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PRE-COMPETITION TAPERING IN HIGH PERFORMANCE SPORTS – A THEORETICAL APPROACH

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ABSTRACT. Aim: The aim of this study is to synthesize the literature on the 'tapering' process, i.e. reduction in training load, which takes place two to four weeks prior to a major competition. **Methods:** The main method used in this material is the literature review method; a total of six studies on this topic have been reviewed. **Results:** A synthesis of the 'tapering' process that should be implemented by every coach before a major competition in the annual competition calendar. **Conclusions:** In order to increase the chances of achieving high performance in major competitions, it is preferable that the training intensity during the taper be high or similar to that of the pre-taper training.

Keywords: *tapering, training sessions, competition, high performance sport*

REZUMAT. ***Descărcarea încărcăturii de antrenament înainte de competiţie în sportul de performanţă – o abordare teoretică*****. Obiective:** Obiectivul acestui studiu este de a sintetiza literatura de specialitate cu privire la procesul de „descărcare" a încărcăturii de antrenament, proces ce are loc cu două până la patru săptămâni, înainte de o competiţie majoră. **Metode:** Ca metodă principală în acest material s-a folosit metoda studiului bibliografic, parcurgând un număr de şase studii care tratează subiectul menţionat. **Rezultate:** Realizarea unei sinteze cu privire la procesul de „descărcare" a încărcăturii de antrenament, proces ce trebuie realizat, de către fiecare antrenor, înainte de o competiţie importantă din calendarul competiţional anual. **Concluzii:** Este de preferat ca, pentru creşterea şanselor de a obţine performanţe la competiţiile majore, în

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perioada de descărcare, intensitatea să fie ridicată sau similară cu cea din antrenamentele din perioada pre descărcare, în timp ce volumul şi frecvenţa antrenamentelor vor fi reduse.

Cuvinte cheie: *descărcare, antrenament, competiție, sport de performanță*

INTRODUCTION

Nowadays athletes cannot be expected to have high performance in major competitions without rigorous training planning that takes into account the annual competition calendar. The literature often refers to 'taper' as the final part of a training plan to be introduced in the final weeks prior to a competition, for a taper has the potential to bring a coach's training plan to fruition or minimize it (Pritchard, Keogh, Barnes, & McGuigan, 2015).

OBJECTIVES

The aim of this study is to synthesize the literature on the 'tapering' process, i.e. reduction in training load, which takes place two to four weeks prior to a major competition.

METHODS

The main method used in this material is the literature review method; a total of six studies on this topic have been reviewed. The main indicators followed in these studies were some of the effort parameters, as volume, intensity and training frequency. In the reviewed studies, the authors mention the fact that decreasing volume and frequency or maintaining training intensity (but reducing frequency of intensive training sessions), for a period between 8-14 days, before a competition, influence the sport performance.

RESULTS

Taper means 'a reduction of the training load during a variable period of time, in an attempt to reduce the physiological and psychological stress of daily training and optimize sports performance' (Mujika & Padilla, 2003, p. 1183).

Reducing the training load along with the catabolic processes during a taper can induce sports performance (Izquierdo et al., 2007, apud Turner, 2011). Such reduction may involve a decrease in training volume, intensity, and frequency, using a specific taper pattern and varying its duration (Bosquet et al., 2007). Notable improvements in sports performance following tapering were seen in rowers, runners, triathletes, cyclists, swimmers, weightlifters (Turner, 2011; Bosquet et al., 2007).

The main purpose of a taper is to reduce the accumulated fatigue and not to improve fitness levels (Mujika & Padilla, 2003).

The fitness-fatigue model is used to highlight how the tapering process may work. This model is based on training after-effects, i.e. after training, the fitness level (adaptation to greater efforts) improves and fatigue occurs, along with physiological changes. According to the literature, performance is the sum of the positive training after-effects (neuromuscular/physiological efficiency) with the sum of the negative after-effects removed (reduced fatigue) (Pritchard et al., 2015).

Taper Types

According to the literature, there are four types of tapers whereby training load can be reduced: linear taper, exponential taper (fast or slow decay of training load), step or nonprogressive taper (Mujika & Padilla, 2003; Le Meur, Hausswirth, Mujika, 2012; Turner, 2011).

A linear taper involves a higher training load compared to an exponential taper. An exponential taper can have either a fast or a slow decay (the training load being higher in the latter case); step taper is a nonprogressive drop in training load (Mujika & Padilla, 2003).

A linear taper can start with a 5% decrease of the pre-taper training load, and then the training load can be decreased each day by another 5% throughout the duration of the taper.

A step taper involves an immediate 50% reduction in training volume from the very first day and then this reduced volume is maintained throughout duration of the taper (Turner, 2011).

The study conducted by Banister and Carter (1999), which compared the applied taper types, and the changes induced in performance, found that an exponential taper was more effective than a step taper; when a fast exponential taper was compared to a slow exponential taper, the former was found to generate improvements in performance (Mujika & Padilla, 2003).

