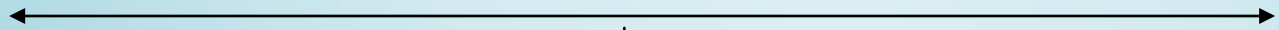


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EFFECT OF SAND TRAINING AND SPRING BOARD TRAINING ON SELECTED SPEED VARIABLES (STRIDE FREQUENCY) OF FOOT BALL PLAYERS

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ABSTRACT.

The purpose of this study was to find out the Effect of sand training and springboard training on selected speed variables stride frequency of Foot ball players. The primary responsibility of the investigator is to adopt the appropriate experimental methodology before proceeding with data collection. A pre-test - post-test randomized group design was used. Each group consisted of twenty subjects (n=20). Before the training pre-test was taken for all the groups on the selected criterion variables, stride frequency, The control group did not undergo any type of training. Sand training was given to the experimental group-I and springboard training was given to the experimental group-II on alternate days in the morning for a period of twelve weeks. At the end of experimental period, the post-test was conducted and data collected on criterion variables. The difference between the initial and final means of the groups was considered as the effect of respective treatments. The data obtained were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance

Key Words: - Sand Training, Spring Board training, Speed Variables Stride Frequency.

INTRODUCTION

The ancient philosopher Aristotle of Greece proclaimed the quality of people, quoted by Bucher as follows: "The body is the temple of the soul and to reach harmony of body, mind and spirit, the body must be physically fit". The efficiency of the human body depends upon many factors. With the enhanced status of sports in society the provision of sports training has become very important although the need for competent training has long been recognized.

Over three thousand years ago, the Greeks saw the need to provide effective and efficient training for the athletes taking part in the Olympics games. But since 1950s many countries have recognized the importance of

an effective sports training programme in a wide range of activities not only for the success in major international competitions but also for the development of healthy participants comprehensive sports training programme is the key factors in producing the skillful high performance.

SAND RUNNING

In physical geography, a dune is a hill of sand built by aeolian processes. Dunes occur in different forms and sizes, formed by interaction with the wind. Most kinds of dunes are longer on the windward side where the sand is pushed up the dune and have a shorter “slip face” in the lee of the wind. The valley or trough between dunes is called a slack. A “dune field” is an area covered by extensive sand dunes. Large dune fields are known as ergs.

Some coastal areas have one or more sets of dunes running parallel to the shoreline directly inland from the beach. In most cases, the dunes are important in protecting the land against potential ravages by storm waves from the sea. Although the most widely distributed dunes are those associated with coastal regions, the largest complexes of dunes are found inland in dry regions and associated with ancient lake or sea beds.

Dunes also form under the action of water flow (alluvial processes), on sand or gravel beds of rivers, estuaries and the sea-bed.

Benefits of Sand Running

Sand, mud, dirt, grass and trails are excellent training surfaces. They force to run slower for the same heart rate, giving the main benefit of altitude training that is, lower risk of injury as high running intensity is the second best predictor of injury. Half the purpose of 80% of running is to develop a big pump and to maximize the bellows. The heart and lungs don't care if one is swimming, biking, or running at 10 minute miles in 6 inches of mud. However, the running and biking muscles do need some training at 1-2 minutes per mile (for running) slower than race pace, at race pace and also at faster than race pace. The trouble with deep sand is that it gets in to the shoes. It can also mess with the running form. But it gives one a tough workout with very low mileage; the back and shoulders get a workout because one has to maintain balance.

SPRING BOARD TRAINING

A springboard or diving board is used for diving and is a board that is itself a spring, i.e. a linear flex-spring, of the cantilever type.

Springboards are commonly fixed by a hinge at one end (so they can be flipped up when not in use), and the other end usually hangs over a swimming pool, with a point midway between the hinge and the end resting on an adjustable fulcrum.

Because of the need to be light and flexible, springboards are usually made of fiberglass. Most springboards are painted, usually blue, and texture is often added to the surface by mixing crushed glass or sand with the paint to provide additional grip.

