

# Effect of Hath Yoga on Hamstring Tightness in Tailors - An Experimental Study

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## ABSTRACT

This study had undertaken to investigate the effect of hath yoga on hamstring tightness in tailors. In the seated position, hamstring is held at shortened position due to knee flexion and posterior pelvic rotation. In prolonged sitting, this constant shortened position develops hamstring trigger points and cause muscle tightness. This can lead to increase the mechanical stress on lumbar spine. Therefore, sewing machine operators can develop low back pain as a result of hamstring tightness. 60 participants were selected according to inclusive, diagnostic criteria (sit and reach test) and exclusion criteria. Pre and post intervention score was taken. Wilcoxon matched - pairs signed -ranks test was done. The result obtained for hath yoga in hamstring tightness suggest significance as P value obtained was <0.0001.

This study shows there is significant effect of hath yoga on hamstring tightness in tailors.

**Keywords:** Hath yoga, Sit and reach test, Hamstring

## I. INTRODUCTION

Hath yoga is a discipline involving various bodily and mental controls, but central to them all is the regulation of the breath. Hatha is derived from two roots, 'ha' (sun) and 'tha' (moon), which symbolically refer to the flowing of breath in the right nostril, called the 'sun breath', and the flowing of breath in the left nostril, called the 'moon breath. Yoga is derived from the root 'yuj' (to join); here fore, Hatha Yoga is the uniting of these two breaths. <sup>[1]</sup>

Hatha yoga commonly has 3 ingredients; postures known as asana, breathing exercises known as pranayama, and meditation—all of which are usually integrated with one another. The postures of Hatha yoga involve standing, balancing, forward bends, back bends, and twists; all strengthen the body and increasing flexibility in a controlled fashion.

With yoga practice we can relax many physical dysfunctions and improve the flexibility of the body. Yoga creates uniform muscle balance around each joint. Enables eccentric contractions to muscles to a greater length enabling a greater practical flexibility via energetically linking the areas crossing the joint to increase

Strength and flexibility. In general yoga practice is performed slowly and gradually, in a closed kinetic chain (specific poses or static postures), which may include active stretching, isometric muscle contractions, enhancing concentration and proper breathing patterns. Conceptually, we can conclude that both physiotherapy and yoga, each through its own procedures, improve muscle strength, increase joint mobility and soft tissue flexibility, mobilize the nervous system, improve body posture, improve proprioception and thereby encourage better

awareness of the body, releasing trigger points and relieving pain [2].

Hamstring tightness is defined as the inability to achieve more than 160° of knee extension while the hip is flexed at 90° [3]. Hamstring tightness can lead to many of the musculoskeletal disorders such as low back pain, hamstring muscle injury, patellofemoral pain and plantar fasciitis [4]. Furthermore, severity of mechanical low back pain increases with the increase of hamstring tightness [5].

In the seated position, hamstring is held at shortened position due to knee flexion and posterior pelvic rotation. In prolonged sitting, this constant shortened position develops hamstring trigger points and cause muscle tightness [6]. This can lead to increase the mechanical stress on lumbar spine.

Therefore, sewing machine operators can develop low back pain as a result of hamstring tightness.

## II. NEED OF STUDY

Hamstring tightness is a common musculoskeletal condition in tailor with incidence of 83.4%. In male it is 91.8% and in female 78.7%. [7]

It may lead to many musculoskeletal disorders like low back pain, hamstring muscle injury, patellofemoral pain and plantar fasciitis.

There have been studies done to check effectiveness of hath yoga in college students

for hamstring tightness which is proved that it is effective. [8]

There are limited evidence pertaining to the effectiveness of hath yoga in hamstring tightness for tailor. So, there is need to see effect of hath yoga on hamstring tightness.

## III. AIM:

To find the effect of hath yoga on hamstring tightness in tailor.

## IV. OBJECTIVE:

To study effect of hath yoga on hamstring flexibility at the end of 7 weeks in tailor by the sit and reach test.

## V. HYPOTHESIS

### NULL HYPOTHESIS (H0):

There will be no significant effect on hamstring flexibility in tailor after 7 weeks.

### ALTERNATIVE HYPOTHEIS (H1):

There will be significant effect on hamstring flexibility in tailor after 7 weeks.

