



Aerobic Exercises and Yogasanas: Effect And Role on Flexibility

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KEYWORDS :

INTRODUCTION

Physical activity is skeletal muscle contraction that results in increased energy expenditure. Thus physical activity might involve walking for a bus or training for a football match and therefore includes all aerobic exercise and sports activities. Isometric muscular contractions (those where muscle length does not change) require energy expenditure but not necessarily results in movement occurring. Aerobic exercise is as repetitive physical activity or movement aimed at improving or maintaining fitness or health. Aerobic classes, weight training and working out in the gym are examples of exercise. Sport is physical activity or movement involving rules and competition. Football, hockey, basketball and badminton are examples of specific sporting activities. Aerobic exercise physiology is the discipline involving the examination of how physical activity, exercise or sport influences the structure and function of the human body -the discipline is usually studied by assessing how movement affects the system of the body (i.e. the cardio respiratory system, the nervous system, the musculoskeletal system and the endocrine system), the cells of the body and subculture molecules. In this way the aerobic exercise physiologist can study the immediate effects of moment on human function, or the long –term effects of regular physical activities.

The immediate or acute effects of moment or physical activity might , e.g. involve assessing what happen to the heart rate during ten minutes of running at a set speed on a treadmill. The long term or chronic effects of physical activity on other hand might involve assessing how resting heart rate is affected by 12 weeks of set exercise or training programme. Aerobic exercise physiology underpins both exercise and sports science. The chronic effects of the programme upon physiological function might then either underpin optimal health and function, or optimal sports performances. This is the difference between exercise and spot science. Exercise science is the study of how physical activity or exercise affects human health and function or vice-versa. Sport science is the study of how political activity or function affects sports performance or vice-versa. Ergometry is the method used to either control or measure work rate /exercise intensity, in other words the methods underpinning the majority of laboratory- based exercise physiology experiments. The devices used in these processes are called ergometres. The advancement of science and technology, though a boon to mankind is leaving behind a dark path which man has to endure with. Life of the modern man is so comfortable among machines, computers, internet and fact locomotion that he feels uneasy when he is away from them. Much of man's task is being done by machines; computers and internet make most men unfit, feel painful and leave them in agony. One such spot is of stiffness in the body. Man has stated to device and innovate new ways to overcome this stiffness the covenanted India had designed a set of exercises way back 4000 years, which is called as yogic practice which if practiced under set regulations may cure most common diseases. Asana are postural patterns which are to be achieved slowly thoroughly proper breathing and maintained for some time steadily and released again in slow and smooth manner to train the body and mind in such a way that necessary equilibrium is established in over all functions.

a. Effects of Yoga Practices

Asanas are physical exercises enabling the body to be physically fit. These exercise in physical education play an important part in helping the pupils to maintain a slim and youthful body. Several tests and experiments have been conducted to know the values and importance of asanas. The most important point to realize before starting the practice of yoga is that, the asanas are not just simple exercise but sustained scientific pattern of postures.

General effects of yoga practices are

1. Relief form tension
2. Improvement of our complexion
3. Normalized weight
4. A trim and firm figure.
5. Lungs become cleaned and strengthened
6. Circulation improved.
7. Overcome chronic fatigue
8. Makes the person slim, flexible and elastic.

Benefits of Yogic Practices

1. Yogasanas can cure and help in preventing diseases.
2. Yogic practices help in regulating the breathing mechanism and increasing vital capacity.
3. Yogic exercise develops the muscular fitness, endurance, strength and flexibility.
4. Yogic practices are the most cost benefit therapy.

The greater thing about yoga is that is constituent threat is the asanas can be harnessed for variety of purpose. There are asanas for various diseases such as asthma, diabetes and heart ailments. There are asanas for increasing concentration and power and asanas for maintenance of freshness's of the body.

b. Aerobic Exercises and their Importance

The term 'Aerobic' literally means 'with oxygen'. During Aerobic activities a continuous supply of oxygen by the body is maintained in order to burn carbohydrates and fats for the production of energy for the activities. The intensity and energy requirements in these activities is within the capacity of the performer so as to sustain the activity. Aerobic activities if done regularly contribute to the development Cardio respiratory endurance (Aerobic Fitness). This category includes those activities which are done for a prolong period of time during which the body can meet the demand for supply of oxygen. During these activities the heart, lungs and blood vessels supply oxygen and nutrients to the cells to meet the demand of long duration physical activity.

