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The Study of Influence the Method of Myofascial Release on the Functional State of the Spine by Measuring the Thermal Field and Electrochemical Conductivity

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Abstract
The aim of the work is to determine the impact of the myofascial release method on the functional state of the spine. The result of the exposure was recorded by measuring the electrochemical conductivity of 12 pairs of spondylogenic cutaneous zones and thermography of the back. It is shown that competent influence on fascial connections, and with this and on vessels, joints, internal organs, gives a deep restoring effect and promotes the improvement of the organism.

1. Introduction

Soft manual techniques, rapidly developing in recent years, seriously expand the arsenal of possible techniques that a specialist in manual manipulation can apply to obtain a therapeutic effect. Some techniques are simple to learn and are possible for use without additional special education. Some other require additional training, the development of specific specialist skills, and some require not only new skills, but also the ability to think in other categories, offering a completely different concept on the nature of diseases, different from traditional Western medicine.

Despite the fact that many techniques of soft influence are rooted in osteopathic practice, some approaches and techniques are possible for independent application or in interaction with traditional classical massage.

One of these methods is myofascial release (MFR). The technique of MFR can complement the arsenal of massage or manual effects, aiming at the muscle shell, reducing its tone and allowing the specialist to get a deeper therapeutic effect in lesser time. In addition, the methods of MFR can influence myofascial, viscerofascial, and other fascial connections, vessels, joints, etc.

The practice of MFR application can lead a specialist to a completely different level of thinking and impact, for example, to myofascial chains, when the massage role will have an auxiliary role, or they will be completely replaced.

Anatomically, almost every element of the body has its own shell, each muscle is

wrapped in a film (fascia), the bones are covered with the periosteum, the spinal cord and brain have a solid medulla, each internal organ has its own membrane. All these shells one way or another pass into each other, uniting in the form of aponeuroses. It is proved that the relaxation or shortening of the fascia directly affects the functioning of the cased organ. With respect to the muscles, this leads to tonus-muscular imbalance. With respect to the liquid medium of the body, this leads to degradation of blood flow through the vessels within fascia and interfascial leaves, as well as in vein-lymphostasis. Since there is a continuous connection between the fasciaes, the tension of one fascia influences the tone of the other fascia (tension or atony). Therefore, affecting one fascia it is possible, to influence the state of others. The chains of tension alternation and atony of the fascia pass through the entire body, like muscle chains, when the spasmodic muscle alternates with the relaxed one.

The purpose of the study is to determine the influence of MFR (myofascial release) on the functional state of the spine by measuring the thermal field and electrochemical conductivity.

2. The Methodology and the Results of the Research

The MFR was held in the stretching zone, of a gum cylinder (roller) for pilates was used - a sports equipment made of foam, 1 m long, 0.15 m thick and an athletic mat. Almost all tissues, when compressed or stretched, create around themselves electric fields that counteract the forces that affect the tissue and which contain information about the nature of the movements that occur [1].

The functional state of the spinal system was investigated by means of the automated complex of functional diagnostics MEDISCRIN with the method of electro-spondylography (ESG) been used. The ESG method is based on a high-precision instrumental study of the reaction of spondylogenic zones on human skin. The electrical conductivity of 24 biologically active skin zones is measured, in the projection of which there are sympathetic biologically active points corresponding to 12 symmetrical basic classical projection lines. The latter are located on the projection line of the urinary bladder and, simultaneously, in the area of the paravertebral skin zones of Abrams and spondylogenic skin zones at the level of individual vertebral motor segments [2]. Based on the measurement and processing of the electrochemical conductivity data of these points, a diagnostic map (figure 1) and a functional map (figure 2) of the spine of the person under investigation have been constructed.

The diagnostic map does not show the absolute values of electrocutaneous conduction, but their location in relation to the norm corridor (green area).

