

# Monitoring strength, speed and power

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## Introduction

**T**he development of speed and power in athletes comes from a number of different training inputs. One of these is from the stimuli provided from gym based conditioning. However, without accurate quantification of the gym based work it is hard to understand the transfer of that work to the track, and therefore maximise the benefit of the time spent in the weights room for your athlete.

There are numerous technologies that now exist to assist the coach in this process and to therefore get the best out of the time spent developing basic strength and power through complex movements. These technologies range in price and capability to support the various assessments and insight required to influence future programming.

The aim of this report is to focus on one such measurement system which has become established in both scientific and practical environments.

## GymAware ([www.kinetic.com.au](http://www.kinetic.com.au))

GymAware is a power monitoring training system that can be used to measure a number of key performance indicators with activity from the weights room (see Figure 1). These variables include acceleration, power, velocity, displacement, force and work down.

The basic technology behind the concept relies on some known engineering principles through use of optical encoders. The GymAware



Figure 1. The basic GymAware hardware

sensors calculate all the output parameters based on first principal determination of displacement and a quartz crystal time base. From time and displacement, velocity can be calculated and then acceleration. If weight is entered, force, work and power can be calculated for that athlete.

Importantly, the current commercial system has been validated against known gold standard measures (<http://www.kinetic.com.au/lang-en/products/gymaware/faqs/validation>) and tested across various dynamic movement patterns

One of the major strengths of the GymAware system compared to other competitor systems for monitoring strength and power development is the use of wireless internet technology feedback to enhance the feedback loop. Figure

2 provides an illustration of how this may work in practice and also support the use of virtual support teams now commonplace in high performance sport.

## Data outputs

The real value of a technology system comes when the information produced leads to change in training approach, method and programming. One of the key strengths of the GymAware system is in the rapid reporting and summaries produced from workouts to illustrate the outputs. In addition, the longitudinal tracking and reporting can provide an indication of how well the athlete is responding to the training and how to balance the stress and adaptation process that will maximise training gain. Figures 3 and 4 provide some example outputs from the GymAware system.

## Summary

The effectiveness of any strength conditioning programme on athletic development is dependent on how well this translates to track performance. One of the key methods which can support this understanding is through effective measurement and monitoring. There are a number of commercial systems which currently exist to support this process, e.g. Tendo units (<http://www.tendosports.com/TENDO-Units.html>); BMS system (<http://www.fittech.com.au/>).

The aim of this article was to identify one such system in more detail which may support some particular coaching needs based on the development of speed and power.

As a health warning, it is important to recognise that no system is without its limitations so a controlled process with understanding of such limitations is crucial in any interpretation.

