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Influence of Six Weeks of Weight Training on Volleyball Players' Strength and Muscular Endurance

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ABSTRACT

The primary aim of this research was to assess the impact of weight training on the muscular endurance of volleyball players. Additionally, the study sought to evaluate the influence of weight training on the strength of volleyball players. It was hypothesized that there would be no significant effect of the selected weight training exercises on the strength of volleyball players. Similarly, it was hypothesized that there would be no significant impact of weight training on the endurance of volleyball players. The study involved 40 male volleyball players. The participants' ages ranged between 17 and 24 years. The training period lasted six weeks, with sessions held six days a week. The participants were selected from the Guru Kashi University Talwandi Sabo Bathinda Punjab India. The variables under consideration were, Sit-ups with bent knees (Muscular Strength) and Push-ups (Muscular Endurance). The data for this study were gathered from 40 volleyball players based in Guru Kashi University Talwandi Sabo Bathinda Punjab India. A total of 40 male volleyball players were chosen using a simple random sampling technique, with their ages ranging from 17 to 24 years. The following tests were administered to gather data for the study, Sit-ups with bent knees were used to measure muscular strength and Push-ups were employed to assess muscular endurance. A simple random design was applied in this study, with the experimental treatments assigned randomly to the participants. The training program lasted for six weeks, with sessions occurring six days a week. No specific training protocol was provided to the control group. The required data were collected by administering the tests designed to measure the selected variables. Prior to the data collection, the subjects were given an opportunity to practice the prescribed tests, ensuring they were familiar with the procedures and understood what was expected of them.

Keywords: Weight training, Volleyball, Strength and Muscular Endurance

Introduction

Weight training exercises are a form of strength training where gravity is used to enhance muscle strength. This is typically done using equipment like dumbbells, barbells, or gym machines. Weight training is one of the most effective ways to develop the strength and size of skeletal muscles. It works by opposing the force generated by the muscles during concentric or eccentric contractions, utilizing various specialized equipment to target different muscle groups and movements. Sports where strength training is essential include bodybuilding, weightlifting, powerlifting, and strongman competitions, as well as events like the shot put, discus, and javelin throws. Many other sports, such as football, wrestling, rugby, track and field, rowing, lacrosse, basketball, and hockey, also incorporate strength training into their training regimens. The popularity of strength training in sports and other physical activities is steadily growing.

Another early strength training device was the Indian club, which originated in Persia and was called the "meels." It gained popularity in the 19th century and has recently made a resurgence in the form of club bells. In the 1960s, exercise machines began to be introduced into strength training gyms, making weight training more accessible. The 1970s saw a rise in its popularity, thanks to the release of the bodybuilding film *Pumping Iron* and the fame of Arnold Schwarzenegger. Since the late 1990s, more women have started weight training, with programs like *Body for Life* contributing to the trend. Today, nearly one in five women in the U.S. regularly engages in weight training.

The fundamental principles of weight training align with those of strength training, with the key elements being the manipulation of repetitions (reps), sets, tempo, exercise types, and the amount of weight lifted. The specific combination of these factors depends on the individual's training goals, with lower reps generally requiring heavier weights.

In weight training, the type of equipment used is an additional factor to consider. This includes barbells, dumbbells, pulleys, weight machines, and bodyweight exercises like chin-ups and push-ups. Different equipment provides varying forms of resistance, and the same weight can feel different depending on the equipment used. For instance, lifting 10 kilograms with a dumbbell might require more force than using a weight stack in a machine due to differences in pulley systems or resistance mechanics.

Proper form is crucial in weight training. Performing exercises with correct technique ensures the target muscles are adequately engaged, while using improper form (known as "cheating") can increase the risk of injury or hinder progress. If the muscles are not sufficiently challenged due to poor form,

they won't experience the overload needed to stimulate growth and strength gains. While weight training can lead to injuries if not performed properly, adhering to good form is key to minimizing risks and maximizing results. By focusing on specific muscle groups, you can enhance strength and reduce the potential for injury.

