

A Thermographic View of Autism

By JOHN E. UPLEDGER, DO

INTRODUCTION

The following article is a description of a clinical study with no research protocol, no hypothesis, no control of variables, no experimental group and no control group: in essence, no experimental design. The work was performed so that we might probe the unknown, so that we might uncover questions worthy of further investigation. In his book *In Vivo*, Hans Selye suggests that it may be of greater value for science and humankind to discover better questions than to attempt the solution of so many mediocre ones. The scientific community seems laden with problem solvers; we may need to nurture our problems finders a bit more.

It is with this thought in mind that we performed thermographic studies of 26 autistic children at the Genessee Intermediate School District Center for Autism in Flint, Michigan. The work with thermography was carried out in the spring of 1980. The arrangements for the use of the equipment and the technical assistance were made by Philip Hoekstra, Sr., PhD, owner and director of Thermoscan Laboratories of St. Clair Shores, Michigan.

THERMOGRAPHY

Thermography is a method whereby infrared wave output is measured and recorded by heat-sensitive instruments. The human body emits infrared wave patterns. The idea that patterns of heat output are significant is not

new. Early Greek physicians were said to have smeared the skin with a thin slurry of mud when looking for tumors: the mud slurry dried more quickly on the skin that overlaid the tumor. Hippocrates is said to have recommended that the physician evaluate the patient's body temperature for symmetry. Lack of body-heat symmetry was considered to be a pathologic sign.

Modern clinical thermography was begun in 1956 in Montreal, by DeRoy Lawson, who published a paper entitled "Implications of Surface Temperatures in the Diagnosis of Breast Cancer." He determined that the skin over a breast tumor was hotter than that of the contralateral side. The same was true for a nipple which contained a malignancy.

Today technology allows us to take a thermographic scan of an area in a fraction of a second. The image can be viewed on a cathode ray tube. Accuracy for temperature data is now re-

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John E. Upledger, DO, FAAO, is chief of staff, Unity Center for Health, Education and Research West Palm Beach Fla. Dr. Upledger is a former researcher in the Department of Biomechanics, Michigan State University College of Osteopathic Medicine East Lansing, Mich.



corded to the hundredths of a degree Centigrade. This accuracy permits us to study the geography of temperature gradients.

The study of circulation is another area in which thermography demonstrates promise and potential clinical application. The poorer the blood supply to a body part or region, the cooler the involved area becomes.

THERMOGRAPHIC OBSERVATION

In our examination of the 26 children, several thermographic studies were obtained on each child. Infrared wave changes from the hands of several children and from two faculty control subjects were studied during the conduct of cranial osteopathic treatment. Thermograms taken were:

Facial views [front and both sides (to show ears)];

- anterior thoracic and cervical;
- posterior thoracic and cervical, and
- the dorsal and palmar surfaces of each hand.

All recordings were made on color videotape, which allowed us to select, photograph, and analyze areas of specific interest. Observations from these thermograms raised some interesting questions for further investigation.

All of the children studied were well-known to us. Rapport with most of them was good. A minimal amount of fear influenced the process, i.e., sympathetic nervous system activity was relatively low.

Facial Views

Of the 26 facial thermograms studied, 16 displayed lack of symmetry of infrared radiation from the two sides of the forehead. We were able to rule out interference with internal carotid blood flow as a cause for this lack of symmetry because the infrared radiation from the eyes was symmetric (Figure 1). The infrared radiation patterns from the foreheads of the four faculty controls were symmetric. Dr Hoekstra explained that in the approximately 30,000 thermograms he has interpreted, he did not recall seeing this kind of facial asymmetry. The meaning of his observation is obscure. It

