

LOAD MANAGEMENT GUIDANCE FOR COACHES



**INTER
NATIONAL
RUGBY
PLAYERS**

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INTRODUCTION

***In 2016, an IOC scientific paper stated:
'emerging evidence indicates that poor load management is a major risk factor for injury' ¹.***

Although “load” in its broadest sense can be taken to mean all the events and stressors a person experiences over a period, there are elements of load that are specific to participation in high level sport. In elite rugby, major loads include preparing for, and participating in, matches. Over recent years, evidence has been growing to support load management as an injury prevention strategy ¹⁻³. Load management is also reported to improve performance through optimisation of training and increased availability of squad members.

What is load management?

It is NOT simply playing fewer matches, nor training less intensely or less frequently. Load management is a system that reduces the risk of injury through planning and managing life, training, and, to a lesser extent, match playing loads.

Training load management is the primary focus in load management among elite rugby teams because training activities are more easily modified when compared to match demands, and training load is reported to account for 84-95% of total physical load in rugby ². Also supporting this training load focus is a report from South African Super Rugby that identified that during competition the players were exposed to an average of 7-9 hours of training in preparation for a match; during the preseason the number of training hours per match was around 30 ⁴.

On average the elite professional rugby player will participate in about 17 matches per year and owing to substitutions and replacements will only complete two-thirds of total game time. Other match participation statistics confirm that 20% of players are involved in 25 matches or more and 5% appear in 30 matches or more².

Whilst this guidance document is primarily directed at elite adult coaches the principles identified will be applicable to all coaches especially those involved with academy and senior schoolboy / girl coaches.

This document has been developed to:

- provide an overview of the guiding principles of load management
- provide examples of practical application of these principles
- support understanding with a glossary
- support further learning through provision of a reference list.

It should be recognised that there is no perfect load management system for eliminating injuries, but practical experience confirms that adopting the principles outlined within this document can assist with reducing injury risk. The recommendations in this document are based on current knowledge and expert opinion. Because the scientific evidence around load management is developing rapidly ⁵⁻⁷, the recommendations will be modified as new evidence becomes available.

GUIDING PRINCIPLES OF LOAD MANAGEMENT

The principles of load management can be considered from the following perspectives:

1. Load - General
2. Load - Team
3. Load - Individual

LOAD - GENERAL

All loads should be identified and, where possible, measured. In order to measure load it is important to consider:

1. Contributors to load:
 - Training
 - Matches
 - Non-physical loads or life loads which can often be split into rugby related and non-rugby related . This group includes psychological load, social (and media) load and travel load. These non-physical loads are difficult to measure but must be considered when determining the appropriate load for the player.
 - External team contributors should also be considered. These include representative team participation for elite adult players and multiple sports or multiple team participation (such as school rugby and club rugby) for youth players.
2. Factors measured to identify total load:
 - Frequency of training (sessions per week)
 - Volume (minutes)
 - Intensity (Rate of perceived exertion – RPE – *see scale Appendix 1*)
 - Type of training – team field training, gym training, sprint training and aerobic conditioning
3. Tools available to measure load:
 - Spreadsheets documenting minutes (volume) and RPE (intensity)
 - Technology – GPS, accelerometers, radio-frequency devices
 - Coding of events (e.g. tackle counts, ruck and scrum numbers) from video records of training and matches

The guiding principle of load management is to implement a program that has **controlled variations** but overall provides a steady, planned change in loads towards an identified ceiling, allowing time for recovery. This is achieved by:

- *Progressive overload* - avoiding sudden changes in the volume and or intensity of load. All increases in load need to be controlled from day to day and week to week.
- Recognising that intermediate-high loads are protective against injury and *sustained low loads pose an injury risk* as players are not conditioned to cope with sudden increases in load (load “spikes” e.g. as may occur in matches, tournaments or returning from injury) ⁸.
- Avoiding sustained high chronic loads over long durations, as these also pose an increased injury risk.
- Recovery should be planned and individualised because it supports regeneration and increases a player’s ability to tolerate load. Recovery includes not only immediate post-exercise recovery methods but also sleep and nutrition ⁹.
- Avoiding spur of the moment decisions to alter training content without reference to the plan

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LOAD – TEAM

A load management program should be established for the team based on the team's previous load history.

