

SORC-C

Sports Orthopedic Research Center - Copenhagen



Annual report 2021

Part of



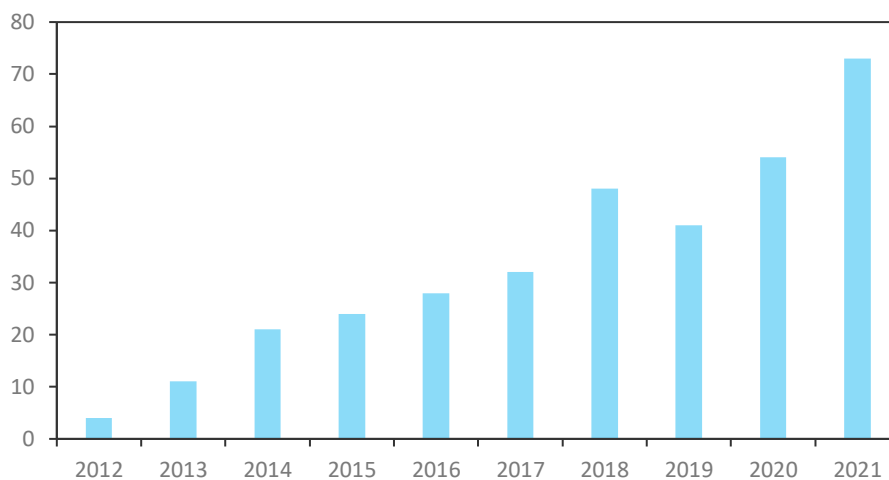
Indholdsfortegnelse

Sports Orthopedic Research Center - Copenhagen	3
Main activity and achievements in 2021	4
Publications, Prizes & Invited presentations	7
Publications	8
<i>Peer-reviewed papers</i>	<i>8</i>
<i>Books and book chapters</i>	<i>16</i>
<i>Clinical guidelines and protocols.....</i>	<i>17</i>
Prizes	18
Invited presentations	19
<i>Scientific congress presentations.....</i>	<i>19</i>
<i>Podcasts / videocasts.....</i>	<i>21</i>
Academic, Editorial & Board work.....	22
Academic supervision, teaching and assessment	23
<i>Defended theses.....</i>	<i>23</i>
Ph.D. theses.....	23
MSc. theses	23
B.Sc. theses.....	24
<i>Course activities</i>	<i>25</i>
<i>Academic assessment</i>	<i>25</i>
Editorial work	26
<i>Editorial boards.....</i>	<i>26</i>
<i>Editor – Special Journal Issues</i>	<i>26</i>
<i>Reviewer work.....</i>	<i>27</i>
<i>Scientific congress moderator work.....</i>	<i>28</i>
Board and committee work	29
<i>Board leadership roles</i>	<i>29</i>
<i>Advisory boards & committees</i>	<i>29</i>
<i>Congress boards & committees</i>	<i>31</i>
<i>Funding committees.....</i>	<i>31</i>
Research Grants	32

Sports Orthopedic Research Center - Copenhagen

Sports Orthopedic Research Center – Copenhagen (SORC-C) is a multidisciplinary research unit at the Department of Orthopedic Surgery at University hospital – Amager and Hvidovre. The research unit was initiated by Professor Per Hölmich in 2005 at Amager Hospital, creating the foundation for SORC-C that was established together with Professor Kristian Thorborg in 2012. The main focus of SORC-C is centered around prevention and treatment of musculoskeletal problems, and SORC-C is involved in research, education and organizational work at both national and international levels to promote and deliver safe and healthy sport, exercise and physical activity participation for all.

SORC-C Publications



The research center focuses on treatment, prevention, and rehabilitation of musculoskeletal problems, with a special focus on optimizing arthroscopic surgery and post-operative rehabilitation, in order to develop models for “the right treatment for the right patient” and to enhance recovery of patients with musculoskeletal pain and injury. SORC-C includes both clinically based part-time researchers as well as full-time researchers within the orthopedic department. SORC-C is part of two clinical academic groups (CAGs) in the research collaboration Copenhagen Health Science Partners at the Capital Region of Denmark and the University of Copenhagen: CAG ROAD (Osteoarthritis) and CAG imPAct (Sports and Physical Activity).

The research unit consists of two clinical professors from the Institute of Clinical Medicine at University of Copenhagen, Per Hölmich and Kristian Thorborg, who are both world renowned experts and specialists within sports orthopedics including surgery, prevention, and treatment. Together with three senior researchers, the two Professors constitute the more experienced part of the research center and this group have the main supervision responsibilities across specialist and academic levels. Currently, SORC-C includes medical doctors, physiotherapists, and sports scientists. SORC-C is part of the Copenhagen - International Olympic Committee (IOC) - Research Centre in Injury and Illness Prevention, a collaboration between SORC-C, and Institute for Sports Medicine Copenhagen.

Main activity and achievements in 2021

In 2021 researchers from SORC-C published 73 peer-reviewed papers, of which 9 are published in journals with an impact factor above 13. SORC-C attracted more than 5.800.000 DKK (792.000 EUR) in funding during 2021.

Focus areas for our research have been tendon and muscle related problems, shoulder problems including impingement and instability, hip and groin problems including FAIS, knee problems including meniscus injuries, ACL injuries and OA, and Achilles tendon injuries.

“Tendinopathy” was a review published in Nature by Millar NL et al including Kristian Thorborg from SORC-C. In collaboration with IOC Research Center Aspetar in Qatar a number of publications on incidence and burden of injuries in a youth athlete. In line with that we have just initiated a large randomised controlled trial on treatment of young athletes with Osgood Schlatter. We are one of the leading research centers for Achilles tendon injuries and several publications including a study of overuse injuries at the Royal Ballet in Copenhagen has been published. Furthermore, our paper “Effectiveness of Adding a Large Dose of Shoulder Strengthening to Current Non-operative Care for Subacromial Impingement: A Pragmatic, Double-Blind Randomized Controlled Trial” (SExSI Trial, by Clausen MB et al published in American Journal of Sports Medicine), was the most read study in this journal from June throughout the year (2021).

The ACL injuries are a major problem in many sports and a focus area for SORC-C. We are currently doing large studies on epidemiology, prevention, etiology, and choice of graft for ACL-reconstruction. Recently we published a large registry study including 475 patients on quadriceps tendon versus hamstring tendon Autografts in the American Journal of Sports Medicine.

Collaboration with the IOC Center in Oslo, Norway and Santry Sport Surgery Clinic in Dublin, Ireland has been ongoing, and validation work on HAGOS using Rasch analysis in more than 450 athletes was published. Additionally, we have research collaboration ongoing about proximal hamstring avulsions between the IOC Centers from Amsterdam, Holland, Aspetar, Qatar, London, UK, and Copenhagen. Also, a large focus on hip arthroscopy including collaborators from Duke University, USA and La Trobe University, Australia has been ongoing, and results on patient acceptable symptoms states (PASS) using HAGOS after hip arthroscopy was published.

In 2021 people from SORC-C have been giving international presentations online in United Kingdom, Sweden, Egypt, Switzerland, and Australia. Furthermore, SORC-C have been represented in national and international sports medicine and physical therapy associations including three Presidential roles: 1) the Danish Society of Arthroscopic Surgery and Sports Traumatology 2) Danish Society of Sports Medicine and 3) International Federation of Sports Physical Therapy. Furthermore, several members of SORC-C had board roles in national and international elite sport organizations.

