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Influence of Strength Training Packages with and Without Additional Resistance on Leg Explosive Power and Shoulder Strength Among Basketball Players

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***Abstract*---**The purpose of the study was to find out the Influence of strength training packages with and without additional resistance on leg explosive power and shoulder strength among basketball players. The study was conformed to forty-five (45) female basketball players were selected randomly as subjects from various departments of Bharathidasan University, Tiruchirappalli, Tamil Nadu, India. Their age ranged between 21 to 25 years. They were divided into three equal groups each group consisted of 15 players. Namely experimental group I (strength training with additional resistance), experimental group II, (strength training without additional resistance) and control group. They were tested twice before and after the training with respect to physical variables of leg explosive power and shoulder strength. The training period for this study was three alternative days per week, for eight weeks. The collected data were statistically analyzed by analysis of co-variance (ANACOVA) and the significance difference on experimental groups with the level of confidence was fixes as 0.05 levels. It was concluded that booth the experimental groups having more significant improvement on leg explosive power and shoulder strength than the control group.

***Keywords*---**additional resisted, leg explosive power, shoulder strength, strength training, weight training.

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Introduction

Generalized training theories are very simple models that coaches and experts use broadly to solve practical problems. These models include only the most essential features of sports training and omit numerous others. General concepts for coaching. Coaches and athletes use them especially for condition and also for plaining training programs. In the one-factor theory, the immediate training effect of a workout is considered as a depletion of certain biochemical substances. The athlete's nature toward a competition or training called prepared ness, is assumed to very in strict accordance with the amount of a substance available for immediate use. There is evidence in exercise and sport science literature that certain substances are exhausted as a result of strenuous training workouts. The best known example is muscle glycogen depletion after hard anaerobic exercise. The two-factor theory of training is more sophisticated than the supercompensation theory. It is based on the idea that preparedness, characterized by the athlete's potential sports performance is not stable but slightly varies with time. There are two components of the athlete's preparedness, those that are slow changing and those that are fast changing. Ther term physical fitness is used for slow changing motor components of the athlete's preparedness. Physical fitness does not vary substantially over several minutes, hours or even days. However, as a result of fatigue psychological overstress or a sudden illness such as flu, an athlete's disposition toward competition may change quickly. An athlete's preparedness is sometimes through of as a set of hidden characteristics that exist at any time but can be measured only from time to time (Vladimir M. Zatsiorsky and William J. Kraemer, 2006).

Strength training programs today have taken on different combinations of the acute program variables put forth more than 30 years ago in the first editionof *Designing Resistance Training Programs.* In designing a resistance training program, the needs of the individual are paramount to the program characteristics (Fleck and Kraemer 2014). The optimal programs with specific goals, startingpoints, and progressions are designed for the individual using the basic principles overviewed in this chapter. A program for a person wishing to increase maximal strength will differ greatly from a program for a person wishing to increase localmuscular endurance. In addition to outcome goals, a program design must take in to account individual differences such as training experience, time allotted totrain, the facilities available for training, and any special needs the person mayhave.The amount of resistance used for a specific exercise is one of the key factors inany resistance training program. It is the major stimulus related to changes instrength and local muscular endurance. Higher intensity is important for strengthdevelopment in all individuals, older and younger (Lee E. Brown, 2017). Weight training is a sequence of movement using weight in addition to the body weight. Any form of resistance training where weights are used to provide resistance and challenge your strength (Mahaboobjan. A and Viswejan. U, 2010).

Basketball is a truly global game. Invented by a Canadian who lived in the United States, it is one of the most popular spectator sports in Europe and isplayed extensively in China. People worldwide seem to like the sport for itssimplicity; only a flat surface, a hoop, and a ball are required to play.

