Annual Report 2021

Center for Health and Performance

A center construction between the Faculty of Education and the Medical Faculty

VISIT US

Skånegatan 14B, Göteborg

Building: Idrottshögskolan

Center for Health and Performance,
Department of Food and Nutrition, and Sport Science.
P.O. Box 300
SE - 405 30 GOTHENBURG
https://www.gu.se/en/chp

Content

A next step forward.....

The second year during the pandemic has just ended. Another year with substantial restrictions that have affected the work of scientists and staff at the University of Gothenburg and at the Center for Health and Performance. Despite the obvious consequences that came along with the restrictions, improvements could be seen after the summer vacation. The slowly opening towards physical teaching as well as the possibility to start new research projects, both in alignment with the safety regulations of the University, has helped to restore some normality in our daily duties.

The work at CHP in 2021 has been manifold. Three of our PhD students were able to finish their education during the year. Two defenses in spring (Andreas Lundberg Zachrisson & Jonatan Jungmalm) were performed digitally. The third defense in December (Pia Desai) could be conducted in a hybrid way, allowing some physical attendance in accordance with the safety regulations of the University. Thanks to the great support from the technical and administration staff of the Faculty of Education and the Medical Faculty, all three defenses were running smooth without any (technical) problems.

Major efforts of CHP in 2021 were taken to support the Health City Initiative (GoCo) in Gothenburg with a series of seminars and discussion forums about health related topics. One additional topic was a discussion forum about the collaboration between academia and industry, the risks and benefits of conducting common research projects and product developments. The attendance at all meetings during the year was outstanding and we are very much looking forward to support this initiative in 2022.

Substantial work of CHP was also spent on the development of Massive Open Online Courses (MOOC), as part of a university wide pilot project of open educational courses in different areas. We have developed a MOOC about lifestyle habits, with three courses covering the field and the importance of the relationship between physical activity and health. The courses are online since November 2021 and attract great attendance so far.

In the second part of 2021, we have been intensively working with the communication of the Center. As part of the newly developed communication strategy, we have been constantly updating our Center website with relevant and detailed information about the Center´s activities. Additionally, we have started two social media channels (Twitter and LinkedIn) where information about activities of CHP is communicated regularly. The maintenance of the website and social media channels as well as further improvements in our communication will be of great importance in 2022.

With regard to our research activities, we were able to manage most of the ongoing projects, many of them with national or international partners. The publication output increased compared to 2020, with approximately 47 peer-reviewed original articles, 1 book, 8 book chapters, 3 doctoral theses and 20 additional publications (e.g. conference papers, non-peer reviewed articles). New research projects could be started as well. The numbers of conference attendances (digital and physical) were still small compared to the time before the pandemic.

Overall, it was a successful year and we would like to thank the staff of the Center for their outstanding performance during these complicated times. We would further like to acknowledge the support of the host department (Department of Food and Nutrition, and Sport Science), the co-department (Institute of Medicine) as well as the two affiliated faculties (Medical Faculty & Faculty of Education) for their constant support. Special thanks goes to Region Västra Götaland for their continuous financial support. To run a Center like ours and to continuously develop it would not be possible without these strategic partners.

Prof. Stefan Grau
Manager CHP

Prof. Mats Börjesson
Manager CHP

Our staff

Among our employees you will find scientists, teachers, and students that all love physical activity. Our aim is to create an environment where ideas develop into new knowledge, innovations, and new methods.

Managers and Professors

Prof. Stefan Grau (100%), Manager CHP, Professor in Biomechanics and Movement Science

Prof. Mats Börjesson (100%), Manager CHP Professor in Sports Physiology, MD

Prof. Stefan Lindinger (100%), Professor in Exercise Physiology/Training

Prof. Emeritus Claes Annerstedt (Learning)

Associate Professors

Dr. Daniel Arvidsson (100%), Nutritionist

Dr. Stefan Pettersson (60%), Nutritionist

Senior Positions (with PhD)

Dr. Dan Fransson (50%), Sport Scientist

Dr. Mathias Wernbom (assoc), Physiotherapist

Researchers & Post-docs

Dr. Jonatan Jungmalm, Sport Scientist

Dr. Andreas Lundberg-Zachrisson, Sport Scientist

Laboratory Positions

Fredrik Edin (60%), Lab assistant Physiology

Mikael Gustafsson (100%), Lab assistant biomechanics & strength & body composition

Administration

Daniel Wennerlund (75%), Project Coordinator and Communication

PhD/Licentiate positions

Jonatan Fridolfsson (phD student, financed by Faculty/host department, supervisors Arvidsson//Börjesson)

Jacob Lindh (Licentiate student, externally financed, supervisors Grau/Annerstedt)

Pia Desai (PhD student until december 2021, financed by Sahlgrenska Akademin and CHP, supervisors Karlsson/Grau/ Börjesson)

Solveig Hausken (“guest” PhD student, funded by CIF, IKI and CHP, supervisors Barker-Ruchti/Grau/Schubring)

Matilda Frisk Torell (50% PhD-student, financed by ALF Money, supervisor Börjesson)

Hampus Luning (50% PhD student, financed by ALF Money, supervisor Börjesson)

Tania Nilsson (PhD student, financed by IF Elfsborg, supervisors Börjesson/Fransson)

Frida Nilsson (100% PhD student, financed by Sahlgrenska Academy 60% and ALF money 40%, supervisors Börjesson/Arvidsson)

Pia Skovdahl (100% Licentiate student, financed by ALF and CHP, Supervisors Arvidsson/Börjesson)

Victor Stoltz (65% PhD student, financed by Elfsborg IF, Supervisors Fransson/Pettersson)

