

Screening Thermography of Chronic Back Pain Patients with Negative Neuromusculoskeletal Findings

Wladislaw V. Ellis, M.D., James M. Morris, M.D., and Aubrey A. Swartz, M.D.

•Individuals with chronic low back pain but negative neuromusculoskeletal findings were examined thermographically for nerve fiber irritation, as were normal controls, who had been screened thoroughly for the absence of any history of back pain. The resulting images were examined in a blind fashion and results were tabulated after the code was broken. No evidence of nerve fiber irritation was found in the normals, and 41% of the chronic back pain patients showed significant thermographic abnormalities.

Introduction

The impetus for this study was a desire to determine the incidence of thermal dysfunction (presumably due to sympathetic overactivation and/or end-organ hypersensitivity) in chronic back pain patients who had no objective neuromusculoskeletal findings, despite extensive investigation, and to compare these results with thermographic findings in normal controls.¹

By combining these groups in an essentially stochastic way, we aimed at objectivizing the results, as well as the validity, of this particular methodology. A baseline of false positives was set by testing a normal population interspersed among a chronic back pain population and by interpreting the images blindly.

Patient Population

Normal control subjects were obtained through University billboard notices. Volunteers were screened thoroughly for the absence of back pain, past or present. The control population consisted of medical and dental students, as well as secretarial staff, and contained slightly more males than females.

Chronic back pain patients were referred by the outpatient orthopedic clinic medical staff after a suitable and comprehensive diagnostic workup, which had proved unrevealing. The individuals chosen were felt to have unremitting and disabling dysfunction because of their pain.

Forty-nine symptomatic and 37 normal individuals were examined. Their ages ranged from 22 to 67 years. There were 45 males and 41 females.

Materials and Methods

Individuals from both groups were scheduled for thermography in the order that they applied. All subjects were informed that they should shower or bathe the morning of their examination and not to apply powders, cosmetics, lotions, etc., to their body. They were further instructed not to use a TNS unit, nor to have EMG/nerve conduction studies, acupuncture, or physical therapy performed within 24 hours of the examination. They were also informed that any bracing or splinting should be avoided at least 10 days prior to the examination.

A mercury/cadmium, telluride-based scanner* was used. The output from the infrared detector was digitalized and put through a colorizer, which generated a video-compatible real-time image of IC isotherms spanning a range of 10C.

After disrobing, each subject was equilibrated in a draft-free 70F (± 1 F) room for at least 20 minutes. An infrared camera mounted on a free-wheeling trolley was placed 4–6 feet away from the subject. Then a permanent photographic record† was obtained of the thermograms of the back and lower extremities at 10–15 minute intervals for a total of three complete sequences. Twelve separate images were required to visualize the entire body surface below T-12.

The film was subsequently mounted in a transparent folder, numbered, and stored until completion of the data gathering.

Subsequently, the 86 thermograms were read for pathology. The reader had no information on the subjects and did not know which thermograms were from the normal group and which were from the chronic back pain group. The standards for abnormality used were those of the Academy of Neuro-Muscular Thermography.²

From the Department of Orthopedics, UCSF.

* Inframetrics 520, Inframetrics, Billerica, MA.

† 35-mm Ektachrome 100, F-4, 1/8-sec exposure.