

CALF MUSCLE CIRCUMFERENCE: ON BASKETBALL PLAYERS

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Abstract:

Purpose of the study

The purpose of this study was to determine the effects of Plyometrics exercise on Calf muscle circumference of Collegiate Basketball players.

Target Population:

Total 60 Basketball considered as an experimental group and 60 Basketball considered control group for the present study. The experimental group was given the Plyometrics training and no training was given to the control group.

Training Program

The duration of training program was six weeks. The training was administrated on alternative days i.e. four days per week. The data was collected before and at the end of six weeks training program, with the help of steel tape. The criterion measures were recorded in centimeters.

Results

To find out the significant effect of Plyometrics training on the Calf muscle circumference t-test was employed and mean difference between pretest and posttest of experimental group and control group was determined. Results of this study showed significant effect of Plyometrics training on Calf muscle circumference was found.

I. INTRODUCTION

The calf (Latin: sura) refers to the posterior portion of the lower leg. The two largest muscles in this region include the gastrocnemius and the soleus. The gastrocnemius is the most superficial of the muscles and has two heads, medial and lateral (Justin et al 2022). Calf circumference also provides information about normal muscle mass. It can reflect a decrease in muscle mass with limited physical activity.

A result of more than 31 cm is considered normal (Tsai et al., 2008). Plyometrics are any exercises that include explosive movements: moves like burpees, jump lunges, mountain climbers, and box jumps. Plyometrics exercises are extremely effective. However, this does not mean that more is better. On the contrary, low frequency (2-3 sessions per week) and low volume (3-6 sets of 2-5 repetitions) are most appropriate. Plyometrics involve jumping and therefore contribute to an increased jump height, as well improved durability through the lower body. When incorporating Plyometrics exercises into training, it is important to appreciate proper technique and progression in order to maximize their effectiveness. (<https://www.breakthroughbasketball.com/fitness/plyo-exercises.html>). Plyometrics tone the entire body, burn calories, and improve cardiovascular health.

They also boost your stamina and metabolism. In addition, Plyometrics exercises rapidly stretch your muscles, allowing you to move more efficiently (<https://www.healthline.com/health/exercise-fitness/Plyometrics-exercises#benefits>). Plyometrics exercises is also help to prevent the injuries. Plyometrics training is often considered the missing link between strength and return to performance (<https://www.healthline.com/health/exercise-fitness/Plyometrics-exercises>). There are many benefits to doing Plyometrics exercises. Since they require little to no equipment, they can be done anytime, anywhere. Plyometrics training increases muscle strength, which allows you to run faster, jump higher, and change direction quickly. They improve performance in any sport that involves running, jumping, or kicking (<https://www.healthline.com/health/exercise-fitness/Plyometrics-exercises>). Plyometrics training really focuses on increasing strength and efficiency of fast twitch muscle fibers. Plyometrics regularly can result in both strength and speed gains, without ever touching a weight

II. METHODS

The method of sample was purposive –A non-random method of sampling design for students with a specific purpose. The study depends mainly on primary source of data. Two groups were targeted as experimental and control group. The 60 collegiate students will be considered as experimental group and 60 physical education students will be considered as control group. The Training will be given to the experimental groups only. The Universe of the study will be basketball players who have been studying in college in Nanded city (MS).

Calf muscle circumference Measurement:

The circumference of calf muscle was obtained in standing position. The steel tape was wrapped horizontally around the naked lower leg of the subject at the maximal budge of the calf muscle. With slight up and down movements of the steel tape keeping it in a horizontal direction, the maximal circumference entail measurement gave the value of calf muscle circumference and was measured to the nearest 0.1 cm. The subject were asked to stand at ease with equal weight on both the feet.

All the participants was performed the training program at Nanded. After pretest, the subjects of experimental group participated in orientation about the training program during this orientation the subjects were given knowledge of each exercise by research scholar. The exercises was explained and demonstration to the participants and then participant will be required to perform each exercise to check the technique issues and address the questions.