## VI. METHODOLOGY

1. Study design – Pre and Post experimental study
2. Sample size- 60
3. Sampling method – Purposive sampling
4. Study population – Tailors age between 20 to 40, doing minimum 6 hours of continuous sitting work per day for a minimum of 5 days a week and this time period more than 6 month.
5. Study setting – In and around Pune City
6. Study duration -6 month

## VII. MATERIALS

1. Pen
2. Paper
3. Yoga mat
4. Consent form
5. Sit and reach table and measuring tape

## VIII. INCLUSION CRITERIA

1. Tailor: Willing to participate in study
2. Male and female who are doing minimum 6 hrs. Of continuous sitting work per day for a minimum of 5 days a week and this time period is more than 6 months.
3. Age: 20 to 40
4. Hamstring tightness: Below average reading in sit and reach test.

## IX. EXCLUSION CRITERIA:

1. Recent surgery of neck, spine, upper limb, lower limb.
2. Daily exercise doing individual
3. Previous musculoskeletal and central nervous system condition associate with hip, knee, and spine.
4. Limb length discrepancy
5. Pregnancy
6. High blood pressure, Insomnia, dizziness, migraine

- 7. Ulcer, Hernia
- 8. Menstruating women

posture and reach forward with both hands as far as possible, not allowing the knees to flex. A score was given based on the most distant point reached by both hands.

**X. OUTCOME MEASURE**

The “Sit and Reach Test” was performed by having the subject assume the long sitting

		Age (year)											
Percentile		18-25		26-35		36-45		46-55		56-65		>65	
Gender		M	W	M	W	M	W	M	W	M	W	M	W
90	Well above average	22	24	21	23	21	22	19	21	17	20	17	20
80	Above average	20	22	19	21	19	21	17	20	15	19	15	18
70		19	21	17	20	17	19	15	18	13	17	13	17
60	Average	18	20	17	20	16	18	14	17	13	16	12	17
50		17	19	15	19	15	17	13	16	11	15	10	15
40	Below average	15	18	14	17	13	16	11	14	9	14	9	14
30		14	17	13	16	13	15	10	14	9	13	8	13
20	Well below average	13	16	11	15	11	14	9	12	7	11	7	11
10		11	14	9	13	7	12	6	10	5	9	4	9

M, men; W, women.  
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**Table 1. Sit and reach test chart**

**XI. PROCEDURE**

Study began with synopsis presentation in front of ethical committee in PES Modern College of Physiotherapy, Pune and ethical clearance was obtained from the committee. Subjects were selected on the basis of inclusion and exclusion criteria. Study was explained to the participants. The assessment was done prior to the treatment. Intervention of hath yoga was start for 7 weeks. Data was collected and analysed.

- Warm up:
  1. Hip wiper
  2. Kneeling hip lunges
  3. Kneeling feet arch stretch up
  4. Lateral stretch up
- Asanas (hold time with progression and linked to 5-10 breath)
  1. 30-60 sec
  2. 60-90 sec
  3. 90-120 sec

**Table 2 – Progressive Yoga Intervention Weekly Asanas  
Week 1-2**

SR. No	Asana-Pose (Sanskrit)
1	Easy Pose (Sukhasana)
2	Cat & Cow Pose (Marjaryuasana & Bitilasana)
3	Child's Pose (Balasana)
4	Crescent Lunge Pose (Anjaneyasana)
5	Half Lord of the Fishes Pose/(Seated Spinal Twist d Spin Pose) (Ardha Matsyendrasana)
6	Sphinx Pose (Salamba Bhujangasana)
7	Bridge Pose (Setu Bandha Sarvangasana)
8	Reclining Hand-to-Big-Toe Pose (Supta Padangusthasana)
9	Supine Spinal twist Pose (Supta Mstsyendrasana)
10	Corpse Pose (Shavasana)

**Week 2-1**

SR. No	Asana-Pose (Sanskrit)
1	Extended puppy Pose (Uttana Shishosana)
2	Gate-(Latch)-Pose (Parighasana)
3	Mountain Pose (Tadasana)
4	Upward Salutes Pose (Urdhva Hastasana)
5	Tree Pose (Vrikshasana)

