

# Comparative Study of Effects of Selective Yogasanas and Abdominal Crunches on Abdominal Girth

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**Abstract:** Background: India is the third most obese country in the world. Abdominal fat deposition increases one's risk of CAD, carcinoma, hypertension, atherosclerosis, hypercholesterolemia. Objective: To compare the effects of abdominal crunches v/s selective Yogasanas on abdominal girth. Outcome measure: Girth measurement in cm at umbilical level. Methodology: 40 participants were divided in two groups for abdominal crunches and yogasanas, 4 weeks intervention was carried out with 5 supervised sessions per week. Result: Statistically significant reduction of abdominal girth in each of the group as well as between the group. Conclusion: Yogasanas and Crunches both are effective in reducing abdominal girth, but better improvement was found in yoga performing group.

**Keywords:** abdominal girth, abdominal crunches, yogasanas

## 1. Introduction

Obesity is defined as a condition of abnormal or excessive fat accumulation that presents a risk to health<sup>[1]</sup>. Obesity is caused due to disturbed energy balance equation, where calorific intake exceeds daily energy expenditure. Excess calories accumulate and get stored as fat in the adipose tissue<sup>[2]</sup>.

Excessive fat deposition increases one's risk of sleep apnea, coronary artery disease, carcinoma, hyperinsulinaemia, insulin resistant diabetes mellitus, hypertension, atherosclerosis, hypercholesterolemia, metabolic syndrome, degenerative joint diseases, gall bladder disease etc<sup>[3]</sup>.

Yoga is a form of physical activity which may assist in achieving recommended level of physical activity. It requires little space and virtually no equipment, has limited or no side effects and with its focus on relaxation of mind and body. Yoga considers all aspects of health like physical, emotional and mental<sup>4</sup>. Yogasanas are defined as, "To be seated in a position that is firm but relaxed for extended or timeless period". The various documented health benefits of Yogasanas are as follows: Improves flexibility, strength and balance, reduces stress and anxiety, increased energy and decreased fatigue, improves physical health and quality of life measures, decreases sleep disturbance and controls hypertension, etc<sup>[5]</sup>.

Abdominal crunches help in augmentation of energy utilization of muscle. The improvement of muscles ability to use energy is as a result of increased level of oxidative enzymes in the muscles, increased mitochondrial density and size and an increased muscle fibre capillary supply. Many physiological, cardiovascular, respiratory and metabolic changes occur with crunches along with benefits such as: decrease in fat, blood cholesterol and triglyceride level, decrease in resting pulse rate, increase in the extraction of oxygen by working muscles, muscle hypertrophy, etc<sup>[6]</sup>.

In present era a lot of population including the middle age people are concerned about physical fitness, self image and cosmetic appearance as all of them influence the person in either way. There are lot of fitness regime and specific exercises to reduce abdominal fat tissues. Till date studies have investigated effects of yogasanas and crunches on abdominal girth as well as effects on pulmonary functions but there was no clarity regarding selective yoga asanas/crunches and there are very few comparative studies<sup>[4,7,8]</sup>. Hence, making it often difficult for an individual to decide which specific exercises to begin and adhere for achieving better and long term results. Hence, the present study was aimed to study & compare the effects of selective Yogasanas with abdominal crunches and recommend the best to reduce the abdominal girth.

## 2. Methodology

40 female subjects were recruited and all subject met the inclusion criteria for study procedure. Subjects were recruited after providing informed, written consent. The enrollment criteria applied were as follows: 1) Healthy females between the age group of 19-25 years. 2) Subjects with abdominal girth more than 80 cm at umbilicus. Exclusion criteria were as follows: 1) Any physical and/or mental disability. 2) Suffering from medical disorders. E.g. Bronchial asthma, bronchitis, pneumonia etc. 3) Musculoskeletal injuries in past 6 months. 4) Going to gymnasium and/or performing regular exercise or yoga. 5) Following weight reduction diet plan. 6) Pregnancy. 7) Menstruation. Type of study was comparative interventional study, simple random sampling method using chit picking was carried out. 40 subjects were divided into two groups, (20 in crunches and 20 in yogasana group). Prior to starting the exercise protocol, girth measurements were taken at umbilicus level. Subjects carried out exercises for 5 days/week for 4 week period for 40 minutes (exercise program included- warm up 10 minutes, exercise protocol 25 minutes, cool down 5 minutes) to induce exercise related

changes in abdominal girth.