Benefits :

- 1) Lowers resting heart rate.
- 2) Increase stroke volume and cardiac output.
- 3) Increases total blood volume (both plasma and blood and solids)
- 4) Contributes to cardiac hypertrophy (Athlete's heart)
- 5) Prevents coronary heart disease.
- 6) Improves strength and endurance of respiratory muscles.
- 7) Improves vital capacity.
- 8) Increases pulmonary ventilation.
- 9) Increases oxygen extraction capacity of the muscles.
- 10) Helps in maintaining ideal body weight.

METHODOLOGY

The selection of subjects, selection of variables, criterion measure, Training Protocol development of training programme, administration of test and statistical techniques were used and development of training programme and analysis of data have been described in this chapter.

Selection of Subjects

Sixty girls studying in Gulbarga university physical education (UCPE) students were selected at random as subjects of the study and divided into three groups of 20 subjects each.

All subjects were almost from the same socio economic group and were found to be physically fit for the programme they were subjected to. The subjects were divided into two groups (group A and group B) at random by drawing the lots. The ages of these subjects ranged between 22 to 25 years all of them were living in hostel of the university campus in same environment and were also taking part in routine physical education programme as per the schedule of the department.

Selection of Variables

The following variables were selected.

Sl. No.	Variables	Test
1	Trunk flexibility	Scott and French Bobbing test.
2	Shoulder flexibility	Shoulder flexibility test.

Criterion Measure

The performance of the subjects in following variables was taken as criterion measure for this study.

1. Trunk flexibility as measured by Leighton flexometer in degree.
2. Shoulder flexibility as measured by Goniometer recorded in degree.

Training Protocol

GROUP 'A' practiced in the selected asanas are use to report in proper sports uniform and practice asanas in bare-footed. The practice session was conducted for a period of 1 hour in the morning i.e. 7.30 am to 8.30 a.m on alternate days i.e. Mondays, Wednesdays, and Fridays for duration of 8 weeks.

Method applied for the Teaching and Practice of Asanas

The asanas were taught and the practice sessions were conducted and supervised by the researcher herself. For teaching purposes, each asana was explained and demonstrated before the students performed the same. Necessary corrections and instructions were made during the practice session.

Sarvangasana

The subject assumed supine position with all muscles completely relaxed. Then she slowly raised her legs through the hip joint and here she raised her whole body with her legs thrown up; and resting her weight on her arms the final position was maintained keeping the body erect standing vertically on the shoulders and the trunk was pressed with the hands till the chin was well set in the jugular notch.

Halasana

To start with the subjects assumed supine position. Then she slowly raised her legs through the hip joint. She bent her legs further raising her hips and lower part of her back. The legs were lowered so much so that the toes were made to touch the ground beyond the head. After few seconds pause here, the toes were again slid further away for the final stage.

Bhujangasana

The subject assumed prone position and then raised her head and bent the neck backward as far as possible, completely throwing out her chin. In this asana the subject does not give a full backward curve to her spine all at once; but tries to raise her vertebrae one by one. And marks that the pressure on the spinal curve is traveling down the column step by step till the thoracic part gets a good backward bent.

Shalabhasana

The student assumed prone position with her chin resting on the floor. She placed her hands under the thighs and slowly raised both the legs together; but the chin was resting on the ground. After few seconds pause here, both the legs were brought back to the normal prone position.

Dhanurasana

The student assumed prone position with her chin resting on the floor. She bent her legs in the knee joint, till they were well folded upon the thighs and were available to the hands that try to grasp them in the ankles when the hands get a good hold upon the legs, the subject tried to raise her trunk as well as her knees till her whole body stood on her seat curving upward both ways. The whole pres-

sure of her body was thrown upon the abdomen.

Pashima-Uttan-Asana

The subject began by fully stretching on her seat, and keeping them close to each other. She then bent forward a little, made hooks of her forefingers, and caught hold of her toes, the right with the right finger and left with the left. A pull on the big toes with the fingers, secured not only a full relaxation but a complete stretching of the posterior muscles of the legs. The subject then further bent forward in the lumbo-sacral region, and stretching her trunk along her thighs, rested her face on her knees.

Ardha Matsyendrasana

To start with, the subject sat on her seat with her legs fully stretched out and placed closed to each other. She then bends in the knee of one of her legs, say the right, and folding it upon the thighs, sets its heel tight on the perineum between the anus and the valva when properly adjusted the right, and folding it upon the thighs, sets its heel tight on the perineum between the anus and the valva when properly adjusted the right sole will closely touch the left thigh. Then the subject withdraws her left leg, bending at the knees, arranges it in such away that the left foot rests on the right side of the right thigh. Next the twist is done by passing the right hand around the left knee and rotating the whole trunk to the left, till the right shoulder and the left knee stand pressing against each other. With a view to obtain a full rotation to the trunk and to prevent the knee sipping to the shoulder, the right hand is fully stretched out and made to grasp the left foot or its toes which is now available on the other side.

