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Chronic Whiplash-Associated Disorders and Their Treatment Using Flotation-REST (Restricted Environmental Stimulation Technique)

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In this study, we investigated for the first time whether flotation-REST might be used for treating chronic whiplash-associated disorders (WAD). Six women and one man, all diagnosed by licensed physicians as having chronic whiplash-associated disorder, participated. Two of the participants were beginners with regard to flotation-REST (2 or 3 treatments), and five of them had experienced between 7 and 15 treatments. The method for data collection was the semistructured qualitative interview. The empirical phenomenological psychological method devised by Karlsson was used for the analyses. Two qualitative models explaining the participants' experiences of flotation-REST emerged. The models describe the participants' experiences of flotation-REST, as well as the short-term effects of the treatment in terms of five phases: (a) intensification, (b) vitalization, (c) transcendation, (d) defocusation, and (e) reorientation. Results indicated that flotation-REST is a meaningful alternative for treating chronic whiplash-associated disorder.

Keywords: *whiplash; whiplash-associated disorder (WAD); WAD, chronic; restricted environmental stimulation technique (REST); flotation-REST*

Whiplash-associated disorders (WAD) mainly arise in connection with automobile accidents and their numbers are increasing (Bunketorp, 2005). From 1989 until 1994, WAD went from being the third most common traffic injury in Sweden to being the most common (Holm, Cassidy, Sjögren, & Nygren, 1999). While having great consequences on an individual level, WAD also affects society at large. The costs related to WAD in the United States are \$29 billion USD a year (Kivioja, 2004). WAD were defined and characterized as a specific problem at the end of the 19th century, when the railroads came increasingly into use (Kivioja, 2004). At that time, the injury was called "railway back," and not until 1928 was the term "whiplash" introduced (Bunketorp, 2005). There is a difference

between the terms "WAD" and "whiplash," because the latter refers to the mechanisms of the actual incident, whereas "WAD" concerns a group of signs and symptoms following the incident. There is also a difference between acute WAD and chronic WAD, and the latter term describes the case in which the symptoms are present 3 months after the whiplash incident, whereas the first term refers to the situation before that point. In 1991, a panel of experts on WAD from all over the world, known as the Quebec Task Force, was set up to review and draw conclusions from the existing documentation about WAD. The panel created a five-graded system of WAD for the purpose of facilitating the diagnosis and treatment of the disorder (Spitzer et al., 1995). Grade 0 (zero) includes no complaint of stiffness or pain by the patient and no sign of physical neck injury. Grade I includes complaints of pain, stiffness, and tenderness in the neck but no sign of physical neck injury. Grade II includes complaints of a neck injury and one or more signs of musculoskeletal damage. Grade III refers to complaints of a neck injury and

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one or more signs of neurological damage. Finally, Grade IV includes complaints of a neck injury and evidence of fracture or dislocation. WAD is a very complex disorder and its symptoms can manifest in various ways. Common features of WAD are stiffness and pain in the neck and back, impaired sensory system and sensory hypersensitivity, psychological stress, dizziness, headache, cognitive and visual implications, weakened muscles, and posttraumatic stress syndrome (Bunketorp, 2005). These features also coincide with the definitions used by the physicians in the present study.

Australian researchers (e.g., Sterling, Jull, Vicenzino, Kenardy, & Darnell, 2005) have carried out several studies on patients with chronic WAD with the help of a life vest designed to collect data on heart and respiratory rates, as well as leg and torso movements, through electrodes, and the patients also recorded personal information about their pain and feelings. They found that the most common symptoms of chronic WAD are neck pain and restricted neck movement, and up to 90% of the 76 patients reported having these experiences. Cervicogenic headaches were also very common and reported by 76% of the patients. Further, lower back pain occurred in about 50% of the cases, and was caused by the injury to discs, facet joints, and sacroiliac joints in the back. Other less common symptoms of chronic WAD were tingling and pain in the arms as a result of the nerve disturbance, and affected approximately 15% of the participants. The actual damaged area in the neck sometimes causes pain in other areas that the nerves serve, such as shoulders and arms, making the effects even more widespread and complex. Other symptoms, found in about 10% of the participants, were problems with memory and concentration, sleep loss, depression, irritability, tinnitus, and/or blurry vision.