**Week2-2**

SR. No	Asana-Pose (Sanskrit)
1	Chair pose/Awkward Pose (Vtkatasana)
2	Warrior, I Pose (Virabhadrasana I) Standing Forward Fold Pose (modified with knee flexed) (Uttanasana)
3	(Extended) Triangle Pose ((Utthita) Trikonasana)
4	Staff Pose (Dandasana)

**Week 3-1**

SR. No	Asana-Pose (Sanskrit)
1	Revolved Crescent Lunge Pose (Parivrtta Anjaneyasana)
2	Head to Knee Pose (Janu Sirsasana)
3	Boat Pose (Paripurna Navasana)
4	Plank Pose (Phalakasana)
5	Cobra Pose (Bhujangasana)

**Week 3-2**

SR. No	Asana-Pose (Sanskrit)
1	Seated Forward Fold Pose (Paschimottanasana)
2	Half Frog Pose (Ardha Bhikasana)
3	Locust Pose (Salabhasana)
4	Four Limbed Staff Pose (Chaturanga Dandasana)
5	Downward Facing Dog Pose (Adho Mukha Savanasana)

**Week 4-1**

SR. No	Asana-Pose (Sanskrit)
1	Warrior II Pose (Virabhadrasana II)
2	Extended Side Angle Pose (Utthita Parsvakonasana)
3	Reverse Warrior Pose (Viparita Virabhadrasana)
4	Wide-Legged Forward Fold Pose (Prasarita Padottanasana)
5	Upward Plank Pose (Purvottanasana)

**Week 4-2**

SR. No	Asana-Pose (Sanskrit)
1	Eagle Pose (Garudasana)
2	Intense Side Stretch Pose (Parsvottanasana)
3	Upward Facing Dog Pose (Urdhva Mukha Savanasana)
4	Sunbird Pose (Chakravakasana)
5	Sun Salutations (modified) (Surya Namaskar)

**Week 5-1**

SR. No	Asana-Pose (Sanskrit)
1	Lizard Pose (Utthan Pristhasana)
2	One-Leg King Pigeon Pose (Eka Pada Rajakapotasana)
3	Wide-Angle Seated Forward Fold Pose (Upavistha Konasana)
4	Bound Angle Pose (Baddha Konasana)
5	Side Plank Pose (Vasisthasana)

**Week 5-2**

SR. No	Asana-Pose (Sanskrit)
1	Bow Pose (Dhanurasana)
2	Camel Pose (Ustrasana)
3	Ear to Knee Pose (Karnapidasana)
4	Plow Pose (Halasana)
5	Supported Shoulder Stand Pose (Salamba Sarvangasana)

**Week 6-1**

SR. No	Asana-Pose (Sanskrit)
1	Crow Pose/ Crane Pose (Bakasana)
2	Warrior III Pose (Virabhadrasana III)
3	Half Moon Pose (Ardha Chandrasana)
4	King Dancer Pose / Lord of the Dance Pose (Natarajasana)
5	Upward Bow Pose / Wheel Pose (Urdhva Dhanurasana / Chakrasana)

• **Cool down:**

1. Static stretch: Supine hamstring and calf stretch, Supine diagonal leg stretch,

Supine spinal twist, Single leg hip stretch, Shoulder bridge shoulder stretch.

2. Active stretch: Supine hip rock and hip circle, Full body distal stretch.

#. Shvasana (8 to 10 min)



**Fig.1.Bhujangasana**



**Fig.2.Setu bandha sarvangasana**

**XII. GENDER WISE DISTRIBUTION**

Gender	Subject	Percentage
Male	32	53%
Female	28	47%
Total	60	100%

**Table 3. Distribution of male and female**

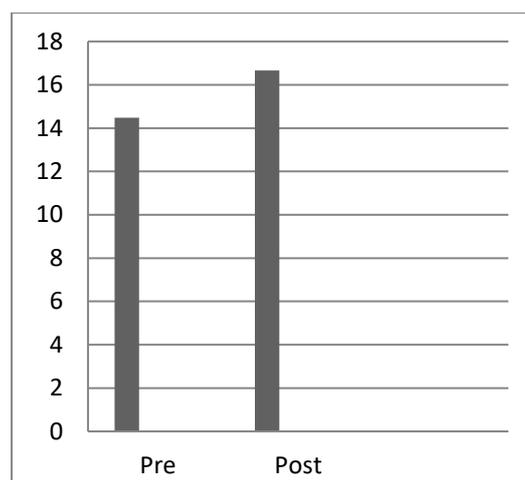
**XIII. RESULT**

The study included 60 professional tailors. Wilcoxon matched –pairs signed – ranks test was done. The result obtained for hamstring

tightness by giving hath yoga measured by sit and reach test suggest significance as p value obtained was <0.0001.

