# EFFECTS OF PLYOMETRIC TRAINING WITH AND WITHOUT ANKLE WEIGHT ON POWER PARAMETERS OF KABADDI PLAYERS

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## Abstract

*The purpose of this study was to find out the effects of plyometric training with and without ankle weight on power parameters of kabaddi players .To achieve the purpose of the study, ninety college women kabaddi players were randomly selected from Bharathidasan University Department and afflicted colleges of Bharathidasan. University, Tiruchirappalli, India. Their age ranged from 18 to 25years. They were divided into three equal groups. The group I was considered as plyometric with ankle weight training group and group II considered as plyometric without and group III considered as control group. The investigator did not made any attempt to equate the group. Both the experimental groups were given respective training for five days per week. The experimental groups were given training for the period of twelve weeks of plyometric training with and without ankle weight* . Leg explosive strength *was assessed by* Standing Broad jump *and unit of measure was* In meters. *The collected data on power parameters was analyzed by analysis of covariance. at 0.05 level of confidence. The result of the present study explored that the, agility and Standing Broad jump significantly improved due to the effect of plyomertic training with and without ankle weight on power parameters of kabaddi players. Further it speculated that the plyometric*

*with ankle weight training produces better improvement when compared with plyometric training without ankle weight training group and control group.*

**Key notes: plyometric with ankle weight training, leg explosive power and kabaddi players.**

## INTRODUCTION

Weight training, also known as weight training or strength training, is for everyone. It is an important tool for achieving a complete healthy life. Weight training is not only for athletes, but also for those who want to build or tone muscle, or those who are using weight training to achieve a better looking body. One may also hear the terms weight training (or weight lifting) and strength training used to describe working the muscles with resistance. weight training is the term used to describe using weights, machines, and even one's own bodyweight to effectively work one's muscles. It is an umbrella term used to accurately describe all forms of weight training, whether working with weights or not. Although strength training accurately describes what weight training does, many people do not use the term because they think it only applies to those trying to become bigger and stronger when, in fact, all weight training which is correctly done indeed increases strength, but does not necessary visibly increase size. Weight training does improve the look and tone of the body but it is now known to be more than just a specialized exercise activity. Weight training environment involves numerous types of equipment to improve variety in a health-club of physical capacities - from improving daily movement to enhancing performance or changing appearance. In particular, weight training improves the functional performance of the neuromuscular system - the system of muscles and nerve pathways that direct and control movement. Weight training produces increased strength, superior movement performance and general fitness, including enhanced function of the respiratory, cardiac and metabolic systems. Other improvements include an increase in muscle mass, strengthening of connective tissue and supportive tissue as well as improvements in posture and physique. Weight training has many psychological benefits as well. It can boost self-confidence, increase motivation, enhance perseverance and produce a strong commitment to fitness. Serious athletes do not

need reminding of the importance of integrating weight training into their year-round conditioning regimes. They know there's no quicker way to significantly boost their levels of strength, speed – and even their endurance.

Ankle weight are a convenient and cheap method of adding resistance to your leg and abdominal workout resistance training also know as strength or weight training is an external part any exercise region. Ankle weights are commonly used during a variety of exercises with the goal of enhancing the benefits of the workout. While there are certainly benefits to the use of these training aids, their advantages are limited to certain targeted areas. Some of the more common uses of ankle weights may actually hurt rather than help. Ankle weights do make the large muscles of the lower body, such as quads, gluteus and hamstrings, work harder to perform exercises that you normally do. Used as part of your strength training program, they can be an effective tool. For those who may not have access to free weights or machines to build strength, they can be a helpful addition to that part of your workout. Going out and buying ankle weights to enhance your exercise routine is one option for building strength, but it does come with potential negatives. To improve the quality of a cardiovascular program, there are other options out there. Running or walking up and down stairs, or taking your jog to an area where there are hills to run are both solid options for providing the additional challenge you seek. The main benefit derived from the use of ankle weights comes when they are used for strength training targeted at the larger muscles of the legs. For someone who is performing leg lifts or knee raises of different kinds for the purpose of strengthening the lower body, ankle weights work like free weights for the legs. Even at two or five pounds, there is a tangible benefit to the leg muscles when adding weight to those exercises.