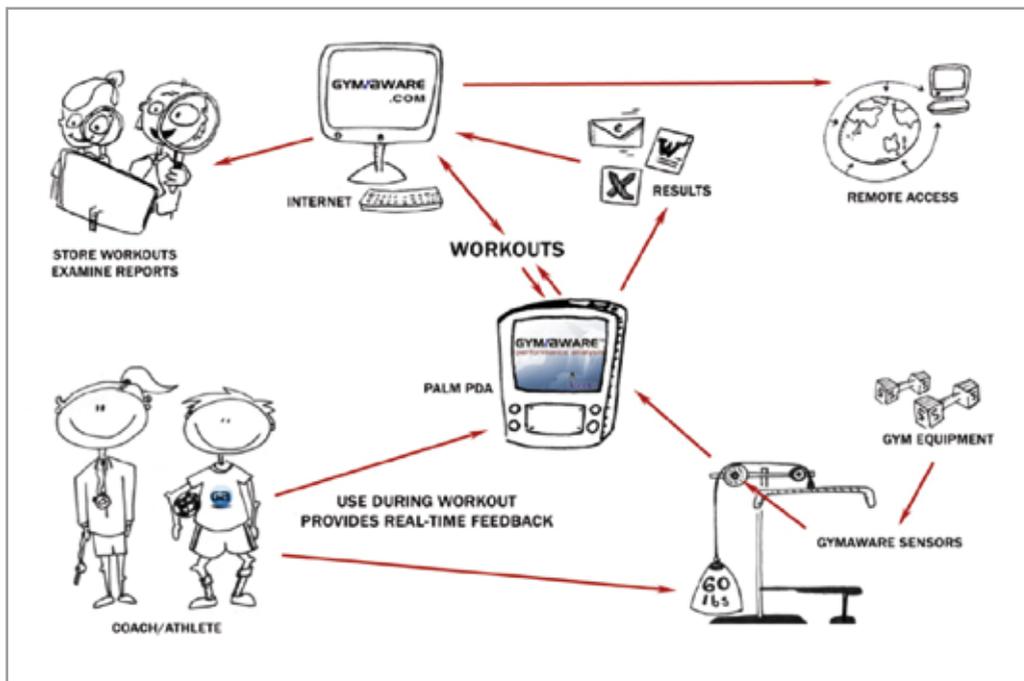


Figure 2. Process flow for the use of GymAware in the training environment

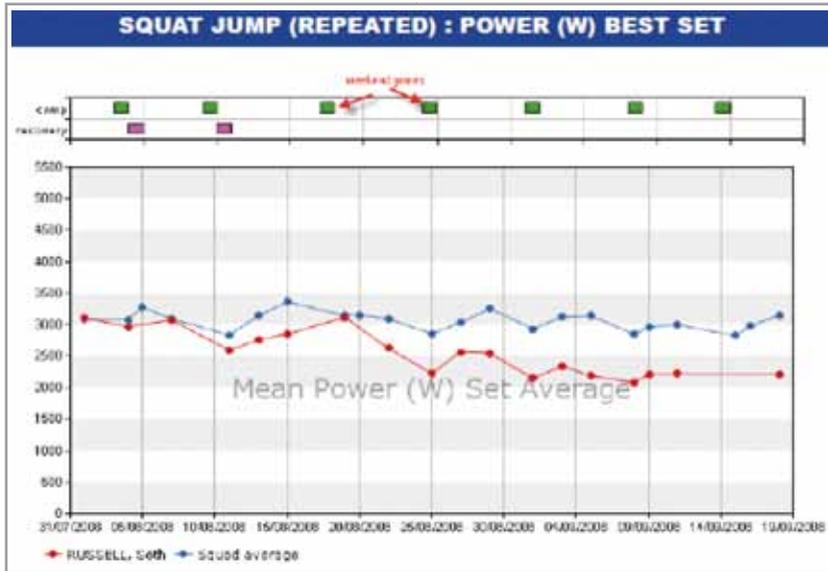


Figure 3. Exemplar data from the GymAware system used for longitudinal tracking

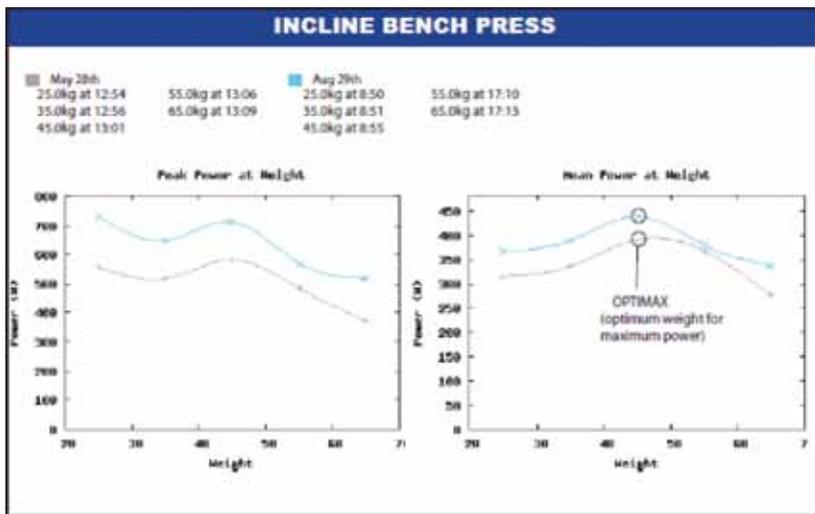


Figure 4. Exemplar data from the GymAware system used for assessment of mean and peak power in the incline press

Please note: the author has no involvement with any of the commercial companies or products mentioned in this report.

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