

**MEASUREMENTS OF THE ELECTRIC FIELD GENERATED BY HUMAN  
BODY  
AND THEIR APPLICATION IN TCM DIAGNOSTICS**

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**INTRODUCTION**

The electric field generated by human organisms reaches far beyond the body. A part of it, called alternating field is generated by the work of muscles and heart, and movements of hands and the whole body. In the result of comprehensive physiological processes, the organism generates also an electrostatic field, or to put it more precisely, a semi-electrostatic field which undergoes very slow changes in time in response to changing metabolic processes, biorhythms and other factors which are yet unknown.

Living organisms are built of orderly structures such as cytomembranes, collagen fibres, muscle cells and bones. The nature of such order is not only biochemical and morphological but also electrical. Electric charges of molecules aggregate into dynamic, complex systems and form areas on the surface of body (the skin), which have electric potentials ranging between  $-10V$  and  $+10V$ . Such potentials should not surprise anyone as they result from aggregation of thousands of tiny dipole charges. Such feature of live matter has been called the bioelectret state. Piezoelectric and pyroelectric effects, typical for all electrets, occur also in this electret, which is formed by a complex system of tissues. The

discussed potentials cannot be measured by contact methods, because they are generated by so-called tied charges, which are immobilised. Therefore, they can be detected and measured only through research on the electric field which they generate in their environment.

## **RESEARCH INSTRUMENTS AND METHOD**

The research of electric field or, more precisely, the semi-static field generated by human organism was conducted with extra-sensitive electric field meter constructed by our laboratory. The measuring antenna of the meter was placed at 5 cm from human body, at a place above the spine (thoracic vertebrae Th: 9, 10, and 11). The area, of 15 cm in diameter, encompassed the so-called back alarm points of acupuncture located on the urinary bladder meridian: UB 18, UB 19 and UB 20 at both sides of spine.

The whole measuring instrument and the persons subject to tests were placed in Faraday cage (120 x 240 x 220), protecting them from external electromagnetic fields. The operating principle of the apparatus and the measurement technique is presented on Diagram 1. The meter was calibrated in units of electric potential recorded on the researched area of the body.

Treatment, appropriate for the type of disorders suffered by the patient, was performed by TCM doctor according to the principles of ECIWO system and classical acupuncture. The concept of ECIWO system developed by Professor Yingqing Zhang is presented for reference on Diagram 2. It consists in stimulation of points located on the long bone of metacarpus. The points, forming a single file, are equivalent to organs and parts of the body.

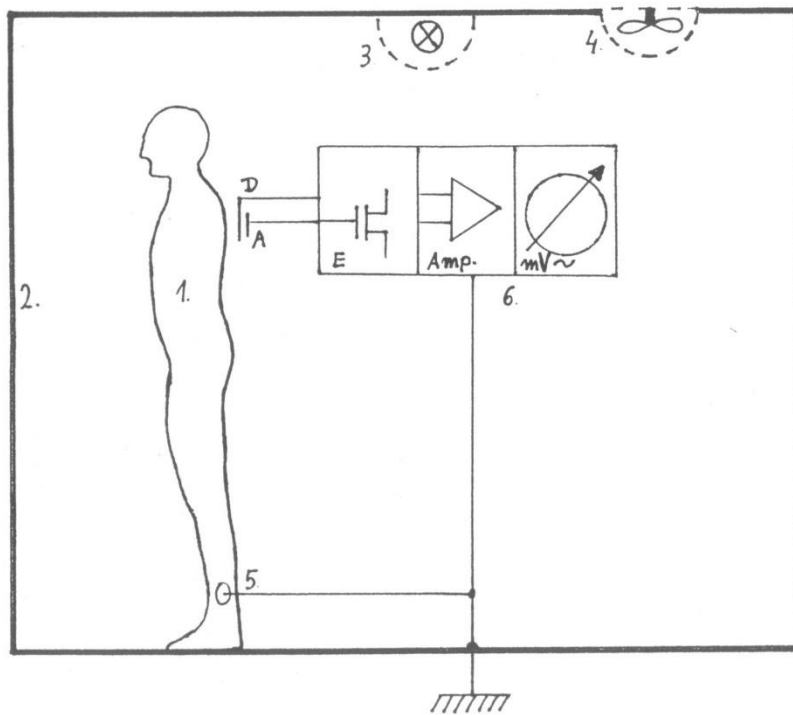


Diagram 1 System for the measurement of human electrostatic field.

