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Review Article

A REVIEW ON BRAIN WAVES WITH A VEDIC GLANCE

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ABSTRACT

Modern science had discovered that human brain emits some electrical waves. These waves are basically of 4 type's viz. Alpha, Beta, Theta & Delta. At different stage of physiological existence these brainwaves keep on changing their patterns by means of frequencies. The lowest is Delta at a frequency of 0.1 Hz and above 14 Hz is called Beta. During emission of Delta waves a person is in deep sleep, unconscious of his body & world whereas Beta is the thinking wakeful conscious stage of being. Here the person is completely involved in the worldly affair and simultaneously holding an inner dialogue to safeguard his personal interest. These are latest discoveries on modern parameters, and we must know that this is only one side of the moon/coin. This human body with brain is not a recent evolved creature rather its existence date back to Vedic and pre-Vedic times. Vedas are rightly declared as the constitution of creation by Maharishi Mahesh Yogi, founder of Transcendental meditation. Being born in the land Bharat we cannot imagine anything that does not have a root in the Vedas in form of Sutras (Formula). Theories related to atomic energy, electrical energy, mechanical energy etc. were described in our ancient texts prior to their modern discoveries. Let us have a Vedic glance of brain waves and other frequency related topics.

Keywords: Brain waves, Consciousness, Frequency, Om, Hormones, Mantras.

INTRODUCTION

In 1924 an Austrian psychiatrist named Hans Berger discovered the existence of electrical waves in the brain. He called them Alpha brain waves as they were the first electrical waves to be discovered in the brain. He also invented the electroencephalograph (EEG), a machine which amplifies records and graphs the electrical activities of the brain.¹ Soon after scientists began discovering other types of brain waves like Beta, Delta, Theta named in the order they were discovered. Then after 40 years of research it was concluded that the brain waves can be controlled. Experienced meditators could slow down their brain waves from Beta to Alpha and even Theta. After repeated analysis and sufficient discussion we infer that 4 types of brain waves are nothing, but the 4 stages of consciousness experienced by an individual from birth to death.

Consciousness is the inherent quality of the soul (Atma), mind is created from within the soul to transmit consciousness to the body. This consciousness as per Mandukya Upanisad has 4 stages of existence Viz. Jagruti (wakefulness), Swapna (dreaming), Sushupti (inactive- potent stage) & Turiya (transcendental).² Beta brain waves above 14Hz are the wakeful stage which we all experience after waking from the bed in the morning. Like the existence of the sun needs no proof so our experiences too need no proof. It is the compulsion of modern parameters only which can reject our experiences by labeling it as unscientific. The functions of Beta waves are alertness, engaged in problem solving, judgment, decision making, focused mental activity.³ It does not matter on which frequency a particular objective is

achieved but one cannot do them without wakefulness i.e. Jagruti (wakeful) stage. Alpha brain waves range from 7Hz to 14Hz and are produced during relaxed, detached awareness & daydreaming time. Its functions are mental coordination, calmness, alertness, mind – body integration and learning. This bridges the gap between the conscious mind and subconscious mind. It is the frequency range between Beta and Theta. It helps us calm down when necessary and promotes feelings of deep relaxation.³ This stage is called Swapna (dreaming) stage in the scriptures and corresponds to the REM phase of sleep cycle where we all dream and the eyeballs flicker. These dreams can be recalled even after waking up.

Theta brainwaves range from 3Hz to 7Hz produced by the so called sub-conscious mind and as per ancient scriptures this corresponds to the NREM phase of sleep, where there is no dream. Hence these waves help in deep healing of body and mind. Other functions of Theta waves are to retain long term memories; it is the centre of creative inspiration. The Upanisads call this stage as Shusupti (inactive potency). The body and mind become inert and allows hypnotic surgery to be conducted safely. Lastly Delta frequency range from 0.1 Hz to 3 Hz. Not much is explored about it still it is believed that it allows intuition, psychic awareness which is impossible at other levels of human experiences. One can access to the Universal psyche. This stage in Upanisad is called Turiya (transcendental). It is the transcendental stage of super consciousness and enables a person even to enter others body like Adi Sankaracharya did and returned to his previous body at will.