Intensity Reduction

The literature in the field emphasizes the importance of maintaining training intensity during a taper so as to retain the adaptations acquired during pre-taper training. A 1/3 or 2/3 reduction in intensity causes a decrease in aerobic endurance (Hickson et al., 1985, apud Mujika & Padilla, 2003).

Other studies state that competitive performance improved when the training intensity during a taper is high or at least similar to the intensity of the training prior to the taper. In contrast, the results were not as good when low-intensity moderate-volume training was used during taper (Shepley et al., 1992, apud Mujika & Padilla, 2003; Le Meur, Meur, Hausswirth, Mujika, 2012).

Volume Reduction

Training volume can be reduced during a taper, without affecting the adaptations acquired in pre-taper training. The endurance capacity built during 10 weeks of training can be maintained (with no significant changes) in the 15 subsequent weeks during which the training volume is reduced by 2/3 (Hickson et al., 1982, apud Le Meur et al. 2012).

In middle-distance runners, the results were better when the taper included reduced training volumes instead of moderate ones, of course compared to the training volumes in the period prior to the taper (Shepley et al., 1992, Mujika et al., 2000, apud Le Meur et al, 2012).

Studies claim that, in order to improve results, the training volume during a taper should be reduced by 41-60% compared to the pre-taper training volume, by shortening the training duration rather than by reducing the number of training sessions (Le Meur et al., 2012).

A progressive (50-70%; 50-90%) reduction in training volume is recommended in order to maintain the adaptability acquired during pre-taper training and to enhance performance.

Studies show that better results were achieved by progressively (50-90%) reducing the training volume in sports such as swimming, running, cycling, triathlon (Banister et al., 1986, Dressendorfer et al 2002; Johns et al., 1992; Kenitzer, 1998; Millard et al., 1985; Mujika et al., 2000, 2002 apud Mujika & Padilla, 2003).

Training Frequency Reduction

According to some studies, reducing the frequency of training has had no influence on sport performance improvement because such reduction also

affects training intensity, which we already know is important to maintain during the taper (Bosquet et al., 2007, apud Le Meur et al., 2012).

In a study consisting of a 20-km cycling trial simulation, a 50% reduction in training frequency during a 10-day taper resulted in improved performance (Dressendorfer et al., 2002, apud Majika & Padilla, 2003).

Whereas a training frequency reduction is recommended in some sports, maintaining a higher than 80% training frequency during the taper is recommended in swimming (Majika & Padilla, 2003). This behavior is also recommended in high performance gymnastics, which requires a high technical level.

Duration of Taper

According to the literature, a taper duration of 8 to 14 days represents the threshold beyond which it is possible to have a positive influence on performance by reducing fatigue, while the other side of the threshold could bring about detraining and implicitly a decrease in performance (Bosquet et al., 2007). An optimal taper lasts 8 to 14 days; during this time, the training volume is exponentially reduced by 40-60%, while maintaining the training intensity and frequency (Bosquet et al., 2007, apud Turner, 2011).

The table below summarizes how taper influences sport performance through the changes that occur in effort variables. Only the aspects that positively influence performance are listed.

Table 1 includes only the cases where performance values changed positively, according to the literature. In swimming, for example, when the training volume was reduced by 21-40%, the performance decreased (mean values of 0.18, while at a volume of 41-60% compared to pre-taper training volume, the values were 0.81).

Table 1. Performance values induced by changes in effort variables during taper

SPORT	V Reduction				I Reduction		Frecv. Reduction		T Duration				Taper Type	
	≤20 %	21 -40%	41-60%	≥60 %	Yes	No	Yes	No	≤7d	8-14d	15-21d	≥22 d	step	progressive
Swimming	-	-	0.81	-	-	0.28	0.35	0.30	-	0.45	-	-	-	0.27
Track and field	-	0.47	-	-	-	0.37	0.16	0.53	-	0.58	-	-	-	0.46
Cycling	-	0.84	-	-	-	0.68	0.95	0.55	-	1.59	-	-	-	0.28

Source: adapted from: (Bosquet et al., 2007)

CONCLUSIONS

As shown in Table 1, performance in swimming improved when the training volume was reduced by 41-60% of the volume used before the onset of the taper. Performance in running and cycling improved when the training volume was reduced by 21-40% of the pre-taper volume.

In terms of training intensity during taper, performance improvements occurred in all three sports (swimming, running, and cycling) when the training intensity was not reduced during the taper.

As far as frequency reduction is concerned, there were no major differences in swimming. In running, performance was higher when the training frequency was not reduced. In cycling, on the other hand, performance was higher when the training frequency was reduced.

In all three sports, performance improved when the taper lasted for 8 to 14 days, compared to 15 to 21 days or more than 22 days.

In terms of taper types, a progressive taper was more effective than a step taper.

During periods of taper, it is recommended that training intensity be maintained at a high level, while the training volume should progressively decrease by 50-90% of the pre-taper training volume.

Studies show that results were better after tapering through progressive reduction of training volume (50-90%) in sports such as swimming, running, cycling, triathlon.

Comparisons between types of taper show that an exponential taper was more effective than a step taper; of the two exponential tapers, i.e. fast exponential taper and slow exponential taper, the fast one enhanced performance (Mujika & Padilla, 2003).

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