

EFFECT OF 30 DAYS ABDOMINALS CHALLENGE VERSUS 30 DAYS PLANKS CHALLENGE ON WAIST CIRCUMFERENCE AND ABDOMINAL SKIN FOLD MEASUREMENTS IN HEALTHY YOUNG INDIVIDUALS: RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Background: With urbanization and development there is reduction in physical activity. According to statistics, about 10-20% of children in India are obese. This number increases to upto 30% among adolescents. About 2/3rd of children with obesity continue to be obese in adult life. A number of physical health problems are associated with obesity.

Purpose: To evaluate and compare the effect of 30 days abdominals challenge versus 30 days planks challenge on waist circumference and abdominal skin fold measurements in healthy young individuals.

Materials and Methods: 60 subjects aged between 18 to 30 years were included. The subjects were conveniently selected and then divided into 2 groups: 30 days Abdominals challenge and 30 days Planks challenge. Demographic data and waist circumference, hip circumference, waist hip ratio and skin fold measurement at the abdominals was noted pre and post the intervention. Subjects had to follow a set protocol with respective rest periods in between for 30 days.

Results: Post intervention a mean difference of 2.58 ± 1.87 was seen in the waist circumference in the Abdominals group whereas a mean difference of 1.88 ± 1.39 was noted in the waist circumference in the Planks group. The abdominal skin fold measurements showed a mean difference of 5.10 ± 3.32 in the Abdominals group while a mean difference of 4.14 ± 3.14 was seen in the Planks group. There was no statistical significance found between both the groups with p value more than 0.0001.

Conclusion: The 30 days Abdominals challenge and 30 days Planks challenge are equally effective in reduction of waist circumference and abdominal skin fold measurements.

KEY WORDS: Abdominal Obesity, Abdominal Skin Fold Measurements, 30 Days Abdominals Challenge, 30 Days Planks Challenge.

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INTRODUCTION

Quality of life of individuals varies and it is influenced by lifestyle, infrastructure, emotional and social wellbeing. People who are inactive are more likely to gain weight. Obesity is a worldwide epidemic and is characterized by excess adipose tissue. It contributes to numerous chronic diseases and early mortality.

To predict weight related risk, BMI and waist circumference are most commonly used. Measurements of height, weight, circumferences and skinfolds are used to estimate body composition. The principle behind the skin fold measurement technique is that the amount of subcutaneous fat is proportional to the total amount of body fat and it is assumed that close to one third of the total fat is located subcutaneously [1]. Skin fold measurement at the abdomen is taken at the vertical fold; 2 cm to the right side of the umbilicus with the subject in standing [1].

Waist circumference is measured with the subject standing, arms at the sides, feet together and abdomen relaxed, a horizontal measure is taken above the umbilicus and below the xiphoid process [2]. In Asian populations; abdominal or central obesity is more common than obesity defined by BMI. A study in India observed that about 20% of adults who were not overweight or obese as per the BMI definition still had abdominal obesity [3].

Hip circumference is measured with the subject standing erect and feet together, a horizontal measure is taken at the maximal circumference of buttocks [4]. Health risk is very high for young men when WHR is more than 0.95 and for young women when WHR is more than 0.86 [5].

As there is an increase in the awareness among the people about the various risk factors associated with obesity, many individuals are undergoing different weight reduction programs. According to statistics, about 10-20% of children in India are obese. This number increases to up to 30% among adolescents. About 2/3rd of children with obesity continue to be obese in adult life [6]. So, obesity is becoming an evolving health problem and it has to be taken care of.

