



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2023; 8(1): 120-122

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www.theyogicjournal.com

Received: 04-01-2023

Accepted: 09-02-2023

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The effects of plyometric training, circuit training and circuit breaker programmes on motor components of tribal students

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Abstract

Sports is a worldwide phenomenon today. The need and importance of performance in sports has increased rapidly in the last few decades. In no period of world history were sports so popular, organized and important as it is today. It has a very prominent role in modern society. The purpose of the investigation was to study and compare the effects of plyometrics, circuit training and circuit breaker programmes on motor components of Tribal Students.

For the purpose of the study 100 male Tribal Students from The Birsa Munda Tribal University, Rajpipla were randomly selected as the subjects for the study. All the subjects were randomly assigned to four groups: three experimental groups viz: plyometric training group (Group A), circuit training group (Group B), and circuit breaker programme group (Group C) and the fourth group served as the control group, each consisting of 25 subjects.

The study was confined to the following motor components, Power (Leg, Shoulder and Arm), Muscular endurance and Speed.

Keywords: Plyometric training, circuit training, circuit breaker programme, power, muscular endurance, speed

Introduction

By nature human beings are competitive and aspire for excellence in every given field. Sports is not an exception. Not only individuals but nations also want to show their supremacy in the field of sports. Sports is a worldwide phenomenon today. The need and importance of performance in sports has increased rapidly in the last few decades. In no period of world history were sports so popular, organized and important as it is today. It has a very prominent role in modern society. It is important to an individual, a group, a nation and indeed the world. There are more nations competing in the Olympic Games than participating in the United Nations. Throughout the world sports has a popular appeal among people of all ages and both sexes. Sports training is a special process of preparation of sports persons based on scientific principles aimed at improving and maintaining higher performance capacity in different sports activities. It is a particular type of training designed to improve fitness and abilities to perform in a given sport. It includes strength in training, corrective and restorative exercises, conditioning and cardiovascular training. It also includes mental and psychological training and advice on nutritional values.

The purpose of the investigation was to study and compare the effects of plyometrics, circuit training and circuit breaker programmes on motor components of Tribal Students.

Delimitations

1. The study was delimited to 100 Tribal students of 18-25 years of age from Birsa Munda Tribal University, Rajpipla, Gujarat.
2. The study was confined to the following motor components
3. Power (Leg, Shoulder and Arm)
4. Muscular endurance
5. Speed

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It was hypothesized that there would be no significant difference in the effects of plyometrics, circuit training and circuit breaker programme on motor components of Tribal Students.

For the purpose of the study 100 male Tribal Students from The Birsa Munda Tribal University, Rajpipla were randomly selected as the subjects for the study. It was ascertained from the health examination reports maintained by university that all the subjects were medically fit. All the subjects were randomly assigned to four groups: three experimental groups viz: plyometric training group (Group A), circuit training group (Group B), and circuit breaker programme group (Group C) and the fourth group served as the control group, each consisting of 25 subjects

- The distance covered by the subjects in meters for best of the three trials on standing Broad Jump was recorded as the score on leg power.
- Shoulder and arm power was measured in meters for best of the three trials using Two Hand Medicine Ball Put Test.
- Muscular endurance for whole body was recorded in numbers of correctly executed squat thrust in one minute using Burpee Test.
- Speed was recorded to the nearest 1/10th of a second using 50 yard Dash.

Random group design was employed in this study. Both subjects as well as the experimental treatments were randomly assigned to the three experimental groups and one control group, consisting of 25 subjects each. The subjects were administered the initial test which was followed by 12 weeks of plyometric, circuit, and circuit breaker training programme and after 12 weeks final scores on the criterion variables was recorded.

The training programme for the experimental groups were administered thrice a week on alternate days. The Plyometric training programme consisted of single leg hopping, bounding, Plyometric pushups, medicine ball throw, depth jumps, box drill and sit ups on Mondays, Wednesdays and Fridays. The circuit training programmed involved step ups, push ups, sit ups, double knee jumps, squat thrust skipping and interval running on Tuesdays, Thursdays and Saturday. The circuit breaker programmed consisted of jump rope, step ups, shuttle run, pushups, jump ups, side jumps and sit-ups on Mondays, Wednesdays and Fridays. To find out the significance differences between pre-test and post-test means among the experimental groups and the control group in selected motor components and physiological variables analysis of covariance was applied, The differences in the paired adjusted final means among the groups were tested following the post hoc analysis. The level of significance chosen to test the hypothesis was 0.05.

The mean values of the pre-test Leg Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 2.020, 1.949, 1.973 and 1.191 respectively. The calculated F value of pre-test is 0.787, which is not significant at 0.05 levels. The subjects randomly assigned to the three experimental groups and a control group namely Plyometric training, circuit training and circuit breaker programme under went the experimental training programme for 12 weeks. The experimental training programme was administered thrice a week on alternate days. The load for the training programme was progressively increased from starting to end of the training session.

The mean values of the pre-test Leg Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 2.020, 1.949, 1.973 and 1.191 respectively. The calculated F value of pre-test is 0.787, which is not significant at 0.05 levels. The post-test mean of Leg Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 2.194, 2.116, 2.130 and 1.971 respectively. The calculated F- value of post-test is 3.392, which is significant at 0.05 levels. The adjusted mean of Leg Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 2.150, 2.129, 2.124 and 2.008 respectively. The calculated F-value of adjusted mean is 3.535, which is significant at 0.05 levels. As the value of calculated ANCOVA is significant, the LSD post-hoc test was used.

