

IMMEDIATE EFFECT OF MOOLA BANDHA ON GALVANIC SKIN RESPONSE OF HEALTHY INDIVIDUALS

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ABSTRACT: Background: The main focus of this study is to explore the effect of Moola Bandha with respect to relaxation using Galvanic Skin Response(GSR) and hence, the report talks more about the concept of moola bandha as extensively discussed in the Classical texts of Yoga.

Aim & Objective: To study the Effect of Moola bandha on Glavanic Skin Response of Healthy Individuals.

Materials and Methods: 10 healthy adults aged 18-40 were recruited for the study. The period of Intervention being 25 minutes per individual. A 25-minute module was designed which consisted of theoretical explanation of Moola bandha, a 5-minute normal breathing before performing Moola bandha, a 5-minute normal breathing after performing Moola bandha and a 5-minute intervention while performing Moola bandha technique. The Paired Samples Statistics reveals that the Mean GSR Post Intervention is greater than the Mean GSR Pre intervention. Hence, we can conclude that participants were more relaxed during GSR Post Intervention than during Pre intervention. The results of this test shows that there is a significant difference in the scores for GSR Pre intervention ($M=139.8430$, $SD=88.27$) and GSR Post Intervention ($M=182.1680$, $SD=120.947$) conditions; $t(9)=-3.458$, $p=0.007$.

Results: The results suggest that, by performing Moola bandha on a regular basis, one can be relaxed and stress free. Moola bandha can be considered as an effective strategy to lower the mental fluster and improve the ability to cope with the challenging situations. The sample size being very less, the duration of intervention very short, and the intervention limited to only one variable i.e.galvanic skin response, the present study was limited to the stress response strategy. There are several other benefits of Moola bandha such as lowering blood pressure, heart rate etc. which can be studied and explored and this study can be taken further to find the effect of Moola bandha in other areas as well.

Key Words: Moola Bandha, GSR, Stress

Introduction

Mudras and Bandhas are the constitutive part of Hatha Yoga written elaborately in Hata Yoga Pradipika. Verses 6 & 7, Chapter 2, of the Hatha Yoga Pradipika states: "Maha Mudra, Maha Bandha, Maha Bedha, Khechhari, Uddiyana, Moola Bandha and Jalandhara Bandha. Vipareeta Karani Mudra, Vajroli and Shakti Chalana, Verily, these are ten mudras which destroy old age and death." They take pranayama to the higher hierarchical level. Bandhas are a branch of mudras. While Mudras work on our energy domain, Bandhas help us lock certain muscles of the body in a certain way so that they influence the unlocking of energy in a positive way. "Bandha" is a Sanskrit Word which means "to lock" in English. The three main bandhas as mentioned in Hatha Yoga are the Moola Bandha (Perineal Contraction), Uddiyana Bandha (Abdominal Contraction) and Jalandhara Bandha (throat Compression). The fourth bandha is the MahaBandha, which is a combination of all the three. Contraction of these perineal, abdominal and cervical muscles in turn affects the nervous system, circulatory system, respiratory system and the endocrine systems and also the internal energy system called Prana. (Singh Rawat, 2017)

Chapter-3, Verses 61 to 63 of Hatha Yoga Pradipika(Light on HathaYoga), an ancient text of Yoga by Yogi Swatmaramain Sanskrit and translated to english by Swami Muktibodhananda clearly describes Moolabandha thus: Pressing the perineum/vagina with the heel and contracting the rectum so that the apana vayu moves upward. it's called moola bandha. By contracting the perineum, the downward moving apana vayu is forced to go upward. Hatha Yogis called it as Moola Bandha. (*Hatha Yoga Pradipika Light on Hatha Yoga and prem With kind regards*, n.d.)

