



IMMERSIVE
HEALTHCARE
TECHNOLOGIES

WHITE PAPER

Virtual Reality for Mental
Health

What are Virtual Reality Exposure Therapies (VRET)?



A TREATMENT WITH PROVEN
EFFECTIVENESS

A MULTIFACTORIAL THERAPEUTIC
APPROACH

THERAPIES ACCESSIBLE
TO EVERYONE

AN ADAPTATIVE
TECHNOLOGY

THE FUTURE OF
NON-PHARMACOLOGICAL
THERAPIES



Mental Health 2.0

Mental health refers to the public health domain that addresses psychological disorders. The impact on individuals' functioning is significant and requires appropriate care. Today, this field is in a dynamic of restructuring, with a focus on non-pharmacological alternatives. In this sense, attention and hopes are turning towards new technologies that answer the call by developing e-health. Among the leading techniques, virtual reality therapies are at the forefront.

VRET : New Approaches

In essence, virtual reality can be defined as an application that allows a user to interact with a virtual environment. In a therapeutic context, virtual reality emerges as an alternative and optimized method of exposure in light of the principles of cognitive-behavioral therapies. These are brief therapies, focused on the "here and now." They require the use of specific equipment to immerse patients in environments where sensory stimuli are integrated, triggering the onset of emotions, behaviors, and dysfunctional thoughts to facilitate desensitization.

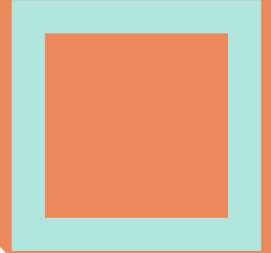


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PART I

Virtual Reality Exposure Therapies



WHAT ARE VRETs ?

To date, **Cognitive Behavioral Therapies (CBT) are the only therapies with scientific validity.** Recommended by the High Authority of Health, these therapies utilize cognitive and behavioral methods to treat psychological disorders. Habituation is one of the psychophysiological mechanisms sought after: **it arises from exposure.** The principle is simple: the patient is gradually confronted with stimuli that generate dysfunctional emotions, cognitions, and behaviors until these are extinguished. This is a counter-conditioning caused by new learning.

Until recently, there were two exposure techniques: imaginal and "in vivo," or confrontation with real stimuli. These techniques present complexities in their application, notably the accessibility of environments. **Clinicians and researchers have turned to virtual reality to address these deficiencies, with success.** Indeed, this technology allows for the infinite replication of exposure situations while retaining the therapeutic benefits of in vivo. Thus, **the 4th wave of CBT, known as Virtual Reality Exposure Therapies (VRET), was born.**

VRET Techniques

Activation of the limbic system

During exposure to synthetic stimuli

Graduation

With a progressive exposure to stimuli



Habituation

Exposure until a significant reduction in the dysfunctional response

Repetition

Until the dysfunctional response is extinguished

The Advantages of Virtual Reality



EFFICACY

Therapeutic benefits identical to in vivo



SPEED

Significant time savings



ERGONOMICS

Multifactorial use



CONTROLLABILITY

Maximized supervision for the therapist



CONFIDENTIALITY

Immersion from the therapist's office



ACCESSIBILITY

Immediate exposure



SAFETY

Secure environments, no real danger



ENJOYABLE

Promotes therapeutic engagement

Scientific Research on VRET

Virtual reality (VR) enhances scientific research through **new paradigms involving human-machine interaction**. In the field of Psychopathology, studies utilizing VR for therapeutic purposes are increasingly numerous and yield convincing results. The primary interest lies in being able to **transfer the acquired knowledge in the virtual environment to the patients' daily lives**.

The range of applications is vast, and experiments have multiplied over the years. **The compelling results provide scientific validation for this method**, which continues to grow in its clinical applications.



RESOURCES ON ANXIETY DISORDERS

Phobias

- *Comparison of the therapeutic effectiveness in patients with generalized anxiety disorder, agoraphobia and panic disorder (North, 1994) ([LINK](#))*

Significant Reduction in Anxiety and Avoidance

- *Acrophobie (Emmelkamp, 2002) Virtual Reality treatment versus exposure in vivo: a comparative evaluation in acrophobia ([LINK](#))*

Efficacité égale

- *Virtual reality in the treatment of spider phobia: A controlled study (Garcia-Palacios, 2003) ([LINK](#))*

Significant reduction in anxiety and avoidance maintenance of gains at +6 months

- *Generalized Social Anxiety Disorder(Geraets, 2019)([LINK](#))*

Significant reduction in anxiety related to social interactions, depressive symptoms, and significant improvement in quality of life

