Performance Enhancement & Health xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Performance Enhancement & Health

journal homepage: www.elsevier.com/locate/peh

The usage and perceived effectiveness of different recovery modalities in amateur and elite Rugby athletes

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ARTICLE INFO

Article history:
Received 8 February 2017
Received in revised form 13 April 2017
Accepted 20 April 2017
Available online xxx

Keywords:
Active recovery
Stretching
Cold baths

ABSTRACT

Background: The use of recovery modalities to help enhance recovery is popular among athletes. However, little is known about the usage of various recovery modalities and the perception of their benefit amongst different level athletes. Therefore, the purpose of this study was to compare the usage and perceptual understanding of different recovery modalities between elite and amateur Rugby athletes.
Methods: Fifty-eight amateur (n = 26) and elite (n = 32) Rugby union athletes completed a questionnaire designed to determine the usage and the perception of 15 different recovery modalities. A 5-point Likert scale was used to examine the perceived importance of recovery and effectiveness of each recovery modality. The number of different recovery modalities, and the number of times each player used each recovery modality per week was also obtained through the questionnaires. The total number of times an athlete used a recovery modality was calculated by summing the number of times each recovery modality was used per week.
Results: No differences were found between groups (elite: 5.0 ± 0.2; amateur: 4.9 ± 0.3) for the perceived importance of recovery to enhance performance. When comparing the effectiveness of each recovery modality, the elite group perceived active recovery, massage, pool recovery, additional sleep and stretching to be significantly ($p < 0.05$) more effective in comparison to the amateur group. No significant differences were found for any other recovery modality. There was a significantly greater amount of recovery modalities used and also a higher frequency of use per week in the elite group ($p > 0.05$).
Conclusion: Although no differences were found for the perception of the importance of recovery, elite Rugby athletes used significantly more recovery modalities and implemented recovery modalities more often in comparison to amateur Rugby athletes.

1. Introduction

Rugby (union and league) is a high-intensity team sport played in several countries worldwide (Duthie, Pyne, & Hooper, 2003; Gabbett, 2005). Like most team sports, Rugby is intermittent, with bouts of high intensity efforts interspersed with low intensity activities or rest (Austin, Gabbett, & Jenkins, 2011; Cunniffe, Proctor, Baker, & Davies, 2009; Gabbett, Abernethy, & Jenkins, 2012). Moreover, the collision-based activities like tackling, static holds, scrums, rucks and mauls, leads to remarkable muscle damage to the extent that muscle damage markers, such as creatine kinase, can remain elevated for up to 120 h post-match (McLellan, Lovell, & Gass, 2011a, McLellan, Lovell, & Gass, 2011b). However, a prolonged period of muscle damage is more likely to result from the cumulative effect of training (i.e. repeat sessions occurring during the training week), rather than exclusively from a single Rugby match (Tavares, Tiaki, & Driller, 2017).

At the elite or professional level, Rugby training often occurs less than 48 h following a match with athletes training for 2 or more consecutive days during a training week (Baker, 2001), therefore, it is likely that the players' physical readiness is compromised (Twist and Highton, 2013; Twist, Waldron, Highton, Burt, & Daniels, 2012). This can lead to an excessive level of accumulated fatigue over the week that may lead to under-performance on match day (Johnston, Gibson et al., 2013; Johnston, Gabbett, & Jenkins, 2013) and undesirable fatigue states over a training phase (Coutts, Reaburn, Piva, & Rowsell, 2007). In order to reduce the harmful effect of fatigue and allow athletes to recover faster, athletes regularly implement different recovery modalities in their routines (Banfi, Melegati, &

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http://dx.doi.org/10.1016/j.peh.2017.04.002
2211-2669/

Valentini, 2007; Beaven et al., 2013; Gill, Beaven, & Cook, 2006; Hamlin et al., 2012; Higgins, Cameron, & Climstein, 2012; Webb, Harris, Cronin, & Walker, 2013). Previous literature has identified stretching and cold modalities as the most used recovery strategies implemented by elite Rugby athletes (Van Wyk & Lambert, 2009). In agreement with previous research, our recent review on recovery modalities identified cold therapies (e.g ice-baths) as the most frequently used recovery strategy reported in the Rugby-specific research literature (Tavares et al., 2017). This is not surprising, given the high-contact nature and consequent muscle damage associated with Rugby training and competition.

When the perceived effectiveness of different recovery modalities between club, National and International level athletes (Hockey, Rugby, Netball and Soccer) was compared, no differences were found between club and National or International level athletes (Venter, 2012). However, no information was provided about the perceived effectiveness of recovery modalities within each sport. To the best of our knowledge, no study has compared the usage and perceived effectiveness of different recovery modalities between different competition levels in Rugby.

