Virtual Reality in the Treatment of Body Image Disturbances after Bariatric Surgery: A Clinical Case

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Abstract. Bariatric surgery is an operation on the stomach and/or intestines that helps patients with extreme obesity to lose weight. Even if bariatric surgery, compared with traditional obesity treatment, is more effective in reducing BMI, this approach does not achieve equal results in every patient. More, following bariatric surgery common problems are body image dissatisfaction and body disparagement: there is a significant difference between the weight loss clinicians consider successful (50% of excess weight) and the weight loss potential patients expect to achieve (at least 67% of the excess weight). The paper discusses the possible role of virtual reality (VR) in addressing this problem within an integrated treatment approach. More, the clinical case of a female bariatric patient who experienced body dissatisfaction even after a 30% body weight loss and a 62% excess body weight loss, is presented and discussed.

Keywords: Bariatric Surgery, Body Image Dissatisfaction, Virtual Reality, Allocentric Lock Theory, Clinical Case

1. Introduction

Bariatric surgery is an operation on the stomach and/or intestines that helps patients with extreme obesity to lose weight. The results of this approach are very promising: Padwal and colleagues [1] found that, compared with traditional obesity treatment, bariatric surgery is more effective in reducing BMI. Nevertheless, all roses have thorns, and this is true for bariatric surgery, too. In particular, a common problem is body image dissatisfaction: as underlined by Kali and colleagues [2] there is a significant difference between the weight loss clinicians consider successful following bariatric surgery and the weight loss potential patients expect to achieve. As a general guideline, bariatric surgery is considered successful when 50% of excess weight is lost and the weight loss is sustained up to five years. However, most obese patients have different expectations: in the previous study patients declared to be “happy” after a 77% +/- 9% excess body weight loss and considered “acceptable” a 67% +/- 10% excess body
weight loss. A 49% +/- 14% excess body weight loss, the gold standard for clinicians, was considered “disappointing”.

In this paper we discuss the possible role of virtual reality (VR) in addressing this problem within an integrated treatment approach. As recently noticed by Ferrer-Garcia and Gutierrez-Maldonado [3] Virtual Reality (VR) is emerging as a technology that is especially suitable not only for the assessment of body image disturbances but also for its treatment. But how VR can be used to improve body image? According the “Allocentric Lock Hypothesis” [4-6] body image disturbances related to eating disorders may be the outcome of a primary disturbance in the way the body is experienced and remembered: individuals with body image disturbance may be locked to an allocentric (observer view) negative memory of the body that is no more updated by contrasting egocentric representations driven by perception.

Psychology and neuroscience indicates that our spatial experience, including the experience of the body, involves the integration of different sensory inputs within two different reference frames: egocentric and allocentric [7, 8]:

- egocentric frame: it is referred to the body of the observer and allows him/her to locate objects relative to the body centre. When we adopt an egocentric stance we represent the object relative to ourselves

- allocentric frame: it is referred to space external to the perceiver. When we adopt an allocentric stance the object is represented independently of our own current relation with it.

As suggested by Byrne and Becker [9] the transformation from egocentric to allocentric representations of space is done by neurons in different medial temporal lobe structures. If, for some reasons, this transformation is impaired, the egocentric perception-driven experience of the real body does not modify the allocentric memory-driven experience of a negative body: patients are locked to an allocentric negative representation of their body [5]. This is what may be behind the problems experienced by the obese patients after bariatric surgery: the impossibility of using sensory inputs for updating the allocentric representation of the body – patients hate their body even after the surgery and a significant weight loss - locks the patients into an unsatisfying body that may explain their depression and low quality of life [10; 11]. As noted by Gallagher [12], “[different] studies indicate that changes in various aspects of body schemata have an effect on the way subjects perceive their own body.” (p. 237). Following this vision it is possible the use of VR to induce a controlled sensory rearrangement that facilitates an update of the locked allocentric representation of the body. For further details see [13]. To test this approach, the clinical case of a female bariatric patient who experienced body dissatisfaction even after a 30% body weight loss and a 62% excess body weight loss, is presented and discussed.

2. The Clinical Case: Patricia C.S.

The patient is a 44-year old woman, who entered in the bariatric protocol with a weight of 114 kg., 1.55 m. height and a B.M.I. of 47. After reaching the weight of 80.2 kg (a 30% body weight loss and a 62% excess body weight loss) she was contacted by the researchers to enter in the experimental protocol. The patient reported at the screening interview that she was interested in the protocol because she was frustrated by the actual weight, higher than the one achieved after the bariatric surgery. She also noted that main reasons for losing more weight were: to improve self-esteem, be more
attractive, and also be more attractive to others. The clinical data collected during the interview matched the inclusion criteria and she accepted under informed consent to participate in the study.

