

“The Effectiveness of Hypnosis for Fibromyalgia Pain”

By

Vanessa Lindgren,CHt

Modern Hypnosis Works

WWW.modernhypnosisworks.com

Hypnessa@gmail.com

540-454-0213

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DECLARATION

I, Vanessa Lindgren, declare that the contents of this thesis represent my own unaided work, and that this thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the University.

Signed _____

Date _____

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Abstract

This paper is based on the topic of the “Effectiveness of hypnosis for Fibromyalgia”. The writer will refer to ‘fibromyalgia’ as ‘FMS’, which means ‘Fibromyalgia Syndrome’ throughout this paper.

The first chapter provides an introduction to the topic including the purpose and significance of the study. “Fibromyalgia pain and its modulation by hypnotic and non-hypnotic suggestion: a functional magnetic resonance imaging analysis”. This study was conducted at the School of Psychology, University of Birmingham, UK by Derbyshire SW, Whalley MG, and Oakley DA.

The second chapter presents a review of the relevant literature, highlighting the previous research carried out in this field. The third chapter covers the methodology for this study, followed by the analysis of findings and discussion in the fourth chapter. The fifth chapter concludes the doctoral thesis, providing implications and useful recommendations for further research.

1 Introduction

1.1. Background

Today, the treatment of chronic pain syndromes such as FMS are clearly under studied and insufficient. With sincere respect to those who treat and pioneer studies for FMS in clinical practice, this writer believes that the traditional treatments for FMS are sadly lacking.

FMS is not a disease. It appears to be the manifestation of the brain giving signals and instructions to the physical body and creating intense pain with no explainable cause.

Just as an autoimmune disease signals the body to create antibodies, which are supposed to protect but often end up attacking the body, the author believes that FMS falls in this same category but is organized by specific messages/instructions from the brain. The body and the mind, in their infinite wisdom continually avert, divert, invent and mastermind the functions of our minds and bodies. It is not understood what triggers these signals. Some think it stems from physical or mental trauma; others site irregular hormones as being the culprit while others believe it to be an underlying virus. These are just a few of the theories. One thing the writer knows for sure is that hypnosis can and does alleviate much of the FMS pain regardless of the cause.

It has been clearly shown that suggestions during and following a hypnotic session can greatly decrease the severity of FMS pain. To discover this and related questions, suggestions following a hypnotic induction and the identical suggestions without a hypnotic induction were

used during functional magnetic resonance imaging. The outcome showed that in both methods, pain was reduced. However, those who had been hypnotized reported substantially more pain relief than those who had not.

Knowing the importance of emotional stress in triggering many of these syndromes as well as the concept of neuronal plasticity, general treatment, which includes exhaustive cooperation on the patient's side, a study was initiated through which valorásemos hypnosis and cognitive-behavioral techniques in patients with FMS were used. Nowadays the use of medication for the treatment of chronic pain syndromes such as FMS shows drastically insufficient results and often creates drug dependency.

The writer of this thesis sees and works with many clients suffering with fibromyalgia. In her experience, the vast majority of these clients are addicted or at least dependent on two to three narcotics at once. It is very sad to see the slow but powerful journey of the pain medications taking control.

Considering the relevance of emotional stress in the cause of many of these pain syndromes and also the concept of neuron plasticity, a study was developed to actually work closely with and collaborate with the patients instead of merely pumping more and more pain medications into them. In this study, it was possible for the study to evaluate-hypnosis as a cognitive behavioral technique in patients affected by FMS.

1.2. Problem Statement

Activation of the midbrain, cerebellum, thalamus, and midcingulate, major and minor sensory, inferior parietal, insula and prefrontal cortices correlated with reported changes in pain with hypnotic and non hypnotic treatment. These activations were of larger magnitude, when treatments followed a hypnotic induction. The changes could be seen in the cerebellum, anterior midcingulate cortex, anterior and posterior insula and the inferior parietal cortex. The results therefore supply evidence for ‘p;’ success of treatment following a hypnotic induction. The results furthermore show direct involvement of a mesh of parts affiliated with the pain ‘neuromatrix’ in the FMS pain experience.

1.3. Purpose of the Study

The reason for the study is to talk about the importance of FMS, which is a functional somatic syndrome, one of a cluster of disorders distributing widespread characteristics and a possible etiological background without know infection (Wessely et al., 1999), (Barsky and Borus, 1999) and (Brown, 2001). The persistence and intractability of the functional disorders, in the clear-cut absence of peripheral infection, has directed research to the likelihood of a centered etiology and the use of functional imaging to check centered hypotheses (Gracely et al., 2002), (Gracely et al.,

2004), (Cook et al., 2004), (Derbyshire et al., 1994), (Derbyshire et al., 2002) and (Naliboff et al., 2001). Research has shown that FMS pain might be caused by the activation of certain districts of the brain which are to blame for the pain experience. (Gracely et al., 2002), (Gracely et al., 2004) and (Croft, 2000).

1.4. Aims and Objectives

The prime objectives of this study are to:

- Discuss the occurrence of FMS
- Determine various modes of treatment for FMS
- Highlight the importance of hypnosis in the treatment of FMS

Functional imaging of pain in patients has been overridden by the study of responses to various un-tested stimuli other than the patients' own pain (Henningesen, 2003). The use of un-tested stimuli to search the neural generators of functional disorder confounds any interpretation of the disorder. (Apkarian et al., 2005). Modulation of the pain experience with treatment avoids this confrontation and complexity. Furthermore, hypnotic proposal induces highly responsive individuals to adjust their sensory experience without complicated mechanical groundwork, perfect for use with functional imaging. Patterns of neural activation during hypnotic modulation of un-tested (Rainville et al., 1997) and clinical pain (Willoch et al., 2000) are very similar to the patterns observed during direct personal manipulation.

1.5. Significance of the Study

Previously, the study used hypnosis to disclose the cerebral means of proposed pain in volunteers (Derbyshire et al., 2004). A perceptual experience of pain was accomplished with a hypnotic induction suggesting painful heat, but without there actually being any delivery of real heat. Functional magnetic resonance imaging (fMRI) then assessed the cerebral cortical pain response along with the patient's own report of his/her pain response. The mere suggestion of the painful heat, under hypnosis, did in fact show a true pain response in the test. A further study independently duplicated the outcome (Raij et al., 2005). For the present study, they continued their hypnotic technique to analyze brain activation dependent on the direct changes in the FMS pain experience.

Suggestions for pain control with the use of hypnotic inductions are highly effective (Montgomery et al., 2000), (Hawkins, 2001) and (Patterson and Jensen, 2003) but the effect of a prescribed hypnotic induction may have more influence on responsiveness to suggestions than before realized. The usefulness of hypnosis for FMS pain, and pain in general, seems to have been severely underestimated. This writer is happy beyond words that this information is now coming to light and being taken seriously.

Here the study exactly addresses this topic by matching suggestions of pain relief with and without hypnosis.

These results continue after the general suggestion of a neural mesh for pain by supplying direct evidence that districts involved in the pain experience are dynamically interwoven in what is often a lifetime of FMS pain and mental misery.

A mesh of cortical districts encompassing the anterior cingulat cortex (ACC), insula, prefrontal districts and prime (S1) an lesser (S2) somatosensory cortices, mediates the pain experience (Apkarian et al., 2005), (Derbyshire, 1999), (Derbyshire, 2000), (Derbyshire, 2003) and (Treede et al., 1999). Abnormal activation inside this pain network may cause or partially develop functional agony and pain disorders including FMS (Gracely et al., 2002).

The writer of this thesis concludes that just as the suggestion of pain can be given to hypnotized subjects, so too can the alleviation of pain be achieved through hypnotic suggestions. This writer will give a detailed example/scripts of how she achieves this in her hypnosis sessions with her pain patients later on in this paper.

2. Literature Review

2.1. Prevalence and Diagnosis of Fibromyalgia

FMS is believed to be a rheumatic disease characterized by chronic, widespread pain with erratic characteristics, more than three months in duration, which does not affect any particular part of the body but has eighteen trigger points which were traditionally described in 1992 by Yunus. FMS is associated with other processes, such as restless legs syndrome, affective disorders and

the cognitive area, headaches, irritable bowel syndrome, chronic fatigue and many other abnormalities.

In this syndrome, both phenomena occur hyperpathia (exaggerated response to painful stimuli) and allodynia (pain stimulation, usually painless), all within a process of widespread musculoskeletal hyperalgesia.

This hyperalgesia is due to the painful memory processes that occur in both the central and peripheral nervous system and in the sympathetic nervous system, thanks to a regulatory enzyme in the function of neurotransmitters.

