

# ELECTRONIC THERMOGRAPHY IN ORTHOPAEDIC PRACTICE: Its Use in Soft Tissue Injuries of the Neck and Back

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**Abstract:** Thermography has emerged as a vital physiologic study which aids considerably in the diagnosis and treatment choice for soft tissue injuries of the neck and low back. It is a most useful adjunctive test which is noninvasive as well as innocuous and gives essential information about a patient's subjective pain behavior. When applied under strictly controlled circumstances and in accordance with set protocol, thermography can be used with or without CT scan and EMG to evaluate musculoligamentous insult and to determine nerve fiber irritation. It is closely predictive of myelographic findings and can assist in determining which patients should undergo that invasive procedure.

In a series of 1117 studies done in 891 patients, thermography gave 90% direct correlation with the 135 myelograms performed in that group. The use of thermography should be considered in virtually all patients with neck as well as back complaints who do not respond to the usual conservative measures in an appropriate length of time. It plays an important part in the clinical course of compensation and liability cases with prolonged symptomatology. Discretionary use under controlled conditions will yield gratifying and informative diagnostic results.

Over the past several years thermography has demonstrated practical and useful applications in diagnostic screening for nerve root irritation, peripheral nerve injuries, reflex sympathetic dystrophy or causalgia and musculoskeletal soft tissue syndrome. It is extremely informative in the day-to-day treatment of cervicohoracic and lumbosacral strains as well as their compensation and liability implications.

Thermography is a most informative, objective test to corroborate or rule out a patient's subjective complaints accompanying syndromes of nerve root irritation, peripheral nerve insult or paravertebral soft tissue injury. It is presently the best test to give practical, objective information about sensory nerve fiber involvement in multiple, widespread areas of the body. This noninvasive test gives a dimension of understanding to a patient's pain complaints which was not previously available. It does not show pain; pain is a complicated psychosocial<sup>1</sup> neurophysiologic response. However, it can show sensory nerve

fiber involvement, the presence or absence of which can allow for a strong medical statement as to pain behavior.

Low back and neck complaints, particularly those with compensation or liability involvement, account for a staggering amount of medical attention and economic outlay. Figures for worker absenteeism and percentages of gross national expenditures for these medical conditions are mind boggling. Although 90% of patients with low back injuries recover within two months, if a patient with low back complaints is not back to work by six months after injury, there is only a 50% statistical chance of getting him back to work at all. Similarly, if he is out of work 12 months, there is only a 23% chance, and if out of work 24 months, there is statistically no chance of getting him back to work.

Clearly there is a need for definition of a patient's clinical course somewhere between the second and sixth month of disability, depending on other pertinent medical circumstances. Patients with bona fide organic injuries and disease should be identified, as should those patients with spurious claim to prolonged and disabling conditions. Not all these patients are appropriate candidates for myelography and many of them are individuals for whom a myelographic experience would be a medical and socioeconomic mistake. Thermography plays a key part in making those determinations, and it can be done quickly and without risk.

## Method

The human body emits a heat pattern from its surface topography which has been accepted as symmetrical in the normal state. Any pressure or irritation on a nerve root or peripheral nerve fiber can produce changes mediated on the basis of sympathetic nerve overactivity. Such activity leads to vasoconstriction and therefore decreased heat emission along the course of the nerve or nerve root affected.

As might be expected, sensory nerve fibers appear to be more delicate and subject to various kinds of alteration in function. Subtle changes in the heat emission pattern can be detected in them even when there are no motor changes determined by EMG. Such changes commonly are found quite closely adhering to the distribution, should it be a nerve root which is affected. Reflex sympathetic dystrophy or causalgia would naturally reflect itself in a more localized or circumferential pattern about a limb, giving readings as though many different nerve roots were involved.

<sup>1</sup>Presently, this thermographic pattern of the body's heat emission