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Προπονητική Επιβάρυνση στους Δρόμους Μεγάλων Αποστάσεων

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Περίληψη

Η προπονητική επιβάρυνση στις μεσαίες και μεγάλες αποστάσεις είναι ένα από τα σημαντικότερα στοιχεία της προπόνησης το οποίο δεν έχει διερευνηθεί επαρκώς. Σκοπός της παρούσας μελέτης ήταν να εξετάσει τι αποστάσεις καλύπτουν οι αθλητές για να βελτιώσουν την αερόβια και αναερόβια ικανότητά τους κατά τη διάρκεια των προπονητικών περιόδων καθ' όλη τη διάρκεια της προπονητικής χρονιάς. Τα στατιστικά δεδομένα συλλέχτηκαν μέσω συνεντεύξεων και ερωτηματολογίων των προπονητών. Τα αποτελέσματα έδειξαν ότι οι αθλητές των μεσαίων αποστάσεων (800m και 1500m) διανύουν 4703.7±1224.1 km, των μεγάλων αποστάσεων (5000m, 10000m και 3000m στιπλ) 5422±1206.41 km και του μαραθωνίου 5781.1±1634 km ετησίως, ενώ τη δεκαετία του '80 οι δρομείς κάλυπταν μεγαλύτερες αποστάσεις. Αυτή η μείωση του όγκου προπόνησης οφείλεται στην αλλαγή των προπονητικών μεθόδων, τις οποίες οι προπονητές ακολουθούν στη σημερινή εποχή.

Λέξεις κλειδιά: *αερόβια προπόνηση, αναερόβια προπόνηση, όγκος προπόνησης, προπονητικές περίοδοι*

Training Volume in Distance Running

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Abstract

Training volume in middle and distance running events is one of the most important elements for improving performance that has not been adequately researched. The aim of the present study was to investigate the running distances (training volume) the athletes cover to improve aerobic and anaerobic performance during the yearly training periods. Data was collected through interviews and questionnaires administered to coaches. The results showed that middle distance runners (800m and 1500m) run 4703.7±1224.1 km, long distance runners (5000m, 10000m and 3000m steeple) run 5422±1206.41km and marathon runners run 5781.1±1634 km per year, while runners in the 1980s used to cover longer distances. This decrease in running volume is due to the different training methods coaches follow in our time.

Key words: *aerobic training, anaerobic training, training volume, training periods*

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Introduction

Training volume in running events is one of the most important elements for improving performance. However, this area has not been sufficiently investigated. In the seventies some research, mainly from USSR, has focused on this area (Homenkov, 1977). During the last decades there has been a significant improvement in performance in middle and long distance and marathon events. This rapid record improvement is possibly due to the change in training philosophy, as far as the intensity and training volume are concerned. Nowadays, coaches are giving more attention in the quality (intensity) than in the quantity (duration) of training.

After years of systematic physical training runners' kilometric volume increases. However, increased training volume does not necessarily lead to improvements in performance. Further increase in training volume may leads to further decline in performance (Lazarof, 1985).

According to Navarro (1998), Neumann (1984) and Zintl (1993) the training methods for improving running performance are short distances (0.5-2min, 80-85%VO2max), middle distances (2-10min, 60-75%VO2max) and long distances (10-35min, 50-70% VO2max). When aiming at the improvement of aerobic performance coaches design their training programs according to the above running distance distributions.

The aim of this study was to investigate the training volume, one of the most important training aspects in training of middle- long- distance and marathon athletes, throughout the basic, special (specific), pre-competitive and competitive periods.

Methods

Kenya, Ethiopia, Spain, Portugal, Italy, Great Britain and Finland have traditionally come up with a vast number of elite athletes in middle and long distance running events, that they have exhibited excellent performances in European and World Championships and Olympics Games. Thirty five top class coaches (their athletes ranked in the world's first 20 positions) from Ethiopia (Addis Ababa), Kenya (Ebu), Spain (Barcelona, Madrid, Soria, Toledo, Alicante), Portugal (Porto, Lisbon), Italy (Milan, Ferrara, Tirrenia), England (London, Coventry, Lichfield, Manchester, Loughborough, Darligton), N. Ireland (Belfast), Scotland (Glascow, Edinbourgh) and Finland (Helsinki, Pajulahti, Vierumaki, Numella) volunteered to participate in the present study. The coaches were selected according to their achievements in International Championships.

Data was collected through questionnaires and interviews. All the questions concerned the running volume (intensity and duration) employed to improve aerobic and anaerobic performance throughout the basic, special, pre-competitive and competitive training period.

Descriptive statistics was used for analysis of the results.