People

SORC-C consists of two professors, one associate research lead, two senior researchers, one postdoctoral researcher and three research coordinators, one scientific assistant, eight Ph.D. students and nine pre-Ph.D. students. Four M.Sc. students and twelve B.Sc. students were also affiliated with SORC-C in 2021. The people of SORC-C are listed below, and detailed profiles of SORC-C researchers can be found at:

<https://www.hvidovrehospital.dk/sorc-c/staff/Pages/default.aspx>

Head of research

Per Hölmich

Professor, DMSc., Medical Doctor

Research lead

Kristian Thorborg

Professor, Ph.D., Physiotherapist

Associate research lead

Kristoffer Weisskirchner Barfod

Ass. Professor, Ph.D., Medical Doctor

Senior researchers

Otto Kraemer

Medical Doctor

Anders Ploug Boesen

Ph.D., Medical Doctor

Postdoctoral researcher

Jasmin Bagge

Ph.D., Ph.D., DVM

Senior clinical coordinator

Kasper Krommes

MSc., Physiotherapist

Clinical research coordinators

Mathias Fabricius Nielsen

MSc., Physiotherapist

Laura Mønsted Krohn

MSc., Physiotherapist

Scientific assistant

Christina Ramos Stavngaard

Physiotherapist, Clinical specialist

Doctor of Philosophy (Ph.D.) students (enrolled)

Adam Witten

Medical Doctor

Allan Cramer

Medical student

Catarina Malmberg

Medical Doctor

Kristine Bramsen Haugaard

Medical Doctor

Louise Hindsø
Medical Doctor

Lasse Ishøi
*MSc. Sports and exercise science,
Physiotherapist*

Maria Swennergren Hansen
MSc., Physiotherapist

Kasper Krommes
MSc., Physiotherapist

Doctor of Philosophy (Ph.D.) students (preparing)

Cecilie Køllner Olsen
Medical Doctor

Christian Asmus Peter Asmussen
Medical Doctor

Niclas Eusturoy
Medical Doctor

Mathias Fabricius Nielsen
MSc., Physiotherapist

Sally Oppendieck Andersen
MSc. Human Physiology

Charlotte Anker-Petersen
MSc., Physiotherapist

Kristine Rask Andreasen
Medical Doctor

Niels Christian Kaldau
Medical Doctor

Merete Brink Speedtsberg
MSc. Sports and exercise science

Master of Science (M.Sc.) students

Ebrahim Rahdi
Medical student

Thomas W. Mayntzhusen
Medical student

Lasse Christensen
Physiotherapist

Ibrahim El Haddouchi
Medical student

Bachelor of Science (B.Sc.) students

Agnes Ingemann Stonor Gregersen
Physiotherapy student

Cecilie Jadach Petersen
Physiotherapy student

Christina Kjærgaard Madsen
Physiotherapy student

Hjalte Holm Nørremark
Physiotherapy student

Nickoline Stifter Andersen
Physiotherapy student

Gudrun Jóannesardóttir Henriksen
Medical student

Amalie Bjerre Jørgensen
Physiotherapy student

Caroline Kirk Schad
Physiotherapy student

Frederikke Villumsen
Physiotherapy student

Line Nordlund Holm
Physiotherapy student

Oliver Rokkjær Olsen
Physiotherapy student

Christian Cuadros Ellitsgaard
Medical student

SORC-C



Sports Orthopedic Research Center - Copenhagen

**Publications, Prizes &
Invited presentations**

Publications

In 2021 researchers from SORC-C published 73 peer-reviewed papers, 1 book chapter. All peer-reviewed papers, books and book chapters are listed below.

Peer-reviewed papers

1. Lysdal FG, Bandholm T, Tolstrup JS, Clausen MB, Mann S, Petersen PB, Grønlykke TB, Kersting UG, Delahunt E, **Thorborg K**. Does the Spraino low-friction shoe patch prevent lateral ankle sprain injury in indoor sports? A pilot randomised controlled trial with 510 participants with previous ankle injuries. *Br J Sports Med*. 2021 Jan;55(2):92-98. doi: 10.1136/bjsports-2019-101767. Epub 2020 Aug 12. PMID: 32796016; PMCID: PMC7788191.
2. Reiman MP, Agricola R, Kemp JL, Heerey JJ, Weir A, van Klij P, Kassarian A, Mosler AB, Ageberg E, **Hölmich P**, Warholm KM, Griffin D, Mayes S, Khan KM, Crossley KM, Bizzini M, Bloom N, Casartelli NC, Diamond LE, Di Stasi S, Drew M, Friedman DJ, Freke M, Glyn-Jones S, Gojanovic B, Harris-Hayes M, Hunt MA, Impellizzeri FM, **Ishøi L**, Jones DM, King MG, Lawrenson PR, Leunig M, Lewis CL, Mathieu N, Moksnes H, Risberg MA, Scholes MJ, Semciw AI, Serner A, **Thorborg K**, Virgile A, Wörner T, Dijkstra HP. Infographic. Consensus recommendations on the classification, definition and diagnostic criteria of hip-related pain in young and middle-aged active adults from the International Hip-related Pain Research Network, Zurich 2018. *Br J Sports Med*. 2021 Jan;55(2):115-117. doi: 10.1136/bjsports-2020-102219. Epub 2020 Aug 31. PMID: 32868314; PMCID:PMC7788225.
3. Serner A, Arnaiz J, Mosler A, Almusa E, Vuckovic Z, Tak I, Maas M, Weir A, **Hölmich P**. Classifying radiographic changes of the pubic symphysis in male athletes: Development and reproducibility of a new scoring protocol. *Eur J Radiol*. 2021 Jan;134:109452. doi: 10.1016/j.ejrad.2020.109452. Epub 2020 Nov 28. PMID: 33310551.
4. Hansen MI, Staghøj J, Khan N, Blønd L, **Barfod KW**. High tibial osteotomy performed with PEEK implant demonstrated a failure rate of 28. *J ISAKOS*. 2021 Jan;6(1):8-13. doi: 10.1136/jisakos-2019-000394. Epub 2020 Nov 3. PMID: 33833040.
5. Millar NL, Silbernagel KG, **Thorborg K**, Kirwan PD, Galatz LM, Abrams GD, Murrell GAC, McInnes IB, Rodeo SA. Tendinopathy. *Nat Rev Dis Primers*. 2021 Jan 7;7(1):1. doi: 10.1038/s41572-020-00234-1. Erratum in: *Nat Rev Dis Primers*. 2021 Feb 3;7(1):10. PMID: 33414454.
6. Puggaard RS, Ingelsrud LH, Jacobsen S, Kjellberg J, Bandholm T, **Hölmich P**, Boesen M, Bliddal H, Skou ST, Schrøder HM, Larsen SW, Møller A, Ziegler C, Troelsen A. Establishing research priorities related to osteoarthritis care via stakeholder input from patients. *Dan Med J*. 2021 Jan 26;68(2):A09200683. PMID: 33543702.
7. Millar NL, Silbernagel KG, **Thorborg K**, Kirwan PD, Galatz LM, Abrams GD, Murrell GAC, McInnes IB, Rodeo SA. Author Correction: Tendinopathy. *Nat Rev Dis Primers*. 2021 Feb

3;7(1):10. doi: 10.1038/s41572-021-00251-8. Erratum for: Nat Rev Dis Primers. 2021 Jan 7;7(1):1. PMID: 33536420.

8. Mark-Christensen T, **Thorborg K**, Kallemose T, Bandholm T. Physical rehabilitation versus no physical rehabilitation after total hip and knee arthroplasties: Protocol for a pragmatic, randomized, controlled, superiority trial (The DRAW1 trial). *F1000Res*. 2021 Feb 25;10:146. doi: 10.12688/f1000research.50814.2. PMID: 34316356; PMCID: PMC8276181.
9. Serner A, **Hölmich P**, Tol JL, **Thorborg K**, Lanzinger S, Otten R, Whiteley R, Weir A. Progression of Strength, Flexibility, and Palpation Pain During Rehabilitation of Athletes With Acute Adductor Injuries: A Prospective Cohort Study. *J Orthop Sports Phys Ther*. 2021 Mar;51(3):126-134. doi: 10.2519/jospt.2021.9951. Epub 2020 Oct 28. PMID: 33115342.
10. **Ishøi L**, **Nielsen MF**, **Hölmich P**, **Thorborg K**. Now you see it - Now you don't: A letter to the editor concerning "Surgery is no more effective than conservative treatment for femoroacetabular impingement syndrome: Systematic review and meta-analysis of randomized controlled trials". *Clin Rehabil*. 2021 Mar;35(3):464-466. doi: 10.1177/0269215520981695. Epub 2020 Dec 21. PMID: 33342271.
11. Paiva M, Blønd L, **Hölmich P**, **Barfod KW**. Effect of Medialization of the Trochlear Groove and Lateralization of the Tibial Tubercle on TT-TG Distance: A Cross-sectional Study of Dysplastic and Nondysplastic Knees. *Am J Sports Med*. 2021 Mar;49(4):970-974. doi: 10.1177/0363546520987819. Epub 2021 Feb 17. PMID: 33595335.
12. Gadeberg MN, **Cramer A**, **Hölmich P**, **Barfod KW**. Validity of sports-related diagnosis codes in the Danish National Patient Register. *Dan Med J*. 2021 Mar 1;68(3):A08200580. PMID: 33660608.
13. Esteve E, Casals M, Saez M, Rathleff MS, Clausen MB, Vicens-Bordas J, **Hölmich P**, Pizzari T, **Thorborg K**. Past-season, pre-season and in-season risk assessment of groin problems in male football players: a prospective full-season study. *Br J Sports Med*. 2021 Mar 10:bjsports-2020-102606. doi: 10.1136/bjsports-2020-102606. Epub ahead of print. PMID: 33692032.
14. Materne O, Chamari K, Farooq A, Weir A, **Hölmich P**, Bahr R, Greig M, McNaughton LR. Association of Skeletal Maturity and Injury Risk in Elite Youth Soccer Players: A 4-Season Prospective Study With Survival Analysis. *Orthop J Sports Med*. 2021 Mar 31;9(3):2325967121999113. doi: 10.1177/2325967121999113. PMID: 33869641; PMCID: PMC8020116.
15. Clausen MB, Merrild MB, Holm K, Pedersen MW, Andersen LL, Zebis MK, Jakobsen TL, **Thorborg K**. Less than half of patients in secondary care adheres to clinical guidelines for subacromial pain syndrome and have acceptable symptoms after treatment: A Danish nationwide cohort study of 3306 patients. *Musculoskelet Sci Pract*. 2021 Apr;52:102322. doi: 10.1016/j.msksp.2021.102322. Epub 2021 Jan 12. PMID: 33485212.