A practical method for developing a team load program is to:

1. Identify training days within a week
2. Identify training sessions and training types for each day e.g. field, gym, fitness etc
3. Assign a total load for each week – *remember to avoid sudden changes and incorporate recovery weeks*
4. Assign a total load for each session – *refer to previous training data for guidance and remember no sudden changes*
5. Identify volume (minutes) and intensity (use RPE) of each training session in each week to conform with the identified weekly load
6. Review and modify the program developed, to eliminate sudden changes in load and to confirm that adequate recovery has been included within the program
7. Adapt the team load for the 'at risk' individual (see below)

It is important to ensure that there is, ongoing communication among team staff to avoid 'load creep'. In professional teams load creep occurs when coaching staff do a little more than was planned, without reference to what the player has recently been exposed to (e.g. a live scrummaging session following a heavy gym session comprising squats/deadlifts).

Alteration of the team training load should be considered when experiencing heavy travel loads and increased game density for example 5 or 6 day turn around compared with 7 – 8 days between games.

LOAD - INDIVIDUAL

Load should always be prescribed on an individual and flexible basis. In order to achieve individuality of load prescription, it is best to first develop a team program and then identify high risk athletes and modify the program for the individual.

A key factor in delivering player-specific programs is communication with and observation of the athlete. Combined with wellbeing monitoring this contributes to identifying athletes who may be fatigued or have non-physical issues that can impact on performance and injury.

High risk athletes have a lowered tolerance for load and therefore need a focused management of their load. High risk athletes fall into one or more of the following categories:

- Players involved in multiple teams e.g. international elite players, junior team players playing in different teams or participating in multiple sports
- Players returning from injury
- Immature and veteran players
- Players who have recently moved to a higher level of competition for the first time (new squad members)
- Players with poor training histories
- Players with high non-physical or life loads – best identified through observation, communication and well-being monitoring

Monitoring the well-being of each athlete (sleep, fatigue, muscle soreness) assists in identifying each athlete's response to the prescribed load (physical and non-physical).

PRACTICAL APPLICATION OF LOAD PRINCIPLES

1. Measuring load - can be measured for each training session and game by assessing time (minutes) and intensity (RPE – *see rating scale below*)¹⁰. For example:
 - 50-minute session with a session RPE rating of 5 has a total load of **250** (50 x 5)
 - 70-minute session with a session RPE rating of 7 has a total load of **490** (70 x 7)

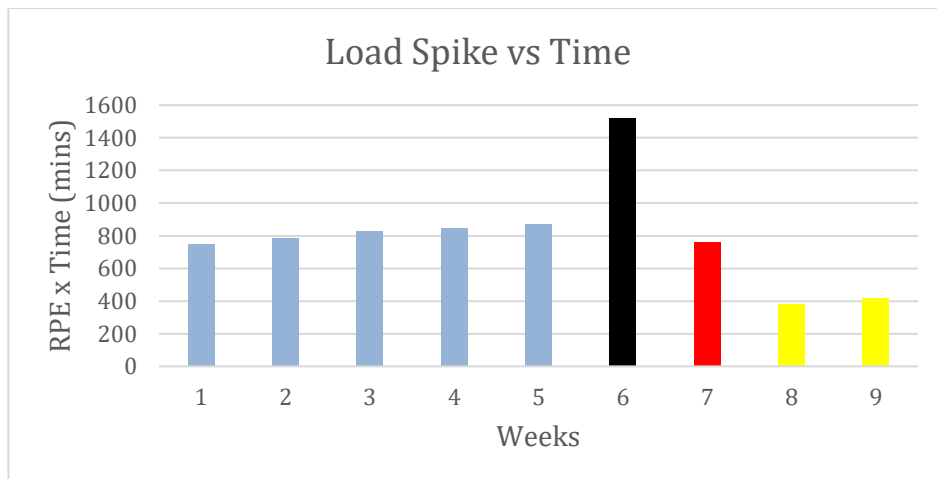
It is not recommended but as a minimum, session RPE could be omitted, and load measured as the number and total minutes of participation in matches and training

It is recognised that in elite teams, GPS may be available for field sessions and intensity may be measured using as for example metres/minute.

2. Most elite teams assume that the RPE for a game is 10 and monitor minutes played
3. Methods for managing load are constantly under review and changing but currently two commonly used methods for load management are:
 - a) assigning a set percentage to increases in day to day and week to week loads.

Changes in load need to be managed with care. As a guide team changes from day to day and week to week should be maintained below 20% with **high risk players** managed with variations at 10% or less.

