Augmented reality turning-cues in Parkinson's Disease

Gepubliceerd: 28-05-2018 Laatst bijgewerkt: 15-05-2024

Visual cues, presented in augmented reality can reduce the severity of freezing of gait evoked during turning in patients with Parkinson's disease. This reduction is significantly stronger for visual cues than for conventional auditory cues, as well...

Ethische beoordeling	Niet van toepassing
Status	Anders
Type aandoening	-
Onderzoekstype	Observationeel onderzoek, zonder invasieve metingen

Samenvatting

ID

NL-OMON27339

Bron NTR

Aandoening

Freezing of gait, Parkinson's disease, turning problems

ziekte van Parkinson, bevriezen van lopen, problemen met omdraaien

Ondersteuning

Primaire sponsor: University of Twente, Enschede **Overige ondersteuning:** self financing

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

The main endpoint is FOG severity, as defined by the parameters: fraction of time spent with freezing; number of freezing episodes; duration of freezing. The occurrence of FOG is determined by evaluation of the video recordings by two independent trained raters. The

FOG severity will be compared amongst the different cueing conditions.

Toelichting onderzoek

Achtergrond van het onderzoek

Background: Freezing of gait (FOG) is a particularly disturbing and potentially harmful symptom occurring in a majority of people with Parkinson's disease (PD) over the course of the disease. FOG symptoms are predominantly evoked by turning around and remain difficult to treat with pharmacological management and/or surgical treatment. The use of external cues, such as auditory, tactile or visual stimuli, have shown to be a valuable strategy to prevent or overcome freezing. There is preliminary evidence that visual cueing is effective for preventing FOG during turning, and in terms of effectiveness, visual cues might be favorable over auditory cues. However, the feasibility of mobile visual cueing, and the benefit compared to auditory cueing needs to be investigated further.

In the current study we use smart glasses to present interactive visual cues in augmented reality, aimed at reducing freezing of gait during turning around. We compare 4 cueing conditions (visual cues; auditory cues; a combination of visual and auditory cues; and no cues) to determine optimal ambulant management of freezing symptoms.

Study design: This is an explorative behavioral study aimed at investigating the feasibility of using visual cueing in AR for alleviating FOG symptoms during turning in persons with PD. All procedures are non-invasive. The experiments require a single 2,5-3 hour visit to our laboratory in Enschede.

The turning experiments are split in two sessions, consisting of 4 blocks each. In each block, lasting maximally 4.5 minutes, the subject performs 15 trials. In every trial, the participant is required to make 180-degree turns 'on the spot'. There will be a different cueing condition per block: participants will receive either auditory cues; visual cues in AR; both auditory and visual cues; or no cues. Within each block, the cueing condition is held constant. The order of the blocks within each session (i.e. the order of the different cueing conditions) will be pseudo-randomized to control for the influence of training or tiredness.

Study population: 16 subjects that are diagnosed with Parkinson's disease and experience regular freezing of gait (i.e. on average, more than once per day). Subjects must be able to walk without walking aid, must have normal or corrected to normal vision and must have no cognitive.

Main study parameters/endpoints: The main endpoint is FOG severity, as defined by the parameters: fraction of time spent with freezing; number of freezing episodes; duration of freezing. The occurrence of FOG is determined by evaluation of the video recordings by two independent trained raters. The FOG severity will be compared amongst the different cueing conditions.

Doel van het onderzoek

Visual cues, presented in augmented reality can reduce the severity of freezing of gait evoked during turning in patients with Parkinson's disease. This reduction is significantly stronger for visual cues than for conventional auditory cues, as well as for a control condition without cueing.

Onderzoeksopzet

not applicable

Onderzoeksproduct en/of interventie

A comparison will be made amongst 4 cueing conditions:

Visual cueing: Using a Microsoft HoloLens, a brand of smartglasses, there are cues displayed on top of the real environment. The cues will reflect the turn-progress and balance of the participant using data from accelerometers and pressure insoles. The cues will be automatically turned off after turn completion (180 degrees).

Auditory cueing: A high-pitch high-frequency metronome will sound, assisting the participant during the turning movement. Turn progression will be registered using data from the Xsens sensors: after turning 180-degrees, the turn is completed and the cueing will stop automatically.

Combined cueing: A combination of the described auditory and visual cues will appear and will be automatically turned off after turn completion.

No cueing: the participant is wearing the HoloLens but does not receive any cues.

Contactpersonen

Publiek

Jaap de Ruyter van Steveninck Nijmegen The Netherlands

Wetenschappelijk

Jaap de Ruyter van Steveninck Nijmegen The Netherlands

Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

- Age > 18 years
- Diagnosed with idiopathic Parkinson's disease according to the UK Brain Bank Criteria
- Written informed consent
- Presence of FOG (defined as a score of 1 on question 1 from the NFOGQ[30]: "have you ever experienced FOG in the past month?")
- Disabling/regular FOG (defined as a score of 3 "Very often, more than one time a day" on question 2 from the NFOGQ: "How often do you experience FOG?")
- Normal or corrected to normal vision.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

- Comorbidities that cause severe gait impairment (e.g. severe arthrosis or neuropathy)
- Comorbidities that cause severe vision impairment (e.g. severe maculopathy)

• Severe cognitive impairments (MMSE <24) or or a score on the frontal assessment battery (FAB) of equal to or smaller than 13.

• Inability to perform a 180 degree turn around the axis unaided (e.g.: without the help of a walking aid or the direct help of a person).

Onderzoeksopzet

Opzet

Туре:	Observationeel onderzoek, zonder invasieve metingen
Onderzoeksmodel:	Cross-over
Blindering:	Open / niet geblindeerd
Controle:	Geneesmiddel

Deelname

Nederland	
Status:	Anders
(Verwachte) startdatum:	01-06-2018
Aantal proefpersonen:	16
Туре:	Onbekend

Ethische beoordeling

Niet van toepassing Soort:

Niet van toepassing

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

ID: 46306 Bron: ToetsingOnline Titel:

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL7049
NTR-old	NTR7254
ССМО	NL66241.044.18
OMON	NL-OMON46306

Resultaten