UNIVERSE IN VIBRATION

The great scientist Nicola Tesla said, “if you want to find the secrets of the Universe, think in terms of energy, frequency and vibration”. In fact, the entire Universe with its each and every content is in constant vibration. Table 1, 2 & 3 (reference no. 4, 5, 6 respectively) shows a list where various objects including planets, light & sound all vibrate at their own frequencies. In 1992, Bruce Tainio of Tainio technology, built the first modern frequency monitors and determined the average frequency of human body to be 62 – 68 MHz during daytime. Human brain frequency ranges from 72 – 90 MHz, Thyroid & Parathyroid gland are 62 – 68 MHz, Thymus gland is 65 – 68 MHz, Heart is 67 – 70 MHz, Lungs are 58 – 65 MHz, Liver is 65 – 68 MHz, and Pancreas is 60 - 80 MHz. These are of average healthy men whereas disease starts at 58 MHz, cold & Flu starts at 57 - 60 MHz, Candida overgrowth starts at 55 MHz, receptive to cancer at 42 MHz & ultimately death begins at 25 MHz.⁷

Again, he stated that fresh foods range from 20 – 27 Hz, fresh herbs from 20 - 27 Hz, dried foods range from 15 – 22 Hz, dried herbs from 15 – 22 Hz, processed and canned foods are 0 Hz. Again, he determined the frequency of essential oils starts at 52 Hz and go as high as 320 Hz which is the frequency of rose oil. Another scientist named Dr. Royal R. Rife declared that every disease has a frequency. He found that certain frequencies can prevent the development of diseases and that others would destroy diseases of lower frequencies. More data shows that negative thoughts has a frequency of -12 MHz, positive thoughts +10 MHz, prayers has +15 MHz, smelling coffee has -8 MHz, drinking coffee has -14 MHz, holding a cigarette has -17 MHz and smoking a cigarette has -23 MHz.⁸

These are the data presented after been verified by modern scientists by their own invented electrical/electronic devices. After correlating and tallying with the statistics of WHO we can infer that processed foods, canned foods & cigarette etc are injurious to health. As per the Physical law of FFR (Frequency Following Response), if we intake low frequency food very often then our body starts to resonate in that low frequency irrespective of our education, health & family background and drag us to 25 MHz and below and compel us to die unnaturally.

Vibration as words

In the ‘GOSPEL OF JOHN’, in the Bible it is said “In the beginning was the word and the word was with God and Word was the God”⁹

As per Indian philosophy just prior to the manifestation of creation there exist these above said word called “sabda brahma” (AUM, AMEN and AMEEN). The Upanishads declared that out of “sabda tanmatra” (unit of ether element) which is the subtlest element came all other 5 elements viz. ether, air, fire, water & earth. This word or sound can be understood as energy, wave, frequency & vibration. In fact, both Veda & science concluded that every atom, molecule, element etc all are in continuous vibration. When the solar system is on the go then what can be still? Coming back to the point the Rig Veda¹⁰ declared Vak/Speech to be of 4 types viz. Para, Pasyanti, Madhyama & Vaikhari. As per the great Sanskrit grammarian Bhartrihari “It is Vak/speech which has created all the worlds”.

Para vak: It finds manifestation only in prana (vital life force). It issues forth from supernal ether (paramam vyomam) where all the sound vibrations that build the various worlds pre exist in an undifferentiated state. This Para Vak (transcendental speech)

becomes the root ideas or germ thoughts. Here the realization of oneness with entire creation is perceived.¹¹

Pashyanti vak: Pasyanti in Sanskrit means seeing speech, it is the sound vibration perceived in casual world. A sage having access to his casual world could see the thoughts of others mind. Every revelation is possible in this stage only. This Pashyanti (conceivable) state of a word has both color and form, which is common for all languages and which has the vibrating homogeneity of sounds. The Indian, European, African or may be birds, beasts, insects etc all experience the same feelings.¹¹

Madhyama vak (mental speech): Madhyama means middle. This sound is perceived in the subtle world. This subtle world is nothing but our own mental world. The outer world starts from our senses which are always extrovert and has limits but in our mental world there is only one person to speak and hear and that is verily you in your mental world and I in my mental world. How the meaning of an entire book is perceived in a fraction of a second. Within a fraction of a second of introspection one can give an hour-long lecture.¹¹

Vaikhari vak (spoken word): it is the lowest form of sound and it signifies outward expression. This is spoken word which evolves out through vocal cord. This is perceived in the Shthula jagat or gross world in our daily life for communication.¹¹

From the above description we can infer that what we call Beta, Alpha, Theta & Delta brain waves in modern parameters has been addressed by Upanisads as Jagriti (wakefulness), Swapna (dreaming), Shusupti (inactive potency) & Turiya (transcendental) and the same is addressed as 4 yugas viz. Kali, Dwapara, Treta & Satya Yuga by the puranas. The Vedas being the ancient most had declared the same in terms of Vaikhari, Madhyama, Pashyanti & Para Vak. In other words, we can say that these are 4 types of languages at 4 stages of consciousness.

