ejpmr, 2020,7(6), 649-654

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

A STUDY TO COMPARE THE EFFECT OF YOGASANA VS DYNAMIC STRETCHING ON HAMSTRING FLEXIBILITY AMONG PHYSIOTHERAPISTS

***[1]Manjula S., MPT and [2]Dr. P. Senthil Selvam**

[1]Asst. Prof, School of Physiotherapy, VISTAS, Thalambur, Tamil Nadu- 600130, India.
[2]PHD, PROF, HOD, School of Physiotherapy, VISTAS, Thalambur, Tamil Nadu- 600130, India.

***Corresponding Author: Manjula S., MPT**

Asst. Prof, School of Physiotherapy, VISTAS, Thalambur, Tamil Nadu- 600130, India.

Article Received on 03/04/2020 **Article Revised on 23/04/2020** **Article Accepted on 14/05/2020**

INTRODUCTION

Physiotherapy plays a crucial role in the health care system. Physiotherapists are looked upon as role models for practicing a healthy lifestyle. They require a good amount of flexibility and endurance to meet the professional demands.

Enhanced flexibility of hamstrings plays a crucial role for Physiotherapists to maintain good fitness level and prevent injuries. Hamstring is an important muscle which contracts eccentrically to maintain a proper posture in standing, hence are prone to be tight. Flexibility varies between individuals particularly in terms of differences in muscle length of multiple joint muscles.

Hamstring tension plays a role in maintaining an upright posture with increased hamstring tightness leading to pelvic rotation. Hamstring flexibility is required in most activities and poor hamstring flexibility is a major factor for anterior knee pain in which the particular surface of the knee cap is gradually eroded. This leads to compressing the patella against the articular surface of femur. Activities like ascending or descending stairs, squatting, driving a car in which the affected leg is lifted to engage the brake or even sitting for prolonged periods in which the affected surface of the patella is compressed against the knee joint by the stretch quadriceps muscle.

Yogasana is one of the effective ways to improve the hamstring flexibility and upper body muscle endurance. If performed correctly, it does not strain or cause injury. It can be an ideal aerobic exercise as it involves both static stretching and dynamic component of exercises with optimal stress.

Dynamic stretching is an important type of stretching based on movements. It uses the muscle themselves to bring about a stretch. It is the ability to use a range of joint movement in the performance of a physical activity at either normal or rapid speed. It is one of the better way to reduce the muscle tightness.

AIM OF THE STUDY

The aim of the study is to compare the effect of yogasana vs dynamic stretching on hamstring flexibility among Physiotherapists.

OBJECTIVES OF THE STUDY

- To assess the effect of yogasana on hamstring flexibility among Physiotherapists.
- To assess the effect of dynamic stretching on hamstring flexibility among Physiotherapists
- To compare the effect yogasana versus dynamic stretching on hamstring flexibility among Physiotherapists

Research Design and Methodology

An experimental study design was conducted with 30 patients within the age group of 25 to 35 years who fulfilled the inclusion and exclusion criteria.

Inclusion Criteria

- Knee extension range <50 degrees
- Gender: Male
- Age 25 -35 years

Exclusion Criteria

- Neuromuscular disorders
- Cardiovascular disorders
- Athletes
- Orthopaedic deformities of lower limbs

Procedure

In this experimental study, 30 subjects were selected according to the inclusion criteria and were randomly divided into 2 groups namely Group A and B. Group A consisting of 15 subjects were given yogasana and Group B consisting of 15 subjects were given dynamic stretching exercises for 4 weeks (5 days per week). Pre

and post-test assessment was done using active knee extension test in terms of ROM and sit and reach test.

Both yogasana and dynamic stretches should start with a warm up and each section should end with a cool down time.In yogasana, the procedures should be well explained to the subjects. The subjects should perform 15 yogasanas in 1 session and each pose was held for 5 seconds. A cool down of 1 min followed each session. Hence 1 cycle of yogasana lasted for 90 seconds. In dynamic stretching, each set consisting of 8 exercises lasted for 1 minute which is inclusive of both the limbs. (30 sec for each limb). The total duration is 8 minutes, and cool down of 2 minutes. The total duration of both the protocol is 16 minutes.

Data Analysis

The collected pre and post test data were analysed and tabulated. For the descriptive statistics, the mean and standard deviation were calculated.. The results were tabulated and the graphs were plotted accordingly.

