

IDENTIFY THE CHANGING OF THE PHYSIOLOGICAL AND BIOCHEMICAL CHARACTERISTICS OF VIET NAM FEMALES CYCLING TEAM AFTER FIRST GENERAL PREPARATORY TRAINING IN 12 WEEKS IN 2016

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INTRODUCTION

international arena. Such as the silver medal of Nguyen Thi That at the Asian Games in Incheon 2014; the gold medal in SEA Games 28 in Singapore in 2015, and the most recent two gold medals at SEA Games 29 in 2017 in Malaysia. However, there is no application of applied science to the training process thoroughly.

Road cycling is one of the most complex cycles, assessing aerobic and anaerobic endurance through physiological and biochemical indicators as one of the foremost factors. It helps to assess the level of training of an athlete correctly precisely.

Joyner and Coyle propose that performance oxygen consumption, anaerobic contribution and the efficiency of movement are the three key physiological factors that can be explain cycling performance. [Performance cycling. The Science of Success – James Hopker, Simon Jobson, page 5]

One of the most discussed terms and researched aspects within all endurance athletic performance literature is oxygen consumption. If an individual can work aerobically and use aerobic processes to yield mechanical work, it is like that fatigue will occur at a slower rate than when working anaerobically (i.e. without oxygen).

PURPOSE

The aim of this study was to identify the changing of the physiological and biochemical characteristics of Viet Nam females cycling team after first general preparatory training in 12 weeks. The research material included 8 female (body height 161 ± 1.7 cm; body mass 57 ± 1.4 kg; percent body fat 20.2 ± 1).

METHODS

1 Research Method

- The testing indoor activity, the same air condition at laboratory, the same investigative methods were common for both tested days (First test day at the early general preparatory training (E1) and second test day at the end general preparatory training (E2)). The used methods were questionnaires, physiological measurements. The athletes were informed of the experimental procedures and gave their written consent. They were asked to complete the questionnaire which they had received personally the day before the test. The questionnaires were created specifically for this type of research. The parameters such as age, gender, a resting heart rate, years as an active athlete, average yearly training volume, the number of similar completed races, the current conditioning.

- Paired sample T-tested is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis. The data was evaluated on the level of significance 0.05 in the program IBM SPSS Statistics 23.

- The cyclist is taken through a proper warm up on the cycling trainer. The cyclist rides on an electronically-braked bicycle starting at a fairly easy load. After the first four-minute stage, the workload is increased by approximately 25 watts every three minutes. During the exercise protocol, the following variables were constantly registered: heart rate (HR), minute ventilation (VE), oxygen uptake (VO₂), %VO₂max@AT and VO₂/HR. (MetaLyzer 3B-2R, Cortex). At the beginning and the end of each workload, capillary blood

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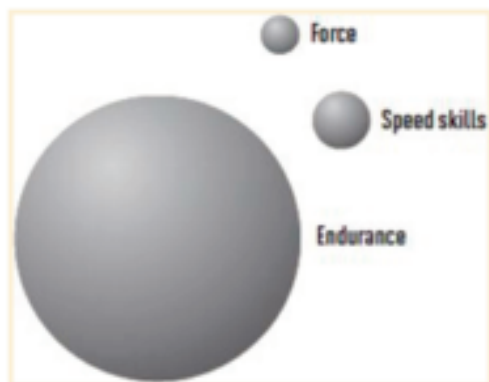
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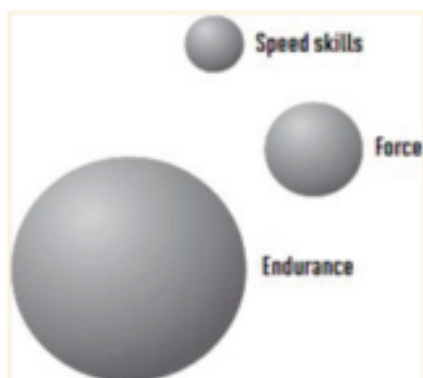
samples were drawn to determine lactate concentration. Blood lactate concentration (mmol/L) are taken at fingers. Cyclist typically ride about 7-8 stages, or until a break point in their blood lactate values has been distinguished. Lactate Scout, USA and Lactate – E Software (David Higgins, John Newell (2005) –Galway Ireland National University) were carried out to determine Work load at Lactate Threshold, Heartrate at Lactate Threshold and Maximal Lactate.