Troubles de stress Post-Traumatique

- *Combat-related posttraumatic stress disorder (Rothbaum, 2011)([LINK](#))*

Significant reduction in anxiety and depressive symptoms sustained

- *(Roy, 2016)*

Significant reduction in amygdala in war traumas

RESOURCES ON ADDICTIONS

Substances

- *Virtual Reality cue exposure for the relapse prevention of tobacco consumption (Malbos 2016)*([LINK](#))
Effectiveness of CBT coupled with VRET in the prevention of smoking relapse in subjects with smoking abstinence
- *Efficacy of VRET for the treatment of alcohol use disorder (Deng 2022)*([LINK](#))
VRET Effective in the Short-term and Long-term, Sustaining Abstinence at +3 Years

Gambling

- *Exposure Therapy for Gambling Disorder: Systematic Review and Meta-analysis (Bergeron, 2022)*
exposure therapy reduces gambling cravings and severity, as well as time spent gambling and erroneous beliefs

PART II

Becoming an Expert Therapist in Virtual Reality



Highly Recommended Training

To effectively use virtual reality exposure therapy (VRET) software, **it is highly recommended to have a background in behavioral techniques**. Specifically, exposure techniques are the theoretical foundations that will be most essential in the practice of VRET. Some VRET training programs provide, in addition to the methods related to virtual reality, **the prerequisites in cognitive-behavioral therapies**.

The training options are as follows:

Online training, 2-hour duration (technical and medical aspects)

In-person training for institutions, half-day duration, 3.5 hours (technical and medical aspects)

Why Become a Therapist Specialized in Virtual Reality?

Today, mental health is increasingly recognized by public authorities. **The impact of psychological disorders is finally acknowledged as a distinct illness.** This recognition has led to the proliferation of healthcare services and training for healthcare professionals. **Virtual reality fits seamlessly into cognitive-behavioral therapies,** recognized as the only therapy with scientific validity.

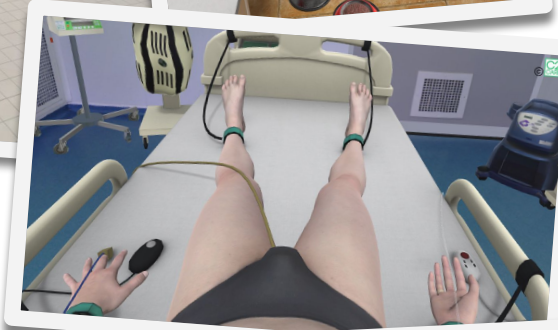
Virtual Reality offers a plethora of exposure environments, thus addressing the deficiencies of in vivo exposure. From the therapist's office, **the patient can be virtually exposed to situations** like flying, being on top of a building, facing a spider, or being transported to a maximized relaxation environment, all without the time-consuming and sometimes impossible accessibility issues of these environments and/or phobic stimuli.

Non-pharmacological therapies are gaining popularity, and for good reason. Faced with the detrimental consequences of medication-based treatments, professionals and patients are seeking alternative solutions. VRET fits into this approach and enhances the skills of therapists trained in this field.

PART III

Immersion in Virtual Reality Environments





Virtual Reality Exposure Therapies (VRET) are based on the principles of exposure therapy in cognitive-behavioral therapy.

Patients are placed in virtual situations that are actively avoided due to their anxiety-inducing nature, and this exposure is prolonged and repeated. The patient gradually becomes accustomed to the virtual anxiety-inducing stimuli and, through the transfer of learning, can regain normal functioning.

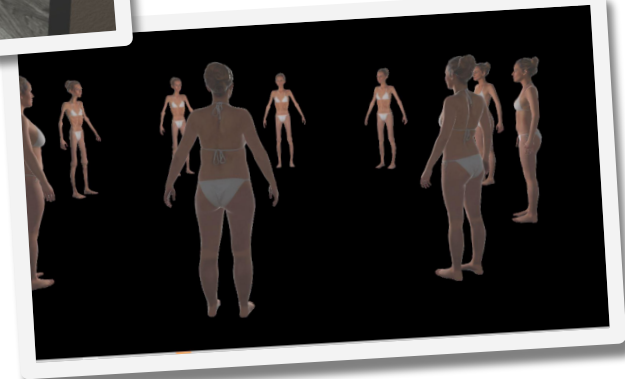
Social Phobia
Specific Phobia
Agoraphobia
Post-Traumatic



Substance and Gambling Addiction

Virtual environments replicating ecological situations in which craving cues (intense desire to consume/engage in a behavior) have been placed will allow the patient to confront their challenges.

