

Alternative treatments to improve quality of life and health outcomes using bioresonance and complementary nutritional supplements

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Abstract

Many acute and chronic diseases and conditions that are treated by conventional medical and clinical approaches fail to improve symptoms, progression and prognosis and also tend to induce a number of adverse effects upon affected individuals, which has led to increased awareness and trialing of alternative and complementary therapies. A wide range of evidence has supported the positive effects of such therapies upon outcomes, such as pain and physical function, although very few have explored the effect upon quality of life. Therefore, this primary qualitative study aimed to evaluate the impact of bioresonance and basic active water therapy, as a combined alternative treatment approach, upon the quality of life of persons with non-malignant diseases and conditions. A total of 18 subjects were purposively sampled from the local clinic and participated in semi-structured interviews. The data was analyzed using a standard method of thematic analysis, which derived two main themes of 1) impact upon physical function and 2) impact upon mental wellbeing. Almost all subjects in the study observed either complete remission of their target symptom/problem or an improvement in the intensity of symptoms from baseline, which were clinically meaningful outcomes that were highly valued by participants. In turn, the improvement in symptoms led to increases in physical function and mental wellbeing, which positively impacted perceptions concerning life quality. The findings of this study are supported by other literature showing that electromagnetic therapy and hydration with mineralized water can positively improve chronic disease control and mental health. However, given the methodological limitations and specific technical characteristics of the interventions used locally, the results cannot be readily applied to other populations. It is imperative that future research continues to explore the effect of bioresonance and basic active water therapy across different study settings and with a larger sample, in order to derive increasingly valid and reliable data to inform alternative and complementary medicine practice.

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1. Introduction

1.1 Background

In persons with ill health, and particularly those with chronic diseases and conditions, such as depression, neuralgia and irritable bowel syndrome, it has been found that many therapies currently offered by clinicians and recommended in formal guidelines fail to improve symptoms or disease control to a degree sufficient enough for persons to attain relief (Isidoro, Huang and Sheen, 2016). Therefore, there has been significant interest and uptake of alternative and complementary therapies that are not based upon the widely accepted biomedical model, which have postulated a predominantly unproven efficacy in being able to improve symptom severity and in turn, outcomes such as quality of life and disease prognosis, as well as efficacy in preventing the onset of disease (Isidoro, Huang and Sheen, 2016). The recognition and potential role of such therapies is reflected in the vast number of and increase in publications within the field of alternative and complementary medicine with authors exploring a wide range of approaches, ranging from plant-based compounds to utilizing vibration and exploiting object frequencies (Crimson Publishers, 2019). Indeed, alternative therapies are of antiquity with most having been used within ancient times but still remain in prevalent use, largely within non-western countries due to a variety of reasons, such as tradition, lack of belief in the biomedical model and frustration with the inefficacy and adverse effects of modern medicines. Although some persons engage with both modern medical care and alternative medicines termed integrative therapy, it is clear that the number of persons seeking to explore and rely upon alternative treatments is increasing and this has even become a trend in populations of western nations, including the United States (Isidoro, Huang and Sheen, 2016).

Indeed, in a large North American survey of more than 30,000 persons, the National Center for Complementary and Integrative Health showed that as many as 38% of adults and 12% of children were utilizing one or more forms of alternative or complementary medicine and that the prevalence in adults had increased by 2.3% over a five year period (Barnes and Bloom, 2008). The survey also found that these therapies were mostly adopted by persons of middle age and those of Caucasian, Asian and American Indian ethnicity with the most common forms of alternative therapies comprising natural remedies, breathing exercises and meditation (Barnes and Bloom, 2008). As scientific evidence to support the safety and efficacy of alternative and complementary therapies is generally lacking, this has led to almost all academic and clinical communities failing to accept and recommend these treatment options

to patients with protracted problems and in those seeking additional and alternative means to achieving pre-morbid levels of health and wellbeing, which has been a major obstacle that is reported to be perpetuating poor outcomes (Isidoro, Huang and Sheen, 2016). Indeed, this may be a justified problem considering that from an ethical and medical position, persons should be objectively informed about the risks and benefits of all treatments prescribed or recommended to them and this requires prescribers to understand how alternative therapies interact with the individuals physiological systems, their conditions or diseases and any medications (Isidoro, Huang and Sheen, 2016).

2. Literature Review

2.1 Overview

Several specific alternative therapies have become increasingly utilized and popular among western populations, including electromagnetic treatments such as bioresonance, quantum resonance magnetic analysis, frequency generation and low-level laser therapy, and nutritional alternatives, such as pycnogenol and active water. Therefore, this literature review will explore the principles and evidence regarding these contemporary alternative medicines.

2.2 Bioresonance and Electromagnetic Field Therapy

The first alternative therapy that has observed increased uptake within many communities is bioresonance, which refers to the utilization of electromagnetic vibrations to induce cells of body tissues to frequencies that may elicit improvement or cure of a pathological process, see appendix 1 (Markov, 2007). The technique of bioresonance was originally founded by Dr Franz Morell who developed the first device with a frequency range of 1-800 kHz that could receive, amplify and return signals associated with pathology to affected anatomical regions of patients. The principal of bioresonance is based on the observation that all entities oscillate with a specific frequency or frequency range and thus, can be manipulated by detecting and applying a problems oscillating frequency upon itself (Karakos *et al.*, 2019). In an early evaluation of bioresonance therapy among 204 children with allergies, Schumacher (1990) reported that the treatment eliminated allergic symptoms in 83%, improved symptoms in 11% and was only ineffective for 4.5% of subjects, although the findings were subject to considerable scrutiny as a result of various systematic biases. Moreover, Dr Schumacher continued to explore the effect of bioresonance and reports upon anecdotes in his book that the therapy has been meaningfully effective for more than 1,000 patients who have been under his care (Schumacher, 1998). Since

Dr Morell's findings, a number of other authors followed to explore the clinical effect of bioresonance and reported similar levels of efficacy in the order of 90% for eliminating or improving symptoms related to allergic diseases, such as rhinitis, asthma and dermatitis, as well as for rheumatoid arthritis and infectious conditions (Herrmann and Galle, 2011; Andra and Nowak, 2006; Popp, 2001). Moreover, in a more recent survey of 311 patients with various health complaints including nasal, eye, respiratory, dermal and gastrointestinal symptoms, Karakos *et al.* (2019) found that bioresonance observed a self-reported efficacy of 90% at eliminating health symptoms and this positive effect even remained significant at 12-months post-exposure. Bioresonance has also observed efficacy in promoting the cessation of cigarette smoking, where in a randomized placebo-controlled trial, Pihtili *et al.* (2014) showed that the intervention was significantly effective at achieving smoking cessation at all time points of one week, two weeks, one month and one year, than compared to the placebo control. In addition, the feedback from participants was reported to consistently support the positive effect of bioresonance in helping patients to become smoke-free.