One might describe FMS as the result of triggers in the brain going haywire and creating pain signals where there should not be any. FMS is an increasing diagnosis in America with an approximated 2% to 6% being mature individuals (4-12 million) with many more women being afflicted than men. FMS prevalence rises with age and peaks between fifty and eighty years old. Several characteristics of FMS overlap with other chronic conditions such as chronic fatigue syndrome (CFS), irritable bowel syndrome (IBS), and temporomandibular disorders (TMJ), among many others. These conditions share the dubious distinction of having no clear pathological markers. They are diagnosed by symptoms after all other possible diagnoses have been ruled out. Many people brandish symptoms that have diagnostic criteria for more than one of these conditions (Bennett, 1998). Overlapping symptoms are common, especially unexplained and enduring fatigue; diffuse or prevalent muscle and jaw pain, sleep disturbances and often depression. Many people with FMS also have criteria for chronic fatigue syndrome: numerous investigations encompass topics with either or dual diagnoses. In this application, the

signs and symptoms for identifying FMS, as well as the inherent biobehavioral affiliated factors and functional alterations, are discussed.

FMS is distinguished by prevalent pain above and underneath the waist, in the right and left edges of the skeleton for a period of three months or more. When pressure is applied to eighteen discrete body parts (called tender points) a great deal of pain is produced. Patients with FMS are also likely to report fatigue, stiffness, numbness and tingling, sleep disturbances, headaches, stomach and bladder symptoms, an inability to focus, recall or think correctly. This is often referred to as “fibro fog.” The harsh realities of FMS in severe cases make it extremely hard for the ‘victim’ to deal with everyday life and the ability to work. Susceptibility to FMS may run in families. Investigations of genetic factors are being researched and new data supporting the genetic theory is emerging. This genetic factor may include the brain chemical serotonin. Serotonin works hard to regulate the feeling states, pain experiences, and behaviors; for example sleep and mood.

Striking is the absence of, injury or tissue damage that can trigger hipermemorización processes. In neuropathic pain, either by altering spinal root, or entrapment neuropathies.

Psychic/mental life is divided into two levels: the conscious, that represents what the person experiences and knows, and the unconscious, which would be what happens in the psychic subconscious mind of a person, without him/her realizing it, acting as an appendix to consciousness, where it downloads, through a mechanism of self-repression, some contents that are sometimes conflicting. In other words, we may think what we want or feel something

consciously but the subconscious mind might actually have a conflicting message. Reaching the subconscious is essential for enabling change, including the control of FMS pain.

Acute emotions, which could be described as overestimated beliefs, can act as an "emotionally competent stimulus", becoming a stressor which is capable of causing a darkening of the field of consciousness. The effects of this can be devastating. Hobbies may disappear, activities severely diminished and a life that now revolves around the emotions whether justified or not. This belief system can cause simple negative thoughts and past traumas to become real and the physical body can actually change (for the better or worse) according to this thinking. FMS certainly appears to be in this category.

It is now unanimously accepted that the presence of this 'belief' factor can trigger stressful FMS. In 85-90% of patients who develop FMS, there is a definitive stress factor triggering the disease/syndrome. This can be very different for different patients. There is no one stressor or trauma that can be pinpointed as the original cause or source for the onset of symptoms. This stressor produces changes in the homeostasis and neurotransmitter level, facilitating the emergence of painful processes. This can affect the emotional dimensions at the somatic level producing lesions (stress ulcers) or pain without apparent injury, and these symptoms are almost certainly triggered by deep emotional reactions. This theory is now widely accepted by the medical community.

The connections between the spino-thalamic bundle in the limbic system and the autonomic nervous system at the level of the ventromedial prefrontal cortex and the amygdala, justify both the symptoms of the affective sphere displayed in the tables at the end of this paper. In addition, somatic symptoms that occur in mood disorders and the sympathetic hypertonia are

closely associated with chronic pain processes and disorders of the affective sphere, all characteristics of chronic pain syndromes.

In chronic pain, nerve endings are stimulated and subsequent painful and often buried memories can cause the brain's representation of happenings to trigger the pain process. If there is no affective component, the patient may perceive the pain as an unpleasant sensation but without being aware of the actual emotional component. Existing connections with the limbic system triggers a profile of displeasure or suffering that is inevitably associated with pain, especially when chronic.

Hypnotherapy has been established by other authors for the treatment of chronic pain syndromes, sometimes within the setting of a more general cognitive behavioral therapy.

According to J. Moix, the following have been tried as a hypnosis treatment program for FMS.

- Reducing pain
- Reducing medication
- Increase in activity and exercise
- Increase in postural hygiene
- Reduction in anxiety and depression

In order that the patient "unlearn" the mechanisms that have somehow been put in place creating pain, it is necessary to include access to the unconscious to modify the coping strategies for particular emotions that have already been mentally and physically implanted. J. Moix's study started the treatment for FMSpain by the use of hypnosis. The study included seventy five volunteers who had been on some sort of a drug treatment over the past twelve months, and in

which the results of those drug treatments showed no distinct changes or favorable progress in the control or elimination of the pain.

FMS meets with more and more interest in scientific circles, and was a topic in the eleventh World Congress of Pain meeting held in Sydney in August 2005. This worldwide coverage and recognition goes, and will go, a long way in creating awareness of FMS pain. Hopefully, from that will stem money for extensive and further research.

New information and statistics are brought to light through the World Congress of Pain meetings. Much information is shared at a worldwide level but one interesting statistic shows that 600,000 French, 2% of the Western population and up to 4.9% of women are affected by this disease.

Although recognized by the World Health Organization, some still believe that this syndrome does not exist. This writer came across an article in *The Journal of Medicine General Practice* 2005; 19.692 that actually says: "Are we condoning a long time doubtful diagnoses or the limits of pure scam? ... "

FMS patients are often misdiagnosed and swatted off like flies being told they have mental problems. They are often treated with a cross between doubt and suspicion not to mention innuendos of being hypochondriacs. Caught between two fires, the patients are in an uncomfortable position, compounded by the lack of treatments with proven effectiveness, especially as some of these patients do not tolerate drugs or are rightfully concerned that they may become addicted to certain medications.

No scientific explanation has been universally accepted, several concepts are discussed: neurophysiological, psychological and social. It is legitimate to wonder. The neurophysiological changes, are they the cause or the consequence of a disturbance as experienced in a depression? Are they symptoms of a somatic expression of a mental disorder? They seem to resist current pathophysiological hypotheses and therapeutic attempts of healing and relief. The medical history of these patients is a long and complicated journey, not to mention a very financially costly one.

2.2. The Link of Fibromyalgia to Life Strain and Emotional Distress

The term FMS is not very old yet the disorder has been in existence for hundreds of years. Hence, this writer's early remark that this syndrome has been severely understudied. Interestingly this writer discovered that the old name for fibromyalgia was 'fibrosis. It is often diagnosed by Doctors of rheumatology as so many symptoms involve joint and muscle pain. In fact, two out of five in a hundred people suffer from FMS and most patients with this non-articular rheumatic disease are women. The main characteristics of this syndrome are fourfold:

- Firstly, that of pain, hypersensitivity or burning sensations affecting the muscles, tendons, ligaments;
- Severely disturbed sleep, often accompanied by fatigue and morning stiffness;
- Chronic fatigue;
- An abnormal sensitivity to specific muscle points;

There are a total of eighteen tender points that are almost always found in FMS patients. In addition to the four characteristics mentioned above, there is another main feature, visible only on the path of an EEG (electroencephalogram): This test often shows a net decrease in slow brain waves. We do not know the exact causes of FMS and researchers cannot make assumptions today. For some people, the disease develops gradually. For others to the contrary, symptoms appear quickly and aggressively. There seem to be implications of a number of factors: a car accident, accidental injury, a viral disease, surgery, infection, emotional shock or physical stress.

Many possible causes, but all seem to relate to trauma or stress in one form or another; all incidents that have somehow altered the balance of the individual both physically and mentally – almost as if factors collided at the ‘right time and place’ – they are in some way woven together and must be acknowledged as such.

There is currently no cure for FMS. The only treatment is to relieve pain and other symptoms. Among the measures taken, painkillers are high on the list but also physical exercise/stretching, massage and medications to improve sleep.

FMS does not produce distortion or infirmity yet the patient’s pain is real and intense with very short periods of any substantial relief. It can cause disability and of course, huge amounts of frustration and despair. Gradually, as the disease develops, the patient’s ability to work and earn a living is severely impacted causing further worry and stress. Indeed, given the intensity of pain, patients often have no choice but to reduce their activities and work schedule to avoid suffering. This reduced activity in and of itself eventually leads to a decrease in muscle strength and makes it more difficult to recover. Depression takes hold and a difficult cycle begins. One can easily imagine a person who sleeps poorly and is suffering will be tired throughout the day.

The lack of sound energy on his/her psyche multiply and even simple basic tasks become overwhelming challenges, both physically and mentally - both in the professional context and in the home. In turn, the abandonment of certain activities or responsibilities will induce an additional stress and anxiety. To add one more layer to this stress, the belief by some (including some medical doctors) that FMS is imagined and, 'in the head' one can see how a 'loop of hell' is created!

