

# Expertise

## **Evaluation of the Nuclear-Magnetic-Resonance-Therapy MBST in Respect to its Therapeutic Potentials**

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### Abstract

The review and evaluation of the Nuclear-Magnetic-Resonance-Therapy (MBST) was carried out by on the basis of the documents (internal reports, summaries, public lectures and publications in renowned scientific journals) made available by the company MedTec Medizintechnik GmbH, Wetzlar, Germany.

Several research groups have shown in pre-clinical experiments, some using in-vitro cell cultures, others using in vivo animals, that there can be no doubt that the appliance of special magnetic fields within the application of MBST has induced biological effects that cannot be explained as being caused as an action of placebo. Negative effects on the cell-cultures, on the other hand, could not be detected.

A clinically relevant therapeutic effectiveness in patients diagnosed with arthrosis was definitely proven and an equal effectiveness for the treatment of patients diagnosed with osteoporosis was shown to be probable. A pleasant feeling of warmth and a slight tingle were the only side effect that could be observed.

In respect to the symptoms of the patients treated, the main symptomatic result reported was a reduction in pain. In view of new scientific results, this reduction in pain can be linked to an interference of the conductivity of the proton channels by the energy transfer caused by the nuclear magnetic resonance as it has been shown that there is a direct correlation between the proton channels and the receptors linked to the transmittance of pain (for example the Vanillin acid receptor). In conclusion, it can therefore be stated that the scientific proof for the therapeutic effectiveness of the MBST therapy has been presented.

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Signed: Prof. Dr. Wilfried Dimpfel

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## Introduction

Living organisms are highly complex systems that function in accordance with the laws of cybernetics. If and when disturbances occur within this system, and there is, therefore, a deviation of the norm, this is referred to as a disease. Disturbances of the equilibrium cannot only be detected at various levels using methods of natural sciences (biochemical as well as biophysical methods), but they often can be corrected by these same methods. This holds true in respect to various levels of organisation - the organism as a whole, at the level of single, and also at the cellular as well as at the molecular level. In order to be able to achieve such detection and repair, it is imperative to have an exact understanding of all processes at the molecular levels, and of all chemical as well as physical processes at the cellular level. Also, one must understand the interdependences of these processes. For that reason one differentiates between causal and symptomatic therapy when one deals with the repair of the disturbances within the organism (or in the sense of medicine: the healing of the patient). Today, the number of causal therapies available remains very limited as most disease processes have not yet been adequately understood. In the great majority of the diseases, one must therefore resort to the therapy of the symptoms. This symptomatic therapy generally finds its foundation in medical experience, and this symptomatic therapy is, today, still the method of choice wherever medical correction of a disturbance of the system is indicated. This is important because the preferred method generally designated as "evidence based medicine" has not become available, even in most cases of therapies that have a long medical history. The experience of every single medical doctor therefore is still the main motor behind the therapeutic activities of that given medical doctor. This experience is still today mainly based on interventions into the chemical processes, medical experience based on observations of interventions into the physical processes are still relatively rare. For this, there are historical reasons, as the use of plants that function through their chemical components has been a successful way of treating diseases over thousands of years. On the other hand, methods based on physical principles can logically only be applied after the physical principles involved have been discovered. Only then can their interrelationship with the molecular and cellular occurrences be studied. First electric occurrences in the body had to be discovered, and only after that had happened, these occurrences could be studied and correction measures for those cases in which these electric occurrences were disturbed could be proposed. The topic of this expertise is exactly that: the therapeutic alternative of applying bio-physical knowledge regarding electric processes.

