The Rugby League Coach Education Programme

The Think Coaching E-Link

Issue 17

Rugby League Coach Education Programme

Welcome to Issue 17 – Conditioning the part time player

Introduction

This issue looks at some of the issues that surround conditioning of the part time athlete. The issue was covered recently at the National League / Academy Coaching Conference proving to be a hot topic amongst delegates.

ARTICLE 1

Skills Based Conditioning Games

By Tim Gabbett

Rugby league matches are extremely intense, requiring players to compete at a high percentage of their maximum heart rate, while also producing significant increases in blood lactate ('lactic acid'). Conditioning coaches use many different activities to improve the physical fitness and performance of players, with the greatest training benefits occurring when the training stimulus simulates the movement patterns and physiological demands of the sport.

In recent times, conditioning coaches have used skill based conditioning games to simulate match conditions. Skill-based conditioning games simulate the movement patterns of a match, while also providing a competitive training environment where players are required to make decisions under pressure and fatigue.

While skill-based conditioning games have been suggested to simulate the movement patterns of rugby league matches, it is unclear whether they simulate the physiological demands of competition. The purpose of this case study was to measure heart rate and blood lactate concentration during training and match conditions and determine if skill-based conditioning games adequately simulate the physiological demands of competition.

Why measure heart rate and blood lactate concentration?

The measurement of heart rate and blood lactate concentration provides an overall estimate of the physiological strain of training sessions and matches. Lactate is a waste product, produced by the body in response to sustained high-intensity exercise. High concentrations of blood lactate are associated with the 'burning' feeling in the legs during exercise and are thought to be responsible, at least in part, for the onset of fatigue. A player who has multiple involvements in a match is likely to produce high blood lactate concentrations. For example, a lock that makes the effort to move quickly off the defensive line for three tackles, makes a cover-defending tackle, and then chases from first marker, may experience dramatic increases in blood lactate concentration, which may not decrease during the course of the match. Conversely, a winger that makes a 90m sprint to the try-line may experience short-term increases in blood lactate concentration that are quickly removed due to the large periods of low intensity activity associated with this position.

METHODS

Training Sessions and Match

Training and match heart rates were recorded for four sub-elite players using recordable Polar Vantage NV heart rate monitors enclosed in protective strapping. The four playing positions selected were prop, hooker, second-row, and centre. These positions were selected as they represented the four general positional playing groups within a team (i.e. props, hookers and halves, back-rowers, and outside backs). Once the raw data was collected, it was downloaded to a computer using Polar Advantage software.

Two mid-season training sessions lasting 70 minutes in duration were recorded. Skill-based conditioning games designed to develop scrambling defence and support play, decision-making, patience and ball control, play-the-ball speed, and one-on-one and two on- one defensive skills were implemented during the sessions. The four players were also monitored during one 70-minute match. If the player was replaced during the match, data for time not spent on the field was removed. Blood lactate concentration was measured from the earlobe at regular intervals during

the training sessions and match using a Lactate Pro portable lactate analyser. Players were also required to estimate the intensity (0 = rest, 10 = maximal effort) of the training sessions and match at regular intervals.

RESULTS

A summary of the heart rate and blood lactate responses during training and match conditions are shown in Table 1. The average and peak heart rate, and blood lactate concentration were similar for the training sessions and match.

Table 1. Heart rate and blood lactate concentration during training (skill-based conditioning games) and match conditions.

	Training	Match
Average Heart Rate	**155**	**152**
Average Heart Rate (% HR max)	**79**	**78**
Peak Heart Rate	**187**	**189**
Blood Lactate Concentration	**5.2**	**5.2**

The perceived intensity of the training sessions and match is shown in Table 2. As expected, the perceived intensity of the match was higher than training sessions.

Table 2. Perceived intensity of the training sessions (skill-based conditioning games) and match.

	Training	Match
Perceived Intensity	**Somewhat Hard**	**Hard / Very Hard**

The average match heart rate and blood lactate concentration in the present study was lower than previously reported for junior elite and semiprofessional rugby league players (Table 3). This finding most probably reflects the lower playing intensity at the sub-elite level.

Table 3. Match heart rate and blood lactate concentration for sub-elite, semi-professional, and junior elite rugby league players.

AVERAGE HEART RATE
Sub Elite 152
Semi Professional 166
Junior Elite 172
AVERAGE HEART RATE (% HR MAX)
Sub Elite 78
Semi Professional 84
Junior Elite 93
PEAK HEART RATE
Sub Elite 189
Semi Professional ..... Not Reported
Junior Elite 197
BLOOD LACTATE CONCENTRATION
Sub Elite 5.2
Semi Professional 7.2
Junior Elite ..... Not Measured

Source - Sub-Elite: present study, Semi- Professional: Coutts *et al* (2003), Junior Elite: Estell *et al* (1996).