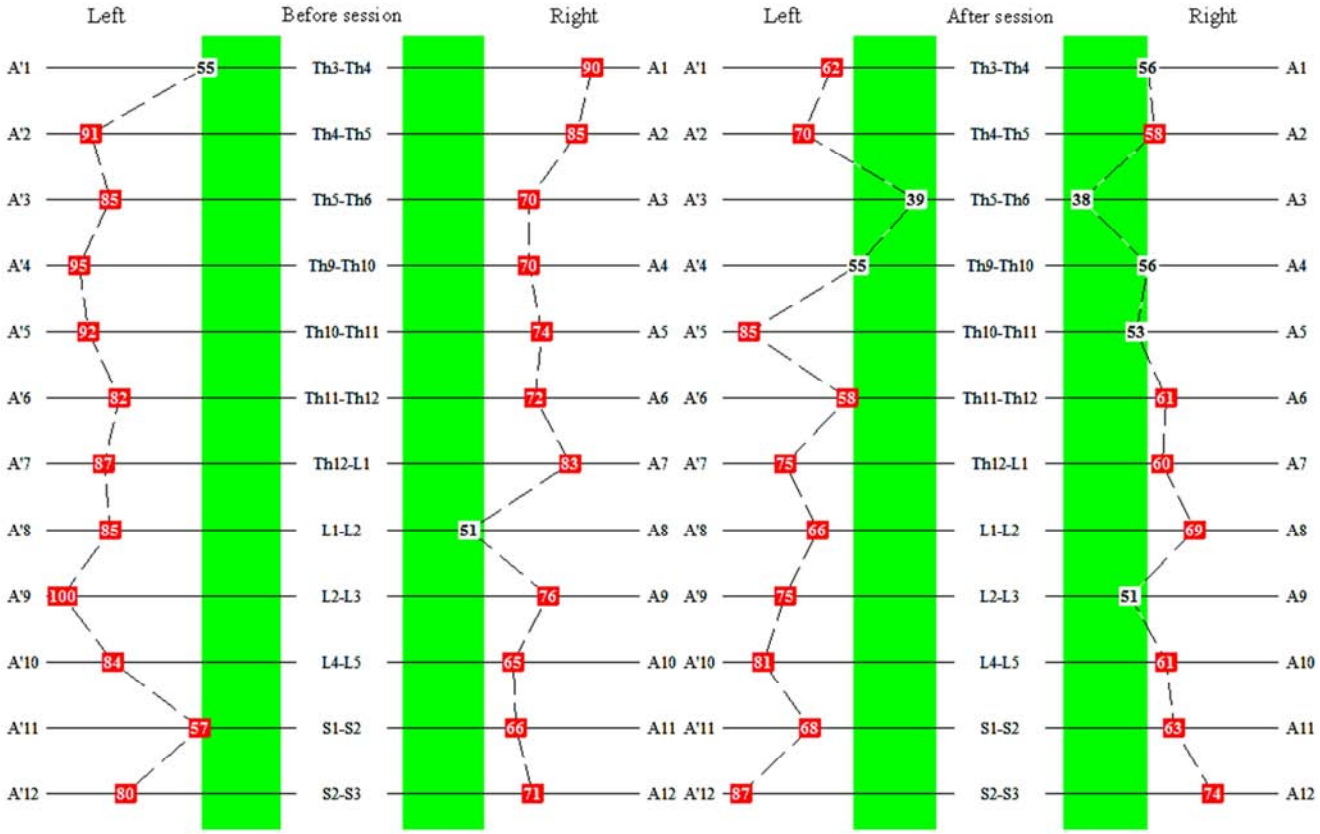

Figure 1. *Diagnostic map before and after the session of myofascial release.*

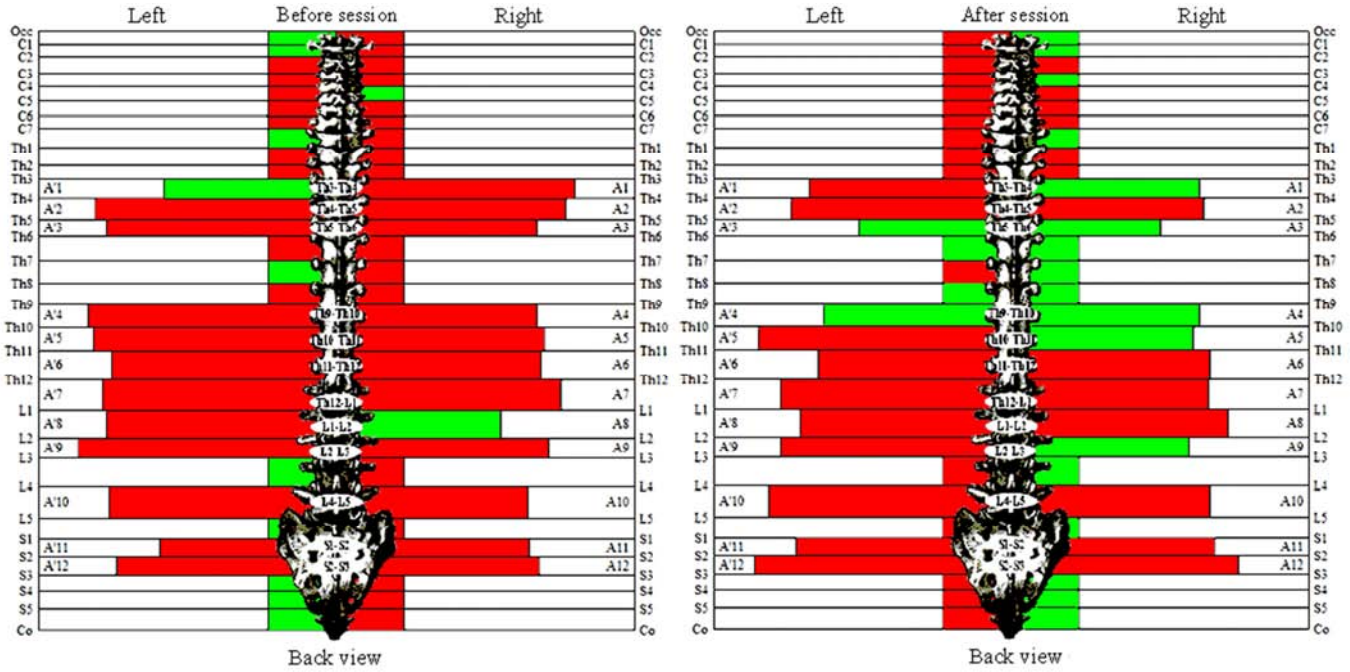

Figure 2. *Functional state of the spinal column system before and after the myofascial release session.*

The following notation was used in figure 1 and figure 2: from A′1A1 to A′12A12 – 12 projection lines at the level of individual vertebral motor segments, the intersection of which with the projection line of the bladder corresponds to 12 pairs of the examined spondylogenic skin zones, Occ – occipital bone, from C1 to C7 – vertebrae of the cervical region, from Th1 to Th12 – thoracic vertebrae, From L1 to L5 – vertebrae of the lumbar region, from S1 to S5 – vertebrae of the sacral region, Co – pubic region.

Thermal imaging is one of the promising methods of non-invasive medical diagnostics [3]. The possibilities of thermal imaging of the spine are discussed in the scientific literature [4 - 8].

Medical thermal imaging studies are not widely used, as the interpretation of thermograms is ambiguous due to the fact that the temperature of the skin depends on the tone of the skin vessels, the activity of sweating, the metabolic activity of the tissues under the skin and other factors. Thus, the differential diagnosis of various processes that affect the temperature of the skin surface is an actual problem of modern medicine and technology [9-12]. To solve this problem, it is of interest to analyze the results obtained by various methods of functional diagnostics.