An example of load spiking is shown in the graph with the load spike (black) preceding an injury (red) and then rehab (yellow) following



- b) measuring and monitoring the ratio between acute (weekly) and chronic (4 weekly) load

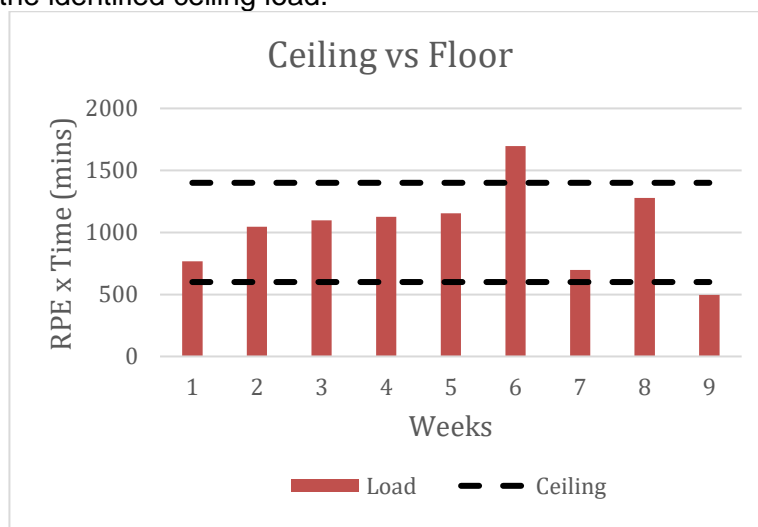
It is currently recommended that acute training load (the training load of the last week) to the chronic load (the 4-week rolling load average) ratio be maintained within a range of 0.8 to 1.3, to stay in positive adaptation and thus reduce risk of injury^{6 11}.

4. Manage loads carefully for high-risk athletes (players returning from injury, immature and veteran players, players with poor training histories, new squad members, compromised players with chronic lower limb joint injuries and those with increased life stressors) and protect them during periods of load change
5. Pay particular attention to load management when entering new periods – new training year, start of competition, changes in training emphasis (move from aerobic to anaerobic training focus), new drills, new techniques, new coaching staff. These 'new' periods require gradual load alteration ¹².
6. Train hard and smart – *Undertake **high-risk training at low-risk times***
High-risk training (high-speed drills, sprint sessions and contact sessions) should **not** be done at high-risk training times (periods of fatigue – end of session, end of 3-day training period, long haul travel). Link high-risk training with low-risk periods
7. Spikes in load have been shown to have a latency period for subsequent injury. This can be 1-2 weeks for muscles, 3-4 weeks for bones and 3 weeks for tendons ^{13 14}.
8. Establish floor and ceiling loads for the squad and each individual by referencing, past historical data. Vary loads from day to day and week to week using squad and individual floor and ceiling loads.

Ceiling loads are defined as an arbitrary maximum load above which injury risk is significantly elevated

Floor loads are defined as an arbitrary minimum load below which offers little protection for ensuing loads.

The graph below illustrates loads fluctuating between a ceiling and a floor with Week 6 above the identified ceiling load.

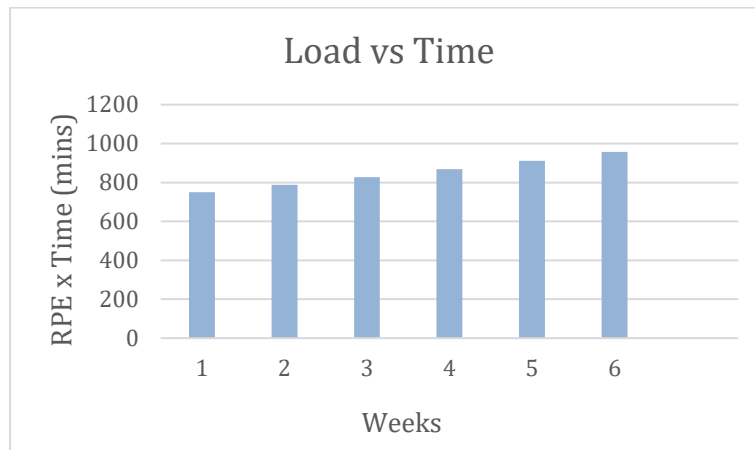


9. Low resilience athletes (chronic joint or tendon injuries or players playing consistently low minutes) need to build resistance against future injury. A plan should

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be developed for these players to build a base, focussing on building volume (high minutes) before intensity (high velocity)

In the graph below, weekly load is built gradually to provide a base.