Chakbrasana

To start with the subject assumed supine position. Then she bent both the legs and placed near the buttocks. She then slowly folded the hands and placed near the ears, palm facing downwards. With the help of palm and foot the complete body will be raised and the whole weight of the body will be on palm and foot in final position.

Practice of Aerobic Exercises

Group B practiced the selected Aerobic Exercises the students reported in their sports uniform.

The Aerobic Exercises session was conducted for a period of 1 hour in the morning i.e. from 7.30 am to 8.30 am every Tuesday, Thursday and Saturday for duration of 8 weeks.

Methods Applied for the Teaching and Practice of Aerobic Exercises

The selected Aerobic Exercise was taught and practice sessions were conducted by the researcher himself. In teaching exercises the activities to be performed were explained and demonstrated. Thereafter when students performed them, corrections were made wherever necessary. As the exercises were not of very complicated nature, they were learnt quickly. The exercises were as follows;

1. Neck Rotation

The subjects stood with their hands on their hips and without moving shoulder they rotated their heads up, down, right and left and repeated the same.

2. Arm rotation

For this exercise the subjects stood with arms outstretched and parallel to the ground without moving their shoulder, they turn both arms in a forward motion and after terms in a similar backward motion.

3. Trunk twist

The subjects stood with their arms outstretched and parallel to the ground with their feet apart. Without moving their feet and lower extremities they twisted their upper body as far to the right and as far as the left as possible.

4. Wood Chop

For this exercise the subjects stood with their hands together and arms fully extended over their head with apart keeping their knees straight and they bend over to touch both hands to one foot. The exercise is repeated after straightening.

5. Elbow Bounce

In this the subjects are instructed to stand with their legs spread as far as apart as possible. Keeping the knees straight, they bend over. Move up and down continuously without completely straightening up, trying to touch their elbows to the ground.

6. Hand Bounce with Leg Cross

This is the continuation to the previous exercise only. The subjects cross their right leg over their left leg keeping their knees straight. They bend over, move up and down continuously without completely straightening up and try to touch the palms to the ground. Then the exercise as repeated with the left leg over their right leg.

7. Ground Hurdle

The subjects sat on the ground with one leg out, straight in front of the body while the other leg is out and back to the side with the foot extended as far as possible. Then they grasp the toes of straightened leg with both hands and held this for 10 to 15 seconds. The exercise is first done with the right leg then with the left leg.

8. Lower Back Sideward Stretching

Subjects lie on their back with the arms at shoulder level. They raised one leg to vertical position keeping the knee extended. The opposite leg should be flat on the floor and in an extended position. Keep the shoulders, arms and back on the ground. Reach towards the opposite hand with raised leg. Stretch until pain is felt. But the trunk should not be raised off the ground. The exercise is repeated three times with each leg.

9. Hip Flexion

The subjects lie on the back, with the arms extended at the sides and the legs outstretched, till pelvis and lower back are flat on the ground. The heels are brought to the buttocks and pull the knees to the chest as far as possible. Lower the feet to the floor close to the buttocks and extend the legs. The exercise is repeated several times.

Administration of Test

1. Scott and French standing bobbing test

Aim : To assess the back and hamstring muscles flexibility.

Equipment used : Leighton Flexometer.

Procedure : To measure the Trunk Flexibility of the subjects Scott and French standing bobbing test¹ was administered.

The subjects were educated about the Flexometer and the bobbing test. The explanation was followed by the demonstration by the researcher. Each subject was given a trial and the initial trunk flexibility of both experimental group and controlled group's were measured. The subjects were tested for trunk flexibility before and after the experimental period.

While taking the bobbing test the subjects stood on the equipment with toes together. Then the trunk was bent forward, fingers in front of the scale. The subjects then bobbed downwards keeping the knees straight. The wooden knob was fixed in upper side of the equipment, the subjects bent forward to touch the scale from the middle fingers, touched the knob and pushing the knob as much as possible in maximum bent position in the forward bending direction. The score is distance in degrees which is indicated when the knob is depressed by the subjects. Thus the pretest and posttest readings were recorded.

2. Shoulder Flexibility test

Aim : To assess the shoulder flexibility of an individual.

Equipment used : Goniometer.

Procedure : To measure the Shoulder Flexibility of the subjects shoulder flexibility test was administered.