Because of the differences among WAD patients, the work of establishing suitable methods of treatment gets complicated. Many persons have pointed out that a multidisciplinary approach is required when dealing with chronic WAD (Drottning, Staff, Levin, & Malt, 1995; Mayou, Bryant, & Duthie, 1993). When planning for rehabilitation of chronic WAD patients, it is therefore necessary to include somatic, psychological, and social aspects, thus making it preferable to use a biopsychosocial model, as it corresponds more closely with the complexity of chronic WAD than the traditional biomedical model (Gerdle, 2004).

A project group (SBU, 2006) conducted a systematic literature perusal of studies around methods of treatment in cases of chronic pain. Those studies showed that persons with chronic pain are often treated with drugs that provide alleviation, but at the same time

entail a risk of strong side effects (SBU, 2006). Other methods of treatment are acupuncture and massage, although these have been shown to have limited effects (SBU, 2006). Cognitive behavior therapy is a more effective method and it helps the person to master the pain about 25% better than with other behavior therapies that were investigated, as well as with drugs, physiotherapy, and with no treatment at all (SBU, 2006).

Hydrotherapy is another way of treating chronic musculoskeletal disorders, and the effectiveness of hydrotherapy has been investigated in a systematic literature perusal of more than 500 studies; 34 of them fulfilled the criteria for further analysis (Bender et al., 2005). Ten assessed moderate- to high-quality evidence of pain relief. Four trials were on patients with osteoarthritis of the hip, two on rheumatoid patients, two on patients with low back pain, one on patients with ankylosing spondylitis, and one on fibromyalgia. In all but one of the studies, the pain was significantly reduced compared to control groups. Factors such as buoyancy, immersion, resistance, and temperature play important roles in hydrotherapy (Bender et al., 2005), and muscle relaxation and reduced joint swellings are other possible parts of the process, as well as improvement in mood and tension reduction.

An examination of 26 studies dedicated to methods of treatment of chronic WAD (Seferiadis, Rosenfeld, & Gunnarsson, 2004) indicated that these treatments often are of a limited quality and that the methods that, among others, could be recommended include electromagnetic field therapy, radio wave neurotomy, and cognitive behavior therapy in combination with physiotherapy. The study also pointed out that additional investigation regarding the effects of treatments in cases of chronic WAD is needed. Our study is the first that evaluates the short-term effects of the flotation-REST treatment in cases of chronic WAD. Previous studies on flotation-REST treatment in cases of pain and stress have shown positive results in terms of inner well-being and pain reduction (Bood, 2006; Kjellgren, 2003). The short-term effects of the flotation-REST treatment in cases with chronic WAD are therefore interesting to evaluate.

Flotation is a mild form of sensory isolation or, to use the more modern term, "Restricted Environmental Stimulation Technique" (REST). The flotation form of REST entails placing the individual in a tank of water with an extremely high saline level, a level that is considerably higher than that in the Dead Sea. However, the salt is mainly magnesium sulphate, which is kind to the skin. The technique involves minimizing sensory

impressions. To achieve this, the opening in the tank is covered by a thin lid which can be easily opened and closed from inside. The tank is insulated on the inside to retain heat and also to exclude sound and light. The temperature of the water is kept at 34.2 °C. The flotation-REST technique is not strongly influenced by expectancy-placebo (Norlander, Kjellgren, & Archer, 2001) or by attention-placebo (Bood, Sundequist, Kjellgren, Nordström, & Norlander, 2005). Several studies have shown the incidence of positive effects, such as increased well-being, mild euphoria, increased originality, improved sleep, reduced stress, reduced tension and anxiety, reduced blood pressure, and less muscle tension (for a comprehensive review see Bood et al., 2006). A recent meta-analysis (van Dierendonck & te Nijenhuis, 2005) investigated flotation as a stress-management tool. The study included 25 articles with a total number of 449 participants, and the results showed that the flotation-REST technique has positive effects on physiology (e.g., lower blood pressure), well-being, and performance.