10. A risk factor monitoring system – Simple practical systems can be created to outline and indicate broad levels of injury risk for individual players. The example below demonstrates a simple monitoring system within a table.

In the table are a range of different measures and ratios that may be used to indicate load. Some include use of GPS and different practitioners will choose different measures and ratios to include based upon the setting, resources (e.g. availability of GPS) and their personal experience.

For example:

- OL = On Legs Load (RPE x Duration)
- Return Last 4 = Player has returned from injury in the last 4 weeks
- RVC = Rate of velocity change (accel, decel, change of direction load)
- No 85% effort = has not recorded any speeds above 85% of his max speed
- TSB = Training Stress Balance (ratio between acute and chronic load)

The player at the top of the table (see below) has 9 risk factor warnings and would be managed differently to the player at the bottom with no warnings. It does not mean he will get injured nor does one factor only suggest he is at risk, but the combination is the key.

Using this approach does not mean you will be able to predict injury, but it allows you to manage risk. This visual tool supports the easy identification of the highest risk players in your squad.

Without addressing every column of risk, a closer analysis of distance for the player at the top of the table illustrates the following:

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He has not had an injury in the last 4 weeks (green) but he has low chronic distance load (less than 18kms). This is in red. His training stress balance is above 120% (red) (there are different TSB's for different measures) because of this low chronic load even though his acute distance load is seen as appropriate (green).

Level 1-2 Durability Players: Risk Overview

selective	Low Chronic Loads					TSB%				>Acute Ceiling				Sum
Return Last 4	OL <100 mins	Sprint <150m	RVC <18 AU	Distance <18 K	No 85% Effort	OLM >140%	Sprint >140%	RVC >140%	Distance >120%	On-Legs	Sprint	RVC	Distance	
x	v	x	v	v	x	v	v	v	v	v	v	x	x	9
v	v	x	v	v	x	x	v	v	v	x	x	x	x	7
x	x	x	x	x	v	x	x	x	x	v	x	v	v	4
x	x	x	x	x	x	x	x	x	x	v	v	v	v	4
v	x	x	x	x	x	v	v	x	x	v	x	x	x	4
x	v	x	v	v	v	x	x	x	x	x	x	x	x	4
x	x	x	x	x	x	x	v	x	x	v	v	v	x	4
v	x	x	x	x	x	x	x	x	x	v	x	v	x	3
v	v	x	v	x	x	x	x	x	x	x	x	x	x	3
x	x	x	x	x	x	x	x	x	x	v	x	v	v	3
v	x	x	x	x	x	x	x	x	x	x	x	v	x	2
x	x	x	v	x	x	x	v	x	x	x	x	x	x	2
x	x	x	v	x	x	x	x	x	x	v	x	x	x	2
v	x	x	v	x	x	x	x	x	x	x	x	x	x	2
x	x	x	x	x	x	x	x	x	x	v	x	x	x	1
x	x	x	x	x	x	x	x	x	x	v	x	x	x	1
x	x	x	v	x	x	x	x	x	x	x	x	x	x	1
x	x	x	x	x	x	x	x	x	x	x	v	x	x	1
x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
x	x	x	x	x	x	x	x	x	x	x	x	x	x	0

APPENDIX 1 - RPE RATING SCALE

RATING	DESCRIPTION
0	Rest
1	Very, Very Easy
2	Easy
3	Moderate
4	Somewhat Hard
5	Hard
6	
7	Very Hard
8	
9	
10	Maximal

INSTRUCTIONS

Ideally data is best collected at a consistent time post training and usually within 30 minutes following the conclusion of the training. The athlete is briefly shown the scale (above) and asked "How was your workout?"

APPENDIX 2 - GLOSSARY

Acute Load

Absolute training load totalled across a seven day period. Some sports may use durations other than seven days

Chronic Load

The average of the acute weekly loads taken over the last four weeks. Some sports may use durations other than four weeks

Session RPE (sRPE)

The multiplication of a session exertion rating (using the Borg Rating of Perceived Exertion Scale) and the session duration in minutes

Training Stress Balance or Acute:Chronic Workload Ratio

The result of dividing the acute workload by the chronic workload. This may be a percentage by multiplying by 100.

Psychological or Life Load

An internal load created by a range of life factors including mental, emotional, psychological, social and environmental stressors that when combined with training/playing external load, create a total individual load. Life factors such as these can be difficult to quantify but are an important issue that coaches should be addressing and considering for each player

APPENDIX 3 - REFERENCES

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