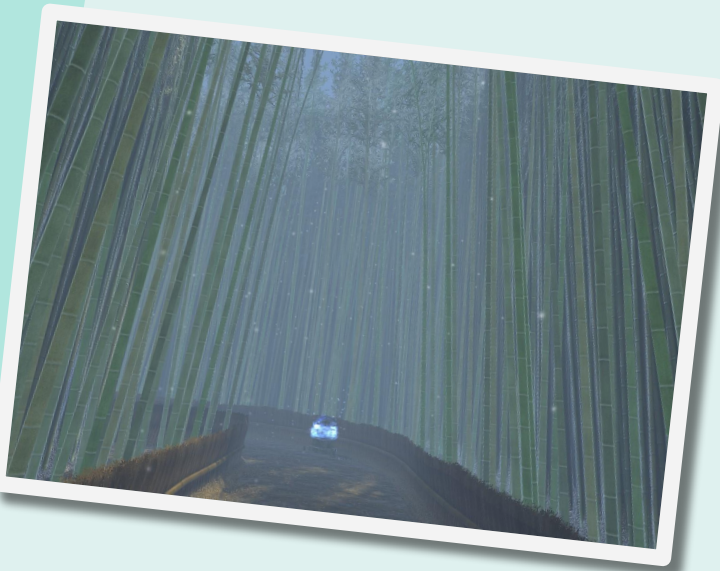
Through exposure to the object and/or cues of addiction, the therapist will work not only on active cognitive processes but also on problematic behavior by providing them with the appropriate methods to manage their addiction.



Work on Body Dysmorphic Disorder using the silhouette test, which has been replicated for in virtual assessment. Immersion enhances the accuracy of the evaluation and provides an additional qualitative diagnostic tool. With this test, you can assess the severity of body dysmorphic disorder or uncover irrational expectations.

This application also helps increase awareness of the disorder by confronting the patient with their actual silhouette compared to their self-perceived silhouette.

Eating Disorders Dysmorphophobia



The numerous environments offered will help initiate positive emotions and establish a state of tranquility. Optimize your mindfulness, sophrology, hypnosis, and relaxation sessions with environments created through the collaboration between our scientific team and specialists.

Whether symptoms of stress and anxiety take on a pathological nature or simply cast a shadow on your patients' daily lives, C2Hypno will assist you in their treatment.

Relaxation Hypnosis

PART IV

C2Care: Your Partner
for VRET



ABOUT THE AUTHORS

We are developing therapeutic software based on exposure therapies under the **guidance of university medical teams and healthcare professionals.**

We have developed multiple treatment modules, a teleconsultation platform, and have the ambition to create new innovative solutions, all with the **goal of simplifying access to healthcare**, especially in the field of mental health.



**IMMERSIVE
HEALTHCARE
TECHNOLOGIES**

OUR SOLUTIONS

+250 Virtual Reality Environnements



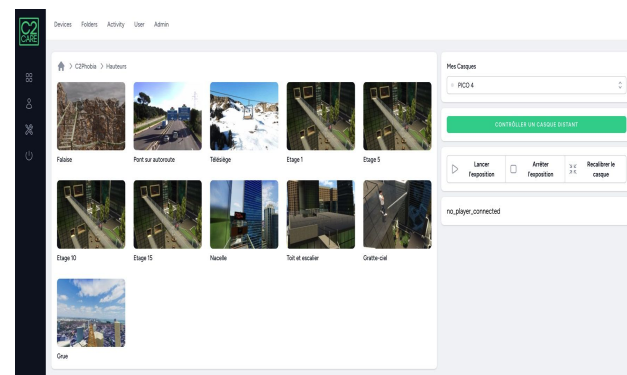
- Developed in collaboration with over 25 academic teams
- Customizable VR scenes tailored to each patient
- Patient tracking

VR Trainings



- Support for quick and easy integration
- In-person or remote training

AppC2Care for an easy use

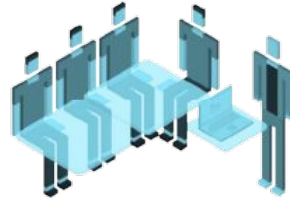


- A dedicated platform for the therapist
- Monitoring of exposures
- Access to all environnements

Multiple Usage Scenarios



Individual

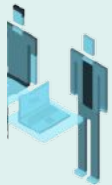


Group Therapy



Remote
Consultation

Des Solutions adaptées aux professionnels de santé



Private Practitioner



Institution



Others
(Associations,...)

THANK YOU

Any Questions?

contact@c2.care
<https://c2.care>

