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[The following is an English translation of the original article.](#)

The following study is intended to examine more closely the effects of therapeutic therapies performed using the HIVAMAT 200 system through the presentation of two examples of my own, as well as with research conducted at the Amberg clinic.

The research works conducted in Germany concerning manual drainage, as well as massage using a electric field, are undoubtedly the most extensive in this field. It is worth mentioning at this point the important development represented by the drainage approach proposed by Professor Kuknke and Doctor Asdonk.

In 1963, the concept for this type of therapy was conceived by the German Johannes Asdonk from Essen together with his wife Krystyna Barteczko from Zabrze. Over time, he added the clasps used in edema treatment and compression therapy to the therapy method; and then, in 1972, after presenting it from a scientific point of view, he introduced it to the range of medical treatments for the "physiotherapy of edemas according to Asdonk and Barteczko". The effectiveness of the Asdonk therapy could be proven using the limb volume analysis method developed by Professor Kuknke of Bonn. In 1973, the world's first specialist Lymphedema clinic – Feldbergklinik Dr. Asdonk – was established. Subsequently, the idea of performing massage using electric fields – the so-called HIVAMAT 200 system – was formulated by a team of specialists led by Hans Seidl of the Luitpold Clinic in Germany.

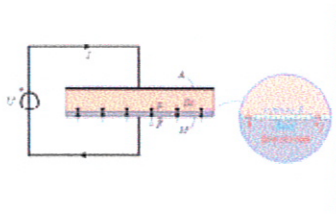
[Physical basis](#)

The electric field is a special spatial state in which the physical objects that are placed in it, in other words the charges, are influenced by the forces exerted from this field. Every electrically charged substance is surrounded by an electric field. In the presence of another charge, this field produces the force used in the HIVMAT 200 system.

The strength of these interactions depends on many factors, such as:

- the size of the charges,
- the dimensions and shapes of the bodies connected with these charges, the so-called conductor geometry,
- their relative positions to each other,
- the electric properties of the medium surrounding the charges.

The patient and therapist are connected together to the device by means of electrodes, whilst at the same time being insulated with vinyl gloves which provide a high level of resistance during the current flow. The device operates by the current flowing first in one direction and then in the other, thus causing the required changes in the frequency of the field. Both the patient and the therapist are alternately charged positively and negatively. A strong pulsating electric field is formed between the hands of the therapist and the body of the patient. The voltage can reach a maximum of 500 V, although the intensity is barely a few microamperes. The electric field penetrates through the tissue and interacts with the charges in the patient's body (there are a lot of ions in tissue). In addition, spontaneous polarization of the particles and elements of the person's body occurs (the field displaces the bound charges).



Photograph 1: The Johnson Rahbeck Effect



Photograph 2: The external effect of various frequencies



Photograph 3: The HIVAMAT 200 device

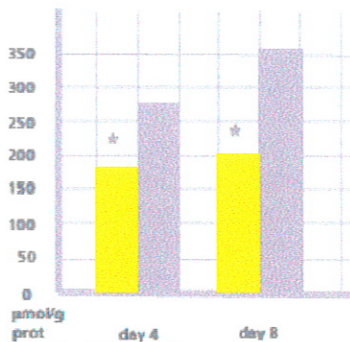


Figure 1: MPO ratio

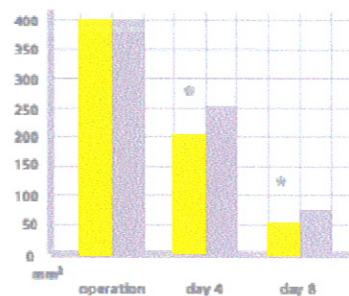


Figure 2: Planimetry result

As this field is variable and penetrates through the entire body, this causes oscillation in deep layers. The device can be set to an appropriate voltage to determine the intensity of the field. The frequency changes in the field, in other words the frequency of oscillation of the tissue, can thus be set. As regards voltage, this should be understood to mean signal strength. There isn't a specific voltage value as this is an alternating current. The voltage changes based on the frequency, which means that the voltage reaches a certain maximum value, after which it starts to decrease to zero before the current begins to flow in the opposite direction up to the specified maximum value (between 5 and 200 times per second). The name of the device is an acronym of the initial letters of the name of the therapy:

- Histologisch - tissue,
- Variable - variable,
- Manuelle - manual,
- Technik - technology.

