

EFFECTS OF PROGRESSIVE PLYOMETRIC TRAINING AND REVERSIBILITY PRECEDED BY PROGRESSIVE PLYOMETRIC TRAINING ON SELECTED ELASTIC STRENGTH PARAMETERS

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INTRODUCTION

In the modern world physical fitness became an integral part of everyone's lifestyle. With the rapid development of sports to a highly organized and immensely competitive social phenomenon.

The term plyometric has been derived from the Greek word 'Pleythyein', meaning "to augment" or "to increase" and the shorter Greek Works 'Plio' "more" and "plyo" to move" metrics means "to measure" or "length".

Coaches and athletes maintain that plyometric training represents the bridge between strength and power and perceive it as a method of training that will directly enhance competitive performance. They often see strength training as a means of increasing general strength and plyometrics as a way to apply this strength to improve performance.

The training effect can reverse itself. If the training does not become challenging, the fitness level flattens out. If the training ends, the fitness level gradually falls. In fact, the training load must continue to increase if the athlete's general and specific fitness are to improve.

In the present investigation, the load will gradually increase for progressive plyometric training of every four weeks for progressive plyometric training group up to twelfth week and reversibility preceded by progressive plyometric training group load will gradually increase up to ninth week, for remaining three weeks (reversibility weeks) the load will gradually reduce in every week.

The primary purpose of the present study is designed to examine the effects of progressive plyometric training and reversibility preceded by progressive plyometric training on selected elastic strength parameters and it also examine which training method is better to develop the selected elastic strength parameters.

The present investigation will have the following significant contribution based on the above concepts to the field of physical education and sports.

Specifically, the results of the study would reveal:

- (i) the effect of progressive plyometric training on elastic strength parameters.
- (ii) the effect of progressive plyometric training by applying reversibility principle on elastic strength parameters.
- (iii) the comparative effects of progressive plyometric training and reversibility preceded by progressive plyometric training on elastic strength parameters.

METHODOLOGY

To meet the purpose of the study sixty (60) women students studying different graduation courses in Aditya Educational Institutions, Kakinada, Andhra Pradesh, India during the academic year 2021-2022 were randomly selected as subjects from total of 370 students. As these subjects were new to plyometric training regime, the subjects cleared the minimum strength requirement test prescribed by Voight and Draovitch which consisted of five push-ups, five squat thrusts, standing long jump and skipping rope for thirty seconds.

The age, height and weight of the subjects were ranged from 18 to 22 years, 153 to 157 cms. and 55 to 58 kg. and means were 20 years, 149 cms. and 52.5 kg. respectively. They were divided into three groups of twenty (n=20) each as two experimental groups and a control group. The first experimental group underwent progressive plyometric training for three days per week for twelve weeks. The second experimental group underwent progressive plyometric training for three days per week for nine weeks, and then they underwent reversibility training for two days per week for remaining three weeks and third group acted as control who did not participate in any special training apart from their regular physical education curriculum. The subjects were free to withdraw their consent in case they felt any discomfort during the period of the training programme, but there were no such drop outs in the study.

Since, power, speed and stride frequency play an important role in almost all games and sports, the following variables have been selected as criterion variables :

- a) Speed
- b) Stride frequency
- c) Anaerobic power
- d) Explosive power (in terms of vertical distance)
- e) Explosive power (in terms of horizontal distance)

Plyometric training, the independent variables such as progressive plyometric training and progressive plyometric training followed by reversibility to test elastic strength parameters have been selected.

The present study was undertaken to assess the effect of progressive plyometric training, reversibility preceded by plyometric training on selected elastic

strength parameters such as speed, stride frequency, anaerobic power, and explosive power in terms of vertical and horizontal distance. The investigator analysed various literatures, had consulted the physical education professionals and selected the following test items which were standardized, ideal for the chosen subjects and most suitable for the purpose of the study. They are presented in the following Table.

