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Correlation Between Level of Physical Activity and Thoracic Spine Mobility Among Sedentary Young Individuals

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ABSTRACT

Background: Sedentary lifestyle is an undesirable characteristic of modern society, affecting significant proportion of population. Technological advances, societal influences and environmental attributes have significantly influenced the way we spend our leisure work and travel time and how we live our lives at home and in our communities, resulting in substantial proportions of the day spent in sedentary pursuits or sitting.
Need of the study: Due to prolonged sitting it is reasonable to suppose that sedentary behavior may induce musculoskeletal changes within relatively stiff thoracic spine contributing towards dysfunction in adjacent spinal regions. Despite the fact that the effects of prolonged sitting and physical activity on thoracic spine mobility have not been widely investigated, so here arises the need of this study is to evaluate the level of physical activity and thoracic spine mobility among sedentary young individuals.
Methodology: Physical activity and sitting time measured using the International Physical Activity Questionnaire short form. Universal Goniometer is used to measure thoracic spine mobility (Age 18-30).
Result: The correction coefficient "r" is found to be 0.392 on right thoracic spine rotation and 0.365 on left thoracic spine rotation with ($p<0.05$) indicating highly significant correlation between physical activity and thoracic spine mobility on both sides.
Conclusion: This study indicates that sedentary behaviors with light intensity of physical activity have reduced thoracic spine mobility.

Keywords: Thoracic Spine Mobility, Physical activity, Sedentary behaviour, Young individuals.

INTRODUCTION

Sedentary behavior, typically defined as activities requiring low levels of energy expenditure that occur while sitting or lying down.[1] Sedentary lifestyles are an undesirable hallmark of modern society, affecting significant proportion of population.[2] Over the past few years, the way in which we live our daily lives has changed dramatically. Technological advances, societal influences and environmental attributes have significantly influenced the way we spend our leisure work and track time and how we live our lives at home and in our communities, resulting in substantial proportions of the day spent in sedentary pursuits or sitting.[3] Due to prolong sitting, it is reasonable to suppose that sedentary behaviors may induce musculoskeletal changes which can lead to postural imbalance. In this era of technology most of the young individuals prefers sedentary lifestyle and spend most of the time sitting in one position. Which can relatively lead to stiff thoracic spine, contributing towards dysfunction in adjacent

spinal regions.[1] Despite the fact that effects of prolonged sitting and physical activity on thoracic spine mobility have not been widely investigated, so the need of this study is to evaluate the level of physical activity and thoracic spine mobility on sedentary young individuals.

The aim of the study is to investigate the level of physical activity and thoracic spine mobility among sedentary young individuals.

Objectives are to assess the influence of sedentary behavior on thoracic spine mobility and to Investigate the influence of physical activity on thoracic spine mobility.

MATERIALS & METHODS

- A total of 135 participants were recruited.
- Physical activity and sitting time were measured using the International Physical Activity Questionnaire (IPAQ short form)[4] (r=0.57-0.65)
- Universal goniometer was used to measure the thoracic spine mobility.[5]
- Seated rotation technique was used to measure thoracic rotation.[6] (r=0.85-0.94)

Inclusion criteria:

- Healthy asymptomatic volunteers.
- Young individuals between the age group of 18 to 30 years.
- Individuals who able to adopt heel sit position.

Exclusion criteria:

- Current or previous neuro musculoskeletal spine conditions.
- Current or chronic respiratory conditions.
- Pregnancy
- Current hip or knee pathology
- Individuals having chronic low back pain
- Any surgical history related to spine

Seated Rotation Technique [5]

- The individual is in a seated position with their hips and knees flexed to 90° and their trunk in an upright neutral posture (not flexed, extended, side bent, or rotated).

  A medicine ball is placed between the knees and the individual is asked to maintain slight pressure on the ball by adducting the hips. The ball is used in an attempt to reduce the contribution of the lower body on spine rotation.
- A stick is placed across the back at approximately the inferior border of the scapulae. The stick in back position is thought to reduce the contribution from the shoulder joints on spine rotation.
- A goniometer is aligned parallel to the ground, at the midpoint between the T1-T2 spinous process. The stationary arm is pointed away from the side of rotation and remains in line with the starting position. Once the individual reaches end range of motion, the angle of the goniometer is noted.