The adjusted mean difference between of Plyometric Training (Group A) and Circuit Training (Group B) is 0.021 which is not greater than critical difference i.e. 0.095. The adjusted mean difference between of Plyometric Training (Group A) and Circuit Breaker Programme (Group C) is 0.026 which is not greater than critical difference i.e. 0.095. The adjusted mean difference between of Circuit Training (Group B) and Circuit Breaker Programme (Group C) is 0.005 which is not greater than critical difference i.e. 0.095. While The adjusted mean difference between of Plyometric Training (Group A) and Control group (Group D) is 0.142, The adjusted mean difference between of Circuit Training (Group B) and Control group (Group D) is 0.121, The adjusted mean difference between of Circuit Breaker Programme (Group C) and Control group (Group D) is 0.116, which were significant than the CD i.e. 0.095.

The mean values of the pre-test Shoulder and Arm Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 2.480, 2.461, 2.543 and 2.543 respectively. The calculated F value of pre-test is 1.005, which is not significant at 0.05 levels. The post-test mean of Shoulder and Arm Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 3.461, 3.343, 3.364 and 2.684 respectively. The calculated F- value of post-test is 33.811, which is significant at 0.05 levels. The adjusted mean of Shoulder and Arm Power of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 3.472, 3.362, 3.350 and 2.670 respectively. The calculated F-value of adjusted mean is 37.944, which is significant at 0.05 levels.

The adjusted mean difference between of Plyometric Training (Group A) and Circuit Training (Group B) is 0.110 which is not greater than critical difference i.e. 0.166. The adjusted mean difference between of Plyometric Training (Group A) and Circuit Breaker Programme (Group C) is 0.122 which is not greater than critical difference i.e. 0.166. The adjusted mean difference between of Circuit Training (Group B) and Circuit Breaker Programme (Group C) is 0.012 which is not greater than critical difference i.e. 0.166. While The adjusted mean difference between of Plyometric Training (Group A) and Control group (Group D) is 0.802, The adjusted mean difference between of Circuit Training (Group B) and Control group (Group D) is 0.692, The adjusted mean difference between of Circuit Breaker Programme (Group C) and Control group (Group D) is 0.680, which were significant than the CD i.e. 0.166.

The mean values of the pre-test Muscular endurance of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 10.600, 11.400, 11.280 and 10.720 respectively. The calculated F value of pre-test is 1.749, which is not significant at 0.05 levels. The post-test mean of Muscular endurance of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 14.800, 14.480, 14.200 and 11.400 respectively. The calculated F- value of post-test is 22.968 which is significant at 0.05 levels. The adjusted mean of Muscular endurance of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 14.757, 14.523, 14.230 and 11.370 respectively. The calculated F-value of adjusted mean is 23.241, which is significant at 0.05 levels. As the value of calculated ANCOVA is significant, the LSD post-hoc test was used.

The adjusted mean difference between of Plyometric Training (Group A) and Circuit Training (Group B) is 0.234 which is not greater than critical difference i.e. 0.918. The adjusted mean difference between of Plyometric Training (Group A) and Circuit Breaker Programme (Group C) is 0.527 which is not greater than critical difference i.e. 0.918. The adjusted mean difference between of Circuit Training (Group B) and Circuit Breaker Programme (Group C) is 0.293 which is not greater than critical difference i.e. 0.918. While The adjusted mean difference between of Plyometric Training (Group A) and Control group (Group D) is 3.387, The adjusted mean difference between of Circuit Training (Group B) and Control group (Group D) is 3.153, The adjusted mean difference between of Circuit Breaker Programme (Group C) and Control group (Group D) is 2.860, which were significant than the CD i.e. 0.918.

The mean values of the pre-test Speed of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 7.545, 7.735, 7.628 and 7.730 respectively. The calculated F value of pre-test is 1.163, which is not significant at 0.05 levels. The post-test mean of Speed of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 7.023, 7.175, 7.210 and 7.802 respectively. The calculated F-value of post-test is 14.170, which is significant at 0.05 levels. The adjusted mean of Speed of Plyometric Training (Group A), Circuit Training (Group B), And Circuit Breaker Programme (Group C) and Control group (Group D) are 7.094, 7.128, 7.230 and 7.758 respectively. The calculated F-value of adjusted mean is 16.900, which is significant at 0.05 levels. As the value of calculated ANCOVA is significant, the LSD post-hoc test was used.

The adjusted mean difference between of Plyometric Training (Group A) and Circuit Training (Group B) is 0.034 which is not greater than critical difference i.e. 0.210. The adjusted mean difference between of Plyometric Training (Group A) and Circuit Breaker Programme (Group C) is 0.136 which is not greater than critical difference i.e. 0.210. The adjusted mean difference between of Circuit Training (Group B) and Circuit Breaker Programme (Group C) is 0.102 which is not greater than critical difference i.e. 0.210. While The adjusted mean difference between of Plyometric Training (Group A) and Control group (Group D) is 0.664, The adjusted mean difference between of Circuit Training (Group B) and Control group (Group D) is 0.630, The adjusted mean difference between of Circuit Breaker Programme (Group C) and

Control group (Group D) is 0.528, which were significant than the CD i.e. 0.210.

The overall analysis revealed that all the three experimental programmes of 12 weeks duration are effective in positively improving most of the physiological variables and motor components of the subjects. In speed and strength variables Plyometric, Circuit and Circuit Breaker programme were better than the circuit training group. The three training programmes had an almost equal effect on the experimental groups with respect to other variables. In all the variables experimental groups exhibited better performance as compared to the control group.

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