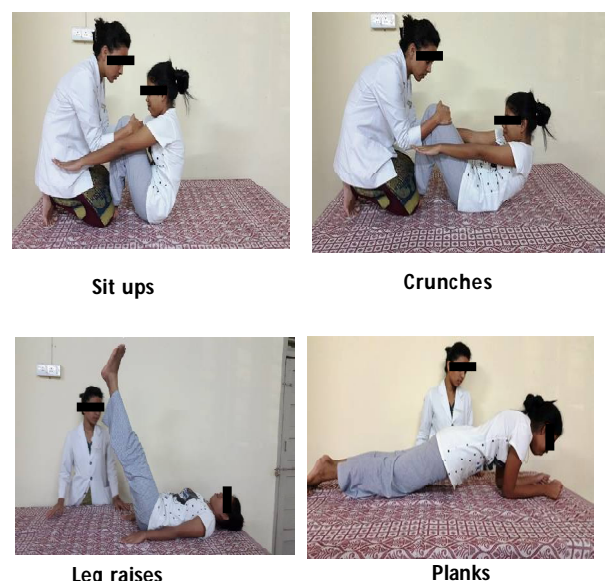
Abdominals and plank exercises consume less time and so they can be incorporated in hectic schedules. These exercises have individual benefits like crunches, sit ups and leg raises work only on the anterior portion of the core muscles whereas planks work on the entire core muscles as well as many other muscles in the body [7].

Since the 30 days Abdominals and 30 days Planks challenge is being used by many health clubs, a comparison as to which one is more beneficial has to be studied.

MATERIALS AND METHODS

An approval for the study was obtained from the Institutional Ethical Committee. 60 subjects aged between 18 to 30 years, both males and females and individuals who were not undertaking any other forms of treatment for weight reduction were included. Exclusion consisted of individuals with recent spinal trauma, upper or lower limb fractures and low back pain with / without neurological symptoms. Subjects were conveniently selected and randomly divided into 2 groups: 30 days abdominals challenge and 30 days planks challenge. Demographic data was collected. Waist circumference [2], hip circumference [4], waist hip ratio and skin fold measurement at the abdominals [1] was measured using the skin fold caliper pre and post the 30 days intervention. Subjects had to follow a set protocol with respective rest periods in between for 30 days.

Fig. 1: 30 days Abdominals challenge exercises.



EXERCISE PROTOCOL

30 days Abdominals challenge

Day1	15 sit ups , 5 crunches, 5 leg raises, 10 seconds planks
Day 2	20 sit ups, 8 crunches, 8 leg raises, 12 seconds planks
Day 3	25 sit ups, 10 crunches, 10 leg raises, 15 seconds planks
Day 4	REST DAY
Day 5	30 sit ups, 12 crunches, 12 leg raises, 20 seconds planks
Day 6	35 sit ups, 15 crunches, 15 leg raises, 25 seconds planks
Day 7	40 sit ups, 20 crunches, 20 leg raises, 30 seconds planks
Day 8	REST DAY
Day 9	45 sit ups, 30 crunches, 30 leg raises, 38 seconds planks
Day 10	50 sit ups, 50 crunches, 30 leg raises, 38 seconds planks
Day 11	55 sit ups, 65 crunches, 33 leg raises, 42 seconds planks
Day 12	REST DAY
Day 13	60 sit ups, 75 crunches, 40 leg raises, 50 seconds planks
Day 14	65 sit ups, 85 crunches, 42 leg raises, 55 seconds planks
Day 15	70 sit ups, 95 crunches, 42 leg raises, 60 seconds planks
Day 16	REST DAY
Day 17	75 sit ups, 100 crunches, 42 leg raises, 65 seconds planks
Day 18	80 sit ups, 110 crunches, 48 leg raises, 70 seconds planks
Day 19	85 sit ups, 120 crunches, 50 leg raises, 75 seconds planks
Day 20	REST DAY
Day 21	90 sit ups, 130 crunches, 52 leg raises, 80 seconds planks
Day 22	95 sit ups, 140 crunches, 55 leg raises, 85 seconds planks
Day 23	100 sit ups, 150 crunches, 58 leg raises, 90 seconds planks
Day 24	REST DAY
Day 25	105 sit ups, 160 crunches, 60 leg raises, 95 seconds planks
Day 26	110 sit ups , 170 crunches ,60 leg raises , 100 seconds planks
Day 27	115 sit ups, 180 crunches, 62 leg raises, 110 seconds planks
Day 28	REST DAY
Day 29	120 sit ups, 190 crunches, 62 leg raises , 115 seconds planks
Day 30	125 sit ups, 200 crunches, 65 leg raises, 120 seconds planks