## METHODOLOGY

The purpose of this study was to find out the effects of plyomertic training with and without ankle weight on power parameters of kabaddi players .To achieve the purpose of the study, ninety college women kabaddi players were randomly selected from Bharathidasan University Department and afflicted colleges of Bharathidasan. University, Tiruchirappalli, India. The group I was considered as plyometric with ankle weight training group and group II considered as plyometric without and group III considered as control group. The

investigator did not made any attempt to equate the group. Both the experimental groups were given respective training for five days per week. The experimental groups were given training for the period of twelve weeks of plyometric training with and without ankle weight.

**DESIGN**

The evaluated power parameters, Leg explosive strength was assessed by Standing Broad jump and unit of measure was In meters The parameters were measured at baseline and after 12 weeks of plyometric training with and without ankle weight training.

**TRAINING PROGRAMME**

The training program was lasted for 45 minutes per session in a day, 5days in a week for a period of twelve weeks duration. This 45 minutes included 5 minutes warm up and 5 minutes warm down remaining 35 minutes allotted for training programme. Every two weeks of training 5% of intensity was increased from 65% to 75% of work load. The training load was increased from the maximum working capacity of the effect of plyometric training with and without ankle weight training was analyzed by using analysis of co variance to find out the significant improvement between pre and post. In all cases the criterion for statistical significance was set at if 0.05 level of confidence ($P< 0.05$).

**EXPERIMENTAL DESIGN**

The random group design was employed in this study. The selected subjects were divided into two groups, namely experimental group I and experimental group II and control group. Each group consists of 30 subjects. The treatment was administered to all the groups for a period of twelve weeks. At the end of $12^{th}$ week post test were administered to both the groups.

The collected data on physical variables due to the effect of with and without ankle weight training was analyzed by computing mean and standard deviation and analysis of co variance. 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.

**Table 1**

**Computation of 't' ratio on leg power of plyometric training with ankle weight training group (ptwawtg), plyometric training without ankle weight training group (ptwoawtg) and control group**

**(Scores in centimeters)**

| Groups | Pre – test mean | Pre – test S. D (±) | Post - test mean | Post – test S. D (±) | 't' ratio |
|---|---|---|---|---|---|
| plyometric training with ankle weight training group (PTWAWTG), | 543.40 | 4.58 | 635.03 | 26.34 | 18.89* |
| plyometric training without ankle weight training group (PTWOAWTG) | 542.73 | 6.46 | 574.73 | 12.81 | 17.58* |
| Control group(CG) | 543.46 | 4.42 | 543.00 | 5.07 | 0.40 |

*Significant at 0.05 level for the degrees of freedom (1 and 29), 2.045

Table 1. shows that the't' ratios on leg power of PTWAWTG and PTWOAWTG were 18.89* and 17.58* respectively. Since, these values were higher than the required table value of 2.045, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 29. Further, the obtained't' ratio between pre and post test of the control group 0.404 was lesser than the required table value of 2.045, and it was found to be not statistically significant.

From the results it was inferred that, PTWOAWTG and PTWOAWTG produced significant improvement in the leg power of kabaddi players.

**Table -II**

**Analysis of covariance on pre, post and adjusted post test means on leg power of plyometric training with ankle weight training group (PTWAWTG), plyometric training without ankle weight training group (PTWOAWTG) and control group**

**(Scores in centimeters)**

| Test | plyometric training with ankle weight training group (PTWAWTG) | plyometric training without ankle weight training group (PTWOAWTG) | Control group (CG) | Source of variance | df | Sum of squares | Mean square | F-ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-test mean | 543.40 | 542.73 | 543.20 | B.G | 2 | 9.86 | 4.93 | 0.18 |
| | | | | W.G | 87 | 2390.53 | 27.47 | |
| Post-test mean | 635.03 | 574.73 | 543.00 | B.G | 2 | 131132.28 | 65566.14 | 222.41* |
| | | | | W.G | 87 | 25646.83 | 294.79 | |
| Adjusted post-test mean | 634.88 | 575.07 | 542.80 | B.G | 2 | 130973.60 | 65486.80 | 231.42* |
| | | | | W.G | 86 | 24335.59 | 282.97 | |

*Significant at 0.05 level for the degrees of freedom (2, 87) and (2, 86), 3.10

Table 2 reveals the computation of 'F' ratios on pre test, post test and adjusted post test means of PTWAWTG, PTWOAWTG and CG on leg power.

