A06

Stefano Gari

Thermal–instrumental diagnosis in football world

Preface by

Giuseppe Francavilla

Aracne editrice

www.aracneeditrice.it
info@aracneeditrice.it

www.gioacchinoonoratieditore.it
info@gioacchinoonoratieditore.it

via Vittorio Veneto, 20
00020 Canterano (RM)
(06) 45551463

ISBN 978-88-255-0047-9

I[st] edition: febbraio 2017

Contents

Preface

Giuseppe Francavilla*

The responsibility to manage clinical and psychophysical suitability in a Sports Club of excellence requires to the Sports Doctor a continuous scientific commitment, that sets the Sports Doctor to be always ready to intervene and attentive to the new rehabilitation techniques which, in addition to being valuable, may shorten physical recovery duration. A new technique related to dermal temperature control is being used for a physiological study on musculo–skeletal system. This non–invasive practice, nowadays rapidly developing, is used to put in evidence potential anomalies at dermal level.

The physiological data related to the variations of bloodstream, and therefor of body temperature, help evaluate if we have before us a series of events connected to an inflammation, excluding the degenerative processes, a marked muscular hypotonia and an evident decrease of arteriovenous stream which cause hypothermia.

Infrared sensors' technology, for some time now used on animals performing motor activity, has been recognized from the American Medical Association since 1987 and recently from the American Academy of Medical Infrared Imaging; several groups of association are promoting the use of thermal imaging in Sports Medicine in various nations, particularly on professional skiers.

The figure that has been, at this point, highlighted by many is the lack of standard reference images which can put in evidence, with great care, the presence of thermal radiations. There are some research teams who study some suitable techniques for better identifying "normal thermograms" through the creation of a atlas which highlights a normal cutaneous distribution in the human being.

* Associate Professor of Sports Medicine, person in charge of the Regional Reference Centre for Sports Medicine, Sicily.

Furthermore, modern computer systems can evaluate with reasonable certainty the thermal sensitivity of the tests and we can consider that it is a method which can be used and applied. All of this is further determined from the non–invasiveness of this practice: images exploit the energy coming from the human tissue and the produced energy is related to the radiation's wavelength. That's why, nowadays, has been issued and is recognised that human cutis is a black body emitting IR radiations at room temperature.

In conclusion, we may assume that it is possible to study thermal properties of human body, especially thanks to the state–of–the–art thermocameras which can interface with computers. That corroborates the diagnostic role and the clinical applications of the *Thermal imaging*.

To determine traumas and inflammations have been analyzed several parameters such as: micro–circulation dysfunctions, macro–circulation in peripheral districts of nervous system and tissue metabolism. During this period a intraoperative assistance in microsurgery and cardio–surgery has been taken into consideration to evaluate both the proper perfusion and the keeping of anastomosis, specifically in open–heart surgery and in coronary by–pass surgery.

Other high resolution IR Imaging methodologies are used for the study of the processes involved in the sympathetic nervous system and for the diagnosis of breast cancer through the highlighting of endothelial nitric–oxide production associated with injury.

The functional IR Imaging is a potentially up–and–coming technique which immediately provides a physico–mathematical modeling of the human body thermal processes. You will be showed an already common practice for experts in the field, undoubtedly the illustration and the evolution of traumas and different pathologies that arise in the football world seems to be a really interesting and highly topical matter.

This text struck me because explains in a clear and synthetic way the complete journey of the study, introducing the inflammation's vascular mechanism, so, the development of heat in traumas with the various modalities of transmission to the skin, up to the first concepts of this future methodology, then concluding with the work carried out with our athletes. You are left to be open to this reading, in which, I suppose it's unavoidable to let questions and thoughts emerge which certainly will contribute to the development of this method.

Introduction

Thermal Instrumental Diagnosis in Football World is a scientific handbook presenting a new diagnostic method thanks to the detections carried out by Flir devices.

Such research is the result of multiple evaluation experiences that the author afforded during his activity of physiotherapist. Who will have the opportunity to adopt this instrument will get to promptly intervene on a potential traumatic event, by exploiting the objectivity of a thermal representation performed on the damaged part, but above all, honing those that are diagnostic capabilities and consequently therapeutic.

