

**The Research Unit
of
The Department of Physical and Occupational Therapy
Bispebjerg-Frederiksberg Hospital
2017 Annual Research Report**

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2017 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
PhD student Emma Ghaziani, OT, MSc
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
Research therapist Mette Leth, OT, MSc
Research therapist Theresa Bieler, PT, PhD

Highlights from 2017

The Research Unit of The Department of Physical and Occupational Therapy had an excellent year with regard to research in 2017. Researchers were very productive publishing their work and submitting new grants applications to expand our current activities in upcoming years.

Highlights from the 2017 calendar year include

- 1 publication in New England Journal of Medicine
- Assignment of senior researchers Christian Couppé and associate professor Tine Alkjær
- Assignment of post doc. Christian Have Dall
- 36 peer reviewed journal publications in journals with an average journal impact factor of 6.42 and a cumulated journal impact factor of 199.00
- Commencement of 3 new RCTs
- Participation in the Clinical Academic Group imPACT
- New collaborations established
- Successful symposium on shoulder treatment arranged in collaboration with the IOC and Danish Sports Physiotherapists

The New England Journal of Medicine

We are particularly proud of Professor Peter Magnusson's contribution and co-authorship of a scientific article in The New England Journal of Medicine. The New England Journal of

Medicine is among the most prestigious peer-reviewed medical journals and is the most cited general medical journal in the world.

Growth with new research staff

The research unit expanded with the appointment of new members of our team: Dr Christian Couppé as a new senior researcher, and Dr Christian Have Dall as a new post doc. Further, Ms Anne Sofie Agergaard commenced her PhD study.

Christian Couppé PT, PhD

Dr Christian Couppé has been assigned as Senior Researcher in the research unit. Dr Couppé will be responsible for research in musculoskeletal physical therapy with an emphasis on translation of basic science to clinical practice.

Tine Alkjær Msc, PhD

Dr Tine Alkjær has been affiliated with the research unit. Dr Alkjær is a tenured associate professor at the University of Copenhagen, but her research activities will be concentrated in the research unit. She will be responsible for research in musculoskeletal biomechanics related to physical therapy and exercise with an emphasis on shoulder and walking biomechanics.

Christian Have Dall PT, PhD

Dr Christian Have Dall has been assigned as post doc. Christian's main responsibilities is to coordinate the RCT on exercise for asthma patients (The REPLACE study) and initiate new studies within respiratory and cardiovascular rehabilitation.

Anne Sofie Agergaard, PT, MSc.

Anne Sofie Agergaard is enrolled as a full-time PhD-student in our unit in collaboration with The Institute of Sports Medicine. Anne Sofie is enrolled at Copenhagen University under supervision of Professor Peter Magnusson. The PhD studies focus on load magnitude on clinical and structural effects of exercise in patellar tendonitis.

Scientific Output

2017 was a successful year in terms of scientific production. The aim for 2017 was 25 peer reviewed publications with an average impact factor of at least 3.00. In 2017 we reached a total of 36 articles published in international journals with peer review with an average journal impact factor was 6.55. We consider the production highly satisfactory.

A list of published articles, book chapters, and conference presentations is appended this report.

New Collaborations

The research unit has established a new and promising partnership with the Respiratory Medicine Research Unity at Bispebjerg-Frederiksberg Hospital headed by Professor Vibeke

Backer. The partnership has successfully planned, funded and initiated the REPLACE study that focuses on physical exercise for asthma patients.

Also, we have established a collaboration with the new research unit at Slagelse Hospital called PROgrez (Patient-Related Objectives: Generating better Rehabilitation, Treatment, Exercise and Diagnostics - Region Zealand) headed by physiotherapists Søren Skou PhD. The cooperation is currently focusing on a joined PhD student (Christian Olesen, PT, MSc supervised by Professor Marius Henriksen) whose PhD studies focus on physiotherapeutic management of acute minor musculoskeletal injuries in the emergency departments. In the future, an exchange program is planned, with researchers and students being exchanged between the institutions.

New studies started

In 2017 we have started 3 new RCTs:

- ✓ The COMPETE study focuses on comparative effectiveness between hip and knee exercises for patellofemoral pain in collaboration with Institute of Sports Medicine.
- ✓ The REPLACE study investigates if regular cardiorespiratory exercise can be a possible replacement of inhaled corticosteroids for asthma patients. The study is done in close partnership with the Respiratory Research Unit headed by Professor Vibeke Backer.
- ✓ Finally, an RCT about load magnitude during exercise therapy for patellar tendonitis has been started. The RCT forms the basis of a PhD study (Anne Sofie Agergaard).

