

# Immediate Effect of Practice of Advanced Set of Asanas and Basic Set of Asanas on Subtle Energy Homeostasis and Stress Relief-A Self as Control Study

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**Abstract**

**Objective:** To find the change (immediate effect) in Energy re-distribution and balance in internal organs/systems, in Entropy Coefficient, Energy L/R symmetry and Stress reliefwith using Electrol Photonic Imaging Technique along with Electro-acupuncture Instrument to analysis energy homeostasis and stress comparing before and after practicing advanced set of asanas and basic set of asanas. These practitioners regularly practiced both basic set and advanced set for one month regularly. They are Yoga practitioners who had more than 1 year regular Yoga practice. Their age range is 21-35Yrs.

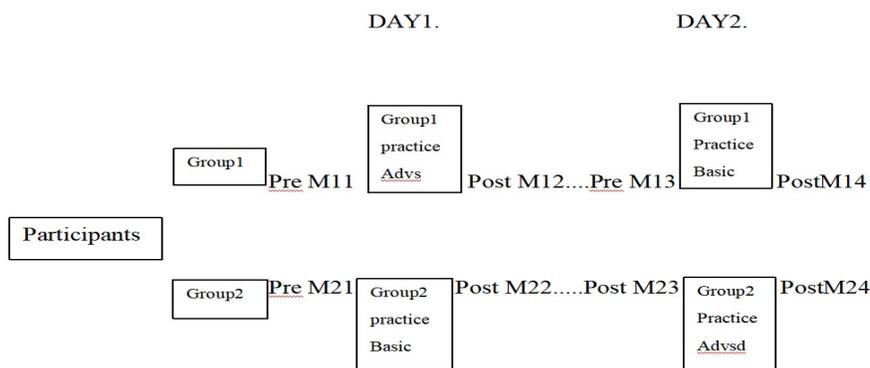
**Design of the study:** A self as control pre-post design.

**Subjects:** A total of 32 volunteers from the students of Svyasa yoga university, who have more than 1 year regular Yoga practice and able to perform Advanced asana set and basic asana set.

**Intervention :** The experiments were carried out on thirty-two subjects in order to find out the reproducibility of GDV and Acugraph outcomes. All subjects were assessed after 1 month practicing both basic and advanced asana set. The basic asana set was selected from begining group and middle group of asanas; the advanced asana set was selected from advanced group of asanas according to the book < Asana Pranayama Mudra Bandha >(Saraswati Satyananda, 1996).

The subjectswere randomly divided into 2 groups. Group 1 were practicing on day1 the advanced set of asanas. Pre & post readings were taken for them of EPI and Acugraph. Group 2 were practicing on that day the basic set of asanas. Pre & post readings were measured. The second day, Group 1 were practicing basic set of asanas and their pre & post reading were taken. The second day Group 2 members were practicing advanced asanas and their pre & post readings were taken. Time setting of each set of asanas is 20mins separately. They practice with a standard-speed, with 1 min holding duration of each asana followed by half min of relaxation. After the practice each group were given shavasana for 7 min.

**Design Chart as below:**



**Data analysis :** The GDV diagram program was used to extract the raw data from the EPI system into csv file. This program provides all parameters which were taken into consideration for analysis, namely Personal Integrated Energy, Stress Level, Left/Right symmetry, Organ Balance and Entropy Coefficient.

The Acugraph furnishes nine important types of graphs which include Yin vs Yang, energy cycle, baseline, elemental pairs, personal integrated energy etc. relevant information about different treatment approaches like Ryodoraku, auricular, spinal reflexes. Photographically represented treatment points aids in discerning of the disease and treatment.

Further, data analysis was carried out using 'R statistical package for data analyses', G-power for analyzing effect size as well as power for each variable, and Microsoft Excel program. Paired sample t-test was used for evaluating pre and post readings and independent sample t-test for cross sectional comparisons between male and female subgroups.