To improve the jumping ability athletes tend to do springboard exercises. In this study, the investigator was interested to find out the effect of spring board exercises on the performance of long jumpers (Singh, 1984).

Benefits of Springboard Training

The benefits of spring board training (SBT) are detailed below:

Springboard training enhances upper and lower extremity power production for the components of the diving approach, hurdle, and take off. The primary purpose is to increase the diver's time of flight.

Increases power production in upper extremity, lower extremity and trunk to maximize velocity of twist spins, and velocity (and compactness) of pike and tuck somersault spins.

Increases strength of trunk musculature to stabilize the spine, thereby enabling the diver to maintain posture and withstand impact trauma during entry.

Maintains a lean, muscular physique for aesthetic performances purposes.

Spring board training is excellent for cross-training. Runners, swimmers, cyclists, rowers, soccer (or football), and others find to be helpful with its total workout.

FOOTBALL

Football is not a matter of life and death. It is much more important than that. Almost all the countries play it and of course millions of people watch it. It is apparently one of the ancient sports and it is the direct ancestor of American Football, Canadian Football, Rugby and several other similar sports.

The game of football is one of the most popular games in the world. The game began in England in the 12th century, but Edward-II banned it in 1324. His successor Edward-III in 1349, Richard-II in 1389 and Henry-IV in 1401 as also the Scottish rulers forbade people from playing football. In the beginning there were no

definite rules of the game. Each team played with its own rules. An attempt was made by Thring and Dewinton to frame a uniform set of rules and the first set of football rules were framed in 1862 and revised in 1863. The football Association of England was formed and new rules of this game were framed in 1864.

Importance of Speed in Football

In fact speed training for football might be just as important as traditional weight lifting. The highest ranked players are more likely to outperform their peers in tests like the 10 yard and 40 yards sprints than they are in the squat or bench press. Thus one could conclude that speed separates the outstanding from the very good.

SPEED PARAMETERS

According to Loren Seagrave (1998) there are four different ways of improving athletic ability in running events: (1) Apply greater force; (2) Apply force in less time; (3) Apply force in the proper direction; and (4) Apply force through the proper range of motion.

Stride Frequency

Ground Time (GT) + Air Time (AT) = Stride Time (ST), or the time it takes to execute one stride. Therefore: $1 \text{ second} / 0.2 = 5.0$ strides per second. 4.8 - 5.2 strides per second is the range for elite sprinters. Young athletes' values are: GT = 0.12 seconds

Air time = 0.13 this is lower due to lack of skill and motor coordination. Stride frequency = 4.0 strides per second. It is not strength which distinguishes elite sprinters from average ones, but efficiently reduced ground times due to enhanced skill and motor coordination.

Energy System for Speed

Energy for absolute speed is supplied by the anaerobic alactic pathway. The anaerobic (without oxygen) alactic (without lactate) energy system is best challenged as an athlete approaches top speed between 30 and 60 metres while running at 95% to 100% of maximum.

Developing Speed

They say that sprinters are “born and not made” due to the necessity of having a preponderance of fast twitch muscle fibers. The development of pure speed involves stimulating the central nervous system to send messages through to the muscles to tell them to contract. The speed of this contraction has a significant bearing on the power of the movement.

When applied in the field of sport however this “element of speed” is not enough on its own. Genetically our muscles comprise of a certain level of fast/slow twitch fibres, which does not significantly change (although training effects can modify them to a limited extent).

In racquet sports like tennis and field events like the javelin, limb speed is essential but strength, suppleness, stamina and skill all play a part in the application of speed to the field of performance. Speed is therefore, an element of the conditioning of the body to meet the specific needs of the sport.

NEED OF THE STUDY

Physical fitness helps to enjoy physical activity sustain skills, learning and enhance performance on the athletic field. Specific physiological systems of the body should be adopted to support a particular game. Since different games make different demands upon the organism with respect to neurological, cardio-respiratory systems are highly adaptable to exercise.