Testing The Effect of Group A In Assessing The Value of Rom Knee and Sit & Reach Test

H_0: There is no significant effect of Treatment A in **increasing** the value of ROM KNEE and SIT & REACH TEST Score

H_1: There is significant effect of Treatment A in **decreasing** the value of ROM KNEE and SIT & REACH TEST Score.

The above hypothesis is tested by the use of **Paired Sample t-test** and the corresponding output is shown below:

Table 1: Group A Output of Paired t-test.

	Mean	**SD**	**t Stat**	**P(T<=t) one-tail**
A_ROM_KNEE_R_Pre1	44.73	3.33	-5.60	0.000
A_ROM_KNEE_R_Post1	46.93	3.39		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_R_Pre2	46.93	3.39	-7.86	0.000
A_ROM_KNEE_R_Post2	49.33	3.66		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_R_Pre3	49.33	3.66	-8.47	0.000
A_ROM_KNEE_R_Post3	51.27	3.47		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_R_Pre4	51.20	3.53	-5.98	0.000
A_ROM_KNEE_R_Post4	53.40	3.07		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_L_Pre1	44.13	2.33	-4.77	0.000
A_ROM_KNEE_L_Post1	45.67	1.68		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_L_Pre2	45.67	1.68	-6.44	0.000
A_ROM_KNEE_L_Post2	47.47	1.36		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_L_Pre3	47.33	1.40	-4.97	0.000
A_ROM_KNEE_L_Post3	49.33	2.23		
	Mean	SD	t Stat	P(T<=t) one-tail
A_ROM_KNEE_L_Pre4	49.33	2.23	-6.72	0.000
A_ROM_KNEE_L_Post4	51.67	2.92		
	Mean	SD	t Stat	P(T<=t) one-tail
A_SIT_&_REACH_TEST_Pre1	8.93	1.22	-4.79	0.000
A_SIT_&_REACH_TEST_Post1	10.07	1.49		
	Mean	SD	t Stat	P(T<=t) one-tail
A_SIT_&_REACH_TEST_Pre2	9.93	1.39	-4.58	0.000
A_SIT_&_REACH_TEST_Post2	12.33	2.02		
	Mean	SD	t Stat	P(T<=t) one-tail
A_SIT_&_REACH_TEST_Pre3	11.67	1.54	-8.57	0.000
A_SIT_&_REACH_TEST_Post3	13.07	1.49		

	Mean	SD	t Stat	P(T<=t) one-tail
A_SIT_&_REACH_TEST_Pre4	13.00	1.60	-4.40	0.000
A_SIT_&_REACH_TEST_Post4	14.87	0.92		

Testing The Effect of Treatm B In Assessing The Value of Rom Knee and Sit & Reach Test

H_0: There is no significant effect of Treatment B in **increasing** the value of ROM KNEE and SIT & REACH TEST Score

H_1: There is significant effect of Treatment B in **decreasing** the value of ROM KNEE and SIT & REACH TEST Score.

The above hypothesis is tested by the use of **Paired Sample t-test** and the corresponding output is shown below:

Table 2: Group Boutput of Paired t-test.

	Mean	**SD**	**t Stat**	**P(T<=t) one-tail**
B_ROM_KNEE_R_Pre1	44.60	3.07	-2.86	0.006
B_ROM_KNEE_R_Post1	45.40	2.92		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_R_Pre2	45.40	2.92	-4.78	0.000
B_ROM_KNEE_R_Post2	46.13	3.27		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_R_Pre3	46.20	3.30	-5.92	0.000
B_ROM_KNEE_R_Post3	47.20	3.03		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_R_Pre4	47.20	3.03	-7.36	0.000
B_ROM_KNEE_R_Post4	48.60	3.16		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_L_Pre1	42.93	2.74	-4.00	0.001
B_ROM_KNEE_L_Post1	43.47	2.90		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_L_Pre2	43.60	2.95	-3.56	0.002
B_ROM_KNEE_L_Post2	44.33	2.77		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_L_Pre3	44.93	3.03	-2.82	0.007
B_ROM_KNEE_L_Post3	45.40	2.75		
	Mean	SD	t Stat	P(T<=t) one-tail
B_ROM_KNEE_L_Pre4	45.67	2.77	-0.96	0.177
B_ROM_KNEE_L_Post4	46.13	3.46		
	Mean	SD	t Stat	P(T<=t) one-tail
B_SIT_&_REACH_TEST_Pre1	9.00	1.00	-3.50	0.002
B_SIT_&_REACH_TEST_Post1	9.47	1.30		
	Mean	SD	t Stat	P(T<=t) one-tail
B_SIT_&_REACH_TEST_Pre2	9.47	1.30	-11.22	0.000
B_SIT_&_REACH_TEST_Post2	10.67	1.50		
	Mean	SD	t Stat	P(T<=t) one-tail
B_SIT_&_REACH_TEST_Pre3	10.67	1.50	-6.09	0.000
B_SIT_&_REACH_TEST_Post3	11.60	1.59		
	Mean	SD	t Stat	P(T<=t) one-tail
B_SIT_&_REACH_TEST_Pre4	11.60	1.59	-7.90	0.000
B_SIT_&_REACH_TEST_Post4	12.53	1.51		