ThermoCamera's potential will be presented in a simple and descriptive way by listing the informations to be gathered.

Will be explained how is possible to identify the steps of a muscle damage or how to detect traumas that the player himself doesn't even know to have received. These results can be obtained through the observation of thermal streams transmitting to the skin. This study has been carried out monitoring, during 2014/15 and 2015/16 football seasons, the Sports Club U.S. città di Palermo's professional footballers.

The greatest benefit carried by this kind of approach is represented both from objectivity of what we are analysing and for the repeatability of the instrumental analysis since it is possible to perform a valuation every given time the operator needs.

My wish is that every medical staff, and not only that, from now on could exploit the Thermal Instrumental Diagnosis, in order to become more conscious at the time of the first aid, that is fundamental in any kind of prognosis, but above all to gain more conviction about a potential therapeutic protocol.

Chapter I

Collaborators

Before focusing in details, it is appropriate to operate two premises: the purpose of this research is not to replace the existing diagnostic equipment. The intent is simply to offer a further evaluative tool which could show the thermal aspect of the tissue creating the first starting point from which to draw the very first considerations; therefore, when we talk about the Instrumental Thermal Diagnosis we want to have a feedback only and exclusively on the thermal flow by monitoring its evolution.

This study arises from a deep desire to improve the work because, as we know, a targeted treatment of the first 48–72 hours of any problem is vitally important, especially at a time when traditional diagnostic tests are unlikely to be reliable and particularly in an environment like ours when timing is everything and games are played more frequently.

Once optimized the recovery times, the staff I work with and me have used more frequently the thermocamera, providing useful information to our heath director.

The diagnostic functional tests must always be the guideline as well as the case history and the dynamic of the traumatic event but, while before we were waiting an ultrasound or a resonance with impatience to know what kind of problem we were facing, now it is possible to understand how we should treat our case more carefully by using a tool which could measure a thermal difference.

I could achieve this kind of work with the help of a dear friend and colleague Federico Genovesi and healthcare staff of Palermo Calcio coordinated by Cristian Francavilla who allowed me, through the instrumental equipment, to examine the muscle cases by comparing the thermal observations with diagnostic tests reported out by Paolo Minatra, team doctor and radiologist of Sassuolo Calcio.

To perform a Thermal Instrumental Diagnosis (DTS) means to search with the thermocamera, with no skin contact, the changes of thermal flows emitted by the body. It will be important to pay considerable attention on this because from these flows it is possible to understand pathological areas of the organism.

1.1. The story of thermal diagnosis

The first thermal studies date back to Hippocrates: to find the location of the various issues he used to cover in mud his patients, the areas that were drying faster were considered pathological. Jean–Pierre Barral, internationally renowned osteopath, identifies, thanks to his great manual skills, more evident thermal areas. The esteem for him and his passion towards the manual practical have been the elements that led both Federico Genovesi and myself to search in the warmth transmitted to the skin of our athletes a key element to gain more information about their health status. However, our needing, by working in soccer, was to have an objective tool which could confirm our feelings. This needing led me to use the device that I have the great pleasure to share with you: the thermocamera.

1.2. What can be observed with DTS

During this experience it is always more refined the ability to know how to understand the thermal video camera's images.

What stunned us is the continued growing in the ability of learning with more conviction the messages transmitted from the body but above all to grasp the new ones, this has been possible because of the luck that we have to work in the field performing the first intervention.

By working in a professional soccer team's staff, we have collected a wide variety of problems and monitoring them every day has made this study the only one of its kind.

The DTS is, primarily, a technique for localizing the diseases and this feature to identify which ones are the most obvious conflicts in soccer and above all in contact sports has been used: direct and indirect traumas.

In most cases the patient can easily affect the diagnosis and, consequently, the therapeutic approach through the description of the symptoms or of their beliefs. The DTS body leaves at the body the task of revealing its disorders, this one stands out from other approaches that can influence the answer.

Each human tissue, structure and function is subjected to a change of flow after a traumatic episode or in any case an event capable of altering its previous equilibrium. I will show how it's possible to perceive them and understand them.