

The Research Unit
of
The Department of Physical and Occupational Therapy
Bispebjerg-Frederiksberg Hospital

2018 Annual Research Report

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2018 Staff

Professor Peter Magnusson, PT, DMSc
Professor Marius Henriksen, PT, PhD
Senior Researcher Susan Warming PT, PhD
Senior Researcher Christian Couppé PT, PhD
Associate professor Tine Alkjær, MSc, PhD
Associate professor Ann Cools, PT, PhD
Post doc Christian Have Dall, PT, PhD
Post doc Emma Ghaziani, OT, PhD
Post doc Theresa Bieler, PT, PhD
PhD student Birgitte Hougs Kjær, PT, MSc
PhD student Cecilie Rødgaard Bartholdy, PT, MSc
PhD student Anne Sofie Agergaard, PT, MSc
Research student Malthe Roswall (PT-student)
Research therapist Durita Gunnarsson, PT, MSc
Research therapist Helle Andersen, PT, MSc

Highlights from 2018

The Research Unit of The Department of Physical and Occupational Therapy had an excellent 2018 regarding research activities. Researchers were very productive publishing their work and submitting new grants applications to expand our current activities in upcoming years. Highlights from the 2018 calendar year include

- 29 peer reviewed journal publications in journals with an average journal impact factor of 2.6 and a cumulated journal impact factor of 76.1
- Record setting external funding attracted
- Successful symposium on cardiopulmonary rehabilitation arranged in collaboration with the Danish Sports Physiotherapists & The Danish Society of Cardiopulmonary Physiotherapists
- Participation in the newly established Clinical Academic Group ROAD
- Assignments of post docs Emma Ghaziani (OT) and Theresa Bieler (PT) as part of structural re-organisation
- The Danish Society of Biomechanics' Lifetime achievement award (The Steno award) given to professor Marius Henriksen

Scientific Output

2018 was a successful year in terms of scientific production. The aim for 2018 was 25 peer reviewed publications with an average impact factor of at least 3.00. In 2018 we reached a total of 29 articles published in international journals with peer review with an average journal impact factor was 2.6. While the average journal impact factor is not above the intended threshold, we consider the production highly satisfactory.

A list of published articles is appended this report.

Other disseminations

In November we held our own symposium; this year with focus on cardiac and pulmonary rehabilitation. The symposium was dedicated physiotherapists in clinical practice. A strong faculty including international experts gave excellent lectures on the subject, and we have received nothing but positive feedback from the attendees.

Our staff has been invited to lecture in a range of settings, including international congresses, local symposia, and meetings for clinicians, ensuring that our research and expertise is disseminated to clinicians within physical and occupational therapy and in relevant medical professions.

Finally, we have been active in pre- and postgraduate teaching at the University of Copenhagen and University of Southern Denmark. We have taught courses at the school of medicine, health science, and under the auspices of various PhD programmes.

Record setting external funding attracted

2018 has been a record setting year regarding received funding for our research.

Professor Peter Magnusson has been particularly successful receiving 1.7 mill DKK from the Novo Nordisk Foundation to the study: *Muscle cell adaptation, collagen healing and clinical outcome following ruptured Achilles tendon: Optimizing rehabilitation*. He also received 1.5 mill DKK from the Danish Research Council for the study: *The influence of load magnitude on extracellular matrix proteins, tendon morphology and biochemistry in healthy and injured patellar tendons*.

Our post-doctoral research Christian Have Dall has received a total of 270.000 DKK for the study named *REPLACE* and PhD student Birgitte Hougs Kjær has received 326.000 DKK for the PhD-project called *CUT'N'MOVE*.

In total we received 4.16 mill DKK, which is an all-time record for a single year in the research unit.

The TAPAS study completed

We have successfully ended a controlled cohort study on technology assisted physical activity on the respiratory medicine ward (The TAPAS study). The study was a collaboration between the research unit and a private tech-company who designs and produces activity monitors. The results showed that by using simple visual feedback hospitalised patients with independent locomotor abilities increase the time spent out of bed by an average of 55 minutes. These results are very encouraging, and we will pursue to replicate them in a larger setting that involves more departments.