Several studies have been performed that apply flotation-REST as a method to alleviate different types of pain conditions (Kjellgren, Sundequist, Norlander, & Archer, 2001). In a series of studies with 123 participants, performed in Sweden (e.g., Bood et al., 2006), one treatment regimen was shown to be effective, with the positive effects of the flotation-REST therapy maintained 4 months after treatment. The schedule was two, 3-week periods, consisting of two treatments of 45 minutes each per week for 3 weeks, followed by a week without treatment, thus giving 12 flotation-REST treatments over 6 weeks (with the entire regimen lasting 7 weeks).

There has been no follow-up on this study, because it can only be regarded as an initial evaluation of how patients with chronic WAD experience the flotation-REST treatment. The aim of the study was to establish a first picture of the short-term effects of the flotation-REST treatment in cases of chronic WAD. We were also interested in whether other possibilities exist to carry out further studies within this area.

Method

Respondents

The participants in this study were six women and one man, all being diagnosed as having chronic WAD by licensed physicians. Because the number of subjects with both chronic WAD and experiences of

Table 1
Age, Duration of Chronic WAD Ailments, and
Number of Flotation Treatments

Participants	Age	Duration (in Years)	Number of Sessions
1	18	0.5	2
2	27	1	3
3	39	1	7
4	40	1.5	9
5	42	2	10
6	50	3	12
7	67	10	15

the flotation-REST treatment were limited when the study was carried out, the sample constitutes the persons who were available and interested at that time. The physical pains that the participants experienced involved symptoms of pain and stiffness in the neck, head, shoulder, arms, and the lower back. Further symptoms were dizziness, problems with memory and concentration, headache, depression, loss of sensation in the hands and arms, loss of sleep, nausea, and irritability. The participants had their own combination and magnitude of the symptoms even though they had all been diagnosed as having chronic WAD. Chronic WAD refers to the fact that the participants had had their symptoms for at least 3 months. Six participants either had WAD grade II (neck complaints and musculoskeletal signs) or WAD grade III (neck complaints and neurological signs), and one participant had WAD grade IV (neck complaints and evidence of fracture or dislocation). Table 1 shows the age of the respondents, and the number of completed flotation treatments, as well as how long they had had their chronic WAD. The participants mean age was 40.43 years ($SD = 15.74$) and they had experienced their ailments during 2.71 years ($SD = 3.31$). Two of the participants were beginners with regard to flotation-REST (2 or 3 treatments), and five of them had experienced between 7 and 15 treatments.

Implementation

The research followed the ethical standards of the World Medical Association declaration of Helsinki concerning Ethical Principles of Medical Research Involving Human Subjects, and the study was approved by the Ethical Board on Experimentation on Human Subjects (Forskningsetikskommittén) at Karlstad University, Sweden.

A request for participation in an interview was posed to 12 persons with chronic WAD who had been treated

or were being treated with the flotation-REST technique at a university in Sweden. Some of them were beginners, whereas others had been practicing the flotation-REST treatment for a longer period, but common to all of them was that the treatment lasted for 45 minutes at least once a week, at the laboratory or at a cooperating flotation studio near the patient's living area. The individuals that thereafter demonstrated interest were contacted by phone, after which the meeting between participant and interviewer took place at the laboratory or at another suitable location agreed on with the participant. The interviews varied from 50 to 80 minutes in length, and were also recorded.

