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Comparative effects of plank and weight training exercises on abdomen strength of college students

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Abstract
The Plank Exercises are also known as front hold, hover, or abdominal bridge. Plank exercises are comes under isometric core strength exercises. In this exercises Athlete have to maintain a position similar to a push-up for maximum possible time. Front plank is most common which is held in a push-up-like position, with the body's weight borne on forearms, elbows, and toes. Many variations exist such as the side plank and the reverse plank. Plank is usually used in by those training for boxing, Pilates, yoga, and other many sports. The "Extended Plank" adds substantial difficulty to the standard plank exercises. To perform the extended plank, a person begins in the push-up position and reaches their arms/hands as far forward as possible.
Objectives of the study: To evaluate the effects of plank and weight training exercises on Abdomen strength of college students and determine the significant difference of adjusted post-test means among three groups of college students in relation to Abdomen Strength.
Materials and Methods: To achieve these purpose Ninety (90) male college students from Government College Kasrawad Dist- Khargone (M.P.) in age group U.G. and P.G. students were selected randomly as subjects. Further they were divided into three groups, with 30 subjects in each group such as Plank, Weight Training Exercises and control group. Data was analyzed by using 't' test and analysis of covariance (ANCOVA).
Results: As Plank and Weight Training Exercises groups improved significantly having 't' values 35.53 and 39.66 respectively. Control group also significant having 't' value 28.76 but performance was not improved.

Keywords: Plank training exercises, weight training exercises, abdomen strength, college students

Introduction
Researcher feels that this Plank Training Exercise does not need much space and any other additional equipment. So, it can do by everyone. In current scenario everyone is busy with their job schedule. This exercise may help release pressure, tension, anxiety, and stress of job who are continuously working on Personal Computers, Office chairs and some other sitting position works. This exercise can be performed in Childhood, Teen age, and Adulthood and Old age. Researchers also think that, it would be give better healthier and fitter generation in shortest possible time. In weight training exercise needs for equipments and space. As a researcher want to know that effects of plank and weight training exercises on Abdomen Strength of college students.

Objectives of the study
- To evaluate the effects of Plank Training Exercises on muscular strength of abdomen, back and legs of college students.
- To evaluate the effects of Weight Training Exercises on muscular strength of abdomen, back and legs of college students.

Methodology
Subjects
The study has made on Ninety (N=90) male college students from Govt. College Kasrawad were selected as subject for this study at random and their age were ranged between 18-25 years.

Variables and Tests

Abdomen Strength was measured through Bent Knees Sit-ups in Numbers. As far as experimental treatments are concern Eight weeks plank and weight training exercises of were conducted in a planned manner.

Procedure

As the subjects were sedentary they were not able to cope up in the early weeks of programme. So the subjects were allowed to take rest in between the Plank and Weight Training Exercises sets and when they required. After the 2nd and 3rd week the subjects were able to perform the Plank and Weight Training Exercises properly. All the subjects performed the Plank and Weight Training Exercises after proper warming up the experimental groups were given respective training to the subjects six days a week Monday to Saturday except Sundays from 3.00 to 4.00 p.m. Exercises were introduced in progressive manner.

Statistical Analysis

To find out the significance difference between the pre and post test data of each group paired 't' test was applied and to find out between group significance of the difference analysis of covariance (ANCOVA) was applied. Whenever the F ratio for adjusted post mean was found significant, the turkey L.S.D. test was applied to determine the paired mean differences. The level of significance was set at 0.05.

Findings, discussion and conclusions

The first objective was to compare the Adjusted mean Back Strength scores of students belonging to Plank Training Exercise Group, Weight Training Exercise Group and Control group by considering Pre-Back Strength scores as covariate. The corresponding null hypothesis which was tested for this objective was "There is no significant difference in the adjusted means Back Strength scores of students belonging to Plank Training Exercise Group, Weight Training Exercise Group and Control group by considering Pre Back Strength scores as covariate". The data were analyzed with the help of 't' test and One Way Analysis of Covariance (ANCOVA).

An initial analysis of the mean differences of Back Strength for two experimental and one control group and their 't' values is presented in Table 1.

Table 1: Paired 't' ratio of Abdomen strength for all the three groups

Groups	Mean		md	se_{dm}	Cal 't'
	Pre	Post			
Plank Training Exercise	28.60	34.66	-6.06	0.77	-7.85
Weight Training Exercise	29.93	39.93	-10.00	0.99	-10.08
Control Group	30.33	29.36	0.96	0.75	1.28

* Significant at 0.05 level for one tailed test Tab t.05 (89) = 1.699, N=90 df=89

The table-1 clearly reveals that Plank and Weight Training Exercise Groups improved Abdomen Strength significantly having 't' values -7.85 and -10.08 respectively. Control group also significant improved Abdomen Strength having 't' value 1.28 less as compared to Plank and Weight Training Exercises Groups. [The needed 't' value for significance at .05 level with (89) df were 1.699].

