Trial Review

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Trial registered on ANZCTR

Trial ID	ACTRN12617000601336
Ethics application status	Approved
Date submitted	24/04/2017
Date registered	27/04/2017
Date last updated	27/04/2017
Type of registration	Prospectively registered

Titles & IDs

Public title	Infraslow neurofeedback for food addiction in women
Scientific title	Infraslow training for food craving in overweight and obese women - a double blind randomised exploratory study
Secondary ID [1]	Nil known
Universal Trial Number (UTN)	U1111-1194-5450
Trial acronym	
Linked study record	

Health condition

Health condition(s) or problem(s) studied:
obesity
food addiction

Condition category	**Condition code**
Diet and Nutrition	Obesity
Mental Health	Addiction

Intervention/exposure

Study type	Interventional
Description of intervention(s) / exposure	20 overweight or obese women between the ages of 18-60 years will be recruited from the community using advertisement in newspapers and on notice boards. Those who are interested will be asked to attend a screening session at the clinic and will be provided with the participant information sheet and consent will be obtained. The researcher will screen for eligibility. If eligible, the participant will undergo an electroencephalogram (EEG) and fill out a battery of questionnaires. Subsequently, they will be randomised and will undergo either treatment infraslow (T-ISF)(n=10) or placebo infraslow (P-ISF) (n=10) for 6 sessions, This will be administered with 3 sessions during the first week, 2 sessions in the second week and 1 session in the third week. The first session will be 10 minutes and the subsequent 5 sessions will be 20 minutes each. During each session, participants will be asked to sit in a chair in an upright position. After careful skin preparation, the appropriate Comby EEG cap will be placed on the participant's head with reference electrodes at the mastoids. The impedance of the active electrodes will be kept below 5kilo-ohms. Before the training period, participants will be instructed to relax and listen to the sound being played. A distinct tone will be used for T-ISF reinforcement at the Posterior Cingulate Cortex (PCC). Reward threshold will be adjusted in real time at above 90%. In other words, for 90% of the time, a sound will be played (reward) when the participant's brain activity meets the infraslow magnitude (threshold). For P-ISF, the simulation protocol by Brainmaster Inc will be administered. Both T-ISF and P-ISF infraslow sLORETA neurofeedback will be implemented with a 24 channel DC coupled amplifier produced by Brainmaster Inc at the research clinic. During the training period, participants will be sitting upright in the chair with the infraslow Comby EEG cap attached. Throughout the sessions, participants will be asked to keep their eyes open, relax and listen to the sound being played by the device.

	Infraslow training will be administered by a researcher who has undergone training by Brainmaster Inc. The researcher administering infraslow training will record the number of sessions attended. Given that this is an exploratory study, only data of participants who attend all six sessions will be analysed for primary and secondary outcomes. However, the researchers will compare baseline characteristics (wellbeing, psychological variables) of those who complete the study to those who did not. This will help inform the researchers on strategies to improve compliance if a larger clinical trial is to be conducted.
Intervention code [1]	Behaviour
Intervention code [2]	Lifestyle
Intervention code [3]	Treatment: Devices
Comparator / control treatment	Control arm 1: 3 sessions of P-ISF Control arm 2: 6 sessions of P-ISF Comparator arm 1: 3 sessions of T-ISF Comparator arm 2: 6 sessions of T-ISF The T-ISF group will undergo active infraslow neurofeedback. The researchers will be comparing the effect of duration of infraslow training (3 sessions of T-ISF to 3 sessions of P-ISF and 6 sessions of T-ISF to 6 sessions of P-ISF) on brain activity and food craving. The set-up and instructions given to participants for P-ISF will be the same to T-ISF. The simulation protocol will play the exact sound to T-ISF randomly instead of when the participant's brain activity meets the ISF magnitude.
Control group	Placebo

Outcomes

Primary outcome [1]	Resting state activity Functional and effective connectivity measured using EEG.
Timepoint [1]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.
Primary outcome [2]	State/Trait Food Craving Questionnaire A 36-item questionnaire assessing temporal and situational states of food craving on a continuous scale.
Timepoint [2]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.
Secondary outcome [1]	Perceived Stress Scale A 10-item continuous scale assessing the perception of stress during the last month
Timepoint [1]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.
Secondary outcome [2]	World-Health Organization five well-being index A 5-item continuous scale assessing aspects of wellbeing within the last 2 weeks
Timepoint [2]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.
Secondary outcome [3]	Yale Food Addiction Scale (YFAS) A questionnaire used to identify individuals who display signs of food addiction similar to the Diagnostic and Statistical Manual of Mental Disorder V (DSM-V) for substance addiction and YFAS score of more than three will be used as an indication of having symptoms of food addiction.
Timepoint [3]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.
Secondary outcome [4]	Symptom checklist 90 revised A 90-item questionnaire used to assess psychopathology, The SCL-90-R consists nine primary symptoms dimension: somatisation, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism
Timepoint [4]	2-3 day after 3 sessions of infraslow training, 2-3 days after completion of 6 sessions of infraslow training, 2 and 4 weeks after completion of 6 sessions of infraslow training.