TESTS SELECTION

S.No.	Criterion Variables	Test items	Unit of measurement
1.	Running speed and stride frequency	50 metres run	1/10 th of a second and number of strides.
2.	Anaerobic power	Margaria Kalamen anaerobic power test	Kilogram metre/second
3.	Explosive power in terms of vertical distance	Sargent jump	Centimetres
4.	Explosive power in terms of horizontal distance	Standing broad jump	Centimetres

During the training period, the experimental groups underwent their respective training Programmes in addition to their regular physical education programme of the course of study as per the curriculum. Group I had undergone progressive plyometric training for three days per week for twelve weeks and group II had undergone progressive plyometric training for three days per week for nine weeks and followed by reversibility for two days per week for remaining three weeks. The principle of overload for Group I had been applied at every four weeks up to the twelfth week to reach the high intensity whereas Group II was attained the high intensity at the ninth week itself and then for remaining three weeks the load was deliberately reduced. The duration of training sessions in all the days was between 45 minutes and an hour approximately, which included warming up and limbering down. Group III acted as control who did not participate in any specific training on par with experimental groups. However, they performed the regular physical education programme of the course of study.

The experimental groups underwent their respective training Programmes during evening hours under strict supervision of the investigator. To reduce the possibility of injury the training was conducted on the grassland. All the subjects involved in this study were carefully monitored throughout the training programme to be away from injuries. They were questioned about their health status throughout the training programme. None of them reported with any injuries. However, muscle soreness discomfort, and fatigue were appeared in the earlier period of the training programme, however, they subsided later.

The data on speed, stride frequency, anaerobic power and explosive power in terms of vertical and horizontal distance were collected by administering 50 metre. run, Margaria – Kalamen anaerobic power test, Sargent jump and standing broad jump test respectively. A video analysis was made for 50 meter run to assess the stride frequency. Pre-test and post-test data were collected prior to and after two days training programme. In both the cases, the data were collected in two days. On the first day, 50mts. run and standing broad jump test were conducted whereas vertical jump test and Margaria – Kalamen anaerobic power test were conducted on the second day.

EXPERIMENTAL DESIGN AND STATISTICAL PROCEDURE

The pre and post-test random group design was used as experimental design in which sixty women subjects were divided into three groups of twenty each at random. No attempt was made to equate the groups in any manner. The collected data from the three groups prior to and after two days of the training programme on selected criterion variables were statistically examined for significant difference, if any, by applying analysis of covariance (ANCOVA). Since three groups were involved whenever the 'F' ratio was found to be significant for adjusted means, Scheffe's test was followed as a post hoc test to determine which of the paired means difference was significant. In all cases. 05 level was fixed as level of confidence.

RESULTS OF THE STUDY SPEED AND STRIDE FREQUENCY

The results of the study imply that significant difference exist in the improvement of speed, stride frequency and anaerobic power between progressive plyometric training group and control group and also between reversibility preceded by progressive plyometric training group and control group. It indicates that both experimental groups improved the speed, stride frequency and anaerobic power when compared to the control group.

Significant difference were found regarding the amount of improvement on speed, stride frequency and anaerobic power between progressive plyometric training group and reversibility preceded by progressive plyometric training group. It shows that both the training programmes influenced almost similar amount of improvement on speed, stride frequency and anaerobic power. The improvement was in favour of reversibility preceded by progressive plyometric training group.

EXPLOSIVE POWER IN TERMS OF VERTICAL & HORIZONTAL DISTANCE AND ANAEROBIC POWER

The results of the study showed significant difference in the improvement on explosive power in terms of vertical distance and horizontal distance between

progressive plyometric training group and reversibility preceded by progressive plyometric training group, progressive plyometric training and control group and also between reversibility preceded by progressive plyometric training group and control group. It reveals that both the experimental groups improved the explosive power in terms of vertical distance and horizontal distance significantly when compared with control group.

Significant differences were found regarding the amount of improvement on explosive power in terms of vertical distance and horizontal distance between progressive plyometric training group and reversibility preceded by progressive plyometric training group. It shows that both the training programmes influenced almost similar amount of improvement on explosive power in terms of vertical distance and horizontal distance. The improvement was in favour of reversibility preceded by progressive plyometric training group.

CONCLUSIONS

From the analysis of the data, the following conclusions were drawn.

1. Both progressive plyometric training and reversibility preceded by progressive plyometric training groups have achieved significant improvement on speed, stride frequency, anaerobic power and explosive power in terms of vertical distance and horizontal distance as compared to the control group.
2. Significant differences were found between progressive plyometric training and reversibility preceded by progressive plyometric training groups towards improving the selected elastic strength parameters.
3. It may be concluded that reversibility preceded by progressive plyometric training is better than the progressive plyometric training to increase the selected elastic strength parameters such as speed, stride frequency, anaerobic power, and explosive power in terms of vertical distance and horizontal distance.

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