Methodology

Methodology is a crucial component of any research project, often considered the core of the research framework. This chapter outlines the methods used for data collection, subject selection, test selection, and the administration of both the tests and training program. The data for this study were gathered from 40 volleyball players based in Guru Kashi University Talwandi Sabo Bathinda Punjab India. A total of 40 male volleyball players were chosen using a simple random sampling technique, with their ages ranging from 17 to 24 years. The following tests were administered to gather data for the study, Sit-ups with bent knees were used to measure muscular strength and Push-ups were employed to assess muscular endurance. A simple random design was applied in this study, with the experimental treatments assigned randomly to the participants. The training program lasted for six weeks, with sessions occurring six days a week. No specific training protocol was provided to the control group. The required data were collected by administering the tests designed to measure the selected variables. Prior to the data collection, the subjects were given an opportunity to practice the prescribed tests, ensuring they were familiar with the procedures and understood what was expected of them.

Training Program

Week	Exercise After Warm-up	Sets	Recovery	Total Volume
I & II Week	Bench press Pull Ups Push Ups Sit ups Leg Push	1 set of 3 Repetition	In every exercise 1 min rest	**Approx. 30 min**
III & IV Week	Bench press Pull Ups Push Ups Sit ups Leg Push	1 set of 4 Repetition		**Approx. 40 min**
V & VI Week	**Bench press** **Pull Ups** **Push Ups** **Sit ups** **Leg Push**	**1 set of 5 Repetition**		**Approx. 1 Hr 10 min**

The warm-up duration was set to 15 minutes, and the cool-down session lasted for 10 minutes every day. The training program was conducted from Monday to Friday, with complete rest on Saturdays and Sundays. The training regimen spanned over six weeks.

This study aimed to examine the effect of selected weight training exercises on volleyball players. Data was collected from 40 volleyball players, and the 't' test statistical method was used for analysis.

To test the hypotheses, the significance level was established at 0.05, which was deemed appropriate for the current study.

The objective of this study was to assess the impact of a six-week (42 days) weight training program on the muscular strength and endurance of volleyball players. Qualitative data was gathered through three distinct tests for strength, administered to both the control group (N=20) and the experimental group (N=20). The data were then analyzed using the 't' test, comparing the post-test means of both groups to determine any significant differences in the selected variables.

The subjects for this study were selected through a random sampling technique. The significance level for hypothesis testing was set at 0.05, which was considered both adequate and reliable for the purposes of the research.

All data related to this study were analyzed using the 't' test to assess whether there was a statistically significant difference between the pre- and post-test scores of the two groups after completing the six-week weight training program.

Table I Muscular Endurance between Pre and Post Test of Control Group

Control Group	Mean	S.D.	M.D.	O.T.
Pre Test	9.65	1.49	1.15	0.018
Post Test	10.8	1.44		

Table-I reveals that there is no significant difference between means of pre and post-test of control group, because mean of pre-test is 9.65 is slightly less than mean of post-test is 10.8, and their mean difference is 0.018. There was no significant difference between pre and post-test of control group because value of calculated 't' = 0.018 which is less than tabulated 't' =2.093 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of control group.

Table II Muscular endurance between Pre and Post Test of Experimental Group

Experimental Group	Mean	S.D.	M.D.	O.T.
Pre. Test	8.8	1.00	11.55	5.58
Post Test	20.35	1.69		

Table-II reveals that there is significant difference between means of pre and post-test of experimental group, because mean of pre-test is 8.8 is less than mean of post-test which is 20.35, and there mean difference is 11.55, to check the significant difference between pre and post-test of experimental group the data was again analyzed by applying 't' test. There was significant difference between pre and post test of experimental group because value of calculated 't' = 5.58 which is greater than tabulated 't' =2.093 at 0.05 level of confidence, which shows good improvement found in experimental group after six weeks weight training.

