Virtual Reality

In

Psychiatry and Psychology

Malineni Lakshmaih Engineering College

singarayakonda

PRESENTED BY:

NIKHIL KUMAR V.V.N — **III/IV B.TECH IT** — **05851A1227**

K.RAMESH — **III/IV B.TECHIT** — **05851A1233**

E.Mail:Nikhil_1227 @yahoo.com

Cell: 9885036820

Cell:9849293068

CONTENTS:

ABSTRACT:

In this, Psychiatric Services introduces a new quarterly column that will highlight and explore the role of **VIRTUAL REALITY** in the development and application of psychiatric services to a spectrum of populations in a variety of therapeutic settings. Far from being technologically oriented, the column's goal is to provide information on the very human and healing effects that modern information technology can achieve when creative and novel methods are used to enhance research, clinical practice, and training in our biopsychosocial field. This initial column highlights these goals by examining current and rapidly developing research on and clinical applications of virtual reality technology.

Virtual Reality Exposure Therapy.

- exposure of the patient to a **virtual environment containing the feared stimulus** in place of taking the patient into a real environment or having the patient imagine the stimulus

ADVANTAGES OF VR EXPOSURE THERAPY:

1. Cost Effective

- many stimuli for exposure are difficult to arrange or control, and when exposure is conducted outside of the therapist's office, it becomes more expensive in terms of time and money

2. Telemedicine Applications

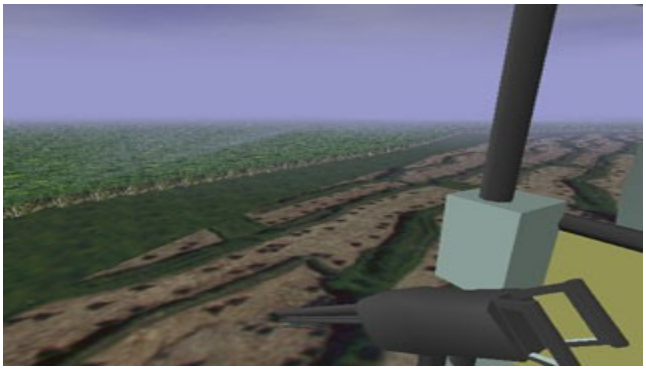
- virtual reality exposure therapy is appropriate for networked delivery of clinical psychology and psychiatry services to remote locations

- Since the patient is receiving therapy within a virtual environment, the clinician conducting the therapy session could be present physically or participate via computer networks from a remote location.

Post-traumatic Stress Disorder Treatment

Virtual Vietnam:

- created to treat Vietnam veterans suffering from post traumatic stress disorder
- currently under evaluation by psychotherapists at the Atlanta Veterans Administration hospital
- users wear a virtual reality helmet and ride (including landing and taking off from an open field) a combat helicopter over various Vietnam terrain like rice paddies, river, jungle



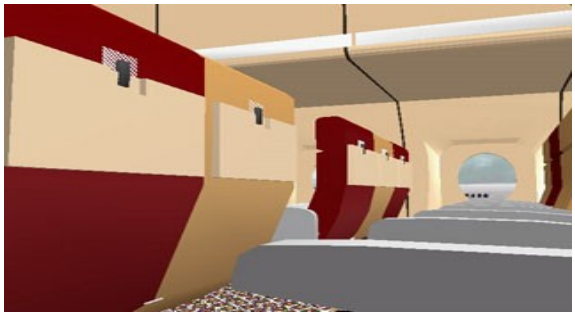
- additionally users can walk through a hostile helicopter landing zone

- immersion of a person in a synthetic world incorporates audio effects
    - effects utilize Hollywood audio production libraries to create a high intensity soundscape highlighted by powerful bass explosions and three dimensional gunfire effects

- while riding in the Huey helicopter, the user is seated in a special chair (Thunderseat) with a 100 watt subwoofer speaker incorporated into its base providing helicopter vibration and explosion shock effects

Fear of Flying Phobia Treatment

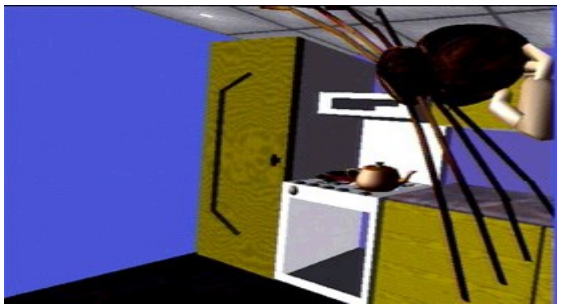
- PC based virtual reality system for treating individuals suffering from a fear of flying
- patients wear a head mounted display and are immersed into a virtual 3-D world
- **virtual airplane**
  - duplicated a passenger seated by the window in a standard commercial jet
- during virtual exposure subject goes through various scenarios:
  - sitting in the plane with engines off or on
  - taxiing the runway
  - smooth or rough takeoff
  - smooth or turbulent flight
  - close pass over the airport
  - smooth or rough landing
- while patients took virtual trip, a counselor talked to them, helping them overcome their fears
- low cost system is currently being sold and marketed to practicing psychotherapists