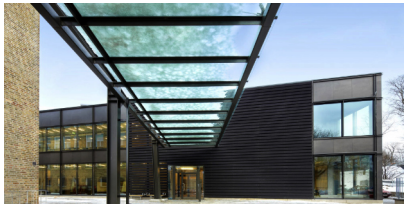
Student positions

Klara Boje af Gennäs (80% until august 2021)

Julia Eriksen (Medical student)

Visiting Students (Research Assistance)

Bogdan Lucas (from 10/2021) Technical University, Chemnitz/Germany; Erasmus Placement)



Disserations 2021

February 2021
Andreas Lundberg-Zachrisson:
Overuse injuries in Swedish elite athletics. Incidence, occurrence, athlete availability, and risk factors

April 2021
Jonatan Jungmalm:
Running-related injuries among recreational runners

December 2021
Pia Desai:
Running-related injuries in recreational athletes. Incidence, risk factors and effectiveness of an injury-prevention programme

Steering Board Members

Frode Slinde, PhD, Head of Department, Department of Food and Nutrition, and Sport Science

Agneta Holmäng, Professor, Dean Medical Faculty, Gothenburg University

Ann Söderström, Director Healthcare services, Region Västra Götaland

Carolina Klüft, CEO Generation PEP, Honorary doctor of medicine at Sahlgrenska Academy, Former Heptathlete

Olle Larkö, Professor, Steering Board Inga-Britt and Arne Lundbergs Research Foundation, Former Dean Medical Faculty, Gothenburg University

Bo Edsberger, CEO Taxi Göteborg, Former Head of Gothenburg Half Marathon and Gothenburg Athletic Federation

Anders Albertsson, District Manager (Region Västra Götaland) of the National Sports Association (Riksidrottsförbund)

Patrik Mossberg, CEO Marinvest

Mattias Zackrisson, Head of Administration, Department of Food and Nutrition, and Sport Science.

Mats Börjesson, Professor, Manager, Center for Health and Performance, Department of Medicine

Stefan Grau, Professor, Manager, Center for Health and Performance, Department of Food and Nutrition, and Sport Science

Daniel Wennerlund, Project Coordinator and Communication, Center for Health and Performance, Department of Food and Nutrition, and Sport Science

Research

At CHP, we have established several interdisciplinary research projects and collaborations with a health and performance perspective within Sport, Physical Activity and Nutrition.

As a Center, our researchers are tied to either the host, Department of Food and Nutrition and Sport Science at the Faculty of Education or at the co-host, the Medical Faculty with Institute of Medicine. It adds to our multidisciplinary approach and opens for more international research collaborations between various disciplines, and contributes to our scientific performance in terms of the number of peer-reviewed publications and scientific presentations.

The two departments involved in CHP have different key competencies that offer the possibility to cover research questions from complementary perspectives.

The Department of Food and Nutrition and Sport Science adds their research expertise on food, nutrition and sport science, while the Institute of Medicine adds their knowledge in medicine, nutrition and rehabilitation.

Scientific output 2021 in Summary

47 Peer-Reviewed Publications in Scientific Journals, (25 with international collaboration)

3 peer-reviewed publications were accepted but not yet published.

1 Book and 8 Book chapter publications

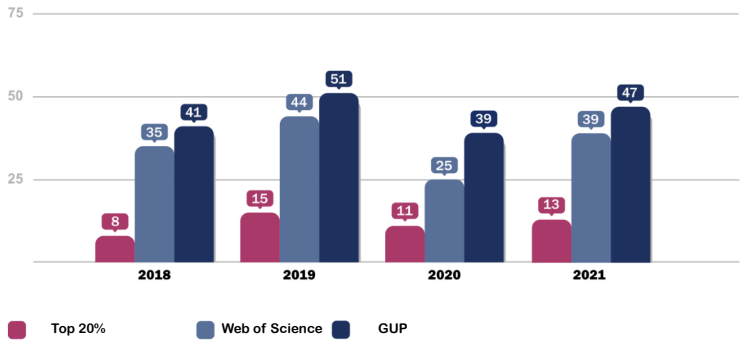
3 Doctoral Theses

Our staff serves as external reviewers and/or opponents for PhD theses for national and international universities, as reviewer for peer-reviewed journal articles (different journals) and as examiner for theses at the Department of Food and Nutrition and Sport Science at the Faculty of Education (BA & MA).

CHP-researcher function as associate editor for international journals (e.g. Br J Sports Med, Sensors) and have also appeared on national television and radio, in news articles, and as contributors or speakers at multiple international conferences.

Historical development of publications since 2018

Peer-Reviewed Publications



*GUP = University of Gothenburg Publication data base

New Research Projects

Children with congenital heart disease
Financed by: Heart and Lung Foundation, HeartLung (Riksförbundet Hjärt-lunga)
Collaborators: Sahlgrenska Academy, Västra Götaland Region, Deptartment of Psychology at GU

Association between change in fitness and healthcare consumption in Swedish adults.
Financed by: Heart and Lung Foundation
Collaborators: The Swedish School of Sport and Health Sciences (GIH), Stockholm Health Profile Institute (HPI)

Cooling feet for hot workplaces – improvement of work safety
Financed by: Elten
Collaborators: VRaktion Leipzig, Elten

MEDAL - Measuring Energy expenditure and Dietary intake at different Activity Levels
Financed by: Heart and Lung Foundation, ALF
Collaborators: Sahlgrenska Academy and Department of Food and Nutrition and Sport Science

SCAPIS – methodological development and individually adapted physical activity recommendations
Financed by: Heart and Lung Foundation, ALF (co-applicant)
Collaborators: Sahlgrenska Academy, The Swedish School of Sport and Health Sciences, GIH

Report from the 15th Footwear Biomechanics Symposium, July 21-23, 2021

During July 2021, we have been hosting the 15th Footwear Biomechanics Symposium, in collaboration with the Swedish School of Sports and Health Sciences (Prof. Arndt). The symposium was the first virtual conference in the history of Footwear Biomechanics Symposia, as the Covid situation didn´t allow us to have a physical meeting in Gothenburg. The planning and organization during the pandemic was complicated and we had to adapt our plans several times. Nevertheless, the symposium was a full success and everything went smooth.

