

# DEEP OSCILLATION® OUR EXPERIENCE CONCERNING THE USE OF DEEP OSCILLATION IN THE THERAPY OF OSTEOARTHRITIS

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## ABSTRACT

*The function of DEEP OSCILLATION THERAPY is based on a pulsed electrostatic field which is built up in the patient's body region to be treated. The treatment with this therapy improve the trophicity of the tissue, the tissue quality, detoxification, muscles relaxation, the tonus control, edema reduction, decrease of skin irritation and because all of these benefits it is applied to a large pathology including important effects in osteoarthritis. The main rehabilitative objectives are pain reduction and movement facility. The study implies the assessment of the outcomes obtained in our PRM Clinic Division, after treatment with Deep oscillation for patients with osteoarthritis.*

*Key words: osteoarthritis, deep oscillation therapy, vibration*

## INTRODUCTION

Electricity has been used for therapy since the ancient Egyptians, as mural paintings which date over three thousand years are proving. At that time, e.g. electric ray or statically charged amber were applied for treatment of various complaints. Since the 18-th century, electricity has been applied in various fields of physical medicine. At the beginning of the eighties, the therapists H. Seidl and W. Walder discovered a therapy effect which, after a long phase of development, is now used as a base for Deep Oscillation Therapy .

The functioning principle:

The phenomenon which, after its discoverers, is called Johnsen-Rahbeck-Effect says that: "if a barrier layer (e.g. plate of slate) is put between two electrodes, a high magnetic force is caused in the space between". Pulsing, this electrostatic field causes an intense resonant vibration of the concerned tissue segment, when one of the electrodes is being moved. Due to the force of the electrostatic field, the respective tissue segment is attracted and then, dropped. This phenomenon happens against the compression exerted by the therapist's hands (passing in the direction of flow) or by the moving hand-applicator.

By repeating this process in rapid succession, rhythmical tissue deformation is caused. The electrostatic pulses lead to an increased static friction, while, during the intervals between pulses, the tissue elasticity counteracts against this mechanism.

In this way, the tissue undergoing treatment is "continuous pumped" in its entire depth.

This effect leads to recover of flexibility and mobilization between individual fibers and layers, as well as the development and improvement of the passing ways of flow and supply.

Thus it has decisive functions in storing, supplying and transporting the nutrients and waste products.

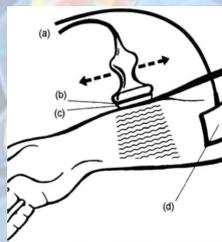


Fig.1 Resonant Vibration; (a) Power Source, (b) Contact 1, (c) Barrier Layer, (d) Contact 2

The application of the therapy form Deep Oscillation includes devices like:

- Deep Oscillation Personal,
- Deep Oscillation Evident
- Hivamat 200

These devices work with current at maximum  $7,8 \mu A$  , this intensity being too small to caused an electrolytic effect; also, the current is applied in biphasic mode.

Effects of the Deep Oscillation Therapy

- anti-inflammatory and immunostimulator effects (inhibition of lipid peroxidation, enzyme activation inhibits oxygen radical production by the whole blood leukocytes activated by Caionophore A 23187) [1]
- improve microcirculation Clinical Pilot Study L. KORKINA et al., 2007
- reduction of oedema - by means of manual lymph drainage [1]
- wound-healing effect („dynamic wound healing“) [2]

- anti-fibrotic effect: disrupt or/and prevent the formation of fibrous septae , reduction of subcutan thickness[3]
- pshychological effect

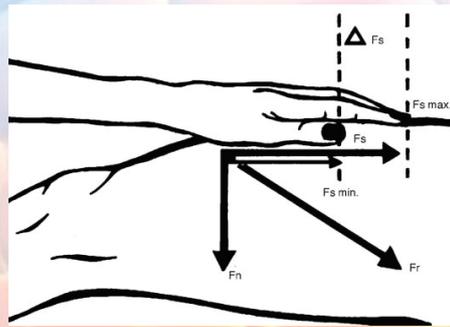


Fig. 2 Modulation of forces acting with HIVAMAT® 200

Fr = Direction and the size of the force exerted by the therapist

Fn = Force component acting vertically on the tissue (normal force)