Description of training program:

The training program was performed by the subjects on Monday, Wednesday and Friday and Saturday. Before starting the exercising the subjects performed warming up by doing 5-10 minutes cardio followed by stretching. The training equipment's will be free weights and machines.

The number of sets per exercise was 3 and the numbers of repetitions for each exercise will be different in various exercises. The weight used for each set was 60% to 70% of 1-repetition maximum comfortably lifted by the subjects. To the level of significance was setup at 0.05 level which was considered adequate and reliable for the purpose of this study.

Results and discussion:

The mean, standard deviation and t value analyzed each dependent variable separately. For the sake of convince and methodical presentation of results, following order has been adopted:

Table- I Mean Scores, Standard deviation and t-ratio of Calf muscle circumference of control groups.

S.No.	Parameter	Test	No.	Mean scores	S.D.	t-ratio
1.	Calf muscle circumference	Pre-test	60	31.24	3.34	1.66 NS
		Post-test	60	31.35	3.41	

Table-1 Shows the **Mean Scores, Standard deviation and t-ratio of Calf muscle circumference** of control groups.

Figure-1 illustrates the Mean Scores and Standard deviation of Calf muscle circumference of control groups

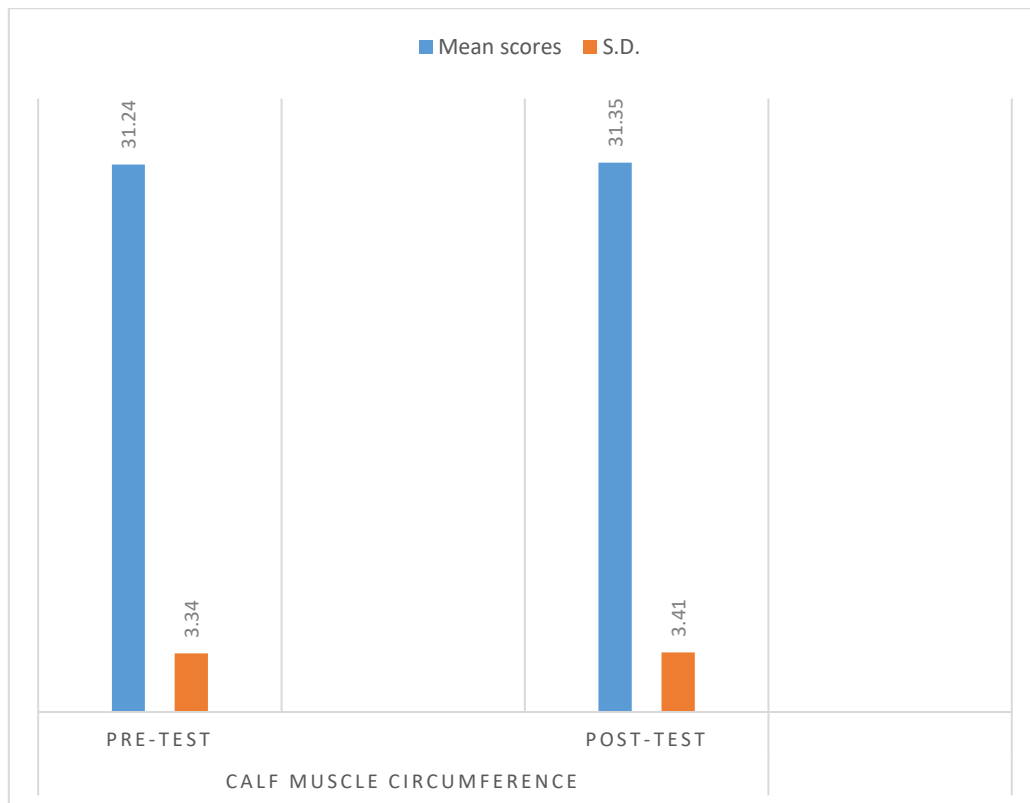


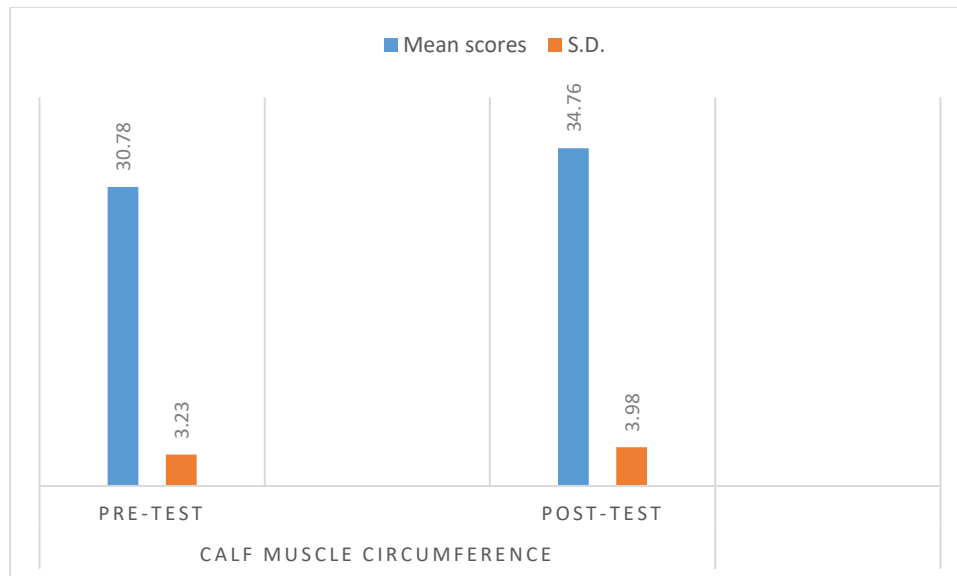
Table -2 Mean Scores, Standard deviation, and t-ratio of Calf muscle circumference of experimental group.

S.No.	Parameter	Test	No.	Mean scores	S.D.	t-ratio
1.	Calf muscle circumference	Pre-test	60	30.78	3.23	3.55*
		Post-test	60	34.76	3.98	

*= Significant.

Table-2 Shows the Mean Scores, Standard deviation and t-ratio of Calf muscle circumference of Experimental group.

Figure-2 Illustrates the Mean Scores and Standard deviation of Calf muscle circumference of Experimental group



III. DISCUSSION

