

Experiments on Claims of Surya Trataka and Heart Stoppage - A case study*

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Abstract

Scientific investigations were carried out on a yogi who practiced Surya Trataka for half an hour. He also claimed that he was capable of maintaining his usual physical fitness even after a month of fasting. The results showed that his BP reduced to 100/65 mm Hg after 25 minutes of Trataka. The HR increased within the first 15 minutes of Trataka upto 130/min and then reduced and remained stabilized upto 117/min during the last 15 minutes of Trataka. The reduction in all the variables of physical fitness except forward bending was insignificant after sixth day of fasting. He was mentally relaxed and emotionally more balanced after Trataka. It was concluded that the yoga has achieved special skill of Sun gazing without disturbing the autonomic functions. The yogi also claimed to stop his heart for a considerable time. The heart stoppage experiment could not be investigated fully as he became unconscious and fell down suddenly when he attempted heart control. Before this moment, his EEG consisted of high amplitude delta frequency and HR was 138 beats/min. Increased PTG amplitude after the heart stoppage attempt indicates his relaxed condition. However, it seems that he has achieved substantial control over his cardiac function.

Key Words: *Surya trataka, heart stoppage, emotional balance, physical fitness*

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INTRODUCTION

Trataka is one of the six cleansing practices of Hathayoga. It consists of a steady gazing, without blinking the eyes, at any small object at one meter distance e.g., the flame of a candle or oil lamp, a small point or the distant objects like rising Sun, planets, Moon etc.; until tears start rolling down (Gharote, 1984). It is practised for purifying the subtler channels (*nadis*) of the body and the nervous system, before learning pranayam and to achieve deeper concentration (Gharote, 1984). In one of the scientific investigations on *Trataka*, performed on the candle flame, It was observed that the degree of psycho-physiological relaxation emotional balance and a feeling of pleasantness as well as the parasympathetic preponderance was increased after *Tritaka* (Gharott: 1990) there was no scientific investigation reported so far on *Surya Tritaka*. It was, therefore, thought to investigate, scientifically,

the clan of One yogi, who was claiming to perform *Tritaka* on the Sun at any time of the day for a considerable period of time and to stop his heart for some time, with the following objectives.

1. *To study the psychophysiological changes during his practice of Sun gaze and to notice other perceptible changes if any.*
2. *To verify his claim that he can maintain his physical fitness at the normal level even after fasting for several days, due to Surya Tritaka.*
3. *To verify his claim of heart stoppage through polygraphid investigations.*

MATERIALS & METHOD

The subject: A yogi named Shri Umashankar, from West Bengal, had been practicing *Surya Tritaka* (Sun gaze) rigorously for 3 years. Since then, he is known as Sun Yogi. He was 30 years old, lean and thin, a bachelor with upright stature, long hair and weighing 48 kgs. He was 5.3 feet tall, wearing a single white loin cloth covering his body from chest upto ankles and was barefooted. He was an Arts graduate and had done Diploma in TV, VCR repairing. He was on his all India tour by walking barefooted (*Padayatra*). He looked confident. He claimed to stop his heart for some time and to still gaze at the Sun at any time of the day. He was also claiming his capability of maintaining his physical fitness even after fasting for a month as a result of regular practice of *Surya Trataka*. He visited Kaivalyadhama, Lonavla and knew that this Research Institution is engaged in scientific research in Yoga. He volunteered himself as a subject for scientific investigation pertaining to his claims.

Variables and Data Collection:

The following parameters were selected for the assessment, on the basis of the claims of the Surya Yogi.

1. **Measurement of Psychophysiological changes during and after the Surya Trataka :**

- a. **Psychological tests:** Basal skin resistance (BSR), Galvanic Skin Response (GSR), Word association test (W A T) and personal interview.
- b. **Physiological tests:** Blood pressure (BP), Pulse rate (PR), checking of pupillary contraction/dilation during the gaze and checking by an ophthalmologist afterwards.

Initial readings of the psychophysiological variables were taken prior to the 'Sun gaze', in the sitting condition. An automatic Digital Sphygmomanometer with printing facility from Ormon company, Japan, was used for BP and PR. BSR was measured on HM4-Mit PGR, feedback instrument and GSR was measured on Psychogalvanoscope after the subject had relaxed in *Shavasana*, to know his relaxation capacity. Kent Rosanoffs Word Association Test (WAT) was also administered for the assessment of his emotional status. It was decided to do Sun gazing for 30 minutes although the yogi said that he could do it for hours. Sun yogi started Sun-gazing at 2.38 p.m. by sitting in a chair in an open space outside the laboratory. In the beginning he practiced *Bhramadhya drishti* and then focused his eyes directly at the Sun. His BP and PR were measured and recorded every five minutes till he finished his gazing. BSR and GSR measurement and WAT test were done pupillary again after the Sun gazing was over.