It is believed that FMS and its symptoms can be triggered by tension that builds up gradually. This tension may be rooted in a brutal and violent time event (accident, emotional trauma, rape etc...), or in a stressful situation long maintained such as severe family conflicts. To summarize the matter in a figurative way, imagine a gradual extension spring, a continuous spring that cannot ever be brought back to its original state, and you will understand what can happen inside the body of an FMS patient. It is as if our resources were mobilized permanently. The physical tension and 'misfired message' from the brain then settles in. It becomes too late: the stiffening seized muscles, tendons, ligaments and joints are hearing and responding to some mysterious message that should not be there in the first place. The body forgets that this automation is that of a physiological tension and the brain/pain response becomes intertwined and apparently permanently connected. Symptoms can arise years after a trauma or stress inducing reaction.

It is therefore not surprising that all possible means to reduce this tension are crucial to improving the patient's condition. Among these means, there are specific relaxation techniques that aim to re-teach the body what it seems to have forgotten, namely the difference between a

state of tension and a state of non-tension. With this approach, the body can learn to simply "disconnect" automatically tensions as they arise.

Another therapeutic approach can go even faster in this re-learning: it is hypnosis. More than ever, in FMS, hypnotic techniques occupy a prominent place at the junction of body and mind healing. Under hypnosis, in effect, the therapist is able to lower the threshold of mental stress while inducing a relaxation of the body, muscles, tendons and ligaments together. The results are fast and they are sustained. The therapist's work is sometimes accompanied by a regressive aspect intended to update and drain the abscess of tension. Going back in the patient's history, we will indeed reconnect it on one (or) traumatic event often located at the origin of the outbreak of this disease/syndrome. The full revival of the event will then accept it and integrate it. The individual will become more adaptable.

2.3. Linking Life Strain, Distress, and Fibromyalgia Physical Symptoms

Hypnosis appears to be a relevant remedy. Especially to renew dialogue and trust based on a possible treatment. These patients are often extremely confused and in despair. They feel unheard, not believed and often have exhausted all traditional paths for help and relief.

The distinctive similarity of the situations has identified one constant: the notion of becoming overwhelmed by family relationships, marital, occupational, social, religious, medical, etc... They seem trapped in their own bodies, prisoners of themselves. Locked in the search for

authentication, legitimizing their "illness" because FMS is relatively unknown to the public and therefore not respected or taken seriously. What a lonely and frightening dilemma to be in.

Curiously, some words commonly appear in the doctor's consultation notes: prison, locked up, tied, shackled. So they suggest to us several metaphors. That of a patient as a prisoner or a caged bird. Behind bars, just a glimpse of a world which he/she is excluded from because of pain and weakness. It is from this representation that a treatment plan is developed using hypnosis to help them escape and go through the door of the cage, already open ... In other words, discover a different reality: one in which it is now possible to overcome these barriers, to find relief, to gain some control over their own pain. To take some power back, to live life again with some dignity and joy.

2.4. Changes in the Nervous System with Fibromyalgia

Several changes in stress-related hormone patterns and functions are seen in people with FMS. (Demitrack and Crofford, 1998). Stress hormones (e.g., epinephrine, norepinephrine, and cortisol) commonly fluctuate. This very often encompasses elevation of these hormones waxing and waning inside a short time span as the patient adjusts to exceptional situations. A large piece of this activation involves the sympathetic nervous system (SNS) with the issue of epinephrine and norepinephrine being released into the bloodstream and into the tissues.

The phenomenon of convergence of sensory neurons of the muscles, skin, bones and those from different organs of the body explains this phenomenon. Very often studies have mentioned FMS patients experiencing unusual physical manifestations: dizziness (especially

when changing positions), pain in the extremities of the hands in contact with the cold, unusual heart palpitations, etc... Looking more closely at the spinal cord, we see that there is a part of our sympathetic nervous system called "autonomous". It is named "autonomous" because it is theoretically not possible to exercise voluntary control over this system. It is responsible and essential to many physiological activities both at rest, and during exercise. It is what makes the heart beat faster, which causes sweating, which allows adjustments of blood pressure, etc... All of these systems and patterns can manifest in pain when misfiring.

The sympathetic nervous system keeps many mechanisms of the human body in equilibrium with another system antagonist, the para-sympathetic nervous system. The human body is designed as such. It operates on a scale. This is the phenomenon of "homeostasis" or, simply put, the "inner balance". However, during stress and pain in particular, the sympathetic nervous system increases its activity, a mere defensive reaction. It is this reaction that allows humans to excel in critical situations with threat to life (natural disasters, accidents, etc.)

Since the sympathetic nervous system is also involved in controlling many functions (including cardiovascular function) it must play a key role in controlling blood pressure and especially during pressure adjustments made necessary especially during the transition from a sitting or lying position to standing. During such movements, due to gravity, the body must adapt quickly to prevent any fall in blood pressure. However, it was shown that FMS does not compensate as fast as it should in this pressure drop. This explains why FMS sufferers often feel dizzy when they rise quickly from a chair or bed.

Some abnormalities of the digestive functions, urinary, skin (including sweat) could also be related with the sympathetic nervous system. Raynaud's phenomenon (cold hands and extremities) could also be related to a dysfunction in the sympathetic nervous system.

Therefore, if the sympathetic system is essential for inner balance, it becomes less "friendly" when it becomes dysfunctional. It generates functional symptoms without organic abnormality (without injury to simplify). Medical research has led to excellent response in the face of organic problems (medication, surgery, etc...) But is still in its infancy for this disorder that affects the "functional". It should be mentioned that there is more and more work/studies being done involving this particular aspect, particularly in the area of pain. So there is a future with hope for FMS sufferers. To date, there are few treatments to compensate for the sympathetic nervous system abnormalities found especially among FMS patients. It is impossible at present to block or modulate the effects of the sympathetic nervous system only at the spinal cord. However, this alternative seems to be heading in the right direction. The rationale is that if the dorsal horn of the spinal cord is hyper excitable and if we could destabilize the region through the spinal cord, it would reduce the excitement level of the dorsal horn and that would be done! There would also be the option of blocking the sympathetic ganglia near the spinal cord with injections. This is an approach that has never been attempted in fibromyalgia but for which we do not base much hope that the pain of fibromyalgia is not "sympathetic." Experience also shows that the problem is more complicated.

It seems that we must also address the problem at the higher centers. In other words, we must also treat and heal on an emotional level because emotions are intimately connected with the activity of the sympathetic nervous system. For this reason it is important to explain to patients the mechanisms that explain their pain. It is already somewhat reassuring to realize that

the pain, although very unpleasant, is not dangerous in itself. This is also why patients are often referred for some psychological support. Not because the disease/syndrome is "in the head" as we hear so often, but because the management of emotions is one way to control pain. If we can reduce stress (chronic) that accompanies the experience of pain, it also manages to calm the sympathetic nervous system and therefore, we add an extra element in controlling pain. It is also partly for this reason that a suitable program of physical activity (aerobic water exercise in particular) is recommended and greatly encouraged as it improves the functionality of the sympathetic nervous system and better management of emotions.

2.5. Possible Explanations for Heightened Pain Sensitivity

Scientists are searching for more concrete evidence of brain alterations that might interpret intensified pain in the face of no conspicuous tissue wound as is apparent in FMS. For example, body-fluid flow to key parts of the brain involved in pain sensation is augmented in people with FMS in evaluation to those without FMS. Evidence that chemicals responsible for pain transmission and modulation are clear and being pursued.

As reconsidered by D. J. Clauw (1995), foremost excitatory chemicals that possibly intensify pain sensitivity encompass amino acids (building blocks of proteins) present on cell membrane receptors (N-methyl-D-aspartate type). Another is Substance P, a chemical that helps pain nerve cell transmission in tissues, encompassing spinal cord neurons and thereby encouraging pain sensations. Pain nerve cell stimulation is contradicted or modulated in the spinal cord by inhibitory chemicals for example serotonin and norepinephrine. These act as

natural analgesics and diminish pain sensations, (Clauw, 1995). Serotonin decreases pain sensations and modulates the transmission of Substance P in tissues.

The allowance of pain promoting Substance P varies in different tissues, but individuals with FMS display increased grades of Substance P in spinal fluid but somewhat usual grades in the bloodstream. As it turns out, body-fluid comprises high levels of compounds (enzymes) that reduce Substance P, which may account for not seeing high levels in the blood. However, these reduced compounds are markedly less in the bladder, nose, and lung tissues. The conjecture is that the surplus of Substance P in these structures could encourage irritating and painful symptoms. For example irritable bladder, running nose (rhinitis), and a hoarse throat (laryngitis), all symptoms often affiliated with FMS.

