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# Effect of Explosive Strength Training on Selected Biomotor Variables of Collegiate Football Players

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**Abstract**

*The purpose of the study is to assess the effect of explosive strength training on selected biomotor variables of collegiate football players after 4 weeks training program. Players were selected as subjects from Anna University, Zone V. The subject were divided randomly into two groups namely one control and one experimental groups consisting of fifteen subjects in each group. Experimental group were given 4 weeks explosive strength training and control group were not allowed to participate in the training program. The training program was given for four days in a week at evening session and alternate days will play football. Pretest and post test was conducted and the data was computed statistically by using (Independent Sample t test) to find out the significant changes. The result revealed that the experimental group has significant effect on explosive strength training after 4 weeks when compared to the control group.*

**Keywords:** Explosive strength, biomotor.



## Introduction

In football, lower body strength is required for kicking, jumping, tackling, twisting and turning and also forms the foundation for explosive speed. Upper body strength is required for shielding the ball, holding off opponents, throw-ins and also contributes to overall power and explosiveness. Strength training for football has to be more comprehensive than virtually any other sport. Football players do need bulk and a lot of bodyweight. But they also need high levels of strength and sport-specific power. Wide receivers, defensive backs and tailbacks need less bulk and more speed and agility. Apor (1998)[1]suggests, in making fitness recommendations for footballers; that players need to develop the musculature of a sprinter.

## Maximal Strength

In Football game, good maximal strength is beneficial for holding off opponents and shielding the ball. More importantly it also forms the foundation of muscular speed and power. Maximal strength (usually measured by one repetition max) makes no allowances for time - for example, a weightlifter can spend 30 seconds or more slowly lifting a weight inch by inch. Not much use to the football player. As a rule of thumb then, maximal strength training serves a greater purpose than just increasing absolute strength. The end result should be to increase the explosive speed and power.

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## Muscular Power

Power is a product of both absolute strength and the speed of movement. Increase either one (without lowering the other) and increase explosive power. Football strength training should fall into some distinct phases. The first phase is used to develop a solid functional strength base in the off-season. The player can then move on to a maximal strength phase before converting this into football-specific power.

## Strength Endurance

Strength or muscular endurance is the ability of a muscle group to perform repeated, high-intensity movements. Strength endurance is essential for football - and like power, perhaps more essential than all-out strength. Good abdominal and lower back strength are also essential for sprinting speed, as the trunk muscles are required to stabilize the sprinting movement.

McNaughton (1998) cites soccer as one of the many games where short, explosive power is required, and that plyometric training is a useful complement or alternative to strength training to achieve this. Once the players are used to it, plyometrics may be more convenient than weights for speed development in terms of scheduling during the season.

## Methodology

The study was conducted on 30 Anna University, Zone 5 football players (15 in experimental and 15 in control group) and their ages between 17 -25

years. Group I underwent explosive strength training and Group 2 did not involve in the training program. 30 Metre Acceleration Test and Ruler Drop Testwere tested.

**Statistical Analysis**

The data was analyzed by applying Independent Sample t test to find out the significant difference at0.05 level of significance**.**

Table 1
*Four week weight training schedule for football players*

| Day | Workout | Repetitions | Set | Rest between sets | Intensity |
|---|---|---|---|---|---|
| **Monday** | Overhead Squats<br>Dead Lifts<br>Leg Curls<br>Lat Pull Downs<br>Seated Rows<br>Standing Calf Raise<br>Preachers curls | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Tuesday** | Bench Presses<br>Military Presses<br>Shoulder Shrugs<br>Lateral Raises<br>Triceps Extensions<br>Twisted Crunches<br>Double Crunch | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Wednesday** | Playing Football | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Thursday** | Overhead Squats<br>Dead Lifts<br>Leg Curls<br>Lat Pull Downs<br>Seated Rows<br>Standing Calf Raise<br>Preachers curls | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Friday** | Bench Presses<br>Military Presses<br>Shoulder Shrugs<br>Lateral Raises<br>Triceps Extensions<br>Twisted Crunches<br>Double Crunch | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Saturday** | Playing Football | 6-12 Max | 3 | 45-60 minutes | 70-80 |
| **Sunday** | Rest | | | | |

Table 2
*Criterion Measures*

| S.No. | VARIABLES | TEST / TOOLS | UNIT OF MEASUREMENT |
|---|---|---|---|
| **1** | Biomotor | 30 Metre Acceleration Test | Seconds |
| | | Ruler Drop Test | Distance (Centimeter) |

Table 3
*Computation of Mean, Standard Deviation, Standard Error and t value on 30 Metre Acceleration Test*

| Test | Group | N | Mean | Std. Deviation | Std. Error Mean | t |
|---|---|---|---|---|---|---|
| **Pre_test** | Experimental | 15 | 4.71 | 0.16 | 0.04 | 1.987 |
| | Control | 15 | 4.84 | 0.19 | 0.05 | |
| **Post_test** | Experimental | 15 | 4.47 | 0.23 | 0.06 | 4.636* |
| | Control | 15 | 4.85 | 0.22 | 0.06 | |

Required table value for significance at 0.05 level of confidence for df of 2 and 28 is 2.048
* Significant at 0.05 level.

