AARHUS UNIVERSITY

Media release

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Basic information

Name: Mikkel V. Petersen Email: mikkel.petersen@cfin.au.dk Phone: 78 46 99 53

Department of: Clinical Medicine

Main supervisor: Karen Østergaard

Title of dissertation: Tractography and Neurosurgical Targeting in Deep Brain Stimulation for Parkinson's Disease

Date for defence: 3/2-2017 at (time of day): 14.00 Place: Palle Juul-Jensen Auditoriet, Aarhus Universitetshospital, Bygn. 10G, Nørrebrogade 44, 8000 Århus C

Media release (Danish)

Individualisering af fremtidig dyb hjernestimulationsbehandling

Et nyt ph.d.-projekt fra Aarhus Universitet, Health undersøger brugen af avancerede MR (magnetisk resonance)-hjernescannings-teknikker til at optimere planlægning og udførelse af dyb hjernestimulationsbehandling i Parkinsons sygdom. Projektet er udført af cand.med. Mikkel V. Petersen, der forsvarer sit ph.d. 3. februar 2017.

Dyb hjernestimulation er en effektiv behandling af motoriske komplikationer ved fremskreden Parkinsons sygdom. Succesfuld behandling beror på nøjagtig placering af elektroder i et meget lille område dybt i hjernen. Behandlingseffekten medieres via elektriske impulser der modulerer aktiviteten af omkringliggende hjernevæv og nervebaner. De eksakte underliggende virkningsmekanismer er dog endnu ikke fuldt klarlagt. Suboptimal placering af elektroder kan medføre uhensigtsmæssig spredning af elektriske impulser til nærliggende nervebaner, hvilket kan føre til både kort- og langsigtede bivirkninger.

Nylig teknologisk udvikling indenfor magnetisk resonans billeddannelse har muliggjort ikke-invasiv kortlægning af hjernens netværk og visualisering af vigtige nervebaner. I dette ph.d.-projekt har Mikkel V. Petersen undersøgt, hvorledes disse nye skannings- og analyseteknikker kan implementeres som en del af den prækirurgiske planlægning. På sigt kan dette hjælpe neurokirurgerne til at optimere og individualisere behandlingsforløbet gennem en mere præcis indsigt i, hvilke nervebaner man ønsker at stimulere for at reducere de motoriske parkinson symptomer og hvilke nervebaner man forsøger at undgå for ikke at fremklade bivirkninger.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 3. februar kl. 14.00 i Palle Juul-Jensen Auditoriet, Aarhus Universitetshospital, Bygn. 10G, Nørrebrogade 44, 8000 Århus C. Titlen på projektet er ”Tractography and Neurosurgical Targeting in Deep Brain Stimulation for Parkinson's Disease”. Yderligere oplysninger: Ph.d.-studerende Mikkel V. Petersen, e-mail: mikkel.petersen@cfin.au.dk, tlf. 78 46 99 53.

Media release (English)

Towards individualised planning of future treament with deep brain stimulation

A new PhD project from Aarhus University, Faculty of Health examines the use of advanced MR (magnetic resonance)-brain scanning techniques for optimising planning and implementation of deep brain stimulation treatment in Parkinson's disease. The project was carried out by Mikkel V. Petersen, who is defending his dissertation on February 3rd 2017.

Deep brain stimulation is an effective treatment for advanced stage Parkinson's disease patients with motor fluctuations and involuntary movements. Successful treatment relies on accurate placement of electrodes into a very small region, deep in the brain. The treatment effect is mediated by high-frequency electrical stimulation, which modulates the activity of the surrounding brain tissue and neuronal pathways. However, the exact underlying mechanism-of-action of deep brain stimulation is not fully understood. Suboptimal placement of electrodes can lead to an undesirable spread of current into neighbouring neural pathways, which can lead to negative short- and long-term side-effects.

New technological advances in magnetic resonance imaging can allow us to non-invasively map the network of the brain and visualise important pathways. In this PhD project, Mikkel V. Petersen has examined how these techniques might be used for individualising the presurgical planning of deep brain stimulation treatment. This may allow clinicians to target more precisely and to avoid critical pathways with greater precision.

The defence is public and takes place on February 3rd at 14.00 in the Palle Juul-Jensen Auditorium, Aarhus University Hospital, Building 10G, Nørrebrogade 44, 8000 Aarhus C. The title of the project is "Tractography and Neurosurgical Targeting in Deep Brain Stimulation for Parkinson's Disease". For more information, please contact PhD student Mikkel V. Petersen, email: mikkel.petersen@cfin.au.dk, Phone +45 78 46 99 53.

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