

FATIGUE MONITORING



RATIONALE

Athlete fatigue can be described as acute exercise-induced decline in muscle force. A certain level of fatigue is to be expected in professional sport with training and competition being frequent and intense. However, excessive fatigue eventually leads to overtraining and possible subsequent injury. Therefore, fatigue monitoring is an important factor in a strength & conditioning regime where the focus is on increased athletic performance whilst staying injury free.

One way of tracking fatigue is by monitoring an athlete's vertical jump performance over time. Vertical jumping requires high rates of force development and power production both of which are dependant on motor unit firing rates and intermuscular coordination. A certain type of neuromuscular fatigue called 'low frequency fatigue' can persist for many days following a training block, and can affect explosive force production and force production at sub maximal loads. Fatigue monitoring may offer the coach key information on an athlete's 'state' allowing them to prescribe training at a level that is productive rather than counter productive.

SETUP

In order to monitor fatigue the GymAware system should be configured for an unloaded vertical jump assessment (squat jump - countermovement). A strict test protocol should be established and enforced to ensure accurate and repeatable data collection.

See 'Basic Guide 1 - Jump Testing' for further details. The athlete should be instructed to jump maximally for height with tests being scheduled at regular time points between competitive events.

Key jump variables such as peak velocity (see Fig 2.) and mean power are prominent indicators of changes in performance and the presence of neuromuscular fatigue.

It may also be useful to record subjective ratings of fatigue and muscle soreness during the monitoring period (see Fig 1.)

BENEFITS TO THE COACH

Fatigue monitoring is an important aspect of any sound conditioning regime. To monitor fatigue effectively the coach requires objective information based on each athletes recovery abilities in response to various training stressors. Knowledge of fatigue allows a coach to modify the ongoing training programme to ensure progression and avoid potential over training.

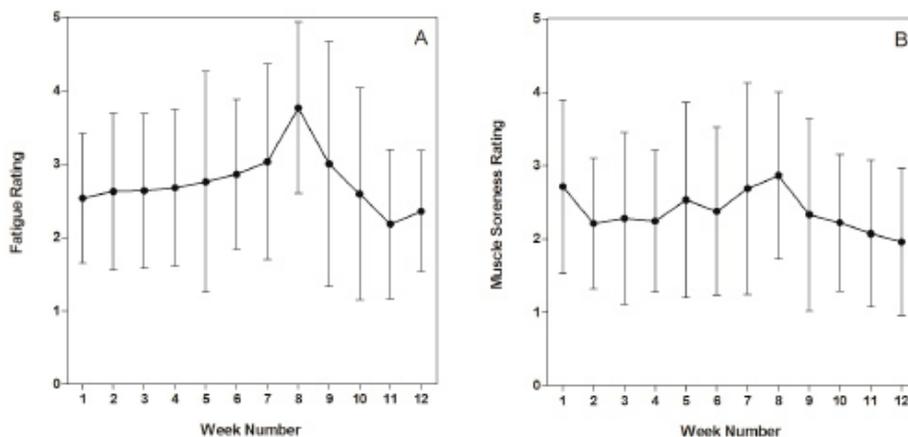


Fig 1. Ratings of fatigue (A) and muscle soreness (B) throughout normal training (weeks 1-4), intensive overload (weeks 5-8), and recovery (weeks 9-12) as found by Taylor, 2012.

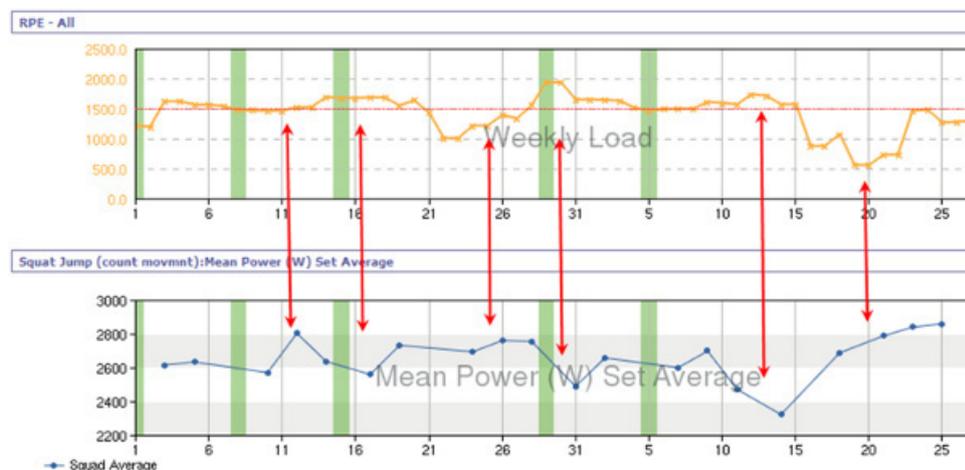


Fig 2. The relationship between Mean Power measured with GymAware and RPE across a complete squad of AFL players. Note the relationship as load increases Mean Power decreases.

References
Taylor, KL, Chapman, DW (2012) Fatigue monitoring in high performance sport: A survey of current trends.
Cronin, JB, Hanson, KT (2005) Strength and Power Predictors of Sports Speed. Journal of Strength and Conditioning
Taylor KL, Hopkins WG (In review) Monitoring neuromuscular fatigue using vertical jumps.
Taylor KL, Chapman DW (In review) Relationships between changes in jump performance and laboratory measures of low frequency fatigue.