

The Inaugural Women in Sport & Exercise Conference: Blood, Sweat, and Fears Staffordshire University, Stoke-on-Trent, UK, June 13–14, 2018

Day One: Speakers and Abstracts

Keynote Speaker: Angela Smith

Former Squash Professional; Chair of Supporters Council, Stoke City FC ambassador with responsibility for projects in Far East; International Sports Consultant, Beswicks Sports, Stoke-on-Trent, England, UK

The difficulties and frustrations encountered as a professional sportswoman and overcoming them

Angela discussed her career as a professional squash player, and the difficulties in starting a professional circuit for women players. She also talked about the advantages that being successful can bring during and after a career in sport and the twists and turns on that journey. In short, she says: always pack a sledge hammer because some walls may need to be knocked down in your efforts to achieve your ultimate goal and be prepared to shed bucketsful of sweat and maybe more along the way! In her presentation, she suggested that to be successful, particularly in sport as a female, you need to be phenomenal or be forgotten, and that once you feel you are the finished article, then you are finished. If you do not see yourself as a winner, then you can't perform as a winner. The preparation, the sacrifice, the constant desire to improve were all covered in her presentation, which highlighted that sports are really a microcosm of society.

Invited Speaker: Dr. Emma Stevenson

Professor of Sport and Exercise Science, Human Nutrition Research Centre, Faculty of Medical Sciences, Newcastle University, UK

The need (or not) for female-specific sports nutrition

The sports nutrition industry is growing on an annual rate and although still limited, there has been an increase in female-specific sports nutrition products appearing on the market. There is still a debate in the academic literature whether the metabolic responses to exercise significantly differ between males and females; however, females are still significantly under-represented in sport and exercise science research. Recent data suggest that fewer than 40% of participants in the available literature are female. Studies using female participants often fail to fully consider hormonal fluctuations throughout the menstrual cycle and there are large variations in contraceptive use that impact ovarian hormone cycles. Other confounding factors such as nutritional status, fitness level, and type and intensity of exercise also need to be accounted for in study designs. Although there are subtle differences in substrate metabolism both during and after steady-state exercise at a given exercise intensity between men and women, it is still debated whether this warrants different nutritional guidelines for male and female athletes. At present, there is little evidence to suggest that

female-specific protein or carbohydrate requirements are necessary but that intakes of these macronutrients should be relative to the individuals' body mass and training status. Micronutrient intake of active women can be low if energy intake is restricted, food groups are eliminated, or if a special diet is followed. It is recommended that nutritional strategies should be tailored to the individual's body mass and composition, type, frequency duration, and intensity of exercise training, and overall training goals. Contraceptive use should also be taken into consideration when planning nutritional strategies.

Invited Speaker: Dr. Kirsty Elliott-Sale

Senior Lecturer and Member of the Musculoskeletal Physiology Research Group, Sport Health and Performance Enhancement (SHAPE) Research Centre, School of Science and Technology, Nottingham Trent University, UK

Coping with the menstrual cycle and hormonal contraceptives

Female reproductive hormones change throughout the menstrual cycle and as a result of hormonal contraceptive use. There is large inter- and intra-individual variation in endogenous estrogen and progesterone concentrations both within and between menstrual cycles. Due to the variety of brands, types, and delivery methods of hormonal contraceptives available, there are large differences in the chemical constitution of hormonal contraceptives and concomitant physiological effects. The metabolic and performance-based effects of the menstrual cycle and hormonal contraceptives are poorly understood. This presentation aimed to discuss the proposed effects of the menstrual cycle and hormonal contraceptive use on athletic performance and female health. The endocrinology of the menstrual cycle and hormonal contraceptives was presented, alongside studies using these hormonal profiles to investigate performance in female athletes. The research is currently unclear and undecided on the direction or magnitude of effects of the menstrual cycle and hormonal contraceptive use on female athletic performance. Additional, high quality, well-controlled studies are needed in this area.

Invited Speaker: Dr. Florentina Hettinga (PhD, SFHEA, FECSS)

Senior Lecturer, School of Sport, Rehabilitation and Exercise Science, University of Essex, UK

Pacing, fatigue and tactics of winning races: Are there differences between men and women?

Many studies have researched how athletes regulate their exercise intensities and how athletes behave and perform in competition.

After an initial focus on the exploration of pacing strategies in time-trial exercise, more recently tactics and decision-making processes in head-to-head competition have been explored. A framework was presented that provides an alternative way of understanding decision making regarding the regulation of exercise intensity in social contexts. Decision making and the modification of ongoing behavior can only be properly understood in the context of the simultaneous availability of multiple affordances (related to opponents, fatigue, positioning, etc.) and the competition between them (Hettinga, Konings, & Pepping, 2017). When racing an opponent, for example, athletes perform better and pace their races differently compared to when racing alone (Konings, Schoenmakers, Walker, & Hettinga, 2016a). However, mostly male athletes have been studied. Though most studies focused on male athletes only, several recent studies took differences in pacing patterns, fatigue development, and tactics between men and women into account. For example, long-distance events (half-marathon and also longer events) show women to have a more stable and even-paced pattern compared to men (Hanley, 2016); this is potentially related to differences in decision-making, over-confidence, physiology (fat versus carbohydrate usage), and sex differences in fatigability. Also, in shorter 1000-m and 1500-m short track skating competitions, a more even-paced pattern for women was found (Konings, Noorbergen, Parry, & Hettinga, 2016b). Though several studies started exploring pacing and tactics in women, more research is needed, focusing on women specifically.