**Crunches**

1) Simple crunch - 10 repetitions/set. 3 sets/session.



**Simple crunch**

2) Oblique crunch-10 repetitions/set. 3 sets/session.

3) Reverse crunch-20 repetitions/session.

4) Bicycle crunch-20 repetitions/set. 2 sets/session.



**Oblique crunch**



**Reverse crunch**



**Bicycle crunch**

**Yogasana**

1) Pawanmuktasana- 3 repetitions/session. Each repetition , hold for 30 seconds.

2) Halasana- 3 repetitions/session. Each repetition, hold for 30 seconds.

3) Bhujangasana- 3 repetitions/session. Each repetition, hold

for 30 seconds.

4) Dhanurasana- 3 repetitions/session. Each repetition, hold for 30 seconds.



**Pawanmuktasana**



**Bhujangasana**



**Halasana**

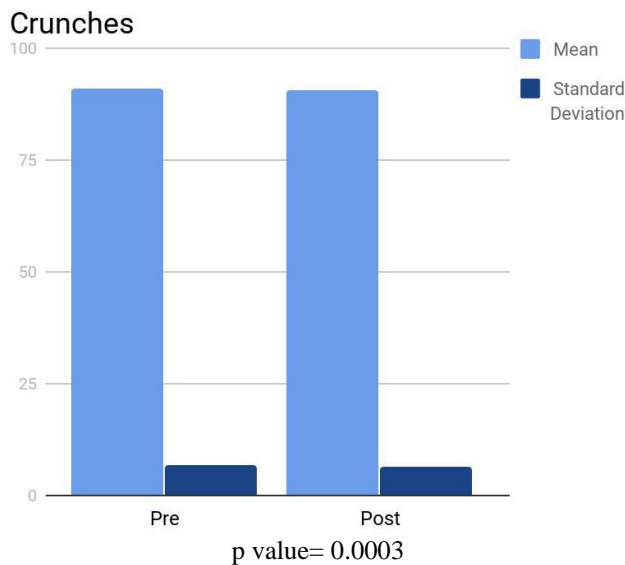


**Dhanurasana**

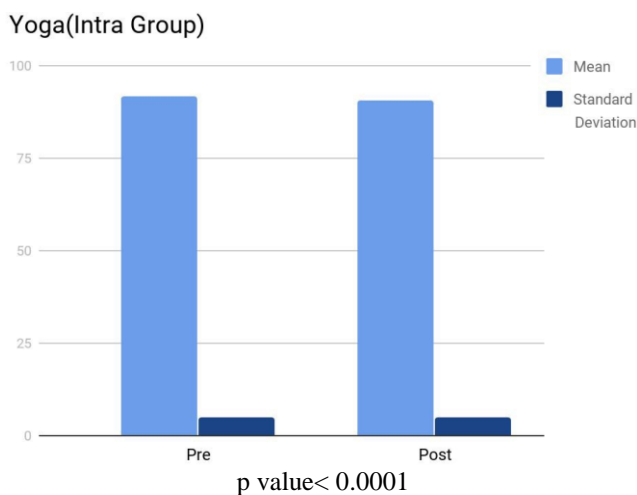
### 3. Result and Analysis

Collected data was entered in 'Graphpad instat' software, Mann Whitney U test was used for between the groups as the data did not pass the normality statistical test and Paired t test was used for within the group as data passed the normality statistical test.

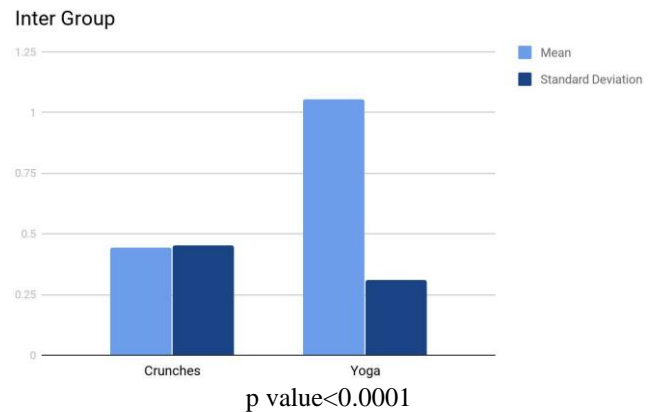
Crunches	Mean (in cms)	Standard deviation
pre	90.97	6.664
post	90.52	6.534