## Physical Therapy

The aim of applying physical methods as therapeutic measures is, as we have already discussed above, to repair the disturbed equilibrium at the cellular and molecular level. An enormous advantage can be deduced from the fact that the therapeutic use of physical methods is not invasive. Basically, a physical method can be applied in two ways. The first method is applying electrical energy directly to the body. This, for example is done using Tens-Appiances. The layman is very surprised when he/she is shown

that using very small amounts of energy applied to the peripheral nerves in this way cause enormous changes in respect to the activity of the brain. Thus, the Motto: a lot helps a lot (For example: the electroshock therapy as treatment for depressions) does not always hold true. In the second method, the energy is inserted into the body on an indirect route. This is done by using the principle of magnetic fields. Here also, there are examples in which a large amount of energy is transferred by induction, as for example in the cases where depressions are treated with trans-cranial magnetic stimulation (TMS), a method that could also be listed under "Soft Electroshock Therapy". However, it remains basically unchallenged that one can influence electro-chemical processes by means of small amounts of energy. This also remains topic for ongoing research. The problem concerning the therapeutic use of smaller amounts of energy, however, is partly to be found in the fact that the knowledge regarding the biophysical processes at the molecular level (where one wants to act) has remained very incomplete to this day. It is, therefore, not at all surprising, that in this respect, a lot of therapeutic methods using magnetic fields (especially in respect to the various frequencies) have been tried out, without knowing the scientific basis for the application of specific frequencies. And thus, it can hardly surprise, that in the past therapeutic successes have not been recognised and that a general acceptance of the "Magnetic Field Therapy" as shown by the expertise of Prof. Krone did not take place, although the effectiveness of special frequencies could not be ruled out.

This changed drastically with the introduction of a new procedure producing illustrative results using nuclear magnetic resonance. The success of using the knowledge regarding this physical principle at the atomic level as a diagnostic tool has led to a world-wide rise in research activities in this field. The results of this research have now also found usage in the therapeutic application of the nuclear magnetic resonance effects in the form of the MBST technology by the company MedTec Medizintechnik GmbH, in Wetzlar. That application is now under discussion. The use of a special frequency, known as the Larmor frequency of the Hydrogen atoms (protons) for therapeutic aims in the MedTec appliances is absolutely new. Therefore, patents for this usage have been applied for and have been granted world-wide. By means of a complex technical controlling module and a highly complex system of air-cored coils, the radio frequency and the special low-frequency field that is modulated into the main field are generated. In that way, proton resonance is induced.

### **Technical Background**

In respect to the application of magnetic fields for therapeutic purposes, one must make a fundamental differentiation between:

- a) static magnetic fields
- b) pulsating magnetic fields
- c) nuclear magnetic resonance effects on the basis of the Larmor frequency of protons



As the influences of these three types of applications on living matter are very different, one must clearly warn against confusions as it is often encountered in the laymen's press.

Ad a): The importance of static magnetic fields in nature has been well documented in the scientific literature. It is therefore not subject of this expertise. Whether, and to what extend, this knowledge can be used for therapeutic purposes remains quite unknown to this day.

Ad b): The importance of pulsating magnetic fields has been discussed in two ways in the pertinent scientific literature. On the one hand, there is the founded suspicion that humans are submitted unwanted to pulsating magnetic fields caused by mobile phone technology, the effect of which has hitherto not be conclusively clarified. A double-blind, placebo-controlled randomised study (Reiser et al., 1995), for example, shows a distinct impact on the electric brain action in humans. On the other hand, in many studies pulsating magnetic fields have examined in respect to their effectiveness on living matter, with the ultimate aim of using them also as therapeutic tools. Also in this respect, the scientific literature reports some successes, that, however cannot be generalized because the studies had a heterogeneous design and with the application of greatly varying frequencies for a number of different medical indications. A comparison with the MBST method that is to be evaluated in this expertise is therefore by no means permissible.

Ad c): The application of the principle of nuclear magnetic resonance on the basis of the well-known nuclear magnetic resonance tomography using static as well as dynamic magnetic fields for therapeutic purposes is, however, from the scientific point of view a fledgling method. The reason for this may well be, among others things, the fact that this technology was developed just a few years ago. This technology is offered in therapy appliances under the designation of MBST-technology. As this technology is very new, the availability is, of course, still rather limited. In respect to the principle of inducing a special nuclear magnetic resonance of protons on which the MBST-technology is founded, and in respect to the practical application of the principle in the therapeutic equipment as offered by MedTec GmbH, I refer to the expertise by Prof. Dr. Jacob of the University of Würzburg. Said expertise states clearly, that the

therapeutic appliances offered by the company MedTec Medizintechnik GmbH, Wetzlar have all the necessary characteristics for the induction of special nuclear magnetic resonance (Jacob, 2005), and that said appliances differ from all usual appliances from a purely technical point of view quite clearly, as those other appliances work only with one of the two other forms of magnetic field application (static or pulsating). Furthermore, the magnetising by the MBST-System is carried out using the so-called Fast Adiabatic Passage (FAP) method. The technology used in the MBST-System is therefore unique. Scientific studies regarding the therapeutic effectiveness have hitherto become available in a limited quantity. These studies are discussed below.