Invited Speaker: Dr. Sarah Grogan

Professor of Psychology, Health & Wellbeing, Manchester Metropolitan University, UK

Body image and exercise: How might appearance concerns prevent (or promote) exercise in young women

Researchers tend to find more positive body image in women who exercise than those who do not, and experimental studies show that women randomly allocated to exercise conditions report more positive body image post-intervention compared to controls. This finding has led researchers to conclude that exercise improves women's body image, probably through increasing women's focus on body function, fitness, and performance rather than body aesthetics. Although exercise has been linked with positive body image, this does not mean that women who engage in sport and exercise do not have body image concerns. Pressure likely comes from two sources for women who exercise: broad socio-cultural pressure to be thin, and sport-related pressure which may be particularly acute in sports where low body fat levels might confer a competitive advantage. Weigh-ins and focus on diet and weight loss, and requirements to wear revealing sport uniforms, can lead to significant pressures to be lean, which can also lead to body dissatisfaction, disordered eating, and over-exercise to reduce weight. Although exercise can improve body image, some women may also avoid exercise because of body concerns and may make unhelpful social comparisons with the bodies of other women when in exercise settings which can exacerbate body dissatisfaction. The aim of this talk was to consider the complex links between exercise and body image in promoting and preventing women from engaging in exercise. Examples of how to improve body image that are relevant to women who exercise were to be considered. These included focusing on health and nutritional needs rather than body weight, normalizing healthy eating, encouraging women to avoid making comparisons between their own bodies and those of other women, encouraging more realistic and healthy ideals, refocusing

on performance and body function rather than appearance, and promoting body acceptance rather than body critique.

Invited Speaker: Dr. Jenny Burbage and Dr. Nicola Brown

Burbage is Principal Lecturer and Researcher in Biomechanics, Department of Sport & Exercise Science, University of Portsmouth, UK; Brown is Senior lecturer and researcher, School of Sport Health and Applied Science, St Mary's University, UK

Breast biomechanics: Performance and health implications

Independent breast movement occurs during exercise due to limited intrinsic breast support. This lack of support can have a number of negative consequences for both elite sports women and recreationally active females. These consequences include: exercise-related breast pain, reported in up to 72% of exercising females; potential breast damage; an effect on sports performance; and psychological effects, such as embarrassment, which can deter females from participating in exercise. It is important to research breast biomechanics to: understand the fundamental biomechanics behind breast motion; understand factors relating to breast pain and damage; inform breast support requirements; and to identify performance factors related to breast support in female athletes. This session provided an overview of our Research Group in Breast Health's novel research findings investigating the effects of breast support on ground reaction forces, gait kinematics, physiological parameters, muscle activity, and perceptions of comfort and pain. It also explored the benefits of breast health education in improving knowledge and awareness of appropriate breast support and bra fit to allow women to exercise safely and in comfort throughout their lives. Our research has identified that sports bra use, and knowledge of breast health in adult women is low. Bra fit issues are also common and more problematic for larger-breasted women, demonstrating the need for breast education. Breasts are the first manifestation of puberty for approximately 85% of girls and it is reported that girls drop out of sport around the time of puberty. We surveyed over 2000 adolescent girls and 46% reported that their breasts had some effect on their exercise participation. Additionally, half of girls reported never wearing a sports bra during exercise. Breast education is key to improving knowledge and awareness of breast support and bra fit, and 87% of girls reported that they wanted to receive breast education.

Invited Speaker: Dr. Donna Duffy

Programme Director, Center for Women's Health and Wellness, Assistant Professor, and Co-Director of the Female BRAIN Project, Department of Kinesiology at UNC Greensboro, NC, USA

Concussion and the female athlete

The rate of concussions for female athletes per athletic exposure is often equal to and sometimes exceeds that of male athletes, depending on the sport (Zuckerman et al., 2015). However, the majority of concussion research to date has only included male athletes or a combined male/female athlete population. Although female concussion rates meet or exceed those of males, there is not a critical mass of research focusing on female athletes. This is a clear disparity in research and a gap that needs to be addressed, because head trauma does not lead to a homogeneous outcome between the sexes (Covassin, Swanik, & Sachs, 2003; Dick, 2009). Therefore, we cannot simply use what we have learned from male athletes and apply it to female athletes in all cases (Covassin, Elbin, Crutcher, &