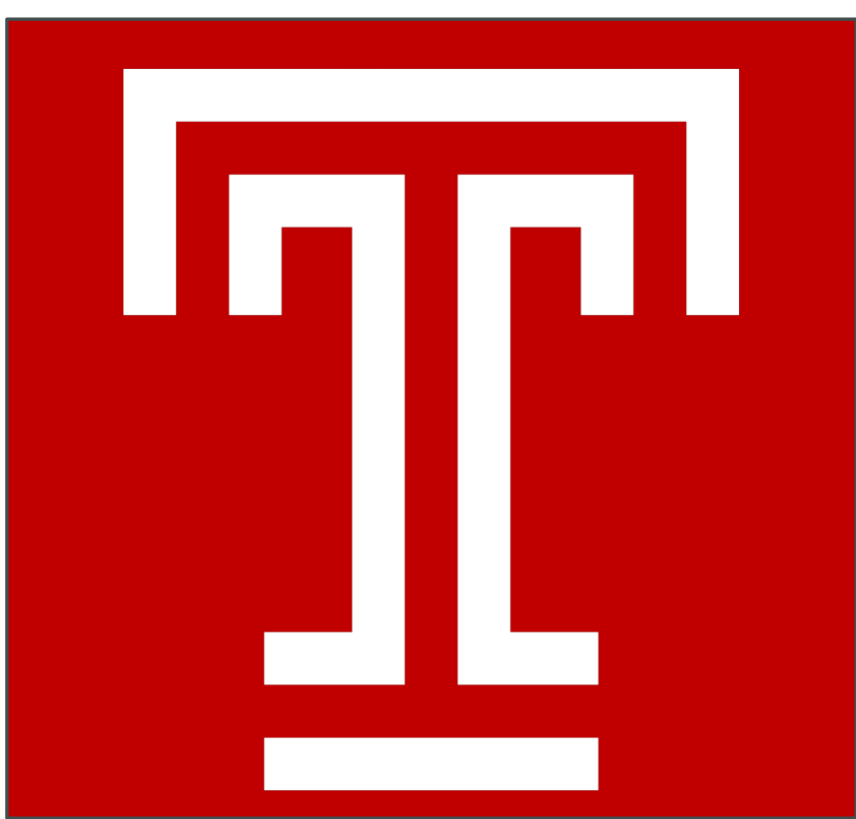




Use of Medical Infrared Imaging to Differentiate Pain Patterns in Complex Regional Pain Syndrome with Coincident Radiculopathy

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Introduction

Complex regional pain syndrome (CRPS) and lumbar radiculopathy are both debilitating conditions. Medical infrared imaging, or thermology, is a non-invasive, non-contact imaging technique that measures skin surface temperature variations, providing valuable insights into underlying pathological conditions. This case report introduces the use of point-of-care thermology in diagnosing coincident CRPS and lumbar radiculopathy in a single patient, highlighting its clinical utility. Thermology, which can visualize underlying physiology, as opposed to more traditional imaging of anatomical abnormalities, may serve as an adjunctive test for CRPS, inflammatory musculoskeletal injuries, and neuropathies [1-4].

