The effects of aging on the corticomotor excitability of shoulder muscles: a pilot study

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON45735

Source
ToetsingOnline

Brief title
Corticomotor excitability of shoulder muscles with aging

Condition

- Other condition

Synonym
Aging, growing old

Health condition

Gezonde jongeren en ouderen

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Aging, Corticomotor excitability, Shoulder

Outcome measures

Primary outcome

The main study parameter is the corticomotor excitability of the five shoulder

muscles measured by TMS in the form of a recruitment curve

Secondary outcome

The secondary study parameter is the weight of the arm, forearm and the hand.

Study description

Background summary

The ability to perform activities of daily living (ADL) contributes to older adults* quality of life. Incidence of shoulder dysfunction increases with age and interferes with the execution of ADLs that involve the upper extremity, thus compromising quality of life. Therefore it is important to understand the mechanisms involved in age-related shoulder dysfunction. One explanation for decreased shoulder function in older adults could be the related evolution of impairment in shoulder joint control caused by a decline in sensorimotor control and function. There is sporadic evidence for impaired shoulder muscle control in old adults demonstrated by surface electromyography (EMG) that measures muscle activity. While surface EMG provides some insights into the timing and magnitude of muscle contraction, this method provides limited or no information on the motor cortical and corticospinal control of voluntary shoulder movements. Transcranial Magnetic Stimulation (TMS) can overcome such shortcomings. Previous studies only examined the deltoid and the supraspinatus muscles using TMS, but the results were inconsistent with many other studies examining the corticomotor excitability in the hand. Given that in previous studies only examined the deltoid and the supraspinatus, there is still a gap in the knowledge concerning the link between aging and corticomotor excitability of other shoulder muscles. Therefore, this study will include

examination of essential shoulder muscle mobilizers (deltoid, trapezius, serratus anterior) and a muscle that stabilizes the trunk (postural erector spinae).

Study objective

The primary objective of the study is to determine the effects of age on corticomotor excitability of five shoulder muscles (anterior deltoid, upper trapezius, lower trapezius, serratus anterior, erector spinae). The secondary objective is to determine the effect of arm support on the corticomotor excitability of these muscles in young and old adults.

Study design

The design of the study will be a cross-sectional repeated measures design with 3 conditions. Responses to TMS will be recorded in the form of a recruitment curve from the five muscles under the conditions. Shoulder abducted to 90° relative to the arm: 1. Fully supported, 2. 50% supported, and 3. Unsupported.

Study burden and risks

Participants will visit the Center for Human Movement Sciences once for a session that will take approximately one and a half hour. TMS is non-therapeutic and the measurements are non-invasive. TMS could cause slight discomfort lasting less than a second on the scalp near the coil. Moreover it can cause some twitching of the muscles, the face and the jaw. This can be unpleasant and surprising, but it is not painful. There are no known long-term risks of TMS.

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

Healthy, right-handed, aged 18 to 35 or 65 to 85

Exclusion criteria

Diagnosed pathologies that could interfere with the measurement results
Presence of pain in the shoulder
History of severe trauma of the shoulder within the previous two years (e.g. fracture, luxation)
Neurological disorders
Pregnancy
A history of epilepsy
Use of a pacemaker and metal in the brain/skull
Use of medication that can have an influence on the measurement

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:	Recruitment stopped
Start date (anticipated):	16-02-2017
Enrollment:	12
Type:	Actual

Ethics review

Approved WMO

Date:	14-03-2017
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	NL59272.042.16
Other	UMCG research register: 201600329