**Results :** The observations in the experiment showed a decreasing trend of Stress in mental level. And in subtle energy homeostasis level there is an increasing trend in Organ Balance and a decreasing trend in Entropy Coefficient. Table 2 indicated the decrease in Stress value turned highly significant (both  $p < 0.001^{***}$ ) in both asana set, the mean values of Stress in advanced asana set decreased more than the basic asana set (ST, advanced asana set  $3.10 \pm 0.59$  to  $2.71 \pm 0.52$ ,  $p = 0.00024^{***}$  and basic asana set  $2.94 \pm 0.512$  to  $2.70 \pm 0.508$ ,  $p = 0.0003^{***}$ ), Statistically, it shows more strength in stress relief through practicing advanced asana set than practicing basic asana set (ST, Cohen's d of advanced asana set is  $0.70^{**}$  and Cohen's d of basic asana set is  $0.47^*$ ). Similarly, In Organ balance, the improvement of energy re-distribution in different organs/systems in advanced asana set turned more significant than in basic asana set (OB, advanced asana set  $85.22 \pm 6.04$  to  $88.74 \pm 5.40$ ,  $p < 0.01^{**}$ , Cohen's d  $0.61^{**}$  and basic asana set  $86.70 \pm 6.90$  to  $90.11 \pm 4.08$ ,  $p < 0.05^*$ , Cohen's d  $0.57^{**}$ ). However, In Energy Reserve, the basic asana set showed a significant increasing trend than the advanced asana set (ER, advanced asana set  $80.97 \pm 20.62$  to  $83.1 \pm 18.58$ ,  $p = 0.30$  and basic asana set  $78.40 \pm 24.05$  to  $88.6 \pm 15.77$ ,  $p < 0.001^{***}$ ).

**Gender-wise :** Both interventions (both sets of asanas-advanced set of asanas and basic set of asanas) demonstrated significant reduction in stress levels. However, through performing advanced asana set, stress decreased significantly in the male group than basic asana set (ST male group, advanced asana set  $p < 0.001^{***}$  / Cohen's d  $0.83^{***}$  and basic asana set  $p < 0.05^*$  / Cohen's d  $0.52^{**}$ ). Whereas In female group, through performing advanced asana set, Left/right Symmetry significantly increased than performing basic asana set (LRS female group, advanced asana set  $p < 0.05^*$  / Cohen's d  $0.89^{***}$  and basic asana set  $p = 0.37$  / Cohen's d  $0.23^*$ ). However, by performing basic asana set, Energy Reserve value showed a significantly improvement in female group, whereas no significant difference was found in male group (ER, female group  $p < 0.01^{**}$  and male group  $p = 0.059$ ). Other parameters at subtle energy homeostasis level in both the groups did not reveal significant changes.

Key Words: advanced asana, Electro Photonic Imaging Technique EPI, Gas Discharge Visualization GDV, subtle energy homeostasis, organ balance, stress.

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## Introduction

The Yoga Sutras of Sage Pantanjali defines asana as sthirasukhamaasanam, a physical posture in which one can remain steady and comfortable (Gheranda Smhita A.B.K., 2010). Asana practice has some subtle effects on the body. It is a change in the breathing process, which helps the

practitioner to achieve mental and emotional balance. asanas make the joints flexible and improve the health of the muscles, they also bring about coordination in the function of the nervous system and increase the efficiency of the internal organs due to their light massaging effect. Thus, with regular practice of asanas the body gradually become healthier (A.B.K., 2010); Therefore it

brought a great yoga boom to the Chinese to learn asanas.

Among Chinese yoga practitioners, healthy young people tend to challenge advanced asanas, while those who use yoga as healing purposes tend to practice basic asanas. For those who have a basic foundation, the pursuit of advanced asana is limited to the higher requirements of strengthening their body muscles or improving their body flexibility. However, many people simply fail to understand the real meaning of yoga and its postures while pursuing advanced style. Hence, unscientific practice caused different degrees of physical injury (“2018年中国瑜伽行业研究报告,”n.d.) (2018 China Yoga Industry Research Report)). The intermittent and unstable practice make many yoga enthusiasts unable to move forward to advanced Asanas, or otherwise, the misunderstandings of advanced asana practice, leads to no longer regular practicing due to inability to see the benefits of advanced asanas for physical and mental aspects. Either long-term stagnation in basic asanas' practicing, or unable to maintain a certain time even after entering an advanced posture, leads to greatly decreased practice effect.

However, asana, as a limb of yoga, is not only a physical discipline, but should be known as integration, which Patanjali describes in the third chapter of the Yoga Sutras, and which involves integration of the body(sarira-samyama), integration of the breath(prana-samyama), integration of the senses(indriya-samyama), integration of the mind(manah-samyama), integration of the intelligence or of knowledge(buddhi-samyama or jnana-samyama)(B K S IYENGAR, 2017).