16. Ban I, Kristensen MT, **Barfod KW**, Eschen J, Kallemose T, Troelsen A. Neither operative nor nonoperative approach is superior for treating displaced midshaft clavicle fractures: a partially blinded randomized controlled clinical trial. *Bone Joint J.* 2021 Apr;103-B(4):762-768. doi: 10.1302/0301-620X.103B4.BJJ-2020-1636.R1. PMID: 33789482.
17. DeLang MD, Garrison JC, **Thorborg K**. Screening to Detect Hip and Groin Problems in Elite Adolescent Football (Soccer) Players - Friend or Foe? *Int J Sports Phys Ther.* 2021 Apr 2;16(2):591-593. doi: 10.26603/001c.21525. PMID: 33842054; PMCID: PMC8016431.
18. **Ishøi L, Thorborg K, Ørum MG, Kemp JL, Reiman MP, Hölmich P**. How Many Patients Achieve an Acceptable Symptom State After Hip Arthroscopy for Femoroacetabular Impingement Syndrome? A Cross-sectional Study Including PASS Cutoff Values for the HAGOS and iHOT-33. *Orthop J Sports Med.* 2021 Apr 9;9(4):2325967121995267. doi: 10.1177/2325967121995267. PMID: 33889644; PMCID: PMC8040572.
19. **Ishøi L, Krommes K, Nielsen MF, Thornton KB, Hölmich P, Aagaard P, Penalver JJJ, Thorborg K**. Hamstring and Quadriceps Muscle Strength in Youth to Senior Elite Soccer: A Cross-Sectional Study Including 125 Players. *Int J Sports Physiol Perform.* 2021 Apr 22:1-7. doi: 10.1123/ijssp.2020-0713. Epub ahead of print. PMID: 33887700.
20. Liaghat B, Ussing A, Petersen BH, Andersen HK, **Barfod KW**, Jensen MB, Hoegh M, Tarp S, Juul-Kristensen B, Brorson S. Supervised Training Compared With No Training or Self-training in Patients With Subacromial Pain Syndrome: A Systematic Review and Meta-analysis. *Arch Phys Med Rehabil.* 2021 Apr 28:S0003-9993(21)00318-X. doi: 10.1016/j.apmr.2021.03.027. Epub ahead of print. PMID: 33930326.
21. Wörner T, **Thorborg K**, Webster KE, Stålman A, Eek F. Psychological readiness is related to return to sport following hip arthroscopy and can be assessed by the Hip-Return to Sport after Injury scale (Hip-RSI). *Knee Surg Sports Traumatol Arthrosc.* 2021 May;29(5):1353-1361. doi: 10.1007/s00167-020-06157-4. Epub 2020 Jul 22. PMID: 32699920; PMCID: PMC8038984.
22. Lysdal FG, Bandholm T, Tolstrup JS, Clausen MB, Mann S, Petersen PB, Grønlykke TB, Kersting UG, Delahunt E, Virgile A, **Thorborg K**. Infographic. Does the Spraino low-friction shoe patch prevent lateral ankle sprain injury in indoor sports? A 510-participant pilot RCT. *Br J Sports Med.* 2021 May;55(9):510-511. doi: 10.1136/bjsports-2020-103342. Epub 2020 Oct 14. PMID: 33055132.
23. Materne O, Chamari K, Farooq A, Weir A, **Hölmich P**, Bahr R, Greig M, McNaughton LR. Injury incidence and burden in a youth elite football academy: a four-season prospective study of 551 players aged from under 9 to under 19 years. *Br J Sports Med.* 2021 May;55(9):493-500. doi: 10.1136/bjsports-2020-102859. Epub 2020 Nov 16. PMID: 33199359.
24. **Cramer A, Jacobsen NC, Hansen MS, Sandholdt H, Hölmich P, Barfod KW**. Diabetes and treatment with orally administered corticosteroids negatively affect treatment outcome at

follow-up after acute Achilles tendon rupture. *Knee Surg Sports Traumatol Arthrosc.* 2021 May;29(5):1584-1592. doi: 10.1007/s00167-020-06371-0. Epub 2020 Nov 19. PMID: 33211215.

25. Andreasen KR, **Hansen MS**, Bencke J, **Hölmich P**, **Barfod KW**. The heel-rise work test overestimates the performed work with 21-25% after an Achilles tendon rupture. *Knee Surg Sports Traumatol Arthrosc.* 2021 May;29(5):1604-1611. doi: 10.1007/s00167-020-06369-8. Epub 2020 Nov 24. PMID: 33236164.
26. Serner A, **Hölmich P**, Tol JL, **Thorborg K**, Yamashiro E, Weir A. Associations between clinical findings and MRI injury extent in male athletes with acute adductor injuries - A cross-sectional study. *J Sci Med Sport.* 2021 May;24(5):454-462. doi: 10.1016/j.jsams.2020.11.003. Epub 2020 Nov 16. PMID: 33334688.
27. **Cramer A**, Rahdi E, **Hansen MS**, Sandholdt H, **Hölmich P**, **Barfod KW**. No clinically relevant difference between operative and non-operative treatment in tendon elongation measured with the Achilles tendon resting angle (ATRA) 1 year after acute Achilles tendon rupture. *Knee Surg Sports Traumatol Arthrosc.* 2021 May;29(5):1617-1626. doi: 10.1007/s00167-020-06391-w. Epub 2021 Jan 2. PMID: 33386883.
28. Wörner T, **Thorborg K**, Webster KE, Stålmán A, Eek F. Return to sport after hip arthroscopy: are you ready? *Knee Surg Sports Traumatol Arthrosc.* 2021 May;29(5):1349-1352. doi: 10.1007/s00167-021-06533-8. Epub 2021 Mar 31. PMID: 33786640.
29. Zebis MK, Aagaard P, Andersen LL, **Hölmich P**, Clausen MB, Brandt M, Husted RS, Lauridsen HB, Curtis DJ, Bencke J. First-time anterior cruciate ligament injury in adolescent female elite athletes: a prospective cohort study to identify modifiable risk factors. *Knee Surg Sports Traumatol Arthrosc.* 2021 May 7. doi: 10.1007/s00167-021-06595-8. Epub ahead of print. PMID: 33961066.
30. Wörner T, **Thorborg K**, Clarsen B, Eek F. Incidence, prevalence, severity, and risk factors for hip and groin problems in Swedish male ice hockey - A one- season prospective cohort study. *J Athl Train.* 2021 May 26. doi: 10.4085/1062-6050-0522.20. Epub ahead of print. PMID: 34038950.
31. Clausen MB, **Nielsen MF**, Merrild MB, **Hölmich P**, **Thorborg K**. High incidence of lost workdays in patients with subacromial impingement syndrome. *Dan Med J.* 2021 May 28;68(6):A07200496. PMID: 34060461.
32. Jacobsen JS, Jakobsen SS, Søballe K, **Hölmich P**, **Thorborg K**. Isometric hip strength impairments in patients with hip dysplasia are improved but not normalized 1 year after periacetabular osteotomy: a cohort study of 82 patients. *Acta Orthop.* 2021 Jun;92(3):285-291. doi: 10.1080/17453674.2020.1864911. Epub 2021 Feb 4. Erratum in: *Acta Orthop.* 2021 Dec;92(6):765. PMID: 33538223; PMCID: PMC8231359.

