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## EFFECT OF DIFFERENT DANCE ON $VO_2$ MAX AMONG POST PUBESCENT GIRLS

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### **Abstract**

*The purpose of this study was to find out the effect of different dance on  $VO_2$  max. To achieve the purpose ninety ( $N=90$ ) women dancers were selected from Jaffna, Sri Lanka, and their age were ranged between 17 and 18 years. They were classified in to Aerobic dance [(AD)(  $n=30$ , practice aerobic dance  $60\pm 15$  min / day/ 3 days / week over the period of twelve weeks)], Bharathanatym Dancers [(BD) ( $n=30$ , practice bharathanatyam  $60\pm 15$ min / day for 3 days / week over the period of twelve weeks)] and Kandyan Dancers [(KD)(  $n=30$ , from Sri lanka, practice kandyan dance  $60\pm 15$  min / day/ 3 days / week over the period of 12 weeks )].  $VO_2$  max was assessed for all the selected subjects by Queen's step test before and after the intervention programme, and collected data were subjected to statistical treatment using analysis of covariance (ANCOVA). In all the cases 0.05 level of confidence was fixed to test the significance. When the obtained 'F' ratio was significant, Scheffe's post hog test was used to find out the paired mean difference. Within the limitations set for this study, it was concluded that aerobic, bharathanatyam, kandyan dance training significantly influence on  $VO_2$  max, however aerobic dance training shows better improvement than bharathanatyam and kandyan dance.*

**Keywords:** Aerobic, Bharathanatyam, Kandyan Dance,  $VO_2$  max

## INTRODUCTION

Dance involves the body, emotion and mind. It is both a physical activity and a means of expression and communication. Dance and health programmes form part of a growing field of arts work which delivers health and wellbeing outcomes for people. It is an art form that generally refers to movement of the body, usually rhythmic and to music, used as a form of expression, social interaction or presented in a spiritual or performance setting.

Long-term exercise can help to make the muscles that expand the lungs stronger and more efficient. This can increase the amount of expansion of chest to breathe in more air with each breath and increase number of capillaries around the alveoli, or air sacs, enabling to absorb oxygen in the blood quicker. This results in being able to exercise at a higher intensity for a longer period of time.

**Aerobic dance:** In the early 70's, Jacki Sorenson developed a fitness program now known as aerobic dance, which was designed to improve cardiovascular endurance (1). It involves choreographed routines made up from various dance steps and other movements including walking, running and skipping. It also involves muscle conditioning exercises for the abdominal, legs and arms (2). Aerobic dance is appropriate for the general public since skill and technique are not emphasized (3). **Bharatanatyam:** very popular dance form in South India. And oldest of all classical dance forms. The general etymology of Bharathanatyam is BHAVA (expression) + RAGA (music) + TALAV (rhythm) + NATYAM (dance). The variety and style of the dance and musical accompaniment provide to the people tastes and performing them. **Kandyan Dance:** is a dance form that originated in the area called Kandy of the Central hills region in Sri Lanka. But today it has been widespread to other parts of the country. The dance waned in popularity as the support for the dancers from the Kandyan kings ended during the British period. It has now been revived and adapted for the stage, and is Sri Lanka's primary cultural export.

Beginning with the first breath and ending with the last, humans move, and from the expressive urges of that movement, dance is born. If life is movement, then the art of that movement is dance. To know dance is to do it: to step glide, turn, dip, reach, shake, bend, and leap to the rhythmic flow of one's inner impulses, for it is in feeling one's energy bristle with life that the nature of this expressive art is revealed.

The physiological response to dance is dependent on the intensity, duration and frequency of the exercise as well as the environmental conditions. During dance practice, requirements for oxygen and substrate in skeletal muscle are increased, as are the removal of metabolites and carbon dioxide. Chemical, mechanical and thermal stimuli affect alterations in metabolic, cardiovascular and ventilatory function in order to meet these increased demands. Hence the purpose of this study was to find out the effect of different dance on  $VO_2$  max among post pubescent girls.

### Methodology

To achieve the purpose ninety (N=90) women dancers were selected from Jaffna, Sri Lanka, and their age were ranged between 17 and 18 years. They were classified in to Aerobic dance [(AD)( n=30, practice aerobic dance  $60\pm 15$  min / day/ 3 days / week over the period of twelve weeks)], Bharathanatyam Dancers [(BD) (n=30, practice bharathanatyam  $60\pm 15$ min / day for 3 days / week over the period of twelve weeks)] and Kandyan Dancers [(KD)( n=30, from Sri lanka, practice kandyan dance  $60\pm 15$  min / day/ 3 days / week over the period of 12 weeks )].

VO<sub>2</sub> max was assessed for all the selected subjects by Queen's step test before and after the intervention programme, and collected data were subjected to statistical treatment using analysis of covariance (ANCOVA). In all the cases 0.05 level of confidence was fixed to test the significance. When the obtained 'F' ratio was significant, Scheffe's post hoc test was used to find out the paired mean difference.