Moola Bandha (Perineal Contraction): The area between the anus and scrotum clitoris. The word Moola in Sanskrit means "root, source, basis, lowest part or bottom, origin, beginning, foundation." Bandha means "lock, restrain, shut or close." Moola Bandha refers to the contraction of the root of the spinal column called the perineum and the seat of Chakaras(kundalini) the Mooladhara chakra situated at the root of the spine. Hence it is the perineal lock. In men, moola bandha is performed by contracting the muscles surrounding the perineal body, between the anus and the genitals. In women, the area around the cervix is contracted. This

helps in controlling or releasing the energy generated by the Mooladhara Chakra. Moola Bandha stimulates both Peripheral nervous system (sensory-motor) as well as the autonomic nervous system. It helps in the realignment of the physical, mental and the psychic levels. ("Moola Bandha - The Master Key," n.d.)

The contraction of the perineum at the physical level helps in maintaining the hormonal balance, regulating and stimulating the nerves, innervating the lower pelvic muscles and in regulating all the internal organs. Hence, it can help treat the lower abdominal diseases such as digestive, and reproductive disorders. The practice of Moola Bandha rekindles certain areas of the brain that control the lower region of the body, by bringing the neuronal circuits responsible for its control into the sphere of consciousness. It acts as a means of directly manipulating and influencing the brain and its neurological and endocrinological functions. Thus, Moola bandha influences our behavior, personality and mental state by exerting a positive and coordinating effect on the whole physical body through the brain. Moola bandha acts as a mental relaxant as the mind and body are connected or interlinked. Hence, it also helps in relieving the mental and psychosomatic disorders due to stress and anxiety. It helps relieve the mental tensions, depressions by unblocking certain energy blocks. In a healthy body, Moola bandha increases the activity of the parasympathetic nervous system, lowering the breath rate, heart rate, blood pressure and stabilizing the brain waves. The whole endocrine system gets rebalanced leading to stabilization and equilibrium of the personality, due to which the mind gets relaxed. Though Moola bandha appears to be a simple physical contraction, it is a means of raising our normal consciousness and fulfilling its enormous potential by the arousal of Kundalini Shakti. ("Moola Bandha - The Master Key," n.d.)

Moola Bandha and Autonomic Nervous System: Practice of Moola bandha has a great effect on the Cerebral cortex, especially the parasympathetic activities such as decreased blood pressure, respiration and heart rate. The Parasympathetic Nervous System is controlled by the sacral nerves, the midbrain and the medulla. By consciously stimulating the sacral nerves through the process of actively controlling the muscles at the base of the pelvis, the nervous system can get into a more relaxed mode. This stimulates the nerves that control the body processes related to relaxation and pleasure. This helps in relaxation of the mind which is a clear, creative and happy mind. ("Moola Bandha - The Master Key," n.d.)

A study on Moolabandha to protect Uterine Prolapse shows that Moola Bandha regulates the changes in intra-abdominal pressure that affects the abdominal organs to a large extent. Moola Bandha relates mainly to the pelvic floor muscles. It also relates to the base of the spine. If the Bandha is to be performed, ideally it should be performed in Siddhasana. The muscles which are not generally used, are contracted in this Bandha. It results in more blood supply to these muscles thereby improving their efficiency. Moola Bandha has been shown to be beneficial for toning up pelvic floor muscles. In yoga, the pelvic floor exercise, or Moola bandha, is one of the fundamentals of core body strength. The practice of Moola bandha tones and strengthens the muscles of the pelvic region which includes stimulating the pelvic nerves, toning of the Urogenital organs and improving constipation as well as hemorrhoids too. Hence, it can be concluded that Moola bandha can play an effective role in treating prolapsed Uterine. ("EBSCOhost | 127726309 | MULABANDHA: A POTENTIAL WAY TO PROTECT UTERINE PROLAPSE,," n.d.)