We have also started a controlled cohort study on technology assisted physical activity on the respiratory medicine ward (The TAPAS study). The study is a collaboration between the research unit and a private tech-company who designs and produces activity monitors. The data collection is expected to be finalised by the end of 2017.

Participation in the Clinical Academic Group imPACT

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 Physical activity and sport in clinical medicine (imPACT) and aims to initiate translational research activity to directly couple laboratory and clinical research groups within physical activity. Professor Peter Magnusson is among the 10 co-founders of the CAG and Professor Marius Henriksen is a member of the focus area '*Musculoskeletal function, injury treatment and rehabilitation*'. The CAG was among the first 4 CAGs that were established in 2017, and we are proud to participate.

Other disseminations

In November we held our own symposium; this year with focus on shoulder rehabilitation. The symposium was dedicated sports 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, University of Southern Denmark and Aarhus University. We have taught courses at the school of medicine, health science, and under the auspices of various PhD programmes.

Plans and Goals for 2018

We hope for a further expansion of the unit by 2-3 PhD-students, of which at least 1 will be fully affiliated with the Unit, and 2 will be more loosely affiliated and doing the main part of their theses at other departments and hospitals in Denmark.

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

We seek to engage in several fruitful collaborations in the coming years, of which 2018 will be used to further 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 continue the close collaborations in 2018.

We hope to engage in more partnerships in 2018, local specialty research units at Bispebjerg-Frederiksberg Hospital, and various Departments and Research Groups at the University of Copenhagen and hospitals in Denmark and abroad.

We aim to keep up the pace related to peer reviewed publications. We hope to reach 30 peer reviewed publications in 2018, maintaining the ambition of publishing in journals with an average impact factor of at least 3.00.

Further, we are aiming at a greater 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 perhaps expand with new studies and staff.

Concluding remarks

2017 was a successful year for the Research Unit. We have expanded our staff and increased our scientific output compared to previous years. We are still in the process of internal consolidation, while at the same time 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 2018.

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 continue our joint efforts in the years to come.

We wish our partners and friends a happy 2018!



Marius Henriksen
Professor



Peter Magnusson
Professor

Appendix: List of articles, book chapters and conference abstracts

Peer Reviewed Journal articles (in alphabetical order)

