

BUILD TRANSCRIPTS OF EVALUATING RESPIRATORY FUNCTION RECOVERY BY HIGH - LEVEL ATHLETES IN MOVEMENT AT MAXIMUM CAPACITY

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Abstract:

Through using the common scientific research methods, the study has selected 6 criteria for evaluating the recovery of respiratory function by high-level athletes after movement at maximum capacity measured by the MetaMax Kortex 3B system. On such basis, the study has built transcripts for assessing the recovery of respiratory function by the subjects at 10 minutes after movement.

Key words: Build transcripts, function, athletes, maximum capacity,....

INTRODUCTION

In practice of Vietnam sports, due to objective and subjective limitations, the development of criteria systems to assess the recovery of high-level athletes in sports after movement in different intensities is quite limited. The athlete's training level is a category including multi factors and criteria reflecting the speed of recovery as criteria reflecting the athlete's training level. In order to solve this problem, we have set up a system of criteria for evaluating by points the criteria reflecting the respiratory function of high- level athletes after movement at maximum capacity.

RESEARCH METHODS

The research has used the methods of document analysis and synthesis, interview, pedagogical examination (measured by the Kostex Metamax 3B system) and mathematical statistics.

- Indicators used to assess the recovery of respiratory function by high-level athlete in movement at maximum capacity include Respiratory rate (breath per minute); Vital capacity (liters); Forced vital capacity (%); relative VO_2 (ml/ph/kg); relative VCO_2 (ml/ph/kg) and respiratory quotient.

The research conducted on 20 athletes at level 1 and grandmaster include 10 male athletes at the age of 18-20 and 10 female at the age of 16-17.

Selected exercises represent for the maximum capacity: 100m run

The study has collected the data of assessing the characteristics of respiratory function

recovery by high-level athletes during maximum capacity movement at different times. They include before movement (before the athletes conduct the training session), after startup (immediately after athletes complete the general and professional startup exercises and prepare for exercises at maximum capacity), in movement (10 seconds after finishing the volume of movement at maximum capacity) and 10 minutes after movement (10 minutes after finishing the volume of movement at maximum capacity).

RESULTS AND DISCUSSION

1. Respiratory function characteristics of high - level athletes before and during movement at maximum capacity

The study uses 06 indicators for assessing the respiratory function of the athletes before movement at maximum capacity. The results presented in Table 1.

The results of table 1 show that before movement, the characteristics of respiratory function by the athletes are at normal threshold but good and better in comparison with the standard of Vietnamese athletes. (Standards of evaluating the training level in sports recruitment and training).

After the athlete performs the general and professional startup exercises and prepares the test at the maximum capacity, we have conducted a test for the athletes with the selected indicators. The results presented in Table 2.

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Table 1 Respiratory function characteristics of high- level athletes before and movement at maximum capacity

No.	Indicators	Male (aged 18-20) (n=10)		Female (aged 16-17) (n=10)	
		$\bar{X}$	$\pm\delta$	$\bar{X}$	$\pm\delta$
1	Respiratory rate (breath/minute)	16.80	1.92	16.30	2.01
2	Vital capacity (liters)	3.25	0.34	3.16	0.33
3	Forced vital capacity (%)	91.23	6.76	87.42	6.45
4	Relative VO ₂ (ml/ph/kg)	5.71	0.53	5.68	0.51
5	Relative VCO ₂ (ml/ph/kg)	4.85	0.47	4.71	0.48
6	Respiratory quotient	0.85	0.01	0.83	0.02

Table 2 Respiratory function characteristics of high- level athletes after startup at maximum capacity

No.	Indicators	Male (aged 18-20) (n=10)		Female (aged 16-17) (n=10)	
		$\bar{X}$	$\pm\delta$	$\bar{X}$	$\pm\delta$
1	Respiratory rate (breath/minute)	19.05	2.1	18.63	1.81
2	Vital capacity (liters)	3.68	0.36	3.59	0.35
3	Forced vital capacity (%)	93.27	8.09	92.25	8.57
4	Relative VO ₂ (ml/ph/kg)	8.73	0.64	8.76	0.62
5	Relative VCO ₂ (ml/ph/kg)	7.51	0.57	7.62	0.56
6	Respiratory quotient	0.86	0.08	0.87	0.09

Table 3 Respiratory function characteristics of high- level athletes during movement at maximum capacity