Overall, we had 222 registrants from around the world, with registrations from all continents, except Africa. The majority of delegated were from North America and Europe. For the first time, Sweden was among the main countries with regard to the number of registrations. Half of the registrants were from Academia, the other half from Industry/ Public agencies. 20% of all delegates were students. During the three days, we had 50 oral short presentations, covering a wide range of footwear related topics.

Keynote speakers and awards

Several prices were awarded to the best papers/presentations, among them a young investigator award and awards for basic research, methodology, applied research and innovation.

Besides the oral short presentations we had three keynotes, one by Sebastian Coe (two times Olympic champion and President of World Athletics), one by Dr. Rasmus Ostergaard Nielssen (Footwear, sports injuries and causality), and one by Prof. Rana Hinman (Footwear to manage knee osteoarthritis).

The Round Table discussion covered the topic of performance enhancing shoes: what are they and do we want them? The round table discussion was followed by an international press conference, which was organized by World Athletics. Almost 50 international media representatives joined.

For the students, two time slots were offered to discuss perspectives and requirements to work in the industry with researchers from different footwear companies. All major (sport) shoe companies supported this discussion.

Finally, time slots were offered for industry sponsors to inform about latest developments and technologies.

All presentations were recorded and made available to those that could not listen to the live presentations due to the different time zones.

The website of the Symposium (https://fbs2021.footwearbiomechanics.org/) is still open for further information.

Special thanks

Due to the support of several conference and award sponsors, we were able to keep the conference fees low, in order to enable as many student participants and participants from developing countries as possible to register. This support also helped us to finish the Symposium with a positive result.

Special thanks needs to be given to Lundströms production company in Pixbo which helped us with the planning and production of the Symposium, as well as with their TV studio from where the Symposium was broadcasted.

Further thanks goes to Meetx and the Swedish Exhibition & Congress Centre in Gothenburg, which offered and handled all issues with the symposium platform.

The 16th Footwear Biomechanics Symposium will be in July 2023 in Osaka, Japan.

Prof. Stefan Grau, Manager Center for Health and Performance

Communication work

CHP researchers have participated in several scientific conferences and meetings during 2021 to present our research. In addition to this, our staff has also appeared on national TV, Newspapers, and radio to talk about the research conducted at CHP.

In general, this year's media appearances underline our research topics' public interest and societal relevance. For example, events such as the cardiac arrest during a football match in the European Championships resulted in an increased demand for Mats Börjesson’s expertise and he answered several questions on this topic.

Further, the doctoral thesis of Jonatan Jungmaln about running injuries for recreational runners was picked up by both the global magazine Runners world and one of Sweden's biggest health and exercise-related pods.

During the year, CHP intensified the efforts to increase online presence, visibility and conformity for the Center and its researchers. The website was updated visually and with new content based on a new communication strategy. As a part of this work, two social media accounts were registered where one now can follow our scientific production and public outreach activities.

At the end of this report an extensive list of our conferences and media appearances can be found.

GoCo-collaboration continues

GoCo Health Innovation City is a massive investment in people's health, wellbeing, and performance by establishing a partnership between academia, industry, and society (Municipalites, Region, Sports organizations). It is located in Mölndal, close to AstraZeneca, and will occupy a large area and involve a large number of people. New buildings are constructed in a rapid pace and the work is supported by large funders. One of those buildings will be designed for GoCo Active, a project targeting nutrition and physical activity for health and performance.

Since the Medical Faculty/Sahlgrenska Academy is one of the founding partners of GoCo, staff at CHP have been engaged from the beginning in the planning and development of GoCo Active (Mats Börjesson/responsible for the scientific programme, Daniel Arvidsson) and have contributed to numerous seminaries that have been released as films under "GoCo-studio" on YouTube (Mats Börjesson, Stefan Grau, Daniel Arvidsson, Stefan Pettersson, Dan Fransson).

The construction of the building will start at the end of 2022 and be completed in the summer of 2024. Importantly, GoCo Health Innovation City will potentially offer staff and students great opportunities in education, research, practice, and employment.

Consequently, we see this engagement as an essential investment for CHP, IKI and our two collaborating faculties.

Watch the seminars and keep up to date with our GoCo-collaboration at:

https://www.gu.se/en/chp/news-and-events

https://www.goco.se

Prof. Mats Börjesson, Manager Center for Health and Performance

Assoc. Prof Daniel Arvidsson, Center for health and performance

Launch of an Open Online Education

As a part of a university-wide pilot project on open online education, CHP has developed a course (three modules) focusing on Physical Activity, Health and Nutrition.

During fall 2021, the University of Gothenburg launched a set of open educations on different topics. In this initiative, CHP has developed an online open course (MOOC) on Lifestyle Habits.

In three modules, the students learn about physical activity - Basic concepts and key mechanisms, sustaining lifestyle changes including nutrition, and a finishing lecture on sensors and wearables for measuring physical activity.

Health, Nutrition and Measurements
With a broad perspective, the three modules introduce relevant research that explains both why and how to be physically active, the connection to public health policy, why we should avoid sedentary behaviour and how to promote lifestyle changes in a sustainable way.

Further, a final module is dedicated to the limitations and possibilities when using sensors and wearables to measure physical activity.