2.1. Assessments instruments

The following psychometric test was obtained at entry to the study and at the end of the protocol

- Spanish version of the Beck Depression Inventory (BDI);
- Spanish version of the State-Trait Anxiety inventory (STAI).
- Spanish version of the Body Shape Questionnaire (BSQ)
- Spanish version of the Bulimia Test (BULIT);
- Spanish version of the Three Factors Eating Questionnaire (TFEQ).

2.2. The protocol

Developed by Giuseppe Riva and his group, the Experiential Cognitive Therapy is a relatively short-term (15-session in 6 weeks), patient-oriented approach that focuses on individual discovery [14; 15]. The protocol includes 5 weekly group sessions aimed at improving motivation to change and assertiveness, and 10 biweekly virtual reality sessions. The VR sessions are based on the NeuroVR 2.0 software (free download from: http://www.neurovr.org). NeuroVR is an enhanced version of the original Virtual Reality for Body Image Modification (VEBIM) immersive virtual environment, previously used in different preliminary studies on non-clinical subjects [16].

NeuroVR 2.0 is composed of 14 virtual environments, used by the therapist within a 60-minute session with the patient [17]. The environments present critical situations related to the maintaining/relapse mechanisms (e.g., Home, Supermarket, Pub, Restaurant, Swimming Pool, Beach, Gymnasium) and two body image comparison areas. In the VR sessions the therapist uses the “20/20/20 rule”. During the first 20 minutes, the therapist focuses on getting a clear understanding of the patient's current concerns, level of general functioning, and the experiences related to food. This part of the session tends to be characterized by patients doing most of the talking, although therapist guides with questions and reflection to get a sense of the patient's current status. The second 20 minutes is devoted to the virtual reality experience. During this part of the session the patient enters the virtual environment and faces a specific critical situation. Here the patient is helped in developing specific strategies for avoiding and/or coping with it. In the final 20 minutes the therapist explores the patient’s understanding of what happened in VR and the specific reactions – emotional and behavioral - to the different situations experienced. If needed, some new strategies for coping with the VR situations are presented and discussed.

2.3. Results

At the end of the protocol the patient experienced only a slightly reduction of her weight: 79.800 Kg. However, more relevant differences can be found in the psychological profile (see Table 1). Clinical data showed a significant improvement in both the level depression and anxiety – measured through the BDI and STAI
questionnaires - and body image – measured through the BSQ questionnaire. This change produced a reduction in the number of avoidance behaviors as well as an improvement in the number of adaptive behaviors as showed by the outcome of the BULIT and TFEQ questionnaires.

In the clinical interview at the end of the treatment, Patricia reported an improvement in her physical and emotional well-being: she felt safer, had better skills in dealing with situations that previously caused her anxiety (social eating) and experienced more control over food because she was able to control herself. More, she reported relevant behavioral changes in her personal and social daily life: she started putting limits on her partner, had better communication and support from her daughters, maintained with more facility the diet that the nutritionist gave her.

<table>
<thead>
<tr>
<th>Questionnaire</th>
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<th>Post</th>
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<tr>
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<tr>
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<tr>
<td>BSQ</td>
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<tr>
<td>TFEQ</td>
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<tr>
<td>Food Restriction</td>
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Table 1. Pretreatment to Post-treatment Assessment ratings

3. Conclusions

For its efficacy in producing weight loss, bariatric surgery is becoming the treatment of choice for morbid obesity. Unfortunately, this approach does not achieve equal results in every patient. Specifically, a common problem is the body image dissatisfaction that affects bariatric patient even after a significant weight loss. In this paper we discussed the possible role of virtual reality (VR) in addressing this problem. Specifically, we reported the clinical case of Patricia, 44-year old woman, who entered in the bariatric protocol with a weight of 114 kg., 1.55 m. tall and a B.M.I. of 47. Even if at the start of the VR protocol her weight was 80.2 kg (a 30% body weight loss and a 62% excess body weight loss) the weight loss achieved after the surgery was unable to modify her negative experience of the body: she expressed the need to improve self-esteem, be more attractive, and also be more attractive to others. More, the clinical data underlined a moderate level of depression matched by a high level of body dissatisfaction. The clinical data after the treatment showed a significant improvement in all the psychological variables matched both by an improvement in the subjective physical and emotional well-being, and by relevant behavioral changes in the personal and social daily life.

In conclusion, the results show the added value of ECT as part of an integrated obesity treatment based on the experiential approach allowed by virtual reality. Longer follow-up data and multi-centric trials are required to investigate the possible effects of the behavioral and body image changes on the long-term maintenance of the weight.
loss. To reach this goal, the “Laboratorio de Enseñanza Virtual y Ciberpsicología” at the School of Psychology of the Universidad Nacional Autonoma de Mexico, in cooperation with the Obesity Unit of the Medica Sur Hospital in México City, have recently started a controlled clinical trial, recently approved by the US ClinicalTrial.gov database (Virtual Environments For Supporting Obesity Treatment – AVATOB - NCT01394393). The trial, that will include 30 morbid obese patients treated with bariatric surgery, started its work in June 2011 and is expected to complete in fall 2012.

4. References