Various other types of electromagnetic therapy, such as static magnetic field, low-frequency sine wave, pulsed radiofrequency field and millimeter wave therapy, have also been used among the alternative medicine community and have received significant attention over the last few decades and have been reported to exert efficacy in the management of musculoskeletal disorders, controlling pain and promoting wound healing (Markov, 2007). There has also been the emergence of quantum resonance magnetic analysis and therapy, that is currently advocated by Rupp (2019) and is based upon a variation of magnetic resonance analysis and the findings of a Chinese study, which essentially delivers electromagnetic waves to diagnose and treat health anomalies. The therapy is reported to attenuate the ageing process, improve symptoms related to tendonitis, coronary heart disease, other vascular diseases and migraine, as well as improve sleep quality, inflammation and pain and achieves this through modifying the health of cells by the application of a pulsating magnetic field at sub-terrestrial levels (Guyana Chronicle, 2015; VDM-Academy, 2019). Indeed, quantum resonance magnetic analysis and therapy utilizes similar principles as bioresonance to essentially detect and apply tissues/cells with their specific oscillating frequencies with positive effects suggested to occur with treatment given for eight minutes in the morning and evening of each day (VDM-Academy, 2019). The treatment utilizes pulsed magnetic field therapy and this is reported to induce changes on a cellular level by altering ion transport and in turn, stimulating cell metabolism and optimizing the membrane potential to a state that improves perfusion,

oxygenation and the removal of waste products and to therefore, achieve greater homeostasis and protection from diseases and conditions (VDM-Academy, 2019). Although some authors state there is little published evidence regarding the safety and efficacy of this technique, a number of studies have been identified and require summarization. Firstly, pulsed electromagnetic therapy emerged in the 1980s following research in murine models showing that exposure to the fields promoted greater wound healing, fracture repair and recovery, reduction of hematomas and attenuated inflammatory processes and this was followed by observations of altered cellular signaling *in vitro* (Wu *et al.*, 2018).

One of the most influential *in vitro* studies was reported by De Mattei *et al.* (2001) who evaluated the effect low energy and low frequency pulsed electromagnetic field therapy upon human articular chondrocytes and found that the treatment led to marked increases in cell proliferation after only three days and that this was associated with enhanced availability of growth factors and other micronutrients, which highlight its utility for the treatment of various arthritic and articular disorders. After this study, there were a high number of randomized trials that explored the impact of pulsed electromagnetic field therapy in persons with osteoarthritis with some promising results. For example, Fini *et al.* (2013) showed that the therapy was able to improve the anabolic activity of chondrocytes and encourage new cartilage synthesis as well as reducing the catabolic effects of inflammation, whilst Ay and Evcik (2009) found that electromagnetic field therapy led to improvements in physical function of the knee with decreases in morning joint stiffness and subsequent increases in the performing of daily activities of living. Positive effects have also been observed in patients with other sites of osteoarthritis where Kanat, Alp and Yurtkuran (2013) showed that magnetotherapy led to highly significant improvements in hand pain, function, vitality, general health and hand joint stiffness, Sutbeyaz, Sezer and Koseoglu (2006) showed that a similar intervention resulted in significant improvements in cervical neck pain and disability and Trock, Bollet and Markoll (1994) previously showed that electromagnetic field therapy was effective for both knee and cervical spine osteoarthritis in terms of reducing pain and increasing joint range of motion.

There have also been several meta-analyses, including a Cochrane review evaluating the impact of pulsed electromagnetic field and pulsed electro stimulation therapies, which have demonstrated positive and significant improvements in pain and function for persons with osteoarthritis and there were no adverse effects reported for any of the included cohorts (Negm, Lorbergs and Macintyre, 2013; Li *et al.*, 2013). In a more recent meta-analysis, Wu *et al.* (2018)

aimed to explore the effect of a single electromagnetic field therapy modality to overcome the limitations of the former analyses and indeed, the authors found that the intervention led to highly significant and meaningful improvement in pain and function for subjects with knee osteoarthritis, however, due to limited number of trials, no conclusions could be inferred about the effect upon persons with hand and neck osteoarthritis. Notably, the most significant effects upon osteoarthritic symptoms were observed for studies utilizing a short duration (<30 minutes) of electromagnetic field treatment, which has been supported by a previous *in vitro* study where Parate *et al.* (2017) found that differentiation of mesenchymal stem cells into chondrocytes was greater after the first 5-20 minutes of treatment exposure. Indeed, other studies have also found that pulsed electromagnetic field treatment can induce marked alterations in cell signal transduction after 5-10 minutes of exposure, demonstrating the effective and convenient utility of the modality (Kristupaitis *et al.*, 1998; Dibirdik *et al.*, 1998). The mechanism of electromagnetic field treatment has been characterized in a review by Strauch *et al.* (2009) who reported that the intervention can increase intracellular calcium levels and optimize calcium ion binding to calmodulin, which acts as a signal to induce cellular and tissue repair through accelerating the generation of nitric oxide activity catalyzed by nitric oxide synthase. In addition, the modality stimulates the release of growth factors, such as fibroblast growth factor 2, tumor necrosis factor-alpha and transforming growth factor-beta, which are known to be involved in angiogenesis, generating collagen and granulation tissue and remodeling tissue architecture and structure, see appendix 2.

2.3 Low level laser therapy

Low level laser therapy (LLLT) is another type of alternative medical intervention and whilst it also uses electromagnetic waves, the modality is based upon the principles of photobiomodulation and is compared to the critical process of photosynthesis within plant species (Cotler *et al.*, 2015). This therapy emerged following Dr Finsen's achievement of the Nobel Prize for his use of concentrated light sources to treat dermatological conditions and Dr Mester's demonstration of the ability of lasers to bio-stimulate tissues (Cotler *et al.*, 2015). The laser used in LLLT is classified as a class 3R/3B laser according to the International Engineering Consortium and its manipulation as therapy involves the application of laser light of a wavelength similar to infrared (660-905nm) and one with a power range of 10-500mW as these characteristics permit dermal and tissue penetration and thus, has reported to benefit symptoms of pain, as well as attenuating inflammation and encouraging repair. LLLT is usually prescribed with an irradiance of 5W/cm² and is directed towards anatomical areas of injury or