Sit and reach test score	Mean	N	SD	SE	p value
Pre	14.4	60	1.5	0.19	<0.0001 Significant
Post	16.6	60	1.3	0.17	

**Table 4. Comparison of pre and post treatment sit and reach test score**



Graph 1. Sit and reach test score

#### XIV. DISCUSSION

This study determines the effects of a 7-week progressive Hatha yoga intervention on hamstring flexibility in tailor using the sit and reach test. Participants performed 49 asanas progressing from easy to more difficult in all planes of motion and it was observed that hip flexion in the sagittal plane was relaxed during stretching which allowed the hamstring muscle to lengthen further. The major finding of the present study was that hamstring flexibility after a 7-week progressive yoga intervention showed a statistically significant difference in pre-score to post-score for both legs. Right and left leg increased from pre-score (M-14.4) to post-score (M-16.6).

The study done by Trayer proved that the effectiveness of hath yoga in college students for hamstring tightness <sup>(7)</sup>. Yoga creates uniform muscle balance around each joint. Enables eccentric contractions to muscles to a greater length enabling a greater practical flexibility via energetically linking the areas crossing the joint to increase strength and flexibility. <sup>(2)</sup> The simultaneous activation of antagonistic neuromuscular systems such as flexion and extension and intrasfusal and golgi tendon-organ feedback may provide a way to maintain range of motion. <sup>(9)</sup>

Standing ananas stretch and strengthen the skeletal and muscular systems, build overall stability, strength, endurance and balance. These asanas strengthen the major muscle

groups, such as the hamstrings, quadriceps, rectus abdominals, hips and the entire spine. Reclining asanas correct neuro-muscular, chemical and other imbalances. They release tension and congestions from the legs, hips, pelvis and abdomen and rest the spine, lung and heart.

Backward bends refresh, invigorate, energize, strengthen and create mind and body balance. They align and integrate the front and the back of the body, sstrengthenn the spine, enhance lung capacity, extend the heart, nourish the abdomen and pelvis. Backward bends also correct postural defects such as rounded shoulders and hunched back.

Sitting asanas awaken, restructure, realign and strengthen the hips, pelvic and abdominal areas. They enhance flexibility; remove tensions, congestions and imbalance caused due to habitual wrong postures and unhealthy life and imbalance caused due to habitual wrong postures and unhealthy lifestyle. <sup>(10)</sup>

Improved flexibility is one of the most obvious and quickly achieved effects of hatha yoga practice, since this is based on gradual stretching of muscle and connective tissue around bones and joints <sup>(11)</sup>, static retention of yoga poses and movements of joints throughout the entire existing range of motion. The latter provide straight-line compression and lubrication of articular cartilage by the synovial fluid, thereby bringing fresh nutrients and oxygen to those

parts of joint cartilage which are rarely used in everyday activities. <sup>(12)</sup>

Our results are consistent with other studies of yoga interventions regarding effects on hamstring flexibility. <sup>(13)</sup>

## XV. CONCLUSION

Based on the results of study, a 7-week progressive yoga intervention on hamstring flexibility was found to be an effective modality to improve flexibility. Yoga may have benefits for those who are coaches, athletes and clinicians who may want to include yoga as a training regimen, to reduce injury, to correct imbalances to increase strength and flexibility or to simply improve their quality of life.

## XVI. LIMITATION

One limitation of this study is that the menstrual cycle of female participants was not taken into account. Post-cycle, some women may experience an increase in flexibility, which could influence the results. Therefore, it is difficult to determine whether the observed increase in flexibility was due to the practice of Hatha Yoga or a natural fluctuation related to the menstrual cycle."

## XVII. FUTURE SCOPE OF STUDY:

The same treatment techniques could be implemented in different populations. Compare the effect of hatha yoga with other different technique.

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