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EFFICACY OF *PASCHIMOTTANASANA* AND *BHUJANGASANA* ON FLEXIBILITY OF *KATI-TRIKA SANDHI* (Lumbo-sacral joint) IN HEALTHY VOLUNTEERS

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ABSTRACT

BACKGROUND: *Sandhi* is defined as articulation of two *Asthi* (bones). *Sandhis* are of two types those are *Chestayukta (*movable) and *Sthira* (immovable). *Shakha* (joints of extremity), *Hanu pradesha* (temporo-mandibular joint) and *Kati* (hip joint) are *Chestayukta Sandhis* and remaining all are S*thira Sandhis*. The lumbo-sacral joint is between the L5 and S1 vertebrae. It helps in different types of movement like flexion, extension and lateral flexion. Sedentary life style leads to restricted movement of joints and abnormal posture which results in the development of ailments related to *kati-trika Sandhi* (lumbo-sacral joint).

AIMS AND OBJECTIVES: To evaluate the combined effect of *Paschimottanasana* and *Bhujangasana* on flexibility of *kati-trika Sandhi* (lumbo-sacral joint) in healthy volunteers.

MATERIALS AND METHODS: Classics of Ayurveda and Contemporary science. The data obtained was critically reviewed and analyzed to establish the relation between *kati-trika Sandhi* (lumbo-sacral joint) and to evaluate the effectiveness of *Paschimottanasana* and *Bhujanganasana* in increasing the flexibility of *kati-trika Sandhi* (lumbo-sacral joint). In this study 100 healthy volunteers select for *Paschimottanasana* and *Bhujanganasana* on daily basis for 60 days in morning time, follow up after 15 and 30 days were taken. Obtained data statically analysed by Independent two sample‘t’ test.

OBSERVATION AND RESULTS: Range of motion (flexion, extension) measuring by goniometer and standard measure tape on 0^{th}, 30^{th}, 60^{th}, follow up after 15^{th} day and 30^{th} day.To assess the flexibility of healthy volunteers after intervention the *paschimottanasana* and *bhujangasana*

DISCUSSION: The data available from the literary review, observations, results made in this study of 100 volunteers are being discussed.Before and after invention of both *Asana* outcome parameters (lumber flexion by goniometer and tape, lumber extension by goineometer and tape, time of Asana position) are being discussed

CONCLUSION: On the bases of observational and survey study flexibility of *kati Trika Sandhi* (lumbo sacral joint) gradually increases day by day with regular practice of both the *Asanas.*

Key Words: Lumbo-sacral joint, *Prushta vamsha,* flexion, extension.

INTRODUCTION: *Sandhi* is defined as articulation of two *Asthi* (bones)[1]. It is one of the *Sthana of Kapha* and they help to keep the body parts together. *Sandhis* are of two types those are *Chestayukta* and *Sthira*[2]. *Shakha, Hanu pradesha* and *Kati* are *Chestayukta Sandhis* and remaining all are S*thira Sandhis*[3]. *Kati-Trik sandhi* is one of the *Prushta vamsha gata Sandhi*. As per *Shabda kalpa druma Trika* is the structure which supports *Prushta vamsha*[4] and according to *Amarakosha, Trika* is the *Prushta vamsha Adhobhag*[5].

The lumbo-sacral joint is between the L5 and S1 vertebrae. It helps in different types of movement like flexion, extension and lateral flexion. It also helps in transferring the body weight from trunk to the lower limb[6].

Asanas are first *Anga* (step) in *Hatha-yoga*. Total 84 lakh Asanas has been described by Lord *Shankar* among them 84 *Asanas* are found to be superior, and out of these 32 are useful for mankind[7]. The *Pashchimottanasana (Ugrasana)* and *Bhujangasana* are mainly correspond with movement of lumbo-sacral joint. The word *Paschima* means the back and word *Uttana* means to stretch. The word *Bhujang* means 'Cobra' and *Asana* means 'posture', since this *Asana* resembles the 'posture of cobra' it is named so[8]. The present study has been taken up to analyze the impact of both *Asanas* on lumbosacral joint flexibility.

AIM & OBJECTIVES:

AIMS:

1. To evaluate the combined effect of *Paschimottanasana* and *Bhujangasana* on flexibility of *kati-trika Sandhi* (lumbo-sacral joint) in healthy volunteers.

OBJECTIVES:

1. To study the normal anatomy of *kati-trika Sandhi* (lumbo-sacral joint) through available *Ayurvedic* literature and contemporary science.
2. To study literature review on *Paschimottanasana* and *Bhujangasana*.
3. To evaluate the effect of *Paschimottanasana* and *Bhujangasana* on flexibility of *kati-trika Sandhi* (lumbo-sacral joint) in healthy volunteers.

MATERIALS AND METHODS:

It is open labelled Interventional study with pre and post-test design**.**

In this study 100 healthy volunteers selected aged between 18 to 40 years by questionnaire method. Consent and CRF (Case record form) were filled and Range of motion were taken in Flexion and extension of *kati-trika Sandhi* (lumbo-sacral joint) in selected healthy volunteers performing *Paschimottanasana* and *Bhujanganasana* with help of standard tape and manual Goniometer on 0^{th} day, 30^{th} day and 60^{th} day.

