



INTERNATIONAL CONSENSUS CONFERENCE “PERFORMANCE IN TOP SPORTS INVOLVING INTENSE EXERCISE”

COPENHAGEN 16 - 18 SEPTEMBER 2009

The aim of this consensus conference is to facilitate the presentation and discussion of the latest knowledge on performance in high intensity elite sports. Specifically, the aim is to produce a series of statements and recommendations that can be used by decision makers in sport as well as in politics and economy. The conference will conclude with a press release presenting the statements and recommendations.

The conference includes two different scientific perspectives: sport psychology human physiology.

The conference presentations and statements will be published in a special issue of Scandinavian Journal of Medicine and Science in Sports.

The conference is organized by Department of Exercise and Sport Sciences, University of Copenhagen and Team Danmark.

The organizers wish to thank Kulturministeriets Udvalg for Idrætsforskning, IOC Medical Committee, Sport Event Danmark and Team Danmark for financial support to the conference.

Scientific and organization committee

Professor Jens Bangsbo, Department of Exercise and Sport Science, University of Copenhagen (Head of Scientific and organization committee)

Director Michael Andersen, Team Danmark

Associate professor Eva Wulff Helge, Department of Exercise and Sport Science, University of Copenhagen

Associate professor Anne Marie Elbe, Department of Exercise and Sport Science, University of Copenhagen

Consultant Martin E. Petersen, Team Danmark

Coordinator Anne Lykke Poulsen, Department of Exercise and Sport Science, University of Copenhagen

Contact

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TEAM DANMARK
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PROGRAM

WEDNESDAY 16 SEPTEMBER

19:00 Visit at Major of Copenhagen

THURSDAY 17 SEPTEMBER

COMMON

09:00 - 09:15 **Welcome**

09:15 - 09:45 **Coaching experience**

Paulus Wildesboer, Head coach, The Danish Swimming Federation

PHYSIOLOGICAL ASPECTS

10:00 - 10:15 **Introduction**

Jens Bangsbo, Department of Exercise and Sport Sciences, University of Copenhagen, Denmark

10:15 - 10:45 **Fatigue during high intensity exercise**

Nicolai Nordsborg, Department of Exercise and Sport Sciences, University of Copenhagen, Denmark

Physiological and performance response to additional anaerobic training

10:45-11:15 **Training for intense exercise performance: high-intensity or high-volume training?**

Paul Laursen, NZ Academy of Sport North Island, New Zealand

11:15 - 11:45 **Coffee**

11:45 - 12:15 **Intense training: the key to optimal performance during the taper**

Inigo Mujika, Department of Physiology, University of the Basque Country (UPV-EHU), Spain

12:15 - 12:45 **Speed endurance training is a powerful stimulus for physiological adaptations and performance improvements in trained subjects**

Marcello Iaia, Manchester United Football Club, Great Britain

12:45 - 13:45 **Lunch**

Effects of resistance training on endurance capacity in Top Level Athletes

13:45 - 14:15 **Strength training: effects on endurance capacity in Top Level Athletes**

Per Aagaard, Institute of Sports Science and Biomechanics, University of Southern Denmark

14:15 - 14:45 **Strength training: Effects on muscle fiber adaptations and consequences for high intensity exercise**

Jesper Løvind Andersen, Institute of Sports Medicine Copenhagen/Team Danmark Testcenter, Denmark

14:45 - 15:00 **Coffee**

Nutritional aspects on training response and performance during intense exercise

15:00 - 15:30 **Importance of physiotherapy in high intense sports**

Kristian Thorborg, physiotherapist, Research unit for orthopedic surgery, Amager Hospital

15:30 - 16:00 **Fuelling strategies to optimise performance – training high or training low?**

Louise Burke, The Australian Institute of Sport, Australia

16:00 - 16:30 **Development of hydration strategies to optimise performance**

Ron Maughan, School of Sport and Exercise Sciences, Loughborough University, UK

COMMON

16:30 - 16:45 **Break**

16:45 - 17:15 **Practical experiences: Performance limitations in elite rowing**

Eskild Ebbesen, Danish former elite world-class lightweight rower, MSc in Human Physiology

17:15 - 18:30 **Physical activity**

IN THE TWO GROUPS

19:00 - 20:30 **Summary – statements**

PSYCHOLOGICAL ASPECTS

10:00 - 10:15 **Introduction**

Anne-Marie Elbe, Department of Exercise and Sport Sciences, University of Copenhagen, Denmark

