



EFFECT OF MAT PILATES TRAINING ON PHYSIOLOGICAL PARAMETERS RESPONSES TO BASKETBALL PLAYERS

Dr. P. satheeshkumar¹ and Dr. A. Mathan²

¹Guest Lecturer, Department of Physical Education, Bharathidasan University, Tiruchirappalli,
Tamilnadu, India.

²Director of Physical Education, NIFT – TEA College of Knitwear Fashion, Tirupur, Tamilnadu

ABSTRACT

The study was designed to investigate the “physiological parameters response to mat Pilates training on basketball players”. To achieve this purpose 30 school level male basketball players were randomly selected from Trichy district as subjects. They were divided into two groups. The group I was considered as experimental group and group II was considered as control group. The investigator did not make any attempt to equate the group. The control group was not given any exercise and the experimental group was given mat Pilates training for five days per week. The experimental group was given training for the period of 8 weeks of mat Pilates training. The following criterion variables were chosen namely Respiratory rate, Breath holding time and Vital capacity. All the dependent variables were assessed before and after the training period of 8 weeks. The collected data on physiological parameters due to effect of mat pilates training was analyzed by computing mean and standard deviation. In order to find out the significant improvement if any ‘t’ test was applied. 0.05 level of confidence was fixed to test the level of significance. The study revealed that the physiological parameters were significantly improved due to the influence of mat Pilates training.

KEY WORDS- 1. Mat Pilates training 2. Physiology 3. Respiratory rate 4. Breath holding time 5. Vital capacity.

INTRODUCTION

Pilates, originally developed by Joseph Pilates after World War I, is described by practitioners as “a unique method of physical fitness that uses a combination of muscle strengthening, lengthening and breathing to develop trunk muscles and restore muscle balance” (Bernardo, 2007; Cozen, 2000; Kloubec, 2010; Latey, 2001; Smith and Smith, 2005). Contrary to traditional resistance exercises based on training the muscles in an isolated manner, Pilates exercises have a holistic approach, requiring activation and coordination of several muscle groups at a time (Pilates, 2001). Although recent studies (Caldwell et al., 2009; Johnson et al., 2007) reported that Pilates exercises are suitable for all ages, all body types and fitness abilities due to the modifiability of the movements, (Kaesler et al., 2007; Kloubec, 2010; Segal et al., 2004; Sekendiz et al., 2007)



In developing his method, Joseph Pilates “combined the mental focus of and specific breathing of yoga with the physicality of gymnastics and other sports” (Ungaro, 2002) for the ideal of attaining a complete coordination of body, mind, and spirit (Gallagher and Kryzanowska, 2000). The mind-body approach is further elucidated by the principles (CCCPFB) that Pilates founded his method on: centering, concentration, control, precision, flow, and breath (Adamany and Loigerot, 2004;

Adams and Quin,2007;Gallagher and Kryzanowska,1999; Siler,2000; Ungaro,2004).

Pilates yields numerous benefits, increased lung capacity and circulation through deep, healthy breathing is a primary focus. Strength and flexibility, particularly of the abdomen and back muscles, coordination-both muscular and mental, are key components in an effective Pilate's program. Posture, balance, and core strength are all heartily increased. Bone density and joint health improve, and many experience positive body awareness for the first time. Pilates teaches balance and control of the body, and that capacity spills over into other areas of one's life.

The game of basketball is very strenuous on the body. The combination of the three basic movement elements - running, jumping, throwing – puts a lot of pressure on the muscular- skeletal structure. As selection of a proper person for basketball is performed in early ages, physiologic properties with physical profile should be learned. Variables to determine physical profile were observed. The observed variables comprise of respiration parameters, blood pressures, aerobic and anaerobic capacity.

The better team or players required physiological system of the body to be fit. It must function well enough to support the specific activity that the individual is performing. Basketball players need physiological fact that the human organism needs stimulating exercise. When the whole body is subjected to regular muscular activity, requiring vigorous stress on the heart, lungs and muscles, the general efficiency of physiological functions is being improved. Research now strongly has the theory that regular and vigorous training helps to keep the heart healthy and may have good cardiovascular endurance. A physically fit heart bears at a lower rate and pumps more oxygen, which denotes the substantial increase of ability to do more physical activities(**Astriand and Rodani,1970**).

Though there are several training methods, which are recommended for the improvement of physiological parameters, the pilates training for basketball players to develop physiological parameters has not been conducted in an exhaustive manner in India.

Thus, it was hypothesizedthat compared to the control group, Pilates training would significantly improve the respiratory rate, breath holding time and vital capacity in the experimental group.

MATERIALS AND METHODS

Thirty school level male basketball players were randomlyselected from the Trichy district as subjectsand their age ranged between 14 and 17 years.They were divided into two groups. The group – Iwas considered as the experimental group and group – IIwas considered as the control group. Thecontrol group was not given any exercise and theexperimental group was given mat pilates training for five days per week for 8 weeks. The evaluated parameters were respiratory rate (Respiratory count per minute), breath holding time (control pause test), and vital capacity(wet spirometer test). The parameterswere measured before and after the Pilates training programme and the effects of the trainingprogramme were examined (Table-1). Thecollected data on physiological parameters due toeffect of pilates training was analyzed bycomputing mean and standard deviation. In orderto find out the significant improvement if any, 't' test was applied.

