Center for Implant and Radiostereometric Research Oslo (CIRRO)

Group Leaders

Stephan M. Röhrl, Ass. Prof., (s.m.rohrl@medisin.uio.no)
Division of Orthopaedic Surgery, Oslo university hospital, Head of the Norwegian Society for Hip and Knee Surgery, Board member of the Norwegian arthroplasty Registry

Lars Nordsletten, Prof. (lars.nordsletten@medisin.uio.no)
Head of the research and development unit of the division for orthopaedic surgery Oslo university hospital and Oslo university

Group Members

Senior members:

- Finnur Snorrason, MD/PhD, OUH
- Vera Halvorsen, MD, OUH
- Marianne Westberg MDT/PhD, OUH
- Harald Steen, Professor, OUH
- Ragnhild Gundersen, MD radiolog, OUH

Alumni (accomplished PhD):

- Wender Figwed, MD/PhD Bærum Hospital
- Berte Bøe, MD/PhD, OUH
- Einar Lindalen, MD/PhD Lovisenberg Hospital
- Jon Dahl, MD/PhD, OUH
- Thomas Kibsgård, MD/PhD, UiO and OUH
- Bernhard Flatøy, MD/PhD, OUH
- Eirik Aunan, MD, Lillehammer Hospital
- Justin van Leeuwen, MD, Betanien Hospital
- Gunnar Petursson, MD, Lovisenberg Hospital

PhD candidates:

- Trygve Glad, MD, OUH, LIS
- Alexander Fraser, MD, OUH, LIS
- Are Stødle, MD, OUH, LIS
- Jan Egil Brattgjerd, MD, OUH, LIS
- Frank David Ørn, MD, Kristiansund Hospital
- Carl Erik Alm, MD, OUH, LIS

Group Members (continued)

PhD candidates:

- Ole-Christian Brun, MD, OUH
- Vinjar Brenna Hansen, MD, HUS
- Peder Thoen, MD Lovisenberg

Radiographers:

- Alexis Hinohosa, CT and MRI radiographer, OUH
- Mona Risdal, CT radiographer, Application specialist CT, OUH
- Silje Klausen, BSC radiography, PgCert Reporting Radiography, OUH
- Kathrine Lamark, BSC radiography, MSC Diagnostic imaging, OUH

Research coordinators:

- Marte Traae Magnusson, PT, Master, OUH
- Anne Christine Brekke, Head nurse, Master, OUH

Research profile and aims

The overall aim of CIRRO is to perform sophisticated basic and clinical research in the field of orthopaedic surgery, material sience and bone turnover, establish a team of dedicated researchers and collaborate nationally and internationally. Our intention is:

- to use and develop precise measurement methods in musculoskeletal research
- to study new treatment options (implants, surgical techniques, biotechnology, rehabilitation interventions and pharmacological treatment) and to ensure safe treatment to patients
- to create an inspirational environment for PhD candidates and researchers
- to study disease development (cartilage wear, bone loss, changes in body composition) together with other methods, in order to gain insight into mechanisms for disease and eventual treatment.
- to further develop CIRRO as a main research centre that delivers sophisticated services to researchers in South-Eastern Norway Regional Health Authority and adjoint hopitals nationally

2019

All our radiographers are performing dynamic RSA-examinations with the Adore systems.

We have continued to recruit patients for our ongoing studies and followed the patients clinically with CT and RSA. Researchers from all involved cities in Norway, Sweden and Japan met at a kick off meeting

in Kyoto (Fig. 1) for out International multicenter study on spinal deformities. A homepage as a collaboration platform is established (https://www.intraks.org). All data will be collected in TSD.

Researcher participated at the 6th biannual RSA congress in Aarhus, Denmark. CIRRO was selected as the organizer for the next international RSA congress 2021. We reached out to sponsors (http://radiostereometry.org/2019/11/sponsor-invitation/).
The topic of the congress will be: *"Imaging technology for safe implants and surgery for our patients".*
We are currently in the planning phase with the congress.

Stephan Röhrl attended the first user meeting for a CT based method to analyze motion in implants. This presents an interesting new technology that will face stringent verification and opens up for many new studies.

CIRRO arranged 2 meetings for the PhD-candidates, radiographers and coordinators. Several members of the group attended at the annual researchseminar at Kleivstua, Norway, arranged by dept. of orthopedics, Oslo university hospital and collaborating units.

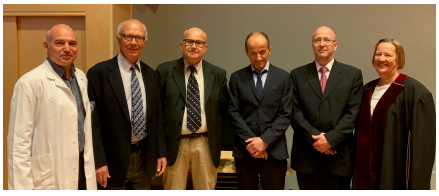
CIRROs researchcoordinator Marte Traae Magnusson also attended a user meeting for TSD, UiO, to continue and optimize the work with electronic datacollection in clinical research. She also gave lectures at Tønsberg hospital regarding GCP and evidence based practice.