Personality aspects and motivational factors in high intensity sports

10:15 - 10:45 **The personality of the athlete in sports with intense exercise**

Tony Morris, School of Human Movement, Recreation and Performance, Victoria University of Technology, Australia

10:45 - 11:15 **Can talent in sports with intense exercise be diagnosed psychologically?**

Anne-Marie Elbe, Department of Exercise and Sport Sciences, University of Copenhagen, Denmark

11:15 - 11:45 **Coffee**

Applied sport psychological work with athletes in high intensity sports

11:45 - 12:15 **Psychological skills training as a way to enhance performance in high intensity sports**

Daniel Birrer, Eidg. Hochschule für Sport Magglingen, Switzerland

12:15 - 12:45 **Talent development in high intensity sports: a holistic ecological perspective**

Kristoffer Henriksen, Team Danmark and Institute of Sports Science and Biomechanics, University of Southern Denmark

12:45 - 13:45 **Lunch**

13:45 - 14:15 **Preventing overtraining in athletes in high intensity sports and stress monitoring**

Michael Kellman, School of Psychology, University of Queensland, Australia

14:15 - 14:45 **Psychology and socioculture affect sport injury risk, consequence, and recovery in high intensity exercise athletes**

Diane Wiese-Bjornstal, School of Kinesiology, University of Minnesota, USA

14:45 - 15:15 **Coffee**

15:15 - 15:45 **A lifespan perspective on the career development of elite athletes**

Paul Wylleman, Faculty of Physical Education and Physiotherapy, Vrije Universiteit Brussel, Belgium

15:45 - 16:15 **Dieting, disordered eating and eating disorders in elite athletes**

Jorunn Sundgot-Borgen, Norwegian University of Sport and PE, Norway



PROGRAM

FRIDAY 18 SEPTEMBER

08:45 - 09:45 **Summary statements from both groups**

09:45 - 10:00 **The Olympic Movement Medical Code**
Jesper Frigast Larsen, NOC and Sports Confederation of Denmark

Integration of sport science and practice

10:00 - 10:45 **The Australian experience**
Louise Burke, The Australian Institute of Sport, Australia

10:45 - 11:00 **Coffee**

11:00 - 11:45 **The Norwegian experience**
Espen Tønnessen, Olympiatoppen, Norway

11:45 - 13:30 **Consensus**

13:30 - 14:15 **Lunch**

14:30 - 15:00 **Consensus statements and press release**





SPEAKERS AT THE CONFERENCE

JESPER LØVIND ANDERSEN

Institute of Sports Medicine (ISMC), Copenhagen
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Jesper Løvind Andersen, MSc, PhD, Senior Researcher, Head of ISMC Laboratory at Institute of Sports Medicine (ISMC), Copenhagen, Denmark. The overall focus of my research is to understand the mechanism behind hypertrophy/atrophy and changes in fiber type composition in skeletal muscle with use and disuse. My current research evolves around changes in myosin heavy chain isoform composition and muscle mass in skeletal muscle due to various types of exercise or inactivity. More specifically, we are looking into the influence of various growth factors in an attempt to understand pathways leading to changes in the size and phenotype of skeletal muscle. Furthermore, I have been involved in a considerable number of studies evaluation anatomical and physiological changes of human skeletal muscle due to mainly resistance type exercise. I have a long background as coach, assistant coach and consultant in various clubs and federations. In the early 90ties I coached the best national sprinter. The last 10 years I have been working as a consultant and strength-training coach for the most successful Danish Soccer club; FC Copenhagen. Furthermore, I have been responsible for the physical education of the UEFA-licensed Soccer coaches education in Denmark.



JENS BANGSBO

Department of Exercise and Sport Sciences, University of Copenhagen
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Dr. Sci. Jens Bangsbo is professor in exercise physiology at the Department of Exercise and Sport Sciences, Faculty of Science, University of Copenhagen. He is the leader of a research group focusing on muscle metabolism, ion transport and fatigue development in relation to physical activity and training. He is a partner in the Copenhagen Muscle Research Centre and member of the board of the Ph.D. School "Academy for Muscle Biology, Exercise and Health Research". Furthermore, he is the Head of Science at the Department of Exercise and Sport Sciences, and a member of the Faculty of Science research board. He is the chairman of the Ministry of Culture Research Board for Sport. He is an UEFA and FIFA instructor. He is consultant for a number of European top teams. Between 2001 and 2004 he was the assistant coach at Juventus FC. He also took part in the coaching staff of the Danish National team for EURO2004. He has been the consultant for a number of top teams in Europe. He has played more than 350 matches in the top Danish League and played in the Danish national teams both as a youth and senior player. He has written more than 250 scientific articles and reviews as well as 13 books with the most recent being "Aerobic and Anaerobic Training in Soccer - with special emphasis on training of youth players". Each of the books has been translated to a high number of other languages. He is the editor of a number of books regarding sport and science and he is a member of the international steering group of "Football and Science". His ability to combine scientific knowledge with years of experience on the soccer field is widely respected all over the world.



