



## Physiotherapy

## COMPARISON OF BASIC FLEXIBILITY AMONG SCHOOL GOING BOYS AND GIRLS AGED 13 TO 17

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**ABSTRACT** **Background-** Flexibility is commonly accepted as an important component in reducing the prevention for injury. Regular physical exercise is important for younger generations, especially with the rise of obesity in children. **Objectives-** To compare basic flexibility among school going boys and girls aged 13 to 17. **Method-** 100 subjects were allocated into two groups. Group A having 49 boys and Group B having 51 girls were assessed for basic flexibility with the help of sit and reach test and trunk rotation test. **Result-** There was significant difference of flexibility between group A and B and the result of trunk rotation test showed no significant difference between group A and group B. **Conclusion-** This study concluded that group A was having more flexibility than group B using sit and reach test. On the other hand, group A flexibility was same to group B using trunk rotation test.

**KEYWORDS :** Adolescents, flexibility**INTRODUCTION**

Childhood fitness is an emerging area of public health concern all over the world. The prevalence of childhood obesity and morbidities associated with it are increasing. Some of the reasons attributed to this increase in obesity and decrease in fitness levels, are improved economic status and better lifestyle choices, increased academic demands, which decrease the time effectively spent in physical activity, and concerns of safety, which parents voice as reasons for disallowing physical activity.<sup>1</sup>

Flexibility is defined as the ability of the muscle to lengthen to the end of the ROM. It is influenced by muscles, tendons, ligaments, bones, and bony structures.<sup>2</sup>

Flexibility is commonly accepted as an important component in reducing the prevention for injury.<sup>3</sup> According to Giles R et al, aging leads to decrease in flexibility. Increase in flexibility is seen from birth to adolescence.<sup>4</sup> Lack of flexibility is common cause of muscle injuries. There has been an enormous growth in sports activities since 1970.<sup>5</sup>

Regular physical exercise is important for younger generations, especially with the rise of obesity in children. Heart disease, type 2 diabetes, asthma and social discrimination are just a few of the possible consequences of a childhood spent in front of the television or the internet.<sup>6</sup>

Range of motion is meaningful component of fitness, especially in order individuals where a deficiency of flexibility can restrict participation in some everyday life activities.

A lack of flexibility may also contribute to the likelihood of falls, due to loss of balance and stability. Presently, there is limited scientific evidence that describes the independent and combined effects of strength training and aerobic exercise on flexibility development in school going children.<sup>2</sup>

**MATERIALS AND METHODOLOGY**

The study was comparative in nature. Total 100 subjects included in the study were school going children selected with convenient sampling technique.

**Outcome measures:**

- Sit and reach test
- Trunk rotation test

**Inclusion criteria:** Normal healthy subjects of both genders of 13-17 years of age were included in the study.

**Exclusion criteria:**

Subjects with recent or chronic musculoskeletal injuries, any associated physical disability (Poliomyelitis and Muscular dystrophy), any associated medical and surgical condition, any acute or chronic lower extremities pain, suffering from any type of neurological disorder (cerebral palsy, head injury and spinal cord injury) and uncooperative subjects were excluded from the study.

**Procedure**

Total of 100 subjects who met the inclusion criteria were selected in the study. A written consent was obtained from all subjects. Then the subjects were allocated into two groups- Group A and Group B. Group A was having 49 boys and Group B was having 51 girls After doing the required assessment, all the subjects were assessed for basic flexibility with the help of two flexibility test i.e. sit and reach test and trunk rotation test.

**METHODS****Sit and reach test:**

The test is a common measure of flexibility and specifically measures the flexibility of the lower back and hamstring muscles. The test involves sitting on the floor with legs stretched out straight ahead. Shoes should be removed. Sole of the feet are placed flat against the box. Both knees should be locked and pressed flat to the floor and the tester may assist by holding them down. With the palms facing downwards and the hand on top of each other, subject reaches forward along the measuring line as far as possible. While the distance is recorded. The score is recorded to the nearest inches. Subject able to touch the toes is considered as normal. Reaching before the toes is negative score and reaching after the toes is positive score.

**TRUNK ROTATION TEST:**

Make a vertical line on the wall. Stand with back to the wall directly in front of the line. Subject should be about arms length away from the wall with feet about shoulder width apart. Extend arms out in front (parallel to the floor). With arms extended and parallel to the floor, twist torso right and touch the wall with fingertips. Subject can turn shoulders, hips and knees. Feet should not move. Have someone mark the position where finger tips touches the wall. Measure the distance from the line. A touch before the line is a negative score and a touch after the line is a positive score. Repeat for the left side and take the average of the 2 scores.

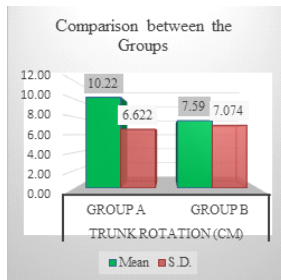
**DATA ANALYSIS AND RESULTS**

All the data was measured using descriptive statistics. Inter group comparison done by calculating mean and standard deviation and using unpaired t test.

