

ANALYSIS OF MIDDLE DISTANCE PERFORMANCE OF INDIAN UNIVERSITY ELITE ATHLETES

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Abstract

The number of participating universities in All India Inter University Competitions continues to increase day by day. The purpose of this study was to examine the middle distance performance (800m and 1500m) in seconds, average running velocity (d/t) and running ratio (men and women) of elite Indian varsity athletes (men and women). For the purpose of the study, AIU records were obtained from Tamilnadu Physical Education and Sports University 2018, Dr.M.G.R. University and University of Madras (2016) respectively. In each event top eight performances were taken separately for men and women and converted into (1/10) seconds. The obtained data were statistically analyzed by ANOVA, the confidence level was fixed at 0.05. The Scheffe's post hoc test was used to compare the mean differences. In 800 m Indian varsity men athletes are improving their performance when compared with previous years. But in case of women this was not found. In 1500 m, Indian varsity men athletes fail to improve their performance. But women's are improved their performance as well as average running velocity. Further the performance ratio was better between women and men on 1500 m.

Keywords: Middle Distance, Indian Athletes.

Introduction

The emerging paradigm shift in scientific research in the field of sports science has come of age and has carved a niche, which athletes and coaches can ignore only at their own peril. Hence, the contribution of scientific back-up to the successful athletic performance at international and national sporting events is indispensable (1). All track and field events, regardless of whether they are runs, jumps or throws, require your athlete to make muscular contribution. The requirement for aerobic and anaerobic endurance depends upon the athlete's chosen event. As race distance increases from sprints to the marathon, the athlete has to rely more and more on the aerobic capacity of the heart and lungs to supply the necessary O_2 (2).

The 800 m and 1500 m are usually classified as middle distance races. Walking and running are two highly complex motor skills that incorporate input from multiple levels of the nervous system, involve muscular contraction throughout the body, and require the coordination of many skeletal degrees of freedom (3,4).

The aerobic demand of walking and running at any given speed is a function of stride rate (SR) and length (SL), such that aerobic demand increases curvilinear as SR is either increased or decreased from the preferred SR (5,6,7,8,9). Change in SR and SL require concomitant change in the rates of muscle lengthening and shortening and rate of force development the ultimately aerobic demand (10,11). As the velocity of eccentric action increases, maximal force production also increases. Classic experiments on isolated animal muscle have shown that muscles can produce less force as the velocity of contraction increases (12).

In today's highly competitive sports world, we are in the midst of a revolution of rising expectations and every nation is fired with an ambition of projecting their best performance at national and international arena. As a result, youth sports currently hold high profile in the

realm of global agenda for achieving excellence. This trend has created a strong interest among the institutions, and nation as to accord a high priority to the sports. The number of participating universities in All India Inter University Competitions continues to increase day by day. The purpose of this study was to examine the middle distance performance (800m and 1500m), average running velocity and running ratio (men and women) of elite Indian varsity athletes (men and women).

Methodology

For the purpose of the study, the recorded middle distance (800 m and 1500 m) performances of Indian varsity elite (men and women) athletes were taken. The AIU records were obtained from Tamilnadu Physical Education and Sports University [men 800 m - n=8, 1500 m n=8, women 800 m - n=8 and 1500 m - n=8, year 2 00 7], M.G. University [men 800 m - n=8, 1500 m - n=8, women 800 m - n=8 and 1500 m - n=8, year 2 0 08] and University of Madras [men 800 m - n=8, 1500 m - n=8, women 800 m - n=8 and 1500 m - n=8, year 2 0 09] respectively. In each event top eight performances were taken separately for men and women and converted into (1/1 0) seconds. The criterion variables selected for this study was 800 m and 1500 m performance (sec), average running velocity (d/t) and performance ratio (men record/ women records). The obtained data were statistically analyzed by ANOVA, the confidence level was fixed at 0.05. The Scheffe's post hoc test was used to compare the mean differences, whenever 'F' ratio was significant.

Results

Table- 1 ANOVA of Middle Distance Performance of AIU Men and Women (Sec 1/10th)

Event	Category		2007	2008	2009	sov	SS	df	MS	F
800M	Men	\bar{x}	119.8	116.39	115.12	B	97.00	2	48.50	10.43*
		σ	.99	2.72	2.36	w	17.62	21	4.64	
	Women	\bar{x}	140.37	137.25	140.12	B	48.25	2	24.12	.301
		σ	7.02	9.11	10.3'1	w	1684.25	21	80.20	
1500M	Men	\bar{x}	245.12	23.12	242.50	B	30.08	2	15.04	.642
		σ	4.25	6.64	2.82	w	491.75	21	23.4	
	Women	\bar{x}	298.00	277.62	300.62	B	2536.08	2	1268.04	20.39*
		σ	13.04	3.:LJ	2.32	w	1305.75	21	62.18	

* Significant at 0.05 level (2/2 1) = 3.47.

Table Ia-Scheffe's Test for the Difference between Paired Means on 800m Men Performance (sec/10th)

Year			MD	CI
2007	2008	2009		
119.80	116.39		3.41*	2.83
119.80		115.12	4.62*	2.83
	116.39	115.12	1.27	2.83

•Significantat0.05level.