AUM

“The waking condition, called the material condition, corresponds to the letter A, which leads the alphabet and breathes in all the other letters. He who understands gets all he wants; becomes a leader among men. The dreaming condition, called the mental condition, corresponds to the second letter U. It upholds; stands between waking and sleeping, He who understands, upholds the tradition of spiritual knowledge; looks upon everything with an imperil eye. No one ignorant of Spirit is born into his family. Dreamless sleep, called the intellectual condition, corresponds to the third letter, M. It weighs and unites. He, who understands, weighs the world; rejects; unites himself with the cause. The fourth condition of the Self corresponds to AUM as One, indivisible Word. He is whole; beyond bargain. The world disappears in Him. He is the good; the one without a second. Thus, AUM is nothing but Self, He who understands, with the help of his personal self, merges himself into the impersonal Self; He who understands.”¹²

The above quotation is also from Mandukya Upanisad(Ch-1/8-11) where ‘A’ is the Beta frequency of wakefulness or Jagruti, ‘U’ is the Alpha frequency of dreaming state or Swapna, here it said it is the in between stage of waking and sleeping. This stage is ‘ardhanimilita avastha’ i.e half closed eyes of Shiva and “yoga nidra” (conscious sleep) of Vishnu described in the Puranas. ‘M’ is the Theta frequency of deep dreamless sleep i.e Shusupti and lastly the SILENCE represents the Turiya stage of Delta frequency. Today many videos streaming in you tube that the sound of the sun is OM. On 22 February 2008 Vedic mantra filled

the Washington State Senate Chamber as it opened its session with a Hindu prayer for the first time where OM was recited. Many researches on OM now proved that it diminishes thoughts resulting in calmness. The more it is chanted deep levels of consciousness could be achieved.

Power of letters in shifting awareness

The Vedic culture is based on mantras. Mantras may be a letter, words, sentences or phrases having a definite desired meaning & effect. Literary meaning of mantra is “That which liberate the mind” or “That which gives the mind a specific direction”. There are 50 letters in Sanskrit. These letters are present within the 6 chakras in the backbone. At first the Visudha Chakra/ throat plexus have 16 letters from A to AHA, the Anahat Chakra/ Heart plexus have 12 letters from KA to THA, Manipura Chakra/ Solar plexus have 10 letters from DA to FA, Swadhisthana Chakra/Sacral plexus have 6 letters from BA to LA, Muladhara Chakra/ Coccyx plexus have 4 letters from WA to SA and lastly Ajna Chakra/ Brow plexus have 2 letters HA & KSHA.¹³ These in total constitute the 50 alphabets of Sanskrit language. It is believed that from this all other languages have developed. The vocal cord is situated in the throat area which contains all the vowels and without which no sound could be pronounced, hence any letter, words or sentences thus pronounced vibrate the particular nerves in the concerned area in a chronological fashion. It is just like a musician playing an instrument according to the notes of the lyrics. Even thinking of the letters or words will vibrate that particular area. The throat plexus is associated with Ether, heart plexus with Air, solar plexus with Fire, Sacral plexus with Water, Coccyx with Earth and lastly brow plexus with the mind. This is how body is made up of 5 elements and mind connects it with the soul. In our culture recitation or japa of mantras were done continuously till the desired result is achieved. As continuous flow of water breaks up the rocks, as exercise for a particular muscle will develop it in few days and a specific yogasana/yogic posture will cure a particular disease then why doubt that Saraswati mantra (goddess of knowledge) will not develop the intellect.

Human backbone consists of 33 bones within which lies the Sushumna Nadi and within that lays all the 33 varieties of gods and goddesses (33 crores in total) mentioned in our scriptures.¹⁴ These gods & goddesses are nothing but various abilities which the Human Body possesses. It is believed that a particular mantra when recited repeatedly at a particular frequency will activate the desired energy. In short, the Human body is believed to carry 330 million potential within the backbone, but the Ajna Chakra/Brow plexus is the seat of mind which has infinite abilities as compared to the body, hence no one should hurt any body's mind knowingly or unknowingly. In Ayurved and Srimad Bhagbad Gita this body is considered as an inverted Aswatth tree (*Ficus Religiosa*), whose roots are in the brain and the peripheral part is its branches. The Yoga scriptures therefore declared SIRSANA to be the highest of all the yogic postures. Each and every spoken word ultimately affects the brain wave pattern. We all know of a religious practice of MAUNA BRATA i.e. maintaining vow of silence, the saints and yogis do it for days, months & years, some do it once a week like Mahatma Gandhi was doing. It is only to settle down the Beta frequency to Alpha and Theta. The culture of our country depends on mantra, yantra, tantra and Bhakti too because without feelings one cannot drive this mysterious machine called the Human Body. Everything here has a common scientific oneness of FREQUENCY. As per physics shorter the wavelength higher the frequency, hence red light having the highest wavelength is fixed on top of highest towers and buildings to be visible from long distance and avoid crash of the flying

machines and ships. Likewise, the words spoken loudly have less effect than mantras recited mentally which can affect around the globe. The brain wave patterns are just like this where Delta has the highest of wavelength and could penetrate the inter space barrier also.

