

Effects of Low Frequency Sound Treatment on the Consciousness State of the Alzhe

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September 27, 2010 at 11:43 pm	#11028 < https://www.musicmedicinecollaboration.com/topic/effects-of-low-frequency-sound-treatment-on-the-consciousness-state-of-the-alzhe-4/#post-11028 > <p>Effects of Low Frequency Sound Treatment on the Consciousness State of the Alzheimer patients â€“ Pilot Study</p>



Heidi

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 Moderator

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i. Summary of Proposed Research

According to brain wave research, the 40Hz frequency from the thalamus area has an important role in the regulation of auditory-evoked potentials. (Galambos, Makeing, Tamachoff, 1981, Naatanen, 1992,). There has also been some evidence that the 40Hz brain wave is disturbed or disappears during in the early stages of Alzheimer disease (Llinas & Ribary, 1992; Ribary et al. 1991; van Deursen, Vuurman, Verhey, et. al.; Huang et al. 2000; Jelic et al. 1996; Jeong 2004; Koenig et al. 2005; Stam et al. 2002, 2003; Lustig et al. 2003). Llinas (1993) and Lehtikoinen (1994, 1997) suggest that with auditory stimulation using a 40 Hz sound, it is possible to reinforce this thalamus frequency.

My research rationale is based on these assumptions. If Thalamus has a role in the cognitive brain functioning, and if the Thalamus frequency is disturbed in the early stages of Alzheimer's disease, I believe it would be fascinating to stimulate it with auditory stimulation using a 40 Hz sound, and investigate this stimulation's potential effect on cognitive brain functioning of the Alzheimer clients.

My research questions will investigate:

- (1) Can the thalamus frequency be reinforced by the physioacoustic 40Hz intervention?
- (2) Is the 40 Hz that have been disturbed or disappeared during the early stages of Alzheimer's coming back if stimulated by the 40 Hz frequency created by the Physioacoustic method?
- (3) Do Alzheimer patients receiving the 40Hz frequency intervention achieve a greater degree of consciousness and reality orientation than those in the control groups?
- (4) Do Alzheimer patients receiving the 40Hz frequency intervention achieve a greater degree of short and long term memory than those in the control groups?
- (5) Can the Physioacoustic 40Hz frequency-intervention be a potential intervention for Alzheimer's clients?

During the various research trials Physioacoustic low frequency sound (Thalamus frequency 40Hz) is applied utilizing two control groups of Alzheimer patients, receiving either familiar music, or without familiar music. In a comparison of these two, it is anticipated that the application of the Physioacoustic low frequency sound will result in an increase of short-term consciousness, reality orientation, and affect both short-term and long-term memory capacities with Alzheimer patients. Both statistical analysis and qualitative analysis will be conducted. The combination of low frequency sound with familiar music is anticipated to be the most effective treatment modality with Alzheimer patients.

2. Detailed Description

Objectives

Physioacoustic low frequency treatment (PLFT) using 40Hz, the Thalamus frequency, has not been profoundly evaluated in patients with Alzheimer's disease (AD). The aim of this pilot study is to perform such an evaluation, and to examine the potential benefits of the Physioacoustic Low Frequency Sound (40Hz Thalamus frequency), and its effects on the degree of the consciousness, reality orientation, and short and long-term memory capacities of the AD patients.

My working hypothesis is that if the 40 Hz had been disturbed or disappeared during the early stages of AD it may come back if stimulated by the 40 Hz frequency created by the PLFT method. If so, the application of the Physioacoustic low frequency sound may result an increase of a short-term consciousness, reality orientation, and affect both short-term and long-term memory capacities of AD patients, and may be a potential intervention for them. The combination of low frequency sound with familiar music is anticipated to be the most effective treatment modality with AD patients.

Research questions are as follows:

- (1) Can the thalamus frequency be reinforced by the PLFT 40Hz intervention?
- (2) Is the 40 Hz that have been disturbed or disappeared during the early stages of ADs coming back if stimulated by the 40 Hz frequency created by the PLFT method?
- (3) Do AD patients receiving the 40Hz frequency intervention achieve a greater degree of consciousness and reality orientation than those in the control groups?
- (4) Do AD patients receiving the 40Hz frequency intervention achieve a greater degree of short and long term memory than those in the control groups?
- (5) Can the PLFT 40Hz frequency-intervention be a potential intervention for AD patients?

Methodology

The aim of the study is to assess whether PLFT intervention could benefit a short-term consciousness, reality orientation, and both short-term and long-term memory capacities of AD patients. The study will provide a randomized controlled trial of PLFT + interview and PLFT+interview+standard MT treatment (familiar songs) being compared with each others and with standard MT treatment (familiar songs + interview) and interview only in people with AD.

