

EXERCISE AND SPORT SCIENCE



FACULTY OF SCIENCE AND INFORMATION TECHNOLOGY



OVERVIEW

Research within the Exercise and Sport Science discipline is diverse and wide-ranging. Our research focus ranges from the general population through to elite athletes. To help us achieve our research goals we have new state-of-the-art laboratories in the Exercise and Sport Science building at the Ourimbah campus.

CURRENT RESEARCH AREAS

Motion Analysis of Field Sport Athletes

A strong research focus is the time-motion analysis of soccer through our link with the Central Coast Mariners Football Club. GPS technology is used to record position, velocity and acceleration during matches and training. This information allows the estimation of the physiological demands of playing soccer. It also provides information to coaches that can be used to design optimal training programs.

Strength Training and Nutritional Supplementation

Determining the effectiveness of nutritional supplementation, and the mechanisms of performance improvement, is a goal of Exercise and Sport Science researchers. A focus is on protein supplementation and exercise in women. Fluctuations in female steroid hormones cause many physiological changes, including substrate utilisation. A greater understanding of this area may assist in both resistance training and supplementation for female athletes.

Women in Sport

Women are exposed to continuously changing female steroid hormone profiles throughout the menstrual cycle. These variations not only affect the reproductive system, but also cause many physiological changes. Xanne Janse de Jonge investigates if these female steroid hormone fluctuations affect exercise performance and the “trainability” of females.

Compression Garments

Compression garments have become very popular sporting apparel that are claimed to have benefits for sporting performance. At present, few of these claims have been scientifically proven. The aim of the research projects within Exercise & Sport Science is to identify any physiological changes that may be responsible for these potential performance benefits.

Speed and Agility

Speed and agility are essential qualities for many sports. Defining effective methods for assessing speed and agility in athletes is essential for ensuring accurate performance monitoring. In addition, defining the most effective training practices for enhancing speed and agility is vitally important. Robert Lockie, Adrian Schultz, and their respective research students investigate these areas of sport science, which combines strength and conditioning, biomechanics, and skill acquisition.

Exercise and Ageing

The goal of our work is to prevent or attenuate the decline in physical functioning associated with ageing and thereby prolong independence and enhance quality of life. We have undertaken a number of exercise trials demonstrate a high degree of residual plasticity remaining in the ageing neuromuscular system and the importance of impact-loading activities for skeletal health. Moreover, muscle performance gains with training in the elderly are preserved following exercise cessation, and losses that do occur are rapidly recouped with training resumption.

Exercise Medicine

Exercise has been shown to be beneficial in a number of disease states. Resistance exercise is an effective countermeasure to the adverse effects of hormone suppression in men with prostate cancer by improving muscle strength and physical function. We are currently extending this work by examining the effects of different exercise regimens on the musculo-skeletal and cardiovascular systems to refine clinical guidelines for exercise prescription.

Low Back Pain

Links have been established with Podiatry in a project investigating the effects of foot orthoses and lumbopelvic stabilising exercises on pain and disability in people with low back pain.



EXAMPLES OF CURRENT PROJECTS

- The effects of speed, agility, and quickness training that emphasises deceleration on sprint velocity, agility and lower-limb power.
- Physiological and perceptual responses and movement characteristics of cricket players during Battle Zone.
- Factors relating to the physical and cognitive performance of elite Australian football umpires.
- The effect of player numbers on the physiological demands of passing drills in soccer.
- Quantitative analysis of training load during high-intensity field training for elite soccer.
- Reliability and validity of new agility and perception tests for basketball.
- Accumulative match fatigue in touch football.
- Effects of pre- and continual-cooling on simulated triathlon performance in the heat.
- Speed in cricket: Validity of current testing protocols and the kinematics of the 'Quick Single'.
- The effects of nutritional supplementation and resistance training on muscle strength and hypertrophy in women.
- The beneficial effects of exercise on treatment side-effects in men receiving hormone therapy for prostate cancer.

GROUP MEMBERS

Dr Dennis Taaffe
Dr Xanne Janse de Jonge
Dr Ben Dascombe
Dr Robert Lockie
Mr Adrian Shultz

EXTERNAL COLLABORATORS

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RESEARCH SUPPORT

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