IMPORTANCE OF BRAINWAVES IN HUMAN PHYSIOLOGY

Today it has been established that every state of human body physiology has a direct effect over the heart and brain which can be observed by the ECG & EEG monitors. At present our concern is to show that the brain wave adjustment could reverse a pathological condition to a normal physiology. The prime concern in today's physiology is of hormones. Every physiological and pathological condition is compared with a particular increase or decrease of hormones and also on the activity of that particular gland.

Dr. Vincent Giampapa, former President of American Board of Anti aging Medicine found that the slower brainwave patterns affect pro activation of three hormones viz. Cortisol, DHEA & Melatonin. Cortisol and DHEA are like anti hormones to each other. When we age DHEA decreases and Cortisol production increases, hence Cortisol is called age accelerating hormone. When one practice meditation and other like technique to slower down frequency of brainwave then there is significant increase in DHEA in blood with decrease in Cortisol level. This DHEA help in producing other hormones like testosterone and estrogen which helps in improving skin texture, vaginal atrophy, healing osteoporosis, erectile dysfunction and many psychological conditions in a positive direction. Likewise, Melatonin, a powerful antioxidant which is secreted by the pineal gland is responsible for good sleep and healthy production of growth hormones. These hormones are too produced in plenty amounts only in slower brainwaves pattern.

Dr. Daniel Rudman, the Director of Geriatric Medicine, Chicago Medical School University of Health Sciences too confirmed in his experiments that Growth hormones production increase in slower brainwaves. The brain is found to release Growth Hormone in very deep sleep of Delta. Most profound result has been found by Aerospace engineer Michael Hercules that there is significant increase in growth hormone at this Delta frequency and also significant increase in serotonin and testosterone was noted. It was found that the Delta range is the most successful in producing Growth Hormone and which is being secreted naturally in very deep sleep. Perhaps this could be a practical explanation to the many saints, sages and monks that they do not seem to age. It has seemed since the dawn of time that a perpetual youthfulness of the body can come along with spiritual practice and meditation.

Dr. Margaret Paterson & Dr. Iford Capel at the Marie Curie Cancer memorial foundation, Research Department, in surrey, England found that when the brain is triggered at a frequency of 10Hz it produces Serotonin, a neurotransmitter which help in reducing depression, anxiety, heal wounds and maintain bone health. Again, when the brainwave is triggered at 4Hz it produces Catecholamine which is vital for memory and learning.

A research team at Veterans Administration, Hospitals in Palo Alto confirms that by giving Acetylcholine to a group of normal subjects showed great improvement in long term memory. Study conducted at MIT declared Acetylcholine improves memory. Researcher Lester A. Henry in his words “is essential to such higher mental process as learning and memory”. Lack of

Acetylcholine is responsible for Alzheimer's Disease. UC Berkly & Researcher Mark Rosen Zweig has shown a direct connection between Acetylcholine and intelligence; hence the human brain size is more due to presence of more Acetylcholine than other species.

National Institute of Mental Health (NIMH) stated that at Theta brainwaves Vasopressin and Endorphin are secreted. Vasopressin is secreted by the pituitary gland which acts on kidney and blood vessel. It helps to prevent water loss in the body. There is an interesting fact that if Vasopressin is given to a person it instantly emits Theta waves. Vasopressin then stimulates the release of Endorphin which interacts with the opiates receptors in the brain to reduce our pain perception and act similarly like drugs Morphine and codeine by triggering positive feeling in body and mind. Endorphin also can reverse Amnesia. Neuroscientist like Dr. Andrew Schaley winner of the Nobel Prize for medicine in 1977 believed that in humans the places in the brain that produces the most Endorphins and contain the greatest concentration of Endorphin receptors are the same areas of the brain involved most intimately with learning and memory. Dr. Candice Pert of NIMH, the discoverer of the opioid receptors had declared Endorphin to be body's natural opioids.