The international target group is broad and include practitioners from the health sector, personal trainers, people interested in increasing their physical activity and others who want to know more about being physically active.

How to take part
The three modules offer both video material and powerpoints as well as further reading links. In addition, each module will have a quiz that you need to complete in order to move on to the next module.

The course is self-paced which means that you decide when to take part and in what intensity.

Read more on our web under "Open Courses"

Daniel Wennerlund, Project Coordinator Center for Health and Performance

Listen to our researchers on these podcasts:

Tyngre träningssnack episode 294 (Running related injuries for recreational runners)

Främja fys-podden, S1Ep4 (On physical activity)

Break-a-leg podden Episode (Sudden cardiac arrests during football matches)

Tyngre träningssnack episode 176 (On football related injuries)

Prestera mera episode 261 (On doing research and being an elite athlete)

Education

CHP provides education for students in sport science and medicine in the fields of biomechanics, physiology, match analysis, training, sports medicine, anatomy and physical activity, in order to prepare students for their future dedication.

Teaching for the Department of Food and Nutrition and Sport Science at the Faculty of Education

BACHELOR LEVEL
SPORT COACHING, HEALTH PROMOTION

Curricular courses
Anatomy, Physiology, Biomechanics, Training Science I and Sports Medicine, Nutrition I and II, Organic chemistry and Biochemistry

Free standing courses
Training- and Match Analysis in Team-sports, Assessment of Human Performance I and Training Science II.

TEACHER EDUCATION
(Teaching hours) Anatomy, Physiology, Biomechanics and Exercise Physiology

NUTRITION, HEALTH ECONOMICS
Nutritional aspects on food habits and meals, Food chemistry nutritional biology

MASTER LEVEL (INTERNATIONAL MASTER SPORT SCIENCE)
Measurement methods I: Diet and physical activity; Measurement methods II: Movement, strength, body composition and physical capacity; Sports medicine in Health and Performance; Applied quantitative data analysis; Internship I; Internship II

Teaching for the Medical Faculty (Sahlgrenska Academy)

Medical students:
Physical activity for health, Contributions to Lifestyle-week (physical activity), Exercise Physiology lab demonstrations

Dental and pharmacological students:
Exercise Physiology lab demonstrations:

Physiotherapy students:
Exercise physiology and physical exercise, Exercise Physiology lab demonstrations

Dietitian students:
Physical activity measurement

Strategic work

We work on a number of strategic issues to create favorable conditions for all our activities. This includes both financial conditions, research applications, communication and promotion of the Center.

- Support Support of the newly established GoCo Health Innovation City cluster (GoCo) with a series of seminars and discussion forums related to health, nutrition, and physical activity. The support will continue in 2022, when more researchers from CHP will present their projects. Read about GoCo and its partners at https://goco.se/
- CHP is a partner in the University Pilot Project for Open Online Education (DURK-project). CHP has developed a MOOC on Lifestyle Habits with a focus on Nutrition, Physical activity and health. A further MOOC about the development of injuries in/due to sport is under planning. Read more about the DURK-project at https://pil.gu.se/projekt/durk
- Application for a special VINNOVA call for Precision Health in June 2021 together with Astra Zeneca, SAS and Region Västra Götaland.
- Support of the elite sports initiative of the City of Gothenburg as well as the collaboration between Gothenburg University, the Swedish Athletic Federation, the Gothenburg Athletic Federation, the Swedish Elite Runners Center in Gothenburg, RF SISU Västra Götaland and the Elite Sports Gymnasium in Gothenburg.
- Development of a collaboration with the Swedish Speed skating Federation (together with the Department of Food and Nutrition, and Sport Science) to support their development scientifically.
- Organization and hosting of the 15th Footwear Biomechanics Symposium (digital). Read more about the conference at https://fbs2021.footwearbiomechanics.org/
- Development of a communication plan and strategy. Updating of the Center website as well as opening of two social media channels (LinkedIn & Twitter).
- Work to become a provider of evidence-based research and knowledge on physical activity and health, supporting the clinical health care and public health (in Västra Götaland Region and nationally) as well as other researchers, governing bodies (National Bureau of Health and Welfare etc.), and the national system for Clinical Knowledge Management (in Swedish: Kunskapsstyrning, NPO, RPO).
- CHP contributed to the national guidelines for physical activity launched by the Public Health Agency in 2021
- Work to increase our role as a Scientific player on the national and international level through continued development of collaborations (Universities, authorities, sports federations, clubs & races).

Collaborations

Industry and civil society

ELTEN

One of the leading manufacturers of safety footwear in Europe. Since 1910, Elten as a family company produces safety shoes in Uedem on the Lower Rhine in Germany.

GoCo Health Innovation City

GoCo Health Innovation City boasts a diverse set of companies, organizations, and individuals working to unlock new solutions to global health challenges.

Generation Pep

Generation Pep is a non-profit organisation working to give children and young people the opportunity and will to live active and healthy lives.

Cosmed

COSMED, an Italian company established in 1980, designs, manufactures and sells worldwide diagnostic medical devices to assess Cardiopulmonary and Metabolic functions and Body Composition.

