

# Add-On Effects of Different Yoga Mat Materials on The Subtle Energy Outcomes of Yoga Practices

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## ABSTRACT

### Background

In order to practice yoga sadhana, a yoga mat is often recommended to provide some level the characteristics such as grip, balance and comfort (the mat must allow the user to practice without feeling the ground). And often biomechanical investigations are conducted to assess grip, balance and comfort. However, yoga mats have never researched upon from the perspective of its add-on effects.

### Aim

The aim is to study the influence of various yoga mats made of Cotton, Rubber and Kuma grass on the outcomes of yoga practice.

### Materials and Methods

Twenty-three self-declared healthy male volunteers, with six or more months of practice to undergo two experimental states i.e., nadi-shudhi pranayama and breath awareness on three different yoga mat types: Rubber, Kuça and cotton on consecutive six days. In this study GDV express(EPI) instrument were used to analyze parameters integral area (IA) (general health), and integral entropy (disorderliness in energy).

### Results and Discussion

Repeated measures Analysis of variance was performed to assess changes between the two time points and across the six different experimental conditions as described earlier. The variables of interest were Integral Entropy, Integral Area on right and left side without filter. The results indicate that, there were notmuch different in EPI parameters across the six condition. Interestingly, we have noted that there were nostatistical significant changes in any of the experimental conditions following the intervention or the mat type.

### Conclusion

Though the result are not statistically significant, energy parameters appears to be more stable and consistent throughout in Kuça mat condition compared to Cotton and Rubber.

### Keywords

Yoga mat, cotton, kuça, pranayama, alternate nostril breathing, nadi-shuddhi pranayama, GDV, EPI, eco-friendly.

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## Introduction

A journey into yoga means dissolving the identity of the self and learning to experience expansive- awareness rather than being caught up in a restrictive and skin-limited understanding of the self. However, yoga is currently observed by many who want to have a better posture and improved physical and mental health. Yoga practices are understood to be

therapeutic and are being integrated as a part of medical management of ailments as well.

To start the practice is quite simple and we do this from the confines of our personalized, brightly colored, private rectangular yoga spaces called yoga mats. Are we assuming that we need a mat to practice yoga or is it possible to practice yoga without a mat.

### Types of Yoga mat in Yogic tradition

It's prescribed in Ayurveda not to sit on bare floors because of the risk of *Vata*. Hence, the reason yogis recommended use of some kind of separation between themselves and the floor/rock etc. Traditional guidance for the yoga practices recommend using various types of mats for different purposes. However, in the present scenario, yoga mats made of rubber, cotton and Kuça grass are being widely used by yoga practitioners round the globe.

Rubber mats appear to be one of the commonest choice for yoga practices as they offer cushioning, and are slip-resistant. While cotton yoga mats are another alternative which gives good cushioning for yoga exercise because of soft texture & they absorb sweat easily. They are also easy to maintain since they can be regularly washed after use. It is that particular quality, that makes them more hygienic. But they are not long lasting as rubber yoga mats.

Mats – recommended materials and their relevance

### **Kuça**

Kuça grass is scientifically known as panic grass and of genus borage species. Kuçagrass mat is mainly used for sitting and doing meditation, yoga, puja like “Yana (“home”)", praying god in home, etc.,

In Ayurveda, Kuça grass is also used as a medicine to treat dysentery and menorrhagia and to promote free flow of urine. Mats made of Kuça grass make very good meditation seats and sages often sit on Kuça grass mats when they do their meditation.

Kuça grass has been mentioned in the Rig Veda for use in sacred ceremonies and also to prepare a seat for priests. Kuça grass is specifically suggested by Lord Krishna in the Bhagavad-Gita as part of the ideal seat for meditation. According to early Buddhist accounts, Kuça grass was used by Buddha for his meditation seat when he attained enlightenment (Paul Williams, 2006).

And it is believed that Kuça grass blocks energy generated during meditation from being discharged through our body (mostly through legs and toes) into ground. Kuça grass can also be used to help shield people from the negative and scientific radiations.(A.V.S- 11.6.15; A.V.S. 6.43.1; R.S- 165)

### **Tiger Skin**

Animal skins, whether sheep, yak or carnivorous beast, have been used for survival from the elements, comfort, convenience and status since humans could hunt or domesticate animals because of their easy availability, they were a readily available source of material to create clothing, dwellings and furnishings. Skins and furs form a natural mat or rudimentary carpet, and have been used in this way from prehistory up to our present technological age. Thus the usage of skins as a meditation seat also goes back to earliest times.