1-man, 2- Faraday cage 3- light, 4- air-conditioning, 5- earthing electrode  
 6- Electric field meter: A- antenna, D- flexible flap, Amp.-amplifier  
 mV- millivolt meter of alternating voltage.

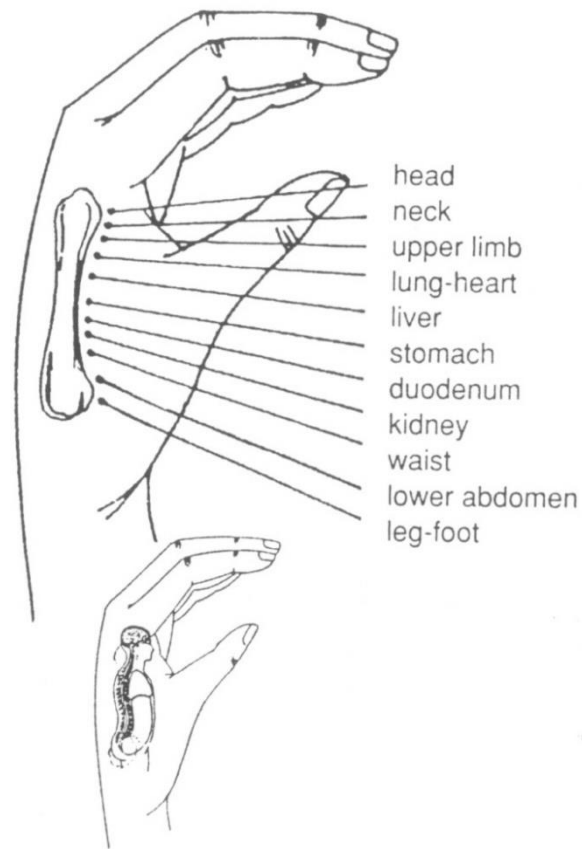


Diagram 2 ECIWO system of points for stimulation.

ECIWO stimulation was performed on patients sitting in Faraday cage. Classical acupuncture was performed outside the cage, on patients in horizontal position. After a 20-minute treatment, patients returned to the Faraday cage for further measurements.

## **DISCUSSION OF THE RESULTS**

Potentials on the skin surface were determined by measurement of electrostatic field. Diagrams 3 and 4 present examples of measurement results for persons displaying various patterns of reactions to applied stimulation.

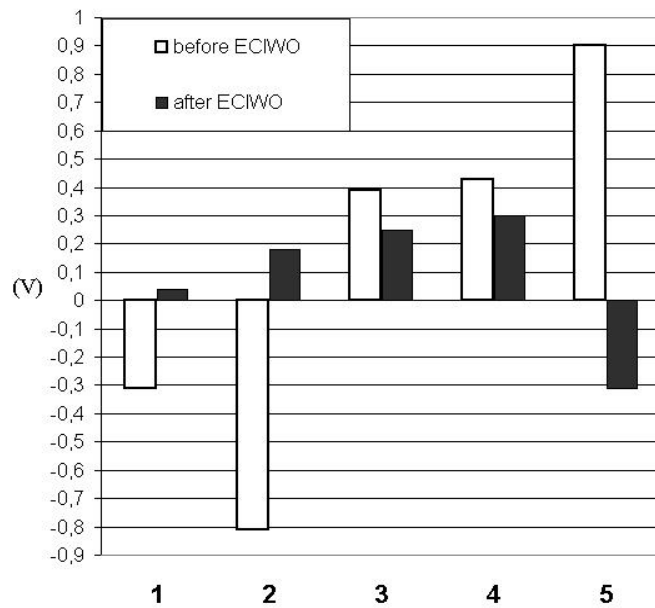


Diagram 3. Electric potentials of skin (UB18- 20) before ECIWO treatment and in 5 minutes afterwards . Records of 5 patients.