Yoga, through all its components which include Kriya (cleansing techniques), Asana (yogic postures), Pranayama (breathing practices), Dhyana (meditation) and diet, has been scientifically proven and shown to improve physical, mental, and emotional wellbeing (Buffart et al., 2012). Yoga postulates that vital energy (prana)

flows through channels called nadis (Sivananada Swami, 1994) forming the human vital energy system. Restoring personal well-being is achieved by improving prana through Yoga postures (Asanas), breathing techniques (Pranayama), and meditation (Dhyana)(Brennan, 1988). These techniques correct energy imbalances and restores energy homeostasis in humans (Lynton, Kligler, & Shiflett, 2007). This energy which is subtle known as Prana (Srinivasan, 2014). However, Prana and shakti denoted by the Vedic system of ancient India as energy of “male” and “female” respectively (Patwardhan, Warude, Pushpangadan, & Bhatt, 2005), It is considered to be the energy that regulates all cellular processes and keeps a person healthy. Such studies have established that participation in integrated Yoga programs of various lengths ranging from a weekend to many months systematically increases subtle energy (Ghosh, Hankey, & Srinivasan, 2017).

Many studies have been performed on yoga practitioners' subtle energy levels (E-Is) by using instruments such as Electro Photonic Imaging, or the Electro-acupuncture Instrument Acugraph, which measures conducts at Jing-well points of acupuncture meridians (Ghosh et al., 2017). We conceptually tried to relate the fundamental fabric of subtle energy (Prana), with the fundamental aspect of matter (electrons), and expect that both may converge closely. Through this, we tried to derive our operational definitions of various abstract constructs. The conceptual relationship between Prana and electrons seems to be quite evident, however, more empirical evidence is needed to support this concept (Kushwah K K, Nagendra R H, 2015).

### **Methodology:**

The experiments were carried out on thirty-two subjects in order to find out the reproducibility of GDV and Acugraph outcomes. All subjects were assessed after 1 month practicing both basic and advanced asana set. The basic asana set was selected from beginning group and

middle group of asanas; the advanced asana set was selected from advanced group of asanas according to the book < Asana Pranayama Mudra Bandha >(Saraswati Satyananda, 1996).

Each set consisting of asanas with standing, sitting, kneeling, prone and supine category postures including forward bending, back bending and twisting asanas for each category. Totally there are 15 asanas in each set. The subject chooses any nine asanas according to his/her choice to perform.

The subjects were randomly divided into 2 groups. Group 1 were practicing on day 1 the advanced set of asanas. Pre & post readings were taken for them of EPI and Acugraph. Group 2 were practicing on that day the basic set of asanas. Pre & post readings were measured. The second day, Group 1 were practicing basic set of asanas and their pre & post reading were taken. The second day Group 2 members were practicing advanced asanas and their pre & post readings were taken. Time setting of each set of asanas is 20mins separately. They practice with a standard-speed, with 1 min holding duration of each asana followed by half min of relaxation. After the practice each group were given shavasana for 7 min.

The readings were taken from all 10 fingers. It is ensured to have at least three hours gap from food intake to data measurement. The subjects were asked to remove all metallic items which they do not wear for 24 hours in a day. Further, they were also provided an electrically isolated surface to stand on during the measurements and were instructed to place the finger on the dielectric glass plate at 45° angle. A distance of 3 feet between the EPI camera and the computer system was maintained; the calibration of the instrument was performed routinely, and an alcoholic solution was used to clean the glass plate after the assessment of each individual.

Table 1: -Pre-post changes at subtle energy homeostasis level and mental levels.

Table 2: Pre-post results of sub groups (Gender-wise) at subtle energy homeostasis level and mental levels.