## Hypothetical Principle of Function

The molecular basis of the electric activity in individual cells is bound to the presence of ion channels within the cell membrane, the organelle separating the inside of the cell from the outside environment. Those ion channels are constructed out of large protein structures that by their structure allow the very selective passage of certain ions through the membrane, or in the inverse sense can selectively inhibit the passage of certain ions. In contrast to the generally known flow out of the wall socket, the load carriers in the living tissue are ions and not electrons. Ions are negatively or positively charged atoms such as  $K^+$  (potassium),  $Na^+$  (sodium),  $Ca^{2+}$  (Calcium),  $Cl^-$  (chlorine), but also  $H^+$  (protons). Ion channels that are selective for the latter are also referred to as proton channels. Recent research in this area has shown that the various channels, that are different from each other (among other things) in respect to their conductivity, can be linked to biological functions. For example, proton channels can be linked to the receptor for vanillic acid. This receptor plays a role in the transfer of pain (Hellwig et al., 2004). An alteration of the flow rate of the protons through these channels as induced by a change of the energy level of the protons (as caused by nuclear magnetic resonance) would therefore have a distinct impact on the sensation of pain. The importance of proton channels, the rapid transport of protons, energy transferring membrane proteins and enzymes have been clarified by new studies (for example Pomes and Roux, 2002; Miloshevsky and Jordan, 2004). Thus, an explanation of the successful reduction of pain sensed after treatment with the MBST-Technology can be explained on the basis of quantum mechanics.

### Pre-clinical results when using Nuclear-Magnetic-Resonance-Therapy (MBST)

#### 1. Harmlessness by direct field impact *in vitro* (Cell cultures).

Just as for any other new form of therapy it is important to clarify, at a very early stage, whether the new therapy could possibly cause negative effect on the organism. More and more, this kind of study is done on *in vitro* models using primary cell cultures (another reason is to limit the number of animal tests). In this kind of study cell deaths (for example caused by apoptosis) or delayed growth can be observed directly by observation through the microscope. The observation cannot result in a qualitative as well as in a quantitative result. A study with the aim to evaluate the possible risks of a treatment with the MBST-Technology was therefore quite indicated. By means of a prospective study using primary chondrocytes and osteoblasts, Temiz-Artmann et al. (2005) were able to report in their publication that the application of the magnetic fields of the MBST-System to the primary cell cultures for nine (9) periods of thirty (30) to sixty (60) minutes each, had no negative effects whatsoever on the cell cultures. The viability of the cultures was verified and evaluated using the accepted Trypan Blue elimination technique. Apoptosis was evaluated using a commercially available kit. Positive controls in the presence of  $H_2O_2$  (which causes cell death) were run parallel to the study groups. The duration of the application of the magnetic

fields was the same as the duration applied during the clinical therapy and can therefore be regarded as being relevant. In addition to this positive result, a tendency towards enhanced cell growth could be observed. This tendency could, however not be statistically secured as the method used was the counting of selected randomised fields of view in which the cells, at the end of the experiment were just about confluent (grown together without visible transition. The cell count at the time of day 15 did, therefore not allow for the expectation of a more distinct result. The difference in proliferation rate of 271 respectively 290 % were rather low in view of a total proliferation rate of nearly 1400 %. Because of the distribution of the measurement point these differences could not be considered statistically relevant as compared to the placebo. It must be noted as an unfortunate fact that the authors did not determined the total protein content of the cultures. These total protein measurements would have allowed for a more distinct evaluation of the rate of cell growth and would have been easier to submit to statistic evaluation. Nevertheless, this work of deserves special attention as it did not reveal any indication that the method had any negative effects on the tissue. On the contrary, the study shows for the first time that the MBST-Method caused a proliferation of the chondrocytes as well as of the osteoblasts. Assuming that these results can be confirmed in future studies, this would mean that the results has their own, special relation to the clinical-therapeutic application of the MBST system as in nearly all patient treated, degeneration of cartilage tissue has been diagnosed. A positive effect in this direction could not be overrated in any way and justify just about any effort.