Academic

Gothenburg University Collaborations

Department of Psychology

Medical Faculty departments, institutes and units: Neuroscience and Physiology, Orthopedics, Medicine, Pulmonary Medicine, Physiology, Sleep Center, Cognition, Bone Health, Surgery SORG, Center for Neuropsychiatry, StressMedicine (ISM), Pediatrics

Centre for Ageing and Health (AgeCap)

Department of Earth Science

National and international collaborations

University of Örebro

Umea University

Mid University in Östersund

Uppsala University

Swedish School of Sports and Health Sciences (GIH)

Technical University in Chemnitz (Germany)

Medical Technical University in Remagen (Germany)

SEMLI Institute, Pretoria University, (SouthAfrica)

University Miguel Hernandez (Spain)

University in Bielefeld (Germany)

University in Jyväskulä (Finland)

KU Leuven (Belgium)

University Turin (Italy)

University of Paderborn (Germany)

Sport sector

World Athletics (IAAF)

Intl. Paralympics Federation (IPF)

Swedish Olympic Committee (SOK)

Swedish Badminton Association

Swedish Football Association

Swedish Innebandy Association

SweSkating (Swedish Speed Skating Association)

Swedish Athletic Association

Göteborg Athletic Association

GöteborgsVarvet (Half marathon)

IFK Göteborg (Football)

IF Elfsborg (Football)

Djurgården IF (Football)

Helsingborg IF (Football)

BK Häcken (Football)

Frölunda (Ice hockey)

Health care and Public sector

Sahlgrenska University Hospital

Västra Götaland Region

City of Gothenburg

Göteborg & Co

Swedish Public Health Agency

Economy in summary

Both the host department (Department of Food and Nutrition and Sport Science) and the Co-department (Institute of Medicine) contribute financially to the CHP budget.

Total budget CHP 2021: ~14.2 MSEK

- 32% of the budget comes from the host department for CHP staff to teach in the departments´ ground education (bachelor and master programs) as well as to teach for other departments.
- 36% of the budget is (strategic) support from the host department and the co- department for CHP research and administration. A large proportion of this research support from both departments is refunding to CHP for performance-related scientific output in previous years.
- 29% of the budget of CHP is from external research grants
- 3% of the budget is for duties for the host-departement (e.g. deputy head of research)

About CHP

In 2017, CHP was established as an official center at the University of Gothenburg. The vision is to become an internationally recognized research center in the field of health promotion and sport performance through multidisciplinary collaboration, innovative entrepreneurship, and product development in collaboration between academia and the surrounding community.

A center is expected to be multidisciplinary and as such has a complementary function to departments and other units. A center is an open meeting place where both external and university-based parties are given the opportunity for dialogue and collaboration within the framework of the center's activities. At least two faculties are involved in each university-wide center. With regards to CHP this is the Faculty of Education and the Faculty of Medicine (Sahlgrenska Academy).

Scientific output 2021

PEER REVIEWED JOURNAL PUBLICATIONS

Title	Authors	Journal
Low physical activity in patients diagnosed with head and neck cancer	Magdalena Karczewska-Lindinger, Lisa Tuomi, **Jonatan Fridolfsson**, **Daniel Arvidsson**, **Mats Börjesson**, Caterina Finizia	Laryngoscope Investigative Otolaryngology
ESC 2020 Guideline on sport and exercise cardiology in patients with cardiovascular disease ESC task force on sport cardiology and exercise cardiology in patients with cardiovascular disease	A. Pelliccia, S. Sharma, S. Gati, Maria Bäck, **Mats Börjesson**, S. Caselli, J. P. Collet, D. Corrado, J. A. Drezner, M. Halle et al.	Revista Espanola De Cardiologia
Recommendations for participation in leisure-time physical activity and competitive sports of patients with arrhythmias and potentially arrhythmogenic conditions. Part 2: ventricular arrhythmias, channelopathies, and implantable defibrillators.	Hein Heidbuchel, Elena Arbelo, Flavio D'Ascenzi, **Mats Börjesson**, Serge Boveda, Silvia Castelletti, Hielko Miljoen, Lluis Mont, Josef Niebauer, Michael Papadakis et al.	Europace : European pacing, arrhythmias, and cardiac
Fitness, strength and severity of COVID-19: a prospective register study of 1 559 187 Swedish conscripts	Agnes af Geijerstam, Kirsten Mehlig, **Mats Börjesson**, Josefina Robertson, Jenny Nyberg, Martin Adiels, Annika Rosengren, Maria A I Åberg, Lauren Lissner	BMJ Open
Physical activity during pregnancy and association with changes in fat mass and adipokines in women of normal-weight or with obesity	Ulrica Andersson Hall, Hanna K. de Maré, Freja Askeli, **Mats Börjesson**, Agneta Holmäng	Scientific Reports
Nonresponders of Physical Activity on Prescription (PAP) Can Increase Their Exercise Capacity with Enhanced Physiotherapist Support	Tom Martinsson Ngouali, **Mats Börjesson**, Åsa Cider, Stefan Lundqvist	International Journal of Environmental Research and Public Health
Prevalence of Subclinical Coronary Artery Atherosclerosis in the General Population.	Göran Bergström, Margaretha Persson, Martin Adiels, Elias Björnson, Carl Bonander, Håkan Ahlström, Joakim Alfredsson, Oskar Angerås, Göran Berglund, **Mats Börjesson** Anders Blomberg et al.	Circulation
Correction to: Integrating Transwomen and Female Athletes with Differences of Sex Development (DSD) into Elite Competition: The FIMS 2021	Blair R Hamilton, Giscard Lima, James Barrett, Leighton Seal, Alexander Kolliari-Turner, Guan Wang, Antonia Karanikolou, Xavier Bigard, Herbert Löllgen, Petra Zupet, **Mats Börjesson** et al.	Sports medicine (Auckland, N.Z.)