Two especially relevant phenomena should be mentioned when describing the physical properties of the system. The first is the electric effect causing the separation of charges in a neutral substance, which occurs in the electric field. This is why the molecules of non-conducting substances become electrical dipoles conveying the charge that propels the field strength. An example of this could be the experiment in which a cotton pad placed near the revolving spheres of an electric machine moves rapidly back and forth. It conveys a charge driven by the force of the field from one sphere to the other, and, in this way, becomes a conductor. This situation permits particles to move, even electrically neutral ones, known as polar particles, which means that their charges are not placed symmetrically. A molecule of water can serve as an example in which electrons are placed closer to the oxygen atom. It appears that the molecule is more negative near the oxygen atom and more positive near the hydrogen atoms. If the charges are moved, then there is a weak electric field around the molecule. If we apply an external field, then an electric force will affect the molecule, as well as causing the movement of the neutral molecule. In an organism, apart from ions, there are also many polar particles, such as vitamins, lipids, organic acids or certain enzymes. In choosing an appropriate, external electric field, we can cause the movement of these molecules.

A second phenomenon, relevant in regard to the HIVAMAT 200 therapy, is the one named after its discoverer - the Johnson Rahbeck effect. If a semi-conductor plate (e.g. a slate sheet) is placed between two electrodes, then a strong attracting force will be created between these electrodes. If this force occurs with a semi-conductor layer and a weak electrostatic field, then it is possible to use it in a compensated form on human tissue (photograph 1).

Surfaces A and M cling together with great force. The reason for this is the fact that the plates touch at very few points, thus only weak current flows through these "contact points". A microscopic pocket of air and the strong field will create a huge attraction force between the electrodes.

Physiological basis

The healing of tissue is complicated and often halted in the initial phase – known as the inflammatory phase or granulation tissue formation phase. The following phases exist in the healing of wounds: the cleaning phase, in other words the inflammatory phase; the reconstruction phase, meaning the growing back of the epithelium, vessels and nerves, the migration of cells; and the shrinking phase with the development of scars, in other words the synthesis and development of collagen. The destruction of the extracellular matrix (ECM) by the uncontrolled release of proteases is the main factor that makes the healing of acute wounds impossible. During the healing of wounds, complicated chemical reactions occur involving locally working, biologically active substances, and also physical phenomena including, for example, increased resistance to stretching.

The open tissue within the wounds brings about blood clotting, inflammation and the healing of the wound. One of the most important substances in the development of healing is the Platelet-derived growth factor (PDGF). It chemotactically attracts neutrophils and monocytes from the blood and fibroblasts from the area of the wound to the wounds. These cells set a short inflammatory process in motion. The prolonged inflammatory phase leads to the creation of exudate, composed of proteolytic enzymes, cytokine, and growth factors. Exudate destroys growth factors, proteins of the organism and extracellular matrix (ECM). Most cell types present in the wound are able to release proteases. These destroy necrotic tissue, temporarily dissolve ECM (allowing the migration of cells and vessels) and remodel ECM in cicatricial tissue, thus giving it a lot of strength.

Under proper conditions, proteolytic activity is under tight control. When healing is dysfunctional, proteases are overproduced and their activity is excessive. Such wounds continue in the inflammatory phase and, without suitable therapy, can grow and remain for many months. If, when using HIVAMAT 200 therapy, there is an oscillation (pulsation) in the organism, transport can also occur, and, if the transport can be controlled, then it is possible to intervene in the physiological processes of the nourishment of the tissues.

