

A DOUBLE BLIND RANDOMIZED CONTROLLED TRIAL OF MAHARISHI VEDIC VIBRATION TECHNOLOGY IN SUBJECTS WITH ARTHRITIS

Tony A. Nader¹, D. Edwards Smith², Michael C. Dillbeck¹, Volker Schanbacher¹, Susan L. Dillbeck¹, Phillipe Gallois¹, Sophie Beall-Rougerie¹, Robert H. Schneider³, Sanford I. Nidich³, Gary P. Kaplan⁴, Steele Belok⁵

¹ Maharishi University of Management, Vlodrop, The Netherlands; ² Maharishi College of Vedic Medicine, Albuquerque, N.M., USA; ³ Center for Natural Medicine and Prevention, Maharishi University of Management, Fairfield, Iowa, USA; ⁴ Dept. of Neurology, North Shore University Hospital, Manhasset, N.Y., USA; ⁵ Harvard Medical School, Cambridge, MA, USA

TABLE OF CONTENTS

1. Abstract
2. Introduction
3. Materials and Methods
 - 3.1. Subjects
 - 3.2. Maharishi Vedic Vibration Technology
 - 3.3. Experimenters
 - 3.4. Experimental design
 - 3.5. Testing procedure
 - 3.6. Statistics
4. Results
 - 4.1. All arthritic conditions
 - 4.2. Peripheral joints
 - 4.3. Conditions of the spine
 - 4.4. Rheumatoid arthritis
5. Discussion
 - 5.1. Control treatment
 - 5.2. Accuracy of assessment
 - 5.3. Mechanism of action
 - 5.3.1. Perspective from Maharishi Vedic Medicine
 - 5.3.2. Perspective of modern science
 - 5.3.2.1. Theories of self-organization and chaos theory
 - 5.3.2.2. Perspective of Unified Quantum Field Theory
 - 5.3.3. Understanding the fundamental basis of creation as a field of consciousness
 - 5.3.4. Additional aspects of Unified Field Theory relevant to the MVVT treatment results
 - 5.3.4.1. Mechanics to produce the observed physiological changes
 - 5.4. Theoretical explanation of variability of the effect
 - 5.5. Conclusion and suggested future studies
6. Acknowledgements
7. References

1. ABSTRACT

To explore ancient Vedic medical techniques, one hundred and seventy-six subjects with arthritis participated in a controlled study through the non-pharmacologic approach known as the Maharishi Vedic Vibration Technology (MVVT). Using a double-blinded and randomized experimental design, the findings showed significant reductions of pain and stiffness, and improvement in range of motion in the study sample. One hundred percent relief of symptoms was the most commonly reported category of improvement due to treatment. For the group as a whole, differences in mean response of treatment and control conditions with respect to relief of pain, limitation of motion, and reduction in stiffness were highly significant: t values ranged from a low of 5.609 in stiffness to a high of 20.950 in pain, $p = 0.000009$ to $<10^{-49}$ respectively. Analysis by sub-categories of peripheral arthritis, painful conditions of the

spine, and rheumatoid arthritis likewise produced significant results. Mechanisms of action were proposed, drawing on Maharishi Vedic Science, developments in quantum field theory, and specifically the theories of chaos and self-organizing systems as they relate to physiological functioning. The instantaneous relief of pain and improvement in function in such a high proportion of subjects with chronic arthritis is unparalleled in modern medical science.

2. INTRODUCTION

According to the Arthritis Foundation, arthritis is the primary cause of disability in the United States, with over 100 different forms of the disease affecting 40 million individuals (1). Musculoskeletal conditions such as osteoarthritis are estimated to cost the U.S. economy \$64.8

Vedic sounds instantly improve arthritis

billion annually (1) consuming a major portion of health care dollars and ranking among the top three health care problems in the developed world (2). Osteoarthritis, also called degenerative joint disease, is the leading cause of disability in the elderly, with 60-70% of all individuals between 60 and 80 years of age suffering from osteoarthritis of the knees (3). Osteoarthritis is characterized by joint pain, deformity, and limitation of motion (4).

Rheumatoid arthritis affects more than 2.1 million people in the United States alone. While the numbers are less than in osteoarthritis, rheumatoid arthritis may begin at a younger age and tends to produce permanent damage to the joints (1).

Back pain caused by arthritis and disc disease affects 60-80% of adults in the United States at some time in their life (5). The literature suggests that exercise, fitness, use of supports, and educational strategies to prevent low back pain have little to no effect on this disorder (5). A recent study in the Netherlands of the management of chronic low back pain by primary care physicians showed that they treat the condition inconsistently, and resort to prescribing non-steroidal anti-inflammatory drugs (NSAIDs) for 35% of their subjects (6).

Specialists caution that from the use of such drugs for arthritis considerable risks are being recognized in older populations (7). About 70 million prescriptions for NSAIDs are written in the US each year (8). These drugs account for an estimated 7,600 deaths and 76,000 hospitalizations in the U.S. annually due to gastrointestinal side effects (9). Treatment of gastrointestinal side effects produced by NSAIDs alone accounts for one-third of the total cost of arthritis therapy (10).

Leading medical authorities state that no cure exists for osteoarthritis and rheumatoid arthritis (7). Despite millions of dollars spent on research, conventional medical treatment provides only incomplete relief for most arthritis sufferers.

A new program for the relief of specific diseases, the Maharishi Vedic Vibration Technology (MVVT) has recently been made available by Maharishi Mahesh Yogi, who more than 40 years ago began teaching the Transcendental Meditation program worldwide. Transcendental Meditation is a technology of consciousness whose benefits have since been validated by over 600 scientific research studies. (11-14).

MVVT is part of an age-old system of natural medicine brought to light by Maharishi in his Vedic Science, the science of consciousness, which is described as containing the total knowledge of Natural Law available in the ancient Veda and Vedic literature (15). Scientific investigation on the application of Vedic knowledge to health, referred to as Maharishi Vedic Medicine, has been carried out for several decades (11-14).

A recent discovery brings out a precise relationship between the structures and functions of the different aspects of the Vedic literature and the structures and functions of the human physiology, leading to the conclusion that the human body is a replica of Veda (16). The sounds of the

Veda have been described as the intelligence that structures the human physiology (15). These sounds are used in the MVVT treatment to enliven the orderly functioning of the physiology, and thereby relieve pain and cure disease.