Comparing The Effect Of Group A And B In Terms Of Changes In The Values Of Both The Parameters – 'Rom Knee Test' And 'Sit & Reach Test' Scores

H_0: There is no significant difference between Treatments A and B in terms of average change in ROM KNEE and SIT & REACH Test Scores

H_1: There is significant difference between Treatments A and B in terms of average change in ROM KNEE and SIT & REACH Test Scores

The above hypothesis is tested by the use of Independent Samples t-test

Table 3: Comparison of Group A & B Output of Independent Samples t-test:

	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_R_Diff1	2.20	1.52	2.90	0.007
B_ROM_KNEE_R_Diff1	0.80	1.08		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_R_Diff2	2.40	1.18	4.88	0.000
B_ROM_KNEE_R_Diff2	0.73	0.59		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_R_Diff3	1.93	0.88	3.29	0.003
B_ROM_KNEE_R_Diff3	1.00	0.65		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_R_Diff4	2.47	1.36	2.68	0.012
B_ROM_KNEE_R_Diff4	1.40	0.74		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_L_Diff1	1.53	1.25	2.87	0.008
B_ROM_KNEE_L_Diff1	0.53	0.52		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_L_Diff2	1.80	1.08	3.07	0.005
B_ROM_KNEE_L_Diff2	0.73	0.80		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_L_Diff3	2.00	1.56	3.53	0.001
B_ROM_KNEE_L_Diff3	0.47	0.64		
	Mean	SD	t Stat	P(T<=t) two-tail
A_ROM_KNEE_L_Diff4	2.33	1.35	3.12	0.004
B_ROM_KNEE_L_Diff4	0.47	1.88		
	Mean	SD	t Stat	P(T<=t) two-tail
A_SIT_&_REACH_TEST_Diff1	1.13	0.92	2.46	0.020
B_SIT_&_REACH_TEST_Diff1	0.47	0.52		
	Mean	SD	t Stat	P(T<=t) two-tail
A_SIT_&_REACH_TEST_Diff2	2.40	2.03	2.24	0.033
B_SIT_&_REACH_TEST_Diff2	1.20	0.41		
	Mean	SD	t Stat	P(T<=t) two-tail
A_SIT_&_REACH_TEST_Diff3	1.40	0.63	2.08	0.046
B_SIT_&_REACH_TEST_Diff3	0.93	0.59		
	Mean	SD	t Stat	P(T<=t) two-tail
A_SIT_&_REACH_TEST_Diff4	1.87	1.64	2.12	0.043
B_SIT_&_REACH_TEST_Diff4	0.93	0.46		

DISCUSSION

In Group A, the output of Paired Samples t-test reveals that the p-values (0.000) of the test statistic for all the four weeks of both the parameters (ROM KNEE and SIT & REACH TEST) is less than 0.05, the null hypothesis is rejected at 5% level of significance ($p < 0.05$). In addition, the mean values of all the parameters are increasing from Pre-test to Post-test in Group A. Hence, the evidence is sufficient to conclude that there is significant effect of Treatment A in increasing the values of both the parameters 'ROM KNEE' and 'SIT & REACH TEST' from Pre-test to Post-test.