DANIEL BIRRER

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Daniel Birrer is head of the sport psychology department of the Swiss Federal Institute of Sport Magglingen (Switzerland). He provides sport psychology services to numerous top level athletes and coaches in different sports such as cycling, beachvolleyball, track and field, swimming, rowing and triathlon. He is a regular teacher at the Swiss Olympic coach education and he leads the expert group "Sport Psychology" of Swiss Olympic. Daniels research interests are in the complex relationship between mood and performance, overtraining and the verification of the efficiency of mental training techniques. Currently he is a member of FEPSAC, AASP and the Forum for Applied Sport Psychologists in TopSport (FAST). From 1999 to 2008 Daniel was a member of the managing board of the Swiss Association of Sport Psychology. He is the organizer of the first Post Graduate Curriculum Sport Psychology preparing psychologists for applied sport psychology services in Switzerland, an education, which entails 51 days of instruction and takes from two to four years to complete.





LOUISE BURKE

Australian Institute of Sport
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Louise Burke, PhD, APD, FACSM. Louise is a sports dietitian with nearly 30 years experience in the education and counseling of elite athletes. She has been head of the Department of Sports Nutrition at the Australian Institute of Sport since 1990. Her role as the dietitian for the Australian Swimming Team from 1991-2007 provided extensive experience with team travel. She was the team dietitian for the Australian Olympic Teams for the 1996, 2000, 2004 and 2008 Olympic Games. Louise's publications include 70 research papers in peer-reviewed journals, more than 40 book chapters, and the authorship or editorship of several textbooks on sports nutrition. She is an editor of the International Journal of Sport Nutrition and Exercise Metabolism. Her research interests include sports supplements and ergogenic aids, carbohydrate intake before, during and after exercise, dietary periodisation strategies for athletes, protein and the response to training, and hydration practices for training and competition. Louise was a founding member of the Executive of Sports Dietitians Australia and is a Director of the IOC Diploma in Sports Nutrition. She is a member of the Working Group on Nutrition for the International Olympic Committee, and the Medical and Anti-Doping Committee of the IAAF. She holds an Honorary Chair in Sports Nutrition, at Deakin University in Melbourne for contribution to research and post-graduate and undergraduate units in Sports Nutrition. In 2009 she received a Medal of the Order of Australia and a Citation Award from the American College of Sports Medicine for her contribution to sports nutrition.



ESKILD EBBESEN

Elite light weight rower and independent lecturer, writer and adviser, Denmark
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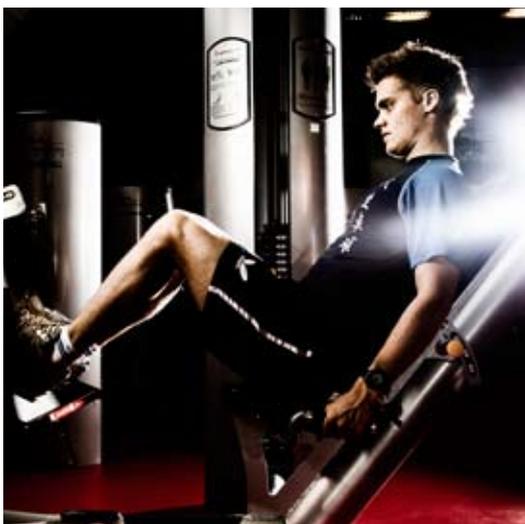
Master of Science in Human Physiology from the University of Copenhagen. Eskild has been one of the partners of HealthGroup, that works with health in Danish Companies. Eskild is also a part of the famous Gold Four Rowing Team winning Olympic Gold in 1996, 2004 and 2008. Also he was in the team winning the World Championships in 1994, 1997, 1998, 1999, 2002 and 2003. He has written a large number of articles primarily about training and health.