Results

The overall yearly running volume in middle distance runners was 4703.7±1224.1 km, in long distance was 5422±1206.4 km and in marathon runners was 5781.1±1634 km. The duration of basic, spe-

Table 1. Yearly Training Volume in Middle Distance Events (800m and 1500m)

Training Volume (km)	Basic Period	Special Period	Pre-Competitive Period	Competitive Period	Yearly
Aerobic Mechanism 70-100% VO_2max (km)	1998.4±931.1	1157.4±474.7	712.7±240.4	714.3±324.2	4305.1±1133.6
Anaerobic Mechanism 100-135% VO_2max (km)	108.7±164.8	110.4±77.4	98.9±96.2	105.0±68.9	387.4±335.6
Total (km)	2107.1±992.4	1267.8±469.7	811.6±340.8	819.3±334.8	4692.5±1224.1
Aerobic Mechanism per Week (km)	103.5±48.2	106.±52.7	73.5±53.3	72.4±30.8	
Anaerobic Mechanism per Week (km)	5.6±8.5	9.7±17.6	10.2±12.9	11±5.52	

Table 2. Yearly Training Volume in Long Distance Events (5000m, 10000m and 3000m steeple)

Training Volume (km)	Basic Period	Special Period	Pre-Competitive Period	Competitive Period	Yearly
Aerobic Mechanism 70-100% VO_2max (km)	2618.1±692.5	1258.8±456.3	963.4±248.4	931.0±578.5	5091.1±1140
Anaerobic Mechanism 100-135% VO_2max (km)	86.6±41.1	91.1±67.6	95.2±50.6	133.5±91.2	330.9±173.5
Total (km)	2704.7±792.7	1349.9±497.3	1058.6±318.8	1064.5±819	5422±1206.4
Aerobic Mechanism per Week (km)	122.3±32.3	126.5±65.7	109.5±40.8	102.8±51.5	
Anaerobic Mechanism per Week (km)	8.8±11.3	8.9±9.3	9.5±8.6	10.1±6.9	

Table 3. Yearly Training Volume in Marathon

Training Volume (km)	Basic Period	Special Period	Competitive Period	Yearly
Aerobic Mechanism 70-100% VO_2max (km)	2933.7±1.3	1602.8±1095.4	1270.1±1128.6	5577.7±1561
Anaerobic Mechanism 100-135% VO_2max (km)	68.9±63.2	71.3±63.2	87.1±32.4	203.4±146.1
Total (km)	3002.6±1588.8	1674.1±1194.7	1357.2±1142.5	5781.1±1634
Aerobic Mechanism per Week (km)	2933.7±1581.3	1602.8±1095.3	1270.1±1128.6	
Anaerobic Mechanism per Week (km)	68.9±63.1	71.2±63.1	87.1±32.3	

cific, pre-competitive and competitive period was 19.3±7.0, 10.2±4.4, 7.2±3.6 and 10.5±3.0 weeks for the middle distance events, and 21.4±6.4, 8.9±2.2, 7.2±2.4 and 13.2±5.7 weeks, respectively, for the long distance events. The duration of basic, specific and competitive period was 16.7±7.6, 7.5±4.8 and 7.4±6.3 wk for the marathon runners. Data showed that training volume decreases and training intensity increases from basic to competitive period in all runners. Data for volume and intensity (aerobic and anaerobic training) are represented in tables 1, 2 and 3 and figures 1, 2, 3, 4, 5 and 6.