The training load and training workload density are likely to differ between elite (Baker, 2001; McLean, Coutts, Kelly, McGuigan, & Cormack, 2010; McLellan et al., 2011b; Twist et al., 2012) and amateur athletes (Higgins, Heazlewood, & Climstein, 2011; Higgins, Climstein, & Cameron, 2013). Moreover, amateur Rugby matches lead to lower levels of muscle damage in comparison to professional Rugby matches (Gill et al., 2006; Hamlin et al., 2012; McLellan et al., 2011a, 2011b; Pointon & Duffield, 2012; Suzuki et al., 2004; Takarada, 2003). Therefore, the purpose of this study was to compare the usage and perceived importance of recovery modalities between elite and amateur Rugby athletes. Moreover, the weekly training schedule of the elite and amateur Rugby athletes surveyed was collected in order to determine if training load influenced the usage and perceived importance of recovery modalities.

2. Methods

2.1. Participants

Fifty-eight male Rugby athletes volunteered to participate in the current study. A questionnaire was completed by 32 elite Rugby athletes all from the same team and by 26 amateur Rugby athletes who were all members of the same team (n = 26) (Table 1). All athletes volunteered to answer the questionnaire and completed the questionnaire during the in-season phase of training. Written informed consent was obtained from each participant, and ethical approval was obtained from the Institution's Human Research Ethics Committee.

Table 1
Participant demographics. Data shown as means ± SD. * represents significant difference between groups ($p < 0.05$).

	Elite (n = 32)	Amateur (n = 26)
Age (years)	24.4 ± 2.9	25.6 ± 4.9
Time playing Rugby (years)	16.1 ± 4.9	12.4 ± 5.7*

2.2. Procedures

The questionnaire was designed to gather information on athletes' usage and perceived effectiveness of different recovery modalities. In addition to background information relating to age and training age, the questionnaire contained questions about the usage and perceived effectiveness of 15 different recovery modalities (cold baths, active recovery, hot baths, massage, contrast baths, compression garments, sauna, pool recovery, cryotherapy, electromyostimulation, additional sleep, nonsteroidal anti-inflammatory drugs (NSAID), stretching, hyperbaric oxygen therapy, peristaltic pulse dynamic compression (PPDC)) and also a question about the importance of recovery to enhance performance. To answer these questions, a 5-point Likert scale (1 = not important at all, 2 = not very important, 3 = neutral, 4 = somewhat important, 5 = extremely important) was used. The recovery modalities were chosen from previous studies in Rugby Union or Rugby League (Tavares et al., 2017) and from the review papers of Barnett, (2006) and Vaile, Halson, & Graham, 2010). In order to clarify the different recovery modalities, a picture of each recovery modality was shown alongside the questionnaire. Participants were also instructed to indicate when they had not experimented nor felt familiar enough (N/E) with certain modalities. From the questionnaire, the number of different recovery modalities each player used per week was recorded. We also calculated the total number of times that athletes used all recovery modalities by summing the number of times each recovery modality was used per week.

Additional information about the typical in-season training week (with a match on a Saturday) was collected from the strength and conditioning coaches for the amateur and professional groups (Table 2). Information relating to the duration and the type of the

Table 2
Typical in-season training week schedule of elite and amateur Rugby players. Resistance training, conditioning and technical-tactical duration (minutes) and intensity or type of training is described.

	Elite						
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	WB (30′; P)		UB (75′; S); TT (60–90′; Low)	TT (30′; Moderate); LB (75′; S); TT (30–45′; High)	Con (30′; Low)	TT (30′; Low); TT (15–30′; Moderate); WB (60′; P)	TT (60; Moderate)
Afternoon							
Evening	Game			TT (75–90′; High)		TT (75–90′; High)	
	Amateur						
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Morning							
Afternoon							
Evening	Game		UB (60′; S + P/HT)′; TT (40′; Low)	LB (60′; S + P/HT)′; TT (60–90′; High)		WB (60′; S + P); TT (75′; Moderate)	

* Whole body resistance training (WB); Upper body resistance training (UB); Lower body resistance training (LB); Strength session (S); Hypertrophy session (HT); Power session (P); Technical-tactical session (TT); Conditioning session (Con). In resistance training sessions, " + " signify a combination of methods of training and "/" means that one of the methods is implemented. For example, "S + P/HT" signify that in the session the group use strength method together with either a power or hypertrophy method.

Please cite this article in press as: Tavares, F., et al. The usage and perceived effectiveness of different recovery modalities in amateur and elite Rugby athletes. *Performance Enhancement & Health* (2017), http://dx.doi.org/10.1016/j.peh.2017.04.002