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Effect of Surya Namaskar on Hip Adductor Flexibility among Young Physiotherapy Students: A Pilot Study

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ABSTRACT

Background: As physiotherapists are the important healthcare professionals, their level of physical fitness, been in good terms, is mandatory. They require a good amount of flexibility and endurance to meet the professional demands. Enhanced flexibility of lower limb muscles play a crucial role for physiotherapists to maintain good fitness levels and prevent injuries. Such health-related awareness activities should be ingrained at the students level itself. Numerous studies have been done on the level of physical fitness among physiotherapy students based on the physical demands of the profession. Since, Suryanamaskar is one of the on growing techniques which deal with both physical and mental well-being. The objective of this study was to assess the effect of Suryanamaskar on specifically the hip adductor flexibility of physiotherapy students.
Methods: This was a pilot study done on 10 physiotherapy students. The subjects were selected by the inclusion criteria of subjects with hip adductor tightness, determined by self-administered positive test for limited flexibility (<90 degree bilateral hip abduction). Suryanamaskar was given as intervention program for four weeks. The measurement of Passive Hip Abduction (PHA) test was assessed for pre and post four weeks.
Results: In the present study, the statistical analysis showed there was a significant difference in pre and post scores of hip adductor flexibility test bilaterally with P value <0.005.
Conclusion: This study demonstrated that Surya Namaskar is effective in improving hip adductor flexibility in a group of young physiotherapy students.

Keywords: Physiotherapy students, Physical fitness, Hip adductor flexibility, Suryanamaskar

INTRODUCTION

Muscle flexibility has been defined as the ability to bend and move a single joint or series of joints smoothly and easily through an unrestricted, pain free range of motion. [1] A person is prone to have several musculoskeletal injuries as a major consequence of having limited flexibility with decreased level of function. [2]

An inadequate level of flexibility of the hip adductor muscles is one of the most critical risk factors for chronic groin pain and strains. [3] Specifically, it has been suggested that having insufficient flexibility of the hip adductor muscles might result in greater stress across the superior pubic ramus and pubic symphysis during powerful weight-bearing sporting actions, increasing the likelihood of sustaining a chronic groin injury. [4] It has been illustrated that those who have insufficient flexibility in the hip adductor muscles are more prone to suffer a muscle strain**.** [5] Although the causes of hip adductor strains are multifactorial, they may occur when the groin muscles are torn when stretched beyond the limits of normal range of motion (ROM). [6] Appropriate stretching may help reduce the risk of these types of

injuries, so it is important to establish an effective warm-up intervention that includes increasing flexibility. [7]

Flexibility is a key component for injury prevention and rehabilitation. [8] Regardless of the potential physical risks of inflexibility, even the most dedicated runner or recreational athlete often does not make time for adequate flexibility training. Since time is often seen as a limiting factor when exercising, a daily practice of yoga can be the perfect solution for time-challenged individuals. [9] Yoga is an ancient activity designated to both healthy and unhealthy individuals. It integrates physical, mental, and spiritual components and may improve aspects of health. [10] Yoga exercises gently tone and shape the body, improve posture, flexibility and contribute to feeling of well-being. [11] Suryanamaskar is a branch of yoga that concentrates physical health and mental well-being. Through practicing various body postures (asana), breathing techniques (pranayama), and meditation, it is believed that one can obtain a sound physical body as well as a calm and peaceful mind. [12] Suryanamaskar is a series of 12 physical postures made up of a variety of forward and backward bends. [13] The series of movements stretch the spinal column and upper and lower body through their full range of motion, massaging, toning and stimulating vital organs by alternately flexing the body forwards and backwards. [12] It builds upper body strength through the inherent weight bearing positions, especially in the arms and shoulders, throughout the series. [13] The series gives such a profound stretch to the body that it is considered to be a complete yoga practice by itself. [14]

The passive hip abduction with knee flexed over the edge of the plinth test (PHA) is the measurement method described in the most prominent sports medicine textbooks [15-17] to assess the flexibility of the biarticular and monoarticular hip adductor muscles, respectively. Although the PHA is indirect measure of the biarticular and monoarticular adductor muscle flexibility, the test has been considered appropriate by the most important American medical organizations. [18,19] Therefore, clinicians can be 95% confident that an observed change between two measures larger than 5.9 degree for the flexibility measures obtained from the PHA would likely indicate a real change in hip adductor muscle flexibility. [3]

Physiotherapists are said to be the role models for practicing a healthy lifestyle. They require a good amount of flexibility and endurance to meet the professional demands. Enhanced flexibility of lower limb muscles play a crucial role for physiotherapists to maintain good fitness levels and prevent injuries.[20]As physiotherapists are the important healthcare professionals, their level of physical fitness, been in good terms, is mandatory. Such health-related awareness activities should be ingrained at the students level itself. Numerous studies have been done on the level of physical fitness among physiotherapy students based on the physical demands of the profession. [21] Since, Suryanamaskar is one of the on growing techniques which deal with both physical and mental well-being. The objective of this study was to assess the effect of Suryanamaskar on specifically the hip adductor flexibility of physiotherapy students.