STATISTICAL ANALYSIS

- IBM SPSS Statistics Base 20.0 software was used to analyze the study data.
- p value <0.05 was considered statistically significant.

RESULT

- 135 completed the study out of which 43(31.9%) were male and 92(68.1%) were female.
- 59.25% individuals had low level of physical activity, 29.62% individuals had moderate level of physical activity and 11.11% individuals had vigours level of physical activity (Fig.1).
- Out of 100% of participants, 43.7% individuals spend more than 7 hours of daily sitting, 51.1% individuals spend 4-7 hours of daily sitting and 3.2% individuals spend less than 4 hours of daily sitting (Fig.2).
- Results from spearman's test showed a statistically significant correlation between physical activity and thoracic spine mobility (p=<0.01) with a large effect size of 0.441 (thoracic right rotation) and 0.436 (thoracic left rotation).

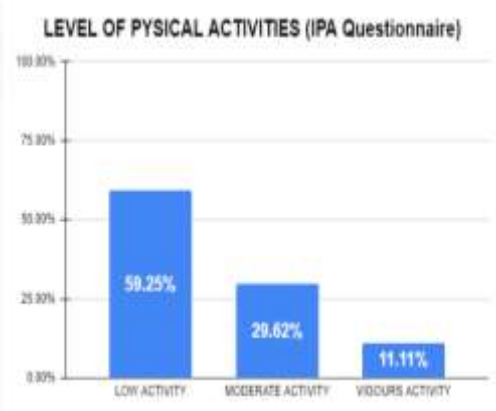

Figure: 1

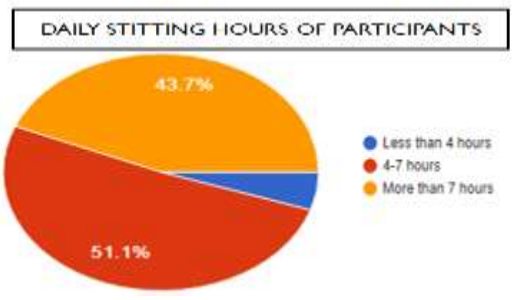

Figure:2

Non-parametric Test	Thoracic spine mobility	r value	p value
Spearman's Test	Thoracic Rotation Right	0.441**	<0.01
	Thoracic Rotation Left	0.436**	<0.01

Table.1 shows correlation between physical activity and thoracic spine mobility.

DISCUSSION

- Sedentary lifestyle is an undesirable hallmark of modern society. In this study total of 43.7% individuals of >7 hours, 51.1% of 4-7 hours and 5.2% of <4 hours spend their time sitting per day.
- Out of total, 80 individuals have low physical activity which is <600 MET minutes/week, 40 individuals have moderate physical activity of 600-1500 MET minutes/week and 15 individuals have vigorous activity accumulating >1500 MET minutes/week.
- The result show the value of right thoracic rotation 22.72±4.10 and left thoracic rotation 19.93±4.43; though the normal value of thoracic spine rotation is 30-35 degrees.[7]
- A significant positive correlation is found between level of physical activity and thoracic spine mobility (p=<0.01), it is found that if the physical activity will increase; the thoracic spine mobility will also increase.
- A study by Nicola R et al provides evidence of reduced thoracic spine mobility in individuals who spend >7 hours a day sitting and <150 min of physical activity a week.[2]
- This study has small sample size, and with observed associations between thoracic mobility, physical activity and sitting duration, a study with larger sample size should be done and further study can be done between right and left dominance with thoracic spine mobility.
- Understanding the effect of sedentary behavior and physical activity on thoracic spine mobility may provide evidence to guide clinical practice and research for prevention of spinal pain.[8]
- Musculoskeletal conditions are a leading cause and disability worldwide.[8]

- As a result, reducing sedentary behavior and increasing physical activity are research and public health priorities.[8]

CONCLUSION

This study provides evidence of reduced thoracic spine mobility in young individuals who spend more hours a day sitting and having light intensity of physical activity.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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