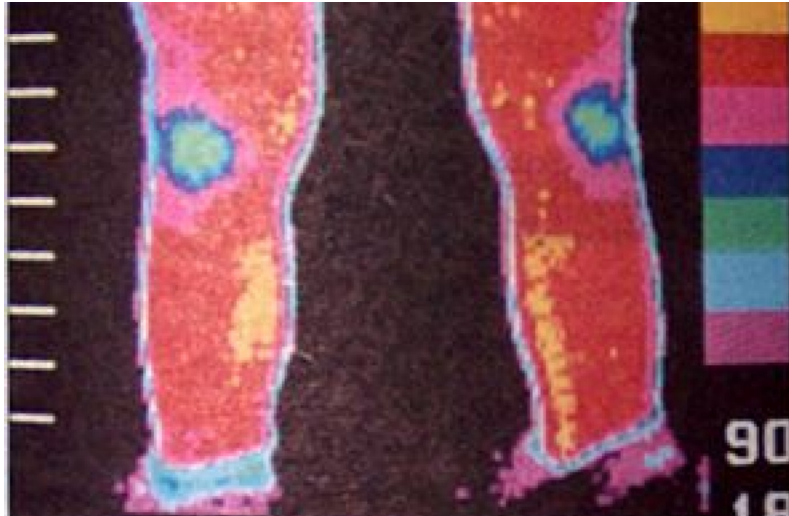


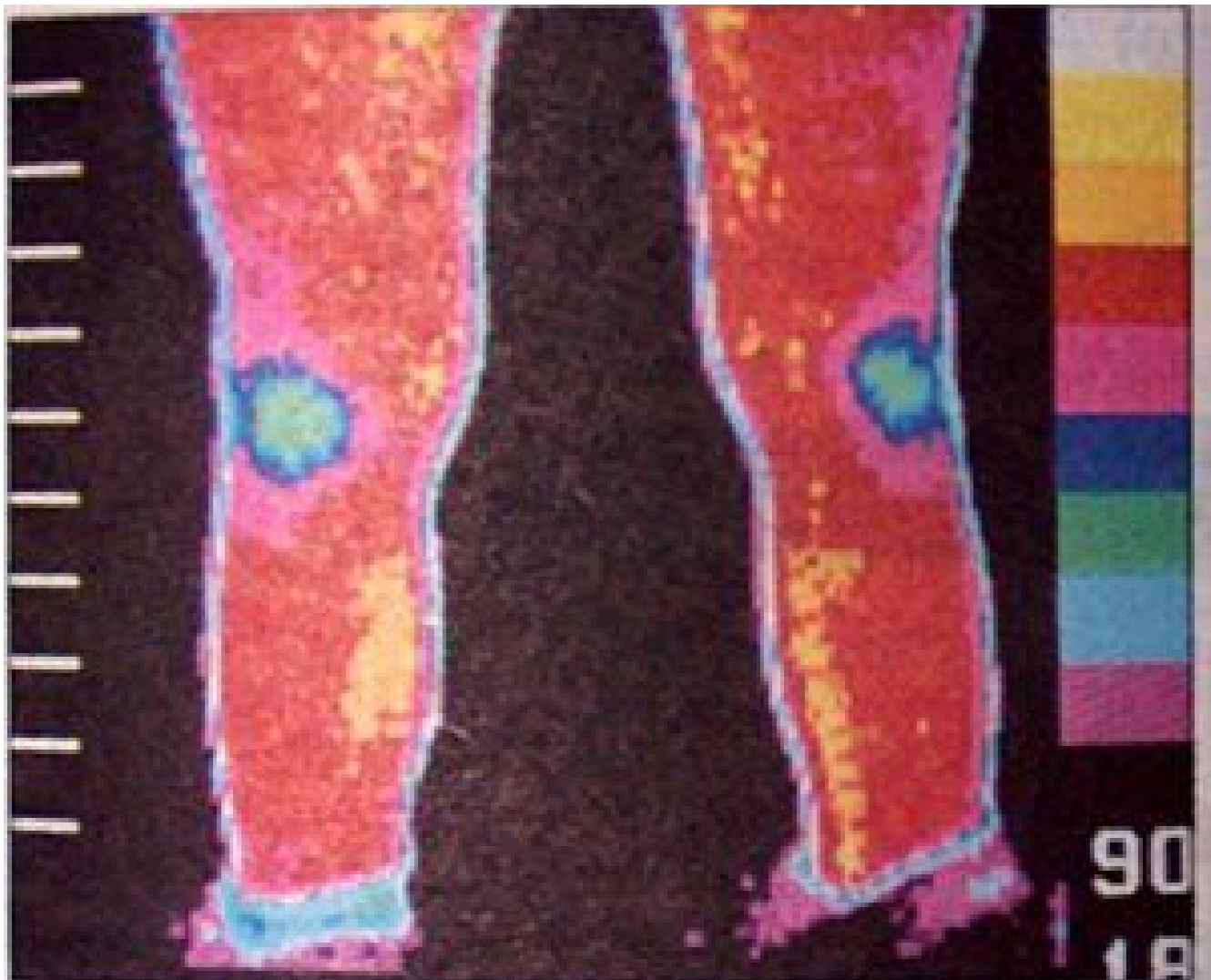
Dynamic Chiropractic



X-RAY / IMAGING / MRI

Infrared Thermography and the Sports Injury Practice

Infrared thermal imaging can be very useful to the sports injury practice. Infrared Thermography (IRT) measures cutaneous surface temperature which is reflective of the underlying sympathetics and local chemical mediators. Previous studies have shown that skin temperature from right to left sides only differ within a few tenths of a degree for homologous parts. In the case of the anterior calves, the normal mean temperature differential is .31 degrees C. Other studies have shown that temperature differentials over .65-.80 degrees C are indicative of underlying pathology. IRT has been found to be useful by both the AMA Council on Scientific Affairs and the ACA Council on Diagnostic Imaging, which has its own American Chiropractic College of Thermology.



1A: Thermography scan of the anterior knees showing thermal symmetry (normal).

IRT has been documented in the world scientific literature as an efficacious diagnostic tool, prognostic and treatment assessment tool. IRT has been shown to be useful for stress fractures, tibial stress syndromes (shin splints), patellofemoral disorders, shoulder impingement, reflex sympathetic dystrophy, Osgood Schlatter's disease, epicondylitis, nerve entrapments, ankle injuries, foot disorders, and myofascial pain syndromes. In a study published by Goodman, et al., IRT was found to be a useful test to distinguish stress fractures and shin splints in a prospective blind study of runners. The athletes with hyperthermic calves had a poorer prognosis as opposed to those with a hypothermic/cold pattern. In a study by this author that was presented at the 17th Annual Symposium of the American College of Sports Medicine, and to be published in the JMPT, IRT was found to have a high sensitivity and specificity for patellofemoral pain syndrome (PFPS). PFPS will image as a global patellar hypothermia that will usually affect the patella region only.



IRT is useful in the differential diagnosis of knee disorders since PFPS will typically image the knee as cold, and meniscal injuries will typically image hot or hyperthermic. IRT has also been documented to be useful for epicondylitis. In a study by Binder, et al., 53 out of 56 patients showed a characteristic focal hyperthermia over the involved elbow and epicondyle. The hyperthermic finding is characteristic of a somatocutaneous reflex response. While IRT is not necessary as a diagnostic tool for ankle sprains, it is extremely useful as a prognostic and