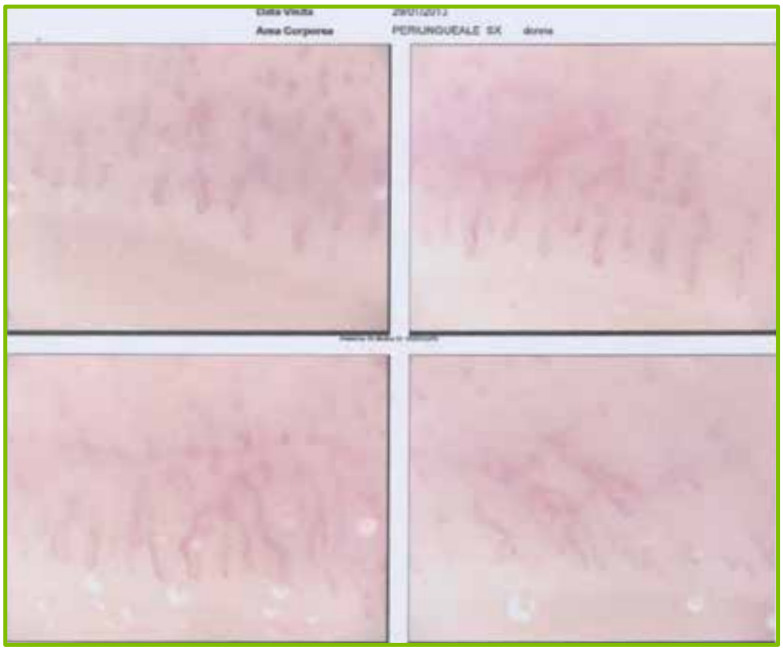

Fig.2 - Basic capillaroscopic

The skin temperature on the back of the hand was also measured continuously by laser thermal camera to record any changes in temperature during the experiment.

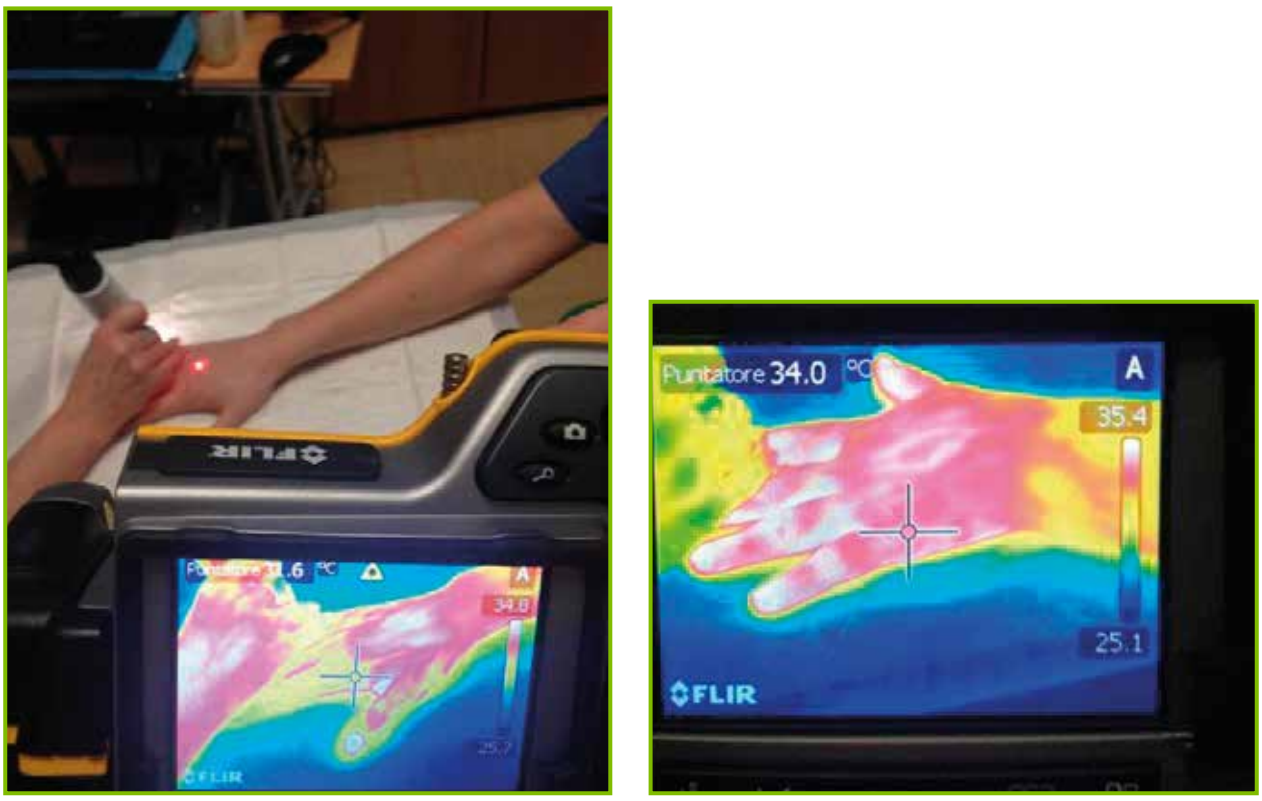

Fig.3-4 – Temperature measurement with laser thermal camera.

Approximately 10 minutes after the first capillaroscopic examination a FIT thermal plaster was applied onto the dorsal skin of the homolateral forearm and the control capillaroscopic examination started approximately 5 minutes after the thermal plaster had been applied.