His eyes were checked to see whether there is a pupillary contraction or dilation. Other body changes were also noted. An in-depth and unstructured interview of the Sunyogi was taken in order to know his personality as well as his subjective feelings and experiences during the Sun gaze. Next day he was taken to the ophthalmologist for eye check up.

2. Assessment of morphological and Physical fitness variables before and after fasting:

The Sun yogi was claiming to fast for a month which was not feasible in the prevailing circumstances. Therefore the measurements were taken before and after 6 days of fasting only.

- i) Body weight was measured on a standard weighing machine, nearest to 0.5 Kg.
- ii) Skinfold measurements from different sites viz. biceps, triceps, subscapular and suprailiac were taken with the help of Lange skinfold caliper, nearest to 0.5 mm.
- iii) Cardiovascular efficiency was assessed by Harvard step test and the score was recorded in index points.
- iv) Arm strength was measured with the help of a grip-Dynamometer and the unit of measurement was Kg.m.
- v) Forward flexibility was measured by Curetor's flexibility box and the score was recorded nearest to 0.5 cm.

3. EEG and other measurements for Heart stoppage experiment

Sun Yogi came to the laboratory (at Kaivalyadhama, Lonavla) in the morning on an empty stomach. EEG electrodes were attached at F1-P3, F2-P4, P3-O3 and P4-O4 points on the skull for Fronto-Parietal and Parieto-Occipital areas on left and right sides respectively as per 10-20 bipolar method of electrode attachment. ECG electrodes were fixed at radial and ankle sites for IInd lead record. Plethysmograph (PTG) electrode was attached to the right index finger and the respiration pick up electrode was fixed to the right (dominant at that time) nostril. The initial recording of the normal condition was done in sitting and standing positions with *open* eyes and closed eyes.

The polygraphic recording was done when the yogi started deep respiration and then *Kumbhaka* along with *Bhrumadhya drishti*, maintained for 17 seconds and when he contracted his chest muscles for 2 minutes. After some rest he started his second attempt, using the same technique. But all of a sudden he fell down on his face and became unconscious for 5-7 minutes. In this condition his breathing was continued (although feeble and slow) but the radial pulse could *not* be felt. EEG, ECG and PTG could *not* be recorded as the electrodes *got* detached from the skull and limbs. Only RR was recorded. Slowly he came to the conscious state. All the detached electrodes were fixed once again and his EEG, ECG, PTG and RR were recorded in sitting and standing conditions.

4. In-depth unstructured and free response interview with Sun yogi:

Youngest of all siblings, Umashankar came from a joint family of a agriculture background. From the childhood he had determination and courage along with the inclination towards spiritual matters. Being a rationalist minded he experimented with himself for *Surya Trataka* in 1992 and found that he could remain alive without consuming food. The technique of *Surya Trataka* was mastered by him through a hard trial and error method, starting with *Trataka* on the rising Sun. The interview indicated his high social and religious inclinations. The same also appears to be corroborated through his responses on Ward Association Test (WAT). He showed a remarkable emotional stability in WAT.

5. Preventive measures taken:

1. Written consent was taken from Sunyogi even though our techniques were non invasive.
2. The oxygen cylinder was kept ready for an emergency.

6. Statistical tools used:

This experiment was mainly conducted to measure the changes in the psychophysiological and the fitness variables of a Sun Yogi. There was no parallel control group. As various changes were observed during and after the Sun gaze, X² (Chi Square) test was applied to evaluate whether these differences appeared due to chance or there was really any significance (Bhattacharya *et al.*, 1977).

RESULTS AND OBSERVATIONS

1. Psychophysiological changes during and after the still-gaze on the Sun

BSR, GSR (relaxation capacity) and WAT score (emotional balance) before and after the gazing are shown in Table 1, whereas BP and PR measurements are given in Table 2.

Other physical changes observed, are as under.

1. He did not blink even once during *Surya Trataka* for 30 minutes.
2. His eyes became red and remained as such till the end of the gaze.
3. He was perspiring through the whole body in the beginning but it was negligible towards the end of gazing.
4. There was no pupillary contraction. Face was also quite normal except little sweating.
5. The ophthalmologist diagnosed that Mr. Umashankar had developed mild fundus phototoxic maculopathy and advised him to discontinue his practice. There was no refractory error, however.
6. Yogi could write and read without the spectacles.