## **2. Alterations in the protein synthesis in fibroblast cultures.**

After the appearance in the pertinent literature of a large number of publications regarding the effects of magnetic fields upon biological cells, it was but natural, to also test the new form of the Nuclear-Magnetic-Resonance Therapy on a similar model. For that purpose, Prof. Dr. Artmann, University of Aachen (Artman, 2006), carried out a study using the new technology and fibroblast cultures. In this experiment, the testing was sensibly not only done against placebo controls, but also against controls that had been submitted to a static magnetic field. In this way, it would not only be possible to study the possible effectiveness of the MBST-Therapy, but there would also be an evaluation of the different of the MBST-Therapy as compared to the use of static magnetic fields. The results confirmed the anticipated and hoped for data in a very impressive way. In a study lasting 12 (twelve) hours (6 x 2 hours daily), distinct differences between the application of the placebo and the application of a static magnetic field on the one side and the application of the MBST System on the other side were determined and recorded. In the latter case (application of the MBST System) there was a significant change in protein synthesis. Hereby there was an increase in the production of some proteins and a decrease in the production of others to be observed. This observation could neither be made in the placebo group nor in the group submitted to the static magnetic field. On the basis of comparative analysis with the help of a Proteome chart of a humane line of fibroblast cells, the proteins involved could be classified (subject to verification) mainly to the structural and



regulating protein classes. Because all collagen fractions were involved, the author interprets these changes in the sense of a possible positive interference caused by an improved hydration as the result of the MBST-Application. Interestingly, a class of the proteins involved also comprised proteins of the inflammatory signal channels, which is an indication for the influence of the MBST-System on inflammatory procedures in the body. This result possibly represents a direct correlation to the positive action of the MBST-Therapy in respect to inflammatory procedures within the scope of the treatment of joint disorders as observed by the patients. These extensive and very elaborate examination do not only prove that the MBST-Application causes a biological impact, but they also show very clearly that there is indeed a difference between the application of the MBST Method and the application of static magnetic field, as had been assumed and expected.

### **3. Regeneration capacity of rat liver.**

After having achieved a positive effect of the application of the MBST-Therapy at the cellular level, it seemed worthwhile and meaningful to also test the effect of the system at the organ level. A promising animal model for the testing of the hypothesis of causing a positive influence upon the regeneration of rat liver was to supply information. As can be deduced from the report given by Prof. Dr. Spiegel of the University of Münster (Hölzen et al., 2006), rats that had been submitted to a surgical resection of the majority of their liver were submitted to a 4 day post surgical treatment with the MBST-Therapy. For this purpose, the animals were put into narcosis for 60 (sixty) minutes (the normal therapy time) submitted to the actions of the MBST-System. In total, 6 (six) groups were formed, each with 2( two) controls, 2 (two) submitted to the impact of the MBST-System as applied for the arthrosis therapy and 2(two) submitted to the impact of the MBST-System as applied for the treatment of osteoporosis. The applications were identical with those used under clinical circumstances. Measurement parameters were blood parameters as well as histological parameters. The application of the MBST-Therapy resulted in statistically significant differences in respect to two important parameters, namely the regeneration volume of the resected liver and the mitosis rate as evaluated by histological methods. The differences were evaluated against the controls at the level of 5% probability of error. The results of the experiment clearly show that the application of this special form of magnetic field therapy by means of nuclear magnetic resonance has a practical therapeutic use.