The present study evaluates the application of MVVT on subjects suffering from chronic pain, or swelling, or stiffness, or limitation of motion of peripheral or spinal joints and who had been diagnosed as having arthritis by their family physician or specialist.

3. METHODS

The experiment presented here was part of a larger study in which a wide range of disorders were treated. These included migraine and tension headache, asthma, neurological disorders and chronic gastrointestinal pain (unpublished data).

3.1. Subjects

Adult men and women of all ages who had previously been diagnosed as having a chronic arthritic condition of the joints or spine were invited to participate in this study. In addition the subjects were required to have active symptoms of pain, limitation of motion, or stiffness when they came for treatment. Upon arrival, they were asked to state in writing the type of arthritic condition as diagnosed by their own physician, describe their symptoms, and give the duration of their arthritic condition. All subjects were required to sign a consent form to enter the study. There were no other exclusion criteria.

3.2. Maharishi Vedic Vibration Technology

The trained expert of the MVVT uses a technique of consciousness as taught by Maharishi Mahesh Yogi. Maharishi has explained that the MVVT technique makes use of impulses of Natural Law in the form of sound, which is silently projected at the most subtle level of thought—at the finest and simplest level of human awareness. The expert practicing the technique directs attention towards the area or problem being treated. The treatment session lasts between 30 seconds and several minutes.

Each expert has been trained by Maharishi Mahesh Yogi to attend to some but not all the diseases. One male and one female expert trained to treat joint and spine diseases have participated in this study. They treated respectively the male and female subjects. Experts trained in the treatment of the other diseases, such as asthma, skin diseases, gastrointestinal disorders and nervous system disorders also participated in this study, providing the control treatment as described below.

3.3. Experimenters

Qualified medical professionals and other trained non-medical assistants questioned the subjects before and after their treatment with respect to their symptoms or signs.

3.4. Experimental Design

The subjects completed history and consent forms. They were interviewed and examined by the experimenters, who randomly assigned them to either experimental or control treatments to be given by the expert

Table 1. Relief from pain after treatment

Degree of Relief	# of Subjects	Duration of Problem		
		10-41 years	3-9 years	0-2 years
100% Relief	64	23	30	11
80% Relief	42	20	14	8
60% Relief	21	11	6	4
40 % Relief	18	8	7	3
Less than 40%	31	15	5	11
Total	176	77	62	37

This table summarizes the distribution of results on relief of pain for all categories of joint and spine disorders, and the duration of the participants problems. The three middle categories of degree of relief are the aggregate number of cases in the interval between the percentage listed (e.g., 80%) and that listed on the line above.

in the MVVT treatment. The experimental treatment consisted of the 30 second to several minute treatment of the subject by the expert trained to treat joint or spine disease. The control treatment consisted of the 30 second to several minute treatment of the subject by an expert who was not trained to treat joint or spine disease but was trained to treat either asthma, skin disease, gastrointestinal disorders or nervous system disorders. Thus the control treatment consisted of an actual MVVT treatment but for a condition of which the subject did not complain. Neither the expert nor the subject knew whether the prescribed treatment was the experimental or control intervention. The subjects then reported their evaluation of change and were examined by the experimenters. Those who had received an experimental treatment first and experienced complete relief did not receive a control treatment. Those who got a control treatment first and had less than complete relief then received an experimental treatment, following which they again gave their subjective evaluation and the experimenter reported his assessment. . There was no more than ten minutes delay between control and experimental treatments, this being the time required to evaluate the results of either the control or experimental treatment. Thus each subject was studied as his/her own control on separate control and experimental occasions.

3.5. Testing procedure

The subjects were asked to report their subjective evaluation. They were also evaluated by the experimenters before and after the treatment for the same symptoms and signs of pain, range of motion and stiffness. Both subject and experimenter used the same scale of change from 0% to 100%. 0% relief of pain indicates no change; 100% relief of pain indicates disappearance of pain over the full range of motion. For range of motion, 0 indicates no change and 100 indicates regaining full range of motion. For stiffness, 0 indicates no change and 100 indicates no stiffness over the full range of motion.

3.6. Statistics

Distribution of responses to treatment are reported, followed by paired *t*-tests of differences in means of control and treatment scores (one-tailed test, since the direction of change is clearly predicted). Significance was reported in terms of *p* values.

4. RESULTS

The results are presented first for all arthritic conditions, and then separately for peripheral arthritis (exclusive of rheumatoid arthritis), painful conditions of the

spine, and rheumatoid arthritis. For each of these categories, the results for relief of pain, improvement in range of motion, and relief of stiffness are reported.

4.1. All Arthritic Conditions

One hundred and seventy six subjects with painful conditions of the joints and spine participated in the experimental double-blind controlled study. Sixty-four subjects experienced 100% relief of pain as a result of treatment and 127 of the 176 cases experienced 60% or greater relief of pain following the treatment (Table 1). For the control condition 19 of 176 cases experienced 60% or more relief of pain and none experienced 100% relief. Distribution of response scores was not Gaussian, since 100% relief was the modal, or most typical, response to the treatment. Nevertheless *t*-tests were appropriate since this test procedure is highly robust, giving accurate probability values even when the assumption of Gaussian distributed data is not met. The differences between mean treatment and control response was highly significant, $t(175)=20.950, p<10^{-49}$. The effect size was 1.58 for reduction in pain due to treatment in comparison to the control condition.

Twenty-four subjects reported limitation in range of motion. Of these there were 4 cases who experienced 100% and 14 cases who experienced 60% or more improvement in range of motion as a result of treatment (Table 2). Only one person in the control condition showed 60% or more improvement in range of motion, and none showed 100% improvement. The difference in mean response for treatment and control conditions was highly significant, $t(23)=7.023, p=0.0000002$. The effect size was 1.43 for improvement in range of motion due to treatment in comparison to the control condition.

Twenty-one cases reported joint stiffness. Of these there were 4 cases who reported 100% improvement and 12 cases who reported 60% or greater improvement of stiffness due to treatment (Table 3). Only two people receiving a control condition reported 60% or greater improvement in stiffness; none showed 100% improvement. The difference in mean response for treatment and control conditions was again highly significant, $t(20)=5.609, p=.000009$. The effect size was 1.22 for improvement in stiffness due to treatment in comparison to the control condition.

