Understanding hand motor control in healthy aging: muscle mechanics and neural control of the aging hand

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Ethical review	Approved WMO
Status	Recruiting
Health condition type	Muscle disorders
Study type	Observational non invasive

Summary

ID

NL-OMON40858

Source
ToetsingOnline

Brief title
Understanding hand motor control in healthy aging

Condition

- Muscle disorders
- Age related factors

Synonym
effect of aging

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Sint Radboud
Source(s) of monetary or material Support: Europese unie (Erasmus mundus)

Intervention

Keyword: finger independence, kinematics, muscle-tendon displacement, neuromechanics

Outcome measures

Primary outcome

Biomechanics of the hand (tendon displacement and muscle activation) and finger independence (hand kinematics and individuation index) between young and elderly.

Secondary outcome

Not applicable

Study description

Background summary

The human hand has evolved to be able to perform complex hand actions such as prehension, gripping and pinching and is necessary in daily life for both fine and gross hand movements. In elderly a gradual decline in the quality of hand motor control is observed, which causes difficulty in performing everyday tasks such as grasping and fine handicraft. To understand the underlying cause for this decline in hand and finger movement, it is necessary to take all the different systems, such as muscles, tendons and central motor control that undergo changes with ageing and their mutual effect on one another into consideration. In this experiment we will study both intermuscular mechanics and the intermuscular motor drive to see their effects on independent finger movement and the possible changes that may occur with ageing.

Study objective

The overall objective of the study is to quantify age-related changes in biomechanics and neural control of hand motor control and finger independence. Therefore, we will determine the finger interdependency during various finger tasks in terms of movement, muscle functionality and muscle interactions in a group of young healthy subjects and a group of healthy elderly.

Study design

Experimental comparison study of the neurophysical and muscular mechanics of the hand for young and elderly subjects.

Study burden and risks

Ultrasound imaging has been used for over 20 years and has an excellent safety record. It uses low-power sound waves and there are no direct risks from a diagnostic ultrasound exam.Surface electromyography is a low-risk exam and complications are rare and subjects will feel minimal discomfort during the experiment. A motion capture technique is used, called the PowerGlove, where the sensors are externally attached to the hand and the individual finger joints and causes minimal discomfort as well. So, the risks for the subjects involved in this project are minimal.

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

- Young subjects: between 18-30 age, all subjects must be right-handed.
- Elderly subjects: between 65-80 years, all subjects must be right-handed and pass the mini-mental state examination (score 25 or higher on a total of 30).

Exclusion criteria

- Presence of wrist pain, previous hand or wrist trauma, previous surgery, and a history of inflammatory arthritis
- Experience with playing musical instruments for more than two years over the course of the last five years

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:	Other

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	15-02-2015
Enrollment:	32
Type:	Actual

Ethics review

Approved WMO

Date:	28-10-2014

Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

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	NL49185.091.14