AARHUS UNIVERSITY

Press release

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Basic information

Name: Anders Meldgaard Kristensen Email: amk@ph.au.dk Phone: 28704586

Department of: Public Health

Main supervisor: Kristian Overgaard

Title of dissertation: Muscle physiological studies of the force-velocity relationship during fatigue

Date for defence: 15-11-2019 at (time of day): 13:00 Place: Dalgas avenue 4, 8000 Aarhus C

Press release (Danish)

Ny viden om forholdet mellem muskel kraft og forkortningshastighed under udtrætning

Menneskers funktionelle kapacitet bestemmes af skeletmusklernes evne til at genere og bibeholde effekt. Effekt er defineret som kraft gange hastighed, og kan derfor bestemmes ud fra musklers kraft-hastigheds forhold. Tabet i maksimal effekt skyldes en reduktion i den maksimale kontraktionskraft, en reduktion i den maksimale forkortningshastighed samt en stigning i kurvaturen af kraft-hastighedsforholdet. Historisk set er der lavet mest forskning vedr. den maksimale kontraktionskraft samt forkortningshastighed. Nye studier har dog vist, at en øget kraft-hastighedskurve bidrager substantielt til skeletmusklers tab af effekt. Dette gør sig specielt gældende for muskler bestående primært af langsomme type 1 fibre, hvor en øget kraft-hastighedskurve kan bidrage med mere end 50% til tabet af effekt. De cellulære mekanismer der ligger til grund for denne øgede kraft-hastighedskurve kendes ikke. Det er dog blevet påvist at hverken en reduktion i mængden af ilt musklerne har til rådighed, eller en reduktion i calcium niveauet fra sarcoplasmatisk reticulum øger kurvaturen af kraft-hastighedsforholdet. Resultaterne er fremkommet via et nyt ph.d.-projekt fra Aarhus Universitet, Health. Projektet er gennemført af Anders Meldgaard Kristensen, der forsvarer det d. 15. november 2019.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 15/11/2019 kl. 13:00 i auditorium 137 på idræt, Aarhus Universitet, Dalgas Avenue 4, 8000 Aarhus C. Titlen på projektet er "Muskel fysiologiske studier af kraft-hastighedskurven under udtrætning". For yderligere oplysninger kontakt: Ph.d.-studerende Anders Meldgaard Kristensen, e-mail: amk@ph.au.dk, tlf. 28704586.

Bedømmelsesudvalg:
Bedømmelsesformand, Professor, Helle Prætorius Øhrwald, Institut for biomdeicin Aarhus Universitet, Danmark.
Lektor, Joachim Nielsen, Institut for idræt og biomekanik Syddansk Universitet, Danmark.
Professor, Hans Degens, Institut for idræts- og sportsvidenskab, Mancester Metropolitan Universitet, England.

Press release (English)

New knowledge regarding the relationship between force and shortening velocity of skeletal muscles during fatigue.

Human exercise performance depends on the ability of the skeletal muscle to generate and maintain power. Power is defined as force times velocity. Maximal power is therefore determined from the force-velocity relationship of the muscles. Loss of maximal power is due to a reduction in maximal contraction force, a reduction in maximal shortening velocity and an increase in the curvature of the force-velocity relationship. Historically, most studies on fatigue have focused on maximal contraction

force and shortening velocity. However, new studies have shown that an increased curvature of the force-velocity relationship plays an important role concerning loss of maximal power. Especially, in slow-twitch muscles, where an increased curvature of the force-velocity relationship can be responsible for more than 50% of the loss of power. Cellular mechanisms responsible for an increased force-velocity curvature was likevise investigated, including the effect of lack of available oxygen and a reduction in released calcium from sarcoplasmic reticulum. The results are obtained through a new PhD project from Aarhus University, Health. The project has been completed by Anders Meldgaard Kristensen, defending it d. 15.11.2019.

The defence is public and takes place on 15/11 at 1 pm in auditorium 137 at sports science, Aarhus University, dalgas avenue 4, 8000 Aarhus . The title of the project is "Muscle physiological studies of the force-velocity relationship during fatigue". For more information, please contact PhD student Anders Meldgaard Kristensen, email: amk@ph.au.dk, Phone +45 28704586.

Assessment committee:
Chairman of the committee, Professor, Helle Prætorius Øhrwald, Department of biomedicine, Aarhus University, Denmark.
Associate Professor, Joachim Nielsen, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Denmark.
Professor, Hans Degens, Department of Exercise and Sport Science, Mancester Metropolitan University, England.

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