33. Light N, Johnson A, Williams S, Smith N, Hale B, **Thorborg K**. Injuries in youth football and the relationship to player maturation: An analysis of time- loss injuries during four seasons in an English elite male football academy. *Scand J Med Sci Sports*. 2021 Jun;31(6):1324-1334. doi: 10.1111/sms.13933. Epub 2021 Mar 5. PMID: 33560529.
34. **Thorborg K**. To Reconstruct the Anterior Cruciate Ligament or Not? - Put into Panther Perspective. *Int J Sports Phys Ther*. 2021 Jun 1;16(3):24097. doi: 10.26603/001c.24097. PMID: 34123547; PMCID: PMC8168982.
35. Schmäcker M, Haraszuk J, **Hölmich P**, **Barfod KW**. Graft Failure, Revision ACLR, and Reoperation Rates After ACLR With Quadriceps Tendon Versus Hamstring Tendon Autografts: A Registry Study With Review of 475 Patients. *Am J Sports Med*. 2021 Jul;49(8):2136-2143. doi: 10.1177/03635465211015172. Epub 2021 Jun 8. PMID: 34102074.
36. Bertiche P, Mohtadi N, Chan D, **Hölmich P**. Proximal hamstring tendon avulsion: state of the art. *J ISAKOS*. 2021 Jul;6(4):237-246. doi: 10.1136/jisakos-2019-000420. Epub 2020 Nov 20. PMID: 34272300.
37. Heijboer WMP, Weir A, Delahunt E, **Hölmich P**, Schache AG, Tol JL, de Vos RJ, Vuckovic Z, Serner A. A Delphi survey and international e-survey evaluating the Doha agreement meeting classification system in groin pain: Where are we 5 years later? *J Sci Med Sport*. 2021 Jul 6:S1440-2440(21)00176-6. doi: 10.1016/j.jsams.2021.06.014. Epub ahead of print. PMID: 34312067.
38. **Hansen MS**, Kristensen MT, **Hölmich P**, **Barfod KW**. The Achilles Tendon Length Measure and the Achilles Tendon Resting Angle show acceptable construct validity using the Copenhagen Achilles Length Measure as gold standard. *Foot Ankle Surg*. 2021 Aug;27(6):655-659. doi: 10.1016/j.fas.2020.08.004. Epub 2020 Aug 25. PMID: 32873503.
39. **Krommes K**, Jakobsen MD, Bandholm T, Andersen LL, Zebis M, Shield A, **Hölmich P**, **Thorborg K**. Cross-sectional Study of EMG and EMG Rise During Fast and Slow Hamstring Exercises. *Int J Sports Phys Ther*. 2021 Aug 1;16(4):1033-1042. doi: 10.26603/001c.25364. PMID: 34386282; PMCID: PMC8329323
40. Holden S, Olesen JL, Winiarski LM, **Krommes K**, **Thorborg K**, **Hölmich P**, Rathleff MS. Is the Prognosis of Osgood-Schlatter Poorer Than Anticipated? A Prospective Cohort Study With 24-Month Follow-up. *Orthop J Sports Med*. 2021 Aug 19;9(8):23259671211022239. doi: 10.1177/23259671211022239. PMID: 34435066; PMCID: PMC8381442.
41. Esteve E, Rathleff MS, **Hölmich P**, Casals M, Clausen MB, Vicens-Bordas J, Pizzari T, **Thorborg K**. Groin problems from pre- to in-season: a prospective study on 386 male Spanish footballers. *Res Sports Med*. 2021 Sep- Oct;29(5):498-504. doi: 10.1080/15438627.2020.1860044. Epub 2020 Dec 14. PMID: 33317337.
42. Korakakis V, Whiteley R, Kotsifaki A, Stefanakis M, Sotiralis Y, **Thorborg K**. A systematic review evaluating the clinimetric properties of the Victorian Institute of Sport Assessment

(VISA) questionnaires for lower limb tendinopathy shows moderate to high-quality evidence for sufficient reliability, validity and responsiveness-part II. *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep;29(9):2765-2788. doi: 10.1007/s00167-021-06557-0. Epub 2021 Apr 16. PMID: 33860806; PMCID: PMC8384816.

43. Korakakis V, Whiteley R, Kotsifaki A, **Thorborg K**. Tendinopathy VISAs have expired-is it time for outcome renewals? *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep;29(9):2745-2748. doi: 10.1007/s00167-021-06596-7. Epub 2021 May 10. Erratum in: *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep 24;: PMID: 33970294; PMCID: PMC8384781.
44. Korakakis V, Kotsifaki A, Stefanakis M, Sotiralis Y, Whiteley R, **Thorborg K**. Evaluating lower limb tendinopathy with Victorian Institute of Sport Assessment (VISA) questionnaires: a systematic review shows very-low-quality evidence for their content and structural validity-part I. *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep;29(9):2749-2764. doi: 10.1007/s00167-021-06598-5. Epub 2021 May 21. PMID: 34019117; PMCID: PMC8384789.
45. Clausen MB, **Hölmich P**, Rathleff M, Bandholm T, Christensen KB, Zebis MK, **Thorborg K**. Effectiveness of Adding a Large Dose of Shoulder Strengthening to Current Nonoperative Care for Subacromial Impingement: A Pragmatic, Double-Blind Randomized Controlled Trial (SExSI Trial). *Am J Sports Med.* 2021 Sep;49(11):3040-3049. doi: 10.1177/03635465211016008. Epub 2021 May 28. PMID: 34048281; PMCID: PMC8411479.
46. Speedtsberg MB, Zebis MK, Lauridsen HB, Magnussen E, **Hölmich P**. Anatomical retraction of the semitendinosus muscle following harvest of the distal semitendinosus tendon for ACL reconstruction. *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep 1. doi: 10.1007/s00167-021-06718-1. Epub ahead of print. PMID: 34471958.
47. Materne O, Chamari K, Farooq A, Tabben M, Weir A, **Hölmich P**, Bahr R, Greig M, McNaughton LR. Shedding light on incidence and burden of physeal injuries in a youth elite football academy: A 4-season prospective study. *Scand J Med Sci Sports.* 2021 Sep 22. doi: 10.1111/sms.14059. Epub ahead of print. PMID: 34551163.
48. Korakakis V, Whiteley R, Kotsifaki A, **Thorborg K**. Correction to: Tendinopathy VISAs have expired-is it time for outcome renewals? *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep 24. doi: 10.1007/s00167-021-06727-0. Epub ahead of print. Erratum for: *Knee Surg Sports Traumatol Arthrosc.* 2021 Sep;29(9):2745-2748. PMID: 34557950.
49. Carmont MR, Brorsson A, **Barfod KW**, Ginder L, Littlehales J, Karlsson J, Nilsson-Helander K. The reliability, reproducibility and utilization of the radiographic Achilles Tendon Loading Angle in the management of Achilles Tendon rupture. *Foot Ankle Surg.* 2021 Oct;27(7):760-766. doi: 10.1016/j.fas.2020.09.013. Epub 2020 Oct 3. PMID: 33059973.
50. Kaldau NC, Kerr S, McCaig S, **Hölmich P**. Training and injuries among world elite junior badminton players - Identifying the problems. *Asia Pac J Sports Med Arthrosc Rehabil Technol.* 2021 Aug 14;26:21-26. doi: 10.1016/j.asmart.2021.07.003. PMID: 34458102; PMCID: PMC8367832.