### Results:

**From table1:** The observations in the experiment showed a decreasing trend of Stress in mental level. And in subtle energy homeostasis level there is an increasing trend in Organ Balance and a decreasing trend in Entropy Coefficient. Table 2 indicated the decrease in Stress value turned highly significant (both  $p < 0.001^{***}$ ) in both asana set, the mean values of Stress in advanced asana set decreased more than the basic asana set (ST, advanced asana set  $3.10 \pm 0.59$  to  $2.71 \pm 0.52$ ,  $p = 0.00024^{***}$  and basic asana set  $2.94 \pm 0.512$  to  $2.70 \pm 0.508$ ,  $p = 0.0003^{***}$ ). Statistically, it shows more strength in stress relief through practicing advanced asana set than practicing basic asana set (ST, Cohen's d of advanced asana set is  $0.70^{**}$  and Cohen's d of basic asana set is  $0.47^*$ ). Similarly, In Organ balance, the improvement of energy redistribution in different organs/systems in advanced asana set turned more significant than in basic asana set (OB, advanced asana set  $85.22 \pm 6.04$  to  $88.74 \pm 5.40$ ,  $p < 0.01^{**}$ , Cohen's d  $0.61^{**}$  and basic asana set  $86.70 \pm 6.90$  to  $90.11 \pm 4.08$ ,  $p < 0.05^*$ , Cohen's d  $0.57^{**}$ ). However, In Energy Reserve, the basic asana set showed a significant increasing trend than the advanced asana set (ER, advanced asana set  $80.97 \pm 20.62$  to  $83.1 \pm 18.58$ ,  $p = 0.30$  and basic asana set  $78.40 \pm 24.05$  to  $88.6 \pm 15.77$ ,  $p < 0.001^{***}$ ).

**From table2:** Both interventions (both sets of asanas-advanced set of asanas and basic set of asanas) demonstrated significant reduction in stress levels. However, through performing advanced asana set, stress decreased significantly in the male group than basic asana set (ST male group, advanced asana set  $p < 0.001^{***}$  / Cohen's

d 0.83\*\*\* and basic asana set  $p < 0.05^*$  / Cohen's d 0.52\*\*). Whereas In female group, through performing advanced asana set, Left/right Symmetry significantly increased than performing basic asana set (LRS female group, advanced asana set  $p < 0.05^*$  / Cohen's d 0.89\*\*\* and basic asana set  $p = 0.37$  / Cohen's d 0.23\*). However, by performing basic asana set, Energy Reserve value showed a significantly improvement in female group, whereas no significant difference was found in male group (ER, female group  $p < 0.01^{**}$  and male group  $p = 0.059$ ). Other parameters at subtle energy homeostasis level in both the groups did not reveal significant changes.

### **Discussions:**

The results from the experiment (subtle energy homeostasis level and mental level) was found that through practicing advanced asana set, there was a highly significant decrease in stress level and a statistical improvement in energy redistribution in different organ/systems. Similar changes were also observed from subgroups of male and female, a highly significant decrease was found in Stress in male group through performing advanced asana set than performing basic asana set, and a highly significantly increase in Left/right Symmetry in female group through performing advanced asana set than performing basic asana set. Further, the baseline comparisons between the genders have also demonstrated the significant difference in Personal Integrated Energy and Energy Stability.

Compared with the previous research in the field of yoga, the present study is first of its kind to measure the effect of subtle energy homeostasis and stress relief in practicing advanced asana set and basic set of asana set on healthy volunteers. Present study also makes an attempt to find out whether EPI and Acugraph parameters before and after advanced set practice or basic set practice differ gender-wise.

### ***Mental Level:***

#### ***\*Stress***

A number of studies have evidence of the phenomenon that regular practice of integrated yoga reduces stress in various populations (Buffart et al., 2012). The results from the present study also show that advanced asanas has an immediate effect which reduces stress significantly ( $p < 0.001$ ) in healthy people (marginally more than basic asana set). This may be due to the yoga practices which work on autonomic nervous system (Streeter, Gerbarg, Saper, Ciraulo, & Brown, 2012) and restore balance between sympathetic and parasympathetic responses. Development of a coherence zone between both sympathetic nerve system and parasympathetic nerve system responses may regulate, unify and correct the imbalances in the flow of Prana in the body. This may be confirmed by the uniformity throughout the EPI image glow area which increases after the yoga practice (Kushwah K K, Nagendra R H, 2015).

### ***Energy Homeostasis Level:***

#### ***\* Organ Balance***

It is well known that yoga components, i.e., physical postures improve health and well-being in individuals (Villacres, Jagannathan, Nagarathna, & Ramakrishna, 2014). The present study also showed a highly significant increase in energy balance in visceral organs through practicing advanced asana set ( $p < 0.01^{**}$ ) which suggests improvement of energy redistribution for different organs and systems. It may be due to reduction in stress level leading towards harmony and improved Pranic circulation, indicating improvement in subtle energy homeostasis level (Kushwah K K, Nagendra R H, 2015).