Also, patients with FMS display reduced body-fluid levels of pain-reducing serotonin and the breakdown components (5-hydroxyindoleacetic acid), and reduced spinal fluid levels of serotonin (tryptophan). However, serotonin levels have not been shown or proven to correlate with actual pain but are more indicative of sadness and depression. Paradoxically high levels are present in other painful conditions (Clauw, 1995). It is more perplexing in that other pain-related chemicals have furthermore been implicated in FMS. For example, the pain-producing consequences of Substance P might be brought about through a key development, which is increased in FMS patients (Giovengo, Russell, & Larson, 1996), as is calcitonin which is a gene-related peptide. Nerve development components help in the development of Substance P-containing a calcitonin gene-related peptide, which is in the identical part of Substance P in many cells, inhibiting the breakdown compounds for Substance P. People with higher levels of these chemicals experience more pain sensitivity.

Although the hormonal systems and the pain biochemical lines of research have mostly appeared individually, new lines of questioning are starting to connect the two, founded on how the hormonal and immune systems interact. For example, the release of norepinephrine and epinephrine, inhibit kind 1/pro-inflammatory cell chemicals (called cytokines).

This activation can adjust the immune balance of compounds that encourage or inhibit the inflammatory process.

This writer takes the liberty of putting the just mentioned and complicated information into simplistic terms. It is almost like a recipe. One could add one spice to a dish and get a distinct flavor or add that same spice plus one more and totally change the taste and flavor creating a dish with no resemblance whatsoever to the first dish. It seems that no one component is 'in charge' but a part of the recipe. It is the physical and mental impacts of FMS working together to create the syndrome. There appears to be no singular piece of the puzzle to be cured for relief, but a harmonized mixture/recipe that works together and hits the nail on the head, so to speak.

In this writer's opinion and experience, a delicate and accurate balance can and often is achieved through hypnosis.

2.6. Summarizing Speculations in Understanding Fibromyalgia

Discovering a comprehensive biobehavioral interpretation for FMS continues to be vague, but

certain speculations are warranted. The living standards and behavioral factors are likely to be different in FMS patients. Any comprehensive interpretation will involve highly complicated hormonal and cellular chemical interactions. It is probable that some individuals have a genetic propensity to experience a highly triggered and/or unrelenting psycho physiological profile in how they deal with and approach life's challenges. Particularly susceptible to FMS are individuals, who experience strong emotional life damage (e.g., abuse) and/or who are self driven to high standards of personal performance and perfectionism.

Clearly, FMS involves strong components of how an individual copes, how they process strong emotions both good and bad. These are interlinked with the whole body. Together these personal coping functions, along with certain physical malfunctions, can and will lead to illness.

The prevailing complexities in FMS are not yet understood and most likely will not be until the entire mind/body manifestations are seen as the combining recipe that creates this very real and miserable disorder. FMS is still a mystery—only to be explained through extensive, creative and all encompassing studies.

2.7. What Is Hypnosis?

It is important to understand that hypnosis is a distinct, changed state of consciousness. You are not asleep. You are not awake. You are in a “trance” for need of a better word. A trance is a state in the brain in which a hypnotized subject is adept to free his or her brain from the

constraints of their five senses and preconceptions. The subject experiences his or her straightforward, consciousness with purity and truth. Typically the feeling is recounted as resting, blissful, dreamy or “I just sensed things differently”. Many hypnotists refer to hypnosis as a, “massage for the brain”. Hypnotism is the method of inducing a hypnotic trance in which positive thoughts can be adopted and negative imprints can be safely released or reframed.

A characterizing facet of hypnosis is a boost in the client’s suggestibility, proficiency to focus and an often astounding improvement in memory. Hypnotherapy makes use of these features to help a subject to literally change or re-arrange messages and imprints that may have led to limiting or unproductive convictions and behavioral patterns. These new modes of thinking then become the client’s base for seeing or feeling with a different perspective. This allows for limitless and positive changes in the depths of the subconscious which then of course affects the daily conscious which controls much of how we react to our personal world.

2.8. Does The Patient Remain In Control?

Yes, we can gain command by effortlessly producing the changes we desire with the aid of hypnotherapy. It is a well established fact that individuals will not be made to react under the leverage of hypnosis that is in any way opposed to their individual values. This means that a hypnotherapist/hypnotist is not able to make a hypnosis subject violate their own ethical code.

2.9. Who Can Be Hypnotized?

Just about any individual can be hypnotized. The ideal conditions to accomplish the hypnotic state are a snug, calm and safe environment. The subject should not be under the influence of drugs or alcohol and must feel trust, safety and sincerity from the hypnotist working with them. Hypnotherapy is not a challenge of wills but a cooperative endeavor in which the hypnotherapist is a knowledgeable, gentle and trustworthy guide.

2.10. Does Hypnosis Work for Fibromyalgia?

Yes, yes, yes! Hypnosis is particularly helpful for the treatment of chronic pain: headaches, neuralgia, fibromyalgia, neuropathic pain, musculoskeletal pain, abdominal pain and so much more. The possibilities are limitless and should not be underestimated.

As noted by the main study discussed in this paper, the proof is most certainly and clinically shown that hypnosis therapy has significant success in reducing pain in FMS patients.

The writer of this thesis has FMS and knows firsthand how much hypnosis helps her pain. Often, just one session can provide a staggering change for the hypnotized subject. However, multiple sessions help ensure a deep, completely effective state of hypnosis for

maximum and lasting relief. This writer has had amazing results in pain relief with her patients and next is just one script for pain that this writer she uses with some of her pain/FMS clients.

*2.11. 'Healing Liquid for Pain'
A script written by the writer in 2011*

Vanessa Lindgren, MHT

Now we are going to move into our most important and powerful visualization. Do you remember how I mentioned earlier that visualizing things and ideas is very personal? There are no rules. There is no pressure. You are totally safe and in control. Whatever is in your mind right now is what is supposed to be there. Remember that if I suggest something to visualize, just do your best. If for any reason you can't get a clear picture, try looking at a blank television screen – take your time.

(Therapist takes a long pause)

Actually, *(client's name)* it really doesn't matter at all. You can just go with the flow, you can pretend, you can tune me out, you can feel free to go anywhere in your thoughts because at all times YOU are in control. You can just pretend that you see something, even when you don't. Just pretend – just like a child. It's fine to just pretend.

Now I want you to visualize a beautiful glass. It can be any type of drinking glass that pops into your mind. It can be delicate and ornate; it can be something from your memory. It might be something you own; it could be imaginary – anything, anything at all. Take your time: stay calm and relaxed: take your time to find a glass that looks and feels right for you.

(Therapist takes a long pause)

When you are ready, very comfortably ready, you will raise one finger on your right hand to let me know that you have found a clear visual picture of your glass. There is no rush: stay calm and peaceful: the image will come when you are ready. I can be calm and patient until I see a finger rise on your right hand.

(Finger Rises) Therapist continues on.

Now I am going to fill your special glass with a clear and crisp liquid. Pure and clean: it's a perfect temperature. Look at your glass now and see the liquid in it. Can you see it? Take your time to see your glass with the pure liquid. When you have a clear image of that, raise a finger on your right hand. You are calm, you are relaxed. Take all the time you need (Client's name)

That's great. You raised a finger so we are ready to continue our journey.

Now you are going to create the exact color of your liquid. You may have to mix colors to create your special color.... (Therapist now says the color that the client described in the pre-talk)

Take your time now. Let your brain do all the work to find the exact mix to make your special color: the color that you can't quite describe in words but you can see in your head – you will know when it's just right. You might think of the little bottles of dye that children use to color their Easter eggs – you know that food safe dye that is safe to eat or drink just like coloring the icing on a birthday cake. Your mind will mix the dyes to create that special color you told me about. It takes just the precise touch – you'll know when it's exactly right. I can wait patiently until you've mixed the color perfectly – when you are, raise a finger on your right hand.

Now take about three big sips of your healing liquid. I will know when you have swallowed a few sips because I will see your throat move just a little.

(Therapist waits to see the swallow in the throat)

Your healing liquid is now travelling calmly and swiftly through your body.

Do you remember ever looking at one of those diagrams in a biology book where you see a figure standing with arms stretched out? You know – like a school biology book or something. A simple picture where you can see all the veins, muscles, organs and all the body parts. Find that picture now – I'll wait. You can always look at your TV screen if you need help capturing this image. I'll wait – there's no hurry. Raise one finger on your right hand when you have a clear picture of the inside of a body.

Now see your entire body flooded with your special healing liquid; that gorgeous color you have created.

(Therapist says the color).

It is filling your veins. It is mixing perfectly with all your body fluids and travelling to every part of your body. Organs, muscles, nerves, nerve receptors, ligaments, bones, tissues, cells – everywhere; no matter how miniscule a capillary of part of your body might be, it is now beautifully flooded with your healing liquid. It is melting away the pain – it knows exactly where you feel pain – it knows exactly where the source of the pain is. It can seek and destroy the pain. It melts it away effortlessly – it is way more powerful than the pain – your special healing liquid has all the knowledge it needs to find anything in your body that needs repair; that needs attention. It is melting the hurt, it is melting the pain

(Therapist – says these kind of things for at least 10 mins – keep re-enforcing)

I want you to know that when you are in pain you can simply pick up your glass and drink more of your special healing liquid. Anywhere, anytime. Your subconscious knows about your liquid; it knows when you need another dose, it knows where it must travel.