Arachnophobia Treatment

- **exposure desensitization treatment**
  - proved effective for a wide range of phobias, including spider phobia

    - gradually and systematically exposing the phobic person to the feared object or situation, and calming them little by little their fear decreases and they become more comfortable with spiders.
- **advantage of VR** over other phobia treatment techniques:
    - greater freedom of the patient or therapist to control the feared stimulus
    - unlike a real spider, virtual spiders obey computer commands, can be placed in various positions and orientations by patient or therapist, and can be touched without danger
    - VR allows the experimenter to control how frightening the spiders appear



- **VR therapy at the HITLab**:
    - patient is sometimes encouraged to pick up the virtual spider web with her cyber hand and place it in orientations that were most anxiety provoking
    - experimenter controls the spider's movements
        - by physically moving a position sensor
        - by entering new position coordinates into the keyboard
        - by using pre-programmed spider behaviors (unexpected jumps, etc.)
    - spiders were placed in a cupboard with a web, were made to jump unpredictably upon being touched, climbed or dropped in incremental jumps between the ceiling and the virtual kitchen floor
    - spiders were touched, held and manipulated by the subject
    - patient could pull the spiders legs off
    - a large brown virtual spider with photograph quality texture-mapped fur, and a

smaller black spider and an associated 3-D web were employed

- during the course of therapy the patient could also squash the virtual spiders with a mixed reality ping pong paddle

- **results**
  - dramatic reduction in the patient's fear

Acrophobia Treatment

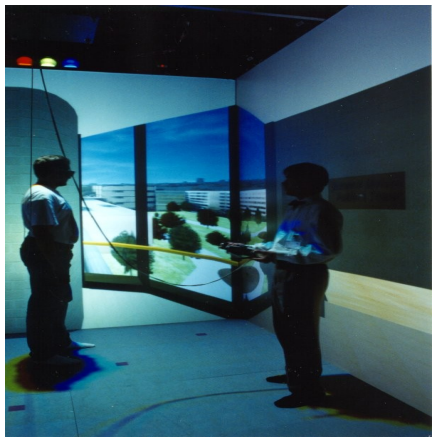
Acrophobia treatment at Georgia Tech

- fear of height treatment via Virtual Reality exposure to three virtual height situations:
  1. elevator
  2. series of bridges
  3. series of balconies

- subject started in the least treatening situation and then progressed under his own control
- they stop at the floor where they feel unable to continue
- **results**
  - shown to be very effective in reducing acrophobic subjects anxiety and avoidance of heights, and in improving attitudes toward heights.

Acrophobia treatment at the University of Michigan

- a realistic simulation of the elevator
- requirements of emotional and architectural realism
  - emotional realism was necessary to evoke the fear of heights in acrophobes
  - architectural realism for controlled studies (comparing it to the real environment)



- virtual environment is realised by CAVE
    - a projection device where a person stands in a 10x10x10 foot room made of projection screens
    - subject wears shutter glasses to create a three dimensional image, and a computer calculates what should be on each wall, based on the virtual model and the location and viewpoint of the subject

Virtual Reality Treatment for Burn Pain

- VR is used as non-pharmacological analgesia to help get burn pain down to a more manageable level during wound care (i.e., distraction) by patient immersion into virtual world
- **Snow World**
    - created by Paradigm Simulations specifically for burn victims
    - patients fly through an icy canyon with a river and frigid waterfall
    - patients shoot snowballs at snowmen and igloos (with animated impacts)
    - since patients often report reliving their original burn experience during wound care, Snow World was designed to help put out the fire

Why VR reduces pain:

- pain perception is largely psychological
    - same incoming pain signal can be interpreted as painful or not, depending on what the patient is thinking
    - pain requires conscious attention
- essence of VR is the illusion of going inside the computer generated environment
    - being drawn into another world drains a lot of attention resources, leaving less

attention available to process pain signals

- rather than having pain as the focus of their attention, for many patients in VR, the wound care becomes more of an annoyance, distracting them from their primary goal of exploring the virtual world

