

Multicomponential VR-enhanced treatment of emotional eating in obese subjects: A randomized controlled clinical trial

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AIMS

The goal of this study is to evaluate the efficacy of a virtual reality enhanced clinical protocol for the management of emotional eating in obese subjects.

The clinical aim is to help obese subjects to cope and manage the emotions in response to which emotional eating occurs.

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OBESITY

Obesity is a medical condition characterized by overweight. Overweight is defined by a BMI>25; obesity is defined by a BMI>30 and a BMI>35 defines a severe/morbid obesity (WHO, 2003).

Obesity is a biopsychosocial pathology, in fact its development is characterized by a complex and dynamic system of biological, social and psychological factors.

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EMOTIONAL EATING (1)

From a behavioural point of view, it consists in eating an unusually amount of food in response to negative as well as positive emotions, independently from speed and level of control.

Psychologically, emotional eating is well explained by the psychosomatic theory of obesity, for which obese people overeat when distressed and eating reduces distress (Kaplan and Kaplan, 1957)

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EMOTIONAL EATING (2)

Clinical observations as well as laboratory studies showed that over-weighted and obese people tend to eat more food in response to emotions than normal-weighted subjects and tend to eat in response to emotions even when normal-weighted subjects don't (Ganley, 1989).

Explaining mechanisms may involve both brain metabolism (serotonin) and learning factors, e.g. an earlier association of pleasurable feelings with feeding in negative situations (Canetti, 2002).

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EMOTIONAL EATING (3)

Emotional eating is a dysfunctional eating behaviour that affect many obese people (Masheb and Grilo, 2005).

It seems to be a component of binge eating and Binge Eating Disorder (BED)

Even if we cannot sustain that emotional eating is implicated in the aetiology of obesity, we can say with certainty that in many cases it contributes to its maintenance and increase.

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THE NEW VR-ENHANCED CLINICAL PROTOCOL (1)

The traditional psychological clinical protocols for the treatment of obesity are behavioural primarily and undervalues the importance of emotional eating in obesity.

In order to clinically approach this dysfunctional eating behaviour, we developed a new VR-enhanced therapeutic protocol that consists in Immersive VR relaxation training with audio-taped narratives, in self-monitoring and in mobile non-immersive VR relaxation training sessions.

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THE NEW VR-ENHANCED CLINICAL PROTOCOL (2)

It incorporates different clinical components:

- Progressive muscular relaxation, autogenic training (only warmth part) and deep breathing exercises
- Self-monitoring work (ABC) from cognitive-behavioural psychotherapy
- Induction of good feelings from Emotion-focused therapy

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THE NEW VR-ENHANCED THERAPEUTIC PROTOCOL (3)

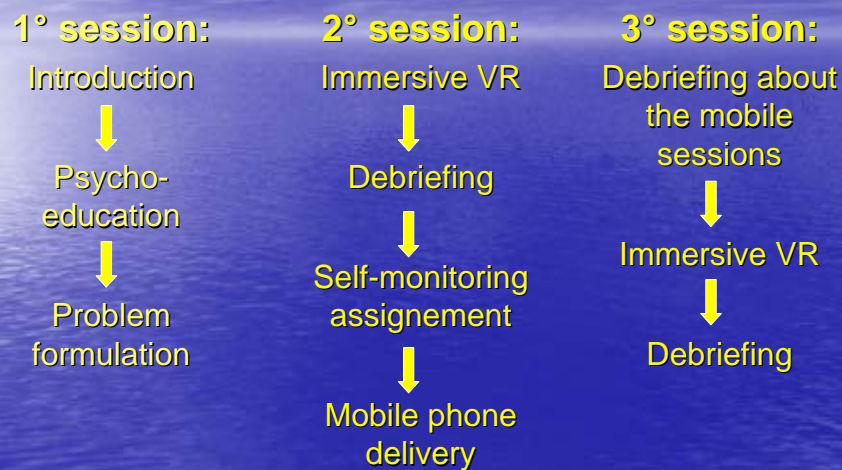
It lasts two weeks and it is organized in this way:

- 1° week: two Immersive VR and one therapist-based sessions and four days of mobile sessions.
- 2° week: one Immersive VR and two therapist-based sessions and four days of mobile sessions.

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THE NEW VR-ENHANCED CLINICAL PROTOCOL (4)



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THE NEW VR-ENHANCED THERAPEUTIC PROTOCOL (5)

4^o session:

Analysis of self-monitoring sheets



Debriefing about the mobile sessions

5^o session:

Immersive VR



Debriefing

6^o session:

Conclusions about the whole experience



Suggestions to keep on self-monitoring and having relaxing sessions at home

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THE NEW VR-ENHANCED CLINICAL PROTOCOL (6)

In immersive VR sessions, participants apply different relaxation techniques, listening to audio-taped guide narratives.