PILATES TRAINING

Pilates training target for a heart rate of 60–70 % of maximal heart rate for the age. The intensity of Pilates training was determined by Carvonon Method(**Fox et al., 1998**).

The Carvonon Method:

Max. Heart Rate=220–Age

Heart Rate Reserve=HR max–HR Rest

(Resting Heart Rate)

%60 Target Heart Rate=(0.60 ×HRR)+HR rest

The Pilates training program consisted of 8-week series of one hour Pilates exercise four days perweek. Exercises were performed on a mat. Each exercise session lasted for about 60 min. For all participants training was provided by the same coach verbal and tactileclues were given during each Pilates exercise. At the beginningof the program, while the intensity of exercisewas 40%, it was gradually increased to 60% in theeighth week.

Table 1 - MAT PILATES TRAINING SCHEDULE FOR EIGHT WEEKS

Week 1 & 2	Week 3 & 4	Week 5 & 6	Week 7 & 8
Roll up (5–10 reps)	Swan dive (5 reps)	Roll over (8 reps total)	Shoulder bridge (3 each leg)
Hundred (sets of 10, 20,, 100)	Heel squeeze (6–8 reps)	Scissors (10 reps)	Open leg rocker (10 reps)
One leg circle (10 reps with each leg)	Neck pull prep (5 reps)	One leg kick (alternate 8 reps)	Jackknife (5 reps)
Rolling like a ball (10 reps)	Oblique roll back (5 to each side)	Double leg kick (5 to each side)	Scissors in air (10 reps)
Single leg stretch (5 sets)	Spine twist (5 to each side)	Shoulder bridge prep (3 each leg)	Bicycle in air (10 reps)
Single leg stretch with oblique (5 sets)	Sidekicks (8–10 reps)	Teaser variation (5 reps)	Teaser variation
Double leg stretch (10 reps)	Side leg lift series (8–10 reps for each)	Swimming prep (5 reps)	Swimming (40 counts)
Spine stretch forward (5–7 reps)	Teaser preps (5 reps)	Leg pull front prep (5 reps)	Leg pull front (5 reps)
Saw (5 to each side)	Seal (10 reps)	Side bend prep (5 each side)	Side bends (5 each side)
Breast stroke(5 reps)	Slow double leg stretch (10 reps)	Push up (3 sets of 3–4 reps)	Boomerang (5 reps)

DATA ANALYSIS

Descriptive statistics such as mean and standard deviation were found in order to get basic idea of the data distribution. 't' test was done for finding whether there is any statistically significant pre-test to post-test mean differences in their respective variables of each groups.

Table 2-Summary of mean and 't' test for the pre and post tests on respiratory rate, breath holding time and vital capacity of control and experimental group

Parameters	Group	Test	Mean	Standard deviation	Mean difference	't' ratio
Respiratory Rate	CON	Pre	20.93	2.25	0.40	1.19
		Post	20.53	2.06		
	EXP	Pre	21.53	1.92	0.86	4.01*
		Post	20.67	1.67		
Breath holding time	CON	Pre	21.47	3.20	0.40	1.11
		Post	21.87	3.94		
		Pre	19.89	1.36	0.30	4.93*

	EXP	Post	20.19	1.41		
Vital capacity	CON	Pre	1.92	0.26	0.01	0.04
		Post	1.91	0.24		
	EXP	Pre	1.93	0.20	0.06	4.58*
		Post	1.99	0.19		

*Significant at 0.05 level of confidence (2.145)

The above table reveals the computation of 't' ratio between mean of pretest and posttest of control and experimental group on respiratory rate, breath holding time and vital capacity of basketball players. The mean values of pre and posttest of respiratory rate, breath holding time and vital capacity for control group were 20.93 and 20.53, 21.47 and 21.87 and 1.92 and 1.91 respectively. Since the obtained 't' ratio 1.19, 1.11 and 0.04 were lesser than the required table value 2.145. It was found statistically not significant for the degree of freedom 1, and 14 at 0.05 level of confidence.

The mean values of pre and posttest of respiratory rate, breath holding time and vital capacity for experimental group were 21.53 and 20.67, 19.89 and 20.19 and 1.93 and 1.99 respectively. Since the obtained 't' ratio 4.01, 4.93 and 4.58 were greater than the required table value 2.145. It was found statistically significant for the degree of freedom 1, and 14 at 0.05 level of confidence.