The method of data collection was the semistructured qualitative interview, which has its emphasis on the participants' rich and unique experiences of the phenomena being studied. An open and flexible interview guide was therefore used during the interview, which means that the participants' verbal space had center stage and the structure of the guide took second place. The guide is reduced to a minimum and follows the story of the participant fully by adding questions when the participant has described a topic in depth. The guide consisted of the following questions: Who are you? How did your whiplash associated disorder occur? Where is your pain located? What does whiplash associated disorder mean to you? How would you describe how it is to float, to me, who has never done it? Please tell me, is there anything more you want to tell?

The purpose of asking questions like this is really to serve narrations made from a unique and personal point of view, and each interview therefore took a different direction depending on what the participant experienced as meaningful. All of the interviews originated from the phenomenological approach that points out the necessary prevalence of the participants' perspective at all times. This study did not include the perspective of a practitioner but had as its mission pointing out experiences from a purely patient perspective.

All participants received the information that everything would be treated confidentially; i.e., that only the person who conducted the interview would listen to the recordings. The participants' integrity had high priority. To address reliability, the participants were informed that some of the quotations would be read by two assessors during a credibility test, as well as included in the presentation of the study, later on. The participants were also informed that they had the right to terminate the interview at any time without giving a reason and

without it affecting their treatment. Finally, it was agreed that the material could be used as a basis for publication, on the condition that the anonymity of the participants was guaranteed.

Processing the Data

The Empirical Phenomenological Psychological Method (EPP method) devised by Gunnar Karlsson (1995) was used in processing the data. The EPP method aims to describe structures of meaning and is based on Giorgi's (1997) three major points of the phenomenological approach in psychology. The first point is the reduction of pre-existing theory and knowledge in favor of whatever is found. The second is the focus on the description of the material rather than the interpretation, and the third is that the essence of the material is sought to capture a concentrated structure of the phenomenon. The EPP method entails an analysis in five stages, where the first step includes the repeated reading of the material to obtain an understanding of the content. The second step includes techniques for dividing the texts into smaller, so-called "meaning units" (MUs). This division is not based on grammatical rules but entirely on the content discovered by the researcher and where there is a suitable shift of meaning. The analysis yielded 1,127 MUs. During the third step, every MU is translated into a higher degree of abstraction so that the implicit levels of the material become explicit in the search for the underlying psychological meaning of the phenomenon. In the fourth step, the MUs are first organized into categories and then into "situated structures," depending on what type of experience they include. The study generated 28 categories. The fifth and final step involves shifting from situated structures to "typological structures" that are presented in the results and discussion section, with quotations from the participants.

To control the reliability of the results of the study, a credibility test for phenomenological analyses was used (Bergman & Norlander, 2005). Two assessors had the task, independent of each other, of assigning 50 MUs to 10 of the categories. Each assessor achieved a 74% correspondence rate, which is comparable to earlier results. The validity of the study was tested by giving two of the participants access to the 28 categories. They were then contacted by telephone. The two participants indicated that the categorization and descriptions in the categories fit well with their experiences during the project.

Results and Discussion

The participants had undergone flotation-REST treatment a varying number of times and provided information about stages prior, during, and after the set of treatments. Throughout the analyses it became obvious that the experiences previous to the treatment radically differed from the experiences following the treatment. The rich experiences prior to the treatment serve as a background contrasting to the foreground concerning short-term effects of the flotation-REST treatment. The results therefore contain two models; the first model covers the participants' experiences of the crises that took place in times prior to the treatment, and the second model describes the short-term effects of the flotation-REST treatment in terms of flotation phases. A linear story about the experienced effects of the flotation-REST treatment in participants with chronic WAD appears as the background and adds depth, the foreground adds light, and the participants' quotations add illustrations to the story.

The Experience of Chronic WAD

To understand how chronic WAD affected the lives of the participants prior to the flotation-REST treatment we must think in terms of constant and intense pain as a central part of life. Some of the participants described the pain as being like a filter through which all other impressions and experiences passed:

When I was really ill, then I had real much pain, and it overshadowed my whole life. It's like something is going on all the time, requiring almost all my attention or sometimes my full attention, but no one else, neither me nor someone else sees it. Whenever you want to do the slightest thing, you are already occupied by feeling pain.