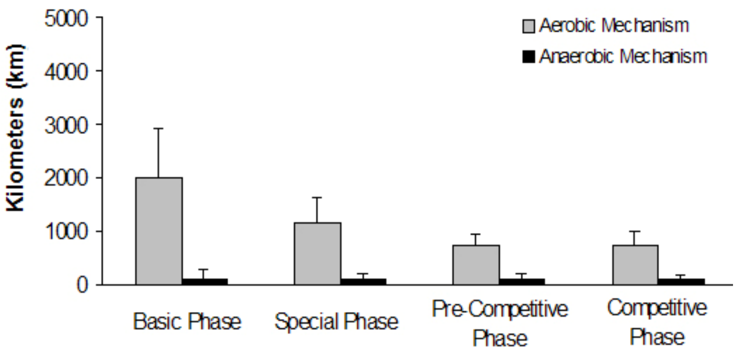

Figure 1. Yearly aerobic and anaerobic training load in middle distance running

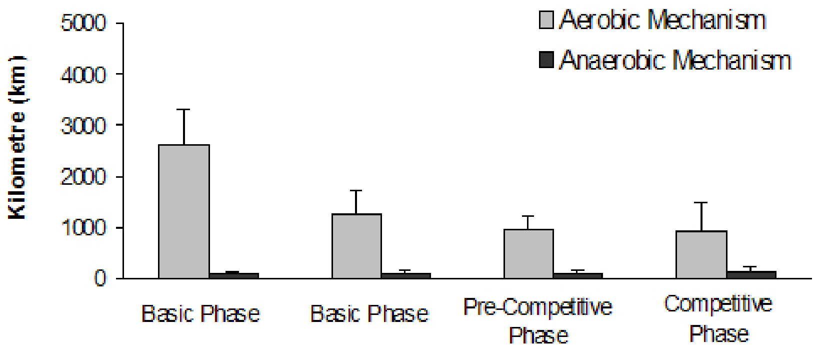

Figure 2. Yearly aerobic and anaerobic training load in long distance running

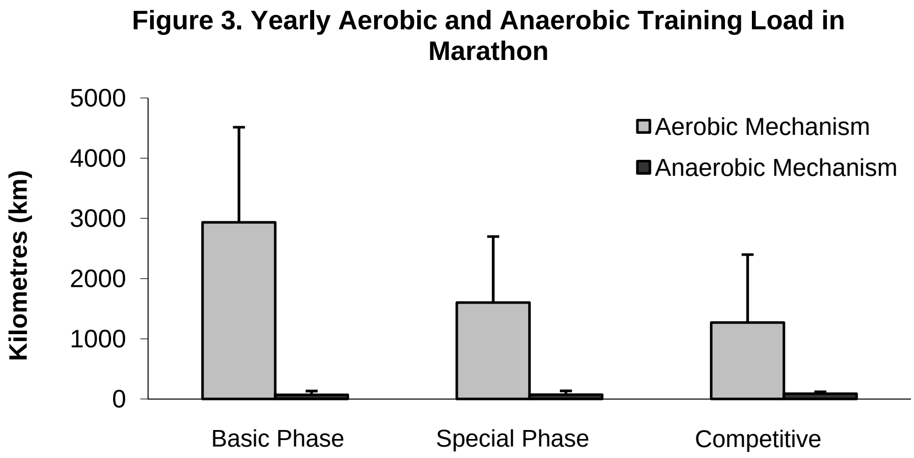

Figure 3. Yearly aerobic and anaerobic training load in Marathon

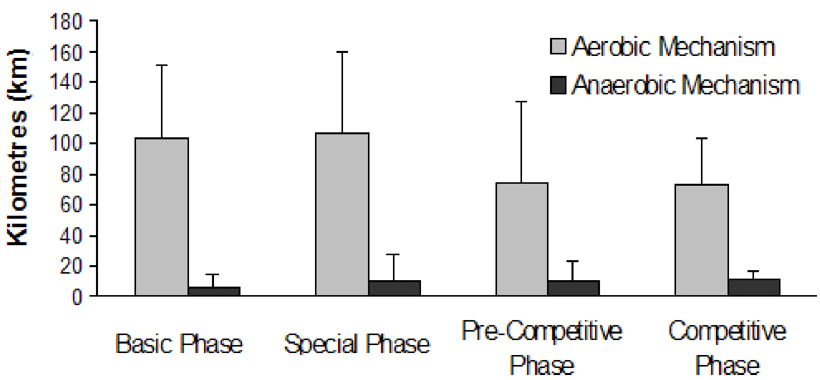

Figure 4. Weekly aerobic and anaerobic training volume in middle distance running