Table 3 states that the post- test mean were 4.47 for experimental group, 4.85 for control group and pre-test mean were 4.71 for experimental group, 4.84 for control group. The obtained t ratio 4.636 for post-test was higher than the table tvalue 2.048. Hence, the post-test was significant at 0.05 level of confidence for the degree of freedom 2 and 28.

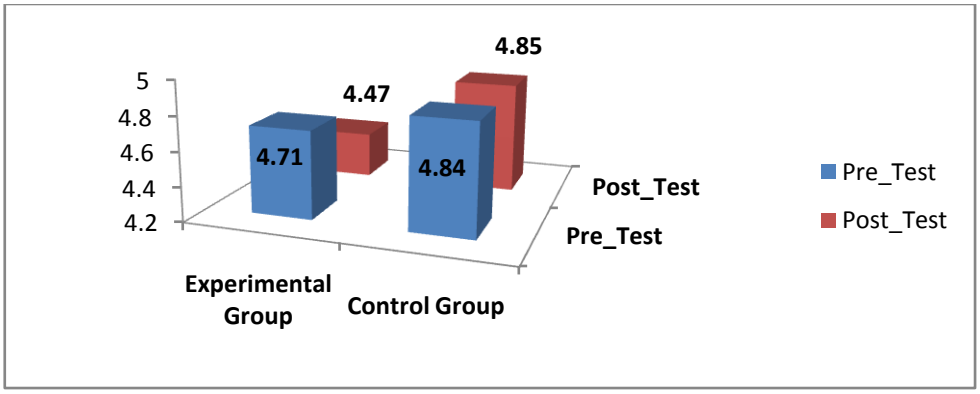


*Figure I*
Graphical representation of mean scores of football players on the 30 Metre Acceleration Test

Table 4
*Computation of Mean, Standard Deviation, Standard Error and t value on Ruler Drop Test*

| Test | Group | N | Mean | Std. Deviation | Std. Error Mean | T |
|---|---|---|---|---|---|---|
| **Pre_test** | Experimental | 15 | 21.90 | 1.21 | 0.31 | 1.363 |
| | Control | 15 | 22.58 | 1.51 | 0.39 | |
| **Post_test** | Experimental | 15 | 19.83 | 0.74 | 0.19 | 6.292* |
| | Control | 15 | 22.66 | 1.58 | 0.41 | |

Required table value for significance at 0.05 level of confidence for df of 2 and 28 is 2.048
* Significant at 0.05 level.

Table 4 states that the post- test mean were 19.83 for experimental group, 22.66 for control group and pre-test mean were 21.90 for experimental group, 22.58 for control group. The obtained t ratio 6.292 for post-test was higher than the table tvalue 2.048. Hence, the post-test was significant at 0.05 level of confidence for the degree of freedom 2 and 28.

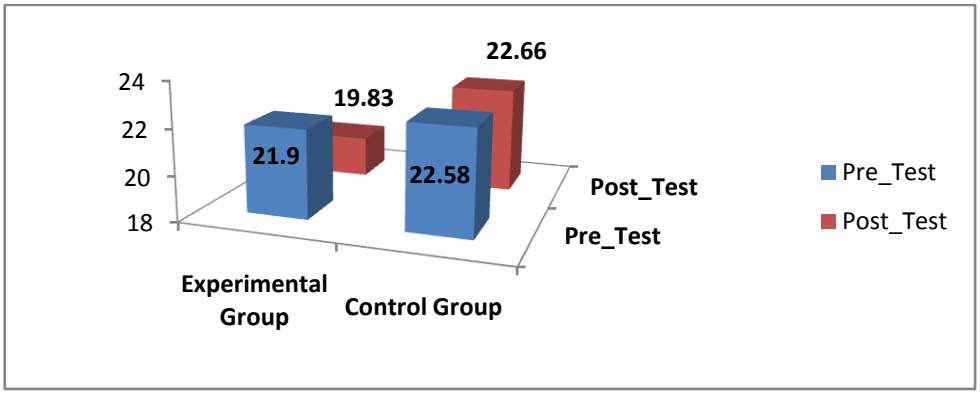


*Figure II*
Graphical representation of mean scores of football players on the Ruler Drop Test

**Discussion**

Reilly (1990) showed that the stronger players outlasted the weaker players in terms of a regular place in the team, and had reduced injury risks. He recommends that leg strength in particular is developed, especially in the quadriceps and hamstrings, to help stabilise the knee joint, which is the most frequently injured joint in football.

Apor (1998), a Hungarian researcher who has been involved in long-term studies of Hungarian professionals, agrees, saying that knee-extension torque has been associated with success in the game and that strong hamstring muscles in relation to quadriceps are crucial to knee injury prevention. Another common football injury is hernia, for which the best protection is developing strong abdominal muscles.

**Conclusions**

It is concluded that there is significant improvement on biomotor variables for the experimental group when compared to the control group. From the finding of the study it is concluded that 4 weeks of explosive strength training has induced significant changes in the selected biomotorvariables namely 30 Metre Acceleration Test and Ruler Drop Test.

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