Participation in the Clinical Academic Group ROAD

The research unit is an active partner in the newly established clinical academic group (CAG) under Copenhagen Health Science Partners (CHSP). The CAG is called Research OsteoArthritis Denmark – Prevention and treatment through the lifespan of patients (ROAD) and aims to improve the quality of life of persons with osteoarthritis. Professor Marius Henriksen is an associate member of the CAG responsible for the Work Package themed '*Understanding the effects of exercise for osteoarthritis*'.

The CAG was among the 4 CAGs that were established in 2018, and we are proud to participate.

Post doc assignments

To strengthen our research profile, it has been decided to convert the 4 research-therapist positions into post-doctoral positions. This decision was made to provide a narrower focus in the research profile of the individual positions and create better research career opportunities for the employees. The post-doctoral positions encompass 50% of clinical obligations and 50% with focus on a focused research project and clinical development assignments. In 2018 2 of the 4 positions were converted; 1 within neurological rehabilitation and 1 within orthopaedic rehabilitation.

Emma Ghaziani OT, PhD, post doc.

Dr Emma Ghaziani has been assigned as post-doctoral researcher in the research unit. Dr Ghaziani will be responsible for research in neurological rehabilitation with an emphasis on stroke.

Theresa Bieler, PT PhD, post doc.

Dr Bieler has been assigned as post-doctoral researcher in the research unit. Dr Bieler will be responsible for research in orthopaedic rehabilitation with an emphasis on total hip replacement.

The Steno Award

In October 2018 the Danish Society of Biomechanics awarded professor Marius Henriksen with the lifetime achievement award, The Steno Award. The award is given to scientists who have contributed significantly to research and development of biomechanics in Denmark. We are proud to have an award-winning professor in our staff.

Plans and Goals for 2019

We hope to engage new PhD-students, both fully and more loosely affiliated with unit.

We seek to engage in more fruitful collaborations in the coming years, of which 2019 will be used to consolidate the current and engage in new partnerships. Our closest current partners include The Parker Institute, The Institute of Sports Medicine, and The Respiratory Research

Unit, and we look forward to more joint projects in the future. We thank these important partnerships for the past year and look forward to continuing the close collaborations in 2019.

We aim to keep up the pace related to peer reviewed publications. We hope to reach 25 peer reviewed publications in 2019, maintaining the ambition of publishing in journals with an average impact factor of at least 3.00.

Further, we are aiming at a continued success rate in terms of attracting external funding to our activities. We will work hard on this, and we hope to get enough funding to consolidate our activities and expand with new studies and staff.

We plan to repeat the successful scientific symposium. The topic of the symposium has not been decided but will be announced in due time.

Concluding remarks

2018 was another successful year for the Research Unit. We have consolidated our staff with internal advancements and transformation of positions into post-doctoral research positions. We maintained a satisfactory scientific output compared. We have succeeded in increasing and strengthening our partnerships with other research groups.

The staff of the Research Unit has worked hard and with a positive attitude, and we hope to see even more enthusiasm and happy spirits in 2019.

We are thankful to the department head, Morten Østergaard, and the hospital administration for providing us with necessary support to do our research. A special thank go to our clinical colleagues in the department for their support and contributions to the research.

Also, we wish to thank our partners for fruitful and inspiring collaborations in the past year. We look forward to continuing our joint efforts in the years to come.

We wish our partners and friends a happy 2019!



Marius Henriksen
Professor



Peter Magnusson
Professor

Appendix: List of Peer Reviewed Journal articles (in alphabetical order; authors from the research unit in bold)