### ***Entropy Coefficient (disorderliness)***

The integrated practices of yoga improve and regulate the vital energy called Prana

(Sharma, Hankey, Nagilla, Meenakshy, & Nagendra, 2014). Keeping harmonious homeostasis of this energy is a key essence of yoga practice, which keeps one healthy and promotes positive health. Loss of homeostasis of the energy produces entropy, which is otherwise known as disorderliness in the human energy systems (Korotkov G Konstantin, 2002), and high or low entropy may lead to diseases in the body. The shift of EC higher to lower values in both advanced and basic asana set, it indicates better energy homeostasis through advanced asana practice.

#### *Gender-wise comparisons*

Through performing advanced asana set, stress decreased significantly in the male group than basic asana set. Whereas In female group, through performing advanced asana set, Left/right Symmetry significantly increased than performing basic asana set. However, by performing basic asana set, Energy Reserve value showed a significantly improvement in female group, whereas no significant difference was found in male group. Moreover, these findings suggest that gender has an influence on energy patterns which needs to be studied more deeply.

#### **Suggestions for future study and Implication of the study:**

From the findings of significant difference in subtle energy trend between the males and females, especially in the baseline

comparison of personal integrated energy and energy stability there are significant differences between males and females, it is suggested that males and females should be studied separately. Further, it is also suggested that future study should attempt to follow the subjects of two separate but matching groups one group practicing only basic set and another group practicing only advanced set and one more matching set as control ( not doing any asanas ) and a long term effect of the practice should be studied.

#### **Conclusions:**

In conclusion, advanced asana practice reduces more stress level of an organism, meanwhile, it brings more energy re-distribution in different organs/systems as well. It regulates and improves the equilibrium and harmony between left and right parts of the brain (significant improvement in female). Besides it reduces more stress (especially significant in male). Therefore, it helps in preserves health both in subtle energy homeostasis and mental aspect. Further, the present study found that the energy pattern differs with gender. Hence, it is suggested that studies with male and female participants may be conducted separately with more data to substantiate the findings. Further, the findings from the investigations also suggest that advanced asana practice can be used to regulate, improve and sustain the energy homeostasis of an organism. This is important in the field of prevention and sustenance of mental and physical health.

**Table 1. Pre-post changes at subtle energy homeostasis level and mental levels**

Asana Set	Variable	Pre	Post	t/v-	p-value (t.test)	Cohen's d	power (%)
		mean±sd	mean±sd	value			
Advance asana	Personal Integrated Energy	52.30±13.05	53.37±13.69	0.68	0.50	0.08	11
	Stress Decreased	3.10±0.59	2.71±0.52	53.50	0.00024***	0.70**	98**

set	Organ Balance	85.22±6.04	88.74±5.40	-3.00	0.0055**	0.61**	95**
	Left/Right Symmetry	93.82±4.64	95.78±3.63	-2.02	0.05	0.46 *	80*
	Entropy Coefficient	2.59±0.24	2.51±0.19	-3.26	0.0029**	0.36 *	62
	Energy Stability	60.23±14.55	60.43±15.54	0.06	0.94	0.01	58
	Energy Reserve	80.97±20.62	83.1±18.58	33.00	0.30	0.11	14
Basic asana set	Personal Integrated Energy	52.63±12.05	52.63±12.00	0.00	1.00	0	5
	Stress Decreased	2.94±0.512	2.70±0.508	-4.10	0.0003***	0.47*	81*
	Organ Balance	86.70±6.90	90.11±4.08	3.54	0.0113*	0.57**	92*
	Left/Right Symmetry	95.87±3.29	96.56±2.61	1.36	0.18	0.23*	34
	Entropy Coefficient	2.63±0.29	2.52±0.26	361.50	0.0019**	0.4*	69
	Energy Stability	59.17±14.35	62.77±11.49	1.32	0.20	0.24*	36
	Energy Reserve	78.40±24.05	88.6±15.77	4.00	0.00065***	0.48*	82*

Significant level, \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001; 0.2 < d\* < 0.5 small effect size, 0.5 ≤ d\*\* < 0.8 medium effect size, d\*\*\* ≥ 0.8 big effect size; 80% ≤ power < 100%, (the more the power is close to 1, the better the hypothesis test is at detecting a false null hypothesis).

