VIRTUAL REALITY FOR FLIGHT PHOBIA: a case report

Rosado, Silvia; Flores, Paz; Masferrer, Carmen; Mane, Anna; Aliart, Xavier; Aceña, Rosa
Institut de Neuropsiquiatria i Addiccions, Parc de Salut Mar, Barcelona, Spain

Introduction

Flight phobia is characterized by intense fear of flying, an immediate anxiety response upon exposure to situations related to flying, and avoidance of such situations. Epidemiological studies estimate that 25% of the general adult population experiences fear of flying and the point prevalence rate for flight phobia ranges from 2.6% to 10.0% in the general population. Despite this high prevalence rate, in comparison to other phobias, there have been relatively few studies on the treatment of flight phobia. Controlled studies suggest that behavioural anxiety-management strategies, especially those that include some kind of exposure, can be effective in the treatment of flight phobia. Though in vivo exposure to flying appears to be quite effective, the difficulty and expense of in vivo flight exposure have daunted many researchers and therapists.
The rapid development of new technologies has some possible benefits, the newest technology to be used to simulate feared stimuli l s virtual reality. Simulated exposure programs include reducing therapist contact time, standardizing treatment and facilitating dissemination. In addition, simulated exposure might be useful for those patients who are reluctant to enter an in vivo exposure therapy. In a number of case studies, VR has been used to assist in the treatment of several phobias. There are previous studies about acrophobia, flight phobia, social phobia, fear of needles, etc, with good results.
VR also permits monitoring the patient using the biofeedback, which helps the therapist to adapt each session to the patient's needs.

Method

Subject

The subject was a single 36-year-old Caucasian man with severe fear and avoidance of flying. He lived in Barcelona and his profession required flying several times a year. Moreover, advancement in his career required additional flying. He had recently turned down a promotion because of his fear of flying, and in the last 5 months he had cancelled four previously booked flights.
The patient had no history of other psychiatric disorders, was not taking psychotropic medication, and had received no previous treatment for the flight phobia. He could not recall a specific event involved with the onset of his phobia, 4 years before.

Assessment and Outcome Measures

Anxiety Disorders Interview Schedule: administered prior to treatment to establish the patient's diagnosis, the ADIS_IV is a comprehensive structured diagnostic interview designed to assess the history of occurrence of any anxiety disorder and other related disorders in accordance with the DSM-IV.

Fear of Flying Questionnaire-Revised: the FFQ-R is a 30-item self-report instrument on which a patient rates the level of fear or discomfort he experiences in different flight-related situations on 9-point Likert scale. It consists of three subscales assessing (a) anxiety during flight; (b) anxiety experienced before boarding the plane; and (c) anxiety caused by vicarious exposure to flying situations not directly related to the patient. The FFQ-R was administered before and after treatment and after a postintervention flight.

Anxiety Likert Scale: during each session, the patient periodically rated his anxiety on a 9-point Likert scale, to assess the degree of habituation to each particular virtual situation.

Biofeedback: during each session the patient was monitored, to assess the degree of habituation to each particular virtual situation. Biofeedback detects and registers the sweating of the patient while the exposure.

In vivo flight exposure: the patient took a flight after completing therapy. He rated the overall pleasantness on a 9-point Likert scale (ranging from *very pleasant* to *very unpleasant*), the most intense fear he experienced during the flight (on a 9-point Likert scale ranging from *no fear* to *very intense fear*), and the likelihood he would take another flight (on a 9-point Likert scale rating from *very unlikely* to *very likely*).

Apparatus

- Laptop
- VR glasses
- Smart phone
- Standard earphones
- Biofeedback sensor
- The PSIOUS app installed with all the settings: at home, at the airport, in the plane, etc.