METHODOLOGY

Based upon the inclusion criteria, the subjects were selected from Padmashree Institute of Physiotherapy. 10 subjects with hip adductor tightness, determined by self – administered positive test for limited flexibility (<90 degree bilateral hip abduction) aged 18-25 years with normal BMI (18.5-24.9) were selected for the study. After taking the written consent of the subjects, they underwent pre-treatment evaluation for hip adductor tightness. Subjects having any Self-reported groin pain, knee or ankle joint pathology, prolapsed intervertebral disc or any pathologies of low back, subjects with neuromuscular and cardiovascular disorders,

orthopedic conditions of lower limbs, athletes. recent history of fracture or sprain, recent surgeries around hip and knee joint were excluded from the study. The materials used for the study were plinth, foam mattress and goniometer.

Outcome measures: Passive Hip Abduction (PHA) test was used to assess hip adductors tightness amongst the subjects as shown in figure 1.

Starting Position:

The subject was asked to lie down in supine on the plinth with the contralateral leg hanging off the side of the plinth and the tested leg extended and placed on the plinth.

Goniometer placement process:

The therapist placed one goniometer arm joining both anterior-superior iliac spines and the other arm placed over the anterior face of the tested limb following its bisector line.

Testing movement:

The therapist performed a slow and progressive hip abduction movement with knee extended (neutral position "0").

Stabilization:

The rotation of the lower limb was avoided. The contralateral extremity (non-tested) was fixed to the plinth by flexion of the knee to approximately 90º.

Measurement:

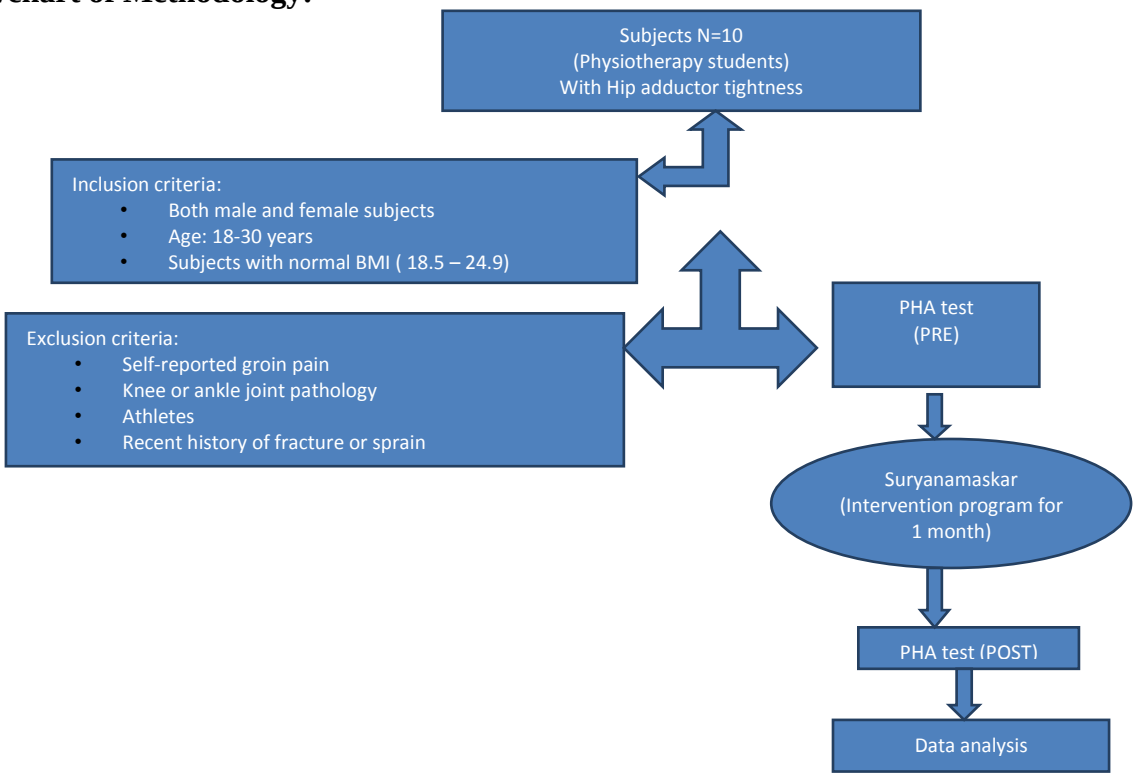
The therapist read and recorded the abduction measurement angle formed by the two goniometer arms. [3]

Intervention:

In Suryanamaskar protocol, the subjects were well explained about the procedure, and a demonstration of each pose was done. The subjects performed 4 Suryanamaskars in one session. Each Suryanamaskar pose was held for 5 seconds. Hence one cycle of Suryanamaskar lasted for 60 seconds cooldown of 2 minutes followed each session. [21] The treatment was given for 3 times per week for period of 4 weeks.