Often yogis chose tiger skin and it is evident from the pictures of yogis sitting on animal skin. Basically, they used what was available. For forest yogis it was natural to use a dry, tanned skin, like the non-conducting gloves when handling electricity.

It is believed that if you sit on a tiger skin, it was possible to acquire all the siddhis and supernatural powers. And that it brings power because the skin has its own vibration, provided the animal has died naturally, then the skin is believed to retain the natural quality or the nature of the animal. (B.G- 6.11; H.Y.P-1.57)

### **Silk**

Silk is an animal fiber produced by certain insects to build their cocoons and webs, and is the only natural fiber that occurs in filament form. Silk is one amongst the oldest fibers known to man. Silk has been used and regarded as a highly valued textile fiber for over 4000 years. Silk has outstanding mechanical properties and biocompatibility. They displaying unusual mechanical properties, such as being strong, extensible, and mechanically compressible (Matsumoto et al., 2006).

Silk is one of the most beautiful fabrics available, with a long and colorful history and changing applications in the world today. Silk's capacity to absorb water makes it comfortable to wear in warm weather and whilst engaged in activity. However, it is equally good in cold weather, as its low conductivity keeps warm air close to the skin.

### **Deer skin**

In olden days, the deer was always a part of the ancient Ashrams of sannyasins and maharishis and sages used to live in forests and there used to be many deer. When the deer died its natural death, their skin was used to make seats. Moreover, since Yogis and Sanyasis are usually away from civilization and man-made fabric material, it leads to the use of more natural and available 'fabric' of animal skin. They should have found the skin of the deer an easily procurable material for their yoga practice (Asana).

It is traditional for many kundalini Yoga practitioners to use sheepskins on which they do their yoga. Many yogis have recommended the sheepskin for meditation, as it creates an insulation between the yogi and the magnetic pull of the Earth. It is believed that they conserve the energy generated by meditation.

The sages found that doing Asana seated on a deer-skin was highly conducive to Siddhi from spiritual point of view. The power generated within the body through Asana was preserved by the skin. It is believed that sitting on a deerskin and meditating will help acquire all the aesthetic beauties, the charms of life, and liberation too. Using a deerskin also gave the soft or gentle nature of the deer. (B.G - 6.11)

### **Physiology of Yoga practice**

Yoga is an ancient technique intended to stabilize and recondition the psychophysiological make-up in an individual. Any mode of exercise or physical activity leads to a state of physical stress on the different systems that changes the homeostasis.

Yoga offers a unique combination of mild to moderate physical exercise

(suryanamaskar and asana), cleansing process (Kaiya), breathing control (pranayama) and meditation (dhyana). And It has not only been used by healthy individuals for health maintenance and disease prevention but used as a treatment for a range of health conditions.

### **Yoga on Electro Photonic Imaging (EPI)**

In the modern day scenario, a globally concern point is health and its care. Meditation is one of the way to enhance physiological and psychophysiological status of a meditator at a subtle level, which can be measure through Electro Photonic Imaging parameters(K. Kushwah, Srinivasan, Nagendra, & Ilavarasu, 2015);(Guru Deo, Kumar, Srinivasan, & Kushwah, 2016). The EPI instrument specially design to measure the subtle energy level and to obtain health index level(G Deo et al., 2015), also emotional condition of an individual through different GDV parameters (Korotkov, Matravers, Orlov, & Williams, 2010). Study has shown that GDV parameters can be used to identify bioenergetics change of the participant by given any intervention(Haun, Patel, Schwartz, & Ritenbaugh, 2015).This technique become worldwide utilize for health assessment also in the field of alternative medicine, therefore study has done to establish the normative data of EPI for the healthy Indian population, for the accuracy of EPI measurements and interpretations(Kuldeep K. Kushwah, Srinivasan, Nagendra, & Ilavarasu, 2016a).

### **Yoga on Metabolic functions/Metabolism**

The practice of yoga generally leads to a more efficient functioning of the psychoneuro-endocrine and immune system. Before the development of Western Medical science, yoga was believed to alter the neuroendocrine system which was vital to health.

A set of practices were developed in order to maintain healthy glands and the body's metabolism.