In Group A, the output of Paired Samples t-test, we see that the p-values (0.000) of the test statistic for all the four weeks of both the parameters (ROM KNEE and SIT & REACH TEST) is less than 0.05, the null hypothesis is rejected at 5% level of significance ($p < 0.05$). In addition, the mean values of all the parameters are increasing from Pre-test to Post-test in Group B. Hence, the evidence is sufficient to conclude that there is significant effect of Treatment B in increasing the values of both the parameters 'ROM KNEE' and 'SIT & REACH TEST' from Pre-test to Post-test. But however it is, the effect is comparatively lesser than Group A

The output of the Independent Samples t-test reveals that the p-values ($p < 0.05$) of the test statistic for all the four weeks of both the parameters 'ROM KNEE' and 'SIT & REACH TEST' are less than 0.05, the null hypothesis is rejected at 5% level of significance ($p < 0.05$). On comparison, the mean improvement in the values of both the parameters by Treatment A is more than that of Treatment B. Hence, the evidence is sufficient to conclude that the Treatment A (Group A) is effective than Treatment B(Group B) in increasing the value of ROM KNEE Test Score and SIT & REACH TEST Score.

RESULTS

The above intra-group analysis shows that both the Group A and B are effective in terms of improvement in both the parameters from Week 1 through Week 4. However, the inter-group analysis showed that Group A is effective than Group B in terms of improvement in both ROM KNEE Test Score and SIT & REACH TEST Score.

CONCLUSION

The study reveals that Group A is effective than Group B . Thus the study can be concluded that Yogasana have significant effect on Hamstring flexibility than dynamic stretching among Physiotherapists.

REFERENCES

1. Kieran O'Sullivan*1,2, Elaine Murray1 and David Sainsbury1,2 The effect of warm-up, static stretching and dynamic stretching on hamstring flexibility in previously injured subjects Received, 29 October 2008; 10: 37. doi:10.1186/1471-2474-10-37 This article is available from: http://www.biomedcentral.com
2. Effect of Lower-Extremity Position and Stretching on Hamstring Muscle Flexibility MICHAEL ROSS Department of Biology, United States Air Force Effect of Lower-Extremity Position and Stretching on Hamstring Muscle Flexibility.
3. Ruan, M, Li, L, Chen, C, and Wu, X. Stretch could reduce hamstring injury risk during sprinting by right shifting the length- torque curve. J Strength Cond Res., 2018; 32(8): 2190–2198.
4. Amit Vaibhav, Swati Shukla, Om Prakash Singh. Suryanamaskar(Sun Salutation): A Path To Good Health. International Journal of Pharmacological Research, 2016; 6(7): 224-230.
5. Saraswati.S. Suryanamaskar: a technique of solar vital- isation .Munger Yoga Publications Trust, 1983.
6. Daniel Mayorga-Vega Rafael Merino-Marban 2 and Jesús Viciana. Criterion-Related Validity of Sit-And-Reach Tests for Estimating Hamstring and Lumbar Extensibility: A Meta-Analysis Department of Physical Education and Sport, University of Granada, Spain
7. Kieran O'Sullivan*1,2, Elaine Murray1 and David Sainsbury1,2 The effect of warm-up, static stretching and dynamic stretching on hamstring flexibility in previously injured subjects. 1Physiotherapy Department, University of Limerick, Limerick, Ireland.
8. Ayano Yamamoto 4, Shingo Matsuo 1, Genki Hatano 5, Manabu Miyazaki 6, Taizan Fukaya. Dynamic Stretching Has Sustained Effects on Range of Motion and PassiveStiffness of the Hamstring Muscles. Department of Health and Sports Sciences, School of Health Sciences, Asahi University, Mizuho, Japan
9. Prof. (Dr.) KANWALJEET SINGH, Dr. BALJINDER SINGH BAL, Dr. WILFRED VAZ. THE EFFECT OF SURYANAMASKAR YOGASANA ON MUSCULAR ENDURANCE AND FLEXIBILITY AMONG INTERCOLLEGE YOGINI 1Guru Nanak Dev University, Amritsar, (Punjab), INDIA, 2Guru Nanak Dev University, Amritsar, (Punjab), INDIA, 3LNUPE, Gwalior (M.P) INDIAS.
10. Dr. Nigar Shikalgar (P.T.), Dr. Safa Anwar (P.T.), Rochelle Janice Rego (P.T.). Effect of two weeks training of Suryanamaskar on flexibility in college female students. Int J of Allied Med Sci and Clin Res., 2017; 5(4): 928-932.
11. Javadekar P, Manjunath NK Effect of Surya Namaskar on Sustained Attention in School Children. J Yoga Phys Ther., 2012; 2: 110. doi:10.4172/2157-7595.1000110
12. Aguilar, AJ, DiStefano, LJ, Brown, CN, Herman, DC, Guskiewicz, KM, and Padua, DA. A dynamic warm-up model increases quadriceps strength and hamstring flexibility. J Strength Cond Res., 2012; 26(4): 1130–1141. Research.

