



ORIGINAL RESEARCH PAPER

Physical Education

EFFECT OF STEP-UPS TRAINING AT AN ACUTE KNEE ANGLE IN FULL SQUAT PERFORMANCE

KEY WORDS: acute angle, full squat, performance,

Dr. Sudip Das

Assistant Professor, Department of Physical Education, Tripura University, Suryamaninagar, Agartala, Tripura, Pin code- 799 022

ABSTRACT

Sport training is a science and act as a vital role in game and sport. Every athlete is trying to get best out of their training. Training is complex in nature and the same training process is not effective for all level of performance. Beginners are different training programme and advanced athletes are different training programme.

Aim: Based on the different aspects of training the current study is employed to identify the effect of step-ups training at an acute knee angle in full squat performance.

Subjects: For the purpose of the study twenty (20) male power lifters were randomly selected from Tripura University and its affiliated colleges of Tripura as treated as subject.

Design: The subjects were randomly divided into two groups i.e. experimental and control group having equal number of subjects. To collection the data for the adjacent examine the step-up test were administrated for eight weeks at an acute knee angle. The pre-test data were collected before the start of experimental treatment and at the end of treatment post-test data were collected. Control group did not participate in the treatment programme.

Statistic: The significance of mean difference between the pre test and post test scores of acute angle "T-test" were implemented and the level of significance was chosen at 0.05 level.

Result: The result of the study showed that the acute angle of step-ups was effective in bringing about significant improvement in the full squat performance.

INTRODUCTION

People get involved in exercise for a number of reasons like to improve their health and physical condition, to achieve a sporting ambition, to relief the tension and stress of daily life, to lose weight and it makes them feel good. Most of the sports require extreme levels of muscular strength and power. Muscle power is the ability of the muscle to do maximum work within the shortest amount of time and the muscle endurance is the ability of the muscle to do moderate work over an extended period of time. Free weights provide a more complete workout. However, they also require more expertise in their use. When lifting free weights like barbells and dumbbells, not only is the prime mover or agonist being worked but all the muscles responsible for stabilizing the joint. As a result is to increase the strength of the stabilizer muscles. Specific strength training is an essential basis of sports development but the method must implement to the specific technique. All most every sports training programme jumping ability is a prime factor for successful performance. As a result of this, it is more important for the coaches to design accurate and precise training drills and activities that will lead towards optimum development in jump performance.

Sports like volleyball, basketball, track & field and other individual sports possess the jumping ability or quickness for gating advantage over their opponents. Strength training has generally accepted as a means of improving performance and preventing the injury. That is the reason most of the sport experts are introduced the strength training is an integral part of their overall training programme including during the off season also. Since performance depends upon explosive strength, speed of movement and anaerobic muscular endurance hence all athletes have to maintain his pre-season strength level during the training season.

In training probably most of the strength forms are involved in weight training. With this method, exercises are designed to strengthen specific muscles by causing them to overcome a fixed resistance. The typical weight training exercises employs an isotonic movement in which force is exerted through a certain range of motion such that the muscle length changes during contraction. Squat is an exercise which consists of squatting all the way down and then rising again to a standing position and step-up is the best way to improve the

squat performance which is also used to assess the cardiovascular recovery capability.

Aim of the Study

The objective of this study was to identify the effect of step-ups training at an acute knee angle in full squat performance.

Hypothesis

It was hypothesized that there might be significance difference in the training of step-ups with acute angle of full squat performance.

Methodology

Subjects

For the purpose of the study twenty (20) male power lifters were randomly selected from Tripura University and its affiliated colleges of Tripura as treated as subject. The subjects were randomly and uniformly divided into two groups i.e. experimental and control group.

Selection of knee angle and height of step bench

According to the requirement of the study the acute angle were selected as taking the biomechanical advantages in relation to joint angle in respect of angle of pull, range of movement and work done etc.

The height of the bench was set according to the height of the subjects.

Criterion measure

The leg strength of the subjects was measured by the full squat performance and was recorded in kilograms.

Instrument reliability

The selected knee angle was measured by the Goniometer and the height of the bench was measured by the steel tape were of standard quality are available in research laboratory of Department of Physical Education, Tripura University.