4.2. Peripheral Joints

When painful conditions of the peripheral joints were considered separately, exclusive of those cases of previously diagnosed rheumatoid arthritis, there were 62

Table 2. Improvement in range of motion after treatment

Degree of Improvement	# of Subjects	Duration of Problem		
		10-30 years	3-9 years	0-2 years
100% Relief	4	0	2	2
80% Relief	9	7	1	1
60% Relief	1	1	0	0
40 % Relief	4	0	1	3
Less than 40%	6	1	1	4
Total	24	9	5	10

This table summarizes the distribution results on improvement of range of motion for all categories of joint and spine disorders, and the duration of the participants problems.

Table 3. Relief from stiffness after treatment

Degree of Relief	# of Subjects	Duration of Problem		
		10-41 years	3-9 years	0-2 years
100% Relief	4	0	3	1
80% Relief	7	6	1	0
60% Relief	1	0	0	1
40 % Relief	4	1	0	3
Less than 40%	5	1	1	3
Total	21	8	5	8

This table summarizes the distribution of results on relief of stiffness for all categories of joint and spine disorders, and the duration of the participants problems.

cases of which 26 reported 100% relief and 42 cases reporting 60% or greater relief of pain due to the treatment, while in the control condition 7 cases showed 60% or more relief of pain and none showed 100% treatment in contrast to the control condition. The difference in mean response between treatment and control conditions was highly significant, $t(61)=11.223$, $p<0.000000001$. This reflected an effect size of 1.43 for relief of pain due to treatment in contrast to the control conditions.

Eleven cases reported improvement in range of motion in the peripheral joints. Of these, three cases experienced 100% and 5 cases experienced 60% or more improvement in range of motion due to treatment, while in the control condition only one case showed 60% or greater improvement and none showed 100% improvement. The difference in mean response between treatment and control conditions was statistically significant, $t(10)=3.375$, $p=.0035$. The effect size was 1.02 for improvement in range of motion due to treatment in comparison to the control condition.

Nine cases reported stiffness of the peripheral joints. Of these, 2 experienced 100% improvement of stiffness and 4 experienced 60% or greater improvement of stiffness due to treatment, while in the control condition only 1 case showed 60% or more improvement and none showed 100% improvement. The difference in mean response between treatment and control conditions was statistically significant, $t(8)=2.309$, $p=0.025$. The effect size was 0.77 for improvement in stiffness due to treatment in comparison to the control condition.

4.3. Conditions of the Spine

When painful conditions of the spine were considered separately, there were 110 cases; out of these 38 reported 100% relief of pain and 81 cases reported 60% or

greater relief of pain due to treatment, while in the control condition 11 cases showed 60% or more relief and none showed 100% relief. The difference in mean responses between treatment and control conditions was highly significant, $t(109)=17.471$, $p<10^{-32}$. The effect size was 1.67 for relief of pain due to treatment in contrast to the control condition.

Twelve cases reported limitation in range of motion in the spine. Of these 12, one case reported 100% improvement and 9 cases reported 60% or greater improvement due to treatment, while no one in the control condition showed 60% or more improvement. The difference in mean response between treatment and control conditions was highly significant, $t(11)=8.811$, $p=0.0000013$. The effect size was 2.54 for improvement in range of motion due to treatment in comparison to the control condition.

Eleven cases reported stiffness of the spine. Of these 11, two reported 100% improvement and 8 reported 60% improvement or greater due to treatment, while only one case in the control condition showed 60% or more improvement and none showed 100% improvement. The difference in mean response between treatment and control conditions was again highly significant, $t(10)=7.913$, $p=0.000006$. The effect size was 2.39 for improvement of stiffness due to treatment in comparison to the control condition.

4.4 . Rheumatoid Arthritis

When those cases which had been previously diagnosed as having rheumatoid arthritis were considered separately, four cases were identified. Of these none reported 100% relief but all 4 reported 60% or greater relief from pain in the joints as a result of treatment, while in the control condition, 1 case showed 60% or more relief from pain and none showed 100% relief. The difference in mean response between treatment and control conditions was

Vedic sounds instantly improve arthritis

statistically significant, $t(3)=3.576$, $p=0.019$. The effect size was 1.788 for relief of pain due to treatment in comparison to the control condition. There were too few subjects to statistically analyze range of motion and stiffness. Of interest, however, is that these uniformly improved individuals had experienced duration of symptoms of from 4 to 30 years with a mean duration of 14 years.

To evaluate reliability of subject responses, independent observations were also made by experimenters. For the entire group including peripheral arthritis, spinal arthritis and rheumatoid arthritis, with respect to relief of pain, the correlation between the subjective and the objective evaluations was 0.82. This indicates high rate of agreement between the subject and his or her medical evaluator suggesting reliability of subject responses.

In this study we observed no side effects from the MVVT treatment. In no instances did subjects complain of feeling more discomfort after either experimental or control treatments.

5. DISCUSSION

This study shows that the MVVT treatment has a significant effect on the symptoms and signs of peripheral and axial joint disease. A large proportion of subjects had 100 percent relief of pain (36.4% of the participants), even though they reported suffering from their disease for an average of 10.5 years (range 1 week to 41 years).

These results are remarkable for several reasons. First, the results were immediate and produced a high degree of relief of symptoms. One hundred percent relief of pain was the most frequently reported category of change. Second, treatments were highly effective no matter which specific disorder was being considered, suggesting that a more fundamental level of benefit common to all these disorders was being achieved. Third, duration of disease appeared to be no barrier to producing relief, which differs from the usual experience in which the best results are seen in cases where the disease has been present for the shortest period of time. Fourth, while relief of pain—which is the most troubling aspect of the disease—was regularly achieved, significant improvement in function, as judged by range of motion and stiffness, was also noted in multiple subjects.

5.1. Control treatment

In this study, neither the subjects nor the experts knew they were receiving or giving the control treatment or the relevant treatment. The control treatment differed from the usual placebo for which there are no expected effects: in this case the control was an actual treatment which is used for other diseases such as asthma, gastritis, etc. It could be expected that the control treatments would also have a beneficial effect on the subjects disorders because all systems of the physiology are interrelated, and therefore treatment of one system may produce benefits in another.