For a good performance in any sports or athletic event, the high standard of fitness is a basic requirement. More participation in sports activity is not enough to improve fitness. The fitness must be gained through conditioning programme.

The athletes and coaches advocate different training and coaching methods to improve their physiological, strength and endurance variables. The investigator was interested to find out the effect of sand training and spring board training on selected speed parameters of football players.

OBJECTIVES

The objectives of the study are as below:

1. To formulate sand training schedule for the benefit of football players to improve their speed parameters.

2. To formulate spring board exercises on trampoline for the benefit of football players to improve their speed parameters.
3. To find out the effects of sand training and spring board training on selected speed parameters of football players.
4. To compare the effects of sand training and spring board training with control group and to point out the improvements on selected variables.

STATEMENT OF THE PROBLEM:-The purpose of this study was to find out the effect of sand training and springboard training on selected speed variables stride frequency of Foot ball players.

HYPOTHESES: - It was hypothesized that:

1. Sand training and springboard training would improve speed parameters, such as, stride frequency of football players compared to control group.
2. There would be no significant differences between sand training and springboard training in altering selected speed parameters of football players.

LIMITATIONS

This study was limited in the following respect and these limitations would be taken in consideration while interpreting the result.

1. The experiment was conducted on football players selected from different colleges in Andhra Pradesh, who represented their colleges in intercollegiate level tournaments.
2. Selection of subjects is between 19 to 24 years of age only.
3. There was no control over the diet, environment, etc., in this study.
4. Regular activities pertaining to their day to day affairs were not controlled.

DELIMITATION

To achieve the objectives of the study, the investigator delimited the following factors:

1. This study was conducted only on 60 male football players.
2. The experimental period was only twelve weeks.
3. The subjects were selected from football players of different colleges in Andhra Pradesh.
4. Sand training was limited to running, jumping, zig-zag running etcetera on beach sand.

5. The spring board training on a rebounder or a mini trampoline is considered for this study.
6. Springboard training was limited to jumping, diving, trampoline bounce, trampoline prances, trampoline, squats etcetera.
7. The following dependent and independent variables were selected for this study:

Dependent Variables:- Speed parameters - Stride frequency.

Independent Variables:- 1. Twelve Weeks Sand training. 2. Twelve Weeks Springboard training

DEFINITION OF THE TERMS: - Stride Frequency

The stride frequency of an athlete is the number of strides completed in a unit time. The average stride frequency was calculated by dividing the number of strides taken by time taken to cover the distance (Jenner, 1964).

METHODOLOGY

This Study describes the methodology and procedure adopted. This includes the selection of subjects, selection of variables, experimental design, experimental treatments, selection of test items, procedure for administering the test items, collection of data and statistical technique employed for analysing the data.

The purpose of the study was to find out the effect of sand training and springboard training on selected speed parameters of football players.

SELECTION OF SUBJECTS

The subjects taken for the present study were sixty men football players from different colleges in Andhra Pradesh, who had represented their college in the inter-collegiate football competitions. The subjects were selected on a random basis and were allotted to three groups (control, sand training and springboard training) by random assignment. The age of the subjects ranged from 19 to 24 years with mean age of 21 years.

The requirements of the experimental procedures, testing as well as exercise schedules were explained to them so as to avoid any ambiguity of the effort required on their part and prior to the administration of the study, the investigator got the individual consent from each subject.

SELECTION OF VARIABLES

The research scholar reviewed the various scientific literature pertaining to the sand training and springboard training on selected speed variables from books, journals, periodicals, magazines and research papers. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following variables were selected.

Dependent Variables:-

Speed parameters:- Stride Frequency.

Independent Variables:- 1. Twelve Weeks Sand training 2. Twelve Weeks Spring board training

EXPERIMENTAL DESIGN

The primary responsibility of the investigator is to adopt the appropriate experimental methodology before proceeding with data collection. A pre-test - post-test randomized group design was used. Each group consisted of twenty subjects (n=20). Before the training pre-test was taken for all the groups on the selected criterion variables, stride frequency, The control group did not undergo any type of training. Sand training was given to the experimental group-I and springboard training was given to the experimental group-II on alternate days in the morning for a period of twelve weeks. At the end of experimental period, the post-test was conducted and data collected on criterion variables. The difference between the initial and final means of the groups was considered as the effect of respective treatments. The data obtained were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance.