Table III Muscular Endurance between Post Test of Control and Experimental Group

Group	Mean	S.D.	M.D.	O.T.
Control	10.8	1.44	9.55	3.54
Experimental	20.35	1.69		

Table-III reveals that there is significant difference between means of post-test of control and experimental group, because mean of post-test of control group is 10.8 is less than mean of post-test of experimental group which is 20.35, and their mean difference is 9.55. To check the significant difference between post-tests of control and experimental group the data was again analyzed by applying 't' test. There was significant difference between post-tests of control and experimental group because value of calculated 't' =3.54 which is greater than tabulated 't' =2.042 at 0.05 level of confidence, which shows improvement in experimental group after six weeks weight training.

Graph I Graphical Representation of Mean Difference between pre and Post Tests of Control and Experimental Group for Muscular Endurance

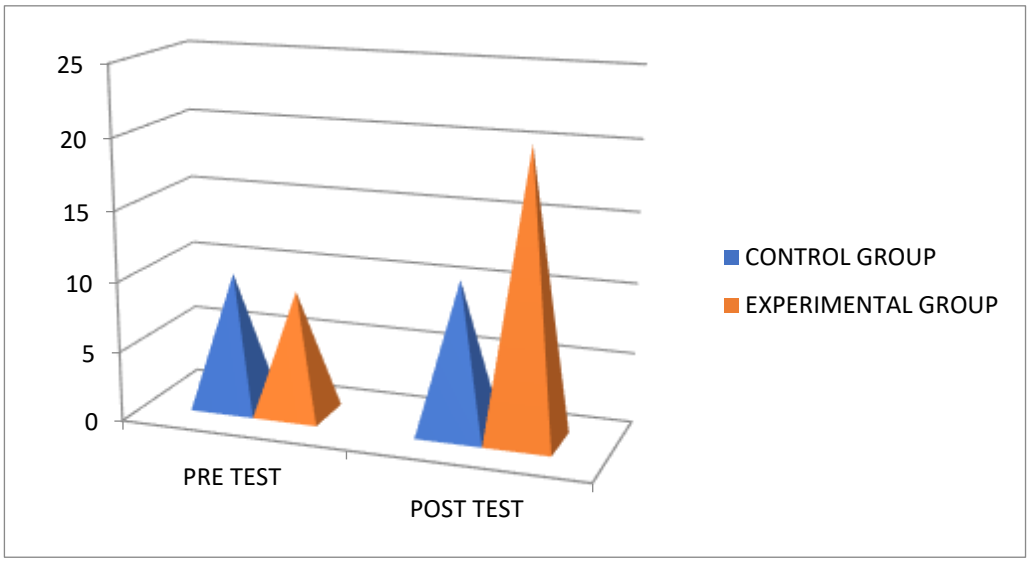


Table IV Muscular Strength between Pre and Post Test of Control Group

Control Group	Mean	S.D.	M.D.	O.T.
Pre Test	**14.55**	**2.502**	**0.40**	**0.599**
Post Test	**14.95**	**2.26**		

Table-VII reveals that there is no significant difference between means of pre-test and post-test of control group, because mean of pre-test is 14.55 which are slightly less than mean of post-test 14.95, and their mean difference is 0.40. To check the significant difference between pre and post-test of control group the data was again analyzed by applying 't' test. There was no significant difference between pre and post-test of control group because value of calculated 't' = 0.599 which is less than tabulated 't' =2.093 at 0.05 level of confidence, which shows no improvement in control group.

Table V Muscular Strength between Pre and Post Test of Experimental Group

Experimental Group	Mean	S.D.	M.D.	O.T.
Pre. Test	**15.9**	**2.97**	**6.45**	**7.02**
Post Test	**22.35**	**2.52**		