Starting with noticing the pain, it is now possible to look at the model of the crisis that conceptualizes the experience of chronic WAD prior to the flotation-REST treatment. One component of the crisis is the conflict concerning experiences that interior management strategies cannot meet the outer stress that confronts the person. Experiences of being limited and unable to do what one wishes to do are parts of this component:

I bought a motorcycle and I had a motorbike when I was fifteen, and since then I always wanted to own a motorcycle again. Two years ago I bought a motorcycle and I have hardly been able to ride on it because I get such pain. Now, I'm about to sell it again, it just sits there and I don't want it.

Worrying as to whether one will be able to cope with the future is also a part of this experience.

Another component of the crisis includes altered reaction patterns and patterns of behavior that the participant does not always have control over and understanding of. Aggression, frustration, isolation, and mood swings are examples of such patterns of behavior that appear unfamiliar and incomprehensible to the individual: "Like, sometimes I can get so damn mean, sometimes I am mean towards him, but it's not his fault, but how am I going to vent my anger?" The shock-like and sometimes apathetic condition that arises because of the accident is included with these altered reaction patterns. This component is also about previously used and well-known reaction patterns not being useful in handling the crisis situation.

A third component consists of altered experiences of one's own psychological and social identity. Personal identity, with self-esteem and acceptance of oneself in focus, is largely affected. Personal identity is closely connected to one's social identity, which is accentuated when relations with close relatives face new demands. The need for being reminded of the person you are can be fulfilled in being with others. Support from and closeness to other people become important.

The last component of the crisis is the stress manifesting itself as, among other things, sleeping problems, concentration difficulties, irritability, and hypersensitivity to the surroundings, stress, and demands: "I can't focus on anything without mixing everything together. All that has happened to me in my whole life comes up." The stress affects everything, in both a psychological and a physiological sense: "I get agitated from the smallest little thing, and I feel the throbbing, and pressure goes up." The prescribed medicine—with strong side effects—also affects the stress level. This component of the crisis involves physiological as well as emotional, psychological, and social experiences of chronic WAD, highlighting the complexity of the disorder. With this background in mind, the participants' experiences of the flotation-REST treatment are brought to the foreground.

Experiences of the Flotation-REST Treatment

The first—and passing—phase is called "intensification" and consists of the experience of increasing pain as well as difficulties in relaxing in the flotation tank. "When I started with the floating, I had so much pain that I didn't know if I should stay on." Primarily, this is a phase with physical key signatures, but it also includes mental barriers and worries. In time, the strong

pain dissipates, and the learning process creates security and a certainty in the flotation environment that leads forward in the chain of development. To a certain degree, the phase is about developing understanding and a sense of connection to the situation:

The first time I had much pain a few days later. But, well, I waited about five days and then I laid down again and I could feel at once that it felt nice when I laid down.

The next phase is called "vitalization," and concerns the physical and mental improvement that gradually takes place. Reduced pain and stress, as well as increased knowledge of one's body and relaxation, characterizes the vitalization phase. Tension and stiffness diminish and cease successively. The experience of relaxation and calm is another important part of this phase:

I feel like I have become better. I haven't read much about this, I have mostly tried it and I walk around telling everybody, "If you are in pain, go and lie down, it is so nice, it is completely wonderful." I think it has become much better after this, I don't feel the pain as much as before.

During the flotation process the vitalization phase recurs, and it carries the development to constantly healthier levels. This phase is seen as a necessity from which the beginning of further phases of development is made possible. It is through the development of the vitalization phase that much of the distance from the pain is brought forward. The phases described so far mostly include experiences perceived on a sensory level. A change in this type of perception occurs when the coming phase is, to a large degree, signified by mental, spiritual, and intuitive impressions and experiences.

