Physical Woring Capacity of the normal Pakistani Population

Pages with reference to book, From 228 To 229

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Abstract

Physical working capacity (Heart-rate, Blood Pressure) of normal Pakistani population was studied taking into consideration their sex, weight and height. The working capacity in both sexes was directly proportional to the above mentioned parameters, and these values were similar to those reported in Americans (JPMA 31:228, 1981).

Introduction

The physical fitness is defined as "the fitness to perform a specific task requiring muscular efforts in which speed and endurance are the main criteria. Physical performance depends on factors including good physical condition with optimal muscular strength to overcome a given load and the motivation to perform to the best of one's ability".
Physical working capacity can be studied by Hardvard step test (Ryhming, 1943; Lovelock, 1945; Seltzer, 1946; Cook and Wherry, 1950) or by using a Tread Mill (Tayler et al., 1955).
In the present study physical working capacity of apparently healthy Pakistani subjects was determined on Tread Mill. The reason for using this particular method was that it is very convenient to use and is a natural exercise test.

Material and Methods

A hundred individuals (88 males and 12 females) were studied. Their ages ranged between 16-50 years. The persons were not allowed to eat anything four hours prior to the test.
Tread Mill was used for exercising the subjects. It consists of a conveyer belt driven by a motor which moves at a variable speed and it is provided by a suitable device to raise or lower the platform.
Sphygmomanometer was used for recording the blood pressure and electrocardiographic monitor for the E.C.G. after every three minutes.
Bipolar electrode was used, positive electrode was applied in V5 position. During the experiment the subject continued to walk on the Tread Mill.

Results

The effect of various levels of exercise on healthy subjects were estimated when heart-rate and blood pressure increased with increased level of exercise. These results are summarized in Table I and II.

Table I

Maximum Pulse Rate/Min. Achieved at Maximum Exercise.

Age Group Years	*Work load in %*	*Work load in stages*	*Range pulse rate min*	*Standard deviation*	*Standard Error*
16—20	12.5—34.0	7—14	150—218	Male ±11.58	Male ± 3.25
				Female	Female
			154—166	±42.14	±14.74
21—25	12.5—37.5	7—15	166—214	Male ±11.99	Male ± 2.44
				Female	Female
			166—214	±54.99	±11.37
26—30	23.5—30.5	11—14	166—210	±36.47	±11.54
31—35	20.0—30.5	10—13	166—210	±59.33	±17.17
36—40	15.0—23.5	8—11	150—240	±41.44	±13.11
41—45	17.5—20.0	9—10	166—187	±12.72	± 3.81
46—50	21.5—15.0	7—8	166—187	± 9.59	± 3.87

Table II

Maximum Heart-Rate in Different Age Groups in Present Study and its Comparison with American Data.

Age in years	*PAKISTANIS*			*AMERICANS*		
	Lower value of Hr/Min.	*Mean Hr/Min.*	*Upper limit of Hr/Min.*	*Lower value of Hr/Min.*	*Mean Hr/Min.*	*Upper limit of Hr/Min.*
16—20	150	184	218	185	203	218
21—30	166	188	210	173	193	213
31—40	166	203	240	163	185	205
41—50	166	176	187	156	176	196

Observed physical working capacity after different levels of exercise was higher in males than in females and reduced with advancing age. The present data was then compared with the predicted

values of U.S.A. Similar results were obtained in both the groups (Table II).

Discussion

The human body works like a machine and its efficiency also decreases with advancing age. It is generally believed that working capacity of a man depends on intensity of work, endurance, strength, power and ability; and training usually increases the efficiency of the performance of an individual. Present data on working capacity shows that pulse rate during exercise and recovery period can be used as a measure of fatigue for measuring work performance. This is based on the fact that there is a linear relation between the oxygen consumption and the pulse rate at the beginning of the work period. The continuous increase of the pulse rate during exercise is an indication ofthe inadequate supply of the blood to the exercising muscles. The heart rate is increased with the strenuity of the exercise. It increases fairly rapidly at the beginning but later stabilizes at a maximum rate depending on the strenuity of work, age, body weight, physical and environmental conditions.

During recovery after exercise, the heart rate will drop quite rapidly at first, then gradually, until it reaches the resting level. The physical fitness decreases with age (Belbin, 1955) because of decrease in muscle strength due to loss of active tissues in the muscles and central nervous system (Quet et al., 1836). Heart rate decreases with increasing age and it has been suggested that inability of heart rate to increase with advancing age is the primary factor resulting in the decrease of maximum oxygen consumption (Astrand and Rhyming, 1954; Robinson, 1969; Tayler et al., 1969).

The results quoted here do not serve as an evidence that the change in muscle strength due to age is the limiting factor for physical fitness, but it merely suggests that this is one of the possibilities.

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