The obtained 'F' ratio for the pre test means of PTWAWTG, PTWOAWTG and CG on leg power was 0.180. Since, the 'F' value was less than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be not significant at 0.05 level of confidence.

Further, the ‘F’ ratio for post test means of PTWAWTG, PTWOAWTG and CG on leg power was 222.416. Since, the ‘F’ value was higher than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be statistically significant at 0.05 level of confidence.

The obtained ‘F’ ratio for the adjusted post test means of PTWAWTG, PTWOAWTG and CG on leg power was 231.425.Since, the ‘F’ value was higher than the required table value of 3.10 for the degrees of freedom 2 and 86, it was found to be statistically significant at 0.05 level of confidence. The results revealed that there was a significant difference in post-test means among PTWAWTG, PTWOAWTG and CG on leg power of kabaddi players.

**Table- III**

**Scheffee's post hoc test for the differences between the paired adjusted post-test means of leg power**

| plyometric training with ankle weight training group (PTWAWTG) | plyometric training without ankle weight training group (PTWOAWTG) | Control group (CG) | Mean difference | Confidence Interval |
|---|---|---|---|---|
| 634.88 | - | 542.80 | 92.08* | 12.32 |
| 634.88 | 575.07 | - | 59.80* | |
| - | 575.07 | 542.80 | 32.27* | |

*Significant at 0.05 level

Table 3 revealed that the mean differences between the paired adjusted post test means of all groups.

The mean difference between PTWAWTG and CG, PTWAWTG and PTWOAWTG and PTWOAWTG and CG were 92.083, 59.806 and 32.276 respectively. The values of mean difference of adjusted post test means were higher than confidence interval value of 12.32 and it is found to be statistically significant at 0.05 level of confidence.

From these results it was inferred that twelve weeks of PTWAWTG produced significant improvement in leg power of kabaddi players than PTWOAWTG and CG groups.

Mean values of pre, post and adjusted post test of PTWAWTG and CG, PTWOAWTG and CG on leg power was presented in figure 1