Thermograms were obtained with a thermal imager Testo 885-2, which had a matrix detector of 320-240 pixels, and a temperature sensitivity of 0.03 K. The studies were conducted indoors at the temperature of 22°C, and the influence of foreign sources of heat was excluded. Increasing the resolution was achieved by using the pseudo-color palette of images with the help of a computer program [13].

In figure 3 and figure 4 shows the obtained thermograms of the person under study, on the left and on the right are graphs of the change in the radiation temperature T along the main meridian BL, indicated by the selected lines.

The distance L on the graphs is measured in dimensionless units (pixels) according to the length of the selected lines on the thermogram.

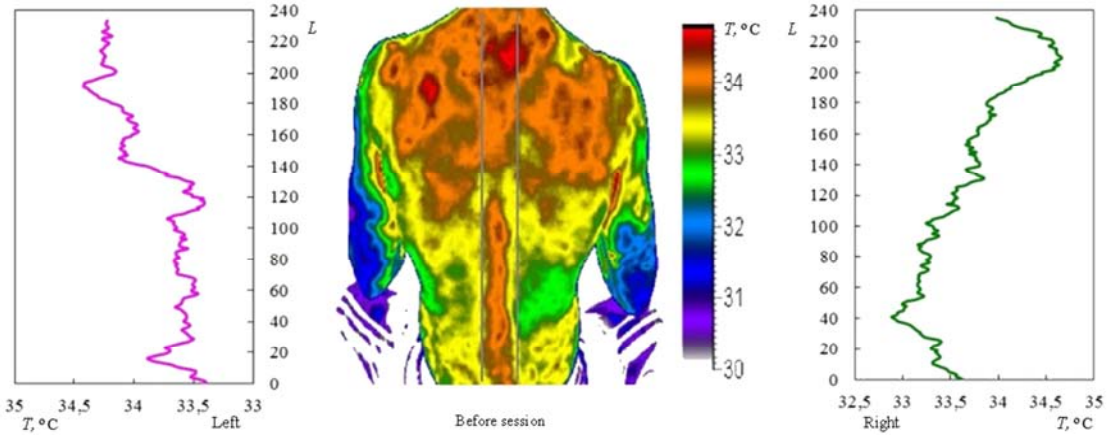

Figure 3. *Thermogram and temperature distribution along the selected lines to the left and right of the spinal column. Before the myofascial release session.*

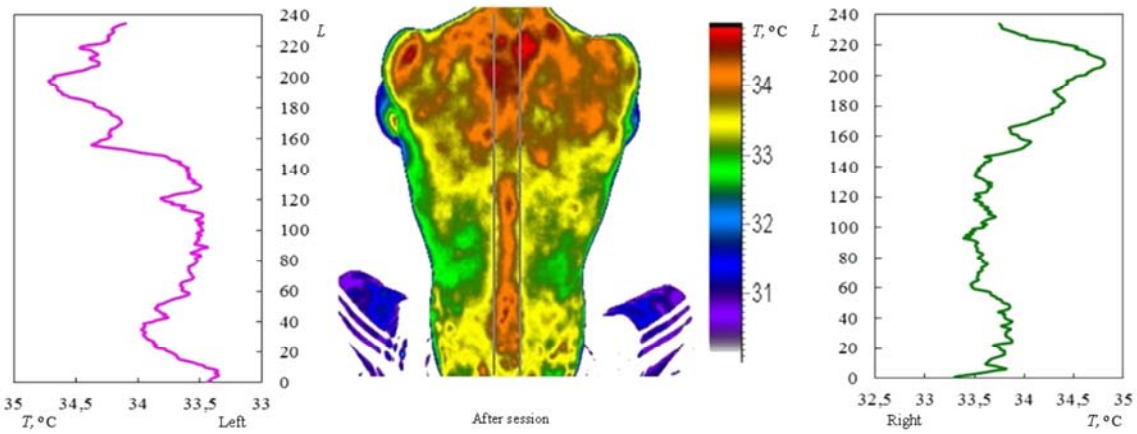

Figure 4. *Thermogram and temperature distribution along the selected lines to the left and right of the spinal column. After a session of myofascial release.*

3. The Discussion of the Results

Consider the results of a study of the influence of myofascial release on the functional state of the spine, comparing the data obtained with the help of the automated complex of functional diagnostics MEDISCRINE with the data obtained on the basis of the analysis of thermograms:

1. Before the MFR, the general functional state of the spinal column is decompensated according to the type of hypertonia. After the MFR, a general decrease in the hypertonicity is observed, especially in the upper part of the back, and on the right side along the entire vertebral column (figure 1, figure 2).