$\Delta F$  = Amount of the modulation of the forces

Fs = Average of the force component acting parallel to the surface of the tissue (shearing force)

Fs max and Fs min = maximum and minimum shearing force due to the frictional force modulated electrostatically

There are three different techniques of applying the system:

- Therapy with special gloves (Fig. 3)
- Therapy by hand applicator (Fig. 4)
- Therapy through a plastic foil (Fig 5)



Fig. 3 Special gloves



Fig. 4 Hand applicator



Fig. 5 Plastic foil

Advantages of the Therapy:

- Deep Oscillation can be use to treat acute traumata, preoperative as well as postoperative pahologies.
- Applicability is verry good even in case of extremely painful conditions, such as TBI, fractures, rupture of a muscle fibers etc.
- Application of Deep Oscillation Therapy, additionally to kinethic exercises training , will generate tranquilizing effects with increase availability/compliance and mobility improvement.
- Is an effective prophylaxis against thrombosis.
- Assure a shorter convalescent periods and thus shorter hospitalisation.
- Is particularly successful in Carcinoma aftercare, simultaneously with radiotherapy. Is an effective treatment of edema (acceleration of lymph flow). Is especially suited for lymphatic drainage due to accurate adaptation to the state of the tissue and selection of all manual pressure gradients.
- Treatment of all kinds of sports injuries as well as pain after muscular exertion.
- Comfortable relaxing therapy for tranquillizing and regeneration.
- Could be apply in open wound areas (with sterile cover), e.g. in case of healing per secundam, ulcus cruris, decubitus, scalds, burns.
- Comfortable detonisation and mobilization in case of respiratory tract diseases/ mucoviscidosis.
- Therapy is easy to learn

The Deep Oscillation Therapy should be performed following the principle of minimal intensity. With an appropriate massage pressure exerted, turn down intensity until a resonant vibration is palpable from the depth of the tissue.

Possible Reactions to Deep Oscillation Treatment

- Acute pain sensations in the area undergoing treatment
- Increased sensation of urinating
- Hypersensitivity of the skin in the area of treatment

- Tiredness ranging from lassitude to exhaustion.
- Rise temperature (local, rarely)
- Blood pressure reduction

**Indications:**

- the most important one is in Neuro-Myo/ Arthro kinethic including postraumatichal pathology: Osteoarthritis such as rheumatism, anchilosing spondylitis (Bechterew's disease), arthrosis, autoimmune diseases, carpal-tunnel syndrome, chronic polyarthritis, collagenosis, epicondylitis, muscular rheumatism, myalgia, osteoporosis; Spinal syndrome (thoracical, cervical, lumbar), corrective osteotomy, articular facet syndrome, ischialgia, lumbago, osteosynthesis, total prosthetic replacement, vertebral fracture. In this cases the HIVAMAT® 200 therapy is for trophic improvement, antialgic effect, promotion of mobility. Treatment area/ technique - Treatment of the affected tissue section; Local treatment of the affected areas by passage grasps of the fingertips or saw-grasps (large movements with flat hands) Large compensatig effleurance stroking movements of entire body (hand over hand, with both hands). Duration and Frequency - 8 min at 150 - 200 Hz; 10 min at 20 -30 Hz; Treatment interval - daily to 3 times a week [4].

- other indications are: hemophilic osteoarthritis, fibrosis, sclerosis, Achilles tendon, ligament distortion, rupture/ tearing, muscle fiber rupture, hematoma, wound healing, cerebral diseases, migraine, multiple scleroris, carcinoma etc.

**AESTHETICS/ aesthetic medicine:** Another aspect where tissue can profit from DEEP OSCILLATION is in gynoid Lipodystrophy better known as cellulite. Deep oscillation affects epidermis, derma, subcutaneous layer and myofibrils we can influence pathophysiological features of cellulite. We improve microcirculation, diminish inflammation and edema, disrupt or/and prevent the formation of fibrous septae and diminish number of estrogen receptors on the skin cells

- Anti-aging treatment for face-neck-decollete
- Skin transplantation
- Postpartum: lactation improving

**Contraindications:**

- Acute infections; Active tuberculosis
- Infectious skin diseases or another dermatosis like Erysipelas
- Vascular disorders with untreated thrombosis
- Untreated malignant diseases
- Unbalanced Heart diseases
- Pregnancy
- Sensitiveness to electric fields
- Must have precaution for Cardiac pacemakers or other implanted stimulators

In opposite to electrostimulation therapy, metal implants are not a contraindication to this kind of therapy.