30 days Planks challenge

Day1	20 seconds
Day 2	20 seconds
Day 3	30 seconds
Day 4	30 seconds
Day 5	40 seconds
Day 6	REST DAY
Day 7	45 seconds
Day 8	45seconds
Day 9	60 seconds
Day 10	60 seconds
Day 11	60 seconds
Day 12	90seconds
Day 13	REST DAY
Day 14	90 seconds
Day 15	90 seconds
Day 16	120seconds
Day 17	120 seconds
Day 18	150 seconds
Day 19	REST DAY
Day 20	150seconds
Day 21	150 seconds
Day 22	180 seconds
Day 23	180 seconds
Day 24	210 seconds
Day 25	210 seconds
Day 26	REST DAY
Day 27	240 seconds
Day 28	240seconds
Day 29	270 seconds
Day 30	300 seconds

Fig. 2: 30 days Planks challenge exercises.



STATISTICAL ANALYSIS

Post the intervention paired and un-paired t-test was used to analyze the data which was assessed on the basis of p value which should be ≤ 0.0001 .

RESULTS

Table 1: Demographic data.

Parameters	Mean ± SD	
	Abdominals group	Planks group
Age (years)	20.58 ± 1.97	22 ± 1.57
BMI (kg/m ²)	22.19 ± 2.74	24 ± 3.51

Table 2: Analysis of 30 days Abdominals challenge group using paired t-test (n=29).

PARAMETERS		Mean ± SD	p value	t value
Hip circumference	Pre	101.24 ± 8.68	<0.0001	5.88
	Post	99.87 ± 8.30		
Waist circumference	Pre	77.77 ± 7.67	< 0.0001	8.2
	Post	75.39 ± 7.63		
Waist Hip Ratio	Pre	0.76 ± 0.05	0.0003	4.12
	Post	0.75 ± 0.05		
Abdominal skin fold measurements	Pre	33.69 ± 5.51	<0.0001	8.27
	Post	28.58 ± 4.97		

Table 3: Analysis of 30 days Planks challenge group using paired t-test (n=27).

PARAMETERS		Mean ± SD	p value	t value
Hip circumference	Pre	105.52 ± 8.27	< 0.0001	9.05
	Post	103.72 ± 7.67		
Waist circumference	Pre	79.24 ± 8.16	< 0.0001	7.03
	Post	77.35 ± 8.12		
Waist Hip Ratio	Pre	0.74 ± 0.05	0.06	1.95
	Post	0.74 ± 0.05		
Abdominal skin fold measurements	Pre	35.63 ± 7.38	< 0.0001	6.85
	Post	31.48 ± 6.50		

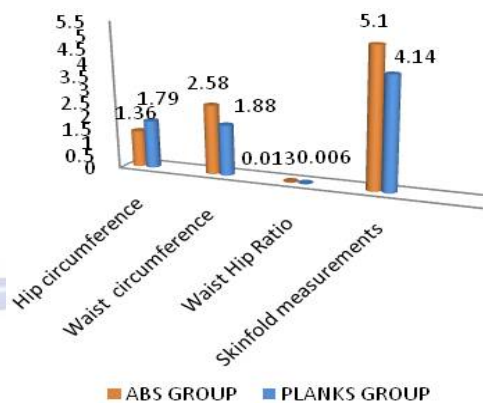
Table 4: Comparison between the groups using un-paired t-test.