DISCUSSION

Spiritually Consciousness is the superset of everything in the Universe but for a common man Consciousness should mean Life. A person may be in coma, unconscious of the world still he is alive and hence Consciousness exists. If 'un' or 'sub' is attached to Consciousness, still Consciousness is not destroyed. As copper or silver added to 24 carat gold to make ornaments do not hamper gold at a least likewise Consciousness is ever unchanged irrespective of various brain wave patterns. We all have now squeezed the meaning of Consciousness to mean 'awareness' and this awareness in Beta frequency depend on the 5 senses only and can be tricked easily as the magicians do. For example, everything is there in the room but when you are aware of hearing music, the eyes cannot see the lizard on the wall. When you are concentrated in a movie you ignore the air flow causing by the fan. In Alpha frequency or daydreaming which is rightly called detached awareness we are even unaware of the body and world around us. At this stage also our Consciousness exists. In Theta and Delta frequency though we are unaware of both outer and inner world still our Consciousness exists which we all experience by feeling refreshed and of vitality after waking up. What we want to point out that Delta frequency which starts from 0.1Hz as per EEG monitor ever exists in all other stages too. The number 0 is present in all other numbers we can think of and so consciousness is independent of the brain waves, but the brainwaves are always dependent on the living/conscious being. Spirituality is known as SANATANA DHARMA (eternal religion) from time immemorial in this land Bharat. Each and

every path which can give scientific conscious realization of the Spirit is called a religion. When a person is able to experience all the 4 stages of Consciousness at will is called a YOGI, otherwise we all experience all the 4 stages daily but unconsciously. SLEEP is the barrier which differentiates Beta stage or Jagruti stage from the rest 3 stages. In Srimad Bhagvat Gita Sri Krishna had designated Arjuna as "NIDRAJAYI" (conqueror of sleep). A person in this world no matter how rich or successful but he is within the clutches of SLEEP. This sleep in Ayurved is indispensable for survival and forceful conquering sleep will cause all types of mental disorders.

Beta stage is the conscious mind, rest 3 stages combine to form sub conscious mind. Sleep is the barrier which separates the conscious and sub conscious mind. We can control our conscious mind to some extent by means of suggestion, motivation, introspection, consolation etc but the sub conscious mind is beyond our present ability. The sub conscious mind controls our Autonomic nervous system, and which is responsible for all the involuntary activities within the body and mind. Unless and until this sleep is conquered, we cannot access the 3/4th area of the mind and body. Once this sleep is erased one could experience the deepest levels of Consciousness. Hypothetically a yogi meditates more and more only to substitute this sleep because in a 24 hour cycle the mind and body needs rest only, but we all fall asleep by nature.

CONCLUSION

After the discussion it is easy for us to conclude that this Human Body being a micro cosmos in itself is a perfect machine ever created. As per Srimad Bhagvatam the Human Body is the last or highest in terms of evolution. This very body with senses, mind and soul is complete and capable of experiencing the creator. There is no basic difference in the body of an Indian, American, African, and European and also of those at Equator and Poles. The same experience of pain and pleasure, victory and loss, happiness and misery, birth and death make us one. It is the same experience from past to present and will be same in future. Then how can be its experiences are different in ancient and modern times. There is a law in physics which says – Energy is neither created nor destroyed it only changes its state of existence. Therefore, we Human Beings cannot be pseudo satisfied in creating or discovering anything new. Everything ever existed on this planet. Only one thing will contend the thirst that is by knowing the self. The self knowledge will come after transcending the body, senses and mind. It is impossible by any sort of technology or software or by ruling the entire planet. For this purpose, the hyperactivity of our brain waves must be settled to Alpha first. If we can control our brain waves at Alpha, then only we can experience the transcendental bliss at Delta with full awareness and retain the same when we are wakeful in Beta state again.

Table 1

Sl no.	PLANETS	FREQUENCY in HZ
1	Mercury	141.27
2	Venus	221.23
3	Earth	194.18
4	Mars	144.72
5	Jupiter	183.56
6	Saturn	147.85
7	Uranus	207.36
8	Neptune	211.44
9	Pluto	140.25
10	Sun	126.22
11	Moon	210.42

Table 2

Sl No.	Colours	Frequency in Nm
1	Ultraviolet	380
2	Violet	423
3	Indigo	449
4	Blue	475
5	Green	512
6	Yellow	573
7	Orange	607
8	Red	680
9	Infra red	780

Table 3

SL no	medium	Speed of Sound $V_{w(m/s)}$
1	Air at 0 ^o c	331
2	O ₂ at	316
3	H ₂ at	1290
4	Ethanol at 20 ^o c	1160
5	Hg at 20 ^o c	1450
6	Fresh water at 20 ^o c	1480
7	Sea water at 20 ^o c	1540
8	Human tissue	1540
9	Polythene	920
10	Aluminium	5120
11	Steel	5960

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