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Effect of yoga training on fitness components and skill abilities among basketball players

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Abstract

Introduction: Basketball game has been described as an intermittent sport that needs a comprehensive ability together with physical, technical, mental, and tactical skills.

Objective: The objective of present study was to assess the effect of yoga training on physical components and skill abilities among novice basketball players.

Methods: Sixty male novice Basketball players (n=60), aged 14 to 16 years, from Jalgaon, were selected randomly. All the subjects were assessed for variables of physical fitness and skills viz., agility, flexibility, strength and power, speed and body fat, shooting ability, passing accuracy and dribbling by using standard tests. After the baseline assessment the subjects were divided randomly into two groups viz; Group –A (Yoga plus basketball training group) and Group – B (basketball training). After pre test assessment, all the subjects of Group A were exposed to a practice of Basketball training and yoga practices and Group B participated in the training in Basketball only. The common training of basketball was imparted for both the groups 1 hr. daily in the evening except Sundays and holidays. However, after completion of 1 hr. training group A participated in yoga training for 30 minutes while the subjects of group B participated in cooling down activities for 30 minutes. Post test was conducted after a total experimental period of 6 weeks.

Results: Results of paired sample t- test in experimental group showed significant change in agility ($p<0.001$); flexibility ($p<0.001$); speed ($p<0.001$); strength ($p<0.001$); body fat ($p<0.001$); shooting ability ($p<0.001$); passing ability ($p<0.001$) and dribbling ability ($p<0.001$) after yoga training intervention. However, there was significant change in all the variables among control group participants. Further, result of between group comparison revealed that experimental group had significant change in agility ($p<0.001$); flexibility ($p<0.001$); speed ($p<0.001$); strength ($p<0.001$); body fat ($p<0.01$); shooting ability ($p<0.001$); passing ability ($p<0.001$) and dribbling ability ($p<0.001$) as compared to control group participants.

Conclusion: Yoga practices are effective in improving physical fitness components and basketball skill abilities of novice basketball players.

Keywords: Basketball players, yoga, physical fitness, skills

Introduction

Basketball game has been described as an intermittent sport that needs a comprehensive ability together with physical, technical, mental, and tactical skills. As this game is being considered physically very demanding, requiring players to frequently repeat bouts of intense actions such as sprinting, shuffling, jumping or short periods of recovery (Ben Abdelkrim, El Fazaa, & El Ati, 2006; McInnes, Carlson, Jones, & McKenna, 1995) [4, 17]. Therefore, the players should have excellent level of physical abilities to execute powerful movements, and aerobic and anaerobic capacities that build them competent in prolonged vigorous offensive and defensive maneuvers to win (Apostolidis, Nassis, Bolatoglou, & Geladas, 2004; Ben Abdelkrim, Chaouachi, Chamari, Chtara, & Castagna, 2010; Delextrat & Cohen, 2008; Hoffman, Tenenbaum, Maresh, & Kraemer, 1996) [1, 10, 8, 11]. Besides a high level of physical fitness, basketball players also need to have the improved technical skills that have shown to have a significant correlation with players' physical fitness (Apostolidis *et al.*, 2004) [1].

The performance mainly depends on shooting accuracy (Erculj & Supej, 2006) [9]. Some previous studies have shown the importance of free throws, field goals and three-point shot accuracy in distinguishing winning and losing basketball teams (Pojskic, Separovic, & Uzicanin, 2009; Trninc, Dizdar, & Luksic, 2002) [19, 25].

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In order to achieve a high shooting percentage and victory, every team has to have players who can accurately shoot in all periods of the game and under different physiological or psychological pressures. Consequently, it can be said that shooting accuracy is one of the most important skills in basketball (Erculj & Supej, 2006; Pojskic, Separovic, & Uzicanin, 2011) ^[9, 20] which poses the question of its determinants.

For basketball players it is very important to control body. Owing to yoga practice, one can develop excellent balance, which facilitates better control of movements, its position in space and, in its turn, improves technique and coordination of movements. Gharote (1976) ^[10] reported that yogic exercises improved physical fitness of school going children. Bera *et al.*, (1998) ^[5] showed improvement in motor function after yoga training programme on school going population. Moorthy (1982) ^[18] in his study on minimum muscular fitness showed better impact of yoga training programme for 6 weeks upon school population. While Kanade (1988) ^[12] in his study showed good changes in physical fitness areas through yoga practices. Kocher and Pratap (1972a and 1972b, reported favourable results in mental health. Yoga practices provide progressive muscular stretching, with slow dynamic movement followed by static stretch, and research based evidences support for gradual progression to greater range of motion (Moorthy, 1982; Moorthy & Bhole, 1981) ^[18] and health related physical fitness (Bera, Gore, Kulkarni, Bhogal, & Oak, 2003). One of the most known benefits of yoga is development of profound and steady flexibility that is very important for basketball. Therefore, the objective of present study was to assess the effect of yoga training on physical components and skill abilities among novice basketball players.