Ethical clearance was obtained from Institutional Ethics Committee prior to initiation of the study; Vide Approval No: JSAM/IECHR/108/11-2019 on 10/10/2019.

This study is registered in Clinical Trial Registry of India (CTRI; www.ctri.nic.in) vide CTRI/2020/02/023336.

Material for Interventional study:

- Standard measuring tape for flexibility measurement
- Pen/pencil
- Paper

- Manual Goniometer for ROM measurements

INCLUSION CRITERIA:

- Healthy volunteers of both genders, who were selected by questionnaire method.
- Age group between 18-40 years.
- Irrespective of religion and socioeconomic status.
- BMI (18-24).

EXCLUSION CRITERIA:

1. Individual having age below 18 year and above 40 year was excluded.
2. Individual performing any kind of physical exercise or *Yogasana* effecting on *kati-trika Sandhi* (lumbo-sacral joint),
3. Pregnant women ,
4. Individual having any disorder related to *kati-trika Sandhi* (lumbo-sacral joint).
5. Individual who have undergone *kati-trika Sandhi* (lumbo-sacral joint) surgeries and any medical interventions.
6. Auto immune diseases related to vertebral column.
7. Obesity [BMI > 24]
8. Congenital anomalies related to vertebral column.

ASSESSMENT CRITERIA:

Subjective criteria: Time of *Asana* position

Objective criteria:

Range of motion (flexion, extension) measuring by goniometer and standard measure tape on 0^{th}, 30^{th}, 60^{th}, follow up after 15^{th} day and 30^{th} day.

To assess the flexibility of healthy volunteers after intervention the *paschimottanasana* and *bhujangasana*.

OBSERVATIONS AND RESULTS:

In present study 100 healthy volunteers fulfilling the inclusion criteria were selected by questionnaire method. All the Results are calculated by using Software XLSTAT. For Parametric Data, Independent two sample‘t’ Test is used. The t test statistic value to test whether the means are different can be calculated as follow:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

TABLE:1. Showing Effect of *ASANA* on objective Parameters:

Intervention		Mean	SD	Mean Diff.	SD	SE	t value	df	p value
Lumbar flexion *(Paschimuttanaasana)* in degree	0^{th} day (BI)	58.18	6.92	17.17	3.68	0.37	46.63	98	<0.001
	follow up after 30 day (AI)	41.01	9.20						
lumbar flexion *(Paschimuttanaasana)*		7.02	6.17	-0.24	6.14	0.61	-0.39	98	0.347

in cm	follow up after 30 day (AI)	7.26	0.46						
lumbar extension *(Bhujangaasana)* in degree	0 day (BI)	33.45	5.69	12.81	4.14	0.41	30.92	98	<0.001
	follow up after 30 day (AI)	20.64	7.12						
lumbar extension *(Bhujangaasana)* in cm	0 day (BI)	1.66	0.44	-1.12	1.22	0.12	-9.18	98	<0.001
	follow up after 30 day (AI)	2.79	1.27						
Time of *Asana* postion of *paschimottanasana* (in min)	0 day (BI)	0.49	0.35	-1.54	0.35	0.04	-43.75	98	<0.001
	follow up after 30 day (AI)	2.03	0.50						
Time of *Asana* postion of *bhujangasana* (in min)	0 day (BI)	0.30	0.07	-1.93	0.46	0.05	-42.23	98	<0.001
	follow up after 30 day (AI)	2.23	0.48						

(S: Significant: ($p < 0.05$)

HS: Highly Significant: ($p < 0.001$)

In Lumbar flexion degree (*Paschimuttanaasana)* the mean score before intervention was 58.18 which was lowered down to 41.01 after intervention, with SD± 3.68 which was statistically highly significant ($p < 0.001$)

In Lumbar flexion cm (*Paschimuttanaasana)* the mean score before intervention was 07.02 which increased to 07.26 after intervention, with SD± 6.14 which was statistically significant ($p < 0.05$)

In Lumbar extension degree *(Bhujangaasana)* the mean score before intervention was 33.45 which lowered down to 20.64 after intervention, with SD± 4.14which was statistically highly significant ($p < 0.001$)

In Lumbar extension cm *(Bhujangaasana)* the mean score before intervention was 01.66 which increased to 02.79 after intervention, with SD± 1.22 which was statistically highly significant ($p < 0.001$)

In Time of *Asana* position of *Paschimottanasana* (how long time volunteers maintain *Asana* position in min)the mean score before intervention was 0.49 which increased to 02.03 after intervention, with SD± 0.35 which was statistically highly significant ($p < 0.001$)

In Time of *Asana* position of *Bhujangasana*(how long time volunteers maintain *Asana* position in min)the mean score before intervention was 0.30 which increased to 02.23 after intervention, with SD± 0.46 which was statistically highly significant ($p < 0.001$)