51. **Thorborg K**, Mendonça L. Sports Physiotherapy for All. *Int J Sports Phys Ther*. 2021 Oct 1;16(5):1178-1180. doi: 10.26603/001c.28268. PMID: 34631240; PMCID: PMC8486411.
52. **Cramer A**, Ingelsrud LH, **Hansen MS**, **Hölmich P**, **Barfod KW**. Estimation of Patient Acceptable Symptom State (PASS) and Treatment Failure (TF) Threshold Values for the Achilles Tendon Total Rupture Score (ATRS) at 6 Months, 1 Year, and 2 Years After Acute Achilles Tendon Rupture. *J Foot Ankle Surg*. 2021 Oct 6:S1067-2516(21)00381-1. doi: 10.1053/j.jfas.2021.09.026. Epub ahead of print. PMID: 34776330.
53. Mikkelsen RK, Blønd L, Hölmich LR, Mølgaard C, Troelsen A, **Hölmich P**, **Barfod KW**. Treatment of osteoarthritis with autologous, micro-fragmented adipose tissue: a study protocol for a randomized controlled trial. *Trials*. 2021 Oct 27;22(1):748. doi: 10.1186/s13063-021-05628-4. PMID: 34706757; PMCID: PMC8549306.
54. **Ishøi L**, **Thorborg K**, Kemp JL, Reiman MP, **Hölmich P**. Maximal hip muscle strength and rate of torque development 6-30 months after hip arthroscopy for femoroacetabular impingement syndrome: A cross-sectional study. *J Sci Med Sport*. 2021 Nov;24(11):1110-1115. doi: 10.1016/j.jsams.2021.05.006. Epub 2021 May 18. PMID: 34119398.
55. Smith MD, Vicenzino B, Bahr R, Bandholm T, Cooke R, Mendonça LM, Fourchet F, Glasgow P, Gribble PA, Herrington L, Hiller CE, Lee SY, Macaluso A, Meeusen R, Owoeye OBA, Reid D, Tassignon B, Terada M, **Thorborg K**, Verhagen E, Verschueren J, Wang D, Whiteley R, Wikstrom EA, Delahunt E. Return to sport decisions after an acute lateral ankle sprain injury: introducing the PAASS framework-an international multidisciplinary consensus. *Br J Sports Med*. 2021 Nov;55(22):1270-1276. doi: 10.1136/bjsports-2021-104087. Epub 2021 Jun 22. PMID: 34158354.
56. **Anker-Petersen C**, Juul-Kristensen B, Antflick J, Aagaard H, Myers C, **Boesen AP**, Boyle E, **Hölmich P**, **Thorborg K**. Six weeks of intensive rehearsals for the Swan Lake ballet shows ultrasound tissue characterization changes of the Achilles tendons in dancers. *Scand J Med Sci Sports*. 2021 Nov;31(11):2133-2143. doi: 10.1111/sms.14034. Epub 2021 Aug 28. PMID: 34407248.
57. Hindsø L, Riis RGC, **Hölmich P**, Petersen MM, Nielsen MB, Lönn L, Taudorf M. Current Status of Trans-Arterial Embolization in Pain Management of Musculoskeletal Inflammatory Conditions - An Evidence-Based Review. *Cardiovasc Intervent Radiol*. 2021 Nov;44(11):1699-1708. doi: 10.1007/s00270-021-02948-5. Epub 2021 Sep 2. PMID: 34476578.
58. **Ishøi L**, **Nielsen MF**, **Krommes K**, Husted RS, **Hölmich P**, Pedersen LL, **Thorborg K**. Femoroacetabular impingement syndrome and labral injuries: grading the evidence on diagnosis and non-operative treatment-a statement paper commissioned by the Danish Society of Sports Physical Therapy (DSSF). *Br J Sports Med*. 2021 Nov;55(22):1301-1310. doi: 10.1136/bjsports-2021-104060. Epub 2021 Sep 16. PMID: 34531185.

59. Wörner T, **Thorborg K**, Clarsen B, Eek F. Hip and groin function and strength in male ice hockey players with and without hip and groin problems in the previous season- a prospective cohort study. *Phys Ther Sport*. 2021 Nov;52:263-271. doi: 10.1016/j.ptsp.2021.10.005. Epub 2021 Oct 12. PMID: 34678567.
60. **Ishøi L, Thorborg K**. Why clinical context and relevant protocols matter: response to Impellizzeri et al. *J Clin Epidemiol*. 2021 Nov 1:S0895-4356(21)00345-0. doi: 10.1016/j.jclinepi.2021.10.021. Epub ahead of print. PMID: 34737061
61. Rathleff MS, Holden S, **Krommes K**, Winiarski L, **Hölmich P**, Salim TJ, **Thorborg K**. The 45-second anterior knee pain provocation test: A quick test of knee pain and sporting function in 10-14-year-old adolescents with patellofemoral pain. *Phys Ther Sport*. 2021 Nov 4;53:28-33. doi: 10.1016/j.ptsp.2021.11.002. Epub ahead of print. PMID: 34775189.
62. DeLang MD, Garrison JC, Hannon JP, McGovern RP, Sheedy PJ, Christoforetti JJ, **Thorborg K**. Midseason Screening for Groin Pain, Severity, and Disability in 101 Elite American Youth Soccer Players: A Cross-Sectional Study. *Clin J Sport Med*. 2021 Nov 10. doi: 10.1097/JSM.0000000000000987. Epub ahead of print. PMID: 34759181.
63. Mendonça LM, Camelo PRP, Trevisan GCC, Bryk FF, **Thorborg K**, Oliveira RR. The Brazilian hip and groin outcome score (HAGOS-Br): cross-cultural adaptation and measurement properties. *Braz J Phys Ther*. 2021 Nov 12:S1413-3555(21)00100-3. doi: 10.1016/j.bjpt.2021.10.004. Epub ahead of print. PMID: 34802916.
64. **Cramer A, Hansen MS, Hölmich P, Barfod KW**. Neither heel-rise Height (HRH) nor Achilles tendon resting angle (ATRA) show strong correlations to patient limitations and return to previous activities one year after acute Achilles tendon rupture. *Foot Ankle Surg*. 2021 Nov 21:S1268-7731(21)00217-4. doi: 10.1016/j.fas.2021.11.003. Epub ahead of print. PMID: 34836720.
65. Christensen KB, Clausen MB, King E, Franklyn-Miller A, Harøy J, Andersen TE, **Hölmich P, Thorborg K**. Validation of the Copenhagen Hip and Groin Outcome Score (HAGOS) using modern test theory across different cultures and languages: a cross-sectional study of 452 male athletes with groin pain. *Br J Sports Med*. 2021 Nov 23:bjssports-2021-104412. doi: 10.1136/bjssports-2021-104412. Epub ahead of print. PMID: 34815222.
66. Jacobsen JS, Jakobsen SS, Søballe K, **Hölmich P, Thorborg K**. Isometric hip strength impairments in patients with hip dysplasia are improved but not normalized 1 year after periacetabular osteotomy: a cohort study of 82 patients. *Acta Orthop*. 2021 Dec;92(6):765. doi: 10.1080/17453674.2021.1986292. Epub 2021 Oct 11. Erratum for: *Acta Orthop*. 2021 Jun;92(3):285-291. PMID: 34633916.
67. Liaghat B, Ussing A, Petersen BH, Andersen HK, **Barfod KW**, Jensen MB, Hoegh M, Tarp S, Juul-Kristensen B, Brorson S. Supervised Training Compared With No Training or Self-training in Patients With Subacromial Pain Syndrome: A Systematic Review and Meta-

analysis. Arch Phys Med Rehabil. 2021 Dec;102(12):2428-2441.e10. doi: 10.1016/j.apmr.2021.03.027. Epub 2021 Apr 28. PMID: 33930326.

68. Andreucci A, Roos EM, Rasmussen S, Olesen JL, **Hölmich P, Thorborg K**, Rathleff MS. Analgesic use in adolescents with patellofemoral pain or Osgood-Schlatter Disease: a secondary cross-sectional analysis of 323 subjects. Scand J Pain. 2021 Dec 3. doi: 10.1515/sjpain-2021-0121. Epub ahead of print. PMID: 34860477.
69. Heijboer WMP, Weir A, Delahunt E, **Hölmich P**, Schache AG, Tol JL, de Vos RJ, Vuckovic Z, Serner A. A Delphi survey and international e-survey evaluating the Doha agreement meeting classification system in groin pain: Where are we 5 years later? J Sci Med Sport. 2022 Jan;25(1):3-8. doi: 10.1016/j.jsams.2021.06.014. Epub 2021 Jul 6. PMID: 34312067.
70. Materne O, Chamari K, Farooq A, Tabben M, Weir A, **Hölmich P**, Bahr R, Greig M, McNaughton LR. Shedding light on incidence and burden of physeal injuries in a youth elite football academy: A 4-season prospective study. Scand J Med Sci Sports. 2022 Jan;32(1):165-176. doi: 10.1111/sms.14059. Epub 2021 Oct 18. PMID: 34551163.
71. Rathleff MS, Holden S, Krommes K, Winiarski L, Hölmich P, Salim TJ, **Thorborg K**. The 45-second anterior knee pain provocation test: A quick test of knee pain and sporting function in 10-14-year-old adolescents with patellofemoral pain. Phys Ther Sport. 2022 Jan;53:28-33. doi: 10.1016/j.ptsp.2021.11.002. Epub 2021 Nov 4. PMID: 34775189.
72. **Kaldau NC**, Kerr S, McCaig S, **Hölmich P**. Hip profile in world elite badminton players: Impingement and range of motion data from the World Junior Badminton Championship 2018. Journal of hip surgery. Doi: 10.1055/s-0041-1739457. E-pub: nov 23 2021.
73. Dawkins J, Ishøi L, Willot JO, Andersen LL, Thorborg K. Effects of a low-dose Copenhagen adduction exercise intervention on adduction strength in sub-elite male footballers: A randomised controlled trial. Translational Sports Medicine, vol. 4, issue 4 p 447-457. February 16. 2021. DOI: 10.1002/tsm2.238

Books and book chapters

- **Hölmich P., Ishøi L.** (2022) Acute and Long-Standing Groin Injuries. In: Canata G.L., D'Hooghe P., Hunt K.J., M. M. J. Kerkhoffs G., Longo U.G. (eds) Management of Track and Field Injuries. Springer, Cham. Epub 2021 Dec 2. https://doi.org/10.1007/978-3-030-60216-1_12

Clinical guidelines and protocols

- **Asmussen CAP, Kraemer O, Stavngaard CR** contributing from SORC-C. National clinical guideline for treatment of anterior cruciate ligament injuries in adults. Danish Health Authority.
- **Kaldau NC**, Petersen J, Hansen EF, Sjøgaard OS, Rasmussen HK. Return to sport after covid-19 infection. Danish Society of Sports Medicine (DIMS).

