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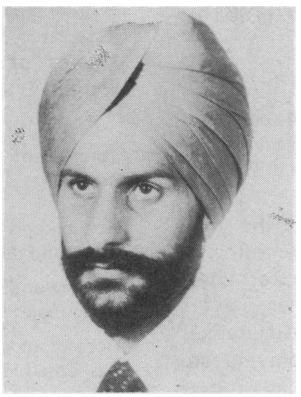

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MAXIMAL ANAEROBIC POWER IN NATIONAL LEVEL INDIAN PLAYERS

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ABSTRACT

The comparative study of aerobic power in different sports was conducted on 99 National Senior as well as National Junior players specialised in hockey and football, field games; volleyball and basketball, court games. The National Seniors were 27 hockey and 16 volleyball players, whereas, 32 football and 24 basketball players were the National Juniors. The maximal anaerobic power of the players was determined from maximal vertical velocity and body weight by the methods of Margaria. The football players have been found to be highest followed by hockey, volleyball and basketball players in vertical velocity. It is observed that field game players are higher than the court game players in vertical velocity and that volleyball players possess higher maximum anaerobic power than football, hockey and basketball players.

Key Words: Anaerobic Power, Vertical Velocity, Body Weight, Field Games, Court Games.

INTRODUCTION

The energy needed for the performance of muscular activity may be supplied either anaerobically or aerobically. When the muscular activity is rapid and violent then the source of energy is through anaerobic mechanism, whereas, in the case of a prolonged muscular activity the source of energy initially is through anaerobic processes (Margaria et al, 1966; di Pampero et al, 1970).This is shown most clearly in the requirements of different sports. A number of research workers have studied the role of aerobic source of energy on top athletes and sportsmen of their countries, but very few studies are available regarding the anaerobic source of energy supply. Bhanot and Sidhu (1981b) have already reported the role of anaerobic mechanism for the supply of energy in the game of hockey. They have suggested that while hockey is thought to be an endurance event, the role of anaerobic power cannot be ruled out because for players playing at certain field positions in the game, it is the main source of energy for their successful participation. In the present study two field games and two court games have been studied to compare the role of anaerobic power, if any, in the field and court games.

MATERIAL AND METHODS

The study comprised two field games, football and hockey and two court games, volleyball and basketball. Data were collected on 99 high class players including 27 hockey, 32 football, 16 volleyball and 24 basketball players attending special training camps at the Netaji Subash National Institute of Sports, Patiala for the selection of National teams participating in International competitions. The players specialising in hockey and volleyball were "All India" National Seniors while those specialising in football and basketball were the National Juniors. The anaerobic power was estimated from maximal vertical velocity and body weight as described

by Margaria et al, 1966 and by us previously (1981b).

RESULTS AND DISCUSSIONS

Table I shows the number of players studied, means and standard deviations of body weight, vertical velocity and anaerobic power.

It can be seen from Table I and Fig. 2 that the football players are the fastest in vertical velocity followed by hockey and volleyball players while basketballers are the slowest in the series. Thus field games players are faster than court games players. The differences between footballers and the court games players are statistically significant (Table II).

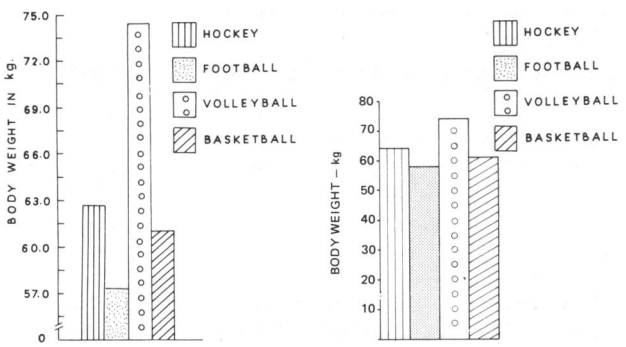

Fig. 1 shows the histogram in kg of body weight of hockey, football, volleyball and basketball players.