Great improvements can be made for basketball players by implementing a Plyometrics workout (Stein, 2008). Adding Plyometrics to a training program produces gains in explosiveness, as well as foot speed, quickness, power, agility and overall speed (Asp, 2007). With regards to Calf muscle circumference of pre and post-test of control group they have obtained the mean value of 31.24 and 31.35 respectively. Whereas, control group obtained the Standard deviation for Calf muscle circumference were 3.34 (Pre-test) and 3.41 (Post-test) respectively. The findings of the study shows no significant difference of pre and post were found in Calf muscle circumference of control group. With regards to Calf muscle circumference of pre and post test of experimental group they have obtained the mean value of 30.78 and 34.76 respectively. Whereas, control group obtained the Standard deviation for Calf muscle circumference were 3.23 (Pre-test) and 3.98 (Post-test) respectively. The results of the study show significant difference of pre and post were found in Calf muscle circumference of experimental group. The study found that, there were significant effects found of Plyometrics exercise on Calf muscle circumference among Basketball Players. Success in many sports depends greatly upon the athlete's explosive leg power and the overall strength of their muscles. Increasing power gives an athlete the potential to improve their performance in sports where speed and strength is sought (Rahimi & Behpur, 2005). Rodrigo et.al (2022) found that, Plyometrics jump training improves jumping performance, linear sprint speed, change-of-direction speed, balance, and muscle strength in basketball players, regardless of sex and age. Research has demonstrated that Plyometrics training has transferred over well to sport by improving one's jump height, sprint time, and change of direction.(<https://thebasketballdoctors.com/Plyometrics-training-for-basketball-purpose-common-mistakes>).