This was indeed the case. Of the 176 subjects with painful conditions of the joints no subjects

experienced 100% relief from pain in the control condition, but 19 experienced 60% or greater relief from pain from the control condition. This suggests that control treatments produced beneficial results in some subjects. However, there were 92 subjects who reported 0% reduction in pain from the control condition, clearly indicating specificity of the experimental treatment for arthritis. This is shown in a significant difference between the control and the specific treatments (64 subjects had 100% relief of pain; 127 had 60% or greater relief of pain; and only 8 had 0% reduction in pain). It can be argued that the statistical significance of the response to a specific treatment is even greater since a neutral placebo control might have yielded a lower response score for the control value.

5.2. Accuracy of assessment

No instruments were used to precisely measure range of motion. The assessment of the degree of pain or stiffness experienced through the full range of motion was made by the subject and the experimenter, considering the full range of motion without pain as 100% and no change from the initial condition before treatment as 0%. If the improvement was halfway between 0% and 100%, this was considered as 50%. It is possible that the exact percentage of improvement in this variable as well as in the other variables was not completely accurate. The fact, however, that a large proportion of the subjects responded with one hundred percent improvement indicates a large effect resulting from treatment and an unquestionably clear end point.

When the subject and experimenter both report that there is no indication of any disordered functioning and that the subject feels no pain and no stiffness, and can move his or her joints freely in the full range of motion, this can be considered a reliable report. The fact that the majority of subjects did not respond to the control treatment but to the specific treatment also indicates that the assessments reflect a real physiological transformation.

The non-significant numbers of subjects who had little or no response were subjects who had vague symptoms that they could not clearly identify before or after the treatment. Other subjects who showed lower response scores had severe deformity and calcification of the joints. According to the MVVT, such cases need more applications of this treatment, followed by the other stages of the program in order to experience complete relief.

All subjects had been under conventional medical treatment prior to this study. It was the lack of success with conventional therapies that attracted them to the MVVT.

5.3. Mechanism of Action

This section proposes two perspectives from which to examine the mechanism of action of the MVVT. These perspectives consider the pathogenesis and pathophysiology of osteoarthritis, rheumatoid arthritis, and painful conditions of the spine with reference to the knowledge of natural law available through Maharishi Vedic Medicine and from other areas of modern science.

5.3.1. Perspective from Maharishi Vedic Medicine

From the perspective of Maharishi Vedic Medicine, the human physiology is an expression of the fundamental structures of natural law, which not only underlie the structures and orderly functioning of the body, but also underlie and govern the orderly functioning of the entire universe. These laws exist in an unmanifest form in an unmanifest field of intelligence, or consciousness, called 'atma' in Sanskrit. Modern quantum field theory describes this field of intelligence as the unified field of natural law (15,16).

As the laws of nature express themselves in material creation, they first emerge as waves. These dynamic waves in their subtle expression are available in the sounds of Veda and the Vedic literature. From this perspective, all matter, including cells, tissues, organs and the entire physiology are based on these vibrations of natural law. The sounds of Veda are the intelligence at the basis of the physiology.

Maharishi Vedic Medicine proposes that the human physiology is an exact expression of Veda and the Vedic literature. Recent scientific discoveries have validated that the 40 fundamental aspects of Veda and the Vedic Literature correspond precisely in structure and function to 40 fundamental aspects of human physiology (16).

The Maharishi Vedic Vibration Technology uses the knowledge of these principles and of the specific sounds of Veda and the Vedic literature corresponding to specific parts of the physiology. Using the proper technology, the expert enlivens the intelligence at the basis of that part of the physiology to transform disorderly functioning into orderly functioning.

5.3.2. Perspective of modern science

In presenting a general theoretical framework of how we can understand the extraordinary phenomenon of instant relief, three interrelated questions should be addressed:

(1) How is it possible that a delicate impulse, or stimulus, is capable of producing an instantaneous change from physiological disorder to normal, orderly functioning of physiology? To answer this question we focus, in the first subsection below (subsection 5.3.2.1), on principles from the theories of self-organization and chaos theory. These theories are most appropriate for explaining how a slight change of a parameter or a faint stimulus can bring about a sudden change from disorder to order.

(2) How can a technology of consciousness produce the effects reported in the study? The answer requires knowledge from unified quantum field theory, which is presented in the second sub-section below (subsection 5.3.2.2).

(3) What are the specific physiological processes that occur during the MVVT treatment? This is addressed in the third sub-section below (subsection

5.3.2.3), as well as in the previous Vedic science portion of the discussion.

5.3.2.1. Theories of self-organization and chaos theory

The theories of self-organization and chaos theory are useful in explaining how a delicate impulse or stimulus is capable of producing an instantaneous change from physiological disorder to normal, orderly functioning of physiology:

Recent developments in self-organization theories and chaos theory, as well as directly related topics from non-linear thermodynamics, show that a large class of complex dynamic systems, in particular living systems such as the human physiology, cannot be understood by a naive (linear) analysis of different forces acting between its constituents. Understanding the dynamics and evolution of these systems requires that the property of self-referral displayed by these systems be considered. The importance of the property of self-referral in these systems became clear in the 1970s through the work of Maturana, Varela and Uribe (17,18).

Developments in non-linear thermodynamics, particularly in the area of autocatalytic systems, have made possible the mathematical study of the simplest systems displaying the quality of self-referral. In the autocatalytic systems, the self-referral property is found in the form of autocatalytic and/or cross-catalytic feedback loops. (19). These mathematical studies, which include computer simulations, have led to the understanding of fundamental principles of self-referral systems, which apply also to more complex, hierarchically organized, self-referral systems such as the human body, and directly relate to the MVVT treatment.

In the past decades, such interdisciplinary investigations have given rise to *theories of self-organization*, which have led to a completely new picture of complex dynamic systems. Theories of self-organization study how the self-referral dynamics of complex non-linear systems express themselves in orderly, dynamic, self-organizing structures. The more complex of these systems have the potential to evolve progressively from one state to another. When these self-organizing systems are studied with the use of mathematical models like autocatalytic and cross-catalytic reaction-diffusion models, and corresponding computer simulations, one arrives at the astonishing (experimentally verified) result that self-organizing systems can display a great variety of both orderly and chaotic patterns, all of which are generated through a simple self-referral dynamics at the microscopic level. (Spatial patterns, for example, are studied in (20-24).