Fig.5 – Capillaroscopy after application of the FIT thermal plaster and Temperature measurement with laser thermal camera

Being a double blind randomised study, the FIT plasters were only identified by a serial number and no operator knew which ones were active, i.e. with the compound AT5.05, and which were placebos, i.e. without the compound. Allocation of plasters to be applied to individual volunteers for the experiment was random.

RESULTS: In all 10 cases, in other words 100% of the cases, where the active FIT plaster had been applied there was an increase in colour of the interstitial connective tissue, passing from a typical pink-violet colour to a more pink-red colour.

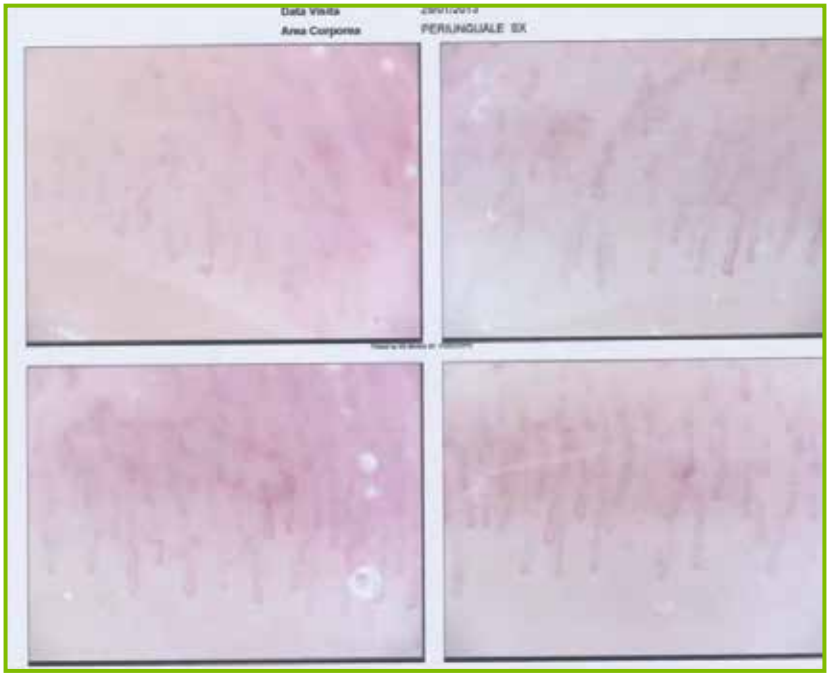

Fig.6 - Basic capillaroscopic examination Pt. G.L.

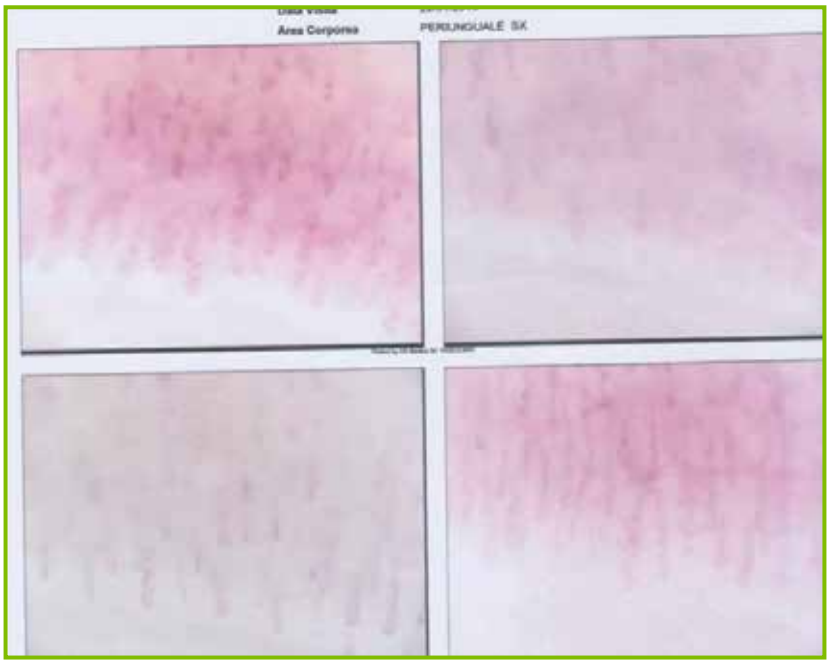

Fig.6 - Capillaroscopic examination post-application active FIT thermal plaster Pt. G.L., showing obvious increase in vascularisation.

In 8 out of 10 cases there was also an assessable visible increase in diameter of both the venous and the arterial component of the capillary, with visible increase in the flow rate in 8 out of 10 cases. In 10 cases in which the placebo thermal plaster had been applied, there was no macroscopically significant change.

CONCLUSIONS: the results of the reliable scientific study have shown that with application of the mixture of metal dioxides AT5.05 contained in the FIT plaster and exploiting FIR technology, there is a statistically significant increase in the skin surface microcirculation. This may involve important functional metabolic clinical changes especially in the skin and muscles with improvement of muscle efficiency, resistance to muscle fatigue and overall bodily wellbeing.

The only limits of this study are those intrinsic to the actual video-capillaroscopy technique, which although the most suitable, non-invasive, sensitive, specific and repeatable technique for assessing the surface vessel microcirculation, is a highly qualitative technique.

Investigator
Dr. Ferdinando Battistella