**Table 2. Pre-post results of sub groups(Gender-wise) at subtle energy homeostasis level and mental levels.**

Asana Set	Variable	Pre male	Post male	t/v-	p-value	Cohen's d	Pre female	Post female	t/v-value	p-value	Cohen's d
		mean±sd	mean±sd	value	(t.test)		mean±sd	mean±sd	(t.test)		
Advanced asana set	PIE	46.2±11.77	46.73±12.42	0.12	0.91	0.04	58.40±11.61	62.00±10.44	0.88	0.40	0.33
	ST	3.07±0.65	2.60±0.32	2.00	0.00018***	0.83***	3.12±0.54	2.82±0.66	-2.27	0.04*	0.49*
	OB	84.62±5.96	87.77±5.47	2.11	0.05	0.55	85.81±6.26	89.72±5.34	2.10	0.06	0.67
	LRS	93.24±5.54	94.34±4.23	0.66	0.52	0.22	94.41±3.64	97.23±2.23	2.79	0.014*	0.89***
	EC	2.61±0.25	2.50±0.24	-3.13	0.007**	0.45*	2.59±0.23	2.51±0.15	-1.65	0.12	0.39
	ES	51.93±13.19	51.80±13.31	-0.03	0.98	0.00	68.53±10.83	69.07±12.80	0.14	0.89	0.05
	ER	83.80±16.77	82.53±20.04	-0.20	0.85	0.07	78.13±24.13	83.67±17.68	28.00	0.18	0.26
Basic asana set	PIE	47.53±9.87	47.20±12.01	-0.12	0.90	0.03	57.73±12.14	58.07±9.53	-0.10	0.92	0.03
	ST	2.89±0.55	2.63±0.43	-4.22	0.00086***	0.52**	3.00±0.49	2.76±0.58	2.21	0.04*	0.44*
	OB	86.28±8.90	89.97±3.58	85.00	0.17	0.48	87.11±4.36	90.25±4.66	-2.05	0.06	0.70

LRS	96.22±3.08	96.92±2.67	0.98	0.34	0.24	95.52±3.55	96.26±2.58	-0.92	0.37	0.23
EC	2.6±0.22	2.5±0.21	21.50	0.03*	0.47	2.67±0.34	2.55±0.31	2.38	0.03*	0.37*
ES	55.53±12.81	60.53±12.06	1.29	0.22	0.40	62.80±15.30	65.00±10.83	-0.56	0.58	0.16
ER	85.80±17.81	92.40±9.95	32.00	0.059	0.43	71±27.64	84.80±19.63	0.00	0.0092**	0.12

**Abbreviations:**

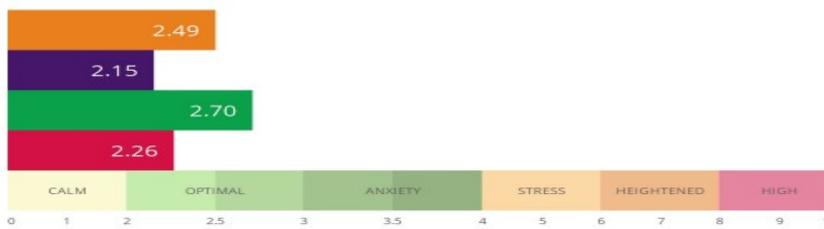
PIE–personal integrated energy , ST–stress, OB–organ balance, LRS–left/right symmetry, EC–entropy coefficient, , ES–energy stability, ER–energy reservation; Significant level, \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001; 0.2 < d\* < 0.5 small effect size, 0.5 ≤ d\*\* < 0.8 medium effect size, d\*\*\* ≥ 0.8 big effect size; 80% ≤ power < 100%, (the more the power is close to 1, the better the hypothesis test is at detecting a false null hypothesis).

**Example 1: Data image for single participant (male/24years)**

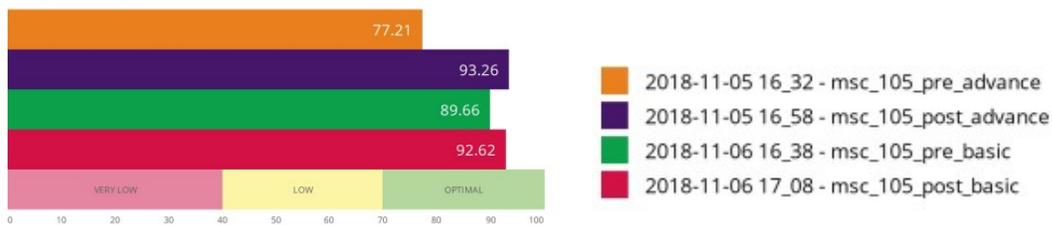
**ENERGY**



**EMOTIONAL PRESSURE**



**ORGANS BALANCE**



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