ANNE MARIE ELBE

Department of Exercise and Sport Sciences, University of Copenhagen
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Anne-Marie Elbe is an associate professor for sport psychology at the Department of Exercise and Sport Sciences, University of Copenhagen in Denmark. Her previous posts were at Northumbria University, Newcastle in the UK and at the University of Potsdam, Germany. She received her PhD from the Free University in Berlin, Germany in 2001 and her post-doctoral lectureship qualification (habilitation) from the University of Potsdam, Germany in 2005. Her publications and research interests focus on motivational and self-regulatory aspects of athletic performance, sport psychological diagnostics, talent and doping. Her currently ongoing research projects are being funded by the World Anti Doping Agency, Team Denmark and the German Federal Institute for Sport Science. Anne-Marie is an elected member of the Managing Council of the European Federation for Sport Psychology (FEPSAC) and on the editorial board of the German journal for sport psychology (Zeitschrift für Sportpsychologie). In addition, Anne-Marie is a licensed sport psychological consultant, a licensed track and field coach and has worked with numerous top level athletes and sport organizations.



KRISTOFFER HENRIKSEN

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Kristoffer Henriksen holds a split position as researcher and applied sport psychologist. The research takes place at the Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark in the form of a PhD study. My research interest is talent development and psychological aspects of elite sport, and my current research project focuses on the role of the environment in successful talent development. The applied sport psychology work is undertaken for team Denmark, where I am part of a sport psychology team that delivers individual and team consultation, athlete and coach education programs and sport specific interventions.



F. MARCELLO IAIA

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F. Marcello Iaia studied for his Ph.D. in Exercise Physiology under the guidance of Professor Jens Bangsbo at the Department of Exercise and Sport Sciences, University of Copenhagen. He carried out studies focusing on performance and skeletal muscle adaptations in response to high-intensity intermittent training, as well as metabolism and the causes of fatigue development during different exercise intensities. In the context of sports, he played in Italian football teams as a youth athlete, and has been fitness trainer and consultant to some football clubs. He also worked as sport scientist in the performance lab of Mapei, the former professional cycling team, and has been acting as coach/ training consultant to some elite Kenyan marathon runners. Currently he works as assistant fitness trainer for Manchester United Ltd.

MICHAEL KELLMANN

Department of Sport Psychology at the Faculty of Sport Science at Ruhr-University of Bochum
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Prof. Dr. Michael Kellmann is Head of Department of Sport Psychology at the Faculty of Sport Science at Ruhr-University of Bochum (Germany). Prior he was Senior Lecturer holding a joint appointment with the School of Human Movement Studies and the School of Psychology at the University of Queensland (Australia). Michael is a member of the Association of Applied Sport Psychology, the German Psychological Association, and the Australian Psychological Society. He served six years on the Executive Board of the German Association of Sport Psychology and is on the editorial board of *The Sport Psychologist*, the *Zeitschrift für Sportpsychologie*, and the *Deutsche Zeitschrift für Sportmedizin*. Current research activities include overtraining prevention and recovery enhancement, sport psychological diagnostics and intervention, coach behavior during competition and practice, as well as personality and performance competence of coaches in sports. Michael's work has appeared in several publications. He is co-author of *Recovery-Stress Questionnaire for Athletes: User Manual* and edited the book *Enhancing Recovery: Preventing Underperformance in Athletes* both published by Human Kinetics (USA). In his applied work, Michael has consulted with and conducted research for the National Sport Centre Calgary in Canada, the Olympic Training Centers in Potsdam and Dortmund/Bochum (Germany), and was the Head Sport Psychologist of the German National Rowing Federation. Michael was the chair of the only education, training, and certification program for German sport psychologist "Sport psychology in high performance sport" of the German Association of Sport Psychology and the German Psychologists Board.



PAUL LAURSEN

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Paul is a Performance Physiologist at the New Zealand Academy of Sport where he provides physiological support for New Zealand's Olympic coaches and athletes involved in the sports of triathlon, kayak and athletics. He also holds the title of Associate Professor of Exercise Physiology at Auckland University of Technology in New Zealand and Edith Cowan University in Perth, Australia. He has published over 65 peer-review manuscripts, and to date this work has been cited over 350 times. He and his team of postgraduate students examine a variety of research themes that surround the endurance athlete, including training program optimization, pacing, fatigue, thermoregulation, precooling, and recovery from exercise. He himself is an avid triathlete, having now competed in 13 Ironman triathlons throughout the world.