If you forget to take extra liquid when you're in pain, don't worry. You took several sips today and that will be in your body forever. Travelling around and melting the pain; seeking and destroying the pain. You have really turned a corner today with your pain – with controlling your pain.

Feel safe, feel calm. Enjoy the relief. Feel the relief. You have so much relief from your pain. (Therapist slowly brings client to full awareness).

2.12 Types of Hypnosis

There are two major kinds of hypnosis techniques: Hypnosis performed by a clinical hypnotist: This kind of hypnosis is presented in-office by a licensed professional. The hypnotist will determine which type of induction and style of hypnosis will work best with the client to decrease their pain. This often is led by the belief system of the client. The hypnotist will then lead the subject into hypnosis through a sequence of relaxation exercises. Once in a hypnotic state, altered consciousness, the hypnotist will make suggestions as to how the subject might change or re-frame ideas and patterns of thinking.

In the case of FMS the goal would be to minimize symptoms and re-align any negative thoughts that might be contributing to the pain and discomfort.

Self hypnosis: Self hypnosis can be done by anyone in the privacy of their own homes. One can learn self hypnosis either from a clinical hypnotist or from one of the many publications/CDs etc... accessible on the subject.

Self hypnosis programs and hypnotherapy techniques are broadly available both on internet and at the library. Self hypnosis methods can be vital for FMS sufferers and can, if chosen, become an extremely important part of their recovery and pain management program. Self hypnosis is used for relaxation or meditation and can be powerfully effective in creating profound physical and mental changes.

2.13. Stages of Hypnosis

Hypnosis has three main stages and the hypnotist may use one or more of these stages to solve a patient's problems. The most important thing is to understand the various stages involved. The first stage of hypnosis has been variously described as the hypnoidal stage superficial trance, Lethargic, hypnotic sleep.

In this stage, the subject's attention is narrowed down, but is still aware of his surroundings. The subject is asked to relax and visualize events in the past or future. This is the lightest stage, but requires firm belief in the process. This stage is mostly used to treat addictions. During this stage, the hypnotist can relay suggestions to the subject, who has the freedom to accept the suggestion or ignore it.

The second stage is called medium or hallucinatory state. This is also called the cataleptic stage. It is much deeper than the first stage. In this stage, all external sensory are blocked out, except the voice of the hypnotist. Sometimes, music may be used to achieve this hypnosis. The subject is asked to remember certain events from the past and with the help and guidance of the hypnotherapist, re-frames any disturbing past events.

The third stage is known as somnambulistic hypnosis. This is the deepest stage and is used to access the innermost thoughts and forgotten emotions stored in the subconscious mind. It is in this stage that physical anesthesia (numbing of body parts or the entire body) can be achieved.

The hypnotist will come to know which stage to use only after meeting the patient and establishing a rapport. Also, he has to keep in mind the level of the patient's receptiveness towards hypnosis when treating the patient.

This is the most helpful process in which hypnotherapists are able to treat patients with severe psychological trauma.

2.14. Effects of Hypnosis on Fibromyalgia Sufferers

Many fibromyalgia sufferers reported reduction in their symptoms with the use of hypnosis. Many FMS sufferers use hypnosis as a way to lessen and control their pain symptoms and decrease their depression. Another study, conducted by the NIH displayed that FMS patients, undergoing hypnosis reported 80% less pain symptoms than those who obtained no hypnosis treatment. Other advantages of hypnosis include: decreased fatigue, fewer sleep difficulties, increased relaxation and a lessening (or eradication) of depression.

About 80% of those who underwent hypnosis sessions for FMS pain showed a significant improvement in their symptoms, according to a study conducted with seventy people affected by this disease/syndrome.

It is estimated that more than one million people, mostly women, suffer from FMS, a

disease characterized by an impaired perception of pain sensation, resulting in the affected person having heightened pain responses and often musculoskeletal in nature.

The lack of effective treatments often leads many FMS patients to resort to so-called complementary medicine, including hypnosis. Sadly there are so many sufferers who have no idea how well hypnosis can help them and often their doctors to not think of referring them to a capable and well trained hypnotherapist. However, nearly half of all FMS patients diagnosed (48%) do try alternative treatments. This was shown in a survey of a hundred and two patients with this disease in a primary care center in Barcelona and the results were published in the *Journal of Clinical Medicine*. According to this data, one in three believes that he/she can make improvements and maybe even get better. The most used techniques are massage, acupuncture, tai chi, yoga and ozone therapy. This writer sincerely hopes that from now on, one other powerful method can be taken into account. That is of course, hypnosis. Other professionals agree, including the authors of a study conducted jointly by the Institute of Rheumatology, Barcelona (IRB) and the psychological department of Madrid. Seventy patients with FMS (and in treatment, without a positive response to drugs) underwent hypnosis treatments for six months, with results being described as "spectacular." According to preliminary data, 80% of cases treated with hypnosis had a significant improvement, with only 10-12% experiencing minimal improvement and just 8% experiencing no improvement after hypnosis. To reach this conclusion, the study measured the degree of pain, fatigue, anxiety, depression, insomnia etc... before and after hypnosis treatment. In the case of pain and fatigue, the VAS scale was used. To enter the study, participants had to be above four on this scale. Things were considered improved when the VAS scale came down by two points after hypnosis. In regards to

depression, the test was done by Goldberg and used the FIQ anxiety scale/test. In both cases, results were considered positive if there was a 50% reduction in pain and symptoms.

3. Methods

3.1. Subjects and screening

In another study conducted by the University of Pittsburg (the rheumatology department) letters were dispatched to three hundred and ninety seven patients with a prime diagnosis of fibromyalgia. The data from these patients came from the University of Pittsburgh's Rheumatology Registry. From this list of three hundred and ninety seven FMS patients, ninety two actually responded to the letter. From that group, forty six patients actually took part in the study. Just four in this group were males. The average age of all the subjects was fifty two years old with a range of twenty one to seventy years old.

3.2. Hypnosis

All forty six of these patients were prescreened using the Harvard Group Scale of Hypnotic Susceptibility which determined if they would be good subjects for hypnosis. (Shor and Orne, 1962). High scorers (>8 out of a total possible score of 12) were further screened for their proficiency to experience significant hypnotic analgesia. During the second screening, patients were shown a design drawing of a dial marked from 0 (no pain at all) to 10 (as awful as the pain gets). Patients were made aware of how the dial worked. It was to measure their level/rating of FMS pain at any specific instant during the experiment. The dial was to quickly adjust and record FMS pain at a high, intermediate or reduced level of pain as verbal suggestions were given to each subject during the hypnosis session.

The functional magnetic resonance imaging procedures were then put in place. Each subject was asked to visualize, in their mind's eye, a dial which would show the level of their own pain. They were told that their present experience of FMS pain was directly connected to the reading on the dial. As their pain diminished it would correspond to the setting on the dial. They were asked to see the dial as close to zero as possible. Following one tap to the base, as close to five as possible. Following two taps, as close to ten as possible. Each tapping signal started a thirty second scanning timespan during which the patients controlled their pain using the dial and shifting their pain as instructed, within their own minds and still under hypnosis.

The experiment was broken down by giving each subject two sessions using the fMRI procedure. The goal was to record four minutes of data for each subject. Two minutes of reduced pain, one minute of high level pain and one minute of intermediate pain. The subjects completed this procedure twice under hypnosis and twice not under hypnosis.

The patients were told that as hypnotic suggestions were given to them, the dial would move up and down, making a noticeable change in their FMS pain sensations. They were then hypnotised individually with the exact same hypnosis induction being given to each subject. (Whalley and Oakley, 2003).

Following the hypnotic induction, suggestions were given for the dial and the corresponding FMS pain sensations to be turned up as high as the subject could stand it. The results were then recorded. Suggestions were then given to turn the dial down as low as possible and dial rankings were freshly recorded. All the patients were given the exact same suggestions to keep the study balanced.

Patients were told to use distractive/dissociative techniques of pain control (e.g. finding themselves on a pleasing sandy seashore and were unaware of the pain). After this stage of the study, the patients who reported dial changes of six points or more (from greatest to minimum) in their FMS pain experience, were chosen for the actual imaging/ scanning section of the study.

Thirteen of the patients chosen for the scanning stage of the study, were female. The average age of this group was fifty one years old with a range of twenty one to sixty three years old. Seven of these thirteen participants reported pain from irritable bowel syndrome. Six of these patients were actually taking medications including antidepressants, benzodiazepines and opiates. Three of the group had been off all medication for a time span of not less than seven days before the scan. Four members of the group were not actually prescribed any medication at the time of study (Table 1).