"Transcendation" is the phase that entails a further deepening of the flotation treatment, encompassing psychological experiences that transcend bodily and observable barriers. Altered states of consciousness, developed dream activities, as well as experiences encompassing fantasy- and picture-rich aspects are common. To delve deeper into the personal world of experience and find new contents in these sources is a part of this phase. In addition, the retrieval of original nucleus material, such as the experience of being totally close to oneself, characterizes these transcending movements. "What I notice is that I feel more like myself again; it feels soothing." This phase could be described as a key, because the flotation treatment

opens up new depths of discovery within the individual. It is a strengthening development for the person insofar as contacts are made to other levels of consciousness:

It is almost some kind of mystical time in some way. The perception of space disappears. I can really get that feeling that I don't know which is my body and which is the thought or the water. I think maybe that's why I get that picture, that the floating in some way touches some very, very deep layer that might be connected with something we have experienced as [a] fetus. I know that it . . . yes, I really believe that, because I somehow felt that it was like my body in some way knew something from old. One could actually imagine that hopefully it could be rather total relaxation, something very original . . . it becomes a wish or longing to feel that condition in some way, I think when I float there are pictures.

The pictures, dreams, and sensations that express themselves are experienced as guiding and enlightening. In large part, this phase is about trusting that the depths within oneself exist and function, and that moreover, they have the ability to reconnect the person to a larger consciousness and insight. The trust is also about daring to acknowledge and interpret reality with immediate instinctive means, and to follow the inklings that arise.

The term "defocusation" alludes to the experience of the physical pain no longer having center stage as the feelings and handling of these instead receive the opportunity to be brought forward. The total isolation that occurs in the flotation tank makes possible a form of positive shielding and desensibilization that promotes the attention toward one's own emotional life. A processing of the feelings created as a consequence of the chronic WAD can take over when insight about and understanding of the situation develop. The injury does not only affect one in a bodily sense, but also in deep markings in the sphere of one's inner emotional life, and for that reason this phase of nature becomes necessary and important so as to touch the whole individual. Experiences and emotions go hand-in-hand with the physical condition which is tangible when we discuss the phase of defocusation: "If I just push away those thoughts, I will stop the bodily relaxation and this liberation from pain . . . it's like, a very . . . like, it cooperates very clearly." The connection between these factors becomes clearer during the progress of the flotation-REST treatment, and the more insight is given within this area, the more a need is created within the person to treat both aspects of the health condition.

The last identified phase, “re-orientation,” describes the effect of the flotation process, mostly on a cognitive level, when new trains of thought, attitudes, and preferences are created. Questions regarding what is important, where to put focus, how to move on, what you want, and on a larger scale, what is meaningful, constitute the hallmark of this phase. A high degree of optimism and thinking about possibilities are characteristic in this context: “After the floating you can concentrate and think things through in a better way . . . how you feel and what you might want to do, you become more, you want to do a lot of things afterwards.” To change focus and see the situation from a wider and more forward-looking perspective becomes central, and could be described as a handling strategy, because a higher degree of distancing toward the disorder develops. “The floating is liberating, it liberates life, but I feel that there is a certain perspective to the floating that is healthy.” The reorientation phase contributes to the growth of continued vitalization phases as the person is being prepared for change and positive development. The reorientation phase creates a place for the spiral of flotation phases that we will now discuss.

The Spiral of Flotation Phases

The flotation phases could be viewed as a complete picture of growing circles that, together, form a linear spiral continuum encompassing movements away from and over the pain. Through the flotation-REST treatment, the world of experience grows further and the treatment continually reaches new levels in the psychological equipment that lives and works within the participant. The chain of development moves toward new altitudes as the vitalization phase is repeated and strengthens the person anew. The circular development goes on as the world of experience is able to receive new impressions and aspects of life. The pain is no longer experienced as overshadowing, because its position changes intact with the spiral development, and gets reduced to a more limited and manageable area or disappears. At the same time, the flotation-REST treatment involves the creation of new elements in the world of experience. The spiral illustrates how the participants with chronic WAD experience the short-term effects of the flotation-REST treatment. The effects of the flotation-REST treatment improves the participants’ experiences described in the concept of the crisis in terms of pain reduction, stress management, changed attitudes, renewed coping strategies, openness to perceptions, and the sense of a centered self.

