Collaborations

Aalborg Hospital, Gävle University, German Sport University Cologne, Karolinska Institutet, Lillehammer University College, Mc Gill University, National Research Centre for the Working Environment, The Hong Kong Polytechnic University, Norwegian School of Sport Sciences, Syddansk Universitet, Technical university of Munich, University School of Physical Education Wroclaw, Université de Grenoble Alpes, Universidad Rey Juan Carlos, University College North Jutland, Universidade Federal de São Carlos, University of Auckland, University of Southampton, Universidad Granada, Århus University, Copenhagen University, University of Jyväskylä.

Affiliated institution of the European College of Sports Science

Innovation

Collaboration

with a number of private companies, e.g. Active Sportswear, Alectia, Anybody, AaB A/S, Brooks, DJO Nordic, DSB, Dansk Boldspil Union, Dansk Håndbold Forbund, Ecco, Ergomat, Footbalance, Grontmij | Carl Bro A/S, HedeDanmark, Medicovi, Meyland— Smith, Newline, Ortopædkirurgisk speciallægepraksis v. Søren Kaalund, Sahva, SAS, Scaniro, Sports Pharma.

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As well as approx. 15 PhD students.

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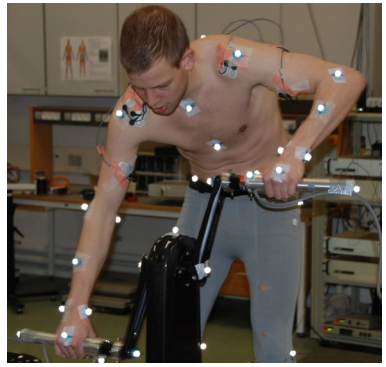
DEPARTMENT OF HEALTH
SCIENCE AND TECHNOLOGY
AALBORG UNIVERSITY

Physical activity and Human performance



Objectives:

To study and analyze fundamental influences of physical work and exercise on the organization of human movement, motor control, metabolism and musculo-skeletal loading patterns.

SMI

Research group on Physical activity and Human performance

Homepage:

http://www.smi.hst.aau.dk/research/rigs/physical-activity-and-human-performance/

Objectives:

Our main activities aim at **optimizing performance** in sports and at work, to **prevent musculoskeletal overload** and **injury** and to **optimize rehabilitation** after injury. The research areas cover **humanities**, **social** & **natural** sciences.

Research areas:

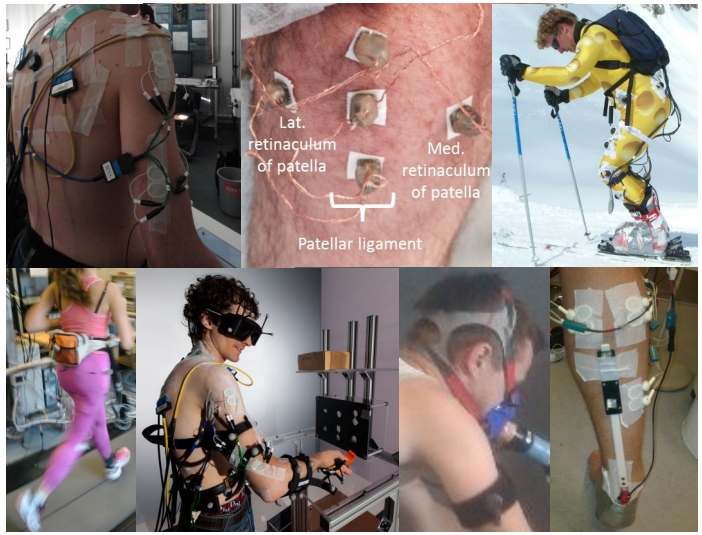
The research is focused on two axes:
- Research within humanities & social sciences focusing on recognized **cultures in sport clubs**, transitional changes for **talented athletes** as well as body and mind connections in **physical learning activities**.
- Research within natural sciences contributing to the basic **understanding of neuromuscular, physiological** and **biomechanical adaptations to physical activity.**

A special focus lies on the development and application of research methods for innovative research in sports, exercise physiology, biomechanics & ergonomics. The goal is to apply and develop basic knowledge to enhance athletes/workers motor skills for improving performance and preventing injuries. An important part of this effort is dedicated to improvement of training modalities and equipment in parallel with the technological development.

The Physical Activity and Human Performance group consists of specialists from **Biomechanics, Coaching, Engineering, Ergonomics, Physiology, Physiotherapy and, Sport Sciences.** The interdisciplinary character of the group enables us to holistically approach applied as well as fundamental research questions.

Fundamental areas:

- Control of movement, role of afferent feedback in movement generation and balance control
- Development of new models to investigate biological adaptation to loading and training
- Novel concepts of linking physiological and mechanical responses
- Cultures, learning and talent development in relation to sports and physical activities



Methods and instrumentation:

Qualitative and quantitative methods. Subjective assessment of perceived exertion, stress and pain. Objective Physiological assessments: Oxygen consumption, blood lactate, ECG, eye tracking, surface electromyography, mechanomyography, transcranial magnetic stimulation and reflex assessment by advanced perturbators. Kinetic measurements, force transducers, force platforms, pressure sensitive devices. Kinematics: accelerometers, gyroscopes, goniometers, 2D and 3D recordings, musculo-skeletal models, Sensors and equipment for *in-situ* data collection.

Educational programs:

Sports Science and Sports Technology
Biomedical Engineering and Informatics
Clinical Science and Technology
Industrial Medicine, Medicine
Product Design and Psychology
International doctoral School in Biomedical Science and Engineering
Post doctoral opportunities

Topics:

Sport science
Exercise physiology
Physical activity
Measurement techniques
Man-machine interaction
Biomechanics
Data processing
Musculo-skeletal modelling
Ergonomics

Application fields:

- Work-related musculoskeletal pain
- Risk factors for sports injury
- Training programs
- Short /long term tissue reactions to interventions/training
- Clinical gait analysis
- Work-place and tools assessments and design

Laboratories:

Laboratory for Applied Exercise Physiology and Metabolism
Laboratory for Neuromechanics and Exercise
Laboratory for Ergonomics and Work-related Disorders
Laboratory for Motor Behaviour and Performance
Laboratory for Movement Dynamics and Sport Technology
Laboratory for Musculoskeletal Modeling