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## Diagnostic Thermography in Low Back Pain Syndromes

\*†‡Pierre L. LeRoy, †§Cynthia R. Christian, and †‡§Roseanne Filasky

\*Section of Neurosurgery, Wilmington Medical Center, and Section of Neurosurgery, St. Francis Hospital, Wilmington, and †Delaware Pain Clinic, ‡Thermography Laboratory, and §Neurosurgical Associates, Newark, Delaware, U.S.A.

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**Abstract:** Diagnostic thermography is a useful test for assessment and management of low back pain syndrome patients. This paper will update the major advances in thermography since Albert et al. first reported its use in diagnosis of lumbar disc disease in 1964. This complex patient population will be discussed, with particular reference to diagnostic thermography in differential diagnosis of low back pain syndromes and specifically in lumbar disc herniation, facetitis, lateral recess syndromes, and reflex sympathetic dystrophy by specific thermal pattern recognition. Medical thermography has taken its place beside such tests as the radiograph, electromyograph, and tomography scan in diagnosis and management of patients with low back pain syndromes and is clearly beyond clinical investigation, as is supported by numerous studies in the literature. **Key Words:** Thermography—Low back pain syndrome—Thermal pattern recognition—Thermatome—Differential diagnosis—Disc herniation.

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Low back pain syndromes are epidemiologic in our population. Helen Neal, author of *Politics of Pain*, estimates 20 million Americans suffer from chronic low back pain alone (1). Chronic pain affects nearly one third of the nation's population. It costs more than \$65 billion per year in medical care, lost work, and compensation, of which \$23 billion is associated with low back pain health care costs, according to Bonica (2.). Accurate diagnosis of low back pain syndromes is essential for effective treatment in order to return patients to productive lives within their impairments. Burton estimates that over one half of surgical procedures on the back fail to significantly relieve the problem (4). New diagnostic imaging techniques, and specifically thermography, allow for improved diagnosis and cost-effective management of this complex patient population.

### DEFINITION OF MEDICAL THERMOGRAPHY

Medical thermography is a diagnostic test that measures the body's radiant heat emission patterns.

The thermal scan provides a visual "heat map" of infrared radiation (IR) in the electromagnetic spectrum at the 3-12  $\mu\text{m}$  band width. Thermography is not a picture of pain, but demonstrates thermal physiological and pathological changes in complex tissues, visualized on a controlled, black-and-white or color scale varying from 0.1 to 1.0°C. Pattern recognition is the same with any thermography system used. The sequence of colors may differ from one type of instrumentation to another. However, the colors are used to merely enhance visual extraction of the data. The quantitative information thus obtained is the same. The colors only represent relative temperatures. One must, however, know the sequence of the colors from hottest to coldest. Although color is more dramatic to the eye, scanning should also include black-and-white testing when possible, since the latter has a higher resolution to detect thermal dysfunction.

Pathophysiology due to a variety of recognizable disorders can be diagnosed thermographically because of specific thermal pattern recognition in low back pain syndromes. Such disorders are also affected by or influenced by the neuropathic, vascular, and skeletal systems and connective tissues (5). Because thermography is noninvasive, is without risk of radiation, and is painless, children and pregnant women with

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Address correspondence and reprint requests to Dr. P. L. LeRoy at Delaware Pain Clinic and Thermography Laboratory, 249 East Main Street, Newark, DE 19711, U.S.A.