## Results

Table I - ANCOVA FOR VO<sub>2</sub> max

|                         | AD    | BD    | KD    | SV | SS     | df | MS     | 'F'    |
|-------------------------|-------|-------|-------|----|--------|----|--------|--------|
| Pre test mean           | 46.22 | 45.01 | 44.11 | B  | 67.49  | 2  | 33.74  | 10.26* |
| SD                      | 2.07  | 1.63  | 1.70  | W  | 286.13 | 87 | 3.28   |        |
| Post test mean          | 54.96 | 50.48 | 49.71 | B  | 481.43 | 2  | 240.72 | 25.57* |
| SD                      | 2.29  | 4.00  | 2.62  | W  | 818.99 | 87 | 9.41   |        |
| Adjusted post test mean | 55.08 | 50.46 | 49.60 | B  | 429.75 | 2  | 214.87 | 22.66* |
|                         |       |       |       | W  | 815.39 | 87 | 9.48   |        |

TV : 0.05 df 2 and 86, 87 = 3.10

Table II - Mean Difference Between Experimental Group S

| AD    | BD    | KD    | MD    | CI   |
|-------|-------|-------|-------|------|
| 55.08 | 50.46 |       | 4.62* | 1.87 |
| 55.08 |       | 49.60 | 5.48* |      |
|       | 50.46 | 49.60 | 0.86  |      |

From the table 2 it was clear that, there was a significant difference between Aerobic dance, Bharathanatyam dance and Kandyan dance groups on VO<sub>2</sub> max. The result of post hoc test showed that there was a significant difference between Aerobic and Bharathanatyam, Aerobic and Kandyan dance groups on VO<sub>2</sub> max. However between Bharathanatyam dance and Kandyan dance insignificant difference was observed on VO<sub>2</sub> max.

## Discussion

Dance is an art form that generally refers to movement of the body, usually rhythmic and to music, used as a form of expression, social interaction or presented in a spiritual or performance setting. Although dance is an artistic expression through the use of the body, and also a long process of physical, intellectual, and psychological preparation. Dance training, rehearsal, and performance do not elicit significant stimulus to result in increased aerobic fitness levels. Therefore, dancers often demonstrate low levels of aerobic fitness even though a strong aerobic foundation is necessary to meet the required workload.

It may indicate the associated dance training outcomes could be affected by such difference in duration, intensity and frequency of dance they undergone. Regular dance training essential for maintain and developing the dancer's technique and coordination. The energetic demands during these training sessions stand in rather sharp contrast to those which can exist during stage performance. The result also shows that the aerobic dancers have better VO<sub>2</sub> max compare to bharathanatyam and kandyan dancers. Therefore intensity, duration and movement patterns of the dance influence on aerobic power such as VO<sub>2</sub> max, cardio respiratory endurance so on.

The literature indicates that changes in cardiorespiratory endurance,  $\text{VO}_2$  max are directly related to the subject's initial fitness level and the frequency, intensity and duration of the training programme. Some aerobic type of activities, have close association with  $\text{VO}_2$  max (4). It has been shown that arm work performed above the head produces a higher  $\text{VO}_2$  max than the work performed below head level, due to an increased sympathetic tone (5). In general, dance students demonstrate lower maximal oxygen up-take ( $\sim\text{VO}_{2\text{max}}$ ) values compared with other athletes (6). Within the dance world, however, modern dancers have shown higher  $\sim\text{VO}_{2\text{max}}$  values than ballet (7).

Through physical exercise, often beginning in childhood and continuing until retirement. Fitness programs, supplementary to traditional dance classes, have only recently been considered as a part of this process, most athletes where aerobic fitness and performance levels increase in parallel during their careers, dancers develop these two parameters independently. It may be suggested that moderate intensity aerobic type exercise supports to the dancers to enrich their theater performance as well as quality of life.

Keeness to follow principles associated with sport training, that improve real opportunity to extend the dancer's career by simply applying sports science principles to dance training and performance. An awareness of these factors will assist dancers and their teachers to improve training techniques, to employ effective injury prevention strategies and to improve better physical conditioning. However, any change in the traditional training regimes must be approached cautiously to ensure that the aesthetic content of the dance is not affected by new training techniques. Since physiological aspects of performing dance have been viewed primarily in the context of aerobic, bharathanatyam and kandyam dance. Physical inactivity and low cardio-respiratory fitness are recognized as important causes of morbidity and mortality [8, 9]. It is generally accepted that people with higher levels of physical activity tend to have higher levels of fitness and that physical activity can improve cardiorespiratory fitness [10]. Nourrey et al. showed in a prospective study that aerobic exercise improves pulmonary function and alters exercise breathing pattern in children [11]. Clark found that cardio-respiratory fitness significantly improved and breathlessness decreased over a wide range of physical work corresponding to activities of daily living [12]. In the present investigation, The Aerobic Dancing group has higher  $\text{VO}_2$  max than Bharathanatyam and Kandyam Dancing group.

**Conclusion :** The aerobic, bharathanatyam and kandyam dancers have to undergo special periodized fitness training to improve  $\text{VO}_2$  max level for achieve height of their professional dance career as well as better theater performance.

**Implication:** Scientific forms of research will be conducted to assess the physiological demands of various dance and dancers.

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