RON MAUGHAN

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Ron Maughan obtained his BSc (Physiology) and PhD from the University of Aberdeen, and held a lecturing position in Liverpool before returning to Aberdeen where he was based for almost 25 years. He is now Professor of Sport and Exercise Nutrition at Loughborough University. He has published extensively in the scientific literature, and is an Editor of several international journals. Professor Maughan is a Fellow of the American College of Sports Medicine and was received that organisations Citation Award in 2007. He is secretary of the Sports Nutrition group established by the IOC Medical Commission in 2002.





TONY MORRIS

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Tony Morris is Professor of Sport, Exercise and Health Psychology in the School of Sport and Exercise Science, Victoria University, Melbourne. He has published 10 books and more than 200 journal and proceedings papers on a range of topics in sport and exercise psychology, including imagery, motivation, personality, anxiety, stress, choking, attention, flow, mood, injury, disability, chronic illnesses, depression, coaching, career transitions, relaxation, meditation and expertise. Tony has supervised 28 PhDs to completion, as well as many masters and honors dissertations. He developed an internationally recognized professional masters program in sport psychology, which accredits students as psychologists and is a model aspired to around the world. Through this program, Tony and his colleagues supervise students in applied work in a range of sports, often at the elite level. Tony has held a number of senior management positions, including Associate Dean Research and twice as Acting Director of the Victoria University Research Centre for Ageing, Rehabilitation Exercise and Sport (CARES). Currently he is focusing on his own research and doctoral supervision.



IÑIGO MUJIKA

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Iñigo Mujika earned Ph.D.s in Biology of Muscular Exercise (University of Saint-Etienne, France) and Physical Activity and Sport Sciences (University of The Basque Country). He is also a Level III Swimming and Triathlon Coach and coaches World Class triathletes. His main research interests in the field of applied sport science include training methods and recovery from exercise, tapering, detraining and overtraining. He has also performed extensive research on the physiological aspects associated with sports performance in professional cycling, swimming, running, tennis, football and water polo. He is the author of "Tapering and Peaking for Optimal Performance". Iñigo received research fellowships in Australia, France and South Africa, published nearly 70 articles in peer reviewed journals and over 10 book chapters, and has given over 100 lectures and communications in international conferences and meetings. Iñigo was Senior Physiologist at the Australian Institute of Sport in 2003 and 2004. In 2005 he was the physiologist and trainer for the Euskaltel Euskadi professional cycling team and between 2006 and 2008 he was Head of Research and Development at Athletic Club Bilbao professional football club. He is now Director of Physiology and Training at USP Araba Sport Clinic, Associate Editor for the International Journal of Sports Physiology and Performance, and Associate Professor at the University of the Basque Country.



NIKOLAI NORDSBORG

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Nikolai Nordsborg (1974) has done research in fatigue mechanisms during high-intensity exercise in humans with special focus on the possible importance of K⁺ perturbations in inducing sarcolemmal inexcitability and subsequent fatigue development. This research area has been approached using microdialysis to determine interstitial K⁺ levels in humans and by use of pharmacological agents to increase the human skeletal muscle Na⁺/K⁺ pump expression. Currently, a new model to study the temporal pattern of fatigue development during high-intense dynamic exercise is being developed. Nikolai completed his master in exercise and sports sciences in 2001 and his PhD in 2005 supervised by Professor Jens Bangsbo. Nikolai has a strong background in competitive swimming both as a swimmer, coach and responsible for education of swim coaches in Denmark. Nikolai is currently employed as an assistant professor at the Institute of Exercise and Sports Sciences at the University of Copenhagen, with the responsibility of conducting research and teaching in the physiology of swimming as well as basic physiological research in human fatigue and adaptation mechanisms.





JORUNN SUNDGOT-BORGEN

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Research area Female athletes: nutrition, menstrual function, eating disorders, osteoporoses, pregnancy and exercise/top level sports, sexual harassment and abuse

Education B.A. Physical education from The Norwegian University of Sport and Physical Education, Oslo, June 1984

Master of Science, Health and Exercise Science from Arizona State University, Tempe, Arizona, December 1985

Dr Scient from The Norwegian University of Sport and Physical Education May 1993

Positions January 1993 - September 1993: Post Doctoral work, Yale University

August 2003-January 2004: Visiting Professor, UC Berkeley

1995-1996: Project leader, The Norwegian Board of Health

January 2002- : Professor in physical activity and health, The Norwegian University of Sport and Physical Education

1995- : Consultant, The Norwegian Olympic Training center

2004-2009: Head of Nutrition department, The Norwegian Olympic Training center

Practical experience National team member in gymnastics and rhythmical gymnastics



ESPEN TØNNESEN

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Espen Tønnessen is manager for physical training at the Norwegian elite sport organization Olympiatoppen, with specific responsibility for endurance sports. He has a PhD in exercise physiology from Norwegian University of Sport and PE. Espen was at the junior national team in athletics (1989-90) and was junior national coach in athletics (jumping disciplines) 1990-2000. He has worked as a konsultant in the Norwegian association for athletics (1997-2000), as consultant in Olympiatoppen (2000-2004).