Table 1 shows a significantly increased Basal skin Resistance indicating psychophysiological activation. However, *emotional balance*, measured through WAT, as well as *relaxation capacity* measured in terms of G.S.R. did not show statistically significant change, The yogi looked calm and composed when interviewed immediately after the experiment session.

Table 1. Psychological tests before and after Sun-gaze

Condition	Basal skin Resistance (Avg KQ)	Relaxation Capacity (KQ)	Emotional balance (W AT) (Score)
Before Sungaze	147	0.25	17.5
After Sungaze	138	0.25	18.2
X2. Value	3.85	0.05	1.52
p.Value	p<0.05	p>0.05	p>0.05

The results as presented in Table 2 indicate that his blood pressure increased significantly up to 126/73 mmHg during first 5 minutes of the gaze ($X^2 = 3.87, p < 0.01$), but thereafter reduced to 100/65 mmHg after 25 minutes of gazing and then stabilized at the initial level. Similar observation was evident in case of HR after 10 min. of the still-gaze. It started increasing after 5 minutes of the still-gaze and rose upto 130/min at the end of 25 minutes of the gazing ($X^2 = 3.91, p < 0.05$) and then got stabilized at the initial level. This indicates that the sympathetic tone was increased in the first 15 minutes of gaze and then there was a parasympathetic dominance. In other words, the *Sun Yogi* was slightly tense in the beginning but then relaxed after 15 th minute of Sun gaze.

2. Physical fitness before and after 6 days of fasting

There was a mild reduction in almost all the variables of physical fitness which was statistically insignificant. The mild increase in forward flexibility was also insignificant. The results indicated that the yogi was maintaining his physical fitness on a *low but still a normal level* even after fasting for 6 days (Table 3). He was looking quite fresh, active as well as enthusiastic after the fasting. It will be interesting to study and compare the same parameters, for the same period, in the ordinary persons who are not practising yoga.

Table 2. Blood pressure and pulse rate of Sun Yogi during Sun Gaze

Sr. No.	Time/Period/Condition	Blood Pressure (in mmHg)				Pulse	
		Syst-olic	X2 Value	Diast-olic	X2 Value	Rate /minute	X2 Value
1.	Initial	112		67		115	
2.	During the	126	3.87*	73	2.43	118	2.15

Gaze							
After 5 min.							
3.	After 10 min.	120	2.45	68	2.25	129	3.86*
4.	After 15 min.	107	3.98*	64	2.20	130	0.55
5.	After 20 min.	105	1.38	64	0.05	113	3.91 *
6.	After 25 min.	100	2.38	62	0.70	114	0.55
7.	After 30 min.	113	3.90*	65	2.17	115	0.55
8.	5 min. After the gaze	105	3.85*	63	2.13	117	0.70

*p<0.05

Table 3. Physical fitness of the Sunyogi before and after 6 days fasting

Condition	Body weight (kgs)	Skin folds(mm)			Cardio- Vas.Efficiency index	Grip Strength (kg.m)	Forward Flexibility (cm)	
		Biceps	Triceps	Subscapular				Supra iliac
Before fasting	56.5	4.0	6.2	10.8	12.6	325	100	33.25
After fasting	55.0	4.0	5.8	10.0	12.2	315	98	34.05
X2-Value	1.95	0.05	2.07	0.95	0.82	1.25	0.70	1.43
p- Value	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

3. EEG Studies on Heart stoppage

In the normal sitting and standing conditions his Heart Rate (RR), Plethysmogram (PTG) and Respiratory Rate (RR) were in normal range. EEG consisted of very low amplitude (2mm) *alpha* frequency, superimposed with *beta* (table 4). When he started with Kumbhaka and Bhramadhya drishti, a high amplitude (15 to 20 mm) delta frequency appeared for 10 seconds. This was followed by theta frequency of 5-7 mm amplitude while Kumbhaka and Bhramadhya drishti were still continued. He then contracted his chest muscles and maintained them in this condition for 2 minutes. This attempt was futile as nothing happened except HR increased upto 132 and then reduced to 102/min. and the production of high amplitude *delta* frequency for 10 seconds (Table 4).

After resting for a few seconds, he started his second attempt. After performing the manoeuvre again as above for 15 seconds, he became unconscious and fell on the ground almost jumping, on his face and all the electrodes, except respiration pick up were detached. Before he fell down, his EEG, ECG and PTG were similar to the first attempt (HR was 138/min.) which indicated that his technique was one and the same in both the attempts. During the unconscious state his respiration was very feeble and shallow at the rate of 42/min. After coming to the conscious state and resting for 2-3 minutes (while attaching the electrodes again), PTG amplitude increased upto 15 mm which is an indication of the increased peripheral blood circulation due to vasodilatation of the blood capillaries. In other words, the relaxed condition of the subject or the parasympathetic dominance towards the end of the experiment, was evident.