1. Bandholm T, **Henriksen M**, Treweek S, Thorborg K. Make it REAL: four simple points to increase clinical relevance in sport and exercise medicine research. *British journal of sports medicine*. 2018;52(22):1407-8.
2. **Bartholdy C**, Gudbergesen H, Bliddal H, Kjaergaard M, Lykkegaard KL, **Henriksen M**. Reliability and Construct Validity of the SENS Motion(R) Activity Measurement System as a Tool to Detect Sedentary Behaviour in Patients with Knee Osteoarthritis. *Arthritis*. 2018;2018:6596278.
3. Bayer ML, Hoegberget-Kalisz M, Jensen MH, Olesen JL, Svensson RB, **Coupe C**, Boesen M, Nybing JD, Kurt EY, **Magnusson SP**, Kjaer M. Role of tissue perfusion, muscle strength recovery, and pain in rehabilitation after acute muscle strain injury: A randomized controlled trial comparing early and delayed rehabilitation. *Scandinavian journal of medicine & science in sports*. 2018;28(12):2579-91.
4. Beyer R, **Agergaard AS**, **Magnusson SP**, Svensson RB. Speckle tracking in healthy and surgically repaired human Achilles tendons at different knee angles—A validation using implanted tantalum beads. *Transl Sports med*. 2018;1(2).
5. Del Bel MJ, Flaxman TE, Smale KB, **Alkjaer T**, Simonsen EB, Krogsgaard MR, Benoit DL. A hierarchy in functional muscle roles at the knee is influenced by sex and anterior cruciate ligament deficiency. *Clinical biomechanics (Bristol, Avon)*. 2018;57:129-36.
6. DeVita P, Aaboe J, **Bartholdy C**, Leonardis JM, Bliddal H, **Henriksen M**. Quadriceps-strengthening exercise and quadriceps and knee biomechanics during walking in knee osteoarthritis: A two-centre randomized controlled trial. *Clinical biomechanics (Bristol, Avon)*. 2018;59:199-206.
7. Eliasson P, **Agergaard AS**, **Coupe C**, Svensson R, Hoeffner R, **Warming S**, Warming N, Holm C, Jensen MH, Krogsgaard M, Kjaer M, **Magnusson SP**. The Ruptured Achilles Tendon Elongates for 6 Months After Surgical Repair Regardless of Early or Late Weightbearing in Combination With Ankle Mobilization: A Randomized Clinical Trial. *The American journal of sports medicine*. 2018;46(10):2492-502.
8. Eriksen CS, Henkel C, Svensson RB, **Agergaard AS**, **Coupe C**, Kjaer M, **Magnusson SP**. Lower tendon stiffness in very old compared with old individuals is unaffected by short-term resistance training of skeletal muscle. *Journal of applied physiology (Bethesda, Md : 1985)*. 2018;125(1):205-14.
9. Eshoj H, Ingwersen KG, Larsen CM, **Kjaer BH**, Juul-Kristensen B. Intertester reliability of clinical shoulder instability and laxity tests in subjects with and without self-reported shoulder problems. *BMJ open*. 2018;8(3):e018472.
10. **Ghaziani E**, **Coupe C**, Siersma V, Sondergaard M, Christensen H, **Magnusson SP**. Electrical Somatosensory Stimulation in Early Rehabilitation of Arm Paresis After Stroke: A Randomized Controlled Trial. *Neurorehabilitation and neural repair*. 2018;32(10):899-912.
11. Giannopoulos A, Svensson RB, Heinemeier KM, Schjerling P, Kadler KE, Holmes DF, Kjaer M, **Magnusson SP**. Cellular homeostatic tension and force transmission measured in human engineered tendon. *Journal of biomechanics*. 2018;78:161-5.
12. Hansen H, **Beyer N**, Frolich A, Godtfredsen N, **Bieler T**. Intra- and inter-rater reproducibility of the 6-minute walk test and the 30-second sit-to-stand test in patients

