

# Dichoptic virtual reality training for treatment of amblyopia

<b>Submission date</b> 05/06/2017	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 13/06/2017	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 26/11/2020	<b>Condition category</b> Eye Diseases	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Anisometropic amblyopia occurs when there is an unequal focus between the eyes. It causes a reduction of the best corrected visual acuity (best distance vision) of the eye without an cause. This condition can lead to permanent vision loss in one eye and limit the vision with both eyes. The main treatments in amblyopia are for children and involve wearing an eye patch over one eye to strengthen the other eye. This treatment is thought to be only effective in the first years of life. A new method of treatment for amblyopia based on the use of a dichoptic (presenting independent and not coordinated stimulus to the eyes) games in a virtual reality environment could help amblyopia for those who are not children. This type of treatment is promising as is non-invasive, without risks associated and motivating for patient as it consists of a game. The aim of this study is to evaluate the effect of dichoptic visual training using a virtual reality head mounted display in a sample of anisometropic amblyopic adults and to evaluate the potential usefulness of this option of treatment.

### Who can participate?

Adults aged 17 and older who have anisometropic amblyopia

### What does the study involve?

Participants undergo an eye examine prior to the training. Participants receive dichoptic visual training using computer games and a wearable virtual reality system. Participants attend two training sessions a week for one month. Training sessions take 40 minutes and include two different types of games. Participants are followed up for stereopsis (the perception of depth) and visual acuity after their last training session and again three months later.

### What are the possible benefits and risks of participating?

There are no notable benefits or risks with participating.

### Where is the study run from?

1. Comenius University (Slovakia)
2. University of Alicante (Spain)

When is the study starting and how long is it expected to run for?  
May 2016 to October 2016

Who is funding the study?  
University of Alicante (Spain)

Who is the main contact?  
Dr David Pablo Pinero

## Contact information

**Type(s)**  
Scientific

**Contact name**  
Dr David Pablo Pinero

**Contact details**  
Department of Optics  
Pharmacology and Anatomy  
University of Alicante  
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Spain  
03690

## Additional identifiers

**Protocol serial number**  
DVR1

## Study information

**Scientific Title**  
Amblyopia treatment of adults with Dichoptic training using the Virtual Reality oculus rift head mounted display: Preliminary results

**Acronym**  
DVR

**Study objectives**  
Dichoptic visual training using a virtual reality head mounted display is able to restore visual acuity and stereopsis in adults with anisometropic amblyopia.

**Ethics approval required**  
Old ethics approval format

**Ethics approval(s)**

## **Study design**

Prospective interventional non randomised pilot study

## **Primary study design**

Interventional

## **Study type(s)**

Treatment

## **Health condition(s) or problem(s) studied**

Anisometropic amblyopia

## **Interventions**

Participants all undergo a baseline ophthalmological examination including visual testing, manifest and cycloplegic refraction, cover test, four dot Worth test, anterior segment examination with the slit lamp, corneal topography and funduscopy.

Participants then undergo a dichoptic visual training was performed using the beta version of the computer game Diplopia Game which was run in the Oculus Rift OC DK2 virtual reality head mounted display. Two games are used, a space game in which subjects were flying spaceship through a system of rings and a breaker game which is a typical block breaker game, but played in a virtual reality 3D setting. Both games had a dichoptic setting in which the central part of the picture was different for each eye.

Each participant undergoes eight training sessions, being performed twice a week. Each session included 40 minutes of training with the two different games (20 minutes per game). This takes one month.

Stereopsis and visual acuity were tested after finishing the last session of training (one month after beginning the training) and three months after the end of training.

## **Intervention Type**

Device

## **Primary outcome(s)**

1. Visual acuity is measured using calibrated liquid crystal display (LCD) optotype with Snellen charts (CC-X10, Topcon, Japan) at baseline, one and three months
2. Stereopsis is measured using the Stereo Randot graded circle test (Stereo Optical, IL, USA) at baseline, one and three months

## **Key secondary outcome(s)**

1. Compliance is measured using the computer registration of the training sessions at one month
2. Refraction is measured using retinoscopy and subjective refraction in trial frame at baseline, one and three months

## **Completion date**

10/10/2016

# Eligibility

## Key inclusion criteria

1. Anisometropic amblyopia
2. Age of 17 years old or more
3. Willing to perform the visual training

## Participant type(s)

Patient

## Healthy volunteers allowed

No

## Age group

Adult

## Sex

All

## Total final enrolment

17

## Key exclusion criteria

1. Strabismus
2. Previous ocular surgery
3. Corneal irregularity
4. Opacification of ocular media including cataracts
5. Active ocular disease

## Date of first enrolment

09/03/2016

## Date of final enrolment

09/05/2016

# Locations

## Countries of recruitment

Slovakia

Spain

## Study participating centre

**Comenius University**

Eye Clinic Jessenius Faculty of Medicine Martin  
L. Novomeského 9

Bratislava  
Slovakia  
036 01

### **Study participating centre**

#### **University of Alicante**

Department of Optics, Pharmacology and Anatomy  
Ctra San Vicente del Raspeig s/n  
San Vicente del Raspeig  
Alicante  
Spain  
03690

## **Sponsor information**

### **Organisation**

Comenius University

### **ROR**

<https://ror.org/0587ef340>

## **Funder(s)**

### **Funder type**

University/education

### **Funder Name**

University of Alicante

## **Results and Publications**

### **Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study are/will be available upon request from Peter Ziak, [1ziakpeter@gmail.com](mailto:1ziakpeter@gmail.com) or David P Piñero, [david.pinyero@ua.es](mailto:david.pinyero@ua.es)

### **IPD sharing plan summary**

Available on request

### **Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
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[Results article](#)

results

28/06/2017

26/11/2020

Yes

No