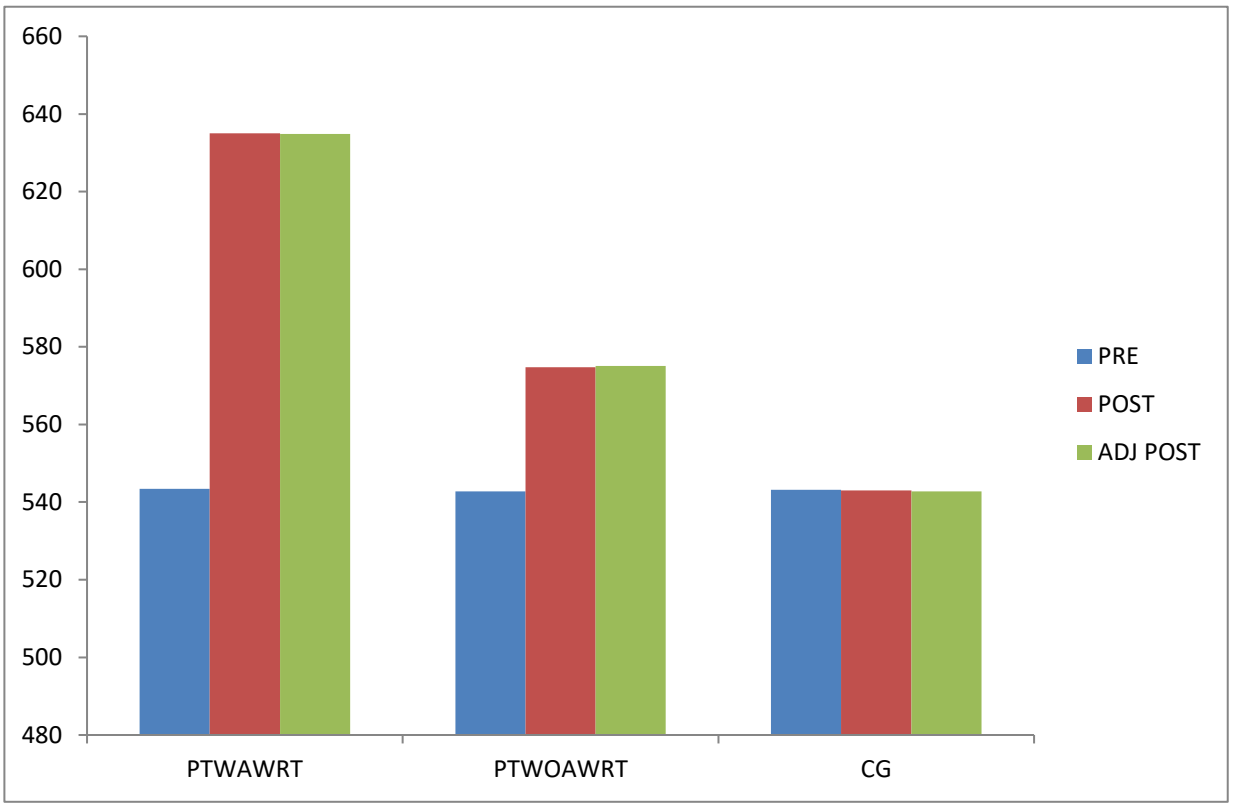


**Figure – 1**

**Bar diagram showing pre, post and adjusted post test means of leg power of plyometric training with ankle weight training group (PTWAWTG), plyometric training without ankle weight training group (PTWOAWTG) and control group**

**(Scores in centimeters)**

**Table -IV**

**Computation of 't' ratio on anaerobic power of plyometric training with ankle weight training group (PTWAWTG), plyometric training without ankle weight training group (PTWOAWTG)and control group**

**(Scores in kg / Mtr / seconds)**

| Groups | Pre – test mean | Pre – test S. D (±) | Post - test mean | Post – test S. D (±) | 't' ratio |
|---|---|---|---|---|---|
| plyometric training with ankle weight training group (PTWAWTG), | 413.24 | 56.82 | 518.58 | 72.58 | 7.55* |
| plyometric training without ankle weight training group (PTWOAWTG) | 414.23 | 56.24 | 454.69 | 55.17 | 30.55* |
| Control group(CG) | 407.00 | 55.73 | 406.46 | 56.037 | 0.10 |

*Significant at 0.05 level for the degrees of freedom (1 and 29), 2.045

Table 4 shows that the 't' ratio on anaerobic power of PTWAWTG and PTWOAWTG were 7.553 and 30.556 respectively. Since, these values were higher than the required table value of 2.045, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 29. Further, the obtained't' ratio between pre and post test of the control group 0.109 was lesser than the required table value of 2.045, and it was found to be not statistically significant.

From the results it was inferred that, combinations of PTWAWTG and PTWOAWTG produced significant improvement on anaerobic power of kabaddi players.

**Table-V**

**Analysis of covariance on pre, post and adjusted post test means on anaerobic power of plyometric training with ankle weight training group (PTWAWTG), plyometric training without ankle weight training group (PTWOAWTG) and control group**

**(Scores in kg / Mtr / seconds)**

| Test | plyometric training with ankle weight training group (PTWAWTG) | plyometric training without ankle weight training group (PTWOAWTG) | Control group (CG) | Source of variance | df | Sum of squares | Mean square | F-ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-test mean | 413.24 | 414.23 | 407.00 | B.G | 2 | 920.25 | 460.12 | 0.14 |
| | | | | W.G | 87 | 275445.69 | 3166.04 | |
| Post-test mean | 518.58 | 454.6 | 406.46 | B.G | 2 | 189777.31 | 94888.65 | 24.85* |
| | | | | W.G | 87 | 332111.94 | 3817.37 | |
| Adjusted post-test | 517.26 | 452.63 | 409.85 | B.G | 2 | 175145.77 | 87572.88 | 42.92* |
| | | | | W.G | 86 | 175466.54 | 2040.30 | |

*Significant at 0.05 level for the degrees of freedom (2, 87) and (2, 86), 3.10

Table 5 reveals the computation of 'F' ratios on pre test, post test and adjusted post test means of PTWAWTG, PTWOAWTG and CG on anaerobic power.