2.Introduce the theory of general training period that Vietnam national road cycling team has followed

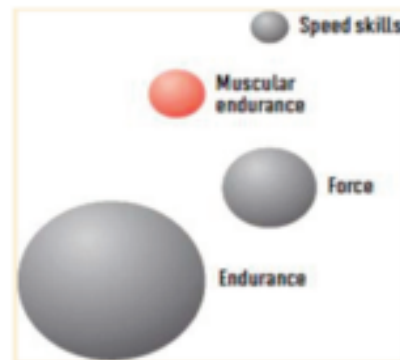
Strength training begins with the Force Anatomical Adaptation (AA) phase, which prepares the muscles and tendons for the heavier stresses to follow later. Speed skills can be developed through drills, usually done on an indoor trainer or rollers. This will reawaken the legs to spinning fluidly in smooth circles.



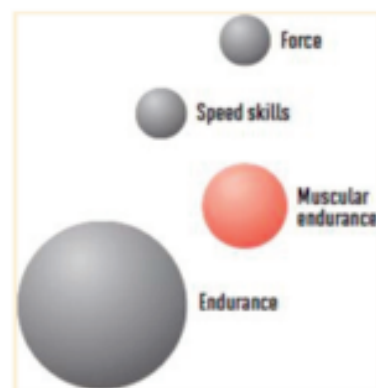
Base 1 marks the start of steady increases in volume to boost aerobic endurance and increase the body's resilience to large workloads. Strength training in Base 1 places an emphasis on establishing Maximum Strength (MS) with the use of high-resistance loads and low repetitions.



Base 2: The best courses at this time of the season keep effort below the LT and allow cadences of 80 rpm and higher while seated as you climb hills. Muscular endurance training is also trained.



Base 3: The total weekly volume of training progresses to the highest point of the season in Base 3, with aerobic endurance rides on the road accounting for about half of all training time.



[Joe, Friel. The Cyclist's Training Bible (Kindle Locations 2605-2606). VeloPress. Kindle Edition].

RESULTS AND DISCUSSION

We compared physiological characteristics between Viet Nam Females Cycling team and the others research on female cyclist that have been released.

DISCUSSION AND CONCLUSIONS

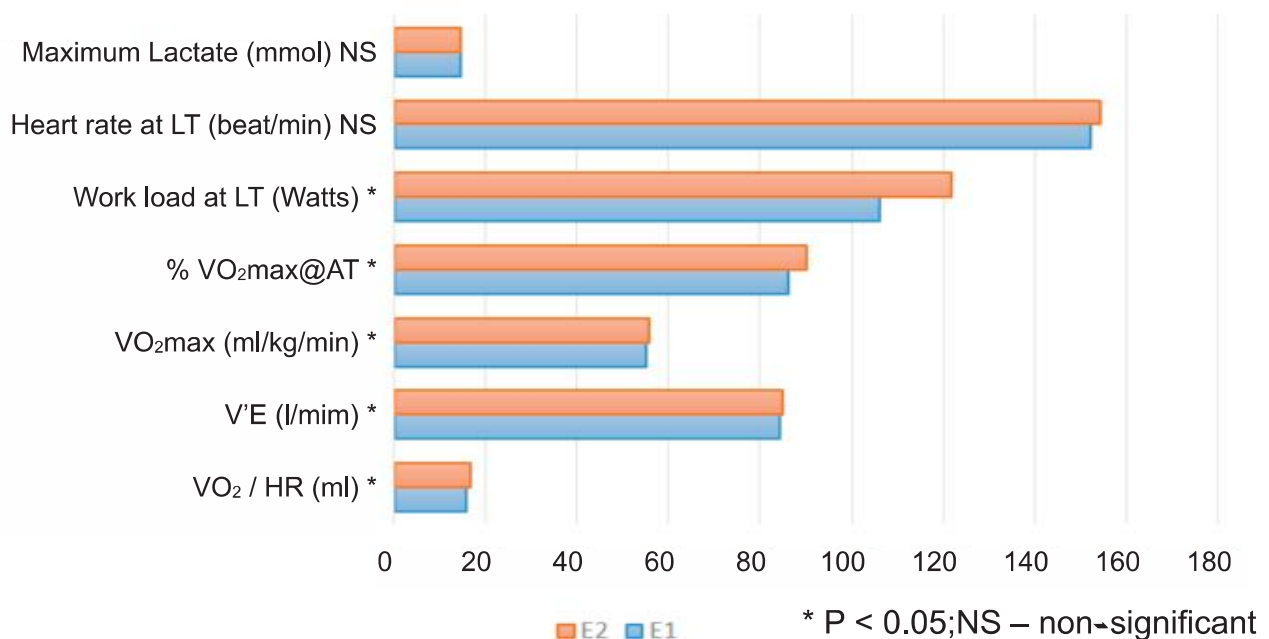
Endurance refers to the length of time that an individual can perform work of a given intensity. The main factor affects and limits this performance is fatigue. Even though a high maximal oxygen uptake (VO_{2max}) is a prerequisite for success in endurance sports, the ability to sustain a high percent of VO_{2max}

