

PLENARIES

PLENARY 1: Optimising Physiological Adaptation While Minimising Physical Strain: Innovative Exercise Strategies for Clinical Populations

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Exercise is a fundamental component of clinical rehabilitation, promoting physiological adaptation and contributing to improvements in physical function, health, and quality of life across diverse clinical populations. However, achieving an effective exercise stimulus while minimising excessive physical strain remains an important challenge in clinical exercise prescription, particularly among individuals with reduced exercise tolerance or complex health conditions.

Eccentric exercise provides a strategic approach to manipulating exercise intensity and physiological loading while potentially reducing the metabolic demands associated with conventional concentric exercise. Appropriate application requires consideration of exercise dose, muscle loading, movement control, recovery, and individual patient characteristics. Individualised exercise prescription should account for clinical status, functional capacity, exercise tolerance, symptoms, recovery requirements, and patient-centred goals.

A central principle is the balance between physiological stimulus and physical strain. An adequate stimulus is necessary to initiate meaningful adaptation, whereas excessive strain may negatively influence recovery, tolerance, adherence, and rehabilitation outcomes. Innovative exercise strategies therefore provide opportunities to modify conventional exercise paradigms and optimise the relationship between training stimulus, physiological adaptation, and patient tolerance.

Translation of exercise physiology into clinical practice requires systematic assessment, appropriate exercise selection, monitoring of physiological and functional responses, and progressive adjustment of exercise dosage. Integrating innovative exercise strategies within individualised rehabilitation programmes may enhance the feasibility, safety, and effectiveness of exercise interventions while supporting meaningful functional recovery.

Ultimately, optimising physiological adaptation is not simply a matter of increasing exercise intensity, but of delivering the right stimulus at the right dose for the right patient.