A qualitative study by Åsenlöf, Olsson, Bood, and Norlander (2007) evaluated whether the combination of flotation-REST treatment and psychotherapy had any effect on two patients, one diagnosed with fibromyalgia and one diagnosed with burnout syndrome depression. This combined treatment gave very good results in terms of the participants’ well-being and experience of meaningfulness and ultimately developed into the “therapeutic spiral.” The results were based on the same idea as the present study, illustrating the effects of the flotation-REST treatment as a linear continuum. The effects of the flotation-REST treatment seem to strengthen the participant during every treatment session, making the participant inclined to seek the treatment again and once more experience the beneficial effects of the treatment. This spiral development continues and leads the participant forward in the process of rehabilitation. In both studies, the participants had experienced pain relief, well-being, and feelings of meaning throughout the spiral of flotation-REST treatment.

Many of the sensations and experiences described by the participants in the present study are because of the physiological effects of the flotation-REST treatment. A meta-analysis by van Dierendonck and te Nijenhuis (2005) evaluated flotation-REST as a stress-handling technique through 25 studies. The results indicated that flotation-REST had positive effects in a physiological sense by way of reduced levels of cortisol and blood pressure. The flotation-REST technique also increased the sense of well-being and the ability to perform. An additional study (Kjellgren et al., 2001) of cases with chronic pain has shown that the most severe perceived pain is significantly reduced because of flotation-REST treatment, while the levels of circulating noradrenaline (metabolite 3-methoxy-4-hydroxyphenylethyleneglycol) significantly increased. The study also found that flotation-REST treatment increased the participants’ optimism, reduced their degree of anxiety and depression at night, and allowed them to fall asleep more easily at night. Increased mood and sleep quality, pain relief, and decreased levels of experienced stress have been major conclusions in this qualitative study as well.

A study of pain relief during hydrotherapy (Bender et al., 2005) points out that water immersion during hydrotherapy induces an increase in methionine-enkephalin plasma levels, and at the same time suppresses plasma β -endorphin, corticotrophin, and prolactin levels, which all play a part in the experience of pain relief. Other factors contributing to pain relief during hydrotherapy are muscle relaxation and reduced joint swelling (Bender et al., 2005). The

effects of pressure and temperature on nerve endings also take place during flotation-REST treatment, making these factors important to take into consideration when understanding the pain relief experienced by the participants of the present study.

Flotation-REST treatment favors the patient in a physiological sense as well as mentally and cognitively. The environment in the flotation-REST tank supports reflection and relaxation to a great extent. In comparison to other common treatments of chronic WAD, such as hydrotherapy, electromagnetic field therapy, radio wave neurotonomy, cognitive behavior therapy, and physiotherapy, the ability to benefit mental and cognitive aspects of the patient is high during flotation-REST treatment. The results of this study, as well as conclusions from other studies of flotation-REST treatment in cases of chronic pain (Kjellgren et al., 2001), point out the ability to treat body and mind in a holistic sense. The integration of body and mind becomes the major differentiation and unique conceptualization of the flotation-REST treatment in comparison to other common treatments of chronic WAD. The complex and sweeping characteristics of chronic WAD makes the flotation-REST approach very appropriate.

The present study was the first to evaluate the short-term effects of the flotation-REST treatment in cases of chronic WAD, and the qualitative results indicate that the treatment is a meaningful and beneficial alternative when treating chronic WAD. Additional studies with more participants and quantitative data are needed to evaluate the long-term effects of the flotation-REST treatment in cases of chronic WAD.

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