There are strong evidences that suggests yoga has a positive impact on hormone regulation. Findings of such studies show there's improved glucose tolerance and insulin sensitivity after regular asana

practice among type 2 diabetics. And clinical significant among the sample were noted in fasting plasma glucose and postprandial plasma glucose after yoga practice(*Jyotsna, 2014*).

Role of earthing the human body

Throughout history, humans were walked barefoot or with footwear made of animal skins. They slept on the ground or on skins. Earthing (also known as grounding) refers to contact with the Earth's surface electrons by walking barefoot outside or sitting, working, or sleeping indoors connected to conductive systems, that transfer the energy from the ground into the body.

Principle underlying earthing the human body

Evidence shows that the Earth's negative potential may create a stable internal bioelectrical environment for the normal functioning of all body systems. Based on the scientific studies it has been well established that electrons from antioxidant molecules neutralize reactive oxygen species

(ROS, or in popular terms, free radicals) involved in the body's immune and inflammatory responses.

Studies suggest the concept that the Earth's electrons influence multiple physiological changes which are of clinical significance, with respect to pain, sleep, and a shift from sympathetic to parasympathetic tone in the autonomic nervous system (ANS), and a blood-thinning effect(*Sokal, Sokal, Chevalier, Sinatra, & Oschman, 2012*).

Earthing & stress sleep & pain.

Grounding the body at night through sleep also seems to have an effect morning fatigue levels, daytime energy, and nighttime pain levels. Results indicate that grounding the human body to earth ("earthing") during sleep reduces nighttime levels of cortisol and re synchronizes cortisol hormone secretion more in alignment with the natural 24-hour circadian rhythm profile. Changes were most apparent in females. And subjects reported that enhancement in these conditions as well as improvements in sleep, pain, and stress— usually occurred

rapidly within the first few days of grounding rather than gradually over.

You may also add stating that free electrons act as anti-inflammatory agents that reduce the extent of oxidative stress and inflammation. And, also there is a study mentioning that there is a potential difference between the ground and the human body in case of people who are using slippers / shoes for prolonged periods of time(*Ghaly & Teplitz, 2004*).

## Methods

Source of Subject

Twenty-three self-declared healthy male volunteers, with six or more months of practice, ages ranging from 18 to 33 years (group mean age – SD, 23.1 ± 3.5 years) residing at S-VYASA University, Bangalore and MaharshiDayanandSaraswati University of Ajmer were recruited as subjects for the study following obtaining written informed consent. All the subjects were not under any medication for any ailment or debility.

Male volunteers alone were selected as autonomic and respiratory variables are known to vary with the phases of the menstrual cycle. All the subjects recruited had been practicing various forms of meditation in the past 6 months. Apart from their prior experience of meditation, they were given a 3-day orientation program.

All participants expressed their willingness to take part in the experiment. The study was approved by the institution's ethics committee. The design of the study was explained to the participant, and their signed consent was obtained.

## Design

The research study involved the subjects to undergo two experimental states i.e., nadi-shudhi pranayama and breath awareness on three different yoga mat types: Rubber, Kuça and cotton on consecutive six days. The order of the intervention was randomized.

The participants were assigned randomly to different mats on different days for 6

days. Each session included three sequences. These were (i) Sequence 1: Guided regulated breathing with 5 second to inhale and 5 seconds to exhale for 5 minutes (ratio of inhalation: exhalation [1:1]). (ii) Sequence 2: Alternate Nostril Yoga Breathing (ANB) for 5 minutes in 1:2 ratio for inhalation and exhalation respectively (5 seconds to inhale and 10 seconds to exhale). (iii) Sequence 3: Self-regulated Breath Awareness for 5 minutes. Each of these 3 sessions on 6 days consisted 2 states: pre, and post to collect GDV reading.

Each session consisted of 25 min in total and during which subjects were made to

practice on any one of the three yoga mats using recorded instructions. The instructions to perform practices were recorded to avoid any instructor or time bias. In that 25 min duration first 5min and last 5min was idle sitting. This was for 6 days keeping the time of the day constant for each subject. Participants were assigned randomly to these 6 possible sequences using a random number table. Hence, each participant was assessed on six different days at the same time of the day, with the assignment of participants to different mats being random.