Recreational Runners With a History of Injury Are Twice as Likely to Sustain a Running-Related Injury as Runners With No History of Injury: A 1-Year Prospective Cohort Study	**Pia Desai**, **Jonatan Jungmalm**, **Mats Börjesson**, Jón Karlsson, **Stefan Grau**	Journal of Orthopaedic and Sports Physical Therapy
Athletes with valvular heart disease and competitive sports: a position statement of the Sport Cardiology Section of the European Association of Preventive Cardiology.	Frank van Buuren, Sabiha Gati, Sanjay Sharma, Michael Papadakis, Paolo Emilio Adami, Josef Niebauer, Antonio Pelliccia, Volker Rudolph, **Mats Börjesson**, Francois Carre et al.	European journal of preventive cardiology
Sports and exercise medicine in Europe and the advances in the last decade.	Daniel Neunhaeuserer, Josef Niebauer, Gino Degano, Veronica Baioccato, **Mats Börjesson,** Maurizio Casasco, Norbert Bachl, Nicolas Christodoulou, Juergen et al.	British journal of sports medicine
Insomnia is associated with metabolic syndrome in a middle-aged population: the SCAPIS pilot cohort	Ding Zou, H. Wennman, Jan A Hedner, Ö Ekblom, Olof Drotz, **Daniel Arvidsson**, Göran Bergström, Ludger Grote, **Mats Börjesson**	European Journal of Preventive Cardiology
Integrating Transwomen and Female Athletes with Differences of Sex Development (DSD) into Elite Competition: The FIMS 2021 Consensus Statement	Blair R. Hamilton, Giscard Lima, James Barrett, Leighton Seal, Alexander Kolliari-Turner, Guan Wang, Antonia Karanikolou, Xavier Bigard, Herbert Löllgen, Petra Zupet, Anca Ionescu, Andre Debruyne, Nigel Jones, Kathryn North, Siddhartha S. Angadi, Maria Jose Martinez-Patiño, **Mats Börjesson,** et.al	Sports Medicine
Participation in exercise-based cardiac rehabilitation is related to reduced total mortality in both men and women: results from the SWEDEHEART registry.	Örjan Ekblom, Åsa Cider, Kristina Hambraeus, Maria Bäck, Margrét Leosdottir, Amanda Lönn, **Mats Börjesson**	European journal of preventive cardiology
The use of coping strategies "shift-persist" mediates associations between physical activity and mental health problems in adolescents: a cross-sectional study	Johan Dahlstrand, Peter Friberg, **Jonatan Fridolfsson**, **Mats Börjesson**, **Daniel Arvidsson**, Ö Ekblom, Yun Chen	BMC Public Health

Physical activity, self-efficacy and quality of life in patients with chronic pain, assessed during and 1 year after physiotherapy rehabilitation - a prospective follow-up study	Emma Varkey, Angelica Dahlbäck, M. Thulin, **Mats Börjesson**, **Daniel Arvidsson**, **Jonatan Fridolfsson**, Paulin Andréll	Disability and Rehabilitation
Methodological implications of adapting and applying a web-based questionnaire on health problems to adolescent football players	Solveig E. Hausken-Sutter, Astrid Schubring, **Stefan Grau**, Klara Boije af Gennäs, N Barker-Ruchti	BMC Medical Research Methodology
Association between change in cardiorespiratory fitness and incident hypertension in Swedish adults	T. Holmlund, B. Ekblom, **Mats Börjesson**, G. Andersson, P. Wallin, E. Ekblom-Bak	European Journal of Preventive Cardiology
Effect of Short-Term Homebased Pre- and Postoperative Exercise on Recovery after Colorectal Cancer Surgery (PHYSSURG-C): A Randomized Clinical Trial.	Aron Onerup, John Andersson, Eva Angenete, David Bock, **Mats Börjesson**, Carolina Ehrencrona, Monika Fagevik Olsén, Per-Anders Larsson, Hanna de la Croix, Anette Wedin et al.	Annals of surgery
Establishing a Global Standard for Wearable Devices in Sport and Exercise Medicine: Perspectives from Academic and Industry Stakeholders	G. I. Ash, M. Stults-Kolehmainen, M. A. Busa, A. E. Gaffey, K. Angeloudis, B. Muniz-Pardos, R. Gregory, R. A. Huggins, N. S. Redeker, S. A. Weinzimer, **Mats Börjesson** et al.	Sports Medicine
The importance of physical activity and cardiorespiratory fitness for patients with heart failure	Martin Lindgren, **Mats Börjesson**	Diabetes Research and Clinical Practice
Applying learning theories in learning how to teach physical education: a study of teacher education students collaborative learning processes in a project.	Glenn Kjerland, **Claes Annerstedt**	Sport, Education and Society
Physical activity spectrum discriminant analysis—A method to compare detailed patterns between groups	**Jonatan Fridolfsson**, **Daniel Arvidsson**, Lars Bo Andersen, Ola Thorsson, Per Wollmer, Björn Rosengren, Magnus K. Karlsson, Magnus Dencker	Scandinavian Journal of Medicine and Science in Sports
Don't buy a pig in a poke: Considering challenges of and problems with performance analysis technologies in Swedish men's elite football	N. Barker-Ruchti, R. Svensson, D. Svensson, **Dan Fransson**	Performance Enhancement and Health