PARAMETERS		Mean ± SD	p value	t value
Hip circumference	Abdominals group	1.36 ± 1.24	0.1627	1.41
	Planks group	1.79 ± 1.03		
Waist circumference	Abdominals group	2.58 ± 1.87	0.1226	1.56
	Planks group	1.88 ± 1.39		
Waist Hip Ratio	Abdominals group	0.013 ± 0.01	0.1422	1.49
	Planks group	0.006 ± 0.01		
Abdominal skin fold measurements	Abdominals group	5.10 ± 3.32	0.2748	1.1
	Planks group	4.14 ± 3.14		

As seen in Table 2, there was a significant difference in the waist circumference, hip circumference, Waist Hip Ratio and abdominal skin fold measurements in the Abdominals group

with p value <0.0001. The results shown in Table 3 states that there was a significant difference in the waist circumference, hip circumference and abdominal skin fold measurements in the Planks group with p value <0.0001. While the Waist Hip Ratio had no significant difference with a p value of 0.0620.

Graph 1: Comparison between the groups.



As seen in Graph 1, post intervention a mean difference of 2.58 ± 1.87 was seen in the waist circumference in the Abdominals group whereas a mean difference of 1.88 ± 1.39 was noted in the waist circumference in the Planks group. The abdominal skin fold measurements showed a mean difference of 5.10 ± 3.32 in the Abdominals group while a mean difference of 4.14 ± 3.14 was seen in the Planks group. There was no statistical significance found between both the groups with p value >0.0001.

DISCUSSION

The study was done to find the effect of 30 days Abdominals challenge versus 30 days Planks challenge on waist circumference and abdominal skin fold measurements in healthy young individuals. 60 subjects participated in this study out of which there was 1 dropout in the Abdominals group and 3 dropouts in the Planks group due to occurrence of back pain and musculoskeletal injuries such as ligament tear and sprains.

Exercise programs (aerobic or resistance training) may lead to differential regional adipose tissue depot loss, possibly by differential regional alterations of adipose tissue depot metabolism.

Several studies have shown that exercise induced relative loss of fat seems to be higher

in the abdominal region [8] or in the arms [9] than in the femoral region.

It is seen that people practicing vigorous activities on a regular basis had lower subcutaneous skinfold thicknesses and waist-to-hip ratios than those not performing these activities [10].

A study done by Frank I. Katch et al reported that the conventional sit up exercises does not preferentially reduce adipose cell size or subcutaneous fat thickness in the abdominal region to a greater extent compared to other adipose sites and significant changes in fat cell size may occur in the absence of changes in fatfolds, girths or total body composition [11].

As seen in Table 3 the Waist Hip Ratio had no significant difference in the Planks group which is supported by a study, that reductions in visceral and total abdominal fat occurs in the absence of changes in body mass and waist circumference [12].

In the Planks group, subjects had to hold plank position for a duration which progressively increased each successive day. The rectus abdominis and transverse abdominis are primary supporters during plank exercises while the obliques also stabilize the plank position isometrically. Subcutaneous fat is reduced in localities where muscles are active and in proportion to their activity [13].

Since there was no significant difference between Abdominals and Plank groups proving that both the groups were equally effective in showing results. The limitations of this study were that subjects more than 30 years of age were not included, daily dietary intake was not checked, long term effect of the exercises were not taken into account due to a short study duration and gender distribution in both the groups was unequal. Future studies on comparison of these exercises on BMI and weight of an individual could be done. Objective outcomes like ultra sonography and EMG could also be used.

CONCLUSION

Post the intervention, there was a 3.06% change noted in waist circumference in the Abdominals group whereas a change of 2.38% was observed

in the Planks group. While the abdominal skin fold measurements showed 15.16% change in the Abdominals group and 11.64% change in the Planks group. Clinically, the Abdominals group was more effective but statistically there was no significant difference found between both the groups. Thus, the 30 days Abdominals and 30 days Planks exercises were equally effective in showing results on waist circumference and abdominal skin fold measurements.

ABBREVIATIONS

BMI - Body Mass Index

WHR - Waist Hip Ratio

ABS group - Abdominals group

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Conflicts of interest: None

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