Fig. 1 Schematic presentation of the Control and Experiment condition

Variable	Description
<i>YMS01</i>	<i>YogaMatStudy (YMS), 01/02 corresponds to participant serial number, _followed by K (C/E), C (C/E), R (C/E)</i>
<i>K(c)</i>	<i>Kuça Control</i>
<i>C(c)</i>	<i>Cotton Control</i>
<i>R(c)</i>	<i>Rubber Control</i>
<i>R(e)</i>	<i>Rubber Experimental</i>
<i>C(e)</i>	<i>Cotton Experimental</i>
<i>K(e)</i>	<i>Kuça Experimental</i>

**Inclusion Criteria**

Yoga Practitioner for 6 months or more, in normal health and not on any medication during the study were chosen as samples. (Inclusion criteria based on previous studies: (Guru Deo et al., 2016).

**Exclusion Criteria**

Individuals with any physical disability, mental instability, or inability to sit in Padmasana (Lotus Posture) for 15 minutes or more will be excluded from participating in the study. who Individuals had cuts in the fingers, missing fingers, any health-related issues and substance abuse(smoked or taken alcohol on the day of measurement) were excluded from the study(Kuldeep K. Kushwah, Srinivasan, Nagendra, & Ilavarasu, 2016b).

**Assessment**

Electro Photonic Imaging (EPI)  
The Gas Discharge Visualization (GDV) technique which is also known as Electro

Photonic Imaging (EPI) technique been used in several studies as a scientific device to evaluate stress, general health depends on a measure of stimulated optoelectronic emission of humans (Korotkov et al., 2010).This instruments also used for various purpose like detecting anxiety, depression etc.This emission takes place when the finger tips are exposed to the glass plate with a short electric pulse of high voltage (10 kv), with high frequency (1024 Hz) and low current in micro amps for less than a millisecond. To capture the images CCD-camera had placed under a dielectric plate in the EPI system(Kuldeep K. Kushwah et al., 2016b).

Electro photonic imaging parameters(EPI)  
Integral area left and right  
The integral area left (IAL) side and the integral area right (IAR) side parameters are a measure of general health index of a subject being measured.

Integral entropy left and right  
Integral entropy left (IEL) side and integral entropy right (ILR) side parameters are components that show the degree of disorderliness in the human energy field (Kuldeep K. Kushwah et al., 2016a).

### **Intervention**

The subjects were asked to come to the laboratory for 6 consecutive days at the same time of the day so as to maintain similar diet and physical activity levels of all the subjects. Throughout all sessions participants sat in Padmasana and kept their eyes closed following prerecorded instructions. An emphasis was placed on carrying out the practices slowly, with awareness of physical and mental sensations and relaxation. Participants were given a 3-day meditation orientation program under our guidance. The purpose of this orientation was for all participants to practice based on specific instructions. The experiment was conducted in a sound attenuated, temperature-controlled environment.

Participants were randomly made to sit on a mat made of cotton, rubber or kuça and they were allowed to wander freely as they listened to a pre-recorded audio consisting of brief periods of instructions. The instruction was meant to induce a non-meditative relaxed state before the intervention.

Participants were then asked to follow the audio instructions for the practice of guided regulated breathing for 5 minutes which involves conscious effort to keep the breathing pattern restricted to 5 seconds to inhale and 5 seconds to exhale as per the instructions given in the audio.

Participants were then asked to follow the audio instruction for the practice of guided ANB in 1:2 ratio of inhalation & exhalation with 5 seconds to inhale and 10 seconds to exhale. They were supposed to be aware of and be absorbed with the breath. And finally, participants were asked to follow self-regulated breathing as per their ability to comply with the ratio of 1:1 breathing.

Data Collection

The data were extracted from the GDV Diagram.

### **Ethical consideration**

A written informed consent was obtained from all the participants recruited for the study. The participants were free to withdraw from the study at any point of time. The assessments are non-invasive and no subjects in the study reported any difficulty or complaint following the assessments.

### **Data Analysis**

All the data were extracted as per the standard procedure recommended for the respective tool. The data were manually inspected for completeness and any incomplete data were removed from data analysis. The data was checked for normality. And based on the distribution of the data, statistical analysis was done using SPSS to measure the changes in autonomic variables.

Repeated measures analysis of variance (RMANOVA) were performed with two “within subjects” factors (i.e., Factor 1: Sessions; Cotton, Rubber, Kuma and Factor 2: States; Pre, and Post).