Anotherattraction is the beauty inherent in basketball. The individuals whoengage in thesport at its highest levels display a grace and athleticism that is both unparalleledand often enrapturing.Basketball is rare among popular sports in that it has a discrete and welldocumented origin. The game was created by James A. Naismith in December1891, at a college in Springfield, Mass., where he was a physical educationinstructor. Tasked by his boss to create an indoor activity for the students thatcould be played during the winter, Naismith developed a game that involvedshooting a soccer ball into two peach baskets. (The first basketball wasintroduced in 1894, and an open basket with a net was adopted in 1912–13.) Therules of the sport initially did not allow players to dribble the ball. Instead,players remained stationary when handling the ball until they passed it down thecourt to a teammate. Early basketball courts were often irregularly shaped.Players sometimes had to avoid stairways and pillars that were part of the fieldof play, and baskets were frequently fastened to gymnasium balconies,which letspectators swat at the ball as it neared the goal (Adam Augustyn, 2011).

Methodology

The purpose of the study was to find out *the Influence of strength training* packages with and without additional resistance on leg explosive power and shoulder strength among basketball players. To achieve the purpose of the study, forty-five *(45) female basketball* players were selected randomly as subjects, from various departments of Bharathidasan University, Tiruchirappalli, Tamil Nadu, India. Their age ranged between 21 to 25 years. The selected subjects were randomly divided in to three equal groups of fifteen (n=15) each. *Group I* (n=15) strength *training with additional resistance, experimental group II,* (n=15) strength *training without additional resistance f*or a duration of eight weeks, with three days per week and per day one session, in addition to the regular schedule and Group III (n=15) control, who is asked to refrain from any special training except their leisure time pursuit. Members of three groups will consist of healthy men students who have participated in their intramural basketball teams.

Independent variables

Taking into consideration of the feasibility of criteria, availability of instruments and the relevance of the variable to the present study, the following dependent variables and tests were selected.

Table 1
Criterion measures and test selection

Criterion Variables	Test Items	Units of Measurement
Leg Explosive Power	Vertical Jump	Centimeter
Shoulder Strength	Modified Push-ups	Counts

Training programme

The subject in the experimentalgroup I underwentstrength *training with additional resistance, experimental* group II underwent strength *training without additional resistance.* All the experimental groups were practiced three alternative days per

week, for a period of eight weeks. Training session consist of approximately 90 minutes, including warm up and cool down.

Table 2
Training schedule for strength training with additional resistance group

S. No	Name of The Exercise	First Four Weeks				Second Four Weeks			
		Rep	Set	Intensity	Rest	Rep	Set	Intensity	Rest
1.	Warming Up	15 min				10 min			
2.	Military Press	8	2	70%	90sec	10	2	80%	90sec
3.	Half squad	8	2	70%	90sec	10	2	80%	90sec
4.	Biceps Curl	8	2	70%	90sec	10	2	80%	90sec
5.	Hamstring Curl	8	2	70%	90sec	10	2	80%	90sec
6.	Bench press	8	2	70%	90sec	10	2	80%	90sec
7.	Split squad	8	2	70%	90sec	10	2	80%	90sec
8.	Seated Rowing	8	2	70%	90sec	10	2	80%	90sec
9.	Step up	8	2	70%	90sec	10	2	80%	90sec
10.	Warm-Down	10 min				15 min			

Table 3
Training schedule for strength training without additional resistance group

S. No	Name of The Exercise	First Four Weeks				Second Four Weeks			
		Rep/ Distance	Set	Movement Frequency	Rest	Rep/ Distance	Set	Movement Frequency	Rest
1.	Warming Up	15min				10min			
2.	Modified Push-ups	10	2	70%	90sec	12	2	80%	90sec
3.	Full squad	10	2	70%	90sec	12	2	80%	90sec
4.	Modified pull ups	10	2	70%	90sec	12	2	80%	90sec
5.	Box jump	10	2	70%	90sec	12	2	80%	90sec
6.	Back push-ups	10	2	70%	90sec	12	2	80%	90sec
7.	Split jump	10	2	70%	90sec	12	2	80%	90sec
8.	Crocodile Walk	20m	2	70%	90sec	25m	2	80%	90sec
9.	Half squad jump	20m	2	70%	90sec	25m	2	80%	90sec
10.	Warm-Down	10min				15min			

Analysis of the data

The subjects of all the groups were tested on leg explosive power and shoulder strength. The collected data from the three groups prior to and immediately after the training programme on selected criterion variables were statistically analyzed with dependent't' test to find out the significant improvement between pre test and post test means of both groups and analysis of covariance (ANCOVA) was used to find out the significant difference between experimental and control groups.In all the cases 0.05 level of significant was fixed to test the hypothesis.