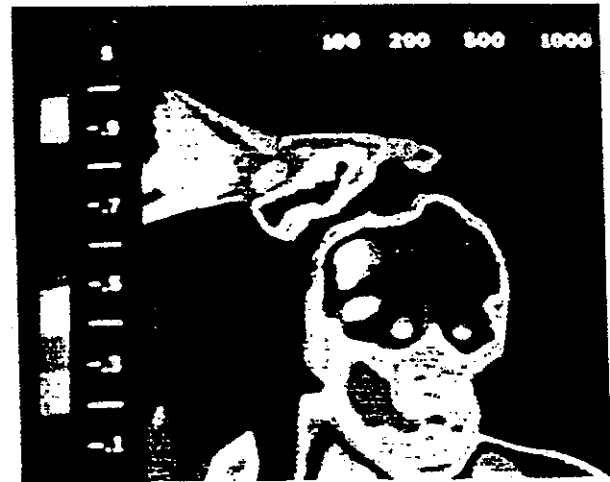


Figure 1. The scale of colors (isotherm) on the left of each figure indicates the temperature. The white at the top is the hottest, and the dark gray at the bottom is the coolest. From white to dark gray in these studies represents a range of 6°C. In this thermogram, the eyes are apparent as two white circular areas in this anterior facial view. The forehead is considerably warmer on the left side of the photograph, which is the right side of the subject's head. The author's hand is gently atop the child's head to inhibit movement.

may be that the rate of cerebral metabolic activity is somehow reflected through the cranial vault. Lateral facial and ear views provided no additional information.

Anterior Thoracic and Cervical Views

Study of the 26 anterior thorax and cervical regions raised two interesting questions. Usually the breast area of males and females is warmer than the surrounding area. Seven females and five males showed marked and significant coolness of the breast areas (Figure 2). Dr Hoekstra stated that he had never seen this phenomenon before and could offer no explanation. Psychoanalytic and endocrine possibilities could be raised. Especially interested might be psychoanalysts who believe that autism is the result of a frigid mother (the so-called "witch's tit" or "cold breast" syndrome.)

Nine subjects were warmer above the right clavicle than above the left. This finding does not positively correlate with the lack of symmetry of forehead infrared output. The supra-

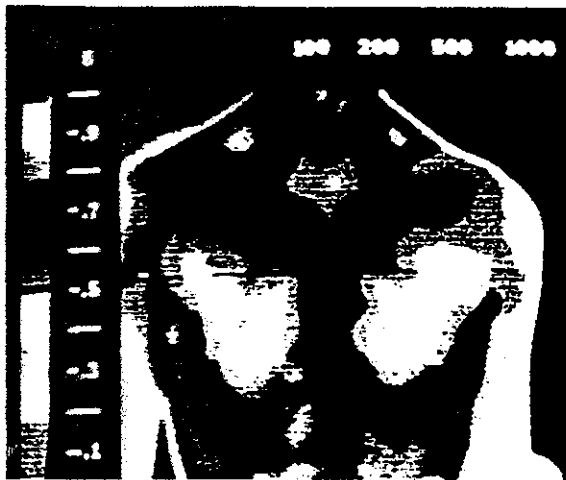


Figure 2. This front thoracic view demonstrates bilaterally cooler breast areas, the frequency of which we found quite puzzling

clavicular warmth on one side was present in only two of our subjects, both of whom displayed lack of symmetry of infrared output on the forehead. No explanation is offered.

Posterior Thoracic and Cervical Views

Figure 3 illustrates a pattern of increased infrared radiation from the posterior upper thorax. This pattern, often including the cervical regions, was present in 23 of the 26 subjects. This finding is fairly common in tense



Figure 3. Posterior view of upper thorax which demonstrates heat at T₁, T₂, and T₃, a finding which we feel is consistent with somatic dysfunction and sympathetic hypertonus or stress

and stressful adults and indicates sympathetic hypertonus. It is not frequently found in younger persons; however, it may be the product of chronic emotional stress, which is common in these children.

It would be very interesting to observe whether these problems subside with the administration of manipulative treatment. The neuromusculoskeletal system examination consistently confirmed the presence of somatic dysfunction in the upper thoracic and cervical regions of these children.

The Hands

Dorsal hand thermographs demonstrated that 21 of the 26 children had reduced radiation from the fingers (Figure 4). This finding is common in persons with vascular insufficiency, but is not often present in young people. This "cold finger" observation may be secondary to sympathetic hypertonus. In addition, Figure 4 illustrates a "hot spot" which correlates exactly to the "hoku" point used in Chinese acupuncture. This point was clearly evident in four hands. Study of the palmar surfaces of the hands was not considered reliable because it was not possible to have the children rest with their palms open for any significant length of time.