On the thermogram of figure 4 as compared to figure 3 an increase in the temperature in the upper part of the back and an increase in temperature on the right side throughout the spine are observed.

2. Before the MFR, a functional overload is observed on the right, especially in the upper part at the Th3-Th4 level in terms of the expressed hypertension on the right and compensated hypertension on the left. After the MFR, the load was equalized. Symmetry in the sections of Th3-Th4 has partially restored, levels of Th5-Th6, Th9-Th10 coming into the norm of tonus due to the longer time of MFR in these sections (figure 1, figure 2).

Thermogram data:

temperature changes at the Th3-Th4 level: before the MFR on the left side, the temperature is 34.2°C, and on the right side it is 34.7°C, the deviation is 0.5°C. After the MFR the temperature on the left side is 34.2°C, on the right side is 34°C, the deviation is less than 0.2°C;

temperature changes at the Th5-Th6 level: before the MFR on the left side is 34°C, on the right side is 33.8°C, deviation - 0.2°C. After MFR on the left side is 34.25°C on the right side is 34.25°C, deviation is 0°C;

temperature changes at the Th9-Th10 level before the MFR on the left side - 34.1°C, on the right side - 33.8°C, deviation - 0.3°C. After the MFR on the left side - 33.9°C on the right side - 33.8°C, the deviation is - 0.1°C.

3. Before the MFR in the lumbosacral area at L1-L2 level, a pronounced hypertonic on the left and a compensatory hypotonic on the right are seen. After the MFR, a decrease in the severity of hypertonia and its approach to the normotonus in the vertebral-motor segments Th10-Th11, Th11-Th12, Th12-L1, L1-L2, L2-L3, L4-L5, S1-S2 is apparent (figure 1, figure 2).

Radiation temperature change:

Th11-Th12 - to the MFR on the left side 33.6°C, on the right side 33.25°C, deviation - 0.35°C. After MFR on the left side 33.5°C, on the right side 33.5°C, deviation 0°C;

Th12-L1 - before MFR on the left side is 33.7°C, on the right side is 33.25°C, deviation - 0.45°C. After MFR on the left side is 33.5°C, on the right side is 33.55°C, deviation - 0.05°C;

L1-L2 - before MFR on the left side is 33.6°C, on the right side is 32.9°C, deviation - 0.7°C. After MFR on the left side is 33.8°C, on the right side is 33.8°C, deviation 0°C;

L2-L3 - before MFR on the left side is 33.75°C, on the right side is 33.3°C, deviation - 0.45°C. After MFR on the left side is 33.8°C, on the right side is 33.7°C, deviation - 0.1°C.

4. The results of functional diagnostics by MEDISKRIN testify, that the adaptive capabilities of the spondylosystem are preserved.

Such positive changes in a short period of time (30 minutes) have occurred due to a competently conducted MFR.

4. Conclusion

Thus, quantitative data on the state of the spine, obtained by two different methods: thermography and measurement of electrochemical conductivity, give mutually complementary results. The use of these two methods together increases the reliability and reliability of the diagnosis of the functional state of the human body and individual organs.

Objective control over the functional state of the spinal system with the help of the automated MEDISCRINE complex and thermal imager Testo 885-2 showed that the competent effect on the fascial connections, and thus on the vessels, joints, internal organs, etc., results in a deep restoring effect and promotes Health improvement of the body.

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