Other highlights of this year were the completion of 3 PhD programs. We congratulate and are proud of Dr. med. Justin van Leeuwen (Fig. 2a) for his Ph.d. in March with the titile: "Evaluation of Patient-Specific Positioning Guides in knee arthroplasty".; Dr. philos. Eirik Aunan (Fig. 2b), for the defense of his Ph.d. in April with the title: "Improving surgical technique and functional outcome in TKA!" and Dr. med. Gunnar Petursson (Fig. 2c) to his Ph.D. in August with the title: "Computer navigation and fixation in total knee replacements!"
All of them did a great defense with internationally appreciated reviewers.

Figure 1

Figure 2

a)



b)

c)

Ongoing projects

Hip projects

- Randomized study between operation with pins with or without plate for undisplaced dislocated femoral neck fracture. Radio stereogrammetric analysis (RSA) of stability and fracture healing and clinical endpoints. (The Pinloc Study)
- RCT on the function of the Trochanteric Support Plate (TSP) in combination with the Dynamic Hip Screw (DHS)
- Solutions for patients at risk: dislocation, hip spine syndrome.
- The value of minimal invasive approaches for THP compared to traditional ones

Knee projects

- In vivo kinematics and performance of contemporary knee arthroplasty (PhD project OUS, Ullevål in collaboration with HF Møre Romsdal)
- Kinematic RSA of three different kneedesignes (collaboration with Lovisenberg Diaconal Hospital)

Methodological projects

- Precision of RSA with different RSA systems
- Phantom study of the hip and the knee during motion
- Motionanalysis with CT

Ankle and foot projects

- Investigating acute Lisfranc injuries in the foot and a new surgical procedure (PhD project OUS, Ullevål)
- Kinematics of the midfoot after Lisfranc injury (PhD project OUS, Ullevål)

Shoulder projects

- Stability of the glenoid implant in reversed shoulder arthroplasty (PhD project OUS, Ullevål).

Hand projects

- A prospective randomized trial comparing two different wrist arthroplasties (PhD project OUS, Rikshospital and Ullevål)

Spinal projects

- INTRAKS study on spinal deformities (https://www.intraks.org).

Most important national and international collaborators

National

- Norwegian Arthroplasty register (NAR)
- Norwegian society for hip and knee surgery (NFHKK)
- Betanien Hospital Skien
- Diakonhjemmet Hospital
- Lillehammer Hospital
- Lovisenberg Diaconal Hospital
- Oslo Sports Trauma Research Center (OSTRC)
- Regional Health Autority Møre Romsdal
- Kristiansund hospital
- Haukeland University Hospital
- Arendal Hospital

International

- Umeå University Hospital, Arthroplasty unit, Sweden
- UmRSA Biomedical, Sweden
- Leiden University, The Netherlands
- Kyoto University Orthopedic Association, Japan
- Helsinki bone and joint research group, Finland
- Skåne University, Sweden

Scientific production of the research group in 2019

1. Brun OL, Sund HN, Nordsletten L, Röhrl SM, Mjaaland KE (2019)
   Component Placement in Direct Lateral vs Minimally Invasive Anterior Approach in Total Hip Arthroplasty: Radiographic Outcomes From a Prospective Randomized Controlled Trial
   J Arthroplasty, 34 (8), 1718-1722
   DOI 10.1016/j.arth.2019.04.003, PubMed 31053468

2. Flatøy B, Dahl J, Röhrl SM, Nordsletten L (2019)
   Does radiopaque cement conceal periprosthetic bone loss around femoral stems?
   Hip Int, UNSP 1120700019863352
   DOI 10.1177/1120700019863352, PubMed 31359800

3. Halvorsen V, Fenstad AM, Engesæter LB, Nordsletten L, Overgaard S, Pedersen AB, Kärrholm J, Mohaddes M, Eskelinen A, Mäkelä KT, Röhrl SM (2019)
   Outcome of 881 total hip arthroplasties in 747 patients 21 years or younger: data from the Nordic Arthroplasty Register Association (NARA) 1995-2016
   Acta Orthop, 90 (4), 331-337
   DOI 10.1080/17453674.2019.1615263, PubMed 31088343

4. Mjaaland KE, Kivle K, Svenningsen S, Nordsletten L (2019)
   Do Postoperative Results Differ in a Randomized Trial Between a Direct Anterior and a Direct Lateral Approach in THA?
   Clin Orthop Relat Res, 477 (1), 145-155
   DOI 10.1097/CORR.0000000000000439, PubMed 30179928

5. Yang Z, Röhrl SM, Nordsletten L (2019)
Displaced Acetabular Fracture in Elderly Patients: Is Acute Arthroplasty an Effective Option?
Z Orthop Unfall, 157 (6), 676-683
DOI 10.1055/a-0842-2320, PubMed 31071728