Test administration

To collection the required data the step-up test was administrated at an acute knee angle. Before the test administration all necessary instructions and demonstration of the exercises were given by scholar self. There was no time limit to perform the exercises but the subjects were given

their optimum effort.

Step-ups

Step-up exercise is a medium of improve the leg strength. It has widely used by the athletes in their training programme. The scholar is directed to the subject to stand near to the step and on command "GO" begin the stepping with the following four counts.

Step-up exercise	First week	Second week	Third week	Forth week	Fifth week	Six week	Seventh week	Eight week
Repetition	15	15	15	15	15	15	15	15
Set	03	03	03	03	03	03	03	03
Recovery	Complete	Complete	Complete	Complete	Complete	Complete	Complete	complete
Resistance	Own body weight	Own body weight	With a bar	With a bar	With a weight of 10 kg	With a weight of 10 kg	With a weight of 20 kg	With a weight of 20 kg

Training sessions was thrice a day.

Collection of Data

To collection the data for the adjacent examine the step-up test were administrated at an acute angle. The experimental treatments were given to the subjects for 8 weeks and the pre-test data were collected before the start of treatment and at the end of treatment post-test data were collected. As well as control group data also recorded as in same manner but only difference is this that control group did not take any treatment.

Statistical analysis

To analysis the effects of step-up training with acute angle, the T-test were implemented and level of significance at 0.05 was chosen to test the hypothesis.

RESULT

Table -1 Significant Difference Between Pre-test And Post- Test Means Of Experimental And Control Group Of Step-ups Training At An Acute Angle

	Means		SD Difference	t-ratio
	Pre-test	Post-test		
Experimental Group	79.25	92.25	5.99	2.17*
Control Group	88.25	89.25	5.37	0.18

* Significant difference at 0.5 level of significance, $t_{.05} (18) = 2.10$

The table-1 indicated the pre-test and post-test means of experimental and control group at an acute angle respectively 79.25, 92.25 and 88.25, 89.25. The above table also shows that the calculated T-value is greater than the tabulated value in respect of experimental group and control group is vice – versa.

DISCUSSION OF FINDING

The analysis of data revealed that the eight weeks treatments of experimental group at an acute knee angle in the full squat performance were sound significant improvement in leg strength of power lifting. Resistance training with progressive manner is to improve the leg strength when it was administrated according to the set principles. Though the adaptation of training is most important to increased strength i.e. increased number and size of myofibrils per muscle fibre, increased capillary density per fiber and increased amounts and strength of connective tendinous and ligamentous tissues. The other biochemical changes such as increase in glycogen, increase in glycolytic enzyme activities, and no consistent change in the ATP turn over enzyme activities, increases in aerobic, Krebs cycle, enzymes activities and a decrease in the volume of mitochondria might have increased the strength of the subjects, resulting in better performance. It may be noted that step-up involves climbing a bench or stair with one leg. The person only overcomes his own body weight plus the additional resistance due to the height of the bench. Hence the earlier said hypothesis is accepted.

Count 1: Right foot up on the bench.

Count 2: Left foot up on the bench.

Count 3: Right foot down on the floor.

Count 4: Left foot down on the floor.

Training structure

The training structure of step-ups with acute angle of knee joint was as a progressive in manner.

CONCLUSION

The current study indicates that the step-ups training at an acute angle to improve the full squat performance in power lifting.

REFERENCES

1. Aileen Carpenter (1938), "A Critical Study of the Factors Determining Strength Tests for Women" Research Quarterly- 9:4, pp.03.
2. Chuck Krautblatt (2002), "Fitness Training Manual Version 7.0", (International Fitness Association).
3. Daniel Riky (1978), "In Season Strength Training Key to Peak Performance", Scholastic Coach 47, pp.59.
4. Frank W. Dick (1980), "Sports Training Principles" (London: Lepus Books, Henry Kimpton Ltd.), pp.169.
5. May M. Novich and Buddy Maylor (1983), "Training and Conditioning of Athletes 2nd ed." (Philadelphia: Lea and Febiger), pp.58.
6. William J. Kraemer and Keijo Hakkinen (2002), "Strength Training for Sports" (Blackwell Science Ltd.), pp.12.
7. William D. Mc. Ardle, Frank I Katch and Victor L. Katch (1981), "Exercise Physiology, Energy Nutrition and Human Performance" (Philadelphia: Lea and Febiger), pp.292.