### **4. Post-traumatic gonarthrosis in rabbits.**

The verification of an indication of Human Medicine in the animal model is a very widespread procedure in the field of the development of medicines. This is done in order to be able take measurements that cannot be taken on the living human body. For this reason, it was but logical to evaluate the effect of a MBST-Therapy in an animal experiment. In this way, a clear proof of effectiveness could be carried through. For that purpose, Jansen and his co-workers at the University of Münster (Jansen et al., 2006), did knee surgery on 12 (twelve) rabbits. In the animals, the anterior cruciate ligament



was removed in order to obtain an instability that demonstrates itself in a post-traumatic osteoarthritis. The evaluation of the production of osteophytes showed a statistically significant ( $p < 0.05$ ) increase of 100% when the animal was submitted to active MBST-Therapy. The total macroscopic score showed significantly lower values for the active group. This means that under controlled laboratory conditions a therapeutic intervention by means of the MBST-Therapy in vivo in animals was proven.

## **Clinical results when using Nuclear-Magnetic-Resonance-Therapy (MBST)**

### **1. Influence on the symptoms of arthrosis.**

After the proof for the biological functionality of the application of the NuclearMagneticResonanceTherapy was given both at the cellular as well as at the organ level, we must now turn to the question of the therapeutic usability of the system. In contrast to the general impact on biological system, we must now talk about the effectiveness for specific indications. Following multiple literature reports about the effectiveness of pulsating magnetic fields when used to treat orthopaedic indications, Krösche and Breitgraf (1998) carried through a prospective application of the MBST-Therapy on thirty (30) patients suffering from pain of multiple joints. As for some patients more than one joint was involved, a total of 44 (forty-four) treatments were made. Gonarthrosis was documented for 27 (twenty-seven) patients. The measurement standard used was an analogue scale in 6 parts for the evaluation of overall feeling, pain frequency, pain intensity, reduction of mobility, swelling, hyperthermia, reddening and malaise. Six (6) weeks after the treatment, 20 (twenty) patients (66%) showed improvement, 8 (eight) patients (26.7%) showed no improvement and 2 (two) patients (6.7%) showed a worsening of their condition. Five (5) patients had a follow-up treatment along the same scheme. Three (3) of these patients subsequently showed an improvement of their condition. Seen under the view point that this study was performed under daily routine conditions, the results are remarkable, especially in view of the fact that except for an occasional feeling of warmth and occasional tingling, no side effects of the therapy could be noted. Looking at the total result, including the result of the follow-up therapy, 76.7 % of the patients witnessed an improvement of the condition in all joints that had been submitted to the therapy. In the opinion of the authors, this proves that the MBST-Therapy is an effective innovative mode of therapy for people suffering from arthritic disabilities.

Dr. Klatsch of the clinic "Spittal an der Drau", Austria comes to a similar positive conclusion on the basis of his therapy observations, the results of which were presented at the 27th yearly congress of the Austrian Orthopaedic Society in Graz (Klapsch, 2003). The author mainly treated knee ankle joints (34/11) in the context of a five hour therapy and 68 (sixty-eight) patients (52/7) in the context of a nine hour therapy. Evaluated was the subjective contentment of the patient, the level of pain at rest, the level of pain under stress as well as the function ability of the joint. Very good to good results were obtained for 70% of the patients submitted to the

short (5 hour) therapy and for 73.5% of the patients submitted to the long (9 hour) therapy. Although these results, as the author states, should, only be considered to represent a trend, these results do represent a certain basis of experience that should be used as the foundation for the planning and design of future double-blind, randomised and placebo-controlled studies.

## **2. Regeneration of cartilage structured damaged by gonarthrosis.**

In respect to this topic, the pertinent literature reveals the work of Prof. Dr. Froböse, Cologne (Froböse et al., 2000). In his publication Froböse reports on the application of the above mentioned NuclearMagneticResonance-Therapy on 14 (fourteen) patients diagnosed with gonarthrosis. The success of the treatment was made visible using a technically strongly enhanced illustrative tomography method that is equally based on the principle of nuclear magnetic resonance. The mean density of the cartilage structures of the patella and the tibia were compared before and after the treatment with the NuclearMagneticResonanceTherapy. For both structures, statistically relevant differences between the values obtained before and after the treatment could be documented. Of course, when such results are presented, there is always the question why the study was not carried out following the double-blind, placebo-controlled principle. However, in view of the fact that the measurement results show a distinct approach towards the values obtained in healthy individuals, the study must be valued relatively high, especially the authors state that no comparable results had ever been presented before.