Imaging

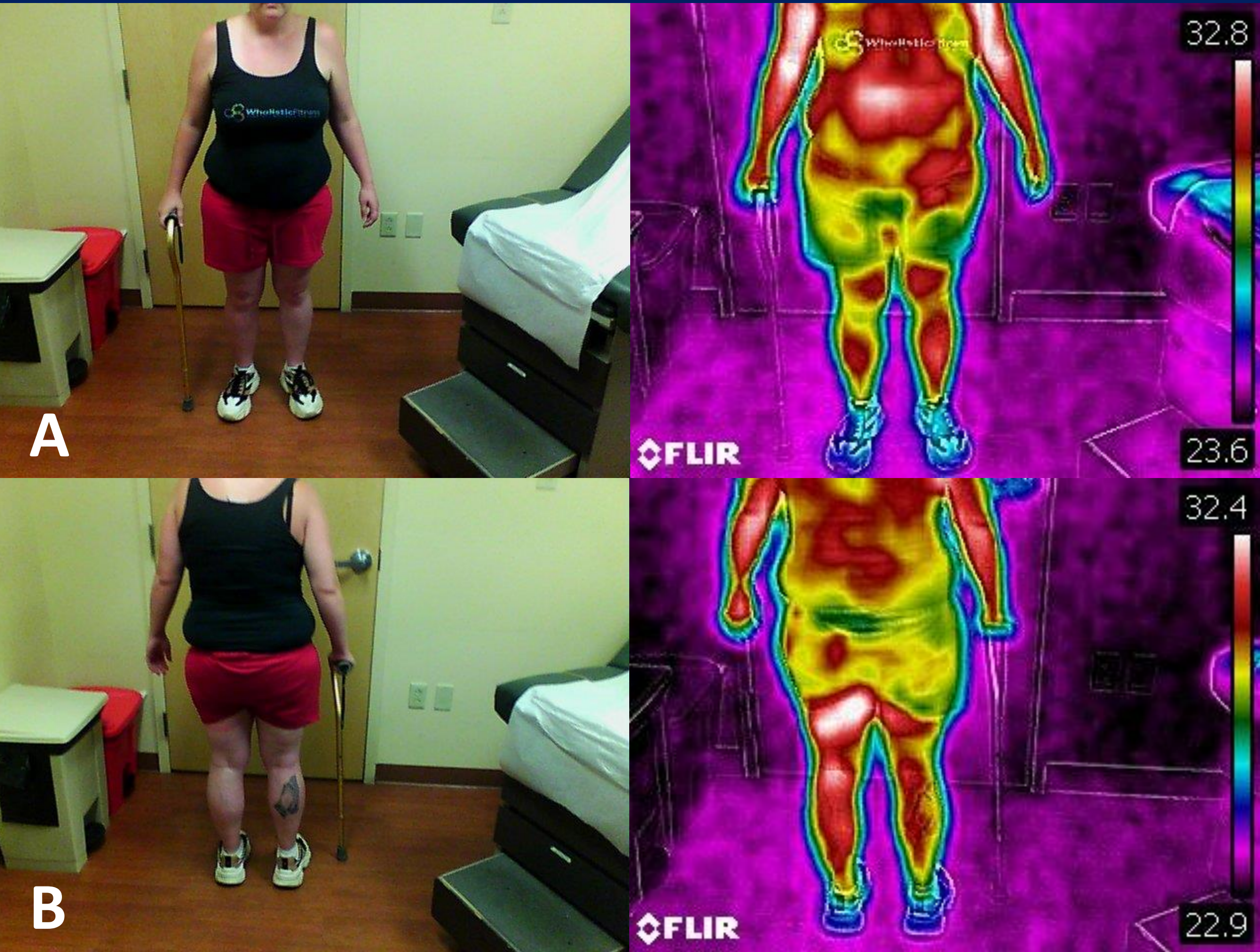


Figure 1. A & B

Case Report

This is a 33-year-old female with a history of major depressive disorder and right knee arthroscopic meniscal repair who presented with a complaint of acute on chronic low back and bilateral lower extremity pain. She reported daily, intermittent back pain over many years of insidious onset, which recently worsened without an inciting event and began to radiate to the posterior left thigh. She also endorsed right anterior leg pain that did not radiate from the back but was associated with intermittent swelling and redness. Upon clinical examination, there was tenderness in the lower lumbar region with restricted active range of motion. Neurological examination revealed allodynia around the anterior and medial right knee, consistent with CRPS.

Given the patient's complex pain history, infrared thermography was employed to further elucidate the underlying pathologies. Thermographic images demonstrated significant asymmetry in skin temperature distribution. The affected anteromedial right lower extremity exhibited a relative decrease in temperature compared to the left in a non-dermatomal pattern, consistent with the diagnosis of CRPS type 1. Additionally, there was localized hyperthermia in the lumbar region extending along the left L5 dermatome, correlating with the site of maximum pain and indicative of inflammatory processes associated with lumbar radiculopathy.

Figure Description

Figure 1. The left images are in standard spectrum and the right images are in infrared spectrum. **A.** Images show decreased surface temperatures around the anterior aspect of the right knee consistent with chronic CRPS Type 1 **B.** Images show increased surface temperature involving the posterior aspects of the left thigh and lower extremity consistent with lower lumbar radiculopathy.

Discussion

This case highlights the diagnostic value of thermology in patients with multifactorial pain. The temperature asymmetry detected in the right lower extremity is a hallmark of CRPS type 1, supporting its diagnosis in the context of this patient's history. Furthermore, the identification of localized hyperthermia in the lumbar region in an L5 dermatomal pattern provided additional evidence of a lumbar radiculopathy. Thermology can serve as a valuable point-of-care tool in the diagnostic process, offering a non-invasive means to visualize physiologic changes associated with different pain syndromes. Its ability to detect subtle thermal variations can aid in differentiating between overlapping conditions, as demonstrated in this case.

While thermology should not replace conventional diagnostic methods, it can improve rapid clinical decision-making, particularly in complex cases where multiple pain etiologies coexist. In conclusion, thermology proved to be instrumental in diagnosing both CRPS type 1 and lumbar radiculopathy in this patient. The findings underscore the potential of thermology to complement traditional diagnostic approaches. Further research and clinical validation are warranted to standardize the use of point-of-care thermology in routine practice and establish its role in the management of chronic pain conditions.

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