

Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Cody Bünger, Professor, MD, DMSc, R, Chairman of the Spine Section, Department of Orthopaedic Surgery, Aarhus University Hospital.

Title of dissertation: Novel growth instrumentation for severe, early-onset scoliosis - Evaluation of a new approach for EOS treatment with perspectives on 3D correction, growth, pain, and compliance

Date for defence: 6. marts 2020 at (time of day): 14.00 Place: Auditorium B, Skejby Sygehus, Palle Juul-Jensens Blvd. 99, 8200 Aarhus

Press release (Danish)

Evaluering af ny operationsmetode til tidlig skolioserygdeformitet hos børn

Svær skoliose rygdeformitet hos børn kan gradvis forværres og blive invaliderende for barnet og dets udvikling. Rygsektoren, Ortopædkirurgisk afdeling, Aarhus Universitetshospital har udviklet en ny kirurgisk metode (CB konceptet), som kombinerer aktiv forlængelse og guided vækst, hvor man med intervaller forlænger et indopereret stavsystem, som modvirker deformiteten og følger barnets vækst indtil barnet er udvokset. Idé og udvikling er foregået under ledelse af Professor Cody Bünger, som konceptet er navngivet efter. Forlængelsen af systemet foretages enten kirurgisk eller ved magnetisk stimulation igennem huden af en indbygget vækstmotor, som anvendes i en viderudvikling af behandlingskonceptet.

Ph.d. afhandlingen indbefatter fire studier: Studie I, en beskrivelse af konceptet og medium- til langtidsresultaterne som viser tredimensionel korrektion af rygdeformiteten med bevaret længdevækst af rygsøjlen. Studie II, undersøgte effekten af én enkelt magnetisk vækststav i et dobbelt stavsystem som CB konceptet eller et sammenligneligt koncept fra Utrecht, Holland. Det viste at en enkelt magnetstav i et sådan system giver et resultat der er sammenligneligt med traditionelt anvendte dobbelte vækststavsystemer eller dobbelt magnetstave beskrevet i litteraturen. Studie III, fokuserede på smerte i forbindelse med magnetforlængelsesprocedurerne som foregår uden brug af bedøvelse eller beroligende medicin. Smerten var beskeden, og de få som oplevede smerte, var smerten mild til moderat og fortog sig indenfor minutter. I studie IV blev den psykiske og fysiske belastning hos patienterne samt den overordnede patienttilfredshed hos barnet og forældrene i forbindelse med forlængelsesprocedurerne af magnet vækststavene undersøgt og sammenlignet med en gruppe unge som havde fået foretaget en primær stivgørende rygoperation. Generelt var der høj tilfredshed i begge grupper, imens både den psykiske og fysiske belastning samt bekymringsniveauet var højere hos de unge, som havde gennemgået primær stivgørende rygoperation. Otte patienter havde været igennem både åben kirurgisk forlængelse og forlængelse med magnetstavsmetoden, og de foretrak alle magnetstavsmetoden.

Resultaterne af de fire studier beskrives i et nyt ph.d.-projekt fra Aarhus Universitet, Health. Projektet er gennemført af læge Simon Toftgaard Skov, der forsvare det d. 6/3 2020.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 6/3 2020 kl. 14 i Auditorium B, Aarhus Universitetshospital Skejby, Palle Juul-Jensens Blvd. 99, 8200 Aarhus. Titlen på projektet er "Novel growth instrumentation for severe, early-onset scoliosis - Evaluation of a new approach for EOS treatment with perspectives on 3D correction, growth, pain, and compliance". Yderligere oplysninger: Ph.d.-studerende Simon Toftgaard Skov, e-mail: simon.skov@clin.au.dk, tlf. 51342383.

Bedømmelsesudvalg:

Benny Dahl, Professor, Overlæge, Ph.d., Direktør for rygprogram og skoliosekirurgi, Texas Children's

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Rigshospitalet, Danmark
Bjarne Møller-Madsen, Professor, Overlæge, Dr.med., Sektorchef Børneortopædkirurgisk sektor,
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Press release (English)

Evaluation of a new surgical approach to manage severe early-onset scoliosis

Severe spinal scoliosis deformity in young children may gradually deteriorate and can potentially become a hazard to the health of the patient. The CB Concept is a novel surgical method developed by the Spine Section, Department of Orthopaedic Surgery, Aarhus University Hospital. Conceptual idea and development was directed by Professor Cody Bünger, hence the name of the concept. It is a screw-mounted rod-system implanted to counteract the deformity, combining active distraction and guided growth. Interval rod-elongations are subsequently performed to allow spinal growth of the child. The lengthening procedures were either open surgical lengthening and relocking of the system, or in later cases by non-invasive trans-cutaneous magnetic stimulation of a special rod with a built-in magnetic driver.

The PhD thesis is based on four studies: Study I, describes the CB Concept and the medium- to longterm results, showing three-dimensional deformity correction and preserved spinal growth. Study II, investigates the effect of a single magnetic growing rod in a double rod system such as the CB Concept or a concept from Utrecht, the Netherlands, which utilizes a similar approach. The study showed that a single magnetic rod generates results comparable to surgical elongated traditional double growing rods or double magnetic growing rods described in the literature. Study III, focus on pain during the magnetic elongation procedures which are performed without anesthesia or analgesia. The average maximum procedural pain intensity was mild, and only few patients experienced moderate pain which siezed within minutes. In study IV, the psychological, physical impact, and overall satisfaction with magnetic elongation procedures in early onset scoliosis patients and their parents were investigated and compared to a group of adolescent idiopathic scoliosis patients who received primary spinal fusion surgery. Overall satisfaction was uniformly high in both groups. while both the physical and psychological strain and pain in conjunction with lengthening procedures were low in comparison with the fusion group. Eight patients had experienced both surgical and non-surgical magnetic elongations and they all preferred the magnetic distraction method.

The project was carried out by Simon Toftgaard Skov, MD, who is defending his dissertation on 6th of March 2020.

The defence is public and takes place on 6th of March 2020 at 2:00 pm in Auditorium B, Aarhus University Hospital Skejby, Palle Juul-Jensens Blvd. 99, 8200 Aarhus. The title of the project is "Novel growth instrumentation for severe, early-onset scoliosis - Evaluation of a new approach for EOS treatment with perspectives on 3D correction, growth, pain, and compliance". For more information, please contact PhD student Simon Toftgaard Skov, email: simon.skov@clin.au.dk, Phone +45 51342383.

Assessment committee:

Benny Dahl, Professor, MD, PhD, Director Spine Program and Scoliosis Surgery, Texas Children's Hospital & Baylor College, Houston Texas, USA
Martin Gehrchen, Associate professor, MD, PhD, Chairman of the Spine Unit, Department of Orthopaedic Surgery, Rigshospitalet, Denmark
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