

Muscle activation patterns of the supraspinatus and deltoid muscle in abduction of the arm: Motion generator or GH (de)stabilizator?

Gepubliceerd: 12-04-2010 Laatste bijgewerkt: 13-12-2022

We hypothesize that, with increased arm abduction moment loading with a constant exerted abduction force, primary arm moment generators (deltoid muscle) will have a greater increase in activation (EMG) as compared to primary arm/glenohumeral...

Ethische beoordeling	Positief advies
Status	Werving gestart
Type aandoening	-
Onderzoekstype	Observationeel onderzoek, zonder invasieve metingen

Samenvatting

ID

NL-OMON19914

Bron

Nationaal Trial Register

Verkorte titel

MAPSAD

Aandoening

Observational study in healthy subjects, to learn more about patients with rotator cuff disease.

Ondersteuning

Primaire sponsor: Leiden University Medical Center

Overige ondersteuning: ZonMW
Reumafonds

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

External force controlled Electromyography (EMG).

To measure activation of individual shoulder muscles (in particular: deltoids, supraspinate, infraspinate, pectoralis major, upper and lower trapezius, latissimus dorsi and teres major) and analyze for relative changes in activation of rotator cuff and deltoid muscles with increased arm moment loading.

Conditions: Arm against an external force in 24 directions (humerus fixed in splint, constant exerted abduction force), 2 moment arms (~4 cm and ~29 cm from the glenohumeral joint).

Outcome: Average filtered EMG value (rEMG), principal Action (PA), Activation Ratio (AR) and Max Voluntary Force (MVF), relative change in deltoid and supraspinate activation (rEMG) expressed in percentages.

Toelichting onderzoek

Achtergrond van het onderzoek

It is generally alleged that mobility in the glenohumeral joint is generated by muscles with relative large force moment arms, while stability in the glenohumeral joint is predominantly guaranteed for by muscles close to the joint with relatively small moment arms: the rotator cuff muscles. Consequently, there is a lack of glenohumeral stability in patients with rotator cuff tears, with subsequent relative cranial translation of the humerus and pain. For abduction of the arm, the deltoid would be the main moment generator, with the rotator cuff muscles providing glenohumeral stability. Nevertheless, these beliefs have never been assessed by biomechanical analyses.

Arm motion (e.g. arm muscle forces and moments) and scapular position directly correlate, but it is not clear whether scapulohumoral rhythm has an essential and active role in facilitating arm motions, or if it is simply the result of muscle activations and intended arm motions. The cooperation of muscle activation patterns and scapular position needs to be studied, because distorted scapulohumoral or scapulo-thoracal rhythm is related to subacromial pathologies.

Doel van het onderzoek

We hypothesize that, with increased arm abduction moment loading with a constant exerted abduction force, primary arm moment generators (deltoid muscle) will have a greater increase in activation (EMG) as compared to primary arm/glenohumeral stabilizers (supraspinate muscle).

Onderzoekopzet

Intake and measurements at 1 timepoint.

Onderzoeksproduct en/of interventie

Subjects will be seated, having their dominant arm fixed in a splint. Next, subjects will have to exert isometric forces in directions perpendicular to the long axis of the humerus, using visual feedback.

In a second session, the same approach will be applied, with the same exerted arm force. However, in the second session the exerted force will be applied at a point nearer to the GH-joint.

In this manner, subjects will participate in 2 sessions of measurements using the same exerted force. However, subjects will be subjected to 2 separate amounts of arm moment loading.

During the isometric force tasks, EMG will be recorded using surface electrodes.

Contactpersonen

Publiek

PO Box 9600, postzone J-11-R
P.B. Witte, de
Albinusdreef 2, Room B-0-57
Leiden 2300 RC
The Netherlands
+31 (0)71 5263606

Wetenschappelijk

PO Box 9600, postzone J-11-R
P.B. Witte, de
Albinusdreef 2, Room B-0-57
Leiden 2300 RC
The Netherlands
+31 (0)71 5263606

Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

1. Age: between 18 and 60 y.o.;
2. No history of shoulder complaints;
3. No current complaints of the shoulder.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

1. No signed informed consent;
2. Pace-maker or other electronic implants.

Onderzoeksopzet

Opzet

Type:	Observationeel onderzoek, zonder invasieve metingen
Onderzoeksmodel:	Factorieel
Toewijzing:	N.v.t. / één studie arm
Blinding:	Open / niet geblindeerd
Controle:	Actieve controle groep

Deelname

Nederland	
Status:	Werving gestart
(Verwachte) startdatum:	25-02-2010
Aantal proefpersonen:	23
Type:	Verwachte startdatum

Ethische beoordeling

Positief advies

Datum: 12-04-2010

Soort: Eerste indiening

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	NL2160
NTR-old	NTR2284
Ander register	ZonMW : 40-00703-98-8564
ISRCTN	ISRCTN wordt niet meer aangevraagd.

Resultaten

Samenvatting resultaten

N/A