STWARG = Strength *Training with Additional Resistance* Group
STWOARG = Strength *Training without Additional Resistance* Group
CG = Control Group

Table 4
Mean standard deviation and dependent 't'- test values on leg explosive power and shoulder strength of experimental and control groups

S.No.	Variables	Group	Pre-Test Mean	SD (±)	Post –Test Mean	SD (±)	't' -Test
1.	Leg Explosive Power	STWARG	31.49	0.31	34.41	1.77	6.09*
		STWOARG	31.47	0.26	36.00	0.46	29.87*
		CG	31.32	0.30	31.84	1.53	1.46
2.	Shoulder Strength	STWARG	22.51	0.29	27.67	0.57	28.31*
		STWOARG	22.46	0.30	25.97	2.04	6.77*
		CG	22.46	0.28	23.63	2.26	1.87

Significant at 0.05 level. (Table value required for significance at 0.05 level for't'-test with df 14 is 2.14)

The tables 4 the pre, post-test means, standard deviations and dependent't' value for leg explosive power and shoulder strength among female basketball players were numerically presented. The pre and post test mean values of experimental and control groups on leg explosive power and shoulder strength are graphically represented in the figure 1.

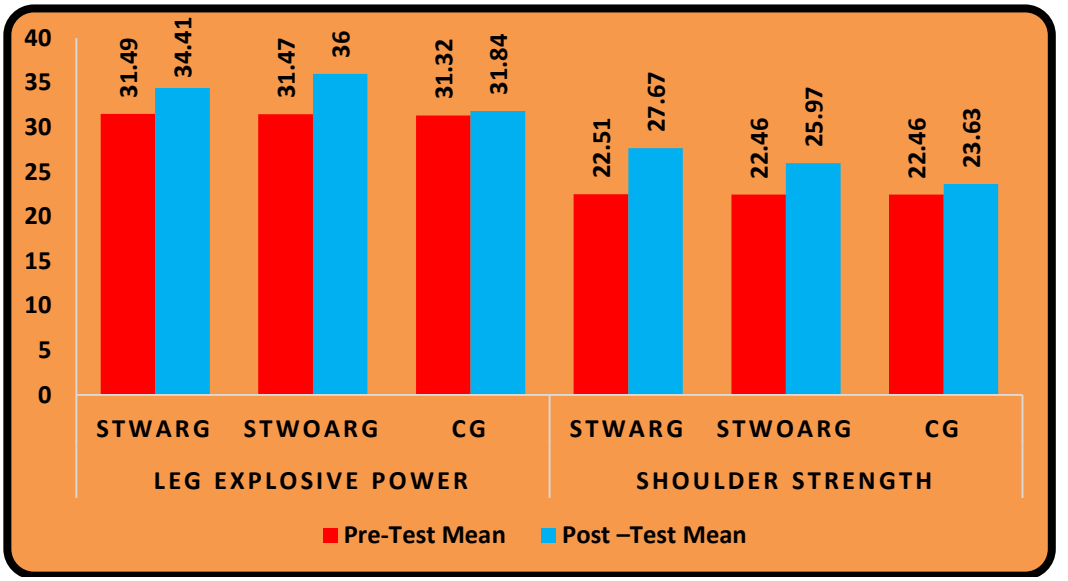

Figure 1. Pre and post test mean of experimental groups and control group on leg explosive power and shoulder strength among female basketball players

Table 5
Computation of analysis of covariance on leg explosive power and shoulder strength among female basketball players

Adjusted Post Test Means									
S.No	Variables	STWARG	STWOARG	CG	SOV	SS	Df	MS	F-ratio
1.	Leg	34.40	35.99	31.91	B.S.	122.83	2	40.94	17.51*

	Explosive Power				W.S.	128.60	41	2.33	
2.	Shoulder Strength	27.72	25.97	23.63	B.S. W.S.	126.06 187.41	2 41	42.02 3.40	12.33*

* Significant at. 0.05 level of confidence (The table value required for Significance at 0.05 level with df 2 and 41 is 3.23).