**Table 1 Showing Unpaired t Test for trunk rotation test between group A and B**

Unpaired t test for trunk rotation test	Group A	Group B
Mean	10.22	7.59
SD	6.622	7.074
SE	1.372	
P value	0.0575	
Significance	Not – Significant	

Table 1



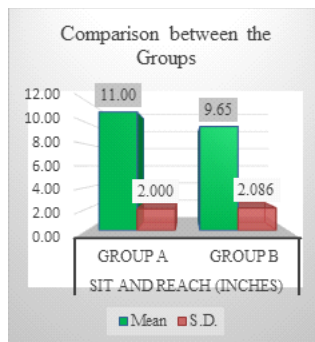
Graph 1

Graph 1 represents the mean±SD values of group A and B are  $10.22 \pm 6.622$  and  $7.56 \pm 7.074$  respectively which shows that there is no statistical significant change in value of trunk rotation test between group A and group B.

**Table 2 Showing Unpaired t Test for Sit and reach between group A and B**

Unpaired t test for Sit and reach test	Group A	Group B
Mean	11.00	9.65
SD	2.000	2.086
SE	0.409	
P value	0.0013	
Significance	Significant	

Table 2



Graph 2

Graph 2 represents the mean±SD values of group A and B are  $11.00 \pm 2.000$  and  $9.65 \pm 2.086$  respectively which shows that there is statistical significant difference of sit and reach test between group A and group B.

## RESULTS

Table 1 Shows the calculated value of trunk rotation test. There is no significant difference between group A and group B. Hence null hypothesis is accepted.

Table 2 Shows that calculated value sit and reach test. There is significant difference between the group A and B. Hence null hypothesis is rejected.

## DISCUSSION

School going children are unaware of the condition eventually develop various problems like low back pain, problems in activities like running, walking, turning or maintain balance on uneven base of

support due to lack of flexibility. So, need of the study was to find and compare basic flexibility in school going boys and girls.

In the present study p value for age was 0.5277 for group A and group B which was greater than 0.05 thus there was no significant difference between group A and group B. Whereas in a similar study (Tremblay et al., 2010) Sit-and-reach scores for boys and girls in all age groups were lower in 2007-2009 than in 1981. In a study by McMillan and Erdmann (2010), girls improved in sit-and-reach performance over a 6-year period, but performance among boys decreased. According to Giles R et al, aging leads to decrease in flexibility. Increase in flexibility is seen from birth to adolescence.6

In the present p values for BMI was 0.0793 for group A and group B which was greater than 0.05. Statistically there was no significant difference between group A and group B. But according to Elżbieta Cieśla, Edward Mleczo, Józef Bergier (2014) BMI negatively affected the level of all the Health-Related Fitness components analysed ( $p=0.000$ ). The negative effect of computer games revealed itself only with respect to flexibility ( $p=0.000$ ), explosive leg power ( $p=0.000$ ) and trunk muscle strength ( $p=0.000$ ). A positive effect of spontaneous activity was observed for flexibility ( $p=0.047$ ), explosive leg power ( $p=0.000$ ), and arm strength ( $p=0.000$ ). Therefore, In this present study no difference found between group A and group B. So, both groups were comparable.

In this study, Lower limb flexibility and lower back flexibility is measured by sit and reach test which is moderately associated with hamstrings and back muscle extensibility. The p values for sit and reach test was 0.0013 for group A and 9.65(inches) in group B which was less than 0.05. So, there was statistically significant difference among group A than the group B. Group A (Boys) have higher flexibility for sit and reach test than group B (girls). Thus a similar study was performed by Welk and colleagues (2010) and found that boys had better sit-and-reach scores in high school than in elementary or middle school and that girls had lower sit-and-reach scores in high school than in elementary or middle school. In this present study boys have higher flexibility than girls Thus males were on higher flexibility scores for sit and reach test which measure the flexibility of lower back and lower limbs. This would be due to increase in the height with the age. According to Tremblay and colleagues (2010) girls were more flexible than boys across all age groups during the school years, but found no differences across age groups for either boys or girls. Present study which sampled school going children were mostly all of a similar age weight and body mass index (BMI). No major difference between the genders was noted as there were 49 boys and 51 were girls. There is statistically significant difference between height of boys and girls and this would be the reason for higher value of sit and reach test among group A (Boys).

Trunk flexibility was measured by trunk rotation test. In trunk rotation test p values for group A and group B was 0.0575 which was greater than 0.05. So statistically there was no significant difference between group A and B.

In health-related fitness measures, children of both genders performed very well in accordance to the reference norms for sit and reach test and trunk rotation.

## CONCLUSION

The conclusion of the study was boys have more flexibility than girls while doing sit and reach test. Results showed significant difference between both the groups. On comparing the result of trunk rotation test between group A and group B, there was no significant difference between groups.

## LIMITATIONS AND RECOMENDATION

Subjects of age group 13 to 17 years only were included in the study. The sample size of study was small.

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