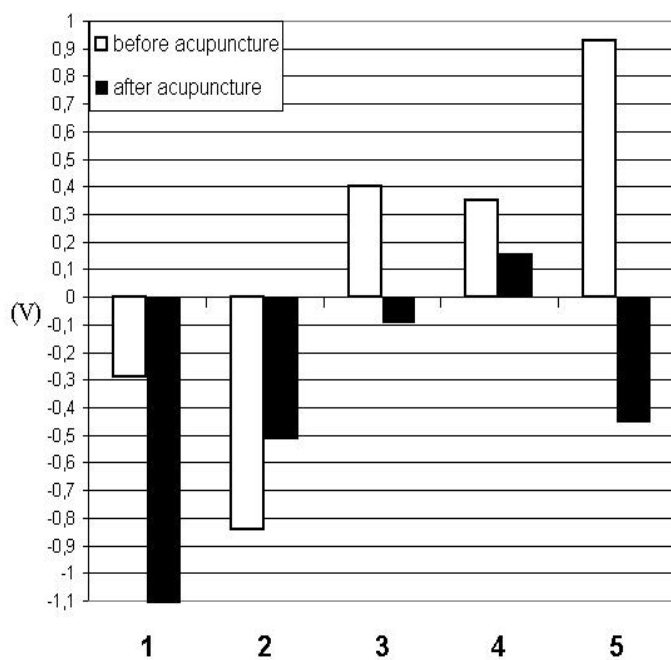


Diagram 4. Electric potentials of skin (UB18 –20) before acupuncture treatment and in 5 minutes afterwards. Records for the same 5 persons.

Diagram 3 presents alterations of electric potential of the area of skin subject to research (UB 18 – 20) in response to stimulation of ECIWO points. The potentials registered before stimulation varied slightly, approximately by 10%. Second measurement was taken in 5 minutes after stimulating with needles a point beneficial to the patient. In all cases significant changes in potential of the area of skin subject to measurement occurred. In

instances in which the initial potential was too low (below zero) it went up, heading towards positive potential (case 1 and 2). When the potential was too high (above zero), it was reduced (case 3, 4 and 5).

Results of tests presented at diagram 3 show that the highest changes of potential, including switch from negative to positive value or vice versa, occurred in instances when its initial level of potential was very high or very low (case 2 and 5). The values of potential of skin in the group changed on the average by 0.44 V.

Similar patterns of changes in potentials were recorded before and after classical acupuncture treatment (Diagram 4). Patients left the Faraday cage for treatment lasting 20 min and returned there afterwards, sitting in the same position as before, when second series of measurements was taken. Acupuncture treatments caused higher changes of potential than ECIWO with the same group of patients (by 0.64 V on the average). Another interesting phenomenon is the difference in reaction of Patient 1 to ECIWO and classical acupuncture treatment. Such variations require further, more detailed research.

Control measurements were also performed, in order to check whether electrical potentials in other skin areas also change in response to stimulation with needles as described above. The measurements were taken in two arbitrarily chosen points located on the front part of the body: Ex 1 and Liv 14 (on the left side). The results showed that potentials of the control areas changed to a much lesser extent, usually by  $\pm 0.1$  V, showing no regular patterns. An increase or reduction of potential in control areas was not co-related with alterations of potential in the researched area of UB 18, 19 and 20 on the back.

## CONCLUSIONS

ECIWO and acupuncture treatments corresponding to the type of disorders in a given case generate characteristic changes in electric potential in the area which was subject to research. Potentials which were initially too low were increased and potentials which were too high were reduced.

Changes of potential probably occur also in other areas surrounding alarm points along the urinary bladder meridian.

Classical acupuncture treatments generated changes in potential which were by 30% higher than those resulting from ECIWO treatments.

The level and direction of changes in electric potential in the area of skin subject to tests may serve as a diagnostic aid for the assessment of

- Correct choice of points for stimulation in the course of treatment,

- Progress in treatment (repetitive tests are necessary)
- Response level of patient's organism to the administered therapy.

## **SUMMARY**

The research described herein was performed with measuring apparatus constructed by our own laboratory. The antenna of the meter was placed at 5 cm from the surface of the body. The instrument serves for non-contact measurement of electric potential of skin with accuracy of 0.02 V within the range of potentials between - 10 V and + 10V. The research focused on electric potentials of area on the skin above the spine (thoracic vertebrae TH: 9, 10 and 11) of approx. 15 cm in diameter, embracing so-called back alarm points on the urinary bladder meridian: UB 18, UB 19 and UB 20 on both sides of spine.

The research proved that persons subject to tests display individual variations of the level and charge (+ or -) of electric potential in the area subject to tests.

ECIWO and classical acupuncture treatments were performed by a TCM doctor in accordance with diagnosed diseases. The treatments generated characteristic changes of electric potential in skin areas subject to tests. Potentials initially low were increased while potentials initially high were reduced. Probably similar changes occur on skin areas wider than those subject to tests and encompass more alarm points along urinary bladder meridian.

Electric potentials within the group in response to ECIWO treatments changed on the average by 0.44V. The same patients responded to acupuncture treatment with average changes of potential amounting to 0.64 V.

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