symptoms for a duration of 30-60 seconds every other day for multiple weeks until tissue healing and reductions in pain and other symptoms begin to occur (Cotler *et al.*, 2015). The principles of photobiology used by LLLT to induce tissue healing, repair and homeostasis involves the ability of cells and cellular components to absorb photons and indeed, photon acceptors in humans include hemoglobin, myoglobin, porphyrins, flavins and flavoproteins and cytochrome enzymes of mitochondria, of which, the latter is reported to be the predominant site of photon absorption during LTTT (Chung *et al.*, 2012). It is suggested that LLLT is able to promote the dissociation of nitric oxide from cytochrome c oxidase within mitochondria, in order to reduce excessive binding that can impair oxidative respiration in injurious and hypoxic cells. In turn, this shifts the redox potential of cells to one that favors enhanced oxidation with greater production of reactive oxygen species and a lower production of reactive nitrogen species, which also induces the transcription of genes involved in growth factor production, deposition of cellular matrix, proliferation and motility, see appendix 3 (Chung *et al.*, 2012). The effects of LLLT upon gene transcription has been reported among numerous studies to increase the rate of fibroblast, keratinocyte, endothelial and lymphocyte proliferation, and ultimately, increasing neovascularization, angiogenesis and collagen synthesis (Frigo *et al.*, 2010; Basso *et al.*, 2013; Szymanska *et al.*, 2013). However, LLLT is reported to have a converse effect in injurious nervous tissue where mitochondrial function within c-fibers and a-delta fibers is inhibited upon application for 10-20 minutes and this provides a degree of nociceptive and other afferent blockade as to improve pain and other symptoms, although the efficacy markedly diminishes after 24 hours (Bashiri, 2013; Konstantinovic *et al.*, 2010). The mechanism attributed to the effect upon neurons is not well understood but thought to involve reductions in mitochondrial membrane potential and ATP production and through altering the release and actions of neurotransmitters, which promotes an anesthetic-type mode of obstructing action potential and impulse transmission (Chow, David and Armati, 2007). The vast majority of studies evaluating the efficacy of LLLT have predominantly comprised patients with musculoskeletal pain with positive improvements in those with both acute and chronic pain syndromes and notably, the effects are suggested to be under-estimated as a result of inter-study heterogeneity (Cotler *et al.*, 2015).

2.4 Water and Nutritional Therapies

Alternative forms of complementary therapy also involve nutritional and water therapies with firstly, basic active water, which is based upon the consumption of water with an optimal quality of its constituents, rather than simply consumption of sufficient quantities of water (VDM-Academy, 2019). The term basic active water refers to the manipulation of its quality to its most basic and useful form, such as through filtration, boiling and ionization, which is reported to reduce the number of molecular chains within water by 100-fold and in turn, encourage greater penetration and entry into cells and across the blood-brain barrier, as well as improving the toxin-binding ability of water molecules (VDM-Academy, 2019). The most important component of basic active water however, is the presence of minerals such as calcium and magnesium, and indeed, the World Health Organization has reported that the fortification of water with minerals is critical to reducing the incidence of various burdensome chronic diseases, such as diabetes and hypertension (Sengupta, 2013). Some authors even advocate the intermittent intake of water with enhanced alkalinity, that is produced through ionization as a result of animal studies showing that consumption can lead to positive effects upon body weight, metabolism, free radical production, deoxyribonucleic acid integrity and growth, although its persistent and isolated use is not recommended due to risks associated with hyperkalemia and myocardial infarction (Magro *et al.*, 2016). Water is the most fundamental element of life where in humans, water accounts for some two thirds of total body weight and hydration being critical to the homeostasis of all cells and tissues yet few persons intake an adequate amount of water each day, see appendix 4 (Popkin, D'Anci and Rosenberg, 2010). Indeed, insufficient replenishment of the body with quantities of water to replace usual losses can have a number of deleterious effects upon health, however, less consideration has been given to the quality of water with sources often containing inadequate mineral levels as well as harboring harmful chemicals, carcinogens and mutagens (Popkin, D'Anci and Rosenberg, 2010; Villanueva *et al.*, 2014). One solution to addressing these issues of water quality has been reported to comprise specific filters, such as those used by Sanuslife, which is reported to eliminate more than 99% of harmful substances, re-mineralize water and enhance its energizing properties (VDM-Academy, 2019).

Among examples of nutritional homeopathic medicines, the intake of germanium within its organic form has been used for more than three decades in the treatment of various diseases and this led to the production of synthetic germanium-based compounds, such as carboxyethylgermanium sesquioxide, which has reported immuno-stimulatory properties that

can enhance the ability to fight viral infections and protecting self from cancer (VDM-Academy, 2019). It has been suggested that these actions of germanium arise from its electron-acceptor properties which can improve oxidative metabolism and assist in the detoxification of the blood, as well as chelate with heavy metals to prevent their deleterious molecular effects (VDM-Academy, 2019). Extracts of the French bark *Pinus pinaster*, that is commercially known as Pycnogenol, has also received considerable attention among the academic and clinical communities due to its potent ability to scavenge free radicals and thereby, protect cells and tissues from reactive oxygen and nitrogen species (Iravani and Zolfaghari, 2011). In addition, Pycnogenol is also reported to have numerous positive effects upon health with anti-inflammatory, anti-carcinogenic, anti-metastatic and anti-oxidative activity, leading to a reduced risk of various neoplastic and non-neoplastic conditions, see appendix 5 (Iravani and Zolfaghari, 2011). Similar health effects have also been reported for the nutritional supplementation of persons with vitamins and amino acids, although the complexity of the molecular handling of these substances and evidence advocating their effects in humans has been compounded by metabolic, transcriptional and epigenetic complexities (Dioguardi, 2011; Kamangar and Emadi, 2012).

2.5 Rationale Statement and Research Aim

Whilst alternative and complementary medicines have a wide reported number of health effects upon persons with various diseases, conditions and ailments, very few studies have explored the impact of such therapies upon an important outcome indicator that is quality of life. Studies in existence have predominantly focused upon persons with cancer where Albabtain *et al.* (2018) showed that alternative medicine was associated with a significantly more favorable quality of life in women with breast cancer, than those who did not utilize alternative and complementary treatments and similar findings have been reported by Jang, Kang and Kim (2017) and Irmak *et al.* (2019) in patients with other types of solid tumors. Considering that no studies appeared to have explored the effect of alternative and complementary medicine upon a range of health conditions, this research aimed to evaluate the combined effect of bioresonance and basic active water therapy upon quality of life of persons with various non-malignant diseases and conditions.

3. Methodology and Methods

3.1 Design

A primary methodological study was adopted to address the former research aim given that this knowledge gap has not been previously addressed by other authors and thus, there was no amenable alternative to evaluating the effect of bioresonance and basic active water therapy upon quality of life. A qualitative and cross-sectional design was adopted to help derive information from persons exposed to the therapies as this provided a more meaningful and in-depth approach to acquiring vast amounts of information from the perspectives of individuals experiences, which is considered more important and patient-orientated than compared to quantitative surveys that can be susceptible to response biases (Rosenman, Tennekoon and Hill, 2011). Moreover, qualitative studies are reported to be markedly useful in exploring novel and niche paradigms as they can provide foundational information upon which, can be used to guide future research studies and/or inform practice change (Watkins, 2012). The study was also grounded by positivist phenomenology in order to ensure that the research methods and findings would be derived and interpreted with logic and objective reasoning and to therefore, generate meaningful recommendations for alternative and complementary medicine practice (Collins and Stockton, 2018).