TABLE II

Values of student's 't' test and probability of body weight, vertical velocity and anaerobic power among four different games players

Comparison Between	Body Weight	Vertical Velocity	Anaerobic Power
Hockey and Football Players	2.0112*	1.6091	1.4005
Hockey and Volleyball Players	2.6353**	1.5970	7.9360****
Hockey and Basketball Players	0.4803	1.3448	1.0430
Football and Volleyball Players	2.9350***	2.0286*	1.4281
Football and Basketball Players	3.0909***	3.2566***	4.9697****
Volleyball and Basketball Players	2.0196	0.1429	2.5586**

Statistically significant at 5% level with probability as follows:

*	–	0.05 > 0.02
**	–	0.02 > 0.01
***	–	0.01 > .001
****	–	< .001

The fastness of football and hockey players than volleyball and basketball players may be attributed to different requirements of these games. In the field events, players have to cover much more area, while in court events they have to cover a small area. Earlier, we

TABLE I

Means and standard deviations of body weight in kg, vertical velocity in $m.sec^{-1}$ and anaerobic power in $kg.m.sec^{-1}$ of hockey, football, volleyball and basketball players

Name of the Game	Number of Players	Body Weight		Vertical Velocity		Anaerobic Power	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
		kg		$m.sec^{-1}$		$kg.m.sec^{-1}$	
Hockey	27	62.65	5.35	1.47	0.10	90.1	9.12
Football	32	57.30	5.24	1.65	0.14	95.9	8.75
Volleyball	16	74.43	6.45	1.37	0.19	104.0	15.4
Basketball	24	61.04	6.87	1.36	0.13	82.8	12.3

Power/Weight Ratio

H 1.44 Field events are higher
F 1.67
V 1.40 Bigger ball users in the two event types are higher.
B 1.36

(1981a) reported that the volleyball players are slower in visual and auditory reaction times of hand and foot than the hockey players. This also strengthens the finding that the court event players are slower than field event players. The bulkiness of volleyball players may also be one of the reasons for their being slow in vertical velocity. While comparing the football and hockey players the former deal with a bigger ball compared with the latter who have to tackle a relatively small ball and a hockey stick which require a much greater involvement of the nervous system, therefore, they cannot be as fast as the former. Moreover, the former are also lighter in body weight.

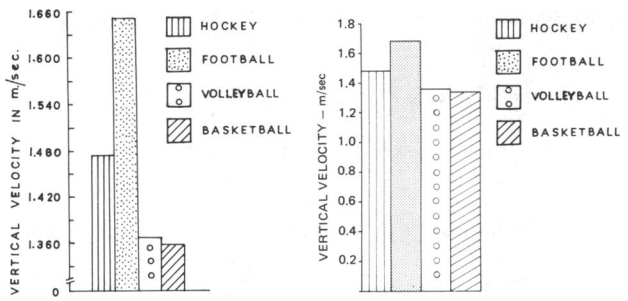

Fig. 2 shows the histogram in m.sec^{-1} of vertical velocity of hockey, football, volleyball and basketball players.

From Table I and Fig. 3 it is seen that the volleyballers possess best anaerobic power in the whole series followed by football, hockey and basketball players. The difference between volleyballers on the one hand and hockey and basketball players on the other hand are significant in statistical terms (Tables I and II), so are the differences between the footballers and basketballers. An instantaneous use of energy with full effort by the players suggests the volleyball to be an anaerobic type of game which is evident from our findings in which the volleyballers possess best anaerobic power (Fig. 3). The game of basketball is known to be of endurance type, which may be the reason that our sample of basketball players possess the least anaerobic power. We have already reported that though the game of hockey is an endurance event, the contribution of anaerobic power in this field game cannot be ruled out because it is the main source of energy derivation for certain field positions. In our results, the footballers possess better anaerobic power than hockey players, thereby showing that role of anaerobic power may be more in football than hockey.

In weight football players are lighter significantly than hockey, volleyball and basketball players (Table I and Fig. 1). Volleyball players are heavier significantly

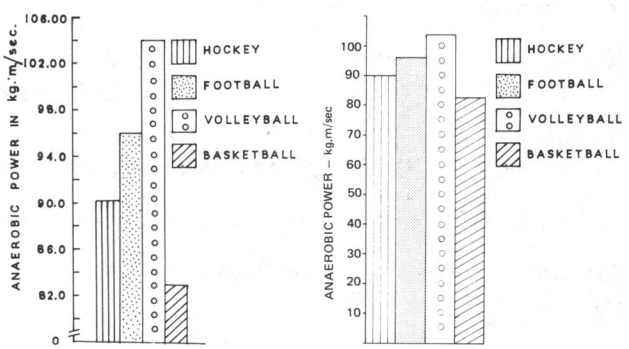

Fig. 3 shows the histogram in kg.m.sec^{-1} of anaerobic power of hockey, football, volleyball and basketball players.

than hockey and basketball players among whom the former are heavier (Table II). The senior players of hockey (field event) and volleyball (court event) are heavier than respective junior players of football (field event) and basketball (court event). The heavy weight seems to help the volleyball players in attaining maximum anaerobic power, but when reduced to a power/weight ratio this can be seen to be easily explained. Similarly, when all four events are reduced to power/weight ratios the field events can be seen to involve higher values in the power tests.

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