DISCUSION

There are examples of Yogis, who have attained mystical powers through their practice of yoga. Although it is not expected that every yoga practitioner should achieve such powers, it certainly attracts the common people. The scientists, on the other hand are interested to know the truth behind them.

Generally there are three types of Trataka (Gharote, 1984; Omananda, 1986; Saraswati, 1981)

1. **Antar Trataka** : Keeping the eyes closed, one has to still-gaze with feeling of visualization on internal regions like *Bhrumadhya*, Heart, and navel.
2. **Madhya Trataka** : Still gaze on an object made up of metal and stone or an ink written ADM on a paper or on a point or *Nasikagra* i.e. tip of the nose or on *Bhrumadhya* (The point midway between two eye brows) or on any near object with open eyes.
3. **Bahya Trataka**: Fixing gaze at Moon, planets, Sun or any distant object.

Normally we cannot gaze directly at the Sun particularly one hour after the Sun rise even through the goggles. The yogi was able to gaze directly at bright Sun at any time of the day for a long period. This itself is a feat. The psychological changes were insignificant. Sun yogi was looking quite stable emotionally. He was very simple in his behavioural and interactive patterns. His BP and PR increased slightly by 10-14 mm.Hg. in the beginning of the gaze but later on they were even less than the initial values just after 10 minutes of gaze. He was perspiring in the beginning but in the later part of the gaze there was no sweating. BP and PR were equal to the initial readings at the end of the gaze. This indicates that there was a sympathetic dominance in the beginning which later on changed to parasympathetic dominance. He was practicing Sun bazing daily for the last 3 years rigorously and even then the development of maculopathic condition of the retina was very mild. He was able to read and write without glasses.

Secondly, he was not consuming food or water for many days. On the contrary it appears that has developed an ability' to convert light energy' into the biological energy to fulfil his energy requirements. Only the plant kingdom possesses such an' ability through the process of photosynthesis. That is why his level of physical fitness might not have altered significantly even after six days of fasting. All these

observations indicate that his level of tolerance was certainly higher than an ordinary man for extreme light and thermal conditions apparently due to conditioning.

From his subjective feelings, expressed during the interview it seems that he felt relaxed as usual throughout the experiment.

It is well known that a regular practice of yoga will yield a good control over the autonomic functions. This is mostly because various breathing reflexes are tackled during Pranayama in general and in Bandhas and Mudras in particular. The Sunyogi was very confident about his control over his heart activity. He manipulated his chest muscles and applied *Bandhas* and *Bhrumadhya drishti* to control cardiac cycle but unfortunately he lost the consciousness in that attempt. Brain activity was greatly affected as was indicated by the appearance of deep sled pattern of EEG just before he became unconscious. He did not give an idea before starting the experiment that he may become unconscious. As the recording of the parameters could not be done and also the radial pulse was absent, it leaves a conjecture that the cardiac period might have increased upto a couple of seconds which is normally considered as a stoppage of heart. In one of the previous studies on heart stoppage the increased heart period was 4.5 seconds due to special kind of breathing and manipulation of the thoracic muscles (2).

Conclusion

Within the limits of the study it can be said that the Sun yogi has apparently achieved a special skill and the level of tolerance in respect of light and heat and a control over the autonomic functions through his long practice of Sun gazing. He seems to be conditioned to bear higher degrees of temperature and light. Psychophysiological investigation indicated that he was quite relaxed and comfortable under the bright Sunlight, during Sun gazing. He remained emotionally stable and uninfluenced from 'mild psychophysiological activation' during the Sun gazing.

The clinical evidence indicates that the retinal layers of his eyes were slightly damaged probably due to over exposure to the Sunrays. This also suggests that the practice of Surya Trataka should be performed on a rising Sun to avoid such retinal damage.

The claim of Sun yogi on fitness was partially true. Even after 6 days of fasting, his overall physical fitness level remained unchanged.

Regarding the study on the heart stoppage, it can be concluded that the Sun yogi tried to stop his heart by using internal breath holding chest muscle manipulation and *Bhrumadhya drishti*. During this the blood circulation towards the brain was suddenly reduced which affected the brain activity including the autonomic control over the cardiac cycle. This, in turn, produced an unconscious state during which the radial pulse was also not felt. This is possible if the cardiac period is increased (2). Although the heart stoppage claim could not be proved completely, it certainly showed that the Sunyogi had achieved a substantial control over his heart activity.

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