3.2 Setting, Participants and Sampling

A small sample of 20 persons attending a local alternative and complementary medicine clinic who had been diagnosed with various non-malignant diseases and conditions were recruited using a purposive sampling technique. This method of sampling was selected as it enabled the primary researcher to invite persons who would be most willing to undergo bioresonance and basic active water therapy and to in turn, provide sufficient accounts of their experience during interviewing. Notably, purposive sampling is a known and accepted qualitative sampling method but its selective nature can increase the risk of selection bias, that would comprise the inclusion of subjects who would be predicted to respond positively to the interventions, however, this was considered a small risk given that patients attending the clinic tended to seek therapies with only true effectiveness (Palinkas *et al.*, 2015). Patients eligible for the study were adults aged >18 years with a clinically diagnosed non-malignant disease or condition, had no contraindications to receiving bioresonance therapy or basic active water and signed the consent forms.

3.3 Exposures and Procedures

All subjects eligible to take part were invited to attend a briefing session where the investigator acquired formal consent and informed participants about the therapies of bioresonance and basic active water and their right to withdraw at any time point. Information concerning subjects' demographics and baseline health status including the disease/condition for therapeutic targeting was sought, in order to enable the researcher to plan and individualize the technical aspects of bioresonance therapy. After treatment planning, patients were prescribed a combined treatment regime consisting of bioresonance therapy and basic active water for a period of 4-8 weeks, depending upon responses to therapy. If participant's symptoms had been completely eliminated at week four, the therapy was withdrawn, but if symptoms persisted, therapy was continued to study end at eight weeks. Bioresonance therapy was delivered to a patients troublesome anatomical sites of disease/symptoms using a Quantum Magnetic Analyzer in accordance with local clinic protocol defined by Rupp (2019). Participants also received an eight week supply of basic active water supplied by Sanuslife on behalf of the VDM-Academy and were instructed to consume this water alone and avoid the intake of tap water and water from other sources (VDM-Academy, 2019).

3.4 Data Collection and Analysis

Demographic and clinical information was collected using simple proformas, whilst qualitative data concerning patients' experiences and views regarding the therapies upon their quality of life was collected through conducting one-to-one semi-structured interviews. Interviews were performed one week after patients had completed therapy, which was during week five for those achieving symptomatic relief at four weeks or at week nine for those achieving cure at eight weeks. Indeed, semi-structured interviews are a well-recognized qualitative method used to acquire information concerning patients experiences of an intervention or exposure and the semi-structured approach ensures that researchers allow patients to converse information that they perceive to be relevant and thus, reduces the risk of restricting and biasing responses (King and Horrocks, 2010). Whilst 20 interviews were sought, the investigator recruited participants and performed interviews until the principle of data saturation had occurred given that this is a technique that can optimize the validity of qualitative research by ensuring that all relevant data had been captured and that no important information about quality of life had been missed by the premature termination of data collection (Saunders *et al.*, 2017). The qualitative data was analyzed using the standard process of thematic analysis that is defined by Braun and Clarke (2006), which included a multi-step process of familiarizing self with data, identifying

consistencies in the responses of subjects to develop codes, grouping codes that were inter-related to develop themes and reviewing the process to ensure accuracy and to refine or revise the codes and themes. This technique of analyzing the data was chosen as it also permitted adherence to constant comparative analysis through the author repeatedly referring back to the original data during interpretation, in order to reduce the risk of subjectivity and bias becoming reflected in the outcomes (Nowell *et al.*, 2017). The data was organized and analyzed using a manual technique rather than utilizing computer software, in order to enhance immersion within the data and thus, to develop an objective and reflective thematic analysis.

3.5 Ethical Considerations

The study was approved by a local ethics committee after submission and review of the proposal document for the research. As the study involved human subjects and exposed them to medical interventions in the form of bioresonance therapy and basic active water, consideration was given to the risks of these exposures, although the absence of any adverse risks reported among the literature and anecdotally, negated these as having any potential negative impact upon subject's health or wellbeing. Despite this, the author retained a log of side effects reported by patients at each attendance for therapy, although no issues were identified among all exposed subjects. In addition to exposure monitoring, the investigator ensured that all patients were properly consented in accordance with local procedures and guidelines and maintained their confidentiality by anonymizing all personal identifiable information. Moreover, all research data was secured using an encrypted electronic storage device and a padlocked cabinet within the local research office, in order to comply with research data protection policy. Notably, the consenting of subjects also acquired permission for publication of the research data within the lay and academic communities in report and journal format, as well for presentation at local meetings and conferences.

4. Results

4.1 Baseline Data

The characteristics of subjects included in the final thematic analysis are summarized in the text, below and within appendix 6. A total of 18 subjects completed the interviews, including 15 females and three males, who collectively, had a mean age of 37 years (range 28-86 years) and all were of Caucasian ethnicity. A variety of clinical diagnoses were identified but most comprised conditions with chronicity, including pain syndromes such as neuralgia and fibromyalgia, as well as headache, joint and musculoskeletal disorders, and dermatological conditions, including psoriasis, eczema and dermatitis. In terms of intervention efficacy, 12/18 subjects observed complete remission of their presenting physical problem at four weeks post-exposure to bioresonance and basic active water therapy, whilst the remaining six subjects had an improvement in symptoms but only observed a partial resolution at eight weeks. The effect upon mental wellbeing was more varied with most subjects observing an improvement rather than complete resolution (appendix 7).

4.2 Thematic Overview

A total of two main themes were identified from the thematic analysis of qualitative data pertaining to the effect of bioresonance and basic active water therapy upon quality of life, which included: 1) impact upon physical function and 2) impact upon mental wellbeing. These are reported in further detail under the respective subheading sections and quotes from subjects are provided for supportive context.

4.3 Theme 1: Impact upon Physical Function

The majority of subjects exposed to the combined bioresonance and basic active water therapy reported that the interventions markedly improved their physical function, particularly for those who observed complete remission of their symptoms at week four. Among these subjects, it was reported that there were substantial improvements in their ability to perform physical tasks that they had previously struggled to complete as soon as week two post-therapy exposure, which in turn had a positive impact upon perceived quality of life. Subjects with pain syndromes stated that the attenuation of pain intensity to levels that were more tolerable led to a return of their premorbid joint mobility and muscle flexibility, which in turn and over time, provided them with greater realization and confidence in being able to perform activities of daily living. This meant that many subjects regained a degree of independence and therefore,

were less dependent upon others, including their spouses, family and carers, which led to great sensations of achievement, content and quality of life.