REFERENCES

- [1] Berger R. A. "Comparison of the effect of various weight training loads on strength", Research Quarterly. Vol.36, No. 6 1965.
- [2] Carpinett R.N. "The Effect of Varied Weight Training Programmes on Strength", Vol. 46, 2003.
- [3] Chuie E.F., "Effect of isometric and dynamic weight training exercise upon strength and speed of movement", Research Quarterly, Vol. 33, No.9, 1964.
- [4] Kansal D. et.al., "Anthropometric study of University Volleyball and football players", Research Bio-Annual for Movement, Vol. 6, No. 1 1987.
- [5] Lawton T. W., et., al., "Effect of Interrepetition Rest Intervals on Weight Training Repetition Power Output", Journal of Strength and Conditioning Research ,Vol. 20, No. 1, 2006.
- [6] Morrow, J.R. et. al., "Anthropometric strength and performance characteristics of American World Class Throwers", Sports Medicine and Physical fitness, Vol. 22, No. 1, 1982.

- [7] Rahimi, R. “ Effect of moderate and high intensity weight training on the body composition of overweight Men”. Facta Un4ersitatis Series Physical Education and Sport , Vol. 4, No. 2, 2006.
- [8] Rahimi R. and Behpur N. “The effects of Plyometrics, weight and Plyometrics-weight training on anaerobic power and muscular strength”. Facta Un4ersitatis Series Physical Education and Sport , Vol. 3, No. 1, 2005.
- [9] Reid C. M., et. al., “Weight training and strength, cardiorespiratory functioning and body composition of men” British Journal of Sports Medicine. Vol. 21, No.1, 1987.
- [10] Sharma and Pal “Comparison of selected anthropometric measurements and motor fitness of mangolians and non-mangolians”, Research Bi-annual for movement, Vol. 7, No. 2, 1989.
- [11] Staron R. S. et. al., “Skeletal muscle adaptations during the early phase of heavy-resistance training in men and women”. Journal of Applied Physiology, 1994, Pp 463-475.
- [12] Steensland, Evan L., "The relative effect of weight training and weight lifting on the development of strength and endurance in University of Washington males", Completed Research in Health, Physical Education and Recreation, 1967.
- [13] Sydney D. and Connell M., "The effect of weight training compared with the effects of dynamic tension on the development of strength and motor ability", Completed Research in Health Physical Education and Recreation , 1963.
- [14] Yaprak Y. et. al., “The Effects of Upper Body Muscle Strength Training on Anthropometric Measurements and Cardiopulmonary Function in Obese Women”. Journal of Physical Therapy Science , Vol. 22, No. 2, 2010.
- [15] [https://www.ncbi.nlm.nih.gov/books/NBK459362/#:~:text=The%20calf%20\(Latin%3A%20sura\),two%20heads%2C%20medial%20and%20lateral.](https://www.ncbi.nlm.nih.gov/books/NBK459362/#:~:text=The%20calf%20(Latin%3A%20sura),two%20heads%2C%20medial%20and%20lateral.)
- [16] [https://www.nfhs.org/articles/using-Plyometricss-for-basketball-pre-season-conditioning/#:~:text=Great%20improvements%20can%20be%20made,speed%20\(Asp%2C%202007\).](https://www.nfhs.org/articles/using-Plyometricss-for-basketball-pre-season-conditioning/#:~:text=Great%20improvements%20can%20be%20made,speed%20(Asp%2C%202007).)
- [17] <https://www.sciencedirect.com/science/article/pii/S2095254620301691#:~:text=Plyometrics%20jump%20training%20improves%20jumping,regardless%20of%20sex%20and%20age.>