Procedure

The subject was recruited in the Anxiety Unit of the Parc de Salut Mar in Barcelona for treatment of fear of flying. He was administered the ADIS-IV and FFQ-R and he signed the written consent to participate in a formal study. The patient received one 40-minute booster session and five 50-minute VR sessions (described below). During each session, the patient made frequent ratings of his anxiety on the 9-point Likert scale. At the end of the treatment the patient completed again the FFQ-R and was offered the possibility to take a flight. After the flight, he completed again the FFQ-R and several comfort and anxiety ratings described above.

VR sessions:
The first author conducted six sessions over a period of 3 weeks. The exposure sessions took place in the office used for visiting and the therapist was sat in front of the patient. The patient wore stereo earphones and VR glasses, and he had one finger connected to the biofeedback monitor. Interventions of the therapist were minimal.

Session 1: the patient was given a brief rationale about anxiety and the treatment, and some instructions about the functioning of the program.
Session 2: preparation for travel, activities the day of the flight: making the suitcase, listening for the news on TV about a flight, and take a taxi to the airport.
Session 3: boarding the plane
Session 4: take off
Session 5: being at the plane
Session 6: descend of the plane and landing

The therapist controlled the setting of the VR exposure in each session gradually according to the patient's fears (for example, the place where the patient sits on the plane, the meteorology, turbulences, etc).

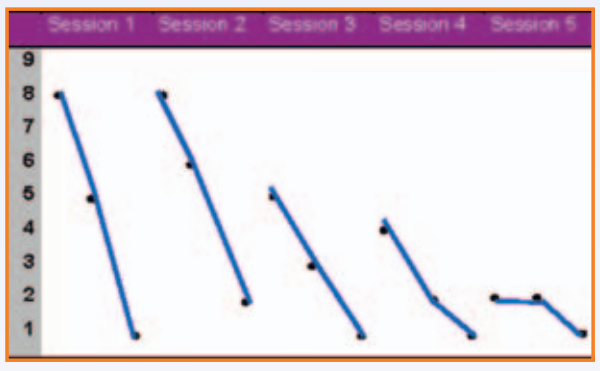
Results

There was a dramatic reduction on the patient's self-reported anxiety following VR treatment. In addition, the patient's anxiety decreased slightly more following the actual flight. He rated the overall flight as pleasant (2 on the 9-point Likert scale) and he pointed 8 on a 9-point scale the likelihood he would take another flight.
After the first flight, the patient reported that he had flown three more times without anxiety.

Table 1. FFQ-R= Fear of Flying Questionnaire-Revised; F= during the flight subscale; P= previous, before taking the plane subscale; V= vicarious flying-related situations subscale.

Measures	Pre-Treatment	Post-VR	Post-Flight
FFQ-R	251	59	43
F subscale	132	34	23
P subscale	76	15	10
V subscale	43	10	10

Table 2. Subjective anxiety scores along VR exposure treatment sessions (from 1 to 9, scores at the beginning, in the middle of the session and at the end).



Discussion

In this case study, VR exposure treatment was successfully implemented in the treatment of flight phobia. Following treatment, the patient was able to plan, prepare for, and take a flight with little discomfort. The treatment was brief, consisting in one 40-minute booster session and five 50-minute VR sessions. Although at the beginning the client questioned the effectiveness of VR exposure, he showed strong psychophysiological activation (e.g., sweating) once exposure started, and he realized that it was very vivid ("like taking an actual flight").

VR has been proved to be effective for phobias, and now there are applying this technique for other mental health problems such as addictions, pain, food disorder s, etc.
About the strongest points of VR, we can conclude that VR exposure permits making standardized protocols for the future, as well as reduce the time and cost of the therapy, it also lets the therapist offer a secure environment and control the setting adapting it to the patient needs, it is also easier for the patient to practice exposure when it has difficult access, the therapist can observe the patient's reaction and read the biofeedback's response.
Nevertheless, we don't have to forget that the contact with the patient cannot be replaced.

For future studies, once the user have learned how to use the program, he should be able to practice it himself at home, and also to act as a co-therapist with other people.

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