These patients completed the clinical anxiety and depression (HAD) scale (Zigmond and Snaitz, 1983), a short self-report screening device that was developed to show anxiety and depressive states in patients with pain and illness.

3.3. Imaging procedure

Brain activation was measured by estimating the levels of body-fluid oxygen. This is known as, BOLD which stands for Blood Oxygen Level-Dependent. (Ogawa et al., 1990). These measurements were recorded by using what is known as the 3 Tesla Turnaround Spiral Method. (TE = 25 ms, TR = 1.5 s, flip angle = 60°, 64 × 64 matrix). ([Noll et al., 1995] and [Stenger et al., 2000]). Briefly, the single-shot turn around spiral imaging protocol, designed for the LX MRI system, allows for the acquisition of 24 3.2 mm broad 64 × 64 pieces with a 20 cm area of outlook in a TR of 1.5 s.

This protocol presents almost full brain treatment with isotropic voxel proportions (3.2 mm on a side) in a time fast enough to record well characterised hemodynamic time courses. The turn around spiral method was designed to decrease susceptibility artifacts that can occur in brain districts adjacent to air cavities. For example the orbitofrontal cortex and perigenual cingulate cortex which are sit beside the frontal sinus.

Seven patients were hypnotized upon going into the fMRI scanner using, as mentioned before, the identical induction that was used during the previous screening. After the session the first two blocks of fMRI data were recorded and the subject was brought out of hypnosis. At this

point, two more blocks of data were recorded while the subjects were not under hypnosis. For the remaining six patients the identical method was used but the order of being hypnotized and not being hypnotized was reversed. Just as had been done during the pre-screening session, the patients were asked to visualize the dial marked from 0 to 10. For the convenience of recording the fMRI data, non-verbal signals were used by a sequence of taps to the patient's left foot. One tap gave the suggestion that the patient should use the dial to decrease their fibromyalgia pain, getting as close to zero as possible. Two taps indicated that the patient was to experience their fibromyalgia pain in the middle of the dial and as close to five as possible. Three taps meant that the subjects were to mentally increase their FMS pain experience to as close to ten on the dial as possible.

After each stage, the participants provided verbal rankings of their pain intensity at each stage before and after the sequence of taps to the left foot. They were also asked to rate how hypnotized they sensed they were on a 0–10 scale of hypnotic depth, where 0 = not at all hypnotized and 10 = as hypnotized as possible (Oakley et al., 2007). At the end of the experiment the patients were debriefed and asked to rate how much command they sensed they had over their pain in the hypnosis and non- hypnosis stages of the sessions, using a 0–10 scale (0 = no command, 10 = maximum control).

3. 4. Data analysis

Data findings were recorded using the FMRIB Software Library (FSL issue 4.1 – Oxford Centre for Functional Magnetic Resonance Imaging of the Brain), recounted in minutia in another location (Smith et al., 2004). All the scans were organized by aligning all later scans with the first. Each re-aligned set of scans, from every subject, were co-registered with his or her own high-resolution functional MRI likeness, and reoriented into the normalized anatomical space of the mean brain supplied by the Montreal Neurological Institute (MNI). To boost the signal to disturbance ratio and accommodate variability in functional anatomy, each likeness was flattened in X , Y and Z proportions with a Gaussian filter of 8 mm (FWHM).

Region of concern (ROI) was furthermore recorded for the midbrain, thalamus, cerebellum, cingulate cortex, insula, S1, S2, inferior parietal cortex and frontal cortex as the major districts of the pain neuromatrix recorded in the preceding meta-analyses ([Apkarian et al., 2005], [Derbyshire, 1999], [Derbyshire, 2000] and [Derbyshire, 2003]).

3.5. Drug effects

To take into consideration the effects of drugs on the profile of brain activation, the medication free patients (those actually not taking their medication and those actually not prescribed any medication) and those taking medication were evaluated individually. To formally consider the overlap in activation from these two subgroups, details were carefully recorded. See Charts at the end of this paper.

4. Results

4.1. Behavioural ratings

Depression ratings were also recorded using a mean depression rating = 7.7 (SD = 4.6), variety 1–13) and also rankings of anxiety using a mean anxiety rating = 9.5 (4.1), 2–15). On the whole, moderate FMS pain was reported by the majority of the patients/subjects at the beginning of the study. The scale used was 0 – no pain; 10 – maximum pain. The variety of pain appeared to be very broad (mean pain rating = 4.1 (SD = 3.1), variety 0–9).

Those under hypnosis showed a considerable reduction in pain according to the reading on the dial. (1.3 (SD = 0.8), 5.3 (0.6) and 8.9 (1.1). When the patients were not under hypnosis the respective rankings were much higher on the scale (2.3 (1.8), 5.7 (1.0) and 8.5 (1.7). There were highly significant and successful effects when hypnotic suggestions were used.

Patients reported much more control over their pain during hypnosis (7.8 (2.2) vs. 4.7 (2.8); $t = 3.4$, $p = 0.005$, 95% CI [2.5, 3.7]). This data is shown in Fig. 2.

4.2. Brain activation correlated with changes in pain with and without hypnosis

Highly significant rises in BOLD were shown which correlated with patient' pain scales. BOLD was increased on the scan when the patients reported a reduction in pain. The results were clear-cut and are documented in Table 2.

When the patients were hypnotized BOLD responses were significantly higher in several districts of the brain encompassing the cerebellum, anterior midcingulate cortex and anterior and Posterior insula. The BOLD responses were much, much lower on the scan when the subjects were not under hypnosis. This was illustrated in the right thalamus, left MCC, bilateral prime sensory cortex (S1) and the left prefrontal cortex.

Here is a list of the parts of the brain affected. Cytoarchitecture (BA = Brodman's area). The x , y , z coordinates (defined as the pixel with the largest Z -score inside each tabulated region) as asserted by the MNI coordinate system (negative is left, posterior and inferior).

sACC = subgenual anterior cingulate cortex; MCC = mid anterior cingulate cortex;

aMCC = anterior MCC; S2 = secondary somatosensory cortex; S1 = primary somatosensory cortex.

BOLD activation weighted by suggestion to decrease or boost FMS pain ratings during hypnosis (left), without hypnosis (middle) and the difference between these conditions (right). Clusters of voxels that passed a Z score > 2.3 and $P < 0.05$ (corrected for multiple comparisons) were advised statistically significant and are shown superimposed on an attained functional MRI drawn from the patient's own functional scans. At the left of each status are coronal pieces displaying the posterior insula (top) and the anterior insula (bottom). In the middle are sagittal pieces right lateral (top) and left lateral (bottom) to the midline. To the right are right exterior (top) and left exterior (bottom) projections. 1 = midbrain district of the pons; 2 = thalamus; 3 = cerebellum; 4 = subgenual anterior cingulate cortex (sACC); 5 = midcingulate cortex; 6 = posterior insula; 7 = secondary somatosensory cortex (S2); 8 = primary somatosensory cortex (S1); 9 = anterior insula; 10 = inferior parietal cortex; 11 = Prefrontal cortex.

The percentage changes in BOLD activation are graphed and shown in Fig. 4 and illustrate that in every ROI, except left MCC, there was a bigger BOLD signal change when patients were hypnotized.

4.3. Drug consequences on the brain activation responses

Patients on medication did not vary significantly in age from those not on medication. (46.5 (13.6) vs. 55.7 (6.7); $t = 1.5$, $p = 0.2$, 95% CI [-22.9, 4.6]) There were no significant differences between these two groups in terms of their starting baseline pain rating (3.5 (2.9) vs. 5.1 (3.5); $t = 0.8$, $p = 0.4$, 95% CI [-6.2, 3.0]), depression (7.5 (5.3) vs. 7.8 (4.2); $t = 0.1$, $p = 0.9$, 95% CI [-6.5, 5.8]), anxiety (9.0 (3.8) vs. 10.0 (4.6); $t = 0.4$, $p = 0.7$, 95% CI [-6.5, 4.5]).

(10.3 (0.8) vs. 10.2 (1.2); $t = 1.4$, $p = 0.2$, 95% CI [-2.1, 0.5]). The widespread activation in the midbrain, thalamus, cerebellum, anterior cingulate cortex, posterior insula, anterior insula, S2 and PFC for both the medication free patients and those taking medication was very similar to both groups while under hypnosis.

The activation is less clear-cut when both medicated and non-medicated patients were not under hypnosis but a somewhat larger activation in the brain did show for the patients on medications. There was an especially conspicuous dissociation in the thalamus, insula, S2 and inferior parietal cortex.