“it was only two weeks and then... realized I could move my neck in positions that I hadn't for years... [S3]

“almost one week.. I was able to move on my own without assistance and do things for myself, I became a happier person.... It was a positive experience..” [S12]

Indeed, some subjects had felt burdened by their physical problem and guilty that they had to depend upon other persons for them to continue living, which had significantly affected their perception of life quality with some subjects wishing that there were more effective treatments, that they hadn't developed their medical problem and one subject, even admitted to having previous thoughts of suicide. However, it was clear that after receiving bioresonance and basic active water therapy, these subjects observed at least a minor to moderate improvement in perceived quality of life, through the intervention granting them a new outlook on life. In this regard, the physical improvement in subject's mobility allowed them to participate in tasks that not only were essential for survival (eating, drinking, hygiene) but also enabled them to engage in hobbies, interests, past-times and social activities, which had previously become out-of-bounds as a result of their debilitation. Some of the physical tasks that were reported to boost subjects' perceptions of life quality included being able to walk to the shops without a mobility scooter, being able to grasp objects and read a book without pain, playing sports such as badminton, golf and jogging, and driving a car with confidence and safety.

“some of the pain has been so bad and I wanted it to go so much that I thought about the end... any relief from the pain was such a positive thing... no one knows how much it improved my life... [S17]

“it was a new lease of life...I was able to go to the shops and do things I couldn't do on my own before.... [S5]

One of the most notable effects of bioresonance and basic active water therapy was increased ability to engage in social activities, that was facilitated through reductions in debilitating symptoms and improvements in physical function. All subjects, including those who observed

partial and complete remission, appeared to highly value this outcome as it helped them to regain and/or rediscover a new or previous identity and thus, meaning to their life, which was reported to be one of the principal factors influencing perceptions of quality of life. The impact of therapies upon social activity and opportunities for subjects not only referred to social engagements in the sense of leisure but also social interactions within increased or newfound employment, which had multiple positive implications upon participants lives. Those able to participate in leisure-type social activities were overwhelmed by the number of positive emotions that this generated, and these not only provided individuals with a sense of satisfaction, happiness and pleasure but also acted as a distraction to their medical problem, which collectively optimized their recovery and appeared to be critical in the achievement of symptom remission. Moreover, for subjects who partly and completely regained their physical function, the ability to commence working was reported to be the most important factor influencing their quality of life, as employment granted them with a new purpose in life, an identity, a network for socialization and a financial income, which has multiple positive repercussions upon their lives and led to many feeling a complete return to their premorbid self.

“I couldn’t socialize at all... I never knew what isolation felt like until then... and then after.. it made a huge difference.. [S4]

“not only could I go out with friends and do things they wanted to do... and not be restricted... I also found a job and that was the most important outcome for me, but I believe it would for anyone in a similar position to me” [S9]

4.4 Theme 2: Impact upon Wellbeing

A number of subjects reported upon the impact of bioresonance and basic active water therapy upon their mental health and psychological wellbeing, which either occurred as a result of physical mobility restrictions being reduced or eliminated and/or due to improvements or resolution of debilitating symptoms, such as pain and paresthesia. For most subjects, it was clear that the return of physical function, whether this comprised increases in fine motor or gross motor competence, positively impacted wellbeing as a result of reductions in depressive symptoms. Due to the protracted and chronic nature of participants diseases and conditions, many had attempted a number of medical treatments and other alternative therapies that had

failed to improve their health status and as a result, they had become low in mood and developed a sense of hopelessness. Indeed, for a few subjects, participation in this research study was considered a last resort with them having exhausted all other options to try and attain symptom relief. Most subjects with chronic and intensely painful disorders had been mentally burdened by their problem with depressive symptoms often developing into more serious morbidity, including clinical depression, psychotic depression and psychosomatic disorders, which as a result of apathy and a lack of desire to recover, had simply exacerbated physical function, mental wellbeing and quality of life.

“this was the last chance I had and that I was willing to try... so many other treatments just didn’t work... I was giving up all hope... [S7]

“it was not long before I was diagnosed with depression... it was a big challenge as my mental health impacted my physical health and this went into a spiraling and continuous circle of worsening quality of life” [S11]

Most subjects with physical limitations and debilitating symptoms also felt a strong sense of isolation from their communities, friends and even families given that they were mostly unable to participate in and contribute to social engagements. The inability to engage in some activities even led subjects to actively avoid those that they were capable of performing, which was reported to result from various factors including embarrassment of their problem, not wanting to impose their condition upon others and perceptions that they would be stigmatized. Indeed, a number of participants admitted that they had experienced and felt a strong sense of stigmatization against them during both social encounters and whilst in employment. This was conveyed as other persons exhibiting aversive and passive behaviors and actions around them or directed towards them, which appeared to represent a form of discrimination that was particularly apparent in subjects’ occupations that were associated with intense and demanding work tasks. Some participants noted that this stigma enhanced their desire to leave their employment or profession, even more than the limitations presented by illness itself, and leaving work was seen as the initiating event that triggered social isolation with most persons having and depending upon small social networks within the confines of their former employer. As most subjects did not have social connections outside of their former occupation, these persons sought support from their families, although for many, relatives were often occupied by their own families, work and ailments, which exacerbated isolation and led to some

individuals becoming completely withdrawn and developing psychiatry pathology. This appeared to be a critical problem that was difficult for self and others to resolve where subjects became completely aversive to different sources of help and support with only few seeking psychiatric advice and medication. However, medication to improve mental wellbeing was also compounded by side effects and inefficacy that led to worsening of hopelessness but increased expectations of alternative and complementary therapies to aid their recovery, albeit being in a much more vulnerable and adverse prognostic state.

“my condition is stigmatized by everyone... I can see it in their eyes..” [S10]

“my mood has always been low, it’s just a natural process of chronic pain... going through the ups and downs..” [S6]

“one time at my lowest... even the psychiatrist could not help me, I felt helpless.. the only option left in my mind was therapies not offered by the state” [S11]

The negative effect of persons conditions upon their mental health was reflected in the impact of bioresonance and basic active water therapy, which led to meaningful improvements in psychological state for almost all subjects included in this study. One subject who had lost all hope in conventional medical treatments and who had tried numerous alternative and complementary therapies but with no effect, reported for the first time, that the intervention markedly improved their wellbeing and outlook on life as it enabled them to escape the debilitating nature of their condition and to lead a more normal life with the re-establishment of physical function and routine. For this participant, the effect of bioresonance and basic active water led to a progressive increase in quality of life as they reported that their perception of wellbeing and hope improved incrementally over the eight-week study period and became maximal at study end. This subject also noted that whilst the intervention did not completely resolve her mental health issues, they reported that they had overcome the critical first step of recovery by taking greater responsibility for the management of their illness and in maintaining a positive and strong desire to overcome their problem. For other subjects, exposure to the intervention enabled them to escape the burden of social isolation and in turn, having greater confidence to merge back into society by taking progressive steps to socialize with other persons. For some individuals, this simply comprised conversing with shopkeepers but over time, this led to more definitive and meaningful actions, including contacting their old friends

and family to engage in activities. Indeed, it was apparent that the renewing of social networks and activities was fundamental to perceptions of quality of life where most despised being alone and enjoyed others company, which induced feelings of pleasure, support and content. One individual even recognized that the impact of therapy improved their awareness of self as their improvement in mental wellbeing provided them with greater cognitive clarity, which helped them to see that the stigma they had previously perceived was a product of their own self-judgement and misconceptions of other's views. For this subject, this realization resulted in a complete change in her mental state and personality to one that was reported to reflect her premorbid self and identity, which appeared to open up several new life pathways and positively tailored the remainder of her occupational life and career.