Virtual Reality in Eating Disorders

Virtual Environment for Body Image Modification (VEBIM):

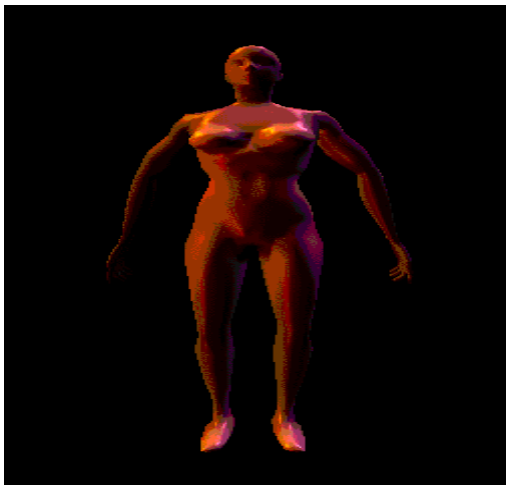
- integrates the two methods commonly used in the treatment of body experience disturbances within a virtual environment

- cognitive-behavioral

1. Influencing patients' feelings of dissatisfaction with different parts of their bodies by means of individual interviews, relaxation and imaginal techniques

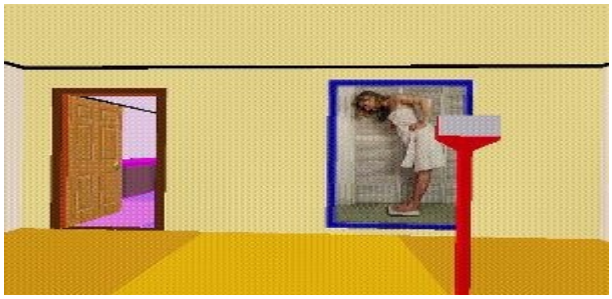
- visual-motorial

use of video recordings of particular gestures and movements with the aim of influencing the level of bodily awareness

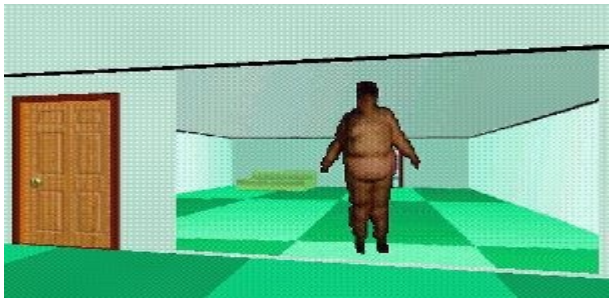


- The virtual environment **VEBIM**
- method of guided imagery - therapist, after introducing a selected image, encourages the patient to associate to it in pictures, rather than in word, and to give a detailed description of them
- 6-zone virtual environment developed using the Sense 8 World Toolkit for Windows consisting of two parts:
- zones 1-2

- designed both to give the subject a minimum level of skill in perceiving, moving through and manipulating objects in VR, and to focus attention on eating and food choice



- zones 3-4-5-6
- designed to modify the body experience of the subject



Virtual Reality Medical Support System for Cancer Patients

- **PsychoOncological VR Treatment** (POVRT)
    - the cancer patients sometime complaint insomnia and unrest especially when they are treated by chemotherapy
    - the purpose of this application is to improve these psychooncological problems by VR technology
    - in the virtual space patients can feel as if they are present in the nature outside of the hospital even when they lay down on the bed and see a picture of the scenery in nature produced by VR
    - relaxation sound also can be chosen whenever they want
- future plans - use of VR for prevention of memorization of nausea by a first chemotherapy
- hardware
    - HMD and 3D projector as an observation system
    - stylus (fastrak) as pointing device in the virtual space
    - SGI Onyx

CONCLUSION:

Just as simulators are now standard in the fields of aviation and aerospace, soon surgical simulators will be standard in the medical field. These simulators will allow instruction of correct surgical technique without the need for live patients. With the advent of virtual reality, surgeons get the opportunity to learn and practise the skills of their trade. It is a tool that has many potential applications. I predict that, as technology continues to advance and the cost of manufacturing decreases, virtual reality will become a dominant tool for training future surgeons.

REFERENCES:

1. A tutorial on Surgical simulation: Past, Present and future; Medicine meets virtual reality (MMVR) journal, January 24, 2002.

2. Medical simulation for Surgical training; Medical image computing and computer- Assisted intervention (MICCAI) journal, October 14, 2001.

3. A computer-based simulator for diagnostic peritoneal lavage, Alan liu, Christoph Kaufmann, Thomas Ritchie, Medicine meets Virtual reality, 2001.