5. Discussion

FMRI data was obtained in the FMS pain experience with and without hypnosis. Suggestion was highly effective in altering personal pain reports. Patients reported significantly more command over their pain and a larger proficiency to decrease their pain while under hypnosis. Consistent with these outcomes, activation of cortical and subcortical structures routinely affiliated with the pain “neuromatrix” were significant in both ‘ hypnosis ’ and ‘ non-hypnosis ’ conditions. Larger activation peaks were shown with the hypnosis status in the cerebellum, aMCC, posterior and anterior insula, inferior parietal cortex and right prefrontal cortex. In the un hypnotized state, there was larger activation in the thalamus, MCC, S1 and left prefrontal cortex.

These outcomes support the idea that hypnotic suggestions can make significant changes in FMS pain, for the better. The outcomes illustrate the extremely promising success in changing the sensory experience. ([Rainville et al., 1997], [Willoch et al., 2000], [Derbyshire et al., 2004], [Kosslyn et al., 2000], [Oakley, 2008], [Raij et al., 2005] and [Szechtman et al., 1998]). The reported changes in pain experience are furthermore reliable with preceding work showing the utility of hypnotic techniques in the treatment of fibromyalgia ([Haanen et al., 1991] and [Castel et al., 2007]).

The study suggests that the activation of neural structures comprising the pain matrix is dependent upon changes in the experience of FMS pain rather than the demand characteristics of the experiment. Volitional responses to the claims of the trial might be anticipated to cause supervisory neural structures, for example the prefrontal cortex and medial ACC ([Spence et al., 2003] and [Oakley et al., 2003]). These structures were triggered during the experiment and the method may mediate some of the cognitive processing considered to underlie hypnotic modulation of pain. ([Miltner and Weiss, 2007], [Faymonville et al., 2006], [Wik et al., 1999] and [Crawford et al., 1993]). Nevertheless, the added involvement of the thalamus, insula, midcingulate and somatosensory cortices is highly reliable with modulation of pain experience ([Derbyshire et al., 1997], [Derbyshire et al., 2004], [Coghill et al., 1999] and [Coghill et al., 2003]) and with other demonstrations of pain control during fMRI (deCharms et al., 2005).

The outcomes are furthermore exactly applicable to present an argument considering the function of hypnosis in leveraging responsiveness to suggestion ([Kirsch and Braffman, 2001], [Gandhi and Oakley, 2005] and [Raz et al., 2006]) and support the outlook that prescribed hypnotic induction can adjust the power or feature of a later suggestion providing for an expanded behavioural and neural response. Intriguingly, the brain districts illustrating

significantly larger activation during suggestion with hypnosis vs. without hypnosis were mostly right lateralised (see Table 3). This finding is amply reliable with outlooks that focus a larger involvement of right hemisphere methods in hypnosis in highly hypnotizable persons (e.g. [Crawford and Gruzelier, 1992] and [Gruzelier, 1998]). It should be emphasized, although, that the differences between behavioural and neural responses when hypnotized and un hypnotized were differences in stage other than type. The general convention of the BOLD response and changes in pain experience were comparable if the patients had learned a prescribed hypnotic induction or not.

“As well as the results and consequences of hypnotic and non-hypnotic proposal, this study furthermore discovered that the brain correlates the perception of pain. This could underlie FMS pain, though it was not designed to elucidate the distinct perceptual functions for each of the activations found. Speculations as to the function of each neural activation are, thus, correctly restrained. Nevertheless, exact commentary on the thalamic activation is warranted because of observations in preceding investigations ([Cook et al., 2004] and [Gracely et al., 2004]). The thalamus is a foremost entrance for noxious information (Apkarian and Hodge, 1989) and as we have contended overhead activation of the thalamus in this study is especially convincing evidence for a change in pain experience exactly related to pain report. Previous investigations, although, have proposed decreased thalamic activation in patients with fibromyalgia ([Cook et al., 2004] and [Gracely et al., 2004]) that can be normalized (increased) utilising hypnosis for pain relief (Wik et al., 1999). By necessity, these preceding investigations used somatic noxious stimulation to provoke brain activation and therefore confounded FMS pain with acute pain experience ([Cook et al., 2004] and [Gracely et al., 2004]). In addition, preceding hypnotic manipulation of FMS pain utilised a baseline assess of brain undertaking that did not involve

hypnosis (Wik et al., 1999). Consequently, the assistance of hypnosis itself, and of somatic stimulation, to the convention of brain activation continues to be unclear.”

6. Conclusion

6.1. Summary

FMS is made up of a set of unexplained individual symptoms with generalized pain and hypersensitivity to palpation at exact body positions as the most obvious symptoms. In addition, patients report continual fatigue, sleep disturbance, stiffness, despondency, disquiet, cognitive impairment, and general malaise sometimes referred to as “fibro fog” (Baumstark & Buckelew, 1992). FMS may have an insidious onset without any identifiable origin and may evolve like a flu-like illness. (Clauw & Chrousos, 1997; Turk, Okifuji, Starz, & Sinclair, 1996).

The community occurrence of FMS is approximated to vary from 66% to 10.50% (Schochat, Croft, & Raspe, 1994). The variability in occurrence may be due to the outcome from differences in classification criteria since not all of these investigations used the American College of Rheumatology criteria (Wolfe et al., 1990). Bennett (1995) approximated that roughly five million Americans have FMS. It is more routinely diagnosed in women, with a feminine to male ratio of seven to one in those searching treatment. In community trials, although, the ratio is nearer to three to one, females to males.

6.2. Recommendations

Although FMS has some exclusive characteristics, many of the customary cognitive and behavioral interventions have been acclimatized for use. This application shows the submission of the cognitive-behavioral treatment (CBT) set about highlighting some of the exact characteristics that are especially important.

Education

Information and reassurance are absolutely crucial for healing FMS. The need for a definitive interpretation of the symptoms often causes doubts among physicians that a patient actually has FMS. Sadly, there are all too many doctors who do not even believe that it is a real syndrome. Symptoms will become progressively worse; many patients being told that there is not anything that can be done; often being told that the problems are all caused by psychological factors (i.e., “imaginary and all in their heads”). Consequently, it is absolutely crucial that treatment start with information about the environment of FMS, the possible causes, and the assistance of emotional, behavioral, and cognitive factors, as well as personal contributions.

Education encompasses a consideration of the distinction between acute pain and chronic pain. Acute pain is correctly seen as a sign of hazard to the body. In the case of FMS, although, the pain is no longer a signal of impairment to the body. Thus, it is important to make the

distinction between *hurt* and *harm*. Patients are taught that they must become involved in their illness and that exercise is crucial. The clinician should acknowledge that a conditioning program will probably cause a boost in the level of pain as muscles and tendons become painful after months or years of disuse but that the activities will cause no enduring damage and exercise is beneficial in the long run.

Focus on Function, not Cure

Patients with a rigid conviction that something is actually wrong within their body can often obstruct treatment of FMS as it strengthens a passive function that will impede acceptance of self-management and subsequently advancement in the direction of personal and psychological functioning. When the patient and therapist embark on treatment, it should aim at reducing emotional sadness, functional gains, and enhancing the patient's overall life. It is not realistic or wise to aim for the entire elimination of symptoms or a cure. It must be approached gradually with every little success being celebrated and built upon. Hypnosis is a wonderful approach to diminishing not only physical pain, but adding joy and purpose to the patient's world. As mentioned early in this paper, hypnosis is like a 'massage for the brain' and who doesn't love a massage!

Goal Setting

Clinicians should aim on strengthening objectives. Goal setting has multiple benefits. Firstly, people with FMS need to have very shrewd goals. If a patient goes into treatment with the aim of being “pain free” and “just like I was before I developed FMS,” then treatment should aim first on learning about FMS, understanding how treatment for FMS involves producing significant lifestyle changes, pacing life, and sustaining these changes regardless of symptom flare-ups and remissions.

Clinicians should double-check that treatment goals are mutually appreciated and acceptable to their patients/clients. Team work is much more valuable and no one approach will work for all. Most victims of FMS are depressed and need large amounts of support. This writer works very hard at increasing her clients’ self esteem and confidence which then seems to naturally lessen their depression and often the anger they feel at being ill and in pain.

Relaxation

Relaxation is an integral part of the self-management program for FMS patients. There are numerous different procedures to help patients learn to rest (e.g., controlled breathing, progressive muscle relaxation, autogenic training), with hypnosis being at the top of the list. Moreover, different people will find different procedures more appealing and helpful. Thus, the therapist should work with patients to help them discover which modalities they find the most

relaxing. This writer often recommends regular massages and hot Epsom salt baths. This writer also tries to encourage her clients/patients to not isolate themselves and withdraw from society which is sadly an all too common occurrence.

Imagery

Clinicians may teach imagery as a productive method that patients may use when they are feeling swamped by their symptoms.

This writer tells her patients that the use of imagery, as well as relaxation, will become simpler with practice, just like any other skill, and to stay dedicated and patient. The clinician should educate the patient to encompass all of their senses to enhance the vividness of images.