“the treatment seemed to improve my mental health and confidence over time... after three weeks I was able to see things differently.. [S17]

“it was an escape from being alone... I was able to become more social and this was highly important to me, for my work, family and social life” [S1]

“I could see, it wasn't others, it was my own twisted views of myself and what others thought... I regained my personality.. it was a miracle [S2]

5. Discussion

5.1 Summary of Findings

In response to the increasing uptake and emergence of alternative and complementary therapies for the management of diseases and conditions that fail to respond to conventional medical care and treatment and due to the lack of studies evaluating the effect of the former therapies upon quality of life perceptions, this study aimed to explore this knowledge gap and through thematic analysis informed from the interviewing of 18 subjects, two main themes emerged; impact upon physical function and impact upon mental wellbeing. All subjects included in this study observed either complete remission of their target symptom/problem or an improvement in the intensity of symptoms from baseline, which were clinically meaningful outcomes that were highly valued by participants.

5.2 Evaluation and Comparison with Literature

For subjects observing an improvement in or return to pre-morbid physical function, this outcome appeared to occur gradually over the course of bioresonance and basic active water therapy and was maximal at 4-8 weeks post-exposure. The positive impact upon physical function was largely mediated through reductions in pain that granted individuals an increase in range of joint motion and indeed, this may be attributed to the mechanism of bioresonance in that the detection and transmission of electromagnetic frequencies to induce oscillation of the underlying pathological entity may have helped to attenuate pain signaling and related inflammation (Karakos *et al.*, 2019). Moreover, the reports of other authors even suggest that bioresonance therapy can detect aberrations in genetic and epigenetic factors associated with the development and progression of chronic disease, and therefore, upon relaying frequencies to induce genetic and epigenetic oscillation, the potential to ameliorate or even cure chronic disease is a distinct possibility (Ebrahimi *et al.*, 2015). Indeed, a number of studies have previously shown that bioresonance therapy can markedly improve clinical symptoms in both children and adults with various infectious, allergic and chronic diseases/conditions and although no data was reported about the impact upon subjects quality of life, it can be inferred that a reduction in symptoms would naturally in turn, lead to a greater ability to lead a usual life and thus, enhance perceived life quality (Schumacher, 1990; Herrmann and Galle, 2011).

Some of the subjects in this study had debilitating musculoskeletal conditions and indeed, the improvement in symptoms and function have been previously supported in a study of patients with rheumatoid arthritis where bioresonance therapy was able to modulate inflammatory and metabolic mediators to one that favored a more stable and less impactful disease course (Islamov *et al.*, 2002). For subjects with neurological based conditions, such as neuralgias and radiculopathies, similar improvements in symptoms were observed in this study and notably, Gramowski-Voss *et al.* (2015) recently showed that electromagnetic field therapy was able to stimulate increases in neural network activity and re-organization and induce morphological changes and neurogenesis, which were seen to improve neuronal repair and function and thus, may be the mechanisms responsible for the positive effects of bioresonance therapy in this study. Furthermore, other authors have even found that the principles of bioresonance can enhance the resistance of neurons to undergo programmed cell death and necrosis, as well as conferring them with increased protection from toxins, which could have complemented the former mechanism in producing positive symptom and functional improvements in subjects studied herein (de Groot *et al.*, 2016; Podda *et al.*, 2014).

Other evidence has even found that bioresonance therapy can positively improve the outcomes of patients with psychosomatic conditions, which are often considered the most challenging and difficult type of problem to treat given the psychosocial complexity of symptom manifestation that is not readily targeted by modern and alternative therapies (Nienhaus and Galle, 2006). Studies exploring the effect of bioresonance upon quality of life have largely been conducted among populations with malignant conditions, which was a group excluded from this study due to the knowledge gap specific to persons with non-oncological pathology. Despite this, it is important to discuss the effect upon quality of life as this may help to support the findings identified formerly. In one study, Belmonte *et al.* (2011) found that a combination of bioresonance therapy and manual lymphatic drainage led to meaningful improvements in pain, heaviness and tightness of patients with breast-cancer related lymphoedema and in turn, positive changes in health-related quality of life. Considering that the cohort analyzed in the former study had chronic problems of lymphoedema and improvements in this chronic condition, rather than cancer itself, the results support the positive effects upon pain, physical function and perceived life quality found in this study. In another study, Schafer *et al.* (2003) failed to demonstrate a significant difference in quality of life between users and non-users of alternative therapies, although as the authors included subjects with only allergic and food intolerances, the findings cannot be generalized to persons suffering from acute and chronic

pain conditions. In contrast, Lappin *et al.* (2003) showed that bioresonance therapy was able to markedly reduce symptoms of multiple sclerosis in a cohort of 117 subjects and this led to improvements in fatigue and quality of life, than compared to placebo control. More recently, Gilling *et al.* (2009) found that the focused delivery of bioresonance therapy to the pelvic floor of women with stress urinary incontinence led to improvements in all primary and secondary outcomes, which included measures of urinary symptoms and quality of life and notably, similar findings have been reported for patients with osteoarthritis (Bagnato *et al.*, 2015). Furthermore, in a recent evaluation of pulsed electromagnetic therapy, Nayback-Beebe *et al.* (2017) showed that the intervention was able to lead to significant improvements in chronic low back pain and related quality of life after one month of exposure, which is a condition that is known to be markedly difficult to treat and was of similar exposure-effect duration to that of this study.