Materials and Methods

Subjects

Sixty male basketball players, aged 14-16 years were selected from Jalgaon. All the subjects who practice regularly and having certain knowledge in competitive basketball were selected randomly. Prior permission was obtained from the selected subjects, and the nature and the purpose of the study were explained to the participating subjects before conducting the study. Finally, sixty subjects were divided randomly into two groups, viz., one experimental group (Group A $N_1=30$) and one control group (Group B, $N_2=30$).

Assessment

Based on literature, this study has been delimited to five variables of physical fitness viz., agility, flexibility, strength and power, speed and body fat, whereas three variables in skill viz., shooting ability, passing accuracy and dribbling, which are found essential for success in Basketball. The tools used for assessment of these variables have been presented in Table 1.

Table 1: Assessment tools for selected dependent variables

Variable	Test name	Measurement Unit
Agility	Shuttle run test	Sec.
Flexibility	Sit and reach test	Cm
Strength and power	Vertical jump test	Cm
Speed	Sprint time over 20 m test	Sec
Body fat	Body fat monitor	%
Shooting ability	Johnson ½ min shooting test	Points
Passing accuracy	Push pass test	Points
Dribbling	Johnson dribble test	Points

Intervention

After the pre test was over, all the subjects of Group A were exposed to a practice of Basketball training and yoga practices and Group B participated in the training in Basketball only. This indicates that the subjects of both the groups were participated in Basketball training, which is common. This common training was imparted for both the groups 1 hr. daily in the evening except Sundays and holidays. However, after completion of 1 hr. training group A participated in yoga training for 30 minutes while the subjects of group B participated in cooling down activities for 30 minutes. The yoga training intervention involved was of physical postures (Asanas) and breathing techniques (Pranayama) conducted under the guidance of yoga expert. Each session was started with prayer. The asanas included were Brahma mudra, Viparitamarni, Sarvangasana, Matsyasana, Ardha Halasana, Halasana, Bhujangasana, Dhanurasana, Paschimotanasana, Yoga Mudra, Supta Vajrasna, and Ardha Matsyendrasana, The breathing exercises i.e. pranayama practices included in the present investigation were Anulom Vilom, Kapalbhati and Ujjayi.

Statistical Analysis

Standard methods were followed for the data extraction for each of the variables. Data analysis was done using statistical software (SPSS, Statistical Package for the Social Sciences, Version 20.0). Data was analyzed using paired 't' tests, independent 't' test and descriptive statistical method.

Results

The outcomes of within group and between group analyses of physical fitness components and skill abilities, for the Yoga and Control groups have been presented in Table 2 and Table 3 respectively.

Results of paired sample t- test in experimental group showed significant change in agility ($t=13.39$, $df=29$, $p<0.001$); flexibility ($t=16.57$, $df=29$, $p<0.001$); speed ($t=9.96$, $df=29$, $p<0.001$); strength ($t=8.40$, $df=29$, $p<0.001$); body fat ($t=10.42$, $df=29$, $p<0.001$); shooting ability ($t=9.5$, $df=29$, $p<0.001$); passing ability ($t=17.55$, $df=29$, $p<0.001$) and dribbling ability ($t=19.44$, $df=29$, $p<0.001$) after yoga training intervention.

Further, results of paired sample t- test in control group revealed no significant change in agility ($t=0.05$, $df=29$, $p>0.05$); flexibility ($t=0.30$, $df=29$, $p>0.05$); speed ($t=0.80$, $df=29$, $p>0.05$); strength ($t=0.28$, $df=29$, $p>0.05$); body fat ($t=1.49$, $df=29$, $p>0.05$); shooting ability ($t=0.65$, $df=29$, $p<0.05$); and dribbling ability ($t=1.23$, $df=29$, $p>0.05$) after controlled period of six weeks. However, significant increase in passing ability ($t=2.77$, $df=29$, $p<0.05$) was observed in control group participants.

The result of between group comparison revealed that experimental group had significant change in agility ($t=12.25$, $p<0.001$) flexibility ($t=8.39$, $p<0.001$); speed ($t=9.32$, $p<0.001$); strength ($t=6.34$, $p<0.001$); body fat ($t=3.26$, $p<0.01$); shooting ability ($t=6.41$, $p<0.001$); passing ability ($t=7.79$, $p<0.001$) and dribbling ability ($t=9.28$, $p<0.001$) as compared to control group participants.

These results indicate that yoga practices are effective in improving physical fitness components and basketball skill abilities of novice basketball players.

Discussion

The findings of this six week research study suggest, amply, the effectiveness of yoga training in improving physical

fitness & skill abilities of novice basketball players.