From the Table-V, the adjusted post test mean values of leg explosive power for experimental group are 34.40 and 35.99, shoulder strength for experimental group are 27.72 and 25.97 were as the control group values are 31.91 and 23.63 respectively. The obtained F-ratio of leg explosive power 17.51 and shoulder strength 12.33 for adjusted post test mean is more than the table value of 3.23 for df 2 and 41 required for significance at 0.05 level of confidence. The results of the study indicate that there was significant difference between the adjusted post test means of experimental and control groups on the development of leg explosive power and shoulder strength. The adjusted post test mean values of experimental and control groups on acceleration and leg explosive power are graphically represented in the figure 2.

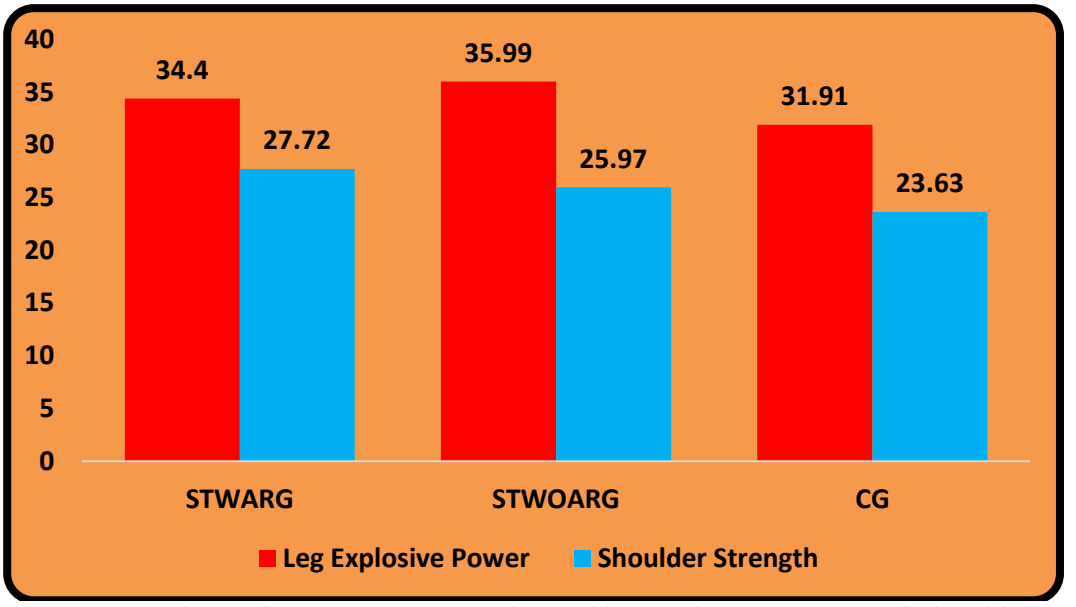

Figure 2. Adjusted post test mean values of leg explosive power and shoulder strength of experimental groups and control group on female basketball players

Discussion on finding

The results of the study reveal that there was a significant change found after the strength training packages with and without additional resistance training programs on leg explosive power and shoulder strength among female basketball players. These results are in corroboration with the studies of Tsimahidis K, Galazoulas C, Skoufas D, Papaiakovou G, Bassa E, PatikasDandKotzamanidis C (2010), Mahesh Yadav (2017*).*

Conclusions

From the analysis of the data, the following conclusions were drawn.

- It was concluded that the eight weeks of strength training packages with additional resistancesignificantly improved leg explosive power and shoulder strength.
- It was concluded that the eight weeks of strength training packages without additional resistance significantly improved leg explosive power and shoulder strength.
- When compare to the entire experimental group, strength training packages without additional resistance training group shows much better improvement on leg explosive power and strength training packages with additional resistancetraining group shows much better improvement on shoulder strength.

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