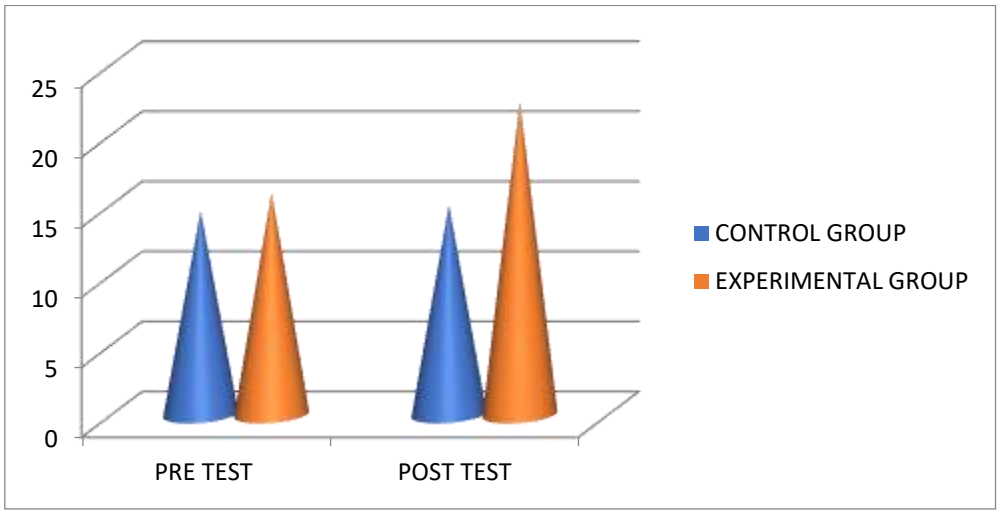
Table-VIII reveals that there is significant difference between means of pre and post-test of experimental group, because mean of pre-test is 15.9 which is less than mean of post-test which is 22.35 and there mean difference is 6.45. To check the significant difference between pre and post-test of experimental group the data was again analyzed by applying 't' test. There was a difference between pre and post-test of control group because value of calculated 't' =7.02 which is greater than tabulated 't' =2.093 at 0.05 level of confidence.

Table VI Muscular Strength between Post Test of Control and Experimental Group

Group	Mean	S.D.	M.D.	O.T.
Control	**14.95**	**2.259**	**7.40**	**6.29**
Experimental	**22.35**	**2.52**		

Table-VI reveals that there is significant difference between means of post-test of control and experimental group, because mean of post-test of control group is 14.95 is less than mean of post-test of experimental group which is 22.35, and there mean difference is 7.40. To check the significant difference between post-tests of control and experimental group the data was again analyzed by applying 't' test. There was significant difference between post-tests of control and experimental group because value of calculated 't' =6.29 which is greater than tabulated 't' =2.042 at 0.05 level of confidence, which shows improvement in experimental group after training programme.

Graph-II Graphical Representation of Mean Difference Between Pre and Post Test of Control and Experimental Group Muscular Strength



Discussion of Findings

The data analysis revealed a notable difference in the results of the same items between the groups after the training program was implemented. Significant improvements were observed in all the selected physical components of the body.

Muscular Strength

The findings indicated substantial improvements both within and between the groups, particularly in muscular strength.

Muscular Endurance

Similarly, the results demonstrated a marked improvement in muscular endurance, both within and between the groups.

Justification of Hypothesis

It was hypothesized that weight training would have a significant effect on selected physical fitness components. The results confirmed that the training had a significant impact on both muscular strength and endurance. Therefore, the hypothesis was accepted at a 0.05 level of significance.

Scientific advancements have greatly influenced the standards of athletic performance. Experts in physiology and sports science believe that an athlete's physiological characteristics play a more significant role in performance than the technical skills or tactics used in sports. Most sports require a combination of strength, agility, and speed, all of which are critical for superior performance. Given this, the researcher chose to focus on the effect of weight training on various physical fitness components.

It was hypothesized that weight training would have a considerable effect on muscular strength and endurance in athletes.

To test this hypothesis, 40 male athletes were selected using a simple random sampling method, with ages ranging from 18 to 25 years. The participants were evenly split into two groups: a control group (N=20) and an experimental group (N=20). The experimental group underwent 42 days of weight training, while no specific training was provided to the control group.

Data were collected before and after the six-week training program by administering relevant tests.

To assess the significant impact of weight training, the mean differences and 't' test were applied to the pre- and post-test scores of both the experimental and control groups. The level of significance was set at 0.05.

Conclusion

Based on the statistical analysis within the constraints of this study, the following conclusion was drawn:

There was a significant effect on both muscular strength and muscular endurance following the six-week weight training program.

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