The subjects were educated about the Goniometer and the shoulder flexibility test. The explanation was followed by the demonstration by the researcher. Each subject was given a trial.

Goniometer was placed on the shoulder and extended towards the arm so that arm and the Goniometer was parallel to the ground.

Slowly the subject was asked to stretch the shoulder joint towards backside. The movement reached to the optimum level then reading was recorded by a research scholar.

Statistical Technique

The data was statically analyzed using mean difference method (t ratio). The level of significance chosen was .05.

ANALYSIS OF DATA AND RESULTS OF THE STUDY

The statistical analysis of data (Trunk and shoulder flexibility collected on 60 subjects belonging to two experimental and a control group is presented in this chapter. Group A performed Yogic Asanas, Group B was subjected Aerobic Exercise and Group C served as the control.

The "t" ratio applied to examine the data with regard to the two experimental groups and a control group. The "t" ratio was calculated to find out the significance of the difference between the pre and post test means for the experimental and control groups. The random group design was employed in this study and subjects of the two experimental groups and the control group were selected at random and were not equated with reference to the factors examined. Hence, the difference between the initial means of the groups at her pretest had to be taken into account during the analysis of post test difference between the means by the process of application of analysis of covariance, where the final means were adjusted for difference in the initial means and adjusted means were tested for significance of difference.

Findings

In order to determine the significance of difference if any, made by the two experimental groups and the control group between pretest and post test means, t- test was applied. The result pertaining to t test for trunk flexibility performance are given in table 1.

Significance Of Difference Between The Pretest And Post Test Means Of Two Experimental Groups And The Control Group In Trunk Flexibility

Groups	Post Test Means	Pre- Test Means	DM	sDM	t-Ratio
A	65.65	59.20	3.0	0.28	10.71*
B	57.40	57.40	6.45	0.63	10.23*
C	54.50	54.05	0.25	0.25	1.00

Significant at 0.05 level

It is evident from table 1 that t values obtained for the two experimental groups (group A and group B) were 10.71 and 10.23 respectively which were significant as they were much greater than the t value of 2.09 required to be significant at .05 level confidence. The t value for the control groups was 1.00 which was not significant at .05 levels.

TABLE 2

Significance Of Difference Between The Pre Test And Post Test Means Of Two Experimental Groups And The Control Group In Shoulder Flexibility Performance

Groups	Post Test Means	Pre- Test Means	DM	sDM	t-Ratio
A	65.7	58.8	3	0.76	9.07*
B	59.9	56.9	6.9	0.26	11.54*
C	54.85	54.6	0.35	0.25	1.00

Significant at 0.05 level

It is evident from table 2 that the t values obtained to the two experimental groups (group A and group B) were 9.07 and 11.54 respectively which were significant as they were much greater than the t value of 2.09 required being significant at .05 level of confidence. The t-value for the control group was 1.00 which was not significant at .05 levels.

In order to find out the significance of difference among the groups in shoulder flexibility performance, analysis of covariance was done.

DISCUSSION OF FINDINGS

The application of t ratio shows significant improvement in shoulder

flexibility and trunk flexibility. This may be due to the fact that the load which was experienced by the subjects in the two training programme was adequate to produce significant improvement in flexibility. No significant improvement in case of control group may be due to their non participation in the training programme.

Group A and B have shown significant improvement in the performance of trunk flexibility but in case of group A (i.e. yoga group) better improvement has been recorded as compared to group B (i.e. Aerobic exercises). Significant difference was observed between the pre-test and post-test means of the two experimental groups in shoulder flexibility group B (i.e. Aerobic exercises) has shown greater improvement than the group A (i.e. yoga group). Whereas the control group did not show any significant increase in the performance.

CONCLUSIONS

On the basis of findings of the study, the following conclusions may be drawn:

1. Aerobic exercise and yogic asana training programme are effective in improving flexibility of the shoulder and trunk.
2. Yogic asana training programme was found to be more effective as compared to the Aerobic exercise programme in developing the flexibility.
3. No significant improvement in the case of control group may be a reflection of inactivity.

RECOMMENDATIONS

On the basis of observation and conclusion drawn in this study in this study, the following recommendations are made:

1. Yogic asanas and Aerobic exercises may form an important part of training programme for enhancing the flexibility of trunk and shoulder.
2. Similar study may be done selecting other motor components such as strength, speed, agility etc.
3. The present study may be repeated with subjects of age and sex other than those employed in this study.
4. Present study may be replicated comparing the combined effects of yogic asanas and Aerobic exercises.

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