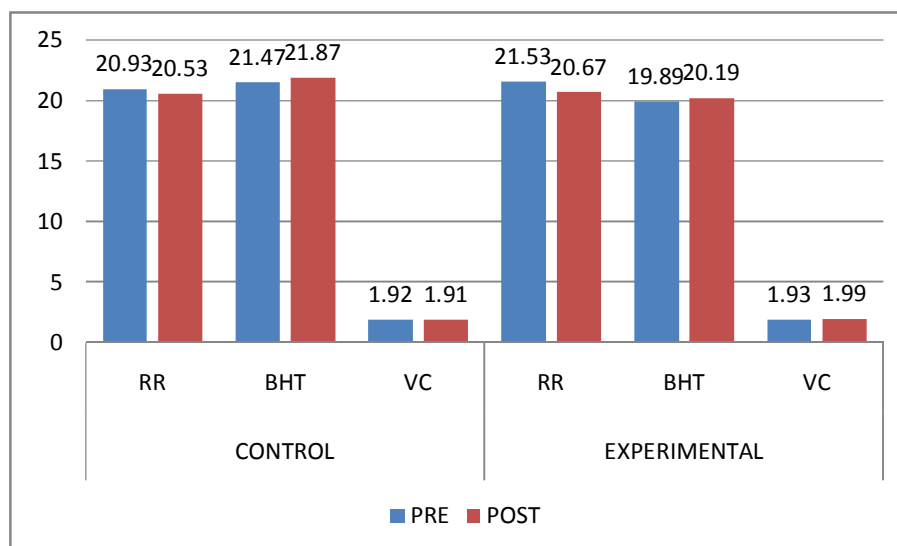


Figure.1

The results clearly indicated the respiratory rate, breath holding time and vital capacity of experimental group improved due to the influence of 8 weeks Pilates training programme.

CONCLUSIONS

Based on the result, the following conclusions have been arrived:

- 1) There was significant improvement in respiratory rate due to the influence of Pilates training on school level male basketball players.
- 2) Eight weeks of Pilates training significantly improved the breath holding time of school level male basketball players.
- 3) There was significant improvement in vital capacity due to the influence of Pilates training on school level male basketball players.

REFERENCES

- Adamany, K., Loigerot, D., 2004. The Pilates Edge: An Athlete's Guide to Strength and Performance. Avery/Penguin Books, New York.

- Adams, M., Quin, R., 2007. The Pilates Teacher Training Manual. Appalachian State University, Boone, NC.
- Bernardo, L.M. (2007) The effectiveness of Pilates training in healthy adults: An appraisal of the research literature. *Journal of Bodywork and Movement Therapies* **11**, 106-110.
- Caldwell, K., Harrison, M., Adams, M. and Triplett, N.T. (2009) Effect of Pilates and taijiquan training on self-efficacy, sleep quality, mood, and physical performance of college students. *Journal of Bodywork and Movement Therapies* **13**(2), 155-163.
- Cozen, D.M. (2000) Use of Pilates in foot and ankle rehabilitation. *Sports Medicine and Arthroscopy Review* **8**(4), 395-403.
- Gallagher, S., Kryzanowska, R. (Eds.), 1999. The Pilates Method of Body Conditioning. Bainbridge Books, Philadelphia.
- Gallagher, S., Kryzanowska, R. (Eds.), 2000. The Complete Writings of Joseph H. Pilates: Your Health and Return to Life through Contrology. Bainbridge Books, Philadelphia.
- Johnson, E.G., Larsen, A., Ozawa, H., Wilson, C.A. and Kennedy, K.L. (2007) The effects of Pilates-based exercise on dynamic balance in healthy adults. *Journal of Bodywork and Movement Therapies* **11**(3), 238-242.
- Kloubec, J.A. (2010) Pilates for improvement of muscle endurance, flexibility, balance, and posture. *Journal of Strength and Conditioning Research* **24**(3), 661-667.
- Latey, P. (2001) The Pilates method: history and philosophy. *Journal of Bodywork and Movement Therapies* **5**(4), 275-282.
- Pilates, S. (2001) *Comprehensive mat work manual*. Canada, Toronto; Merrithew cooperation.
- Segal, N.A., Hein, J. and Basford, J.R. (2004) The effects of Pilates training on flexibility and body composition: an observational study. *Archives of Physical Medicine and Rehabilitation* **85**, 1977-1981.
- Sekendiz, B., Altun, O., Korkusuz, F. and Akin, S. (2007) Effects of Pilates exercise on trunk strength, endurance and flexibility in sedentary adult females. *Journal of Bodywork and Movement Therapies* **11**, 318-326.
- Smith K. and Smith E. (2005) Integrating Pilates-based core strengthening into older adult fitness programs implications for practice. *Topics in Geriatric Rehabilitation* **21**(1), 17- 67.
- Siler, B., 2000. The Pilates Body. Broadway Books, New York.
- Ungaro, A., 2002. Pilates: Body in Motion. Dorling Kindersley Publishing, Inc., London.
- Ungaro, A., 2004. The Pilates Promise: 10 Weeks to a Whole New Body. Dorling Kindersley Publishing, Inc., New York.



Dr. P. Satheeshkumar

Guest Lecturer, Department of Physical Education, Bharathidasan University,
Tiruchirappalli, Tamilnadu, India.