# The effects of leg power training on mobility and gait biomechanics in old adults with moderate mobility disability

No registrations found.

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|---|---|
| **Ethical review** | Positive opinion |
| **Status** | Recruiting |
| **Health condition type** | - |
| **Study type** | Interventional |

## Summary

### ID

NL-OMON27358

**Source**
Nationaal Trial Register

**Brief title**
Potsdam Gait Study – POGS

**Health condition**

Healthy old adults (age ≥ 65 yrs) with moderate levels of mobility disability.

### Sponsors and support

**Primary sponsor:** University Medical Center Groningen (UMCG)
**Source(s) of monetary or material Support:** University of Potsdam, Division of Training and Movement Sciences, Potsdam, Germany

### Intervention

### Outcome measures

**Primary outcome**

Gait speed

### Secondary outcome

Muscle power, gait biomechanics, SPPB, 6-minute walk test, balance, stair climbing time.

## Study description

### Background summary

BACKGROUND: Self-selected habitual gait speed measured on a level surface is a marker and predictor of many clinical conditions, including daily function, late-life mobility, independence, mental health, survival, and mortality. Although physical therapists, geriatricians, and rehab experts routinely prescribe interventions for old adults, we do not know how, if at all, training-induced performance enhancements become incorporated into movements of activities of daily living, and in case of gait, produce longer steps and faster walking.

OBJECTIVE: Therefore, the aim of the present randomized controlled trial is to determine the effects of leg power training on mobility and gait biomechanics in old adults with moderate mobility disability.

HYPOTHESIS: We hypothesize that power training increases leg muscle power measured by dynamometry and these increased abilities become expressed in joint powers measured during gait. We expect that such favorable modifications in joint kinetics underlie the increases in step length, leading ultimately to a faster post-intervention walking speed.

STUDY DESIGN: This study is a randomized controlled trial with two arms, each crossed over, without blinding. Arm 1 completes 25-30 exercise sessions over 10 weeks, followed by a 10-week follow-up (detraining) period. Arms 2 starts with a 10-week control period to assess reliability of the tests and are then crossed over to complete 25-30 training sessions over 10 weeks.

INTERVENTION: The exercise program is designed to improve lower extremity muscle power based on ACSM guidelines.
MAIN OUTCOME MEASURES: Gait speed, muscle power, and gait biomechanics are tested at baseline, 10 weeks, and 20 weeks.

### Study objective

Increasing age is associated with a decrease in step length, gait speed, and mobility. Gait speed predicts numerous clinical conditions, including independence and mortality. A variety of exercise interventions are highly effective in maintaining and even increasing old adults' gait speed. For example, it is routinely reported that increases in leg muscle strength are coupled with increases in habitual and maximal gait speed. Curiously, there is virtually no information about the neural and biomechanical mechanisms mediating the increases in gait

speed. Therefore, the aim of the present randomized controlled trial is to determine the effects of leg power training on mobility and gait biomechanics in old adults with moderate mobility disability. The hypothesis is that power training increases leg muscle power measured by dynamometry and these increased abilities become expressed in joint powers measured during gait. We expect that such favorable modifications in joint kinetics underlie the increases in step length, leading ultimately to a faster post-intervention walking speed.

### Study design

1) Baseline, 2) after 10wks of training, and 3) after 10wks of no intervention follow-up at 20 wks.

All variables are recorded at all Timepoints

### Intervention

Power training consists of 30 sessions administered over 10 weeks. We use the approach of intention to treat with the minimum number of training sessions 80% (24/30) for a subject's data to be included in the analysis. The intervention focuses on improving leg power and is based on ACSM guidelines. Each session starts with 3-5 minutes of warm-up. There are two personal trainers testing and supervising subjects at all times.

Subjects will be initially tested for their three repetition maximum (3RM) measured on: 1) a seated leg press, finishing the movement with an ankle thrust and 2) knee extension (Life Fitness, Inc.) As recommended for power training by ACSM, naïve subjects perform three sets of 6-8 repetitions at 40-60% of the most recent 1RM with the intention to move the weights rapidly, explosively. The inter-repetition and inter-set rest is, respectively 10 s and 1 min. Subjects perform the following main exercises targeting leg power: seated leg press completed with an ankle thrust, knee extension, and knee flexion. Exercise progression will be based on the 3RM re-measured biweekly. Subjects can choose from a menu of supplementary exercises including trunk muscle exercises (e.g., plank).

## Contacts

**Public**
A. Deusinglaan 1, Room 3216 - 217

C.M.I. Beijersbergen
Groningen 9713 AV
The Netherlands
(+31)50 363 6231
**Scientific**
A. Deusinglaan 1, Room 3216 - 217

C.M.I. Beijersbergen
Groningen 9713 AV
The Netherlands
(+31)50 363 6231

# Eligibility criteria

## Inclusion criteria

Male, female, age ≥65, controlled blood pressure, self-selected gait speed < 1.2 m/s.

## Exclusion criteria

BMI ≥ 30, unable to walk 10 m independently, joint replacements in leg less than 6 months before enrollment, uncontrolled CVD or angina, neuromuscular disease, diagnosed Parkinson's disease, Multiple Sclerosis, or stroke, cancer therapy less than 3 months before enrollment, severe asthma or chronic bronchitis, diagnosed diabetes with neuropathy, poor and uncontrolled eyesight

# Study design

## Design

| | |
|---|---|
| Study type: | Interventional |
| Intervention model: | Crossover |
| Allocation: | Randomized controlled trial |
| Masking: | Open (masking not used) |
| Control: | Active |

## Recruitment

NL

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|---|---|
| Recruitment status: | Recruiting |
| Start date (anticipated): | 01-02-2015 |
| Enrollment: | 30 |
| Type: | Anticipated |

# Ethics review

Positive opinion

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|---|---|
| Date: | 17-04-2015 |
| Application type: | First submission |

# Study registrations

## Followed up by the following (possibly more current) registration

No registrations found.

## Other (possibly less up-to-date) registrations in this register

No registrations found.

## In other registers

| Register | ID |
|---|---|
| NTR-new | NL4880 |
| NTR-old | NTR5151 |
| Other | Potsdam University Research Ethics Committee : Ethical Review No. 40/2014 |

# Study results