A virtual environment representing a tropical island is used to enhance relaxation by visually presenting key images for facilitating the process and enabling participants to practice, and hence master, relaxation techniques in a more realistic context.

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THE DREAM ISLAND



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THE NEW VR-ENHANCED CLINICAL PROTOCOL (7)

In the mobile sessions, subjects continue applying relaxation exercises individually and daily through the support of a mobile phone playing a relaxing video extracted from the virtual environment, with a relaxing narrative.

Plus, they apply self-monitoring each time they feel down, writing on a sheet about the situation in which they are, the emotions, the thoughts and the behaviours.

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THE CLINICAL TRIAL

Participants

38 female in-patients (Mean age=42; SD=8,6) meeting WHO criteria for morbid obesity. Further inclusion criterion was a score of 1 or higher in at least one of the 6 items of the Emotional Overeating Questionnaire (EOQ)

Experimental design

We compared 3 conditions:

VR: Immersive VR relaxation with integrated clinical protocol

TR: "In imagination" relaxation with integrated clinical protocol

CTRL: Control group with no treatment

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THE CLINICAL TRIAL

Measures (1)

Primary outcome variable – 3 months follow-up (in plan)

EOQ (Emotional Overeating Questionnaire) (Masheb, 2005)

Secondary outcome variables – post treatment and follow-up

WELSQ (Weight efficacy life style questionnaire)

(Riva et al., 2003, *Italian validation*)

BDI (Beck Depression Inventory)

STAI (Trait Anxiety Inventory)

Tertiary outcome variables – in session emotional changes

STAI (State Anxiety Inventory)

VAS (Visual Analogue Scale)

PANAS (Positive Affect Negative Affect Scale)

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THE CLINICAL TRIAL

Measures (2)

Sense of presence

ITC-SOPI (Independent Television Commission - Sense Of Presence Inventory) (Lessiter et al., 2001)

Physiological measures – in session changes

heart rate, galvanic skin response, electromyography and respiration rate - objective correlates of emotions



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RESULTS

Premises

- Statistical data analyses are characterized by low statistical power due to the small number of the participants in each group (10 TR, 14 VR, 14 CTRL) and to the non parametric tests used.
- The virtual environment is characterized by high navigation complexity due to the conformity of the Island.
- The mobile phone based sessions are difficult to live regularly in a hospital where there are few suitable places.

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RESULTS

Baseline comparisons

No stat. sig. differences emerged between the three groups in all the variables.

Within groups comparisons

- Eating control related Self-efficacy improved stat. sig. both in VR ($p=0,004$) and TR ($0,009$) groups, but not in CTRL group ($p=0,327$) at the end of the treatment.
- Depressive symptomatology didn't change in any groups. This result depends on the general low scores observed at the baseline assessment.

RESULTS

Within groups comparisons

- State anxiety decreased stat. sig. in all the relaxation sessions for the VR group, only in one (2^o week) for the TR group.
- Negative affect and Positive affect improved stat. sig. in 5 on 6 sessions for the VR group, while in the TR group there were improvements stat. sig. only for the negative affect in 3 sessions (two relaxation ones).
- Physiological measures (heart rate, resp. rate and skin conductance) improved stat. sig. in 3 sessions (relaxing ones) for the VR group, while in TR group only heart rate improved.

RESULTS

Between groups comparisons

Delta values were used to compare the groups.

For state variables, a sum delta value was calculated for each participants by adding the relative changes observed in each single session.

- A stat. sig. difference emerged in the respiration rate sum delta ($p=0,01$). VR group improved more than TR.
- A stat. sig. difference emerged in the eating control self-efficacy ($p=0,004$) between VR and TR vs. CTRL.

RESULTS

Correlations with Sense of Presence

- Data show trends in correlations between changes in anxiety/emotional state (objective and subjective) observed in Immersive VR sessions and sense of presence, indicating the existence of a positive relationship between reduction in anxiety and level of presence in the virtual environment.

The more present the user felt, the higher the reduction in anxiety and increase in positive emotions

DISCUSSION

- Results show that VR protocol was more effective than TR in improving emotional state, both subjective and objective, even if this emerged only in within group analysis.
- Between groups analysis showed only one stat. sig. difference between VR and TR.
- Probably the lack of more differences is due to insufficient power, or to the too small effect the VE we used had above the narratives.

DISCUSSION

- A significant correlation emerged between the sense of presence and the level of emotional change for VR group.

CONCLUSIONS

VR protocol seems to be more effective than a traditional one, but its effect size is not so much. Probably, this is due to the particular environment we used, characterized by a high degree of activating stimuli.

Relaxation needs a less challenging environment.



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Thank you for your attention

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