Another study to investigate the effect of Moola bandha yoga in female population with symptomatic mild degree of prolapse, shows that, a three-month yoga therapy is a safe and effective measure as adjuvant therapy to conventional treatment modalities in reducing the severity of symptoms and improving the quality of life in patients with a mild degree of prolapse. Better conservative management with Moola bandha yoga therapy can help reduce dependence on pessaries, surgical interventions and its associated side effects. (Sweta, Godbole, Awasthi, & Pandey, 2018)

Galvanic Skin Response (GSR): The GSR is a variation in the electrical properties of the human epidermis caused by an interaction between the subject's mental state and environmental actions. The moisture levels in the epidermis change, when an individual is stressed, aroused or excited, causing variations in its electrical conductance. This phenomenon occurs because the sympathetic nervous system regulates the secretions of sweat by the sweat glands and this variation in conductance can be an indirect measure of brain and nervous system's activity. GSR is a noninvasive rapidly captured physiological signal usually used for assessment of the present state of the user, mostly for mental stress, emotional state, arousal level, attention, and anxiety. As mental stress increases, variations in the electrical conductance of the skin are identified by GSR sensors. (Ramadan & Alhaag, 2018)

The Galvanic Skin Response helps to find the changes in the skin's conductivity due to the activity in autonomic nervous system. The degree of cortisol arousal of the hemispheres, indeed the whole brain, are recorded by the GSR psychometer, which does not distinguish between both the hemispheres, or between the cortical and the primitive brain responses. The higher arousal (that occurs with increased involvement) will almost instantly (0.2 - 0.5 sec) cause a fall in skin resistance; the reduced arousal (that occurs with

withdrawal) will cause a rise in skin resistance. Low level of cortical arousal is desired for relaxation. ("The Emotional Response Indicator," n.d.)

Aims & Objectives

Moola bandha is an effective yoga practice which can enhance the Neuromuscular connection with the deep core. Despite this, no randomized studies have been conducted to evaluate the Autonomic variations and explore Moola bandha as a tool to enhance the psycho-physiological aspects of the human body.

The aim of this study is to evaluate the effectiveness of Moola Bandha on Galvanic Skin resistance on Healthy Individuals. The Objective of this study is to measure the immediate effect of Moola bandha on stress in Healthy adults.

Methods and Materials

Ten healthy Adults, trained in Yoga and knowledge of Pranayama with ages ranging in between 18 – 40 years were recruited for the study. Healthy Adults who attended Yoga Instructor course (YIC) and Bachelor of Science (BSc) in Yoga at SVYASA, Bangalore. Participants' age ranged from 18 to 40 years were included. Adults not trained in Yoga, adults with major disabilities and undergoing Medication were not included. The stress levels of the participants are measured.

All statistical analyses were performed using the IBM SPSS Statistical Package for Social Sciences (version 20.0). Data collected with the help of RMS Polyrite instrument Version 4.0.2.

Intervention

The participants were assessed before and after the intervention.

A 25-minute module consisting of theoretical explanation of Moola bandha, a 5-minute normal breathing before performing Moola bandha, a 5-minute normal breathing after performing Moola bandha and a 5-minute intervention while performing Moola bandha technique.

Procedure to perform Moola bandha (Sweta, Godbole, Awasthi, & Pandey, 2018)

1. Sit in a comfortable position preferably in Padmasana, Siddhasana or Sukhasana
2. Placing the hands on the knees, close the eyes and relax. Focus on the breath and slowly move your attention to the pelvic floor region and genital-anal openings
3. Inhale deeply and retain the breath
4. Contract the pelvic floor muscles and pull them up gently. Do not over strain. This is called Moola bandha
5. Hold the bandha as long as one can retain the breath without much strain
6. Slowly exhaling, release the bandha by relaxing the pelvic muscles
7. This is considered as one round of Moolabandha
8. The cycle can be repeated 8-10 time

Moola Bandha activates the Autonomic Nervous System, Hypothalamus and Intestinal Peristalsis and the Mechanics of Moola Bandha is shown in the following Figure 1 (Sweta et al., 2018)

