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Aerobic Capacity, Speed, Power and Fatigue Index of Female Hockey Players

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Abstract

Aim: To observe aerobic capacity, speed, power and fatigue index of female hockey players. **Method:** Ten healthy female hockey players participated and their age ranged from 17 to 27 years. Each subject performed a Queen's step test and Running based Anaerobic Sprint Test (RAST). **Result:** The mean age, height and weight of hockey female players was 22.90±1.91year, 157.20±8.21cm, and 50.40±6.09kg. The mean VO_2max, sprint time 1, sprint time 2, sprint time 3, sprint time 4, sprint time 5, sprint time 6, power 1, power 2, power 3, power 4, power 5, power 6, power maximum, power minimum, power average and Fatigue index was 33.15±2.88ml.kg.min, 4.38±.46 seconds, 4.48±.51 seconds, 4.60±.51 seconds, 4.78±.62 seconds, 4.75±.52 seconds, 4.90±.62 seconds, 773.60±256.32 watts, 734.30±264.27 watts, 674.60±250.81 watts, 587.40±258.70 watts, 609.30±212.03 watts, 567.10±220.68 watts, 779.20±254.45 watts, 524.90±240.86 watts, 657.70±236.92 watts and 9.24±3.80watts/second. **Conclusion:** It was concluded that female hockey players take more time to finish their last sprint than the first sprint and there was also a decreased power during the last sprint.

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Introduction

Hockey is such a fantastic game because not only it is magic to watch, but it consists of such a large physiological demand of the human body.Muscular strength, muscular endurance, cardiovascular endurance, speed, quickness, agility, power and flexibility. The list goes on and on. However, often we think of hockey as a predominantly aerobic sports. Whereas in reality, it is opposite (Derek 2007).When hockey is broken down. The game is played by players performing at various speeds and intensities; walking, jogging and sprinting. The majority of play is in intervals and the activity does not last for long periods of time (e.g. chasing a loose ball, making a run into space etc.) This is the most important factor to consider when doing hockey conditioning. There definitely is a need for aerobic conditioning as well, due to the fact that the intervals mentioned are repeated at various intensities and durations over the course of a match. The high level of the anaerobic capacities in hockey player enables them to perform high speed runs, which in the end may have a crucial impact on match results (Luhtanen 1994). Kumar and Kathayat (2014) reported that power during different sprints run by the players declined with the course of time and they had taken more sprint time. Kumar and Kathayat (2015) reported a negative relationship between different sprint times and power and fatigue index. Hockey is a predominantly aerobic sport(Stolen et al.,2005 ; Bangsbo et al.,1991) and anaerobic energy is essential to performance high intensity runs which may

contribute to the final outcome of the game (Little and Williams 2005) . Top- class hockey players are able to perform more high-intensity running than moderate professional hockey players. The players spend 1-11% of the game sprinting (Bangsbo 1992; Bangsbo et al., 1991; Reilly et al., 1976), which represents 0.5- 3.0% of effective time with ball in play (O 'Donoghue 2001; Bangsbo 1992; Ali and Farrally1991). The performance of sportspersons in any game or event is dependent on various factors of physiological nature. So, investigator had tried to touch such hidden facts, which will promote the level of hockey that will become future of International level. The purpose of the present study was to observe aerobic capacity, speed, power and fatigue index, (i.e. anaerobic power and capacity) of female hockey players.

Material and method

The female hockey players who were participated in inter-college and all India inter-university level competitions from Government College of Physical Education Patiala (Punjab) and Punjabi University Patiala were selected. The present study was conducted on ten (n=10) female hockey players. All the risks involved were also looked into and precautions were taken while collecting data. Method of testing was explained to each player and their voluntary consent was also taken from them. Each volunteer was first subjected to physical examination that includes measurements of corporal data like date of birth, age, height and then specific data was collected.