The formalism of chaos theory enables one to study the aspects of systems that relate to disorder and order. This theory gives important conclusions of how slight changes in conditions have an essential impact on the patterns displayed by these systems (i.e. butterfly effect). In particular, chaos theory explains that an apparent disorderly dynamics at the macroscopic, or surface, level is often accompanied by a hidden underlying order at the

microscopic level. This finding of order at the depths and disorder at the surface explains how systems can easily shift from disorder to order, as discussed in the following paragraphs.

In particular, the theories of self-organization and chaos theory provide an explanation of how a specific delicate impulse or slight change of a parameter of the system can be used to bring about specific desired results, e.g., to transform chaos or disorder into order. This has been studied mathematically in autocatalytic cyclic reaction chains, whose dynamic patterns easily shift from chaos to order if one slightly varies specific control parameters (like flow of chemicals). (25-28) Further systems with similar behavior are reviewed by Swinney (29).

Analogous results in the field of physiology have been found by Freeman, who studied the firing patterns of neurons of the olfactory bulb related to the sense of smell. (30, 31) He was surprised to discover that the firing patterns of neurons can shift suddenly and dramatically from a seemingly disorderly dynamics to a highly orderly dynamics, the fingerprint of a specific smell. Merely a faint stimulus of the receptor neurons in the nasal passages is sufficient for a shift from disorder to order. Freeman mathematically explained this sudden shift from disorder to order using principles of chaos theory.

This finding verifies that the easy shift from disorder to order found in simple autocatalytic chemical systems [and other simple systems reviewed in (30)] can be extended to more complex systems like the physiology. Freeman's finding further demonstrates that in the physiology a change from disorderly functioning to an orderly coherent pattern is possible by means of the faintest stimuli, like the stimulus of the perception of the neurons in the nasal passages by a few molecules.

Another relevant finding of the theories of self-organization is that a specific action in the form of a field effect can be used to selectively generate a specific orderly pattern. This principle applies to so-called bifurcations (19) at phase transitions, where a field effect can be utilized to actualize one of several possibilities. In the context of the MVVT treatment, this phenomenon means that a field effect of consciousness (please refer to the next subsection) can generate a specific pattern of orderly physiological functioning.

Thus, the theories of self-organization and chaos theory give clear evidence of how a delicate stimulus can transform a disorderly dynamic pattern into an orderly dynamic pattern. This finding is important for the scientific understanding of the MVVT treatments because it reveals the general mechanism that underlies the striking, instantaneous transformation from a state of physiological disorder into a state of orderly physiological functioning.

Application of these general principles of the theories of self-organization can lead to a completely new approach to the treatment of disease. The old approach of cutting out pathological tissues or using potent

pharmaceutical drugs to produce a quick effect is crude in comparison to these delicate and profound principles of the theories of self-organization, which can produce an even more powerful and holistic effect on the physiology as a whole.

5.3.2.2. Perspective of Unified Quantum Field Theory

The previous section considered general principles of systems dynamics that can account for a shift from disorder to order. This section discusses the actual forces or fields that produce and mediate the delicate impulses that cause this shift from disorder to order. In particular, this section proposes how the technologies of consciousness that are an aspect of the MVVT treatment are able to generate specific delicate impulses that have profound effects on the physiology. This explanation includes the most recent findings from unified quantum field theory.

A precise analysis of the technologies of consciousness used by the experts of Maharishi Vedic Vibration Therapy treatment reveals that none of the ordinary four fundamental forces of nature—gravitational force, electromagnetic force, weak nuclear force and strong nuclear force—is capable of mediating the documented effects of this program on the physiology. The inadequacy of using the ordinary four forces to explain the effects of the technologies of consciousness becomes even more obvious if one analyzes the Maharishi Effect (32-43). The Maharishi Effect is a well documented field effect of consciousness that is also generated by a technology of consciousness, Maharishi Transcendental Meditation-Sidhi Program.

The only way to explain the remarkable and scientifically well documented effects of these technologies of consciousness is by means of the most recent findings from unified quantum field theory. It is beyond the scope of the present article to elaborate the mathematical details of unified quantum field theory which are required to fully understand the effect. This section presents only a general overview of fundamental principles of unified quantum field theory that can be utilized to explain the effect of the MVVT treatment.

In the past decades developments in unified quantum field theory have shown that the four fundamental forces of nature can be progressively unified. This process of unification starts with the electro-weak unification and culminates in super unification, where all the fundamental force and matter fields are unified in one single quantum field, the Unified Field of superstring theory—also called the superstring field. This field is conceived as underlying all objective phenomena in Nature.

This knowledge of this unification, and of the principle that a Unified Field underlies all objective phenomena is important for understanding the mechanics and effects of the technologies of consciousness offered by Maharishi Vedic Vibration Therapy: It leads one to (a) understand that the fundamental basis of creation is a field of consciousness; and (b) it implies the existence of further

field components and structures of unified quantum field theory that are necessary to explain the effect of the MVVT treatment. These two points are now elaborated.

5.3.3. Understanding the fundamental basis of creation as a field of consciousness

It can be inferred that the Unified Field is a field of pure self-referral consciousness (44). This can be especially inferred from the self-interacting, self-referral nature of the Unified Field, which directly relates to the self-referral property of pure consciousness. The identification of the Unified Field as a field of consciousness is further substantiated by recent findings of quantum cosmology, which reveal the essential importance of the *observer* in the quantum creation of the universe.

The most important implication of this finding that the Unified Field of modern science is identical with the field of self-referral consciousness is that technologies of consciousness can operate at the fundamental level of the Unified Field, and therefore are able to produce powerful effects that express themselves in concrete phenomena at more superficial levels of nature.

5.3.4. Additional aspects of Unified Field Theory relevant to the MVVT treatment results

The mathematical analysis of unified quantum field theory shows that with the progression towards more unified levels of quantum field theory one gets new additional types of fields—specific field components of the Unified Field—and other interesting structures that are beyond the presently observed realm of high energy physics, but whose dynamics can give rise to observable effects at more superficial levels. The precise mathematical structure of a particular unified quantum field theory determines what specific types of additional fields and further structures will appear. Examples that may be relevant to the MVVT treatment results are (a) additional long-range force fields, which couple very weakly to the known matter fields; (b) very light $U(1)$ superconducting cosmic strings (45-49); and (c) $U(1)$ -magnetic monopoles (50-51) (as endpoints or crossing-points of cosmic strings) (45).