DISCUSSION

The results of this case study demonstrate that skill based conditioning games produce similar heart rate and blood lactate concentrations to those measured under match conditions. These

findings demonstrate that skill-based conditioning games offer a specific method of conditioning for rugby league players.

While the present results demonstrate that skill-based conditioning games simulate the physiological demands of competition, these results do not suggest that all other training activities should be abandoned.
Rather, skill-based conditioning games should be used in combination with other activities (e.g. core skills training, traditional running training, strength and power training, etc) as a coaching 'tool' to enhance performance. The skill-based conditioning games employed in this study were implemented after players had undergone an appropriate degree of aerobic conditioning and core skills training. Indeed, it is likely that without an adequate skills and aerobic base, the players of the present study would not have had an adequate skill or aerobic fitness level to produce the recorded training and match intensity.

The intensity of the skill-based conditioning games was similar to the training intensity that would be expected for traditional conditioning activities (e.g. running activities without the ball). Indeed, the respective average heart rate and blood lactate concentration of 155 beats/min and 5.2 mMol could readily be achieved through the use of traditional interval training. The advantage that skill-based conditioning games have over traditional conditioning activities is that they provide an additional challenge to rugby league players that would not normally be present in non-skill related activities. While the skill based conditioning games used during training in the present study offer a specific method of conditioning for rugby league players, it is likely that lower intensity, shorter duration games would underestimate the physiological demands of matches. Equally, higher intensity, longer duration games could over estimate match intensity and lead to overtraining.

The perceived intensity of the skill-based conditioning games was lower than the competitive match. This finding is not surprising given that the emotional stress (i.e. anxiety) associated with playing rugby league is higher than the emotional stress associated with training for rugby league. Skill-based conditioning games are therefore likely to be useful if coaches wish to mentally 'unload' players before an important match. However, skill-based conditioning games are likely to be of less benefit if coaches are requiring a mentally grueling, traditional conditioning session.

While the present study provides important information on the physiological demands of rugby league training and competition, only four playing positions (i.e. prop, hooker, second-row, and centre) were investigated. In addition, only two training sessions and one match were investigated. A longitudinal investigation (e.g. one season) of training and match intensities in all playing positions would provide a greater understanding of the physiological requirements of competition and the training required to provide an appropriate training stimulus to enhance performance.

In summary, the results of this case study demonstrate that skill-based conditioning games produce similar heart rate and blood lactate concentrations to those measured under match conditions. These findings demonstrate that skill-based conditioning games offer a specific method of conditioning for rugby league players.

ARTICLE 2

Train Harder or Train Smarter

By Tim Gabbett

The question of how intense, how long, and how much training a rugby league player should perform, is a challenge often encountered by coaches. By implementing low intensity, short duration training sessions, coaches run the risk of having players 'underdone'. Excessively long, high intensity sessions may lead to overtraining, with players forced to compete in a fatigued state.

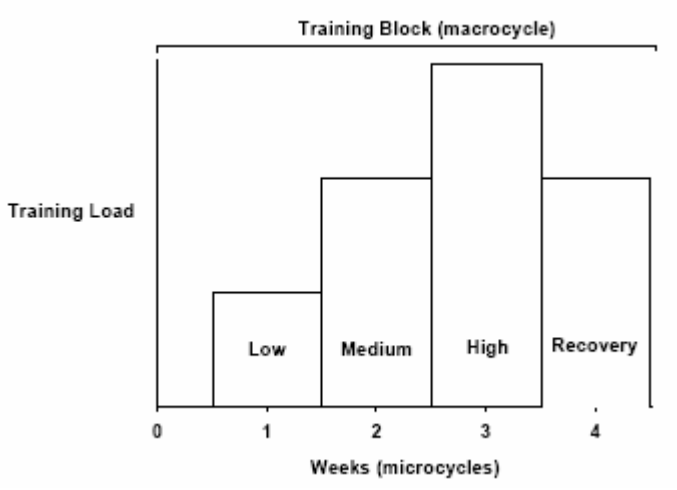
From an injury prevention and performance enhancement perspective, how much training do players require to improve physical fitness while also minimising the number and severity of training injuries?