The study is based on multiple-case experimental design. Multi-methodological instruments (i.e. videotaping, reflection notes, EEG, various assessment data) will be used to collect the data. The statistical analysis will be conducted by comparing the initial baseline, the treatment period, and finally, the PLFS groups and the control groups (EEG, various assessment data, videotaping, reflective notes). Differences in baseline characteristics between the two experimental groups and

two control groups in categorical parameters will be tested using for example, Fisher's exact test. Differences between continuous variables will be assessed by analysis of variance (ANOVA) comparisons for normally distributed parameters; otherwise, for example, the Kruskal-Wallis test will be used. Analysis of covariance (ANCOVA) will be performed to compare the change in outcome measures between experimental and control groups. Analyses will be adjusted for baseline value of the outcome measure. Finally, to explore whether the effect of the intervention on cognitive outcomes (i.e. MMSE and ADAS-Cog) differ according to baseline cognitive status. All analyses will be performed using the Statistical Package for the Social Sciences (SPSS for Windows, version 10.0).

The qualitative data (videotaped observations & case worker's reflections) will be analyzed qualitatively. A modified mode of the Strauss & Corbin mode of grounded theory method (Strauss & Corbin, 1990, 1994, 1998) will be engaged in a constructivist way. This kind of triangulation allows that not only was the phenomenon interpreted according to the possible social processes that occur about the phenomenon, but understanding was enhanced about possible meanings of existential human experience of the phenomenon (Annells, 2006, p. 58; see also Wilson & Hutchinson, 1991). NVivo qualitative software analysis will be used as a tool including grounded theory steps such as open, axial, and selective coding. The data will be divided into concepts, concepts into categories, assigning properties to categories, dimensions of properties along a continuum, and breaking properties into dimensions during the open coding phase (Hueser, 1999, p. 61 in Amir, 2005, p. 366). Axial coding will involve procedures for connecting categories found in open coding. The coding process will focus on matching conditions, contexts, action/interactional strategies and consequences (Strauss & Corbin, 1990, p. 96). Selective coding will be the process of identifying core categories from the analysis and relating them in a systematic way to other categories found in the analysis.

Research Participants

Number of the investigated AD: 20. Participants are to be identified as being eligible for the study and will be approached in collaboration with the Alzheimers Society. The inclusion criteria will be a diagnosis of AD according to NINCDS-ADRDA criteria (McKhann et al, 1984); living in their own home or in an assisted living unit with a caregiver in regular contact; and the ability to communicate verbally. Participants will be chosen randomly, by drawing a card, into either the control or experimental groups. Each group consists five participants and each participant participates four 30 minutes sessions.

Data Collection and Setting

(1) Interview will take place during each session. Participants will be prompted to give either spontaneous or cued answers, with the aid of calendars, clocks and notes, and they are invited into reality-based communication i.e. focusing on personal, time and space orientation and discussing news, or topics of general interest. The contents of the interview, client's alertness, consciousness, reality orientation, focus, memory capacities, and any changes that may take place will be analyzed.

(2) Videotaping will take place during all sessions. This allows for an analysis of

participants alertness, consciousness, reality orientation, focus, memory capacities and any changes that may take place during the treatment.

(3) The EEG investigation will be carried out during the treatment with participant during each session.

(4) Patients' pre-and post treatment cognitive assessments will be graded using the following criteria (in decreasing order of importance): (a) well-recognized published cognitive tests; (b) orientation tests; (c) short-term memory tests; (d) information tests. For example: cognitive function, measured with the MMSE and the Alzheimer's Disease Assessment Scale – Cognition (ADAS-Cog; Rosen et al, 1984); functional status, measured with the Barthel index (Mahoney & Barthel, 1965) and Instrumental Activities of Daily Living (IADL; Lawton & Brody, 1969); behaviour (Neuropsychiatric Inventory; Cummings et al, 1994); and medications used. This will be conducted prior to beginning of sessions and at the conclusion of the 4-session treatment period.

(5) The case worker's follow up include his/her observations about the client after the treatment i.e. his/her consciousness state, alertness, memory functioning and reality orientation and any changes that take place during the treatment day. The caregiver will provide a written reflective report. Caregiver's assessment may also include demographic information; mood measured with the Hamilton Rating Scales for Depression (HRSD; Hamilton, 1967) and Anxiety (HRSA; Hamilton, 1959); quality of life (rated using the Medical Outcomes Study 36-item Short-Form General Health Survey (SF-36; Tarlov et al, 1989); and burden of care (Caregiver Burden Inventory; Novak & Guest, 1989).

Experimental/control groups

(1) Group 1: During the 30 minute treatment these participants, while sitting in the PA chair, will experience the 40Hz low frequency treatment and interview.

(2) Group 2: During the 30 minute treatment these participants, while sitting in the PA chair, will simultaneously experience the conventional music therapy (familiar music: listening/singing) and the 40Hz low frequency treatment + interview by the therapist. The music therapist will choose the applicable music.

(3) Control Group 1: During the four 30 minute treatments these participants, while sitting in the PA chair, will experience only conventional music therapy (familiar music: listening/singing) + interview by the therapist. The music therapist chooses the applicable music.

(4) Control Group 2: During the four 30 minute treatments these participants, while sitting in the PA chair, will be interviewed by the therapist only.

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