The results on physical fitness components revealed that almost all the variables were improved as a result of inclusion of yoga practices in the training schedule of novice Basketball players. Many exercise strategies available so far to improve fitness (Bogdanis *et al.*, 2007; Kilinc, 2008; Welderman Ross and Padua, 2009) [6, 13]. Nevertheless, earlier research studies in relation to yoga and physical fitness it has been found that yoga, promotes physical fitness (Collins, 1998; Gharote, 1976; Telles, Hanumanthaiah, Nagarathna, & Nagendra, 1993) [7, 10, 24] by promoting increased muscle strength (Raub, 2002) [21], flexibility (Armstrong & Smedley, 2003; Ray *et al.* 2001) [2, 22], and stability (Telles *et al.* 1993) [24]. Telles *et al.*, (1994) [23] supported that yoga encompasses many techniques including physical postures (*asanas*), breathing techniques (*pranayamas*) and meditation (*dharana, dhyana etc*), which has become extremely popular strategy for better physical fitness towards enriching a better quality of life. The results of present study are in accordance with earlier investigations wherein improvement in physical fitness components was observed after six weeks of yoga training.

In case of the selected skills in Basketball, the result revealed that *Yoga plus Basketball training* showed significant

superiority over the Control in improving Shooting ability. Although similar results on impact of exercise training are evident (Kladopoulos and McComas, 2001; Vamvakoudis *et al.*, 2007) [14, 26], no study on yoga for novice players is recorded so far. It is generally known that shooting needs a good level of concentration which depends upon an individual's ability to bring psychophysiological balance. In this study the yoga practices might have brought a balance state of body and mind so that the muscles of the whole body were refreshed which perhaps helped to improve shooting ability among the Basketball players. Similar mechanism of yoga might have contributed to influence accuracy in passing Basketball and Dribbling performance. The results on Basketball skills indicate that yoga plays an important role in improving all the selected skills of novice Basketball players. Finally, it can be summarized that yoga plays an important role in improving physical fitness components and skills of novice basketball players.

Conclusion

Yoga training intervention for six weeks helps to improve physical fitness components as well as skills required for novice basketball players.

Table 2: Descriptive statistics and t-test results for within group comparison in physical fitness components & basketball skills

Variable	Pre Mean ± SD	Post Mean ± SD	t value	Sig.	95% CI for mean	
					Lower	Upper
Yoga Group						
Agility (Sec)	18.13 (±1.33)	14.35 (±1.35)	13.39	0.001	3.20	4.35
Flexibility (Cm)	23.60 (±2.29)	29.60 (±2.40)	16.57	0.001	6.74	5.25
Speed (Sec)	7.21 (±0.71)	5.93 (±0.55)	9.96	0.001	1.01	1.54
Strength (Cm)	44.43 (±3.42)	50.03 (±3.38)	8.46	0.001	6.95	4.24
Body fat (%)	16.67 (±1.93)	13.88 (±1.91)	10.42	0.001	2.24	3.33
Shooting (Points)	7.20 (±1.64)	11.90 (±2.86)	9.51	0.001	5.71	3.68
Passing (Points)	15.32 (±1.40)	11.66 (±1.76)	17.55	0.001	3.23	4.09
Dribbling (Points)	17.58 (±1.80)	13.73 (±1.18)	19.44	0.001	3.44	4.25
Control Group						
Agility (Sec)	18.28 (±1.46)	18.26 (±1.11)	0.07	0.95	0.48	0.51
Flexibility (Cm)	24.50 (±2.25)	24.36 (±2.42)	0.30	0.76	0.75	1.01
Speed (Sec)	7.03 (±0.38)	7.06 (±0.37)	0.80	0.43	0.11	0.05
Strength (Cm)	45.06 (±2.75)	45.16 (±2.47)	0.28	0.77	0.81	0.61
Body fat (%)	16.06 (±2.33)	15.40 (±1.68)	1.49	0.14	0.24	1.56
Shooting (Points)	7.90 (±1.68)	8.10 (±1.51)	0.65	0.51	0.82	0.42
Passing (Points)	15.48 (±1.51)	15.02 (±1.56)	2.77	0.01	0.12	0.80
Dribbling (Points)	17.26 (±1.29)	17.00 (±1.52)	1.23	0.22	0.16	0.68

Table 3: Results of independent sample t test between yoga & control group in physical fitness components & basketball skills

Variable	Yoga-Final Mean ± SD n=32	Control-Final Mean ± SD n=29	t	Sig (2-tailed)	diff. in Mean 95% CI lower/upper
Agility (Sec)	14.35 (±1.35)	18.26 (±1.11)	12.25	0.000	3.91 (4.55 - 3.27)
Flexibility (Cm)	29.60 (±2.40)	24.36 (±2.42)	8.39	0.000	5.23 (3.98 - 6.48)
Speed (Sec)	5.93 (±0.55)	7.06 (±0.37)	9.32	0.000	1.13 (1.37 - 0.88)
Strength (Cm)	50.03 (±3.38)	45.16 (±2.47)	6.34	0.000	4.86(3.33 - 6.40)
Body fat (%)	13.88 (±1.91)	15.40 (±1.68)	3.26	0.002	1.52(2.45 - 0.58)
Shooting (Points)	11.90 (±2.86)	8.10 (±1.51)	6.41	0.000	3.80(2.60 - 4.98)
Passing (Points)	11.66 (±1.76)	15.02 (±1.56)	7.79	0.000	3.36(4.22 - 2.49)
Dribbling (Points)	13.73 (±1.18)	17.00 (±1.52)	9.28	0.000	3.27(3.97 - 2.56)

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