Physical activity in children and adolescents with CHD: Review from a measurement methodological perspective	**Pia Skovdahl**, Cecilia Kjellberg Olofsson, **Daniel Arvidsson**	Cardiology in the Young
Measurement of physical activity by shoe-based accelerometers—calibration and free-living validation	**Jonatan Fridolfsson**, **Daniel Arvidsson**, **Stefan Grau**	Sensors
Physical workload and fatigue pattern characterization in a top-class women's football national team: a case study of the 2019 FIFA Women's World Cup	F. Yousefian, Hannah Hüttemann, **Mats Börjesson**, Pontus Ekblom, M. Mohr, **Dan Fransson**	Journal of Sports Medicine and Physical Fitness
Is Physiological Equivalent Temperature (PET) a superior screening tool for heat stress risk than Wet-Bulb Globe Temperature (WBGT) index? Eight years of data from the Gothenburg half marathon.	Sofia Thorsson, D.P. Rayner, Gunnar Palm, Fredrik Lindberg, Eric Carlström, **Mats Börjesson**, Finn Nilson, Amir Khorram-Manesh, Björn Holmer	British journal of sports medicine
The Development and Precision of a Custom-Made Skitester	T. Lemmettylä, T. Heikkinen, O. Ohtonen, **Stefan Lindinger**, V. Linnamo	Frontiers in Mechanical Engineering
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Mechanical Energy and Kinematics of Double Poling Technique Performed at Different Inclines by World-Level Cross-Country Skiers During World Cup Races	Arrigo Canclini, Antonio Canclini, Guido Baroni, **Stefan Lindinger**, Renzo Pozzo	Journal of Science in Sport and Exercise
Force Generation Profiles of Para-Nordic Sit-Skiers Representing Different Physical Impairments	M. Karczewska-Lindinger, V. Linnamo, V. Rosso, L. Gastaldi, W. Rapp, Y. Vanlandewijck, **Stefan Lindinger**	Journal of Science in Sport and Exercise
High-intensity activity is more strongly associated with metabolic health in children compared to sedentary time: a cross-sectional study of the I.Family cohort	**Jonatan Fridolfsson**, C. Buck, Monica Hunsberger, J. Baran, F. Lauria, D. Molnar, L. A. Moreno, **Mats Börjesson**, Lauren Lissner, **Daniel Arvidsson**	International Journal of Behavioral Nutrition and Physical Activity

Frequent blood flow restricted training not to failure and to failure induces similar gains in myonuclei and muscle mass	T. Bjornsen, **Mathias Wernbom**, G. Paulsen, S. Berntsen, R. Brankovic, H. Stalesen, J. Sundnes, Truls Raastad	Scandinavian Journal of Medicine & Science in Sports
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Intrarater Reliability and Agreement of Recommended Performance-Based Tests and Common Muscle Function Tests in Knee Osteoarthritis.	Pætur Mikal Holm, Mette Nyberg, **Mathias Wernbom**, Henrik Morville Schrøder, Søren Thorgaard Skou	Journal of geriatric physical therapy (2001)
Effects of two randomized and controlled multi-component interventions focusing on 24-hour movement behavior among office workers: A compositional data analysis	Lisa Marie Larisch, Emil Bojsen-Møller, Carla F.J. Nooijen, Victoria Blom, Maria Ekblom, Örjan Ekblom, **Daniel Arvidsson**, **Jonatan Fridolfsson**, David M. Hallman, Svend Erik Mathiassen et al.	International Journal of Environmental Research and Public Health
Children and Adolescents Treated for Valvular Aortic Stenosis Have Different Physical Activity Patterns Compared to Healthy Controls: A Methodological Study in a National Cohort	**Pia Skovdahl**, Cecilia Kjellberg Olofsson, Jan Sunnegårdh, **Jonatan Fridolfsson**, **Mats Börjesson**, Sandra Buratti, **Daniel Arvidsson**	Pediatric Cardiology
The gap between stated importance of and clinical work in promoting healthy lifestyle habits by healthcare professionals in a Swedish hospital setting: A cross-sectional survey	A. Ek, O. Ekblom, M. Ekstrom, **Mats Börjesson**, L. V. Kallings	Health & Social Care in the Community
Constitutive PGC-1α Overexpression in Skeletal Muscle Does Not Contribute to Exercise-Induced Neurogenesis.	Lars Karlsson, María Nazareth González-Alvarado, Reza Motalleb, Yafeng Wang, Yong Wang, **Mats Börjesson**, Changlian Zhu, Hans-Georg Kuhn	Molecular neurobiology
Long-term risk of stroke and myocardial infarction in middle-aged men with a hypertensive response to exercise: a 44-year follow-up study.	Kok Wai Giang, Per-Olof Hansson, Zacharias Mandalenakis, Carina Ulla Persson, Gunnar Grimby, Kurt Svärdsudd, Lars Wilhelmsen, **Mats Börjesson**, Per Ladenvall	Journal of hypertension

Six Weeks of Aerobic Exercise in Untrained Men With Overweight/Obesity Improved Training Adaptations, Performance and Body Composition Independent of Oat/Potato or Milk Based Protein-Carbohydrate Drink Supplementation.	**Stefan Pettersson**, **Fredrik Edin**, Carl Hjelte, David Scheinost, Sandro Wagner, Björn Ekblom, Niels Jessen, Klavs Madsen, Ulrica Andersson Hall	Frontiers in nutrition
2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease.	Antonio Pelliccia, Sanjay Sharma, Sabiha Gati, Maria Bäck, **Mats Börjesson**, Stefano Caselli, Jean-Philippe Collet, Domenico Corrado, Jonathan A Drezner, et al.	European heart journal
Delphi developed syllabus for the medical specialty of sport and exercise medicine: part 2.	David Humphries, Rod Jaques, H Paul Dijkstra, Irfan Asif, Mark E Batt, **Mats Börjesson**, Emin Ergen, Celeste Geertsema, Boris Gojanovic, Anca Ionescu et al.	British journal of sports medicine
Testing cost containment of future healthcare with maintained or improved quality—The COSTCARES project	Karl Swedberg, Desmond Cawley, Inger Ekman, Heather L. Rogers, Darijana Antonic, Daiga Behmane, Ida Björkman, Nicky Britten, Sandra C. Buttigieg, Vivienne Byers, **Mats Börjesson** et al.	Health Science Reports
The role of modern cardiovascular imaging in (suspected) coronary artery disease in competitive athletes	P. Sörensson, Mikael Dellborg, **Mats Börjesson**	Trends in Cardiovascular Medicine
Youth sport injury research: a narrative review and the potential of interdisciplinarity	**Solveig E. Hausken-Sutter**, Richard Pringle, Astrid Schubring, **Stefan Grau**, Natalie Barker-Ruchti	BMJ Open