Further proof for the effectiveness of the MBST-Therapy when used for the treatment of gonarthrosis was given by Auerbach and his co-workers at the "Waldkrankenhaus Bad Dübener -orthopädisches Klinikum (Orthopaedic Hospital). Their results were presented at the German Orthopaedic Congress in Berlin (Auerbach et al., 2005). In this study sixty (60) patients that had been diagnosed with cartilage disorders were treated for one hour each on five days in a row using the therapeutic equipment produced by the company MedTec Medizintechnik GmbH, Wetzlar. The results of the treatment were evaluated using various internationally recognised analogue scales and questionnaires. The results could be evaluated on fifty-nine (59) patients directly after the treatment as well as two (2) and six (6) months after the treatment. For all evaluation criteria (in total 7 criteria), a statistically significant improvement as compared to the condition before the treatment could be documented. Time dependent, pain levels as well as the degree of stiffness of the joint and the functionality of the joint could be documented as being improved. The improvements were parameter dependent 6-15% directly after therapy, 19-27% two (2) months after therapy and 32-40% six (6) months after therapy. Even in a further evaluation made one year after the termination of the therapy, the therapy success could still be clearly recognised.

This distribution over time is very remarkable as these results allow for only one interpretation: the NuclearMagneticResonanceTherapy initiates long-term structural healing processes that are possibly based on alterations of protein synthesis (see the section on Pre-Clinical results).

### **3. Therapeutic effectiveness when treating patients suffering from osteoporosis.**

Osteoporosis is defined as a pathological, painful condition of the body caused by a bone mass volume that is lower than the value of healthy individuals of similar age. The diagnosis of this disorder is made using various methods among which the Quantitative Computer Tomography (QCT) may well be the method of choice. For the use of the NuclearMagneticResonanceTherapy for treatment of this indication we have the observation results of our colleagues Overbeck, Gerhardt and Urban (Overbeck et al., 2004). The observations were made in three specialised surgeries and in one therapy centre. The observations give concrete evidence for a useful application of the NuclearMagneticResonanceTherapy on patients diagnosed with osteoporosis. In total, twenty-seven (27) patients with diagnosed osteoporosis were treated. For all patients the density of the bones had been measured and the results were available. The therapy series comprised 10 treatments of one hour each on ten (10) days (without a break) over a period of two (2) weeks. Over a period of six (6) months, the bone density was measured four (4) times: before the therapy was started, about six (6) weeks after the start of the therapy, three (3) months after the start of the therapy and six (6) months after the start of the therapy. The therapy was generally considered to be painless, having no side effects, and as being gentle. The evaluation of the results obtained from twenty-one (21) patients for whom a complete set of data was available revealed highly significant improvements in respect to the pain situation, pain frequency and bone density. Although the bone density was measured using two different methods, an evaluation could be made for the single individuals. The fact that there is no control group or alternative method is not to be considered negative in this area of indication as the clinical aspects of osteoporosis do not improve by themselves. The successes achieved by means of the NuclearMagneticResonanceTherapy speak for themselves, even when they have hitherto become evident only by means of observations during therapy. As medical doctors today still orient themselves primarily on the basis of their personal experience (as we have already discussed above), it is quite normal that the authors are enthusiastic about their results as shown in their final statement: "The fascinating thing about the MBST-NuclearMagneticResonanceTherapy is its high level of effectiveness by no known side effects. Our results show that the increase of the bone density and therefore the increase of stability is achieved faster by means of the MBST-NuclearMagneticResonanceTherapy than by means of any other therapy."