The obtained 'F' ratio for the pre test means of PTWAWTG, PTWOAWTG and CG on anaerobic power was 0.145 Since, the 'F' value was less than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be not significant at 0.05 level of confidence.

Further, the 'F' ratio for post test means of MPTPG, PTWAWTG, PTWOAWTG and CG on anaerobic power was 24.857. Since, the 'F' value was higher than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be statistically significant at 0.05 level of confidence.

The obtained 'F' ratio for the adjusted post test means of PTWAWTG, PTWOAWTG and CG on anaerobic power was 42.921.Since, the 'F' value was higher than the required table value of 3.10 for the degrees of freedom 2 and 86, it was found to be statistically significant at 0.05 level of confidence. The results revealed that there was a significant difference in post-test means among PTWAWTG, PTWOAWTG and CG on anaerobic power of kabaddi players.

**Table VI**

**Scheffee's post hoc test for the differences between the paired adjusted post-test means of anaerobic power**

| plyometric training with ankle weight training group (PTWAWTG) | plyometric training without ankle weight training group (PTWOAWTG) | Control group (CG) | Mean difference | Confidence Interval |
|---|---|---|---|---|
| 517.26 | - | 409.85 | 107.41* | 33.07 |
| 517.26 | 452.63 | - | 64.63* | |
| - | 452.63 | 409.85 | 42.78* | |

*Significant at 0.05 level.

Table 6 revealed that the mean differences between the paired adjusted post test means of all groups.

The mean difference between PTWAWTG and CG, PTWAWTG and PTWOAWTG and PTWOAWTG and CG were107.413, 64.631 and 42.782 respectively. The values of mean difference were higher than confidence interval value of 33.07. It is found to be statistically significant at 0.05 level of confidence.

From these results it was inferred that PTWAWTG produced significant improvement in anaerobic power of kabaddi players than PTWOAWTG training and CG groups.

Mean values of pre, post and adjusted post test of PTWAWTG and PTWOAWTG and CG on anaerobic power was presented in figure 2

