

Applied Session
BIOMECHANICS AND GYMNASTICS

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The applied session at the 28th International Society of Biomechanics in Sport Conference focuses on two major themes of research; the **Coaching-Biomechanics Interface** and **Injury and biological loading**. These two interrelated themes underpin the understanding and knowledge needed to provide a safe and effective environment for the development of gymnastics skills and for the well being of performers. Ecological validity permeates these research approaches ensuring that meaningful information for coaches, scientists and clinicians is provided. The four presentations will use examples from evidenced based research on these themes. Two will focus on the coaching-biomechanics interface; one from an experimental perspective (Dr Gareth Irwin) and the other from a theoretical/modelling one (Dr Mike Hiley). The coaching-biomechanics interface is a term used to conceptualise how coaching can be informed from a biomechanical perspective. The process involved here is a continuous one, with each cycle starting and ending with the athlete. The process is based on a coach's tacit knowledge in relation to the practices that are routinely used to develop athletes' skills. Integral to this process, is the communication between the biomechanist and the coach and athlete. This cycle of extracting, processing and imparting new scientifically grounded knowledge and understanding represents the coaching-biomechanics interface. Sometimes this new knowledge may simply reinforce existing practices or it can provide new insights which inform future skill development. The overall purpose of developing the coaching-biomechanics interface is to bridge the gap between biomechanical science and sport practice. The interface aims to make training more effective and efficient for athletes who are already working near to their physiological limits.

The second theme presented by Dr Marianne Gittoes and Professor Peter Brüggemann examines the effects of gymnastic performance on the loading of the biological structures of the gymnast. These two talks will explore impact loading and the resultant physical demand on performers. Examples will include landing in gymnastics. One fundamental topic will be an examination of the ability of the gymnast to voluntarily i.e. consciously modify technique. Investigating what the gymnast can do and what is inherent in predisposing them to high loads therefore how does the gymnast interact technique changes with inherent mechanisms of load attenuation.

Presenters are:

1. Dr Gareth Irwin (Wales): Coaching Biomechanics Interface: Competition and training
2. Dr Mike Hiley (England): Coaching Biomechanics Interface: Simulation modelling
3. Dr Marianne Gittoes (Wales): Variability and performance: implications for injury in gymnastics
4. Prof Dr Peter Brüggemann (Germany): Biological load and injury in gymnastics