1. Anderson L, Nguyen TT, **Dall CH**, Burgess L, Bridges C, Taylor RS. *Exercise-based cardiac rehabilitation in heart transplant recipients*. Cochrane Database Syst Rev. 2017;4:CD012264.
2. Bandholm T, Christensen R, Thorborg K, Treweek S, **Henriksen M**. *Preparing for what the reporting checklists will not tell you: the PREPARE Trial guide for planning clinical research to avoid research waste*. British journal of sports medicine. 2017;51(20):1494-501.
3. Bandholm T, **Henriksen M**, Thorborg K. *Slow down to strengthen sport and exercise medicine research*. British journal of sports medicine. 2017;51(20):1453.
4. Bartels EM, Henrotin Y, Bliddal H, Centonze P, **Henriksen M**. *Relationship between weight loss in obese knee osteoarthritis patients and serum biomarkers of cartilage breakdown: secondary analyses of a randomised trial*. Osteoarthritis and cartilage. 2017;25(10):1641-6.
5. **Bartholdy C**, Juhl C, Christensen R, Lund H, Zhang W, **Henriksen M**. *The role of muscle strengthening in exercise therapy for knee osteoarthritis: A systematic review and meta-regression analysis of randomized trials*. Seminars in arthritis and rheumatism. 2017;47(1):9-21.
6. Bayer ML, **Magnusson SP**, Kjaer M. *Early versus Delayed Rehabilitation after Acute Muscle Injury*. New England Journal of Medicine. 2017;377(13):1300-1.
7. **Bieler T**, **Magnusson SP**, Christensen HE, Kjaer M, Beyer N. *Muscle power is an important measure to detect deficits in muscle function in hip osteoarthritis: a cross-sectional study*. Disability and rehabilitation. 2017;39(14):1414-21.
8. **Bieler T**, Siersma V, **Magnusson SP**, Kjaer M, Beyer N. *Exercise induced effects on muscle function and range of motion in patients with hip osteoarthritis*. Physiotherapy research international. 2017 [Epub ahead of print].
9. **Bieler T**, Siersma V, **Magnusson SP**, Kjaer M, Christensen HE, Beyer N. *In hip osteoarthritis, Nordic Walking is superior to strength training and home-based exercise for improving function*. Scandinavian journal of medicine & science in sports. 2017;27(8):873-86.
10. Bliddal H, **Henriksen M**. *Osteoarthritis: Time to put steroid injections behind us?* Nature reviews Rheumatology. 2017;13(9):519-20.
11. Boesen M, Ellegaard K, **Henriksen M**, Gudbergson H, Hansen P, Bliddal H, Bartels EM, Riis RG. *Osteoarthritis year in review 2016: imaging*. Osteoarthritis and cartilage. 2017;25(2):216-26.
12. Christensen P, **Henriksen M**, Bartels EM, Leeds AR, Meinert Larsen T, Gudbergson H, Riecke BF, Astrup A, Heitmann BL, Boesen M, Christensen R, Bliddal H. *Long-term weight-loss maintenance in obese patients with knee osteoarthritis: a randomized trial*. The American journal of clinical nutrition. 2017;106(3):755-63.
13. **Coupe C**, Comins J, Beyer N, Hansen SE, Stodolsky DS, Siersma V. *Health-related quality of life in patients with chronic rheumatic disease after a multidisciplinary rehabilitation regimen*. Qual Life Res. 2017;26(2):381-91.
14. **Coupe C**, **Dall CH**, Svensson RB, Olsen RH, Karlsen A, Praet S, Prescott E, **Magnusson SP**. *Skin autofluorescence is associated with arterial stiffness and insulin level in endurance runners and healthy controls - Effects of aging and endurance exercise*. Experimental gerontology. 2017;91:9-14.

15. **Couppe C**, Svensson RB, Heinemeier KM, Thomsen EW, Bayer ML, Christensen L, Kjaer M, **Magnusson SP**, Schjerling P. *Quantification of cell density in rat Achilles tendon: development and application of a new method*. Histochemistry and cell biology. 2017;147(1):97-102.
16. Dideriksen K, Boesen AP, Reitelseder S, **Couppe C**, Svensson R, Schjerling P, **Magnusson SP**, Holm L, Kjaer M. *Tendon collagen synthesis declines with immobilization in elderly humans: no effect of anti-inflammatory medication*. Journal of applied physiology (Bethesda, Md : 1985). 2017;122(2):273-82.
17. **Ghaziani E**, **Couppe C**, Henkel C, Siersma V, Sondergaard M, Christensen H, **Magnusson SP**. *Electrical somatosensory stimulation followed by motor training of the paretic upper limb in acute stroke: study protocol for a randomized controlled trial*. Trials. 2017;18(1):84.
18. Hansen H, **Bieler T**, Beyer N, Godtfredsen N, Kallemose T, Frølich A. *COPD online-rehabilitation versus conventional COPD rehabilitation - rationale and design for a multicenter randomized controlled trial study protocol (COPRe trial)*. BMC Pulm Med. 2017 Nov 16;17(1):140.
19. 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 in pediatrics. 2017:1-14.
20. **Henriksen M**, Klokke L, **Bartholdy C**, Schjoedt-Jorgensen T, Bandak E, Bliddal H. *No effects of functional exercise therapy on walking biomechanics in patients with knee osteoarthritis: exploratory outcome analyses from a randomised trial*. BMJ open sport & exercise medicine. 2016;2(1):e000230.
21. **Henriksen M**, Skou ST. [Bandages for knee problems]. Ugeskrift for læger. 2017;179(38).
22. **Hougs Kjaer B**, Ellegaard K, Wieland IP, **Warming S**, Juul-Kristensen B. *Intra-rater and inter-rater reliability of the standardized ultrasound protocol for assessing subacromial structures*. Physiother Theory Pract. 2017;33(5):398-409.
23. Mikkelsen UR, Agergaard J, **Couppe C**, Grosset JF, Karlsen A, **Magnusson SP**, Schjerling P, Kjaer M, Mackey AL. *Skeletal muscle morphology and regulatory signalling in endurance-trained and sedentary individuals: The influence of ageing*. Experimental gerontology. 2017;93:54-67.
24. Møller KL, Brauer C, Mikkelsen S, Loft S, Simonsen EB, Koblauch H, Bern SH, **Alkjaer T**, Hertel O, Becker T, Larsen KH, Bonde JP, Thygesen LC. *Copenhagen Airport Cohort: air pollution, manual baggage handling and health*. BMJ open. 2017;7(5):e012651.
25. Møller 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. 2017:1-12.
26. Nielsen SM, Bartels EM, **Henriksen M**, Waehrens EE, Gudbergson H, Bliddal H, Astrup A, Knop FK, Carmona L, Taylor WJ, Singh JA, Perez-Ruiz F, Kristensen LE, Christensen R. *Weight loss for overweight and obese individuals with gout: a systematic review of longitudinal studies*. Annals of the rheumatic diseases. 2017;76(11):1870-82.
27. Nielsen SM, Tarp S, Christensen R, Bliddal H, Klokke L, **Henriksen M**. *The risk associated with spinal manipulation: an overview of reviews*. Systematic reviews. 2017;6(1):64.
28. Ojanen X, Tanska P, Malo MKH, Isaksson H, Vaananen SP, Koistinen AP, Grassi L, **Magnusson SP**, Ribel-Madsen SM, Korhonen RK, Jurvelin JS, Toyras J. *Tissue viscoelasticity is related to tissue composition but may not fully predict the apparent-level viscoelasticity in human trabecular bone - An experimental and finite element study*. Journal of biomechanics. 2017.