No.	Indicators	Male (aged 18-20) (n=10)			Female (aged 16-17) (n=10)		
		$\bar{X}$	$\pm\delta$	% change	$\bar{X}$	$\pm\delta$	% change
1	Respiratory rate (breath/minute)	40.25	4.05	111.29	39.67	3.97	112.94
2	Vital capacity (liters)	3.43	0.33	-6.79	3.28	0.32	-8.64
3	Forced vital capacity (%)	90.37	9.07	-3.11	90.25	9.01	-2.17
4	Relative VO ₂ (ml/ph/kg)	43.67	4.32	400.23	42.17	4.19	381.39
5	Relative VCO ₂ (ml/ph/kg)	46.29	4.61	516.38	43.44	4.23	470.08
6	Respiratory quotient	1.06	0.11	23.26	1.03	0.1	18.39

Results of Table 2 show that at the time after startup the respiratory function of the athletes has considerable change in response to the movement. The measured criteria are much higher than at the time before movement.

We have used the parameters measured at the time after startup as a benchmark to assess the recovery process of the athletes.

To evaluate the characteristics of athlete's respiratory function, we have collected the data at 10 seconds after the athletes finish the test on Kostex Metamax 3B system. The results presented in Table 3.

At the time during movement at maximum capacity, the respiratory function of the athletes

has considerable change through the parameters. Specific:

- Respiratory rate has significant increase during movement at maximum capacity of 111.29% in male athletes and 112.94% in female athletes. The reason is that in movement at maximum capacity, the time of test is less than 15 seconds and at the maximum intensity, most athletes breathe very little during the test. Respiratory rate will increase rapidly after finishing the movement to compensate for the volume of debt oxygen during the movement at maximum capacity (at the time of 10 seconds after movement- time of data collection).

Table 4 Transcript for assessing respiratory function recovery of male high-level athletes (aged 18-20) (n = 10) at 10 minutes after maximum intensity movement (calculated unit: % recovery)

No.	Indicators	Points									
		10	9	8	7	6	5	4	3	2	1
1	Respiratory rate (breath/minute)	125.85	122.5	119.15	115.8	112.45	109.1	105.75	102.4	99.05	95.7
2	Vital capacity (liters)	65.5	63.6	61.7	59.8	57.9	56	54.1	52.2	50.3	48.4
3	Forced vital capacity (%)	102.4	99.3	96.2	93.1	90	86.9	83.8	80.7	77.6	74.5
4	Relative VO ₂ (ml/ph/kg)	124.71	121.36	118.01	114.66	111.31	107.96	104.61	101.26	97.91	94.56
5	Relative VCO ₂ (ml/ph/kg)	122.65	119.4	116.15	112.9	109.65	106.4	103.15	99.9	96.65	93.4
6	Respiratory quotient	123.06	119.91	116.76	113.61	110.46	107.31	104.16	101.01	97.86	94.71

Table 5 Transcript for assessing respiratory function recovery of female high-level athletes (aged 16-17) (n = 10) at 10 minutes after maximum intensity movement (calculated unit: % recovery)

No.	Indicators	Points									
		10	9	8	7	6	5	4	3	2	1
1	Respiratory rate (breath/minute)	123.4	120.05	116.7	113.35	110	106.65	103.3	99.95	96.6	93.25
2	Vital capacity (liters)	74.02	72.12	70.22	68.32	66.42	64.52	62.62	60.72	58.82	56.92
3	Forced vital capacity (%)	58.5	55.4	52.3	49.2	46.1	43	39.9	36.8	33.7	30.6
4	Relative VO ₂ (ml/ph/kg)	126.06	122.71	119.36	116.01	112.66	109.31	105.96	102.61	99.26	95.91
5	Relative VCO ₂ (ml/ph/kg)	123.54	120.29	117.04	113.79	110.54	107.29	104.04	100.79	97.54	94.29
6	Respiratory quotient	105.3	102.15	99	95.85	92.7	89.55	86.4	83.25	80.1	76.95

- The indicators of vital capacity and forced vital capacity tend to decrease slightly reflecting the post-movement fatigue.

- The indicators of VO₂ and VCO₂ significantly increased but not reached the maximum threshold with a respiratory quotient of 1.03-1.06, indicating that the body is in the anaerobic- aerobic mixed movement

2. Develop transcripts to assess respiratory function recovery of high-level athletes in movement at maximum capacity

The study has built set of evaluation criteria in two forms: criteria of classification according to 5 levels and criteria of evaluation points for each indicator. Results presented in Tables 4 and 5.

CONCLUSION

The characteristics of respiratory function by high-level athletes at the time before movement, after startup and during movement develop in

corresponding with the law of physiology and achieve good and very good levels.

The study has built a system of transcripts to evaluate the respiratory function recovery of high-level athletes after movement at maximum capacity by gender.

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