Before beginning the rehabilitation protocol and after 4 weeks of intervention (as shown in figure 2), all the subjects were evaluated by the following outcome measure: PHA (Passive hip abduction) test.

Flowchart of Methodology:

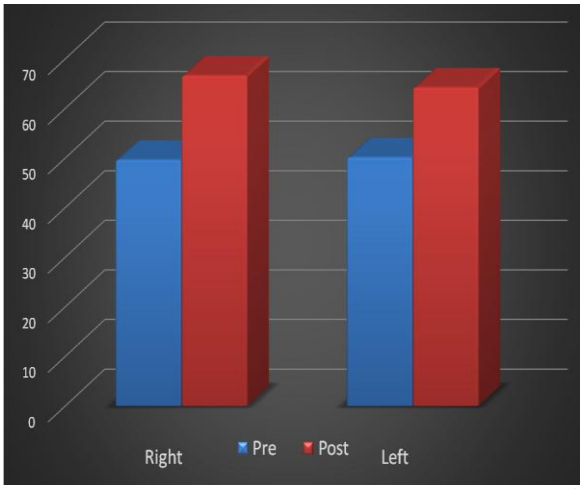


RESULTS

SPSS (version 20.0) was the software used for statistical analysis. Within the group, the comparison for pre and post score was made with the paired t-test. P value <0.05 was considered significant for this study. N=10 with a mean age of subjects being 23 years, mean height 1.6m, weight 57.4 kg and BMI 22.28kg/m^2. Comparison between pre & post-test mean scores of Bilateral PHA test (degree) with Suryanamaskar practice showed significant difference within group ($p<0.05$) as shown in graph 1.

Fig 1: Pre-treatment evaluation, PHA test with knee flexed over the edge of the plinth

Fig 2: Post-treatment evaluation, PHA test



Graph 1: Comparison between pre & post-test mean scores of Bilateral PHA test (degree)
Right PHA test- Pre: 49.6, Post: 66.6
Left PHA test: Pre: 50.1, Post: 64.2

DISCUSSION

In the present study subjects were asked to perform Suryanamaskar for 4 times with 5 sec hold at each asana. Then the hip adductor flexibility was measured before and after doing Suryanamaskar by Passive Hip Abduction (PHA) test.

The results of the present study as shown in the graph are mean values for PHA test before and after doing Suryanamaskar i.e.49.6 degree and 66.6 degree respectively (for right) whereas 50.1 degree and 64.2 degree respectively (for left). Thus, the findings of statistical analysis clearly indicates that there is significant improvement in hip adductor flexibility of the young physiotherapy students due to one month Suryanamaskar practice.

All the sequential movements involved in Suryanamaskar causes stimulation of blood circulation to the whole spinal column and brain resulting in a healthy nervous system. [22] Muscle flexibility and strength is gained by this technique as it causes both stretching and contraction of the muscles in a systematic manner. During Suryanamaskar practice, it requires to stretch different parts of the body which makes muscle or joint relax and flexible. [23] This study is also supported by Singh Kanwaljeet *et al.* (2010) who conducted an experimental study entitled

"the effect of suryanamaskar yogasana on muscular endurance and flexibility among intercollege yoginis." [24]

Choudhary R, Krzytof Stec (2010) also conducted an experimental study entitled "The Effects of Dynamic Suryanamaskar on Flexibility of University Students" which also indicated that flexibility significantly improved after six week Dynamic Suryanamaskar. It is being confirmed that yoga in general has a significant impact on shoulder, hip, trunk and neck muscles flexibility and specially suryanamaskar also supports in this effect all other yogic asanas and practices. [25]

The increase in flexibility can most likely be attributed to the probable reason that Suryanamaskar is the combination of twelve exercises that include stretching, holding and relaxation. [26] The increased range of motion resulting from prolonged stretching is most likely due to an increase in length of both connective and muscle tissue. Increased connective tissue length can occur due to its property of elastic elongation. [26]

Similar results were demonstrated by Dr. Anurodh Singh Sisodia who found that in Surya Namaskar practice we perform flexion and extension or hyperextension of hip joint which improve flexibility of hip joint, lower back and posterior thigh muscles. [27]

Dr. Sethu S. in his study assessed the effect of Suryanamaskar on Joint Flexibility and concluded that Suryanamaskar is the best practice to improve flexibility at the joints. [28] From the various studies and findings it is confirmed that flexibility significantly improved after Suryanamaskar training.

Limitations and Future scope of the study:

The present study was limited only to young physiotherapy students aged from 18 to 25 years. Future studies can be performed on other group of professions and on healthy and elderly populations. In addition, effect of Suryanamaskar needs to be further investigated as a tool to enhance physical fitness and quality of life dimensions in various fields.

CONCLUSION

This study demonstrated that suryanamaskar is effective in improving hip adductor flexibility in a group of young physiotherapy students. Thus, Suryanamaskar can be recommended to improve flexibility component of physical fitness.

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