29. Pingel J, Nielsen MS, Lauridsen T, Rix K, Bech M, **Alkjaer T**, Andersen IT, Nielsen JB, Feidenhansl R. *Injection of high dose botulinum-toxin A leads to impaired skeletal muscle function and damage of the fibrillar and non-fibrillar structures*. Scientific reports. 2017;7(1).
30. Potter RM, Huynh RT, Volper BD, Arthur KA, D'Lugos AC, Sorensen MA, **Magnusson SP**, Dickinson JM, Hale TM, Carroll CC. *Impact of TGF-beta inhibition during acute exercise on Achilles tendon extracellular matrix*. American journal of physiology Regulatory, integrative and comparative physiology. 2017;312(1):R157-r64.
31. Raffalt PC, Guul MK, Nielsen AN, Puthusserypady S, **Alkjær T**. *Economy, Movement Dynamics, and Muscle Activity of Human Walking at Different Speeds*. Scientific reports. 2017;7:43986.
32. Riis RG, Gudbergesen H, Simonsen O, **Henriksen M**, Al-Mashkur N, Eld M, Petersen KK, Kubassova O, Bay Jensen AC, Damm J, Bliddal H, Arendt-Nielsen L, Boesen M. *The association between histological, macroscopic and magnetic resonance imaging assessed synovitis in end-stage knee osteoarthritis: a cross-sectional study*. Osteoarthritis and cartilage. 2017;25(2):272-80.
33. Riis RGC, **Henriksen M**, Klokke L, **Bartholdy C**, Ellegaard K, Bandak E, Hansen BB, Bliddal H, Boesen M. *The effects of intra-articular glucocorticoids and exercise on pain and synovitis assessed on static and dynamic magnetic resonance imaging in knee osteoarthritis: exploratory outcomes from a randomized controlled trial*. Osteoarthritis and cartilage. 2017;25(4):481-91.
34. Rudavsky A, Cook J, **Magnusson SP**, Kjaer M, Docking S: *Characterizing the proximal patellar tendon attachment and its relationship to skeletal maturity in adolescent jumping athletes*. Muscles, Ligaments and Tendons Journal, 18;7(2):306-314 2017.
35. Skovgaard D, Svensson RB, Scheijen J, Eliasson P, Mogensen P, Hag AM, Kjaer M, Schalkwijk CG, Schjerling P, **Magnusson SP**, **Coupe C**. *An advanced glycation endproduct (AGE)-rich diet promotes accumulation of AGEs in Achilles tendon*. Physiological reports. 2017;5(6).
36. Svensson RB, Herchenhan A, Starborg T, Larsen M, Kadler KE, Qvortrup K, **Magnusson SP**. *Evidence of structurally continuous collagen fibrils in tendons*. Acta biomaterialia. 2017;50:293-301.