Detailed theoretical studies by one of the authors, using the mathematical framework of unified field theories, have indicated that the dynamics of these new additional fields and other structures of unified quantum field theory can account for the observable phenomena produced by technologies of consciousness. The general mechanism of how technologies of consciousness produce their characteristic effects can be understood through the following model.

The above mentioned new structures predicted by unified quantum field theory can be viewed as constituting intelligently organized fabrics, which underlie the commonly observed phenomena. With reference to the physiology, these fabrics constitute the body's inner intelligence, which underlies and directs physiological functioning. The mechanism of how this level of the inner

intelligence of the body directs the physiological functioning can be understood by means of field effects related to the above mentioned long-range field components of the Unified Field. Due to the high sensitivity of physiological functioning (discussed above), faint impulses mediated by the long-range field components are sufficient to direct physiological functioning.

The experts in the MVVT treatment specifically operate on this fundamental level of unified quantum field theory, the level of the inner intelligence of the body, to correct deviations that have caused disorderly physiological functioning.

In summary one can conclude that unified quantum field theory offers a framework for understanding how technologies of consciousness can produce clearly observable effects, and specifically how experts in the MVVT treatment can operate on the fundamental, holistic level of nature.

5.3.4.1. Mechanics to produce the observed physiological changes

This section relates the theoretical framework presented above to physiological changes during the MVVT treatment. Previously it was explained that self-organizing systems in general, and the physiology in particular, can be very sensitive to specific delicate impulses or stimuli, and that findings from unified field theories suggest the general mechanism for how technologies of consciousness can produce such specific impulses. The particular aspects of physiological functioning that are sensitive to these delicate impulses can be identified as follows.

The self-referral dynamics of physiology (discussed generally in the first subsection) is available in a hierarchy of interrelated homeostatic and homeokinetic feedback loops. Due to their hierarchical arrangement, these feedback loops are themselves highly sensitive to very specific impulses that regulate these feedback loops in a hierarchical manner.

If specific impulses act directly or indirectly upon the control units, or integrating centers, of these feedback loops, very powerful and far-reaching effects can be produced. It is therefore natural to presume that the impulses of consciousness utilized in the MVVT treatment have very specific impacts on these control units (by means of field effects presented earlier). This hypothesis seems reasonable when considering that specific manifestations of the treated diseases like pain, inflammation, spasm, etc., can be generated by the functioning of feedback loops in a state of physiological abnormality. A related possibility is that the feedback loops themselves have pathological deviations.

Of course the control units of these feedback loops are not the only aspects of physiology that react to delicate impulses. The receptor unit of a feedback loop is also very sensitive to specific stimuli; an appropriate

impulse may dramatically reset a whole hierarchy of feedback loops. However, due to the close relationship between control units and receptor units of hierarchically organized feedback loops of the physiology, it might be inappropriate to distinguish between impacts on control units and receptor units.

This theoretical analysis together with the physiological analysis in the previous section propose an explanation of how the impulses of consciousness used in the MVVT treatment are able to produce virtually instantaneously a new, more healthy style of physiological functioning, as well as bring relief to pain caused by physiological abnormalities.

5.4. Theoretical Explanation of the Variability of the Effect

The study suggests that the MVVT treatment is unique in its high rate of effectiveness in quickly relieving pain, improving muscular-skeletal mobility, and relieving other symptoms of chronic diseases. Nothing in modern medicine has been shown to be capable of producing such fast and complete relief of pain without producing harmful side effects.

As related above, the most frequently reported improvement noted in this study was instant 100% relief of pain. This extraordinary finding leads one to the question of why the MVVT treatment did not produce 100% success in 100% of the cases.

The following factors should be considered as influencing the degree of variability of results:

1. Necessity to treat the full range of the disease

For reasons of experimental design this study utilized only one specific treatment for the particular disease reported by the patient. This may have neglected the treatment of other important aspects that are necessary for complete resolution of the specific disorder. The real reason for joint pain could be the release of toxins by the digestive tract, so that focus just on the joint may not produce complete relief. Comprehensive treatment must therefore include not only the appropriate specific treatments for a disorder, but also all the appropriate supportive components of the treatments provided by the MVVT. With this comprehensive approach, an even higher rate of success would be predicted.

2. Necessity for Repeated Treatment

Instantaneous improvement from a single treatment, as observed in the present study, is highly unusual in the therapy of chronic diseases. Repetition of treatment is a common procedure in medicine. It is therefore natural to expect that those individuals with severe symptoms from long-standing disorders may require repeated treatments to achieve satisfactory results.

From the principles of self-organization and from chaos theory it was inferred that a delicate impulse can give rise to a dramatic change in condition, in particular to a change from disorder to order. It is also well known from these theories that a system may have a sequence of states

with different degrees of order or chaos. From this perspective it is therefore natural to expect that severe disorders will require repetition of the procedure until the ideal state of physiological order is reached and finally stabilized.

3. The Delicate Nature of Resonance

As explained earlier, the principle of a field effect can be applied to explain how a technology of consciousness can produce the specific effects reported in this study. From the perspective of physics the remarkable effectiveness of the MVVT treatment in addressing very specific disorders can only be understood if this field effect utilizes the principle of resonance: specific field components of the unified field which mediate this field effect have to oscillate with a characteristic spectrum that resonates with the respective aspects of the physiology. Resonance is a very delicate effect; even the slightest deviations from the appropriate value results in a dramatic loss of effectiveness (e. g., a radio must be precisely tuned to the proper frequency for proper reception of the signal).

There can be different reasons for such a slight deviation from the maximal resonance and a corresponding reduction in effectiveness. Anything which distracts or inconveniences the expert performing the MVVT treatment, e.g., cramped space or loud noises, can reduce its effectiveness. Ideal conditions for giving the treatment would therefore be expected to add to its effectiveness.

4. Noise Level

It is a general principle of physics and information theory that the presence of random disorderly fluctuations (statistical noise), not necessarily related to audible sound, reduce the chances that a signal is properly transmitted. This is particularly true for a faint or delicate signal. For example, the ripples produced by a stone dropped into calm water are more easily and effectively propagated than the ripples in turbulent water.