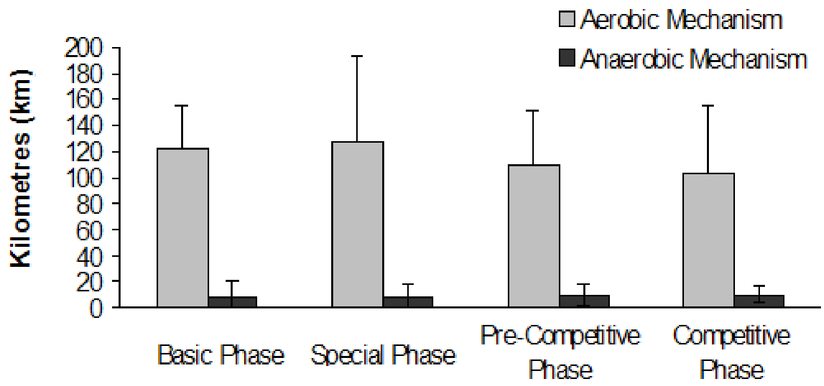

Figure 5. Weekly aerobic and anaerobic training volume in long distance running

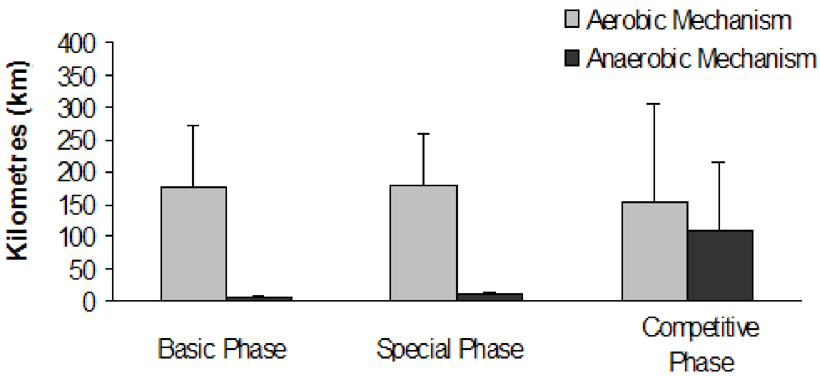

Figure 6. Weekly aerobic and anaerobic training volume in Marathon running

Discussion

According to our data the distance running distribution follows the classic model which focuses on quantity during the basic period, while later the emphasis is laid on the quality (intensity), as running intensity progressively approaches the demands of the race. It is a fact that modern middle distance runners cover less kilometers (4703.7±1224.1 km) during their yearly training season than they used to in the 1980s (5000-6000 km, Hirsch, 1987), while long distance runners tend to cover 5422±1206.41 km yearly compared to 6000 to 8500 km (Hirsch, 1987) covered in the past. Marathon runners cover 5781.1±1634 km, while runners in the 1980s covered from 7000 to 9000 km per year (Hirsch, 1987). Coaches have possibly followed a training method of greater volume in the past because of the difficulty to evaluate training and athletes' physiological aspects (e.g. aerobic threshold, anaerobic threshold and VO2max). Quality training volume depends on the athlete's personal traits. Moreover, this comes to support the training "rule of individuality", according to which "training models" have no place in modern scientific training (Soulas, 1993).

The above training philosophy is in agreement with current research on the training methods that is oriented towards intermittent training without underrating the importance of continuous running in improving performance. Mostly middle distance runners use intermittent running to train themselves at velocities approximate to their own specific competition velocity. The aim of the specific method of training is the maintenance of high intensity running for as long as possible avoiding lactate concentration in blood. Various kinds of intermittent high intensity training have been developed and reformed since 1960. Nowadays, short intermittent training is where most researchers focus on. Gorostiaga Walter, Foster, Hickson (1991) showed that interval training with repetitions of 30 seconds work at 100% of VO2max, separated by 30s of rest, produced a greater increase in VO2max than continuous training at 70% of VO2max. Moreover, Billat et al. (2000) reported that intermittent exercise (of 30s running – 30s rest) allowed subjects to maintain VO2max for longer than continuous slower running (8min vs 3min) without a large accumulation of lactate in the blood. In addition, Demarie, Koralsztein and Billat (2000) suggested that intermittent exercise is more efficient than continuous exercise in increasing maximal aerobic power, allowing longer time at VO2max and obtaining higher peak VO2 with lower lactate accumulation. Also Daussin et al., (2007) suggested that interval training seems optimal in maximizing peripheral muscle and central cardio respiratory adaptations, permitting significant functional improvement. The above indications recommend high intensity training methods for maintaining and improving performance.

The decrease in training volume (taper) is more essential during the competitive period (tapering period). The reduction in training volume for a short time period is a widely promoted and accepted method for maximizing performance. Endurance athletes are frequently urged to conduct a taper prior to competition, and most training programs include a taper of one to several weeks immediately preceding the targeted event (Hooper, Mackinnon, Ginn, 1998; Houmard, Anderson Johns, 1994; Mujika 1998). By reducing training volume, while maintaining intensity levels, performance improves. The conclusion we can draw from this is that intensity of effort plays a much more important role in performance than does volume of training. It has been shown that 3-weeks of 70% reduction in training volume, while maintaining training intensity, followed by a 4-week training period, resulted in the maintenance of VO2max and 5km running performance in distance runners (Wittig, Houmard, & Costill, 1989).

In conclusion, interviews with the coaches have revealed that nowadays the training intensity has increased while the volume of running has decreased for runners specializing in middle, long distance and marathon running. High intensity training is preferably used by highly trained runners that have quick recovery in the training session and among the training sessions. More research is needed to determine the adequate training volume for these events. Uncontrolled distance running is a practice that belongs to the past.

The Importance for Competitive Sports

Aerobic and anaerobic power are some of the most important elements for the improvement of performance in distance running. The present study investigated the volume of training that athletes use to improve their aerobic and anaerobic performance nowadays. The results of this study can be useful for the construction of an efficient running training program.

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