In order to give a sense of therapy treatment using the HIVAMAT 200 system, one can say that it consists of cleaning, dissolving, rinsing and draining. The benefits of deep oscillation caused by the HIVAMAT 200 device are as follows:

- combats pain resulting from trauma by means of the "gate control theory" system;
- improves immunological regulatory mechanisms in the inflammatory area (activating the activity of h monocytes and T lymphocytes);
- variable blood pressure, stretching and field strength achieved by using the HIVAMAT 200 to activate the development of fibroblasts;
- increases speed in transporting lymph through the lymphatic system, slowing granulation of the wound through the cytokine content in it which destroys extracellular matrix;
- regulates the proteolytic activity of cells in the wound. The destruction of ECM through the un-controlled release of proteases is the main factor preventing the healing of acute wounds;
- accelerates the process of moving the healing of the wound along from the inflammatory phase to the reconstruction phase;
- renews the proper dressing of the wound with immunological results (phagocytosis);
- "loosens" the intersegment and intermuscular connection of the fascia;
- "pumps onward" the liquids from the intercellular space, along with the elements contained in them (proteins, components of decomposing cells, neurotransmitters, etc.) through the lymphatic system;
- variable stretching of tissue layers - a good method to ensure their painless mobilization.

Uses of the system:

- swelling therapy,
- pain therapy for the musculoskeletal system
- wound therapy, including open wounds,
- disease therapy for the respiratory system.

Contraindications:

- thrombotic vessel diseases,
- when ferromagnetic implants are present in the direct field used by the system, electronic implants, e.g. pacemakers,
- other specific illnesses such as in the case of other manual treatment, e.g. classical massage or lymphatic drainage.

Therapy methods:

Treatment using the HIVAMAT 200 system depends on the specific disease. The therapy can be successfully used for stromal, classical or lymphatic massage. In the case of various types of edema, in which manual drainage is recommended, then it is necessary to proceed in accordance with the methodical foundations for drainage, e.g. in a post-mastectomy and secondary lymphedema of the upper limb state, it should be performed:

- on the abdominal side:

- treating cervical lymph nodes and venous angles on both sides, in other words treating the drainage area and the chest on the healthy side,
- treating the peri-edematous area: the operated side of the chest together with therapy for the wound or scar,
- the edematous area, in other words draining all upper limbs;

- on the spinal side:

- treating the drainage area in the area of the neck and venous angles,
- treating the edematous area in the area of both spine quarters,
- treating the edematous area of the upper limb.

The device applies a field with the following frequency:

- 80-200 Hz - high - vibrational effect and delicate shaking, surface effect,
- 25-80 Hz - medium - shaking effect and light pumping,
- 25-5 Hz - low - pumping, deep effect.

Description of cases

Diabetic foot syndrome

The 47-year old patient was admitted to hospital on 6.01.2006 due to a diabetic foot complication with phlegmon of the right toe and transverse platypodia of the right foot (see photographs 4-8). In the x-rays, there are clear signs of the rarefaction of osseous structure behind the inflammatory changes. Conservative treatment was not successful and led to the necrosis of the toe, thus requiring amputation. After two weeks with a cleaned wound, the patient was allowed home. Recommendations: monitoring in surgical and diabetic clinics, colloid dressing, agapurin, sadamin 2 x 1. No planimetric changes in the wound were observed between the time of the operation and the beginning of the HIVAMAT 200 system therapy.

Drainage was performed using the HIVAMAT 200 system device:

- duration of treatment: 25-35 minutes,
- frequency: 5 minutes - 100 Hz, 3 minutes - 180 Hz, 5 minutes - 25 Hz, the remainder of the time - 120 Hz,
- methods: cervical and supraclavicular lymph nodes, venous and inguinal angles, lymphoducts of the thigh, popliteal lymph nodes, lymphatic vessels of the foot, therapy on the wound,
- proportion of the period spent on the wound compared to other parts - 1:1,
- every day treatment in the first 2 weeks, then 3 times a week. Joint time of therapy: 8 weeks. The next stages of therapy is shown in photos 4-8.