- with severe and very severe COPD. International journal of chronic obstructive pulmonary disease. 2018;13:3447-57.
13. Hansen L, Erhardtsen KT, Bencke J, **Magnusson SP**, Curtis DJ: The Reliability of the Segmental Assessment of Trunk Control (SATCo) in Children with Cerebral Palsy. Physical Occupational Therapy Pediatrics 38: 291-304, 2018
 14. **Henriksen M**, Overgaard A, Hartkopp A, Bliddal H. Intra-articular 2.5[%] polyacrylamide hydrogel for the treatment of knee osteoarthritis: an observational proof-of-concept cohort study. Clinical and experimental rheumatology. 2018;36(6):1082-5.
 15. Ipsen K, **Couppé C**, Neergaard, C, Prescott EI, **Magnusson SP**, **Dall CH**. Reliability of non-invasive blood pressure measurement during heavy resistance exercise: A pilot study. Translational Sports Medicine. 2018;1(2):89-94.
 16. Jensen JK, Nygaard RH, Svensson RB, Hove HD, **Magnusson SP**, Kjaer M, **Coupe C**. Biomechanical properties of the patellar tendon in children with heritable connective tissue disorders. European journal of applied physiology. 2018;118(7):1301-7.
 17. **Kjaer BH**, **Magnusson SP**, **Warming S**, **Henriksen M**, Krogsgaard MR, Juul-Kristensen B. Progressive early passive and active exercise therapy after surgical rotator cuff repair - study protocol for a randomized controlled trial (the CUT-N-MOVE trial). Trials. 2018;19(1):470.
 18. Mikkelsen N, **Dall CH**, Frederiksen M, Holdgaard A, Rasmussen H, Prescott E. Depression, Socioeconomic Factors, and Ethnicity as Predictors of Cardiorespiratory Fitness Before and After Cardiac Rehabilitation. Journal of cardiopulmonary rehabilitation and prevention. 2018.
 19. Moller SP, Brauer C, Mikkelsen S, **Alkjaer T**, Koblauch H, Pedersen EB, Simonsen EB, Thygesen LC. Risk of subacromial shoulder disorder in airport baggage handlers: combining duration and intensity of musculoskeletal shoulder loads. Ergonomics. 2018;61(4):576-87.
 20. Nielsen FK, Boesen M, Jurik AG, Bliddal H, Nybing JD, Ellegaard K, **Bartholdy C**, Bandak E, **Henriksen M**. The effect of intra-articular glucocorticosteroids and exercise on symptoms and bone marrow lesions in knee osteoarthritis: a secondary analysis of results from a randomized controlled trial. Osteoarthritis and cartilage. 2018;26(7):895-902.
 21. Raffalt PC, **Alkjaer T**, Brynjolfsson B, Jorgensen L, **Bartholdy C**, **Henriksen M**. Day-to-Day Reliability of Nonlinear Methods to Assess Walking Dynamics. Journal of biomechanical engineering. 2018;140(12).
 22. Raffalt PC, Nielsen LR, Madsen S, Hojberg LM, Pingel J, Nielsen JB, **Alkjaer T**, Wienecke J. Assessment of intersegmental coordination of rats during walking at different speeds - Application of continuous relative phase. Journal of biomechanics. 2018;73:168-76.
 23. Raffalt PC, Nielsen LR, Madsen S, Munk Hojberg L, Pingel J, Nielsen JB, Wienecke J, **Alkjaer T**. Day-to-day reliability of gait characteristics in rats. Journal of biomechanics. 2018;72:247-51.
 24. Rolid K, Andreassen AK, Yardley M, Bjorkelund E, Karason K, Wigh JP, **Dall CH**, Gustafsson F, Gullestad L, Nytroen K. Clinical features and determinants of VO2peak in de novo heart transplant recipients. World journal of transplantation. 2018;8(5):188-97.
 25. Smale KB, Hansen LH, Kristensen JK, Zebis MK, Andersen C, Benoit DL, Helge EW, **Alkjaer T**. *Loading intensity of jumping exercises in post-menopausal women: Implications for osteogenic training.* Translational Sports Medicine. 2018;1(1):30-6.
 26. **Sobol NA**, **Dall CH**, Høgh P, Hoffmann K, Frederiksen KS, Vogel A, Siersma V, Waldemar G, Hasselbalch SG, **Beyer N**. Change in Fitness and the Relation to Change in Cognition and

- Neuropsychiatric Symptoms After Aerobic Exercise in Patients with Mild Alzheimer's Disease. *Journal of Alzheimer's disease: JAD*. 2018;65(1):137-45.
27. Svensson RB, Smith ST, Moyer PJ, **Magnusson SP**. Effects of maturation and advanced glycation on tensile mechanics of collagen fibrils from rat tail and Achilles tendons. *Acta biomaterialia*. 2018;70:270-80.
28. Sørensen Larsen M, **Couppé C**, Buch Møller A, Schjerling P, Løivind Andersen J, Harboe Nygaard R, Langberg H, Kjaer M, Hansen M. *Response to resistance training following immobilisation – influence of delaying post-exercise meal*. *Translational Sports Medicine* 2018, 1, 119-123
29. van der Kleij LA, Petersen ET, Siebner HR, Hendrikse J, Frederiksen KS, **Sobol NA**, Hasselbalch SG, Garde E. The effect of physical exercise on cerebral blood flow in Alzheimer's disease. *NeuroImage Clinical*. 2018;20:650-4.