In 2020 and 2021, SORC-C collaborated with physiotherapists and doctors at Amager-Hvidovre Hospital to produce 15 post-operative rehabilitation protocols based upon best practice.

<https://www.hvidovrehospital.dk/sorc-c/rehabilitation-protocols/Pages/default.aspx>

- Rehabilitation protocol 1: Bankart surgery
- Rehabilitation protocol 2: Rotatorcuff reinsertion
- Rehabilitation protocol 3: Rotatorcuff reinsertion with subscapularis insertion
- Rehabilitation protocol 4: Femoroacetabular impingement
- Rehabilitation protocol 5: ACL reconstruction
- Rehabilitation protocol 6: ACL reconstruction with meniscus repair, standard
- Rehabilitation protocol 7: ACL reconstruction with meniscus repair, restrictive
- Rehabilitation protocol 8: Meniscus repair, standard
- Rehabilitation protocol 9: Meniscus repair, restrictive
- Rehabilitation protocol 10: Eminentia avulsion fracture in children
- Rehabilitation protocol 11: Medial patellofemoral ligament reconstruction
- Rehabilitation protocol 12: Elmslie Trillat operation
- Rehabilitation protocol 13: Steadman, Femorotibial joint
- Rehabilitation protocol 14: Steadman, Patellofemoral joint
- Rehabilitation protocol 15: Gluteus Medius reinsertion

Prizes

In 2021, SORC-C was part of winning two 1. Prizes for scientific work and contributions.

- PhD CUP Winner.
Basic and Clinical Research in Musculo-skeletal Science (MUSKOS) Annual symposium.
Cramer A, Barfod KW, Hölmich P, Christensen K, Pedersen DA. Genetic contribution to the etiology of Achilles tendon rupture. A Danish nationwide register study of twins.
- Best poster.
The Danish Orthopedic Society meeting 2021.
Jacobsen JS, **Thorborg K**, Sørensen D, Jakobsen SS, Nielsen RO, Oestergaard LG, Mechlenburg. Feasibility and acceptability of a six-month exercise therapy and patient education intervention for patients with hip dysplasia not eligible for surgery.

Invited presentations

In 2021 people from SORC-C were invited to do 22 presentations and 4 pod-/videocasts.

Scientific congress presentations

- Hölmich P. Keynote: Zooming in on the Groin Pain: Anatomy, Clinical Assessment, and Diagnosis in athletes. 20-20 Hip & Groin Vision Day, 2021 BASEM Spring Conference.
- Thorborg K. Keynote. Translational sports medicine research – from basic science to clinical implementation. Annual Swedish Sports Medicine Congress, Malmö, Sweden.
- Thorborg K. Keynote. Groin pain in athletes from prevention to management. Sports Medicine Australia Annual Congress.
- Hölmich P. Presentation: Tertiary prevention: Conservative or surgical? 2021 IOC World Conference on prevention of injury and illness in sport, Monaco.
- Hölmich P. Presentation: Development of clinical entities, treatment, and prevention. 2021 IOC World Conference on prevention of injury and illness in sport, Monaco.
- Thorborg K. Presentation: Screening for secondary prevention: What are the options? 2021 IOC World Conference on prevention of injury and illness in sport, Monaco.
- Thorborg K. Presentation. Exercise treatment for groin pain in athletes. Annual British Association of Sport & Exercise Medicine (BASEM) Annual Congress.
- Thorborg K. Presentation. What's happening: Etiology of muscle injuries. Danish Society of Arthroscopic Surgery and Sportstraumatology (SAKS), Roskilde, Denmark.
- Thorborg K. Presentation. Physiotherapy treatment of anterior knee pain. Danish Society of Arthroscopic Surgery and Sportstraumatology (SAKS), Roskilde, Denmark.
- Barfod KW. Presentation: Conservative - functional treatment of Achilles tendon rupture. 9th International Conference of Egyptian Arthroscopy Association 2021.
- Barfod KW. Presentation: Population outcomes following Achilles tendon rupture: the importance of establishing registries. 36. Jahreskongress Deutsche Gesellschaft für Orthopädie und Orthopädische Chirurgie (GOTS).
- Barfod KW. Presentation: 'Optimising non-operative management '- ESSKA Highlight webinar on Achilles Tendon Rupture.

- Barfod KW. Presentation: New trends in treatment of Achilles tendon disorders. 19th ESSKA Congress.
- Hölmich P. Presentation: View of the hip: Diagnosis of hip related pain in athletes, 20-20 Hip & Groin Vision Day, 2021 BASEM Spring Conference.
- Hölmich P. Presentation: Proximal hamstring avulsions. Danish Society of Arthroscopic Surgery and Sportstraumatology (SAKS) Focus symposium on Sports Orthopedics – When is surgery indicated, and how to do it, Roskilde, Denmark.
- Hölmich P. Presentation: Groin and hip pain. Danish Society of Arthroscopic Surgery and Sportstraumatology (SAKS) Focus symposium on Sports Orthopedics – When is surgery indicated, and how to do it, Roskilde, Denmark.
- Hölmich P. Presentation: Chronic groin pain – no hernia, Orthopedic perspective and examination. Hernia 2021 - Bridging Evidence and Clinical Practice. EHS-AHS Joint Congress, Copenhagen, Denmark.
- Hölmich P. Presentation: Treatment of groin injuries. 12th Advanced Team Physician Course, International Olympic Committee, Istanbul, Turkey.
- Thorborg K. Presentation: The specialist examination of the hip joint. CAG ROAD, Research in Osteoarthritis Denmark webinar.
- Hölmich P. Presentation: Before Osteoarthritis: Hip arthroscopy – indications, technique and expected result. CAG ROAD, Research in Osteoarthritis Denmark webinar.
- Ishøi L. Presentation. Prognosis after hip scope: Time to re-calibrate expectations? Swedish Sports Medicine Conference (IDROTTSMEDICINSKT HÖSTMÖTE) 2021, Malmö, Sweden.
- Kaldau NC. Presentation. Injuries prevention in Badminton. Badminton Pan America webinar.

Podcasts / videocasts

- **Thorborg K, Ishøi L, Stavngaard CR, Jakobsen JS.** #4 Hip problems in athletes. Danish Society of Sports Physical Therapy (DSSF) podcast series.
<https://www.sportsfysioterapi.dk/fagligt/podcast/>
- **Thorborg K.** #15 Sports Physiotherapy. SportsMAP podcast series.
<https://sportsmap.com.au/podcast/15-sports-physio-with-kristian-thorborg/>
- **Thorborg K.** Pearls of Performance interview with Evert Verhagen. Pearls of performance podcast series.
https://Inns.co/59_U3LYZFOW
- **Anker-Petersen C.** Flexibility training in children and adolescents. GymDanmark webinar.
<https://www.youtube.com/watch?v=FRvROLEY7P8>

SORC-C

Sports Orthopedic Research Center - Copenhagen



**Academic, Editorial &
Board work**

Academic supervision, teaching and assessment

Academic supervision is a highly valued core competency of SORC-C, as the unit aims to facilitate education of young and aspiring researchers interested in optimizing and enhancing the pre- and post-operative rehabilitation and recovery of patients seen in an arthroscopic surgery clinical setting. Teaching activities are important for SORC-C, as they act as a possibility for the researchers to evolve their teaching skills, disseminate and promote their research as well as increase the awareness of SORC-C.

Defended theses

In 2021, researchers from SORC-C provided supervision for 14 defended theses.