**MATHERIAL & METHODS:**

We analyzed 25 patients admitted in our clinical division between November 2008 - July 2009 with: average age 54,64, med. age 53, gender distribution (72% F, 28% M)

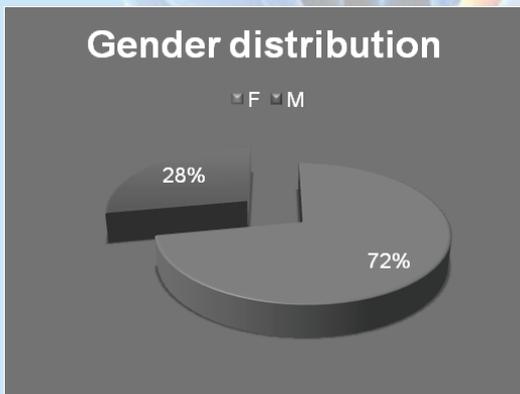


Fig. 6 Gender distribution

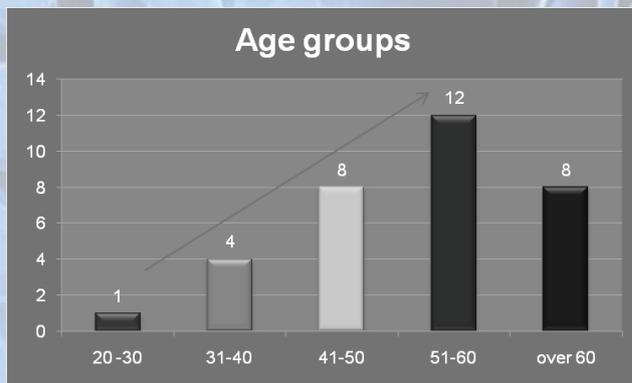


Fig. 7 Age group statistic

The main pathology treated with Deep oscillation was osteoarthritis for different kind, most of them in column (40%), then on hip (28%), shoulder (16%), knee (12%) and ankle (4%).

The patients received 10 sessions of Deep Oscillation therapy (Hivamat 200) high frequency (100 Hz), for 10 minutes slowly application (to induce vibration feeling, normal mode) over their painful areas in addition to usual care respectively specific medication (anti-inflammatory drugs, analgetics) and/ or physical/ kinetical procedures.

## RESULTS

Pain significantly improved in the treatment group, from a baseline average VASP of 6,32 to 1,96 ( $p = 0.0000$ ) points after treatment;

Additionally to kinetic therapy we obtained a significant increasing of ROM:

- average ROM at admission 74,99%, St dev 10,784
- average ROM at discharge 91,00%, St. Dev 15,424 ( $p = 0.0000$ ).

The patient satisfaction assessment showed that most patients were content with this therapy: the average satisfaction was 4,44 points, also correlated with the level of a/ d VASP

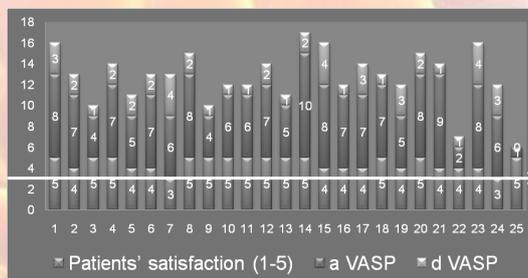


Fig. 8 Patient's satisfactions statistic

## DISCUSSIONS

This new procedure was very well tolerated, so that none of the study patients accused any discomfort or other adverse reactions.

All patients show a great interest for this physiatric method, find it anodin and, in the same time, extremely comfortable and relaxing.

## CONCLUSIONS

Deep Oscillation if adequately indicated and correctly applied is large applicable, well tolerated, accessible, and efficient showing a great promise as physiatric method [5].

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