Yogasana	Mean (in cms)	Standard deviation
Pre	91.64	4.941
Post	90.59	4.893



Inter Group	Mean of difference (in cms)	Standard Deviation
Crunches	0.445	0.4536
Yoga	1.055	0.3103



### 4. Discussion

The aim of the study was to study & compare the effects of abdominal crunches and selective yogasanas respectively on abdominal girth. Following 4 weeks of exercise showed that there was a statistically significant reduction in abdominal girth at umbilical level in both the groups, but the yoga group showed better improvement as compared to abdominal crunches.

The probable reasons for our study findings could be attributed to the physiological changes associated with respective exercise and are as discussed below:

The more one exercises the more is the muscle use. The more one uses one's muscle the more metabolically active muscle becomes. This means, even at rest, more calories are burnt and there is reduction in weight. The basal metabolic rate increases, hence leading to consumption of the stored fat in adipose tissue. In this study, different crunches were given to improve the strength and reduce the excessive fat deposition in the abdominal regions. Various muscles targeted are upper and lower part of rectus abdominus, internal and external obliques, the hip and thigh musculature and lateral rotators of the trunk in various combinations<sup>[9]</sup>.

The slow and steady poses, which require slow breathing in every posture, includes stretching along with muscle contraction build up heat, burn the calories and potentially cause a calorie reduction. Yoga acts on metabolism as well as on fat deposits. The deep breathing in yoga increases the oxygen intake to the cells in the body, including the fatty tissues which burn once they come in contact with oxygen<sup>[4]</sup>.

Abdominal crunches as well as yogasanas improves the strength and endurance of the abdominal muscles. Hence, in turn it improves the tone of these muscles. This reduces the sagging of the abdomen. Thus, laxity of muscle decreases which is seen as reduction in abdominal girth.

A comparative study by Nisha shinde, Shindhe KJ, Khatri SH, Deepali Hande from Pravara Institute of Medical Sciences, India on yoga and aerobic exercises in obesity and its effect on Pulmonary function shows that obese subjects who participated in yoga group showed better improvement in terms of pulmonary functions and reduction of BMI compared to subjects who participated in aerobic group<sup>[4]</sup>.

Study by Jerold Petrofsky of Loma Linda University on EMG activity in yoga and yoga related activity compared to

abdominal crunches shows that the work performed in a single yogic exercise combined with breathing was equivalent to 5 crunches, for the rectus abdominus the work was about 2.5 times higher in yoga than crunches, whereas for obliques, the work was 6 times higher than for crunches. The muscle activity for all 4 muscle groups during abdominal crunches averaged 24% of the total activity of these muscles. For breathing exercises, muscle activity was somewhat greater with 41% of the muscle activity. These differences were significant ( $P < 0.05$ ). For breathing exercises, the greatest muscle activity was for the obliques<sup>[10]</sup>. Thus, the effects of both the groups - yoga being more effective than abdominal crunches can be summarized as:

- 1) Augmentation of energy utilization of the muscles.
- 2) Improvement of muscle ability to use energy is the direct result of increased levels of oxidative enzymes in the muscles as well as increased mitochondrial density and an increased muscle fibre capillary supply.
- 3) The muscles used and the cardiovascular systems will adapt to the training stimulus over time.

The study shows that there was a statistically significant reduction in girth at umbilicus level [0.4450 cm and 1.055 cm for crunches and yoga respectively]. Difference between the two groups is statistically significant. Hence yogasanas showed better effect than crunches in reducing abdominal girth.

## 5. Conclusion

Based on the results of the present study, selective yogasanas can result in reducing abdominal girth and associated long term health problems (Hypertension, DM, CAD, metabolic syndrome). Hence, they can be used as a health promotion activity at community levels in various settings.

## 6. Future Scope

- 1) Study can be done in large populations.
- 2) Study can be done for longer duration.
- 3) Aerobic exercises other than crunches and yogasanas other than used in this study can be done.

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## Author Profile



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