For finding the significance of difference between the means of two experimental and one control group analysis of covariance was applied. The value of F and means of two experimental and one control group are presented in table -2.

Table 2: Analysis of variance and covariance of all three groups for Abdomen strength

Source of Variance	Group Means			Sum of Squares	Df	Mean Sum of Square	'F' Ratio
	Plank Training Exercise	Weight Training Exercise	Control Group				
Pre Test Means	28.60	29.93	30.33	B=49.42 W=7831.73	2 87	B=556.13 W=78.22	7.10*
Post Test Means	34.66	39.93	29.36	B=1674.82 W=7355.50	2 87	B=131.23 W=69.85	1.87
Adjusted Post Test Means	35.53	39.66	28.76	B=1817.73 W=1698.38	2 86	B=191.40 W=14.75	12.97*

*Significant at 0.05 level 'F' Ratio needed for significant At 0 .05 (2, 86) =3.10, N = 90

B = Between Group Variance, W= Within Group Variance

The table-2 indicates that 'F' value for adjusted post test means (F=12.97) for Plank and Weight Training Exercise Groups and one control group was significant. [*The* 'F value needed for significant at .05 level with (2, 86) df was 3.10].

To find which of the differences between adjusted group means were statistically significant, the post hoc 't' test was applied as an extension of analysis of covariance. The data related to this is presented in table-3.

Table 3: Paired adjusted final means and difference between means of all three groups for Abdomen strength

Plank Training Exercises	Weight Training Exercises	Control Group	Mean Difference	Critical Difference	Decision
35.53	39.66	-	-4.13*	1.37	Not Sig
35.53	-	28.76	6.77*	1.37	Sig
-	39.66	28.76	10.90*	1.37	Sig
*Significant at 0.05 level					

Table-3 clearly reveals that Plank and Weight Training Exercise Groups were statistically superior to the control group (MD=6.77 and 10.90) respectively, as Mean Difference is greater than Critical Difference, It was also found that Weight Training Exercises Group was statistically superior to Plank Training Exercises Group (MD=-4.13).

The graphic representation of the adjusted final means of all the three groups are presented in figure-1

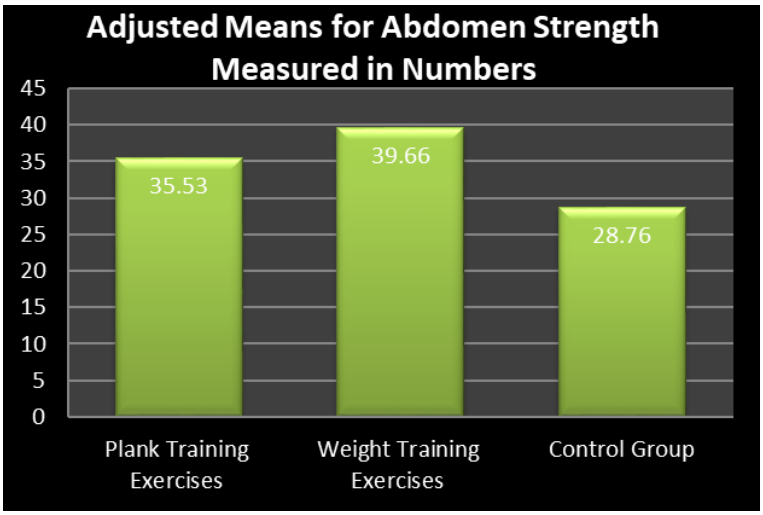

Fig 1: Comparison of paired adjusted final means of the two experimental and one control group for Abdomen Strength.

Discussion of findings

The reason of these differences can be associated with above results this is probably due to the different nature of the physical components training and number of training and level of participation. The reason may be attributed that the level of College Students and taken different types nutrition food. These results may be due to a small sample of size and other factors such as different types of body, differences in body composition. These results may be nutrition diet schedule differences. The reason may be Psychological variables like stress, sports competition anxiety, aggression, fear, motivation confidence, attention concentration etc. The findings of present study is supported by the study conducted by LiyeZou, Nan Zeng&Jun He., (2016) assessed the preliminary effects of an 8-week school-based Bamboo Dance intervention on motor fitness performance among college students in China. The intervention underwent 8 weeks of training session (90 min per week). Balance was measured before and after the training session for each group. Indicated that participants in the intervention program showed significantly promotions in balance and strength 109 than students in control group performing Bamboo Dance provides the health benefits to college students in terms of developing lower extremity-related motor abilities & fitness.

Conclusion

Conclusively it was found that both Plank Training Exercise and Weight Training Exercise were found near about equally effective in enhancing Abdomen Strength of College students when the groups were matched on Pre-Abdomen Strength Scores. Weight Training Exercises group was found to be significantly more effective than Control Group in enhancing Abdomen Strength of students when the groups were matched on Pre-Back Strength Scores. Plank Training Exercises group was found to be significantly more effective than Control Group in enhancing Abdomen Strength of students when the groups were matched on Pre-Back Strength Scores.

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