This study also observed that bioresonance therapy was associated with marked improvements in mental health and psychological wellbeing, which although was related to improvements in symptom control and physical function, the effect may also be attributed to organic cognitive effects. Indeed, in a recent randomized controlled trial evaluation the impact of electromagnetic field therapy upon persons with treatment-resistant depression, Straaso *et al.* (2014) found that the intervention was able to improve the remission rate by 6-7% by week five and this was maintained at study end at week eight. The mechanism postulated to be responsible for this positive improvement in mental health has been related to the ability of bioresonance to upregulate tyrosine kinase (Src) and mitochondrial ribonucleic acid related to brain-derived neurotrophic factor, which has been known to play a critical role in resistance to anti-depressant medications and thus, bioresonance therapy appears to reverse this molecular contribution to impairments in mental health status and in turn, perceived quality of life (Saarelainen *et al.*, 2003). Indeed, similar improvements in mental health have been reported among other cohorts with resistant depression, as well as persons with fibromyalgia, migraine and multiple sclerosis (Martiny, Lunde and Bech, 2010; Sutbeyaz *et al.*, 2009; Rosch, 2015). Although the findings of this study are likely to have resulted from exposure to bioresonance therapy, the supplementation with basic active water cannot exclude this treatment as an important contributor to improvements in symptoms, physical function, psychological wellbeing and quality of life. Whilst no studies among academic journals have evaluating the effect of basic active water, the simple intake of plain mineralized water has been previously shown to benefit mental health where adequate hydration significantly decreases the risk of depression and can

even improve chronic disease control (Haghighatdoost *et al.*, 2018; Popkin, D'Anci and Rosenberg, 2010). Whilst simple hydration and intake of minerals from water may help to enhance improvements in pain, physical function, mental health and quality of life as evidenced in this study, it is important that populations opt for basic active water sources given that the consumption of tap water or other sources can comprise harmful chemicals and lead to poisoning (Chowdhury, Krause and Zimmerman, 2016; Popkin, D'Anci and Rosenberg, 2010).

5.3 Study Limitations and Implications

Whilst the findings of this qualitative study suggest that bioresonance and basic active water therapy are markedly effective in improving quality of life of subjects with non-malignant conditions, the validity and applicability of the results requires acknowledgment of the studies limitations. Firstly, the selective nature of the sampling technique may have led to the biased recruitment of subjects and results given the risk of inclusion of persons who would be likely therapy responders and the exclusion of non-responders. Secondly, the collection of data through interviews and the presence and behaviors of the interviewer may have skewed the responses of subjects to those that favor a positive outcome, which would constitute response bias. Thirdly, few techniques to enhance the validity of the findings were amenable to employ, which included constant comparative analysis, data saturation and triangulation of the data with wider literature, although reflexivity and audit trailing were insufficient (Noble and Smith, 2015). Finally, the study was conducted in a single-center and only included a small cohort of 18 subjects and thus, the findings cannot be readily generalized to other populations. Moreover, the techniques of bioresonance therapy and the characteristics of basic active water were specific to local protocol and manufacturing processes and thus, as techniques are likely to differ between institutions, the findings may have limited meaning for other researchers and practitioners. Therefore, the implications of this study can only impact local practice and considering the marked positive improvements in quality of life conferred by bioresonance and basic active water, it is recommended that local research conducts additional trials of high quality randomized controlled design, in order to make more informed judgements concerning the routine utilization of the former interventions.

5.4 Conclusion

In summary, this study explored the impact of bioresonance and basic active water therapy upon the quality of life of persons presenting with a multitude of chronic non-malignant diseases and conditions and found that marked improvements in symptoms, physical function and mental wellbeing led to meaningful increases in perceived quality of living. Overall, the methodological limitations of the study and the specific technical characteristics of the interventions employed mean that the findings can only impact local practice, although it is important that future local and wider research evaluates the effect of such therapies upon other populations and using trials of high-quality design with minimal biases.

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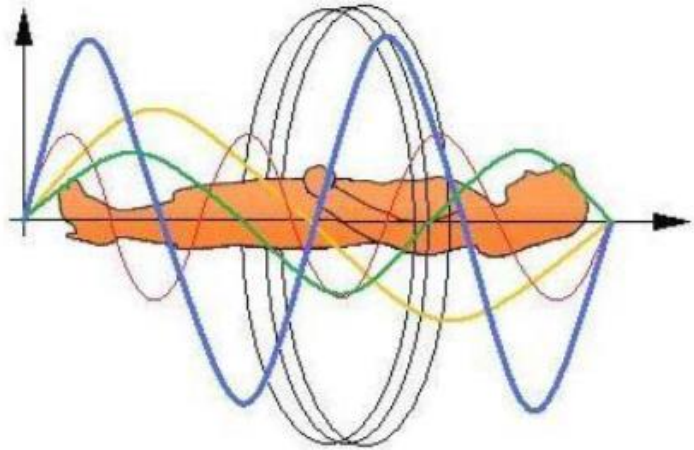
Villanueva, C. M., Kogevinas, M., Cordier, S., Templeton, M. R., Vermeulen, R., Nuckols, J. R., Nieuwenhuijsen, M. J. and Levallois, P. (2014) Assessing exposure and health consequences of chemicals in drinking water: current state of knowledge and research needs. *Environmental health perspectives*, 122 (3), 213-221. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/24380896> [accessed 15/11/2019].

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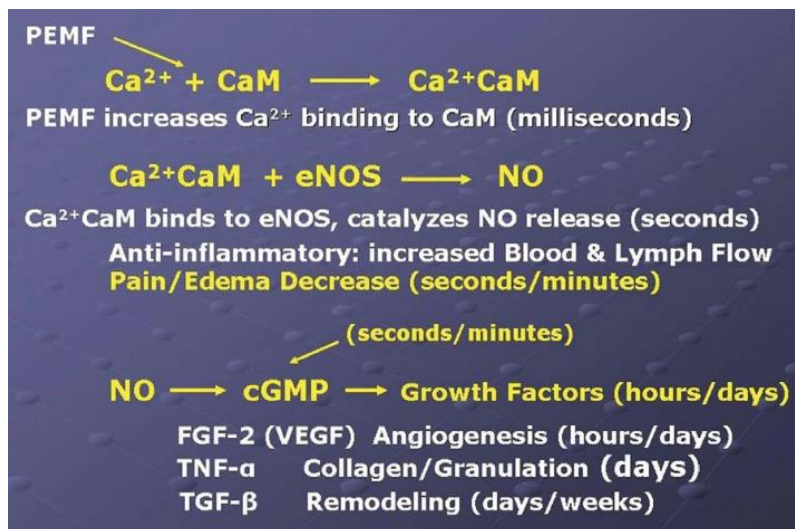
Wu, Z., Ding, X., Lei, G., Zeng, C., Wei, J., Li, J., Li, H., Yang, T., Cui, Y., Xiong, Y., Wang, Y. and Xie, D. (2018) Efficacy and safety of the pulsed electromagnetic field in osteoarthritis: a meta-analysis. *BMJ Open*, 8 (12), 1-8. Available from: <http://bmjopen.bmj.com/content/8/12/e022879.abstract> [accessed 16/11/2019].