Applying this principle to the study, any type of disturbances or random dynamics occurring during treatments could have reduced the chances that the delicate impulses of consciousness of the MVVT treatment would produce the predicted effects.

Treatment conditions therefore should be as ideal as possible. This will minimize the chances of disturbance and maximize the possibility for the experts to perform the MVVT treatment with their awareness established in the most calm and steady state, from the level of pure consciousness. (Maharishi Vedic Health Centers are being constructed to provide ideal conditions for the application of the Maharishi Vedic Vibration Technology.)

5.5. Conclusion and suggested future studies

In conclusion, this study demonstrates relief of symptoms of arthritis that are unprecedented in modern medical science. Results were found to be immediate. With a treatment that is entirely free from harmful side effects, complete relief was the most frequently reported single category of improvement. The specific treatment

techniques are subtle and delicate, but can be learned by those with no previous experience with the techniques.

An explanation of the results requires a deeper understanding of the laws governing the physiology than is currently available from the linear models in modern medicine. An explanation of the Vedic perspective on the source and dynamics of the self-referral functioning of the physiology has been presented. Its close correspondence with the most advanced areas of quantum field theory and non-linear dynamics, as found in self-organization theories and chaos theory of modern science, has been noted.

These principles offer an explanation of how a tender impulse of consciousness can produce profound changes in disease symptoms. To fully comprehend the mechanism of action producing these results requires a thorough understanding of Vedic science and its relationship to the most advanced areas of quantum field theory. The Maharishi Vedic Vibration Technology is one of many technologies available in Maharishi Vedic Medicine, which, in view of these results, appears likely to change the future of modern medical care.

Given the size of the effect of MVVT, future studies are warranted. At this time patients from the ordinary clinical setting could be tested to confirm whether the results of this study of self-selected subjects could be generalized to the population at large. These studies could also answer the question as to whether similar results would be seen where the diagnosis was precisely determined and whether standard objective clinical markers of disease presence and activity were of predictive value in the outcome. Finally, follow up studies could be performed to answer the question of how long the benefits persist.

6. ACKNOWLEDGEMENT

The authors would like to thank John W. Salerno, Ph.D. for his technical assistance.

©Transcendental Meditation, TM and Maharishi Vedic Vibration Technology are service marks registered in the US Patent and Trademark Office, licensed to Maharishi Vedic Education Development Corporation and used under sublicense.

7. REFERENCES

1. Informational material, Arthritis Foundation, Atlanta, GA, (1997)
2. Dieppe P. Osteoarthritis: Current Research and Prospects for Pharmacological Intervention. Mosby, London, (1991)
3. Felson D: Epidemiology of hip and knee osteoarthritis. *Epidemiol Rev* 10, 1-28, (1988)
4. Kuetner K. & V.M. Goldberg: Osteoarthritic Disorders. In: American Academy of Orthopedic Surgeons (1995)
5. Lahad H, A.D. Malter, A.O. Berg, & R.A. Deyo: The effectiveness of four interventions for the prevention of low back pain. *JAMA*; 272(16), 1286-1291 (Oct. 26, 1994)
6. VanTulder M.W., B.W. Koes, L.M. Bouter, & J.F. Metsemakers: Management of chronic nonspecific low back pain in primary care: a descriptive study. *Spine* 22(1), 76-82 (1997)
7. Harrison's Principles of Internal Medicine 13th edition. McGraw Hill, New York (1994)
8. Gabriel S.E., R.L. Jackkimaianen, & C. Bombardier. The cost effectiveness of misoprostol for non-steroidal anti-inflammatory drug-associated adverse gastrointestinal events. *Arthritis Rheum* 36, 447-59 (1993)
9. Fries J. Assessing and understanding patient risk. *Scand J Rheumatol Suppl*; 92, 21-4 (1992)
10. Bloom BS. Direct medical costs of disease and gastrointestinal side effects during treatment of arthritis. *Am J Med* 84, 20-4 (1988)
11. Orme-Johnson D.W., & J.T. Farrow: Scientific research on the Transcendental Meditation Program: Collected papers, Volume 1, Maharishi European Research University Press, Rheinweiler, Germany (1977)
12. Chalmers R, G. Clements, H. Shenkluhn, & M. Weinless: Scientific research on Maharishi's Transcendental Meditation and TM-Sidhi Programme: Collected papers, Volumes 2-4, Maharishi Vedic University Press, Vlodrop, The Netherlands (1989)
13. Wallace R.K., D.W. Orme-Johnson, & M.C. Dillbeck: Scientific research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected papers, Volume 5, Maharishi International University Press, Fairfield, Iowa, U.S.A. (1990)
14. Scientific research on Maharishi's Transcendental Meditation and TM-Sidhi Programme: Collected papers, Volume 6. Maharishi Vedic University Press, Vlodrop, The Netherlands, (in press)
15. Maharishi Mahesh Yogi: Maharishi Forum of Natural Law and National Law for Doctors. Maharishi Vedic University, India: (1995)
16. Nader T.A.: Human Physiology: Expression of Veda and the Vedic Literature. Maharishi Vedic University Press, Vlodrop, The Netherlands: (1995)
17. Varela F., H.R. Maturana, & R. Uribe. Autopoiesis: The Organization of Living Systems, Its Characterization and a Model. *Biosystems* 5, 187-196 (1974)
18. Maturana H.R., & F. Varela: Autopoietic Systems. Report BCL 9.4. Biological Computer Laboratory, University of Illinois, Urbana, IL (1975)
19. Nicolis G. & I. Prigogine: Self-Organization in Nonequilibrium Systems: From Dissipative Structures to Order Through Fluctuations. Wiley-Interscience, New York (1977)
20. Vidal C. & A. Pagola: Observed Properties of Trigger Waves Close to the Center of the Target Patterns in an Oscillating Belousov-Zhabotinsky Reagent. *J Phys Chem* 93, 2711-2716 (1989)
21. Kagan M.L: Chemical Formation of Spatial Patterns Induced by Nonlinearity in a Concentration-Dependent Diffusion Coefficient. *J Phys Chem* 93, 2728-2731 (1989)
22. Rodriguez J. & C. Vidal: Measurement of Convection Velocity in "mosaic" Patterns. *J Phys Chem* 93, 2737-2740 (1989)
23. Nagy-Ungvarai Z: Experimental Study of the Chemical Waves in the Ce-Catalyzed Belousov-Zhabotinsky Reaction. 2. Concentration Profiles. *J Phys Chem* 93, 2760-2764 (1989)
24. Maseko J., J.S. Reckley & K. Showalter: Regular and Irregular Spatial Patterns in an Immobilized-Catalyst

