# Does ageing influence cycling behaviour and stability?

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Background: Injury rate and injury severity of elderly cyclists due to self-induced cycle accidents increase with age. Starting at the age of 55 years, injury risk increases with a factor 4 at the age of 75 years. Injury mechanisms such as...

| | |
|---|---|
| **Ethische beoordeling** | Niet van toepassing |
| **Status** | Werving nog niet gestart |
| **Type aandoening** | - |
| **Onderzoekstype** | Observationeel onderzoek, zonder invasieve metingen |

## Samenvatting

### ID

NL-OMON20718

**Bron**
NTR

**Aandoening**

elderly, cycling, stability, ageing, physical degeneration, mental degeneration

### Ondersteuning

**Primaire sponsor:** Roessingh Research and Development;
University of Twente
**Overige ondersteuning:** Ministerie Economische Zaken: PIDON tender 2010 - PID 101 047

### Onderzoeksproduct en/of interventie

### Uitkomstmaten

**Primaire uitkomstmaten**

1. Lateral sway of the cyclist with respect to the bicycle;<br>
2. Lateral acceleration;<br>
3. Lateral sway and steer angle of the bicycle.

# Toelichting onderzoek

**Achtergrond van het onderzoek**

Rationale:

Cycling is a natural, highly accepted and often used mode of transportation in The Netherlands. However, the incident rate and injury severity of bicycle accidents increase with age. Similar findings have been reported internationally and the corresponding mechanisms resulting in bicycle accidents, such as getting on and off the bicycle and ground irregularities, have been analysed. However, the causes for the accidents, like cycling behaviour, muscle weakness and balance or reaction problems have not yet been studied.

Objective:

The aim of this study is to record and analyse cycling kinematics, subjective and objective stability and balance strategies of elderly cyclists and compare them to younger subjects. Furthermore, the aim of this study is to analyse the relationship between physical and cognitive abilities of elder cyclists and their cycle stability.

Study design:

This study has a cross-sectional design, with one measurement session (T1) for assessing the kinematics and clinical scores of the younger and elderly subjects.

Study population:

15 younger subjects (<40 years old) and two groups with each 20 elderly subjects (>65 years old): A control group and a fall-risk group.

Intervention: No intervention will be applied.

Main study parameters/endpoints:

The main study parameter of the present experiment is the lateral bicycle sway. This

kinematic measure is used to evaluate the influence of natural aging on cycling performance.

Nature and extent of the burden and risks associated with participation, benefit and group relatedness:

The risks for the subjects are limited, since the cycling tasks represent functional and familiar movements and are performed only within the scope of the subject's ability. The clinical tests are performed before the cycling tests, so insight in the subject's abilities will be available beforehand. During the cycling tests the difficulty in task increases slowly and can be stopped, by the subject self or by the therapist, at any time. In addition, the measurements used in this study (kinematics, clinical scores) are all noninvasive and involve no risks to the subjects in any way.
Participation of a subject in this experiment has no direct benefit for him/her, other than expanding knowledge about underlying mechanisms of motor control of cycling and aiding in development of sophisticated tools to improve bicycle stability.

**Doel van het onderzoek**

Background:

Injury rate and injury severity of elderly cyclists due to self-induced cycle accidents increase with age. Starting at the age of 55 years, injury risk increases with a factor 4 at the age of 75 years. Injury mechanisms such as slippery roads and poles have been identified, however little is known about the underlying personal factors.

Aim:

Analyse the cycling behavior of elderly cyclists and improve our understanding of the influencing physical and cognitive factors.

Hypothesis:

Degeneration of physical and cognitive abilities results in changes in cycling behaviour and more instable cycling situations.

**Onderzoeksopzet**

For each subject, the clinical tests and cycling test will be performed within two weeks time.

Measurement methodes:

1. Movement sensors to asses the movements of the bicycle and cyclist (primary outcome measures);

2. Clinical questionnaires to asses balance (Berg balans), short-term memory (15 words test) and general health status (SF-36);

3. Lanodolt C –visus chart to asses the visual ability;

4. Questionnaire with Visual Analog Score (VAS) to asses subjective cycling experience;

5. Handheld dynamometer to asses handgripstrength;

6. Velocity and cadance measurement devices to asses cycling velocity and pedal frequency;

7. Reaction time Vienna-testsysteem.

**Onderzoeksproduct en/of interventie**

N/A

# Contactpersonen

## Publiek

Postbus 310
Rosemary Dubbeldam
Enschede 7500 AH
The Netherlands
+31 (0)53 4875700

## Wetenschappelijk

Postbus 310
Rosemary Dubbeldam
Enschede 7500 AH
The Netherlands
+31 (0)53 4875700

# Deelname eisen

## Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

1. Maximum age of 40 years for the 'Young' and min 65 years for both Élderly' groups;

2. No self-induced cycling falls occured for the 'Young' and 'Elderly' group; and 1 or more self-induced cycling falls occured during the last year for the 'Elderly-at risk' group;

3. Regular cycling experience (2-3 times per week);

4. The ability to cycle for 20 minutes on a non-electric bicycle;

5. Adequate visual and auditive functions to understand the experiments, follow instructions and give feedback to the researchers.

## Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

1. Serious visual or auditive impairments;

2. History of bicycle fall (s) resulting in serious injuries.

# Onderzoeksopzet

## Opzet

| | |
|---|---|
| Type: | Observationeel onderzoek, zonder invasieve metingen |
| Onderzoeksmodel: | Parallel |
| Toewijzing: | N.v.t. / één studie arm |
| Blindering: | Open / niet geblindeerd |
| Controle: | N.v.t. / onbekend |

## Deelname

| | |
|---|---|
| Nederland<br>Status: | Werving nog niet gestart |
| (Verwachte) startdatum: | 01-11-2012 |
| Aantal proefpersonen: | 55 |

| | |
|---|---|
| Type: | Verwachte startdatum |

## Ethische beoordeling

Niet van toepassing

| | |
|---|---|
| Soort: | Niet van toepassing |

## Registraties

### Opgevolgd door onderstaande (mogelijk meer actuele) registratie

Geen registraties gevonden.

### Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

### In overige registers

| Register | ID |
|---|---|
| NTR-new | NL3467 |
| NTR-old | NTR3619 |
| Ander register | CCMO : 42027 |
| ISRCTN | ISRCTN wordt niet meer aangevraagd. |

## Resultaten

**Samenvatting resultaten**
N/A