DIANE M. WIESE-BJORNSTAL

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Diane M. Wiese-Bjornstal, PhD, University of Minnesota USA is an Associate Professor in the School of Kinesiology, Affiliated Scholar with the Tucker Center for Research on Girls & Women in Sport, and Co-Director of the Minnesota Youth Sport Research Consortium. A former intercollegiate volleyball and softball coach, she received her PhD in Physical Education with dual emphases in Social Psychology of Sport and Biomechanics from the University of Oregon in 1989. Dr. Wiese-Bjornstal teaches graduate level courses in sport & exercise psychology, psychology of sport injury, and competitive sport for children and youth, and has advised more than forty sport & exercise psychology graduate students to completion. Dr. Wiese-Bjornstal has published and presented in a variety of forums on her innovative and collaborative line of research and conceptual scholarship exploring the psychological responses of athletes to sport injury; she is co-editor of the related book, Counseling in Sports Medicine. Her professional service has included being on the editorial boards of several journals, such as the Journal of Sport and Exercise Psychology, Journal of Applied Sport Psychology, and Research Quarterly for Exercise and Sport. She is a fellow of the Association for Applied Sport Psychology (AASP) and of the Research Consortium of the American Alliance of Health, Physical Education, Recreation, and Dance (AAHPERD), and is an AASP Certified Consultant in Sport Psychology. In 2009 she was named for a three year term to the Sport Science Advisory Board of the United States President's Council on Physical Fitness and Sport.





PAUL WYLLEMANN

Vrije Universiteit Brussel

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Paul Wylleman is full professor at the Vrije Universiteit Brussel teaching Sport psychology, Mental support provision across the athletic career, Career and lifestyle management for athletes, Skills for performance managers, and Human Resources Management at the faculties of PE and Physiotherapy and Psychology and Educational Sciences. He coordinates the project "Sport psychology support" which provides mental support services to coaches and young talented and elite athletes in nine elite sports federations in Flanders as well as the "Career support services" project for Flemish sport federations. Paul is the current President of the European Federation of Sport Psychology (FEPSAC) and he also co-ordinates the European Forum for Applied Sport psychologists in Topsport (FAST) which brings together sport psychology service providers working with elite and Olympic athletes and teams in more than ten countries throughout Europe. As sport psychology consultant to the Belgian Olympic Committee and elite sport federations he provides sport psychology support in elite sports school and to elite athletes at European/World Championships and at the Olympic Games. Paul has published articles, chapters and books and has been a key-note speaker on the topic of, amongst others, mental skills of elite athletes and coaches, the quality of sport psychology support service/providers, and career and life style management of elite (young) athletes at international congresses as well as at meetings of the IOC and of different European Olympic Committees. Finally, he is also head of the department "Topsport and Study" which provides support to elite student-athletes at the Vrije Universiteit Brussel.



PER AAGAARD

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Per Aagaard serves a position as Professor in Biomechanics at the Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark. Further, Per Aagaard is partly affiliated to the Copenhagen Institute of Sports Medicine (former Sports Medicine Research Unit) at Bispebjerg Hospital, University of Copenhagen. For more than 15 years Per Aagaard was employed by the Danish Elite Sports Organization (Team Danmark), providing physiological research, testing and supervision of Danish elite athletes within the fields of strength/power training and neuromuscular training adaptation. Research areas comprise biomechanics, motor control, muscle physiology and neuromuscular adaptation to training. Specifically, the research have been focused on changes in neural function, muscle morphology and muscle architecture induced by training and detraining/disuse in untrained individuals, athletes and in relation to aging and musculo-tendinous injury. Experimental work also has been conducted on the role of antagonist muscle co activation for knee joint protection, spinal motor function during walking and running, and on biomechanical aspects related to in vivo muscle-aponeurosis-tendon function, muscle work efficiency, and athletic performance. Currently, 113 peer-review scientific articles and text-book chapters, as well as 201 Conference Abstracts have been published in international scientific journals and text books.