Eligibility

Key inclusion criteria	1. Symptoms of food addiction (scores equals to or greater than 3 on the YFAS) 2. Women aged 18-60 years 2. Being right handed 3. Overweight (BMI equals to or greater than 25) or obese (BMI equals to or greater than 30)
Minimum age	18 Years
Maximum age	60 Years
Gender	Females
Can healthy volunteers participate?	No
Key exclusion criteria	1. Major weight gain or loss (> 5kgs) in the last 6 months

	2. Certain medications 3. Recent significant head injuries. e.g. concussion where consciousness is lost or surgery 4. Psychiatric disorders with psychotic symptoms or manic symptoms 5. Other health problems-diabetes, cancer, heart disease, uncontrolled hypertension 6. Females who are or intend to become pregnant 7. History of epilepsy 8. Metal implants or implanted electronics (pacemaker) 9. Recurring headaches 10. Previous bariatric surgery 11. Previous diagnosis of an eating disorder

Study design

Purpose of the study	Treatment
Allocation to intervention	Randomised controlled trial
Procedure for enrolling a subject and allocating the treatment (allocation concealment procedures)	An independent researcher from the department will seal each allocation in a consecutively numbered opaque envelope before handing them to the enrolling researcher. During enrolment and randomisation of a new participant, the enrolling researcher will write the participant's ID before opening the sealed envelope and retrieving the allocation from inside.
Methods used to generate the sequence in which subjects will be randomised (sequence generation)	To ensure that sample size is balanced across the T-ISF and P-ISF groups over time, block randomisation will be applied. The independent researcher will use a validated computerised program for this purpose.
Masking / blinding	Blinded (masking used)
Who is / are masked / blinded?	The people receiving the treatment/s The people assessing the outcomes The people analysing the results/data
Intervention assignment	Parallel
Other design features	
Phase	Not Applicable
Type of endpoint(s)	Efficacy
Statistical methods / analysis	The nature of the brain activity data that is collected makes power calculations difficult and formal power calculations have not been reported in previous studies. Our previous pilot study using transcranial pink noise stimulation showed that among 16 women (8 in sham and 8 in real treatment), after the treatment period, the real treatment group had a 22% reduction (mean decrease of 1.11, 95% CI:-2.09, -0.14, p=0.029) on the intense desire to eat sub-scale compared to the sham group. Given that we hypothesised that infraslow neurofeedback would be more efficient than transcranial pink noise stimulation, a sample size of 10 in each group will be sufficient to show a significant difference on the scale.

Recruitment

Recruitment status	Not yet recruiting

Date of first participant enrolment			
Anticipated	15/05/2017	**Actual**	

Date of last participant enrolment			
Anticipated	1/12/2017	**Actual**	

Date of last data collection			
Anticipated	19/01/2018	**Actual**	

Sample size			
Anticipated	20	**Actual**	

Recruitment outside Australia	
Country [1]	New Zealand
State/province [1]	Dunedin

Funding & Sponsors

Funding source category [1]	University
Name [1]	University of Otago
Address [1]	362 Leith St, North Dunedin, Dunedin 9016
Country [1]	New Zealand

Primary sponsor type	Individual
Name	Professor Dirk de Ridder
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Secondary sponsor category [1]	Individual
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Other collaborator category [4]	Individual
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Ethics approval

Ethics application status	Approved
Ethics committee name [1]	Northern B Health and Disability Ethics Committee
Ethics committee address [1]	Health and Disability Ethics Committees Ministry of Health 133 Molesworth Street PO Box 5013 Wellington 6011

Ethics committee country [1]	New Zealand
Date submitted for ethics approval [1]	22/03/2017
Approval date [1]	19/04/2017
Ethics approval number [1]	17/NTB/61

Summary

Brief summary	Dysfunctional neural activity in the cortical reward system network is implicated in food craving. Altering this pathological state using techniques of non-invasive neuromodulation may be a therapeutic option. To date, no published studies have used Infraslow neurofeedback (ISF) in the treatment of food craving among overweight and obese individuals. The aim of this study is to use ISF to target the Posterior Cingulate Cortex (PCC) as part of the default mode network (DMN) in overweight (body mass index equals to or greater than 25) or obese (body mass index equals to or greater than 30) individuals with symptoms of food-addiction (Yale Food Addiction Scale score of equals to or greater than 3) to investigate the effects on brain activity, food craving and wellbeing.
Trial website	
Trial related presentations / publications	
Public notes	
Attachments [1]	http://www.anzctr.org.au/AnzctrAttachments/372793-HDEC Letter 17NTB61 Approved EXP Application.pdf (Ethics approval)
Attachments [2]	http://www.anzctr.org.au/AnzctrAttachments/372793-ISF food addictionv3.docx (Protocol)
Attachments [3]	http://www.anzctr.org.au/AnzctrAttachments/372793-PIS consent version2.docx (Participant information/consent)

Contacts

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