Table 1. General preparatory training plan of Viet Nam National Cycling Females Team

	Weeks	1	2	3	4	5	6	7	8	9	10	11	12
Macro Cycle	Macro Cycle	General preparation											
	Mesocycle	Base 1				Base 2				Base 3			
Training Plan	No. of days training	26				24				26			
	Volume (km)	400	450	500	400	600	650	500	600	700	750	600	650
	Volume and intensity												
	Body exercise hours	6	6.5	6.5	7	6	6	6	7	7	5	6	7
	Intensity Zone (8 zones)	1	1	1	1	2	2	2	2	2	3	3	3
	Training focus	Aerobic endurance				Endurance/Technique /Flex				Endurance/Strength			

Table 2. Physiological and biochemical characteristics results at early general preparatory training

	Min	Max	$\bar{x}$		δ	δ^2	CV(%)
	Statistic	Statistic	Statistic	Std. error			
VO ₂ /HR (ml)	10.3	21.4	15.9	1.52	4.31	18.55	27.09
V'E (l/min)	56.5	118.7	84.28	6.87	19.43	377.69	23.06
VO ₂ max (ml/kg/min)	43	70	55.04	4.04	11.42	130.44	20.75
% VO ₂ max@AT	71	97	86.13	2.93	8.29	68.7	9.62
Heart rate at LT (beat/min)	130.9	168.2	152	5.68	16.05	257.74	10.58
Work load at LT (Watts)	83.3	122.4	106.1	4.56	12.9	166	12
Maximum Lactate	10.3	17.8	14.46	1.79	2.36	5.55	16.29

**Figure 1. The changing of the physiological and biochemical characteristics of Viet Nam females cycling team after 12 weeks**

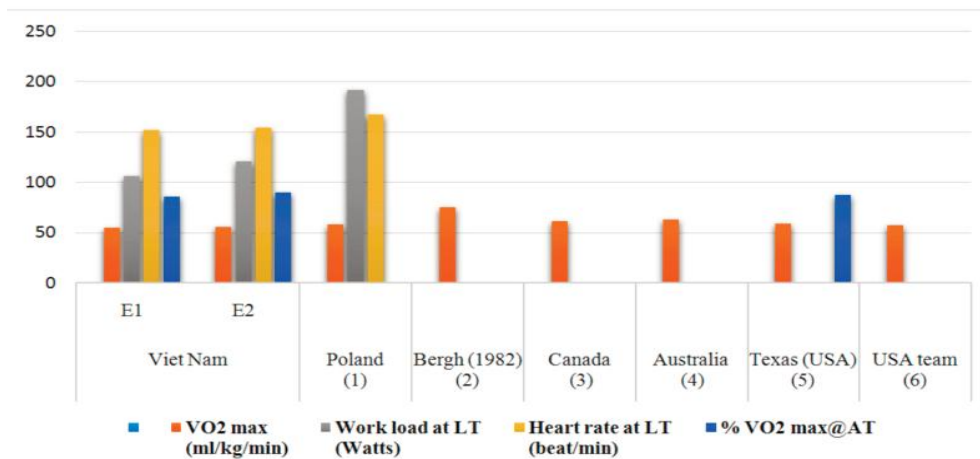


Figure 2. The physiological characteristics between Viet Nam Females Cycling team and the others research on female cyclist that have been released

without accumulating fatigue is of greater importance.

Most of values of $VO_2\text{max}$ (ml/kg/min), VO_2/HR (ml/beat), VE (l/min), $\%VO_2\text{ max@AT}$ and Work load at LT (Watts) observed in our study were significant ($p < 0.05$) differences. These results indicate that aerobic capacity of Viet Nam females cycling has developed, cause the development of $VO_2\text{max}$ (ml/kg/min) and $\%VO_2\text{ max@AT}$. This may explain the good adaptation of Viet Nam females cycling on the general preparatory training plan. Nonetheless, the values of Maximum Lactate (mmol) observed that was not differences ($p > 0.05$). This may explain that the intensity in this period is not high.

On the other hand, when we compared the $VO_2\text{max}$ (ml/kg/min) values of Viet Nam females cycling and the others research on female cyclist showed that $VO_2\text{max}$ (ml/kg/min) value of Viet Nam females cycling lower than the others research on female cyclist. Although, the $VO_2\text{max}$ (ml/kg/min) values is not a perfect marker to assess level of training and the $VO_2\text{max}$ (ml/kg/min) values measurement has involved several factors. The $VO_2\text{max}$ (ml/kg/min) values showed that the difference level training of pro riders has always higher than others.

In day-to-day training, a stronger aerobic metabolism becomes the critical foundation for improving the anaerobic capacity because it permits riders to do more or harder intervals.

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