The Mechanics of Moola bandha

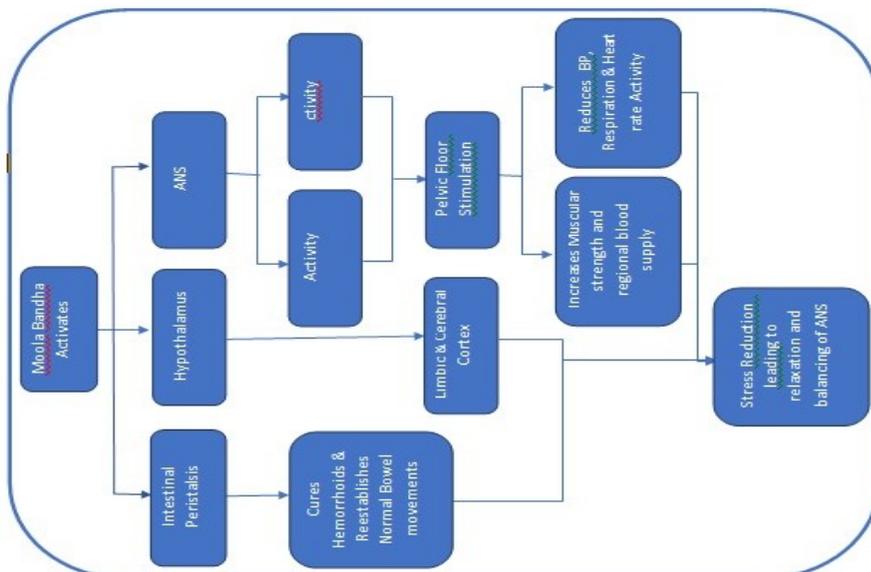


Figure 1

Ethical Consideration

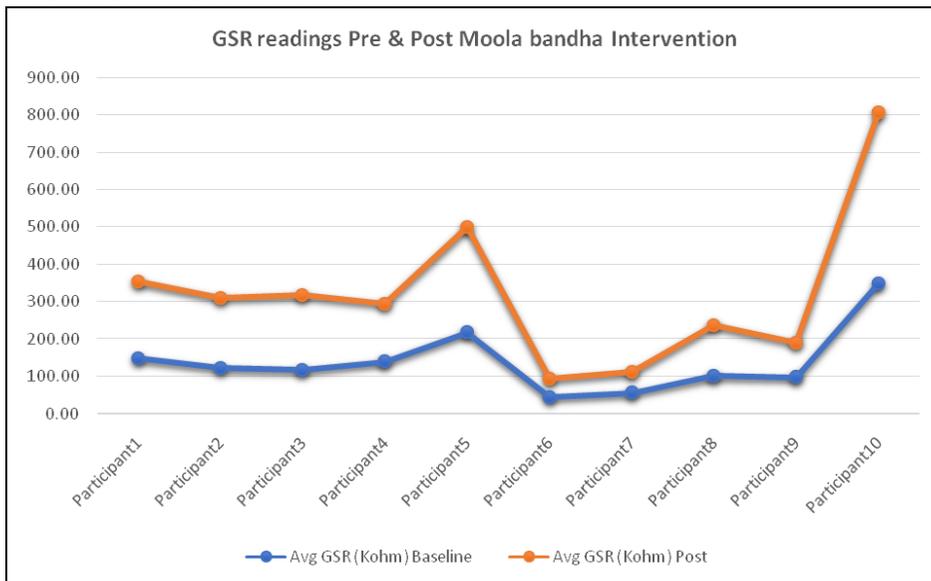
The participants were explained in detail about the nature of the study and the voluntary nature of participation and were not provided with any incentives for their participation.

Data Extraction and Analysis

Test for Normality and A paired-samples t-test were conducted to compare the GSR pre intervention and Post intervention.

Results

Graphical representation of the comparison of pre and post data shows that the result is statistically significant. post Moolabandha GSR Values show that there is a rise in skin resistance which means a reduced cortisol arousal. A level of cortical arousal is desirable for relaxation.