13. Beedle, B, Rytter, SJ, Healy, RC, and Ward, TR. Pretesting static and dynamic stretching does not affect maximal strength. J Strength Cond Res., 2008; 22(6): 1838-1843.
14. COSTA, P. B., T. J. HERDA, A. A. HERDA, and J. T. CRAMER. Effects of Dynamic Stretching on Strength, Muscle Imbalance, and Muscle Activation. Med. Sci. Sports Exerc., 46(3): 586–593, 2014.
15. Chen CH, Xin Y, Lee KW, Lin MJ, Lin JJ Acute effects of different dynamic exercises on hamstring strain risk factors. PLoS ONE, 2018; 13(2): e0191801. doi:10.1371/journal.pone.0191801
16. Coons, J.M., Gould, C.E., Kim, J.K., Farley, R.S. & Caputo, J.L. Dynamic stretching is effective as static stretching at increasing flexibility. Journal of Human Sport and Exercise, 2017; 12(4): 1153-1161. doi:https://doi.org/10.14198/jhse.2017.124.02
17. Brosseau L, Balmer S, Tousignant M, O'Sullivan JP, Goudreault C, Goudreault M, Gringras S. Intra- and intertester reliability and criterion validity of the parallelogram and universal goniometers for measuring maximum active knee flexion and extension of patients with knee restrictions. Arch Phys Med Rehabil, 2001; 82: 396
18. Donald E Hartig John M Henderson. Increasing ham- string flexibility decreases lower extremity overuse in- juries in military basic trainees. The American Journal of Sports Medicine, 1999; 27(2): 173-176.
19. Goldman E.F., Jones D.E. Interventions for preventing hamstring injuries: a systematic review. Physiotherapy, 2011; 97: 91-99. [PubMed] [Google Scholar]
20. Chen C.H., Xin Y., Lee K.W., Lin M.J., Lin J.J. Acute effects of different dynamic exercises on hamstring strain risk factors. PLoS One, 2018a; 13: e0191801. [PMC free article] [PubMed] [Google Scholar]
21. Chaouachi A., Padulo J., Kasmi S., Othmen A.B., Chatra M., Behm D.G. Unilateral static and dynamic hamstrings stretching increases contralateral hip flexion range of motion. Clinical Physiology and Functional Imaging, 2017; 37: 23-29. [PubMed] [Google Scholar]
22. Goldman E.F., Jones D.E. Interventions for preventing hamstring injuries: a systematic review. Physiotherapy, 2011; 97: 91-99. [PubMed] [Google Scholar]
23. Matsuo S., Suzuki S., Iwata M., Hatano G., Nosaka K. Changes in force and stiffness after static stretching of eccentrically-damaged hamstrings. European Journal of Applied Physiology, 2015; 115: 981-991. [PubMed] [Google Scholar]
24. Moran K.A., McGrath T., Marshall B.M., Wallace E.S. Dynamic stretching and golf swing performance. International Journal of Sports Medicine, 2009; 30: 113-118. [PubMed] [Google Scholar]
25. Opplert J., Babault N. Acute effects of dynamic stretching on muscle flexibility and performance: an analysis of the current literature. Sports Medicine, 2018; 48: 1-27. [PubMed] [Google Scholar]
26. Worrell T, Perrin D: Hamstring Muscle Injury: The Influence of Strength, Flexibility, Warm-Up, and Fatigue. J Orthop Sports Phys Ther., 1992, 16(1): 12-18.
27. Nayar H.S., Mathur R.M.et.al.. Effects of yogic exercises on human physical efficiency. Oct.1975 Indian journal of medical research, 1369-1375.
28. Karthik PS, et al. J Clin Diagn. Effect of pranayama functions in medical students, Res, 2014.
29. Patanjali's Yoga Sutras: Translated by Rama Prasada, Munshilal Manoharlal Publishers Pvt Limited, Copyright 2002, This edition, 2003, ISBN 81-215-0964-5
30. Suryanamaskaaram' by Mr. M. Balakrishnan Nair (in Malayalam), Udyogamandal School, Udyogamandal P.O. Kerala published at M. G. M. Press, Alwaye, Kerala, 1978.