This was followed by a post hoc analysis with Bonferroni adjustment for multiple comparisons between the mean values of different states (Pre, and Post) and all comparisons were made with the respective Pre state.

### **Results**

Repeated measures Analysis of variance was performed to assess changes between the two time points and across the six different experimental conditions as described earlier. The variables of interest were Integral Entropy, Integral Area on right and left side without filter.

All the variables of interest met the condition of sphericity. Interestingly no significant changes were noted across any of the comparisons.

Table:1 shows mean, SD of Integral Area right and left (IA-R, L), and Integral Entropy right and left (IE-R, L) in control condition.

VARIABLE	CC		KC		RC	
	PRE	POST	PRE	POST	PRE	POST
IAL	0.08±0.58	0.17±0.38	0.17±0.46	0.17±0.43	0.16±0.36	0.32±0.36
IAR	0.04±0.64	0.15±0.52	0.1±0.42	0.1±0.38	0±0.57	0.24±0.37
IEL	1.88±0.19	1.87±0.22	1.89±0.2	1.89±0.23	1.86±0.2	1.86±0.26
IER	1.9±0.15	1.9±0.21	1.91±0.17	1.87±0.2	1.94±0.2	1.89±0.26

Table:2 shows mean, SD of Integral Area right and left, and Integral Entropy right and left in experiment condition.

VARIABLE	CE		KE		RE	
	PRE	POST	PRE	POST	PRE	POST
IAL	0.18±0.4	0.26±0.3	0.21±0.57	0.2±0.37	0.03±0.57	0.2±0.34
IAR	0.23±0.43	0.24±0.4	0.13±0.61	0.13±0.51	0.05±0.55	0.09±0.53
IEL	1.85±0.2	1.83±0.23	1.81±0.24	1.79±0.19	1.92±0.2	1.8±0.23
IER	1.84±0.27	1.87±0.18	1.91±0.19	1.91±0.17	1.9±0.23	1.91±0.17

### Discussion

Twenty-three healthy experienced Yoga practitioners were recruited to the study following obtaining written informed consent. The subjects were randomly on each day allocated to either the experimental or the control sessions on one of the three conditions: rubber mat, Kuça mat & cotton mat sessions to control for any laboratory bias. All the data were normally distributed. No significant differences in baseline values were noted across the six consecutive days of assessments for the subjects in the study. Interestingly, we have noted that there were no significant changes in any of the experimental conditions following the

intervention or the mat type. We speculate that this might be attributed to the already stabilized subtle energy levels in the experienced yoga practitioners, whose subtle energy patters does not vary significantly following nadishuddhi pranayama or breath awareness session. Pervious study has shown long term yoga practitioner tent to positive changes, there is high chances in equilibrium of subtle energy level. Though studies suggested that the mean value of GDV parameters IA seen to be lower and IE is higher, still it is statistically not significant due to cumulative effect of long term practice(*Guru Deo et al., 2016*).

## **Conclusion**

The present study result shows that the effect of different yoga mat material on a yoga practitioner in subtle energy level and psycho-physiology level has no significant changes.

It is found that, the different of Integral area and Integral entropy parameters level in different condition on different days is very less.

The previous studies show that among experienced yoga practitioners, subtle energy levels have been more stable compared to normal population. And the same was observed among yoga practitioners, on different condition on different mats. Hence the current investigation suggests that more experiment needs to be done in order to understand the impact of various material on a yoga practitioner.

## **Appraisal**

### **Strengths of the Study:**

This study was one of a kind and very unique also. We had studied the immediate effect of the intervention of the mat materials on healthy individual.

In this study the data was collected for each individual on six different days

regularly, at the same time on different days.

Prior recoded intervention was given to mention the stander of it.

Sample randomization in order to control sample bias and other confounding factors in this study.

Availability of appropriate equipment to measure the variable, that gave consistent data.

Providing orientation program to the participant.

## **Suggestions for Further Research**

Recommendations for future studies yet to be undertaken, should consider the following points: For meditational studies, others parameters must be considered to get reliable outcome measures.

To control confounding factors in the studies, temperature, humidity, and persons' diet intake must be taken care.

Further study must be done to understand the impact of yoga mate in long term usage.

Need to study the effects of yoga mats using various instruments.

Need to include other widely used yoga mat materials to add including no mat condition.

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