Graph 1

In the Paired Samples Statistics, the mean for the GSR Pre Intervention, M=139.8430. The mean for GSR post intervention, M= 182.1580. The standard deviation for the GSR Pre Intervention, SD= 88.27 and for the GSR Post Intervention, SD=120.95. The number of participants in both the interventions (N) is 10. The paired samples Correlations determines that the correlation between Pre and Post intervention of Moola bandha scores are significantly positively correlated(r=0.980)

Paired Samples Test

	Paired Differences				t	df	Sig. (2-tailed)	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
Pair 1 GSR (Kohm) Baseline - GSR (Kohm) Post	-42.32500	38.70144	12.23847	-70.01034	-14.63966	-3.458	9	.007

Table 1

The P-value (0.007) ≤ α(0.05): The difference between the means is statistically significant. Hence, Reject H₀

The Sig. (2-Tailed) value is 0.007. This value is less than .05. Hence, we can conclude that there is a statistically significant difference between the mean GSR for Pre intervention and GSR Post Intervention. The Paired Samples Statistics reveals that the Mean GSR Post Intervention is greater than the MeanGSR Pre intervention. Hence, we can conclude that participants were more relaxed during GSR Post Intervention than during Pre intervention.

The results of this test shows that there is a significant difference in the scores for GSR Pre intervention (M=139.8430, SD=88.27) and GSR Post Intervention (M=182.1680, SD=120.947) conditions; $t(9)=-3.458$, $p = 0.007$.

Discussions and Conclusion:

The results suggest that, by performing Moola bandha on a regular basis, one can be relaxed and stress free. Moola bandha can be considered as an effective strategy to lower the mental fluster or the battle of nerves and improve the ability to cope with the challenging situations.

The sample size being very less, the duration of intervention very short, and the intervention limited to only one variable i.e., galvanic skin response, the present study was just limited to the stress response strategy. There are several other benefits of Moola bandha such as lowering blood pressure, heart rate etc. which can be studied and explored and this study can be taken further to find the effect of Moola bandha in other areas as well.

Bibliography:

1. EBSCOhost | 127726309 | MULABANDHA: A POTENTIAL WAY TO PROTECT UTERINE PROLAPSE. (n.d.). Retrieved April 11, 2019, from <https://web.b.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jml=09769242&AN=127726309&h=g9t2jocn7iiVGltZpqOko5Vvk7gfWmuIslvTcMilUPQAdPwr0KHiRC5jnFYjda0Hb4kAciT2vA%2BP18yXST14bIlg%3D%3D&cr1=c&resultNs=AdminWebAuth&resultLocal=>
2. Hatha Yoga Pradipika Light on Hatha Yoga and prem With kind regards. (n.d.). Retrieved from <https://terebess.hu/english/Hatha-Yoga-Pradipika-Muktibodhananda.pdf>
3. Moola Bandha - The Master Key. (n.d.). Retrieved April 12, 2019, from <https://www.scribd.com/doc/238489274/Moola-Bandha-The-Master-Key>
4. Ramadan, M. Z., & Alhaag, M. H. (2018). Evaluating the User Physical Stresses Associated with Watching 3D and 2D Displays over Extended Time Using Heart Rate Variability, Galvanic Skin Resistance, and Performance Measure. *Journal of Sensors*, 2018, 1-10. <https://doi.org/10.1155/2018/2632157>
5. Singh Rawat, S. (2017). Effect of mudra and Bandh on selected physiological variables. *Human Movement and Sports Sciences (Vol. 2)*. Retrieved from www.theyogicjournal.com
6. Sweta, K. M., Godbole, A., Awasthi, H. H., & Pandey, U. (2018). Effect of Mula Bandha Yoga in Mild Grade Pelvic Organ Prolapse: A Randomized Controlled Trial. *International Journal of Yoga*, 11(2), 116-121. https://doi.org/10.4103/ijoy.IJOY_32_17
7. The Emotional Response Indicator. (n.d.). Retrieved April 12, 2019, from <https://trans4mind.com/spiritual/gsr.htm>