TEST ADMINISTRATION: STRIDE FREQUENCY

Purpose: To measure the stride frequency of the subject.

Equipment: Stop watch, clapper, Saw Dust.

Procedure: While the subjects were allowed to run fast about 50 metres to measure speed, the measurement of the stride frequency was taken in the test zone of 30 metres (between 20th to 50th metres). The time elapsed for five right/left foot contacts of the subjects after the initial supporting phase in the test zone. Thus, the time taken for ten strides was recorded. Dividing the number of strides (10) taken by the time recorded given the number of strides ran in one-second (Seagrave, L., 1996).

$$Sf = t / 10$$

Where Sf = Stride Frequency

t = time taken for 10 strides

STATISTICAL PROCEDURE:-The following statistical tool, i.e., one way Analysis of Covariance ANCOVA was followed to estimate the effect of sand training and springboard training on selected speed and endurance parameters of football players. As suggested by Thomas and Nelson.(1990)

$$F\text{-ratio} = \frac{(MSy.x)_b}{(MSy.x)_w}$$

Where,

(MSy.x)_b is the final adjusted mean squares between, and

(MSy.x)_w is the final adjusted mean squares within

When significant differences were noted, the Scheffe’s post hoc test was used to find out the paired means significance difference.

RESULTS AND DISCUSSIONS: Results on Stride Frequency

The statistical analysis comparing the initial and final means of Stride frequency due to Sand training and Spring board training among football players is presented in **Table-I**.

ANCOVA RESULTS ON EFFECT OF SAND TRAINING AND SPRING BOARD TRAINING COMPARED WITH CONTROLS ON STRIDE FREQUENCY.

	SAND TRAINING	SPRING BOARD TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre-Test Mean	3.76	3.80	3.84	Between	0.07	2	0.03	4.65*
				Within	0.42	57	0.01	
Post-test Mean	3.81	3.84	3.84	Between	0.01	2	0.01	0.760
				Within	0.42	57	0.01	
Adjusted Post-test Mean	3.85	3.84	3.80	Between	0.03	2	0.01	17.51*
				Within	0.04	56	0.001	
Mean Diff.	0.05	0.03	-0.01					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.

*Significant at 0.05 level

As shown in Table- I, the obtained pre-test means on Stride frequency on Sand training group was 3.76, Spring board training group was 3.80 was and control group was 3.84. The obtained pre-test F-value was 4.65 and the required table F-value was 3.16, which proved that there was significant difference among initial scores of the subjects.

The obtained post-test means on Stride frequency on Sand training group was 3.81, Spring board training group was 3.84 was and control group was 3.84. The obtained post-test F-value was 0.760 and the required table F-value was 3.16, which proved that there was significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and analysis of covariance was done and the obtained F-value 17.51 was greater than the required value of 3.16 and, hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in **Table-II**.

Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on Stride frequency

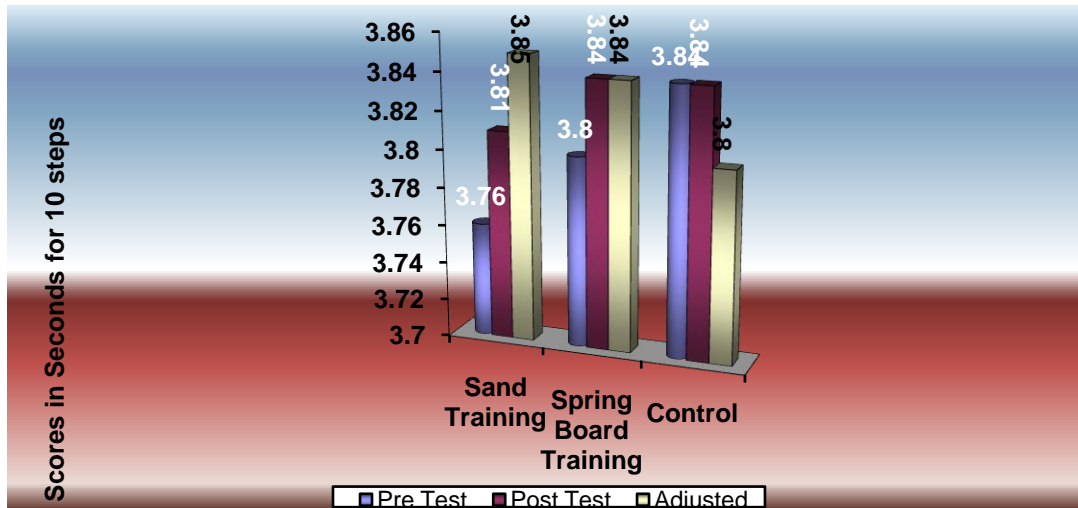
MEANS				Required C.I.
Sand training Group	Spring board training Group	Control Group	Mean Difference	
3.85	3.84		0.01	0.02
3.85		3.80	0.05*	0.02
	3.84	3.80	0.04*	0.02

* Significant at 0.05 level

The post-hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Sand training group and control group (MD: 0.05). There was significant difference between Spring board training group and control group (MD: 0.04). There was no significant difference between treatment groups, namely, Sand training group and Spring board training group. (MD: 0.01).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in **Figure-I**.

BAR DIAGRAM SHOWING PRE-TEST, POST-TEST AND ORDERED ADJUSTED MEANS ON STRIDE FREQUENCY



Discussions on Findings on Stride Frequency

In order to find out the effect of sand training and spring board training on speed parameter Stride frequency the obtained pre and post-test means were subjected to ANCOVA and post-hoc analysis through Scheffe’s confidence interval test.

The effect of Sand training and Spring board training on Stride frequency is presented in Table-I. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 17.51 was greater than the required table F-value to be significant at 0.05 level.

Since significant F-value was obtained, the results were further subjected to post-hoc analysis and the results presented in Table-II proved that there was significant difference between Sand training group and control group (MD: 0.05) and Spring board training group and control group (MD: 0.04). Comparing between the treatment groups, it was found that there was no significant difference between Sand training and Spring board training group among football players.

Thus, it was found that Sand training and Spring board training were significantly better than control group in reducing Stride frequency time and thereby improve stride frequency of the football players.

DISCUSSIONS ON HYPOTHESES

1. Sand training and springboard training would improve speed parameters, such as, stride frequency of football players compared to control group.
2. There would be no significant differences between sand training and springboard training in altering selected speed parameters of football players.
3. The results presented in Tables- I show the ANCOVA calculations on speed parameters, stride frequency respectively, and the obtained F-values 17.51 were greater than the required F-value of 3.10 to be significant at 0.05 level. The post-hoc analysis presented in Tables- II on selected speed parameters respectively proved that sand training and spring board training groups were significantly better than control group and the formulated hypothesis No. 1 that sand training and springboard training would improve speed parameters, such as, stride frequency of football players compared to control group was accepted at 0.05 level.
4. The formulated hypothesis No. 3 stated that there would be no significant differences between sand training and springboard training in altering selected speed parameters of football players. The multiple comparisons of paired adjusted means of results were presented in Tables- II, I on selected speed parameters, such as, stride frequency,. The results proved that sand training was significantly better than spring board training on speed and to this extent the formulated hypothesis was rejected at 0.05 level, and the alternate hypothesis that there would be significant difference between sand training and spring board training was accepted. As for variables, stride frequency, , there was no significant difference between the treatment groups and hence, the formulated hypothesis was accepted at 0.05 level.

CONCLUSIONS

It was concluded that twelve weeks sand training and spring board training significantly improved speed parameter, such as, stride frequency of the college level football players compared to control group. Comparison between treatment groups proved that there was no significant difference between sand training group and spring board training group in altering stride frequency of the football players.

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