Photograph 4: The beginning of therapy: February 16, 2006;

Photograph 5: The first week of therapy;

Photograph 6: The third week of therapy;

Photograph 7: The sixth week of therapy;

Photograph 8: The eighth week of therapy – the end



The next stages of the therapy:

Photograph 9: The fourth day of the therapy;

Photograph 10: The sixth day of the therapy;

Photograph 11: The eleventh day of the therapy;

Photograph 12: The fourteenth day of the therapy – conclusion

Description of cases

mammectomy, with a scar on the medial side of the shoulder after receiving skin tissue for mammaplasty

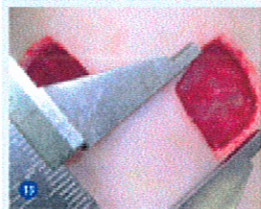
44-year old patient, following mammectomy, with a scar on the medial side of the shoulder after receiving skin tissue for mammaplasty. Following the removal of the stitches, resolution and development of wounds resistant to healing. After one month, there were no indications of cicatrisation.

Course of action:

Treatment every day without breaks for 14 days,

- total duration of the treatment - 20 minutes,
- application time on the wound and its sides
 - 15 minutes, with the remaining time on the shoulder and venous angles,
- frequency: 100 Hz - 10 minutes, 180 Hz - 5 minutes, 40 Hz - 5 minutes. The next stages of therapy are shown in photographs 9-12, page 6.

The HIVAMAT 200 system was also used on the cut wound of a rat on the basis of data provided by Hans Seidl of the Clinic Klinik Luitpold Mittelbayerisches Rehabilitationszentrum" for indication groups orthopaedics, neuroorthopaedics, traumatology, internal medicine and vascular diseases. This is one of a large number of examples provided by the developers of the system and result from over twenty years of testing the use of this method. Planimetry and the ratio of proteases activity is observed (figure 1 and 2). The next stages of the therapy are presented in photographs 13-22.



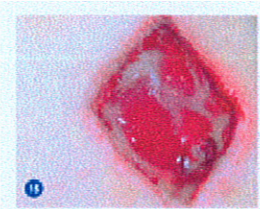
Photograph 13: Using the HIVAMAT 200 system on the cut wound of a rat;



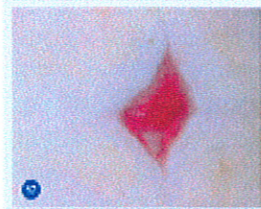
Photograph 14: Therapy with a manual applicator, time – 3 minutes, frequency – 100 and 10 Hz with a ration of 2:1;



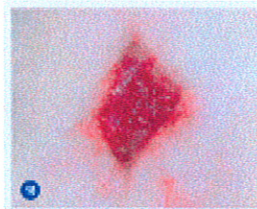
Photograph 15: Wound with application on the 4th day of therapy. MPO ratio – 190 mkmol/g of proteases; photograph



Photograph 16: Control wound without application on the 4th day. MPO ratio – 290 mkmol/g of proteases;



Photograph 17: Wound with Application on the 8th day of Therapy. MPO ratio – 200 Mkmol/g of proteases;



Photograph 18: Control wound on the 8th day. MPO ratio – 360 mkmol/g of proteases;



Photograph 19: Wound with application. Visible antiphlogistic effect on the 8th day of therapy;



Photograph 20: Control wound without application on the 8th day;



Photograph 21: Wound with Application on the 8th day Planimetry 50 mm²;



Photograph 22: Control wound on the 8th day. Planimetry-80 mm²

Final conclusions

The use of the HIVAMAT 200 system, particularly based on the available research presented by the developers of this method, leads to considerable acceleration in the healing of damaged tissue, thus giving it great significance for physiotherapy. Above all, more rapid healing significantly improves the quality of cicatrization of tissue, allowing the quicker and more efficient introduction of other rehabilitation methods, especially kinesitherapy. This in turn not only implies a more rapid return to normal tissue functioning, but also represents considerable improvement in quality. A special area for research on the usage of this system seems to be the field of sports traumatology, where quick, but reasonable improvement is of considerable importance. Additionally, when conducting further research, more attention should be paid to the explanation of the mechanisms controlling the bacteriostatic activity of the system which are not fully recognized and in particular the restraining of excessive protease activity. In this latter case, an analysis should be made in particular of the polarity of protease particles.

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