Energy cost of balance control in stroke patients

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Further investigate the energy cost for balance control in patients after stroke and to compare the energy costs of stroke patients and healthy controls during quiet standing with and without balance perturbations. The energy costs will be related…

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Central nervous system vascular disorders
Study type	Observational non invasive

Summary

ID

NL-OMON32235

Source
ToetsingOnline

Brief title
Energy cost of balance control

Condition

- Central nervous system vascular disorders

Synonym
CVA, Stroke

Research involving
Human

Sponsors and support

Primary sponsor: Vrije Universiteit
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Balance, Energy cost, Stroke

Outcome measures

Primary outcome

Balance

*mean amplitude: the average COP distance to the origin of the mean-centered

posturogram

*sway path length: sum of the distances between consecutive points in the

conventional posturogram

*the 95% confidence circle area, which represents the area of the posturogram

with a circle that includes approximately 95% of the distances from the mean

COP (Prieto et al. 1996)

*normalized sway path length of the posturogram; measures the amount of

twisting and turning

*largest Lyapunov exponent; measure for local stability

*DFA (detrended fluctuation analysis); determines correlation in time

*sample entropy; measure for regularity

Energy:

*Oxygen consumption in milliliters/ minute/ kilogram

*Energy expenditure in Joules/ minute/ kilogram

Muscle activity:

*root mean square of the EMG data

Secondary outcome

*Berg Balance scale

*Medical status of the patient

Study description

Background summary

The energy cost during ADL tasks are higher for people with several disorders of the human movement system and/ or the nervous system. A possible explanation is an altered movement execution caused by the locomotive impairments, but it is also possible that the increased energy demand is (partly) caused by an increased energy cost for balance control. There is only limited data available on the relation between balance control and energy cost in stroke patients. If it is found that the energy cost for balance control is higher in stroke patients, this information could be used to improve the rehabilitation program.

Study objective

Further investigate the energy cost for balance control in patients after stroke and to compare the energy costs of stroke patients and healthy controls during quiet standing with and without balance perturbations. The energy costs will be related to different balance measures (COP-traject, Berg Balance Scale, Electromyography (EMG)).

Study design

Balance and energy expenditure will be measured during five different conditions while standing quiet on a force plate:
*Standing on firm surface
*Standing on firm surface while performing a dual task
*Standing on firm surface with eyes closed
*Standing on foam surface
*Standing with feet placed parallel against each other
Each condition lasts 2 minutes.
Furthermore, balance will be determined with the Berg Balance scale and energy expenditure will be measured with a respiratory system. Muscle activity for balance control (muscle activity of the Tibilialis anterior and Gastrocnemius of the non-paretic leg (or dominant leg in healthy controls) will be measured with EMG. Measurements will take place in Rehabilitation centre Heliomare.

Balance will be quantified with conventional and dynamical measures of the COP-traject (obtained with a force plate).
These measures, the score on the BBS, the energy expenditure and the muscle activity will be compared between groups and conditions. Furtermore, the balance measures and the muscle activity will be correlated with the energy expenditure.

Study burden and risks

The stroke patients are all able to stand for two minutes and therefore it is expected that the risks of the measurements are minimal. During the measurements at least one experimenter will be close to the subjects to intervene if necessary. Furthermore, an aid will be placed in front of the subjects, so that subjects can hold on to it when necessary.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

*Admitted to rehabilitation centre and diagnosed with stroke
*Able to stand without aids or assistance for at least 2 minutes
*Maximal score on Berg Balance scale of 45

Exclusion criteria

*Vestibular disease
*Cognitive and communicative disorders which could influence the protocol
*Medically unstable
*Use of medication that could interfere with balance control
*Non stroke related sensory or motor impairments that could interfere with balance control

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	25-05-2008
Enrollment:	24
Type:	Actual

Ethics review

Approved WMO

Date: 21-05-2008

Application type: First submission

Review commission: METC Amsterdam UMC

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
CCMO	NL22526.029.08