Table 1b-Scheffe's Test for the Difference between Paired Mean son1500m Women Performance (secl/10th)

Year			MD	CI
2007	2008	2009		
298.00	277.62	-----	20.38*	10.36
298.00	-----	300.62	2.62	10.36
-----	277.62	300.62	23.00*	10.36

• Significantat0.05level

Table 2-ANOVA of Middle Distance Average Running Velocity of AIIU Men and Women (m/sec)

Event	Category		2007	2008	2009	SOV	SS	df	MS	F
800M	Men	\bar{x}	6.67	6.87	7.31	B	1.759	2	.879	2.237
		Σ	.0057	.15	1.07	W	8.253	21	.393	
	Women	\bar{x}	5.70	5.87	5.73	B	.134	2	.0067	.475
		Σ	.288	.380	.442	W	2.965	21	.141	
1500M	Men	\bar{x}	6.11	6.17	1.18	B	.0022	2	.0011	.775
		Σ	.106	.161	.007	W	.299	21	.0014	
	Women	\bar{x}	5.03	5.39	4.98	B	.804	2	.402	22.64*
		Σ	.217	.006	.003	W	.373	21	.0017	

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able 1a-Scheffe's Test for the Difference between Paired mean son 1500m Women Average Running Velocity (m/sec)

Year			MD	CI
2007	2008	2009		
5.03	5.39	-----	0.36*	.05
5.03	-----	4.98	0.05	.05
-----	5.39	4.98	0.41*	.05

• Significantat0.05level.

Table 3 - ANOVA of Middle Distance Performance Ratio of AHU Men and Women

Event		2007	2008	2009	SOV	SS	df	MS	F
800M	\bar{x}	.85	.84	.83	B	.00006	2	.00003	.108
	σ	.0036	.0037	.0078	W	.0061	21	.0002	
1500M	\bar{x}	.81	.87	.80	B	.00193	2	.00096	30.37*
	σ	.0024	.0017	.00074	W	.00066	21	.000031	

* Significant at 0.05 level (2/21) = 3.47.

Table 3a - Scheffe's Test for the Difference between Paired means on 1500 m Performance Ratio of Men and Women

Year			MD	CI
2007	2008	2009		

0.81	.87	-----	0.06*	.0072
0.81	-----	.80	0.01*	.0072
-----	.87	.80	0.01*	.0072

* Significant at 0.05 level.

Table 1 reveals that, the obtained 'F' ratio for 800 m men's (10.43 sec) and 1500 m women's (20:39 sec) performance was significant, among different years (i.e 2007, 2008 and 2009). Since three years were compared, the Scheffe's test is used to findout paired mean difference and presented in table 1a and 1b respectively. The result of 800 in men's performance was significantly better in the year 2009 and 2008 when compared to year 2007. Hence it was concluded that 800 m performance was increased for men from 2007 to 2009. 1500 m women performance was significantly better in the year 2008 when compared to 2007 and 2009.

Table 2 reveals that, the obtained 'F' ratio for 1500 in women's average running velocity (22.64 m/sec) was significant among different years. The Scheffe's test (Table 2a) indicates that, the mean difference of average running velocity was infavour of year 2008 when compared to year 2007 and 2009.

Table 3 indicates that, the obtained 'F' ratio for 1500 m performance ratio (30.37) was significant, among different years. The Scheffe's test (table 3a) reveals that the mean difference of performance ratio was infavour of year 2008 followed by 2007 when compared to 2009.

Discussion

To a layman, distance running must appear to be the least complicated form of track and field athletics. But, in fact, it is not so simple. Since middle distance running events fall in between sprints and long distance runs, they require a training procedure which would be a combination of speed training (anaerobic work) and endurance training (aerobic work). In order to attain peak performance in middle distance events, the aerobic and anaerobic workouts are to be employed in proper proportions. Since very few studies have been done on this aspects and that too on foreign athletes only, our coaches and athletes have so far been adopting methods of training based on their experiences only, and some time they use trial and error methods. Therefore, there is a need to have ideal proportions of aerobic and anaerobic workouts for training middle distance runners in India (13).

800 and 1500 m involves cyclic movements with medium time endurance. It requires repetitive range of movements of various joints in addition to strength and strength endurance. Running races ranging from short sprints to distance events makes different demands on the athlete's anaerobic and aerobic capacity (2). An athlete's aerobic endurance is controlled by the ability of the athlete's heart, lungs and circulatory system, to supply oxygen to the athlete's muscles for a long, sustained effort.

Force production is inversely related to velocity of shortening during concentric actions. During faster movements, less force production is possible, and when lifting heavier loads, slower movements will occur (14). This is probably due to a smaller number of cross-bridge contacts on action filaments at any instant as the velocity of shortening increases (15).

As the velocity of eccentric action increases minimal force production also increases (16). Muscle torque varies with joint angular velocity according to the type of muscular action. Tests have shown that during Isokinetic concentric exercise by human subjects, torque capability declines as angular velocity increases. In contrast, during eccentric exercises, as joint angular velocity increases, maximal torque capability increases, after which it declines gradually (17).

Aerobic demands expressed per unit of time for both walking and running increase systematically as speed, and thus exercise intensity, increases. When the aerobic demand as

energy cost is considered relative to the distance traveled. It becomes apparent that walking and running economy responses are substantially different from one another. The mass -or-weight-specific aerobic demand to cover a given distance varies little with running speed, indicating that the total energy cost to run a given distance is nearly the same whether a leisurely pace or a high speed is used. Hence the coach of Indian universities has to concentrate, to improve the present status of middle distance performance by adopting scientific training systems.

Conclusion

1. In 800 m Indian varsity men athletes are improving their performance when compared with previous years. But in case of women this was not found.
2. In 1500 m, Indian varsity men athletes fail to improve their performance. But women's are improved their performance as well as average running velocity. Further the performance ratio was better between women and men on 1500 meters.

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