DISCUSSION:

Figure no.1: *Asana* position of *paschimottana*

Figure no.2: *Asana* position of *bhujangasana*

Kati is described as the region present below the *Nabhi pradesha*, and above the *Medra* & *Mushka* region[9]. In the present context it should be understood as *Shroni pradesha* ie; Hip region. *Kati kapala*, *Nitamba* & *Shroni Phalaka* all these indicates the Ileal part of Hip bone. *Kati* is the lowback region along with the Ileal part of hipbone & sacrum. Thus the region of L5 have to be inferred in the present context. *Trika* is considered as the region, where the union of three structures takes

place. *Trika* is mentioned as the region present in the posterior aspect of *Kati*. It is considered as the *Shroni Kanda bhaaga*, stem part of Hip bone.

Anatomical features of *Kati-Trika Sandhis* mentioned in *Ayurveda* can be correlated upto certain extent with the help of the contemporary science. *Kati-Trika Asthi Sandhi* are *Pratara* variety of *Sandhis*. They are *Alpa cheshtavanta* (slightly movable joint). These types of joints are responsible for the slippery and gliding type of movements. It can be correlated to Cartilaginous & Synovial joints.

Yoga is a way of life predominantly concerned with maintaining a state of equanimity at all costs. It brings steadiness and health to the physical, mental, emotional and spiritual dimensions of the individual. The most common technical significance of the term *Asana* is "posture". This is considered as one of the regular *Anga* (limbs) of the *Yogic* path and is usually listed first.

In *Bhujangasana* slow extension of vertebral column bending the back bone backwards and again there is slowly relaxation These movements increases the stress & strain created by muscle & joint activity in the Lumbosacral region & joint in its movable threshold, influences the cell shape & physiology & can have a direct mechanical effect on matrix alignment.

Paschimottanasana stretches the hamstring muscles and increases flexibility in the hip joints.

CONCLUSION:

Kati is considered as the low back region along with the Sacrum and Ileal part of hip bone which refers here to L5 vertebra. *Trika* is the region of *Asthi Sanghata*, which forms the *Shroni kanda bhaga*, which can be taken as the sacral region. While performing both the *Asanas* Erector spinae, Latissimus dorsi, Hamstrings, Gluteus maximus, Piriformis, Obturator internus and Gemelli, Gluteus medius and minimus, Gastrocnemius and Soleus, Popliteus, Trapezius, Abdominal Muscles was involved. Improvement in time of *Paschimottanasana* Position on 0^{th} day - 0.49 and on follow up after 30^{th} day - 2.03 min and in *Bhujangasana* on 0^{th} day 0.30 – and on follow up after 30^{th} day 2.23 min. Lumbar Flexion on 0^{th} day 58.18 - and on follow up after 30^{th} day 41.01 degree. Lumbar extension on 0^{th} day 33.45 - and on follow up after 30^{th} day 20.64 degree. Lumbar Flexion on 0^{th} day 7.02 - and on follow up after 30^{th} day 7.26 cm. Lumbar extension on 0^{th} day 1.66 - and on follow up after 30^{th} day 2.79 cm. Above data clearly indicate that flexibility of *kati Trika Sandhi* (lumbo sacral joint) gradually increases day by day with regular practice of both the *Asanas*.

REFERENCES:

1. Acharya YT, editor. Commentary Agnivesha and Dridhabala on Charaka Samhita, Shareera Sthana, Cha.5/26, Varanasi: Chaukambha Sanskrit Pratishthan; 2009.p.768.

2. AcharyaYT, editor. Commentary Nagarjuna of Acharya Sushruta on Sushruta Samhita Sharira Sthan, cha.5/24, Varanasi: Chaukhambha Sanskrit Series; 2014.p.366.

3. Acharya YT, editor. Commentary Nagarjuna of Acharya Sushruta on Sushruta Samhita Sharira Sthan, Cha.5/25, Varanasi: Chaukhambha Sanskrit Series; 2014.p.365.

4. Raja Radhakantdev Bahadura, Shabdakalpadruma, part 2/6/76, Varanasi: Chaukhmbha Amarabharti Prakasan; p.654.
5. Hargovind sastri, editor. Commentary of Amarasimha, Amarkosa, Dwitiya kanda, Manushya Varga 6/73, Varanasi: Chaukhambha Sanskrit Series; 2012.p.293.
6. Ross and Wilson. Anatomy and Physiology in health and illness.12th ed. SCHAND Publication; 2014.p.401-412.
7. Chamanlal gautam, Hath yoga pradipika cha.1, Bareli: Sanskrit Sansthan; p.28.
8. J.L.Gupta, editor. Commentary of Rai Bahadur Srisachandra Vasu, Gherand Samhita, cha.2/24, 42, 43, Varanasi: Chaukhambha Publication; 2003.p.30, 36.
9. Indu Commentator, Astanga Samgraha of Acharya Vruddha Vagbhata, edited by Jyotir misra, Sharira Sthana 8/35, Varanasi: Chaukhambha Sanskrit Series; 2012.p.333.

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