BOOKS AND BOOK CHAPTERS

Title	Authors	Type	Book
Fysisk aktivitet vid hypertoni	**Mats Börjesson**, Stefan Lundqvist, Aron Onerup, **Daniel Arvidsson**, Björn Dahlöf	Book chapter, reviewed	FYSS 2021
Smärta och fysisk aktivitet	Monika Läfgren, Karin Jensen, Paulin Andrell, Emma Varkey, **Mats Börjesson**, Eva Kosek	Book chapter, reviewed	FYSS 2021
Idrottsrelaterad plötslig hjärtdöd	**Mats Börjesson**, Erik E Solberg, Eva Nylander, Mikael Dellborg	Book chapter, reviewed	FYSS 2021
Riskbedömning vid fysisk aktivitet	**Mats Börjesson**	Book chapter, reviewed	FYSS 2021
Smärta vid myokardischemi	Paulin Andrell, **Mats Börjesson**, Clas Mannheimer	Book chapter, reviewed	Långvarig smärta-smärtmedicin vol 2
Distansbaserad blended learning - ett realtidssamarbete inom biomekanik.	**Claes Annerstedt**	Book chapter, reviewed	Medicinsk informatik. Göran Petersson, Martin Rydmark och Anders Thurin [red.]
Skolans friluftsdagar ur ett historiskt perspektiv	**Claes Annerstedt**, Marie Annerstedt	Book chapter, reviewed	Idrott Historia & Samhälle. Svenska idrottshistoriska föreningens årsskrift.
Idrottsdidaktik.	**Claes Annerstedt**	Book chapter, reviewed	Tio forskare om ämnesdidaktik. Tomas Kroksmark (redaktör)
FYSS 2021	**Mats Börjesson**, Ing-Mari Dohrn	Book, reviewed	FYSS 2021
Overuse injuries in Swedish elite athletics - Incidence, occurrence, athlete availability, and risk factors	**Andreas Lundberg Zachrisson**	Doctoral Thesis	
Running-related injuries among recreational runners. How many, who, and why?	**Jonatan Jungmalm**	Doctoral Thesis	
Running-related injuries in recreational athletes.	**Pia Desai**	Doctoral Thesis	

ACCEPTED NOT PUBLISHED

Title	Authors	Journal
Risk factors for not finishing an ultramarathon: 4-year study in 23996 race starters, SAFER XXI	Sewry N, Schwellnus M, **Borjesson M**, Swanevelder S, Jordaan E.	Sports Med Phys Fitness
DHEA-S production capacity in relation to perceived prolonged stress.	Lennartsson A-K, Arvidson E, **Börjesson M**, Jonsdottir IH.	Stress 2021.
Impact of equipment color on competition outcome in Premier League karate. Accepted for publication 2021-09-10 in	Jozef Berglez, **Daniel Arvidsson**	J Martial Arts Anthro.

NON-PEER REVIEWED Contributions and articles

Title	Author	Type	Published in
A veteran athlete post myocardial infarction: keep running (contra)	Mats Börjesson	Conference	Cardiac Risk of The Young (CRY) Annual meeting, London, Oct 15, 2021
A veteran athlete with coronary artery disease: what to the guidelines say?	Mats Börjesson	Conference	European Soc Cardiology (ESC) Annual meeting, Aug 29, 2021
Biomechanics concept inventory for Sports Coaching students	Jonatan Jungmalm	Conference	The Annual Conference of Swedish Society of Biomechanics, 18 March, Virtual Conference
Cardiac screening and cardiac arrest on the pitch	Mats Börjesson	Article	Aspetar Sports Med J
Dags att ta tag i tidskriften	Claes Annerstedt	Article	Idrott & Hälsa
ECG screening: establishing priorities when resources are limited	Mats Börjesson	Conference	Int Olympic Committe (IOC) Prev Congress, Monaco, Nov 26, 2021
Editorial to the 15th Footwear Biomechanics Symposium	Stefan Grau	Introduction	Footwear Science
ESC guidelines on Sports Cardiology	Mats Börjesson	Conference	Norwegian Sports Cardiology Seminar, March 4, 2021
Exercise and sports activity in the veteran athlete with suspected coronary artery	Mats Börjesson	Conference	Brazilian/Pan-American Sports Med Congress, Oct 29, 2021

disease: how to decide about participation?			
Fysisk aktivitet- den tredje vaccinationsdosen	Mats Börjesson	Article	Läkartidningen
Halverad mortalitet hos unga svenska idrottsutövare- pga screening?	Mats Börjesson	Conference	Norwegian Sports Csardiology Seminar, 4 March, 2021
How to predict and prevent serious medical encounters in endurance competitions	Mats Börjesson	Conference	FIMS World Congress Sports Med, Athens, Sep 25, 2021
Models to increase PA in health care- evidence for the Swedish PAP model	Mats Börjesson	Conference	Sports, Medicine and Health summit 2021, Hamburg, April 24, 2021
Sports and exercise medicine in Europe and the advances in the last decade.	Mats Börjesson	Introduction	British journal of sports medicine
Swedish PAP- using a patient centered perspective	Mats Börjesson	Conference	American Medical Soc Sports Med, Annual meeting, April 13, 2021
Beakta hjärtkomplikationer av covid-19 vid återgång i idrott	**Mats Börjesson**, Stefan James	Article	Läkartidningen