International Journal of Open Publication and Exploration (IJOPE), ISSN: ISSN: 3006-2853
Volume 9, Issue 2, July-December, 2021, Available online at: https://ijope.com

Study of Spinal Mobility of Participants in Yoga and Gymnastics

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INTRODUCTION

Mobility is refers to ease with which an articulation is able to move before being restricted by the surroundings structures.Motion in the spinal is produced by the coordinated action of nerve and musles. Hart and Madagon(1995) measured spinal range of movements, according to them these measurement were remarkably content and provide the best measure of the progress of spinal stiffness in any given case. In early cases,where pain rather than structural change prevent movement,a definite increase could be obtained in the spinal range as a result of effective treatment. Moll and Wright (1971) studied the total 237 subjects in which all ages between the second and ninth decades. Mobility of spinal in females in anterior flexion and extension. Whereas spinal mobility in female exceeded mobility in lateral flexion. They gave the emphasis on the importance of normal mobility in terms of a wide range of values and demonstrated the considerable scatter of spinal mobility. Sturrok et al. (1973) conducted a study on the spinal movement of the 142 clinically normal males and females with the Dunham's spondylometer and tried to establish the range of normal values for spinal movements.They suggested that the total range of spinal mobility diminished with age and range of extension in women in the child bearing years was superiar to men because of hormonal effort.

In Hart etal. Study they found that they the spondylitics ageing was not always associated with the deterioration of spinal movements as in the case of Moll and Wright(1971)and Sturrocket al.(1973), Reynolds (1975) found the spondylometer was the quickest method in employing but applicability was the limited only to certain movements, Moran et al.(1979)studied the range of spinal movement,used the modified test of Macrae and Wright(1969)who modified the method of Schober(1937) for measuring late anterior spinal flexion and Moll and Wright (1971),method for measuring lateral spinal flexion.

They also defined the normal range in children flexion. They recommended the use of method outlined by them for measuring the spinal mobility. Rider and Daly(1991)'s study suggested that specialized training in back flexibility for older adults is warranted and significant gain in spinal mobility can be obtained regardless of age. Solminen, J.J.et al. (l 992)conduct a study on the spinal mobility and trunk musclestrength. The result of the study indicated that in this growing age population there was a subgroup with recurrent low-back pain having different spinal mobility pattern as well as decrease trunk muscle strength. Nilsson et al.(1993)did a comparative study of spinal sagittal mobility and joint laxity. The results agreed with those of earlier studies and suggested that ballet dancers. Luk et al.(1996)measured lumbar spinal mobility after short anterior interbody fusion.The result showed that the total flexibility of lumber spine was decreased after single level fusion further decreased after double level fusion. Burton et al. (1996)studied the natural history of back pain during adolescence in boys and girls and to explore the influence of sports participation and lumber flexibility. Result showed severity of back pain and flexibility of spine were not related to sex, treatment or sport.

MATERIAL AND METHOD

The purpose of this study was to compare spinal mobility of participants in yoga and gymnastics of adult male group. A total thirty male fifteen yoga and fifteen gymnastic participants were included as sample.

VARIABLES AND CRITERION MEASURES

Measurements

1. **Height Vertex**: It was measured with anthropometric recorded and converted feet.
2. **Anterior Spinal Flexion**: It was measured in centimeters with the help of steel tape.
3. **Lateral Spinal Flexion**: It was measured in centimeters with the help of steel tape.
4. **Spinal Extensio**: It was measured in centimeters by steel tape.

Statistical Consideration
The statistical formulas, like Means, S.D., 't'test was used for analysis the groups.

RESULT

To find out the difference of spinal mobility of participants in yoga and gymnastics.T-test applied at participants the level of significance 0.01.

Table No. 1: Mean, Standard Deviation of Anterior Spinal Flexion In Participants of Yoga And Gymnastics

Group	Means & SD	MD	DF	SE	t- Value
Yoga Participants	24.8				+ - .91
Gymnastic participants	22.4	2.4	28	0.2	6.63

Significant at 0.01 level $'t_{0.01}=2.46$

Table No. 1 shows the mean values, standard deviation of anterior spinal flexion of adult male participants of yoga and gymnastics. The comparison of mean values in this table highlighted. The mean values of yoga and gymnastics participants were (M=24.8,M=22.4)respectively. It may be observed from table4.1 that participants of yoga and participants of gymnastics were significantly differed as their't 'test value of 6.63 is found to be statistical significant at 0.01 level of confidence. The mean value of anterior spinal flexion of yoga and gymnastics participants showed difference in whole factor.

Table No. 2: Comparison of Spinal Extension of participants in yoga and Gymnastics

Group	Means & SD	MD	DF	SE	t- Value
Yoga Participants	23.93				+ - 1.16
Gymnastic participants	22.40	1.5	28	0.14	+ - 1.29

Significant at 0.01 level $'t'_{0.01}(28)=2.46$

Table 2 shows the comparison of mean value of spinal extension in yoga and gymnastics participants. That occupation exhibited that statistically significant. On the comparison of mean value it was found that mean value of participants of yoga was higher than gymnastics.(M=23.9,M=22.4) respectively and their't' value was 3.40 which is found to be statistical significant at 0.01 level.

Table No. 3: Mean, Standard Deviation of Lateral Flexion of Right Side In Yoga and Gymnastic Participants

Group	Means & SD	MD	DF	SE	t- Value
Yoga Participants	22.8				+ - 1.08
Gymnastic participants	22.70	2.1	28	0.086	+ - .59

Significant at 0.01 level $'t'_{0.01}(28)=2.46$

The result exhibited by Table No. 3 that there is significant difference between participants of yoga and gymnastic from comparison on their spinal flexion of right side. It may be observed from comparison of mean value that yoga performers were superior to gymnasts (M=24.8,M=22.7)respectively. The value of participants of yoga and gymnastics 6.48 is to be statistically significant at 0.01 levels. The result of table no. 3 shows that yoga and gymnastics performers have more lateral spinal flexion of right side.

Table No. 4: Mean Standard Deviation of Lateral Flexion of Left Side-Side In Yoga and Gymnastics Participants

Group	Means & SD	MD	DF	SE	t- Value
Yoga Participants	23.14				+ - 1.05
Gymnastic participants	21.3	2.09	28	0.086	+ - .57

Significant at 0.01 level $t'_{0.01}(28)=2.46$

It observed from table no. 4 that participants of yoga and gymnastic were significantly differed as their 't'value 6.48 is to be find statistical significant at 0.01 level. Descriptive statistics indicated means value on lateral flexion of left side yoga performer were 23.12 with the dispersion of 1.05 and participants of gymnastics mean value with the dispersion of .57, which further indicated that yoga performer were having more lateral flexion of left side as compared to gymnasts.

DISCUSSION OF FINDINGS

The analysis of data shows that yoga performer had more spinal mobility as compare to gymnasts. The more mobility of yoga performers due to slow, progressive and systematic training. It also involves isometric training which helps in increasing the mobility of yoga performers. The hypothesis of this study is accepted as it was hypothesied that there would be significant different between both groups. The related literature synchronizes with the findings of the study to support it. Nilsson (1992) reported that spinal mobility and joint laxity is significantly related to performance in dance and comparison between control and experimental groups shows that dancers had greater mobility and joints laxity. Rider had Daly (1991)also found significant improvement in spinal mobility. It may be conclude from result of present study that there is significance difference between yoga performer and gymnasts on spinal mobility in all three dimension (saggital, coronal and horizontal).

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