Periodisation

Periodisation refers to the application of sport science principles to coaching. Specifically, periodisation allows the coach to break down the overall training year to design and implement a plan for each session, each week, and each month of the season, so that peak performance can be reached at the correct stage of the season (e.g. finals). Some astute coaches have also introduced a longer-term (e.g. three-year) periodisation plan based on the age or physical development of players. Periodisation allows conditioning coaches to monitor training intensity and training loads, in order to take away the 'hit and miss' component of training. Finally, while periodisation for rugby league is a relatively new concept, the implementation of a periodisation plan has been advocated as a method of avoiding unnecessarily high injury rates. Using a typical periodisation plan, a training block (i.e. macrocycle) usually includes three progressively harder weeks (i.e. microcycles), followed by one recovery week (See Figure 1).

However, it is not uncommon for different teams to use shorter (e.g. three-week) or longer (e.g. six-week) macrocycles depending on the stage of the season, the standard of competition, the motivation of players, and/or the coaching philosophy employed by the club.

Figure 1 An example of a typical four week training programme



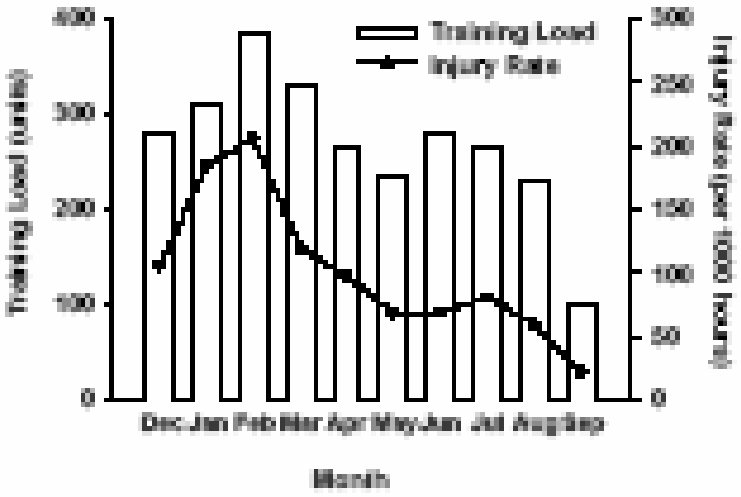
The training load during the first three weeks (microcyles) is progressively increased until the fourth week (recovery). The four microcycles make up one macrocycle.

Recent evidence from the Runaway Bay Rugby League Club *Injury Prevention and Performance Enhancement Project* suggests that injury rates may be closely related to the training load applied. Throughout the project, training intensity, training duration, and training load were monitored for each training session. In addition, all injuries sustained during training sessions were recorded. Training load increased from December through to February, followed by a progressive decline until September. Training injury rates followed a remarkably similar trend, increasing from December through to February, followed by a progressive decline until September (See Figure 2). These findings suggest that as training load is increased, injury rates are also increased. There are a number of possible explanations for the observed injury trends. Traditional training activities (i.e. running without the ball in hand) have typically been employed during the off season and pre-season phases of the rugby league season, with game-specific activities introduced as the season progresses. It has also been shown that the greatest proportion (37.5%) of training injuries occur during traditional training activities.

It is perhaps not surprising, therefore, to find high injury rates from December through to February. Equally, given that game-specific activities are associated with a low incidence of injury (10.7%), the finding that training injury rates decrease during the competitive phase of the season is also to be expected. While the average distance covered in a rugby league match has been estimated to be between 7,466-10,052 metres (See Meir, *Rugby League Coaching Magazine, 20)*, rugby league players are rarely required to run further than 40 metres in a single bout of intense activity. These findings question the specificity of traditional training activities for rugby league that provide an adequate training stimulus to enhance physical fitness and performance, without unduly increasing the incidence of injury.

The conditioning coach has traditionally been the ‘disciplinarian’ of the rugby league team, often implementing torturous training sessions to develop the ‘mental toughness’ necessary for playing success. Well planned, intense sessions are necessary to improve the physical fitness and performance of rugby league players. However, excessively intense training sessions may have an adverse effect on the fitness and subsequent performance of the player. Training loads appear to be closely related to training injury rates, with the incidence of injury increasing as the session intensity increases. Conditioning coaches should monitor training loads closely in order to optimize performance and minimise the adverse effects of injuries.

Figure 2. Relationship between training load and injury rate



Training loads and injury rates for each month of the 2001 rugby league season. The 'vertical bars' represent the training load while the 'dots' represent the injury rate. An increase in training load resulted in an increase in injury rate, whereas reductions in training load resulted in a reduction in injury rate. From a practical viewpoint, these findings suggest that the harder rugby league players train, the more injuries they will sustain.

Both these articles appeared originally in the Rugby League Coaching Magazine and are produced here for educational purposes only by their kind permission.

The Rugby League Coaching Magazine website has a wide variety of products that are useful for coaches. They can be contact via this link http://www.rlcm.com.au/home.htm

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