### **4. Therapeutic effectiveness when treating patients suffering from back pains.**

Back pains are a big problem in our population. Often, they can only be treated on a symptomatic basis. For this reason physiotherapeutic measures are often complemented by additional therapy methods. Docent Dr. Kullich and his co-workers at the Ludwig Boltzmann Institute of the PVA Saalfelden, Austria have therefore studied the implications of an additional



treatment with the MBST-NuclearMagneticResonanceTherapy. The patients were submitted to the therapy for 1 hour at the time, for five days in a row. The study was performed on a double-blind, placebo controlled, randomised scheme, and the result compared in combination with physiotherapy. The results were presented before publication at the yearly congress of the Austrian Society for Rheumatology and rehabilitation in Vienna, Austria (Kullich at al, 2005) and are now in the process of being published. The study comprised 62 patients that were all treated with the usual physiotherapeutic measures. Thirty (30) patients were additionally treated with the MBST-NuclearMagneticResonanceTherapy, whereas the remaining thirty-two (32) patients were treated with placebo. The results show a distinct statistical significant superiority of the combination therapy as compared with the physiotherapy and additional placebo treatment. This superiority could be shown for just about all parameters, for example of the visual, analogue pain evaluation scale or of the impairment evaluation score according to Oswestry. The improvements were shown for the results obtained one week after the start of the therapy as well as for the evaluations made three (3) months after the therapy (Kullich et al., 2006). Again, in this new study carried out according to the modern criteria, no side effects related to the MBST-NuclearMagneticResonanceTherapy could be observed.

### **Studies in Progress**

In addition to the studies that have been completed and that we have discussed above, further studies are in progress. The single studies in progress today can be listed as follows:

1. Melzer, C., Handschuh: Evaluation of the effectiveness of the MBST-NuclearMagneticResonanceTherapy for the treatment of degenerative disorders of the spinal column. This study is double-blind, placebo-controlled, randomised and comprises one hundred (100) patients.
2. Melzer, C., Handschuh: Evaluation of the effectiveness of the MBST-NuclearMagneticResonanceTherapy for the treatment of whole-body osteoporosis. This study also is double-blind, placebo controlled, randomised and comprises one hundred (100) patients.
3. Moser, Ausserwinkler: Evaluation of the effectiveness of the MBST-NuclearMagneticResonanceTherapy for the treatment of arthrosis of the finger joints. This study also is double-blind, placebo controlled, randomised and comprises one eighty (80) patients.
4. Happack: Evaluation of the effectiveness of the MBST-Nuclear-MagneticResonanceTherapy for the treatment of degenerative disorders of the spinal column. This study is double-blind, placebo-controlled, randomised and comprises sixty (60) patients.

5. Graf, Happack: Evaluation of the effectiveness of the MBST-Nuclear-MagneticResonanceTherapy for the treatment of arthritic disorders of the hip joint. This study is planned and will comprise sixty (60) patients.

### **Evaluation of the results of completed studies**

The evaluation of the scientific material available today in connection with the effectiveness of the MBS-Therapy is without exception positive. Even under the consideration that the available data is in part "merely" the result of observations or based on experience, one must note that the pre-clinical and clinical studies have resulted in sufficient firm data that have been presented at scientific congresses and/or have been published in recognized journals. For that reason, a qualitative evaluation is quite possible.

There can be no doubt in respect to the effectiveness of the Therapy form under discussion for the treatment of arthrosis. Furthermore, if one takes into consideration, that even today, the therapy carried out by the medical profession is mainly based on the experience of the people involved, and not on the so-called "evidence based Medicine"; the material presented here, as based on case studies, experience report and prospective studies that were in part double-blind, randomised and placebo-controlled or were evaluated in comparison with a standard therapy it an extremely solid foundation for a further recommendation to be given to the colleagues. This separated the therapeutic method under discussion from all other therapeutic trials that use static or simple pulsating magnetic fields, the therapeutic value of which has been discussed quite controversially in the pertinent literature. As the technology described here is completely novel therapeutic method, a comparison with past experiences as they have been described in the field of magnetism is neither possible nor permissible.

As a conclusion, it can be stated that the effectiveness of the MBST-Therapy, at least as a method for treating "arthrosis of various joint" has been proven scientifically. A positive symptomatic effect (reduction of pain) during the treatment of degenerative disorders of the spinal column is to be expected with a high probability.

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## **Enclosures**

Reports, Lectures, Publications.