Belousov-Zhabotinsky Reaction. *J Phys Chem* 93, 2774-2780 (1989)

25. Turner, J.S : Alternating Periodic and Chaotic Regimes in a Chemical Reaction-Experiment and Theory. *Phys Lett* 85A, 9-12 (1981)

26. Argoul F: From quasiperiodicity to chaos in the Belousov-Zhabotinsky reaction. I. Experiment. *J Chem Phys* 86, 3325-3338 (1987)

27. Richetti P: From quasiperiodicity to chaos in the Belousov-Zhabotinsky reaction, II. Modeling and Theory. *J Chem Phys* 86, 3339-3356 (1987)

28. Györgyi L. & R.J. Field: Mechanistic Details of the Oscillatory Belousov- Zhabotinsky Reaction. *J Phys Chem* 95, 6594-6602 (1991)

29. Swinney : Observation of Order and Chaos in Nonlinear Systems. *Physica* 7D, 3-15 (1983)

30. Freeman W.J: The Physiology of Perception. *Sci Am* 264, 34-41 (Feb. 1991)

31. Freeman W.J: Neuronal Networks and Chaos. *J Theor Biol* 171, 13-18 (1994)

32. Cavanaugh K.L: Time series analysis of U.S. and Canadian Inflation and unemployment: A test of field-theoretic hypothesis. Proceedings of the American Statistical Association, Business and Economics Statistics Section (Alexandria, VA: American Statistical Association): 799-804 (1987)

33. Cavanaugh K.L. & K.D. King: Simultaneous transfer function analysis of Okun's misery index: Improvements in the economic quality of life through Maharishi's Vedic Science and technology of consciousness. Proceedings of the American Statistical Association, Business and Economics Statistics Section (Alexandria, VA: American Statistical Association) 491-496 (1988)

34. Cavanaugh K.L. & K.D. King & C. Ertuna: A multiple-input transfer function model of Okun's misery index: An empirical test of the Maharishi Effect. Proceedings of the American Statistical Association, Business and Economics Statistics Section (Alexandria, VA: American Statistical Association), 565-570 (1989)

35. Dillbeck M.C., G.S. Landrith III. & D.W. Orme-Johnson: The Transcendental Meditation Program and crime rate of change in a sample of forty-eight cities. *J of Crime and Justice* 4, 25-45 (1981)

36. Dillbeck, M.C., K.L Cavanaugh., T. Glenn., D.W. Orme-Johnson. & V. Mittlefehldt: Consciousness as a field: The Transcendental Meditation and TM-Sidhi program and changes in social indicators. *J Mind Behav* 8, 67-104 (1987)

37. Dillbeck M.C., C.B. Banus, C. Polanzi & G.S. Landrith III: Test of a field model of consciousness and social change: The Transcendental Meditation and TM-Sidhi program and decreased urban crime. *J Mind Behav* 9, 457-486 (1988)

38 Dillbeck MC: Test of field theory of consciousness and social change: Time series analysis of participation in the TM-Sidhi program and reduction of violent death in the U.S. *Social Indicators Research* 22, 399-418 (1990)

39. Dillbeck M.C. & M.V. Rainforth: Impact assessment analysis of behavioral quality of life indices: Effects of

group practice of the Transcendental Meditation and TM-Sidhi program. 1996 Proceedings of the Social Statistics Section or the American Statistical Association (Alexandria, VA: American Statistical Association), 38-43 (1996)

40. Hatchard G.D., A.J. Deans, K.L Cavanaugh & D.W. Orme-Johnson: The Maharishi Effect: A model for social improvement. Time series analysis of a phase transition to reduced crime in Merseyside metropolitan area. *Psychology, Crime and Law* 2, 165-174 (1996)

41. Orme-Johnson D.W. & M.C. Dillbeck: Maharishi's Program to Create World Peace: Theory and research. *Modern Science and Vedic Science* 1(2), 207-259 (1987)

42. Orme-Johnson, D.W., C.N. Alexander, J.L. Davies, H.M. Chandler & W.E. Larimore: International peace project in the Middle East: The effect of the Maharishi Technology of the Unified Field. *J Confl Resolut* 32, 776-812 (1988)

43. Orme-Johnson D.W., C.N Alexander & J.L Davies: The effects of the Maharishi Technology of the Unified Field: Reply to a methodological critique. *J of Conflict Resolution* 34, 756-768 (1990)

44. Hagelin J: Is Consciousness the Unified Field? A Field Theorist's Perspective. *Modern Science and Vedic Science* 1 (1), 29-87 (1987)

45. Vilenkin A. Cosmic Strings and Domain Walls: *Phys Rep* 121, 263- 315 (1985)

46. Witten E: Superconducting Strings. *Nucl Phys* B249, 557-592 (1985)

47. Haws D, M. Hindmarsh & N. Turok: Superconducting Strings or Springs? *Phys Lett*; B209, 255-261 (1988)

48. Hill CT, H.M. Hodges & M.S. Turner: Bosonic Superconducting Cosmic Strings. *Phys Rev* D37, 263-282 (1988)

49. Babul A., T. Piran & D.N Spergel: Bosonic Superconducting Cosmic Strings. I. Classical Field Theory Solutions. *Phys Lett*; B202, 307-314 (1988)

50.. Rossi P: Exact Results in the Theory of Non-Abelian Magnetic Monopoles. *Phys Rep* 86, 317-362 (1982)

51.. Hajicek P. Quantum Wormholes (I). Choice of the classical solution. *Nucl Phys* B185, 254-268, (1981)

Key Words: Arthritis, Maharishi Vedic Vibration Technology, Maharishi Vedic Medicine

Send correspondence to: D. Edwards Smith, MD, FACP, Medical Director, New Mexico Center for Chronic Disorders, President, Maharishi College of Vedic Medicine, 2721 Arizona St. NE, Albuquerque, NM 87110 Tel: 505-830-0435, Fax:505-830-0538,E-mail: DESmithMD@aol.com