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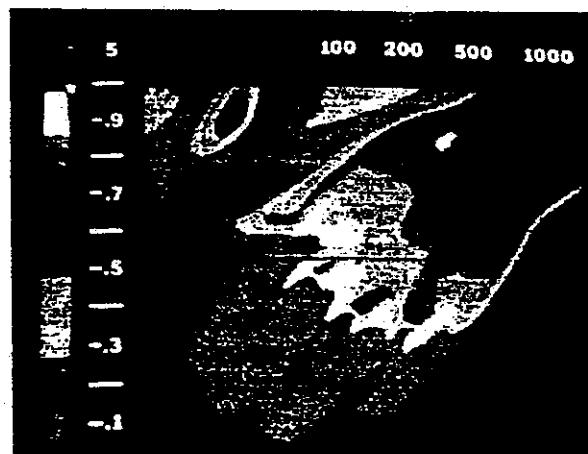


Figure 4. Thermogram of hand, which demonstrates cooler fingers and "hot spot" at the "hoku" point described in Chinese acupuncture

Craniosacral Treatment

We monitored 12 patients: 10 students and 2 teachers. Both teachers had headaches.

The following phenomena were consistently observed during all treatment processes and apparently without exception.

1. All clinically successful craniosacral normalizing procedures produced quick hand warming. The warming occurred in increments that seemed to correlate well with each phase of the structural normalization of the craniosacral system.

2. When craniosacral "position and hold-for-release" techniques were applied, and during the time that the system was being held against the restriction barrier without release, a cooling of the patient's hands occurred.

3. Passive head-holding produced some hand-warming, but to a lesser extent than the functional normalization of the craniosacral system using manipulative techniques.

4. Both teachers with headache reported relief of headache severity in stages that were immediately and positively correlated to hand-warming and to the release of craniosacral system restriction barriers.

DISCUSSION

From the observations made, some valid questions arise.

1. Why did the majority of autistic students have asymmetric heat patterns on their foreheads?

The temperature of the eyes was usually symmetric, which indicates normal internal carotid artery function. The ratio of subjects who were warmer on the right side of the forehead was about 2:1.

2. Why did so many young children have breasts that were cooler than the adjacent thoracic tissue when the reverse is usually true? Could this phenomenon have some symbolic meaning in a psychoanalytic context, or could there be a neurophysiologic, neuroendocrine interpretation?

3. Why, although eye temperatures were symmetric, did several of the children demon-

strate a greater warmth over the right supraclavicular region, which is usually correlated with carotid artery blood flow?

This lack of symmetry over the carotids did not correlate with the asymmetric heat patterns on the forehead. The warm right carotid subjects were not the same subjects who demonstrated greater warmth over the right side of the forehead.

In addition to these questions, some suggestions for further investigation have become apparent.

1. The posterior upper thoracic and cervical "hot spots," coupled with other physical findings, suggest an inordinate amount of somatic dysfunction in these areas. This condition is rare in children but common in highly stressed and tense adults. One might consider these findings suggestive of emotional stress and concurrent hypertonus of the sympathetic branch of the autonomic nervous system.

2. The cold hands of the subjects also support the suggestion of a sympathetic hypertonus with secondary vasoconstriction.

3. The warming of the hands, which occurred during successful craniosacral treatment, suggests that this treatment is more effective than placebo treatment in achieving relaxation. This phenomenon was demonstrated by the vasodilation that occurred following release of restriction barriers. Conversely, it would appear that sympathetic tone is increased when the craniosacral system is forcibly held against a restriction barrier. Because sympathetic control centers are located in the thalamic and hypothalamic regions of the brain, it seems reasonable to postulate that craniosacral manipulation may have an effect on these regions of the brain.

SUMMARY

At a center for autism, 26 children and 2 teachers were studied by thermography. Many unexplained findings, and the questions they raised are discussed. Vasoconstriction and vasodilatation of the fingers were observed in response to the application of craniosacral therapy. □