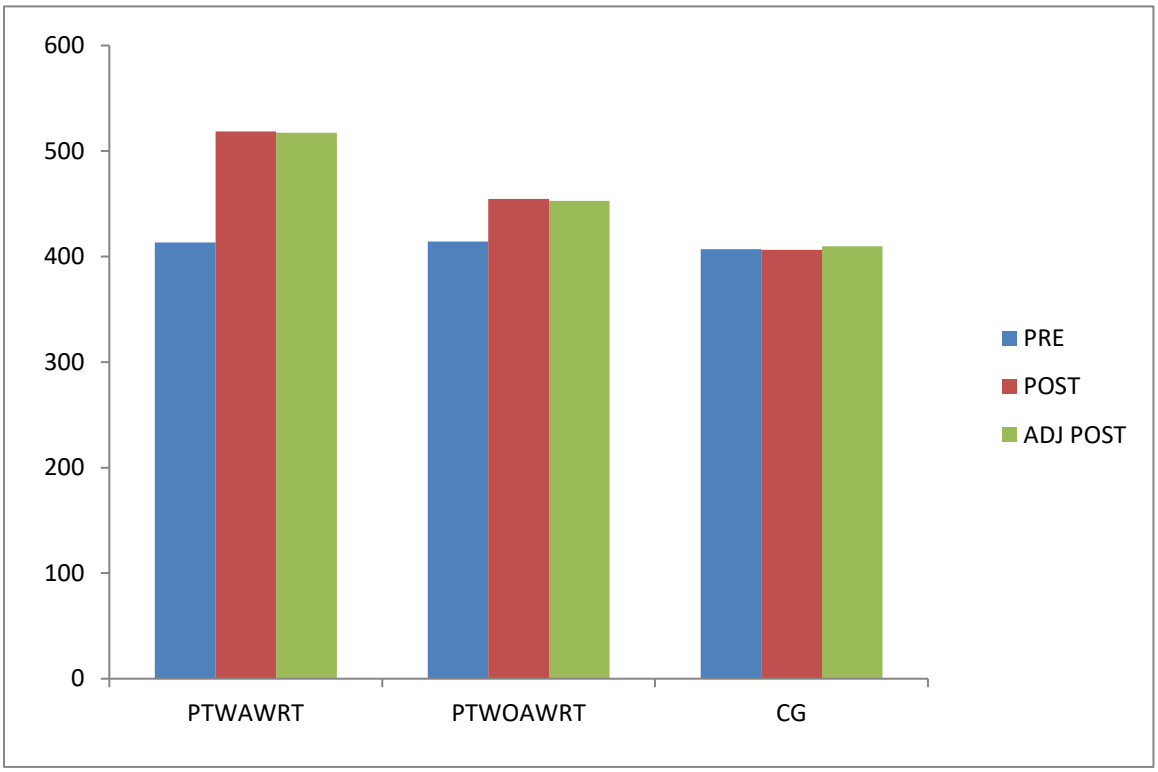


**Figure – 2**

**Bar diagram showing pre, post and adjusted post test means of anaerobic power of plyometric with ankle weight training (PTWAWTG)and plyometric with ankle weight training (PTWOAWTG) and control group**

**(Scores in kg / Mtr / seconds)**

## DISCUSSION ON FINDINGS

The present study experimented the effects of plyometric with and without ankle weight training on power parameters of kabaddi players.

The result of this study indicated that without ankle weight training improved the leg explosive power and anaerobic power of kabaddi players. Further, a significant improvement was observed over leg explosive strength and anaerobic power due to the influence of plyometric training with ankle weight training.

It was also observed that there was a significant improvement in leg explosive strength and anaerobic power of kabaddi players due to plyometric with ankle weight training.

The findings of the present study had similarity with the findings of the investigations referred in this study.

**Buchheit (2010)** suggested that substantiate the deficits of strength, proprioception, balance and functionality in recreational athletes with FAI. The isokinetic exercise program used in this study had a positive effect on these parameters. **Jullien, (2008)** indicated that our results indicate that in the short sprints or shuttle sprint with changes in direction, lower limb strengthening did not improve performance. **Kaminski.,*et.al* (2002)** studied the effect of strength and proprioception training on eversion to inversion strength ratios in subjects with unilateral functional ankle instability. **Alegre.,*et.al* (2007)** examined the effectiveness of ankle taping on the limitation of forced supination during a change of direction, as well as the losses of effectiveness after a 30-minute training session. **Edward, *et.al* (1996)** studied the Neuromuscular Adaptations in Isokinetic, Isotonic, and Agility Training Programs. Weight training is an integral part of most athletic con ditioning programs; yet, the effect of these programs on neuromuscular function remains unclear. **Khan.,*et.al* (2004)** compared the effectiveness of group resistance and agility-training programs in reducing fall risk in community-dwelling older women with low bone mass. **Dwyer., *et.al* (2002)** studied the Rehabilitation of the Ankle After Acute Sprain or Chronic Instability . **UfukSekir. (2003)** The purpose of this study was to investigate the effects of isokinetic exercise on strength,

joint position sense and functionality in recreational athletes with functional ankle instability (FAI). **Jullien., et.al (2008)** studied the A Short Period of Lower Limb Strength Training Improve Performance in Field-Based Tests of Running and Agility in Young Professional Soccer Players. **Wimmer*et al* (2011)** studied the Speed Training Drills with Ankle Weights. Training with a string ladder wearing ankle weights will help improve foot speed and agility. **Saltzman, *et al* (2004)** studied the effect of Agility Ankle Prosthesis Misalignment on the Peri-Ankle Ligaments In the Agility total ankle replacement system, motion is constrained by the implant's articulating surfaces and the peri-ankle ligaments. The results of the present study indicates that plyometric with and without ankle weight training programme are effective method to improve leg explosive strength and anaerobic capacity of Kabaddi players.

## CONCLUSIONS

Based on the results of the study, the following conclusions have been arrived.

1. It was concluded that the twelve weeks of plyometric with and without ankle weight training improved leg explosive strength of kabaddi players.

2. There was significant improvement over aerobic capacity due to the effect of plyometric with and without ankle weight training of kabaddi players.

3. Plyometric with and without ankle weight training for a period of twelve weeks was found to be the most appropriate protocol to produce significant changes over leg explosive power and anaerobic capacity of kabaddi players.

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