The clearer the image, the more impact the visualization session has. This writer reminds her patients that if they are having difficulty imagining a picture, to try looking at it on a blank television screen in their mind. If all this fails, she reminds them that they can just pretend for a little while and usually that permission to not 'perform' perfectly will bring about a peaceful feeling and often an image will follow. Hypnotherapists are the perfect choice for helping FMS patients learn how to visualize, for both physical and mental relief.

Pacing and Increasing Activities

FMS patients often fear that activity will cause agony and further damage. Consequently, they bypass important functions of life that can actually make them feel better if they can just slowly adjust. Treatment should aim at encouraging patients as it is through their own efforts that they can increase their endurance and decrease their fatigue.

Learning to pace exercise, work, daily chores is crucial in gaining strength, reducing pain and depression. Not too much too quickly or there thre will nothing!

Sleep

A widespread symptom reported by FMS patients is poor sleep. The clinician should encourage patients to set up a sleep regime which comprises: a benchmark wake-up time, eradicating daytime napping, bypassing caffeine and alcohol or anything that might hinder their sleep.

Maladaptive Thoughts

Many people with FMS subscribe to several contradictory and maladaptive ideas about themselves and their plight. Clinicians should address the connection between ideas, sentiments,

demeanour, and physiology. To aid in the breakthrough method, patients may be asked to keep a journal and note when their symptoms are worse or better. Knowledge is power and their health can be directly altered by how they perceive their condition and by creating a more positive change in thinking

Stress

Many patients with FMS have little or no idea of how huge a part stress plays on their pain. Of course the stress of the pain is acute within itself. Again, hypnosis is the ideal tool to teach the FMS patient how to calm their bodies and minds keeping the stress level as low as possible at all times.

6.3. Conclusion

FMS seems to be an extremely under studied and under funded syndrome with profound consequences. It is a complicated and mysterious state of being. Although the word ‘fibromyalgia’ has only fairly recently been coined it has been around for centuries but had not been given a name. This writer discovered that in fact it used to be known as ‘fibrosis. There seems to be so many conflicting reasons for FMS. So, is it triggered by bacterial or viral

infections? Is it the result of hormonal mal-functions? Is it the result of a nervous system default? We do know by this thesis and the research and study done, that brain functions and changes have a great deal to do with this syndrome. However, there are widespread theories in both the medical and alternative medical field and much more needs to be done in understanding FMS. This writer very much hopes that one day all of this will be studied in more detail, but in the meantime, way too many FMS sufferers live on an island of their own.

This thesis has shown that prescribed medication can dull the pain but not cure the cause of it. So are we to be walking pharmaceutical guinea pigs with the hideous adverse consequences of too many drugs and often insipid side effect and potential addiction. Perhaps a certain amount of medication is necessary for a FMS patient to be able to continue their lives with some degree of dignity and joy. Hypnosis has no bad side effects and can decrease pain and misery to such an extent that it is almost criminal for it to not be encouraged and supported by all. This writer believes that hypnosis should actually be 'prescribed' by physicians to their patients on a routine base with medical insurance coming into play. It is only a question of time before hypnosis will be the forerunner in alleviating the pain and misery of FMS and other pain syndromes.

This writer recommends and hopes to continue studying the effects of hypnosis regression (including past life regression) in not only the alleviation of FMS pain, but a better understanding for each patient of how and when the syndrome took a hold of them. This writer plans on being a leading pioneer in this field and asks other hypnotherapist to join her in creating significant and dynamic change.

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Appendix

Appendix

Table 1. Shows the medication use for each patient

Patient	Antidepressant	Benzodiazepine	Opiate
1	Sertralineb	Diazepam	None
	25 mg once daily	5–15 mg daily, as needed	
	Desipramine		
	100 mg once daily		
2	Nortriptyline	Clonazepam	Fentanyl patch
	25 mg three times daily	1 mg once daily	
3	Venlafaxine	None	None
	75 mg three times daily		
4	None	None	None
5	None	None	None
6	None	None	None
7	Paroxetine	None	None
	40 mg once daily		
8	Venlafaxinea	None	None
	75 mg twice daily		
	Paroxetinea	None	None
	40 mg once daily		
	Trazadonea		
	100 mg once daily		
10	Fluoxetinea	Lorazepam	Methadoneb

Patient	Antidepressant	Benzodiazepine	Opiate
	40 mg once daily	4 mg once daily	
11	Trazadone	None	None
	50 mg once daily		
12	None	None	None
13	Venlafaxine	None	None
	75 mg twice daily		

^a Drug not taken during the 7 days before the study.

^b Drug not taken during the 14 days before the study.

Table 2. The regions with increasing or decreasing (*italicized*) BOLD response dependent upon changes in reported fibromyalgia pain experience with and without hypnosis

Figure label	Hypnotised			Unhypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
1	Pons/midbrain				
	(4, -20, -20)	M	4.1	(2, -22, -24)	3.2
2	Thalamus				
	(-2, -6, 0)	L	3.1	(-22, -30, 10)	3.7
	(18, -4, 10)	R	4.4	(18, -14, 2)	5.4
3	Cerebellum				
	(-14, -58, -18)	L	3.9	(-8, -56, -12)	6.2
	(12, -50, -14)	R	4.0	(4, -62, -14)	4.2

Figure label	Hypnotised			Unhypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
4	sACC				
	(14, 46, -8) (BA 32)	R	4.5	(10, 36, -6) (BA 24/32)	3.1
	(6, 24, -18) (BA 25)	R	3.4		-3.1
	(14, 40, 2) (BA 24/32)	R	-2.7	(-14, 44, -14) (BA 25/11)	
5	aMCC			MCC	
	(-4, 14, 30) (BA 24/32)	L	3.0	(-16, 16, 38) (BA 32)	3.1
	(2, 36, 20) (BA 24/32)	R	3.8	-	
6	Posterior insula				
	(-48, -20, 14)	L	3.5	(-52, -16, 8)	-4.1
	(34, -32, 8)	R	3.3		
7	S2				
	(-58, -28, 10)	L	5.1	(-64, -26, 16)	3.0
	(54, -16, 12)	R	4.4	(70, -34, 20)	4.5
8	S1				
	(-28, -36, 64)	L	3.5	(-52, -40, 44)	3.0
	(26, -36, 62)	R	4.4	(30, -28, 68)	
				(64, -22, 40)	-3.0
9	Anterior insula				
	(-30, 0, -8)	L	5.4	(-30, 26, -4)	4.7
	(40, 10, -2)	R	5.2	(46, 16, -18)	3.9
10	Inferior parietal cortex				
	(-60, -38, 40) (BA 40)	L	4.5	(-40, -56, 46) (BA 40)	

Figure label	Hypnotised			Unhypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
	(52, -52, 44) (BA 40)	R	4.5	–	
11	Prefrontal cortex				
	(-52, 14, 8) (BA 44/45)	L	4.5	(-40, 50, -10) (BA 10/47)	4.7
	(-28, 54, 4) (BA 10/46)	L	3.7	(48, 36, -12) (BA 10/47)	5.2
	(36, 62, 2) (BA 10)	R	4.8		

Table 3. The regions with increasing BOLD response dependent upon hypnotically suggested changes in fibromyalgia pain experience greater than those from suggestion without hypnosis and vice versa

Figure label	Hypnotised > un hypnotised			Unhypnotised > hypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
1	Pons/midbrain				
	No significant difference	M	–	No significant difference	–
2	Thalamus				
	No significant difference	L	–	–	–
		R	–	(18, -14, -2)	3.5
3	Cerebellum				

Figure label	Hypnotised > un hypnotised			Unhypnotised > hypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
	–	L	–	No significant difference	–
	(10, –52, –4)	R	3.5		–
4	sACC				
	(0, 22, –12) (BA 25/11)	M	3.6	No significant difference	–
5	aMCC			MCC	
	–	L	–	(–6, 0, 28) (BA 24)	3.5
	(4, 36, 26) (BA 24/32)	R	3.2	–	–
6	Posterior insula				
	(–52, –20, 10)	L	3.2	No significant difference	–
	–	R	–		–
7	S2				
	No significant difference	L	–	No significant difference	–
		R	–		–
8	S1				
	–	L	–	(–36, –14, 62)	3.3
	(62, –26, 38)	R	2.5	(48, –8, 50)	3.6
9	Anterior insula				
	(–44, 14, 10)	L	2.8	No significant difference	–
	(38, 10, 0)	R	3.5		–
10	Inferior parietal cortex				
	–	L	–	No significant difference	–
	(60, –42, 22) (BA 40)	R	3.1		–

Figure label	Hypnotised > un hypnotised			Unhypnotised > hypnotised	
	Brain area (x, y, z coordinates) (region)	Side	Z-score	Brain area (x, y, z coordinates) (region)	Z-score
11	Prefrontal cortex				
	–	L	–	(40, 52, –8) (BA 10/47)	4.4
	–	L	–	(–42, 26, 34) (BA 9)	3.6
	(40, 40, 6) (BA 10/46)	R	3.0	–	–