Appendices

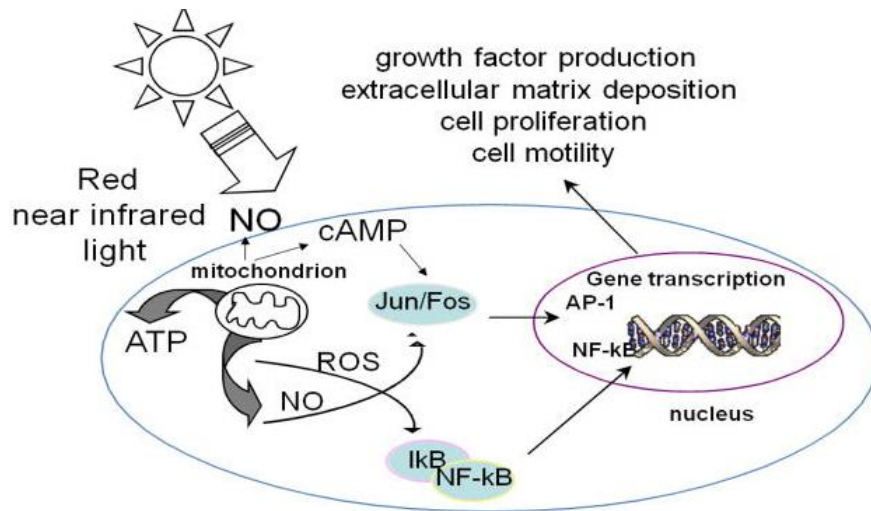
Appendix 1. Crude illustration of oscillations related to different body tissue/cell frequencies.



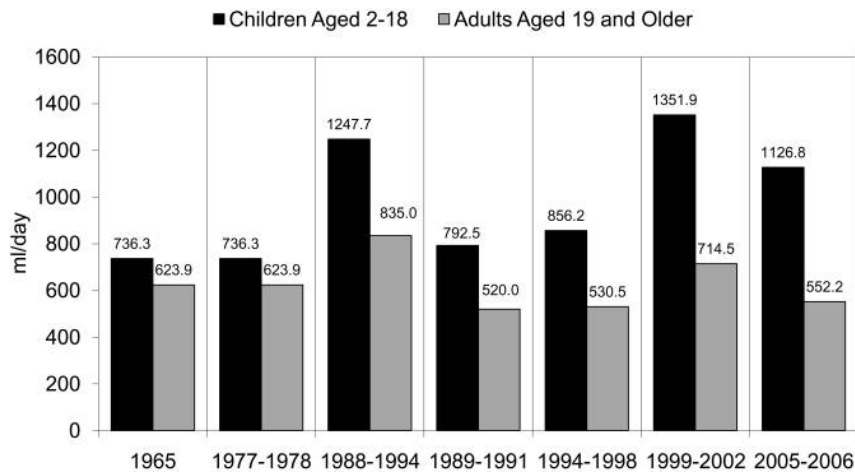
Appendix 2. Proposed mechanism of electromagnetic therapy (Strauch *et al.*, 2009).



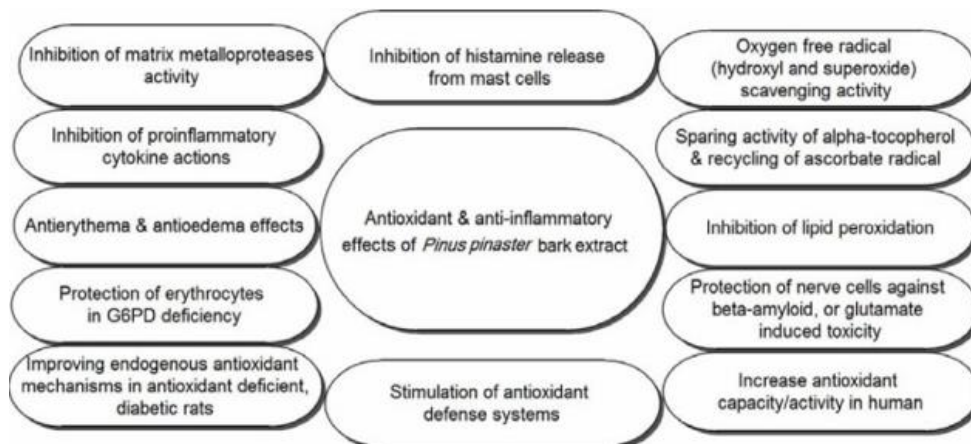
Appendix 3. Proposed mechanism of LLLT (Cotler *et al.*, 2015).



Appendix 4. Trends of water intake in the United States (Popkin, D'Anci and Rosenberg, 2010).



Appendix 5. Effects of Pycnogenol (Irvani and Zolfaghari, 2011).



Appendix 6. Baseline Characteristics

<i>Characteristic</i>	<i>Statistic</i>
Age	37 years (mean) [28-86 (range)]
Gender	15 females (83%) 3 males (17%)
Ethnicity	
Caucasian	100%
Other	0%
Diagnosis	
Pain syndromes	33% (n=6)
Neuralgia	5 (83%)
Fibromyalgia	1 (17%)
Headache disorders	3 (17%)
Migraine	2 (67%)
Cluster headache	1 (33%)
Musculoskeletal conditions	12 (67%)
Osteoarthritis	9 (75%)
Rheumatoid arthritis	2 (17%)
Spondylosis	1 (8%)
Duration of Diagnosis	
Pain syndromes	4 years (mean) [2-12 (range)]
Headache disorders	10 years (mean) [7-13 (range)]
Musculoskeletal conditions	6 years (mean) [2-9 (range)]

Appendix 7. Summary of the of Type of Impact following Bioresonance and Basic Active Water Therapy.

<i>Subject ID</i>	<i>Physical Function Effect</i>	<i>Mental Wellbeing Effect</i>	<i>Subject ID</i>	<i>Physical Function Effect</i>	<i>Mental Wellbeing Effect</i>
1	Symptomatic improvement	Symptomatic improvement	10	Elimination of problem	Symptomatic improvement
2	Elimination of problem	Elimination of problem	11	Symptomatic improvement	Symptomatic improvement
3	Symptomatic improvement	Symptomatic improvement	12	Symptomatic improvement	Symptomatic improvement
4	Elimination of problem	Symptomatic improvement	13	Elimination of problem	Symptomatic improvement
5	Elimination of problem	Symptomatic improvement	14	Elimination of problem	Symptomatic improvement
6	Elimination of problem	Symptomatic improvement	15	Symptomatic improvement	Elimination of problem
7	Elimination of problem	Elimination of problem	16	Elimination of problem	Symptomatic improvement
8	Symptomatic improvement	Elimination of problem	17	Elimination of problem	Symptomatic improvement
9	Elimination of problem	Symptomatic improvement	18	Elimination of problem	Symptomatic improvement