Ph.D. theses

- Filip Gertz Lysdal. Spraino: A new concept in lateral ankle sprain injury prevention. Department of Health Science and Technology. Aalborg University, Denmark. Co-supervisor: **Kristian Thorborg**
- Jordi Vicens-Bordas. Physical performance and hamstring injury risk factors during the off-season period in footballers: Inertial flywheel versus gravity-dependent resistance training methods. University of Girona, Spain. Co-supervisor: **Kristian Thorborg**
- Tobias Wörner. Return to sport after Hip Arthroscopy. Perspectives on a journey with many destinations. Department of Health Science. Lund, Sweden. Co-supervisor: **Kristian Thorborg**

MSc. theses

- Mathias Fabricius Nielsen. Pain provocation tests in male football players with longstanding groin pain. University of Southern Denmark. Main supervisor: Carsten Juhl. Co-Supervisor: **Kristian Thorborg**
- Sally Oppendieck Andersen. Master Thesis in Human Physiology. Physical capacity among patients treated with periacetabular osteotomy for hip dysplasia: a cross-sectional study. Department of Nutrition, Exercise and Sports, University of Copenhagen. Supervisor: **Per Hölmich**
- Lasse Christensen. Long term impact on self-reported health in adults with a history of Osgood Schlatter. University of Southern Denmark. Supervisor: **Kasper Krommes**
- Anders Brøgger Overgaard. Calf Muscles Volume and Tendon Elongation Assessed using Magnetic Resonance Imaging after Acute Achilles Tendon Rupture. A Randomized Controlled Trial investigating the Copenhagen Achilles Rupture Treatment Algorithm (CARTA) University of Copenhagen. Supervisor: **Kristoffer Barfod**

B.Sc. theses

- Cecilie Jadach Petersen. Prevalence of pain and/or discomfort, including location and type of onset, in Danish elite and subelite TeamGym gymnasts aged 10-30 years: A cross-sectional study, University College Copenhagen. Co-supervisor: **Charlotte Anker-Petersen**
- Christina Kjærgaard Madsen. Prevalence of pain and/or discomfort, including location and type of onset, in Danish elite and subelite TeamGym gymnasts aged 10-30 years: A cross-sectional study, University College Copenhagen. Co-supervisor: **Charlotte Anker-Petersen**
- Caroline Kirk Schad. Inter-tester reliability of isometric knee extension strength test with handheld dynamometry in adolescents with and without knee apophysitis. University College Copenhagen, Faculty of Health, Department of Physiotherapy. Supervisor: **Kasper Krommes**
- Hjalte Holm Nørremark. Inter-tester reliability of isometric knee extension strength test with handheld dynamometry in adolescents with and without knee apophysitis. University College Copenhagen, Faculty of Health, Department of Physiotherapy. Supervisor: **Kasper Krommes**
- Line Nordlund Holm. Inter-tester reliability of an ultrasound protocol for knee-Apophysitis. University College Copenhagen, Faculty of Health, Department of Physiotherapy. Supervisor: **Kasper Krommes**
- Nickoline Skifter Andersen. Inter-tester reliability of an ultrasound protocol for knee-Apophysitis. University College Copenhagen, Faculty of Health, Department of Physiotherapy. Supervisor: **Kasper Krommes**
- Oliver Rokkjær Olsen. Inter-tester reliability of an ultrasound protocol for knee-Apophysitis. University College Copenhagen, Faculty of Health, Department of Physiotherapy, Supervisor: **Kasper Krommes**

Course activities

In 2021, researchers from SORC-C have led 2 academic and speciality courses.

- Ishøi L and Thorborg K. 6 weeks of course leading, tutoring, and lecturing. Course: Rehabilitation of muscle injuries. Master of Science in Physiotherapy. University of Southern Denmark.
- Kraemer O, Kaldau NC, Boesen A, Barfod KW, Thorborg K, Hölmich P. 1 week of course leading and lecturing. Sports traumatology and orthopedics. Specialty course. Danish Orthopedic Society (DOS).

Academic assessment

In 2021, researchers from SORC-C also provided academic assessment for several academic positions and theses.

Academic positions

- Hölmich P. Assessment of qualifications for applicant for the position of Associate Professor at Faculty of Health Sciences at Australian Catholic University.

Ph.D. theses

- Hölmich P. Assessment of Ph.D. thesis in Medical Sciences by Anders Pålsson at Department of Health Sciences, faculty of medicine, Lund University, Sweden.
- Hölmich P. Assessment of Ph.D. thesis in Health Sciences by Ida Lindman at Institute of Clinical Sciences, University of Gothenburg, Sweden.
- Thorborg K. Chair of the Assessment Committee of Ph.D. thesis in Health and Medical Science by Christian Pilely Olsen at University of Copenhagen, Denmark.
- Barfod KW. Chair of the Assessment Committee of Ph.D. thesis in Health and Medical Science by Mads Temdrup, University of Copenhagen, Denmark.

Editorial work

Editorial work is considered an important opportunity for the SORC-C researchers to contribute to the scientific community and evolve their critical thinking skills. In 2021, researchers from SORC-C were part of 11 editorial boards and contributed to the scientific community by reviewing papers in more than 28 international scientific journals and acting as chairmen or moderators for 7 scientific presentation sessions. All contributions by SORC-C researchers are listed below.

Editorial boards

- Thorborg K. Deputy Editor. British Journal of Sports Medicine.
- Thorborg K. International Associate Editor. International Journal of Sports Physical Therapy.
- Thorborg K. Associate Editor. Annals of Joint.
- Thorborg K. Editorial board reviewer Journal of Orthopedic & Sports Physical Therapy.
- Ishøi L. Associate Editor. BMS Sports Science, Medicine and Rehabilitation.
- Ishøi L. Editorial board (reviewer). International Journal of Sports Physical Therapy.
- Kaldau NC. Editorial board member. International Journal of Racket Sports Science.
- Hölmich P. Orthopedic Editor. Ugeskrift for læger (Danish Medical Journal).
- Hölmich P. Editorial board. Bone and Joint 360.
- Hölmich P. Editorial board. Journal of Hip Preservation Surgery.
- Barfod KW. Editorial board. Orthopedic Journal of Sports Medicine.

Editor – Special Journal Issues

- Thorborg K. Danish Sports Physical Therapy Association Issue, British Journal of Sports Medicine.

Reviewer work

- Thorborg K. Reviewer for The International Journal of Sports Physical Therapy, British Journal of Sports Medicine and Ugeskrift for læger (Danish Medical Journal).
- Barfod KW. Reviewer for Scandinavian Journal of Medicine and Science in Sports, British Journal of Sports Medicine, American Journal of Sports Medicine, Ugeskrift for læger (Danish Medical Journal), Expert Opinion on Pharmacotherapy, Medicines, 'Knee Surgery, Sports Traumatology and Arthroscopy', Danish Society of Sports Medicine, Danish Orthopedic Association. Sports Medicine.
- Krommes K. Reviewer for Biomedical Human Kinetics, J sport and Health, Physical Therapy in sports
- Kraemer O. Reviewer for Ugeskrift for læger (Danish Medical Journal), The Physician and Sportsmedicine.
- Kaldau NC. Reviewer for International Journal of Racket Sports and Ugeskrift for læger (Danish Medical Journal).
- Hölmich P. Reviewer for American Journal of Sports Medicine, BMJ Case reports, British Journal of Sports Medicine, Clinical Journal of Sports Medicine, Clinical Orthopaedics and Related Research, Journal of Bone and Joint Surgery, Journal of Medicine and Science in Sports, 'Knee surgery, Sports Traumatology and Arthroscopy', Medicine and Science in Sports and Exercise, Physical Therapy in Sport, Scandinavian Journal of Medicine and Science in Medicine and Sport, Acta Orthopaedica Scandinavica.
- Ishøi L. Reviewer for Journal of Sports Science, Sports Medicine, BMJ Open Sport & Exercise Medicine, Journal of Sport Rehabilitation, International Journal of Sports Physiology and Performance, Physical Therapy in Sport, Journal of Sport and Health Science, British Journal of Sports Medicine.