Results and Discussion

Table 1. Mean± SD of Age, height, weight, BMI, VO_2 max, Sprint times, power and fatigue index

Variables	N	Mean	Std. Deviation	Absolute difference	% percentage difference
Age (year)	**10**	**22.90**	**1.91**	**-**	**-**
Height (cm)	**10**	**157.20**	**8.21**	**-**	**-**
Weight (kg)	**10**	**50.40**	**6.09**	**-**	**-**
BMI (kg/m^2)	**10**	**20.04**	**2.11**	**-**	**-**
VO_2 max (ml.kg.min.)	**10**	**33.15**	**2.88**	**-**	**-**
Sprint time 1 (seconds)	**10**	**4.38**	**0.46**	**0.10**	**2.28**
Sprint time 2 (seconds)	**10**	**4.48**	**0.51**	**0.12**	**2.67**
Sprint time 3 (seconds)	**10**	**4.60**	**0.51**	**0.18**	**3.91**
Sprint time 4 (seconds)	**10**	**4.78**	**0.62**	**-0.03**	**-0.62**
Sprint time 5 (seconds)	**10**	**4.75**	**0.52**	**0.15**	**3.15**
Sprint time 6 (seconds)	**10**	**4.90**	**0.62**	**0.52**	**11.87**
Power 1 (watts)	**10**	**773.60**	**256.32**	**-39.3**	**-5.080**
Power 2 (watts)	**10**	**734.30**	**264.27**	**-59.7**	**-8.13**
Power 3 (watts)	**10**	**674.60**	**250.81**	**-87.2**	**-12.92**
Power 4 (watts)	**10**	**587.40**	**258.70**	**-21.9**	**-3.72**
Power 5 (watts)	**10**	**609.30**	**212.03**	**-42.2**	**-6.92**
Power 6 (watts)	**10**	**567.10**	**220.68**	**-206.5**	**26.69**
Power maximum (watts)	**10**	**779.20**	**254.45**	**-**	**-**
Power minimum (watts)	**10**	**524.90**	**240.86**	**-**	**-**
Power average (watts)	**10**	**657.70**	**236.92**	**-**	**-**
Fatigue index (watts/second)	**10**	**9.24**	**3.80**	**-**	**-**

Table 1 shows that the mean age, height and weight of female hockey players was 22.90±1.91year, 157.20±8.21cm, and 50.40±6.09kg. The mean scores of VO_2max, sprint time 1, sprint time 2, sprint

time 3, sprint time 4, sprint time 5, sprint time 6, power 1, power 2, power 3, power 4, power 5, power 6, power maximum, power minimum, power average and Fatigue Index was 33.15±2.88 ml/k/.min, 4.38±.46 seconds, 4.48±.51 seconds, 4.60±.51 seconds, 4.78±.62 seconds, 4.75±.52 seconds, 4.90±.62 seconds, 773.60±256.32 watts, 734.30±264.27 watts, 674.60±250.81 watts, 587.40±258.70 watts, 609.30±212.03 watts, 567.10±220.68 watts, 779.20±254.45 watts, 524.90±240.86 watts, 657.70±236.92 watts and 9.24±3.80watts/second. Further, a trend of increase in sprint time was observed from sprint -1 (4.38 ± 0.46 seconds) to sprint -6 (4.90 ± 0.62 seconds) except sprint-5. The percentage difference between sprint time -1 vs. sprint -6 was 11.87%. In other words it was found that female hockey players take 11.87% more time to finish the sprint -6 than sprint-1 (Table 1). But a trend of decrease was observed from Power 1 to Power-6 except Power-5 during.

Conclusion

It was concluded that the power effect the sprint time and fatigue index. It was found that female hockey players take more time to finish last sprint than first sprint and during this a decrease in power was observed. Due to the effect of the power these players doesn't performed high intensive activities like professional hockey players. So these female hockey players should improve their power and to decrease the sprint time and fatigue index with training.

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Conflict of Interest: None declared