Press release

Please fill in this form and return it to graduateschoolhealth@au.dk in Word format no later than three weeks prior to your defence.

Basic information

Name: Jakob Hansen Email: jaohan@rm.dk Phone: +45 23959774

Department of: Clinical Medicine

Main supervisor: Jørgen Feldbæk Nielsen

Title of dissertation: Measuring sit-to-stand kinematics for application in stroke patients

Date for defence: 19/08-2021 at (time of day): 14:00 Place: Udannelsesafdelingen, Regionshospitalet Hammel Neurocenter, Universitetsklinik for Neurorehabilitering, 8450 Hammel.

Press release (Danish)

Bevægelsesanalyse af transitionen fra siddende til stående med henblik på anvendelse hos apopleksipatienter

Halvsidig lammelse er en ofte forekommende komplikation efter apopleksi. Det er en svækkelse af den ene side af kroppen og er ofte kombineret med hæmmet muskelkoordination samt nedsat postural kontrol. Dette medfører en øget risiko for fald blandt disse patienter, især i forbindelse med overgang fra siddende til stående stilling (STS). STS-bevægelsen undersøges ofte med 3D bevægelsesanalyse, hvor kinematikken og kinetikken af bevægelsen kan bestemmes. Det kan dog især være svært at måle bækkenets bevægelse, da bækkenet ofte er gemt væk i stolens sæde, hvilket udgør et problem, idet bækkenets bevægelse er essentiel for at udføre STS.

Derfor var formålet med ph.d.-projektet at bestemme de underliggende biomekaniske parametre, der relaterer sig til øget faldrisiko hos apopleksipatienter og undersøge hvordan patienternes bevægelse kan understøttes for at minimere faldrisikoen. Yderligere var formålet at teste forskellige markørprotokoller specifikt målrettet målinger af bækkenet ved STS. Ph.d.-projektet fra Aarhus Universitet, Health er gennemført af Jakob Hansen, der forsvarer det d. 19/08-2021

I projektet blev det påvist at bestemte biomekaniske parametere er relateret til en øget faldrisiko hos apopleksipatienter og hvordan en ankel-fod ortose påvirker disse parametre. Ph.d.-projektet indeholder også et opslagsværk for den nødvendige datakvalitet ved bevægelsesanalyse af bækkenet, når der udføres STS. Til blev forskellige markørprotokoller til måling af bækkenet undersøgt med henblik på en anbefalet protokol til undersøgelse af STS bevægelse.

I dette ph.d.-projekt er der skabt viden om, hvilke biomekaniske parametre der kan være relevante at undersøge hos apopleksipatienter med en halvsidig lammelse. Dette kan anvedes i klinikken til at identificere patienter med øget faldrisiko og dermed kan rehabiliteringsforløbet efterfølgende målrettes patientens individuelle behov. Yderligere bidrager ph.d.-projektet med et opslagsværk for den nødvendige datakvalitet og en metodeanbefaling til måling af bækkenets bevægelse ved STS. Dette kan skabe værdi hos andre forskere, der ønsker at undersøge bækkenets bevægelsen ved STS med 3D bevægelsesanalyse.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 19/08-2021 kl. 14.00-16.00 i Mødelokale 3 i Udannelsesafdelingen, Regionshospitalet Hammel Neurocenter, Universitetsklinik for Neurorehabilitering, Voldbyvej 15, 8450 Hammel. Grundet COVID-19 er der også mulighed for online deltagelse. Link til sessionen kan tilsendes ved at kontakte Louise Sørensen på Louise.b.soerensen@midt.rm.dk. Titlen på projektet er ”Measuring sit-to-stand kinematics for application in stroke patients”. Yderligere oplysninger: Ph.d.-studerende Jakob Hansen, e-mail: jaohan@rm.dk, tlf. + 45 78419063

Bedømmelsesudvalg:

Dieter Rosenbaum, Professor, Dr.
Institute of Experimental Musculoskeletal Medicine, Münster Universitet,
Münster, Tyskland

Jesper Bencke, MSc, PhD.
Ortopædkirurgisk Afdeling, Københavns Universitetshospital
Hvidovre, Hvidovre, Danmark

Helge Kasch, Lektor, Dr. Med., PhD (Chair).
Institut for Klinisk Medicin- Vestdansk Center for Rygmarvsskade, Aarhus Universitet, Aarhus, Danmark

Press release (English)

Measuring sit-to-stand kinematics for application in stroke patients

Hemiparesis is a frequent complication after stroke and is a weakness of one side of the body, often in combination with impaired muscle coordination and reduced postural control. This leads to an increased fall risk, especially during transfers like sit-to-stand (STS). Therefore, the STS movement has been investigated in stroke patients and other frail subgroups. One method used for this is optical motion capture, where the kinematics and kinetics of the STS are assessed. However, it can be especially difficult to measure the movement of the pelvis, as it is tucked into the chair. This is an issue, as the pelvis movement is essential to STS performance.

Therefore, the aim of this PhD proect was to establish biomechanical parameters related to fall risk in stroke patients and investigate how we can assist stroke patients to lower the fall risk. Further, the aim was to test and compare a variety of marker protocols for optical motion capture measurements of pelvis motion during STS . The PhD project from Aarhus University, Health was carried out by Jakob Hansen, who is defending his dissertation on 19/08-2021.

In this PhD project it was established that certain biomechanical fall risk parameters were related to an increased fall risk in stroke patients and how an ankle-foot orthosis affected these parameters. Further, the PhD project provides a reference work for the optical motion capture data quality needed when measuring pelvis motion during STS. Lastly, a variety of pelvis marker protocols were tested in order to suggest a specific pelvis marker protocol for STS measurements.

This PhD project provides evidence for the biomechanical paramteres related to an increased fall risk in stroke patients with a hemiparesis during STS. This can be applied in the clinic to identify patients with increased fall risk and hence, the rehabilitation can be tailored to the individual needs. Further, the PhD project provides a reference work for the required data quality for pelvis measures during STS, along with a methodological suggestion on which marker protocol to use. This can aid other researchers also investigating the STS movement using optical motion capture.

The defence is public and takes place on 19/08-2021 at 14.00-16.00 in meeting room 3 at the education department, Hammel Neurorehabilitation and University Research Clinic, Voldbyvej 15, 8450 Hammel. Due to COVID-19 it will also be possible to attend the defense online. Link for the online session can be obtained by contacting Louise Sørensen at Louise.b.soerensen@midt.rm.dk. The title of the project is "Measuring sit-to-stand kinematics for application in stroke patients". For more information, please contact PhD student Jakob Hansen, email: jaohan@rm.dk, Phone +45 78419063.

Assessment committee:

Dieter Rosenbaum, Professor, Dr.
Institute of Experimental Musculoskeletal Medicine, Münster University,
Münster, Germany

Jesper Bencke, MSc, PhD.
Clinical Orthopaedic Research, Copenhagen University Hospital
Hvidovre, Hvidovre, Denmark

Helge Kasch, Associate professor, Dr. Med., PhD (Chair).
Department of Clinical Medicine - Spinal Cord Injury Centre of Western
Denmark, Aarhus University, Aarhus, Denmark

Permission

By sending in this form:

- I hereby grant permission to publish the above Danish and English press releases.
- I confirm that I have been informed that any applicable inventions shall be treated confidentially and shall under no circumstances whatsoever be published, presented or mentioned prior to submission of a patent application, and that I have an obligation to inform my head of department and the university's Patents Committee if I believe I have made an invention in connection with my work. I also confirm that I am not aware that publication violates any other possible holders of a copyright.