Scientific congress moderator work

- Hölmich P. Chair. Prevention of long-standing groin pain in athletes. 2021 IOC World Conference on prevention of injury and illness in sport, Monaco.
- Hölmich P. Organizer and chair of Focus symposium on Sports Orthopedics. Danish Society of Arthroscopic Surgery and Sports Orthopedics (SAKS). Roskilde 2021, Denmark.
- Hölmich P. Chair. From Copenhagen to Dublin via Oslo: Collaborating to tackle primary, secondary and tertiary groin injury prevention in sports. 2021 IOC World Conference on prevention of injury and illness in sport, Monaco.
- Barfod KW. Chair. Sports Orthopaedics 1. Danish Orthopedic Society meeting 2021, Denmark.
- Barfod KW. Moderator. DOS Battle. Danish Orthopedic Society meeting 2021, Denmark.
- Barfod KW. Chair. Symposium on knee osteotomies. Danish Orthopedic Society Congress.
- Kraemer O. Chair. Focus symposium on Sports Orthopedics. Danish Society of Arthroscopic Surgery and Sports Orthopedics (SAKS). Roskilde 2021, Denmark.

Board and committee work

In 2021, researchers from SORC-C were part of 17 boards and committees with 3 leadership roles, and thus playing an important part in advising national and international sports and health federations, national health initiatives and organizing and executing congresses. All boards and contributing SORC-C researchers are listed below.

Board leadership roles

- Hölmich P. President of the Danish Society of Arthroscopic Surgery and Sports Traumatology (SAKS).
- Barfod KW. President of the Danish Society of Sports Medicine (DIMS).
- Thorborg K. President of the International Federation of Sports Physical Therapy (IFSPT).

Advisory boards & committees

- Hölmich P. Chair of the Medical Committee for the Danish Football Association (DBU).
- Hölmich P. Member of the Governance and Development Committee for the Danish Football Association (DBU).
- Hölmich P. Co-Chair of IOC Sports Medicine Copenhagen: Center for Injury Prevention and Protection of Athlete Health.
- Hölmich P. Steering committee member. Clinical Academic Group: Research OsteoArthritis Denmark (ROAD). Greater Copenhagen Health Science Partners.
- Hölmich P. Steering committee and expert group for the UEFA Soccer Doctor Education Programme.
- Hölmich P. Steering committee member. Danish Hip Arthroscopy Registry (DHAR).
- Hölmich P. Chair of the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS) Hip, Thigh, and Groin Committee.
- Hölmich P. Advisory board for Physical Medicine and Rehabilitation – Copenhagen (PMR-C).
- Hölmich P. Member of The Post-Graduate Research School Program: ‘Basic and Clinical Research in Musculoskeletal and Oral Sciences’ at University of Copenhagen.

- Hölmich P. Steering committee member. Clinical Academic Group: Research, Physical activity and sport in clinical medicine (CAG imPAct). Greater Copenhagen Health Science Partners.
- Thorborg K. Member of the Medical Committee for the Danish Football Association (DBU).
- Thorborg K. Board member. Advisory board for the IOC Diploma course in Sports Physical Therapies.
- Thorborg K. Steering committee member. IOC Sports Medicine Copenhagen: Center for Injury Prevention and Protection of Athlete Health.
- Thorborg K. External committee member. Danish Society of Sports Medicine (DIMS).
- Thorborg K. Equity, Diversity and Inclusion Committee in British Journal of Sports Medicine (BJSM).
- Kaldau NC. Steering committee member. Danish Society of Sports Medicine (DIMS).
- Hugaard KB. Steering committee member. Danish Society of Sports Medicine (DIMS).
- Barfod KW. Chair of scientific committee. Danish Orthopaedic Society (DOS).
- Barfod KW. Head of the Achilles Tendon Study Group (ATSG).
- Kraemer O. Steering committee member. Danish Hip Arthroscopy Registry (DHAR).
- Anker-Petersen C. Board member. Dance Science Denmark.
- Kaldau NC, Board member of Badminton World Federation Sport Science and Medical Research Commission.
- Boesen A. Board member of the Danish Society of Arthroscopic Surgery and Sports Traumatology (SAKS).
- Witten A Board member of the Danish Society of Arthroscopic Surgery and Sports Traumatology (SAKS).

Congress boards & committees

- Hölmich P. Scientific board member. Scandinavian Sports Medicine Congress (#SPORTSKONGRES) 2022. Copenhagen, Denmark.
- Stavngaard CR. Chair of organizing committee. Scandinavian Sports Medicine Congress (#SPORTSKONGRES) 2022. Copenhagen, Denmark.
- Thorborg K. Scientific chair. 4th World Congress of Sports Physiotherapy 2022. Nyborg, Denmark.
- Krohn L. Organizing committee member. 4th World Congress of Sports Physiotherapy 2022. Nyborg, Denmark.
- Barfod KW. Scientific committee member. 20th Congress of the European Society of Sports Traumatology, Knee Surgery & Arthroscopy (ESSKA).
- Hölmich P. Program and scientific committee member. 13th Biennial International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS) Congress.

Funding committees

- Thorborg K. Committee member. The Swedish Research Council for Sport Science.
- Thorborg K. Committee member. Research grants – Amager-Hvidovre hospital.
- Thorborg K. Committee member. Research grants - Institute for Clinical Medicine, Copenhagen University.

SORC-C



Sports Orthopedic Research Center - Copenhagen

Research Grants

Research Grants

From searched grants with SORC-C as main, co-applicant or named collaborator, we have in 2021 from a variety of funding bodies attracted a total amount of 5.895.707 DKK (792.8434 EUR). The funding bodies include:

- Novo Nordisk "Project grants in Surgical Research". Effect of graft choice in ACL reconstruction on knee function from a patient-centered, biomechanical, clinical, and muscle morphological perspective. Main applicant: Per Hölmich. (2.954.542 DKK / 397.116 EUR).
- The Ministry of Cultural research fund (Kulturministeriets Forskningsmidler): Implementation of evidence-based injury prevention in football. Main applicant: Elisabeth Bandak, co-applicant: Kristian Thorborg (691.200 DKK / 92.903 EUR).
- The society for Sports Physiotherapy (Dansk Selskab for Sports Fysioterapi). Healthy and happy in gymnastics form young to adult (JumpSmile) - Injury and risk factors in female gymnasts aged 10-30 years. Main applicant: Charlotte Anker-Petersen, co-applicant: Kristian Thorborg and Per Hölmich (6.000 DKK / 806 EUR).
- Danish Physiotherapists' research fund. Healthy and happy in gymnastics form young to adult (JumpSmile) - Injury and risk factors in female gymnasts aged 10-30 years. Main applicant: Charlotte Anker-Petersen, co-applicant: Kristian Thorborg and Per Hölmich (50.000 DKK / 6.720 EUR).
- The Capital Region: research fund for health research – PostDocoral Grants (Region Hovedstadens Forskningsfond til Sundhedsforskning 2021). Treatment of osteoarthritis with stem cells from microfragmented adipose tissue – characterization of cells. Main applicant: Jasmin Bagge, co-applicants: Per Hölmich, and Kristoffer Barfod (600.000 DKK / 80.645 EUR).
- The Danish Rheumatism Association (Gigtforeningen): In vitro characterization of adventitial stem cells and pericytes isolated from microfragmented adipose tissue used in clinical trial to treat osteoarthritis of the knee. Main applicant: Jasmin Bagge, co-applicants: Per Hölmich and Kristoffer Barfod (230.000 DKK / 30.914 EUR).
- The Hartmann Foundation (Brødrene Hartmann Fonden): Treatment of osteoarthritis with stem cells from microfragmented adipose tissue – characterization of cells. Main applicant: Jasmin Bagge, co-applicants: Per Hölmich, and Kristoffer Barfod (100.000 DKK / 13.441 EUR).
- The research foundation (HVH Forskningspulje). Better diagnostic of patients with hip- and groin pain. Main applicant: Kristian Thorborg, co-applicants: Mathias Fabricius Nielsen, Per Hölmich and Lasse Ishøi (300.000 DKK / 40.323 EUR).

- Østifterne f.m.b.a: Keeping young people physically active and in sports - managing growth pain. Main applicant: Kasper Krommes, co-applicant: Kristian Thorborg and Per Holmich (599.958 DKK / 80.640 EUR).
- The Beckett Fund: Keeping young people physically active and in sports - managing growth pain. Main applicant: Kasper Krommes, co-applicant: Kristian Thorborg and Per Holmich (70.000 DKK / 9.409 EUR).
- The research foundation (HVH forskning fond). Den danske korsbånd undersøgelse. Main applicant: Niels Kristian Kaldau, co-applicant: Per Holmich. (150.000 DKK / 20.161 EUR).
- The Ministry of Cultural research fund (Kulturministerets Forskningsmidler). Knee Injury Prediction in Sports (KNIPS). Main applicant: Tina Alkjær, co-applicant: Kristian Thorborg (144.000 DKK / 19.355 EUR).

SORC-C

Sports Orthopedic Research Center - Copenhagen