assessment tool to predict the course of the injury. Hyperthermic ankle sprains heal in the usual time frame; however, cold pattern ankle sprains take much longer and have a poorer prognosis with relapses if allowed to return to competition too soon. IRT has been found to be useful in entrapment neuropathies such as carpal tunnel syndromes and ulnar neuropathies which are not uncommon in cyclists. One of the biggest contributions of IRT is in the area of reflex sympathetic dysfunction (RSD) which is characterized by three different stages and often occurs after minor injuries and traumas or post-surgical. Stage I is a stage of sympathetic hypertonia and has also been called "sympathetic maintained pain." It is clinically characterized by pain that "does not go away," burning, allodynia, hyperalgesia, vasomotor and sudomotor dysfunction. If it is undetected or not treated properly, it can progress to Stage III which then can cause dystrophic changes to bone, skin, and muscle. RSD should be especially thought of when dealing with chronic ankle, shoulder, and knee injuries, or when the patient complains of an extremely cold extremity with burning, allodynia, and hyperalgesia.

IRT is also helpful in the following conditions:

1. Shoulder impingement syndrome -- focal hyperthermia of shoulder.
2. Achilles' tendinitis -- focal hyperthermia at Achilles' tendon.
3. Morton's neuroma/metatarsalgia -- focal hyperthermia at plantar foot.
4. Tarsal tunnel syndrome -- hypothermia at heel and big toe.
5. Osgood Schlatter's disease -- focal hyperthermia at tibial tubercle.
6. Myofascial pain syndrome -- focal hyperthermia overlying involved muscle.
7. Facet syndrome -- focal hyperthermia overlying involved facet.
8. Ankle sprains -- typically hyperthermic.
9. Tennis leg -- hyperthermia over head of involved gastrocnemius as opposed to diffuse hyperthermia in phlebitis.

IRT is also useful as a prescan team assessment tool, to determine areas of thermal asymmetry that may represent subclinical problems predisposing the athlete to injury. For example, in a study done by this author, it was found that 70 percent of a high school football team showed patellar thermal asymmetry. IRT can be used with follow-up studies to follow treatment response and as a prognostic indicator of when to best return the athlete to practice and/or competition.

Conclusion

Infrared thermography has many applications in a sports injury practice and is valuable for diagnostic, prognostic, and treatment assessment purposes. Thermography should be utilized whenever possible by sports medicine doctors.

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