

Healing Through Arts: Decoding the Indian Paradigm

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Seen your liver lately or checked your DNA? Did you know that your stomach lining changes every five days, your skin changes every four weeks, your liver changes every six weeks? Or that every 12 weeks there are major changes in your skeletal structure, and that every six weeks your DNA changes?

In short, says New Age Guru Deepak Chopra, “you create the body you live in... You are constantly reincarnating a new body in yourself. Just as you cannot step into the same river twice, as the water keeps flowing, so also you cannot possess the same body.”

What a miracle this human body of ours is! We breathe out 10 to the power of 22 atoms and breathe in the same amount. As Dr. Chopra notes, these atoms are “the very same millions of atoms which have inhabited the bodies of Gitam Buddha, of Jesus Christ, of Osama Bin Laden or a man in Manhattan which pass through our bodies and put the human body through a constant process of change.”

It is this constant replacement of raw material by the human body, thus, continually creating a new physical body, which is at the heart of the Indian belief that the *sharira*, the body, is the link between the earth and the cosmos, between humanity and divinity. And to help this body remain healthy, the traditional knowledge of India has identified one major path: the creative impulse. Expression through the arts, music and dance, painting and sculpture, literature and poetry, is the pathway that leads to all wellness.

There are so many systems of treating disease but only one science of health. These various systems can be broadly classified under two heads: those which depend on external preparations, like drugs and chemical formulations; and those which take the internal route, often called Nature Cure. The first, the external system, uses drugs and is loosely known as the allopathic, Western system of medicine. It is by far more popular because it is an easy and quick way of alleviating the symptoms of disease, even though it is largely a suppressant. But in the other system, the one that looks at the body's interior, commonly known as Nature Cure, the belief is not only that prevention is better than cure. It goes further to stress that prevention is the *only* cure.

A body that changes its entire physical structure and schemata as quickly and as thoroughly as we have observed earlier cannot possibly be reduced to mechanical deductions of the sort that the allopathic system of healing presupposes. Pop a pill, and are you sure it will have the same effect on the liver, the spleen, the lungs, the skin today as it did a few weeks ago when the doctor prescribed it? Also, says the traditional healer, how do you know what side effects it is going to cause, not just at the time of consuming it but for the weeks thereafter when it will stay in the body, its chemical nature making it indissoluble, imperishable and yet challenged by the body's continually changing nature?

In other words, true health needs to be created from within the body and with the help of

awareness of its real nature. This is where the creative process comes in, particularly the role of the arts.

Indian traditional view equates the arts of music and dance with those of a revealed scripture – they are called the fifth *Veda*, after the four *Vedas*, written, conservatively, some 3,000 years before Christ. The *Vedas* deal with the nature of phenomena, of the existence of man and other aspects of the vast cosmos. There is a limitless treasury of written material in our texts and treatises, which details the effect of music and dance on the minutest and most microcosmic layers of the body. Coupled with it is a sizeable corpus of recent advances in scientific research and the conclusion is exactly what the ancients had said it was: the arts heal, they are completely therapeutic in nature and behind the apparent good health, longevity and incredible stamina of most dancers, musicians and visual artistes lies the fact that the very nature of the work they do, i.e. sing, dance, paint, sculpt, in short create a work of art, is an endless source of pumping metaphorical iron, vitamins and nutrients into the body while at the same time ridding it of disorders, imbalances and disease.

Moreover, the Indian aestheticians and philosophers of dance have always pointed to these arts being akin to *Yoga* and hence their training and teaching, too, is in the nature of building blocks of Yogic discipline, from the physical exercises, called *Asanas* to the breathing techniques, the *Pranayama*, which act as a common base for enabling the body and the mind to grow towards its potential.

Dance as therapy

At this point, it may be argued that all exercise is conducive to good health. So what is so special about, say, the movements and canons of dance seen as simply exercise? Or about the art of creating music? To answer this fully, we need to look at the attributes of an ideal system of exercise. These, say manuals like *Roger in his Dance – a basic education technique*, share three elements described as the three S's, namely suppleness, strength and stamina. Further, they should fulfill the following requirements:

1. Make exercise an enjoyable experience, fulfill the urge for self-expression and lead to making it a habit that stays with one for one's lifetime.
2. Partake of the element of play, even as it makes the body supple, tones up the muscles and the nervous system.
3. Provide symmetry of movement and due exercise to each and every part of the body in proper proportion. This should address each and every muscle, tissue and cell and do so in a speedy manner, to suit today's severe limitations of time.
4. It should strengthen the heart, improve blood circulation and increase the capacity of the lungs.
5. Further, it should involve the brain, challenge the nervous system and push both to their outer limits so as to quicken the reflexes and sharpen the development of a sound body and an alert mind.

Indian classical dances, at least, and they are the ones I am most familiar with, fulfill these criteria to the full. Children who are taught these forms develop extraordinary powers of observation, expression and stamina and stay with dance through most of their adult life.

Moreover, recent research has shown that learning a classical dance style like Bharatanatyam can actually repair common eye defects like far-sightedness and near-sightedness. Most youngsters who are shortsighted, due either to genetic predisposition or excessive strain to the eyes have no relief for this condition except to wear glasses. Indeed, the condition can only worsen and lead to more strongly powered lens as time goes on. But experience has shown that the eye movements done in the course of the dance have, in many cases, made distinct improvement and many youngsters have been able to discard glasses.

Again, the question may be asked, can't simple eye exercises achieve the same results? Why not? The only problem is that unless a child's creative faculties are involved in the exercise and unless he/she is given the pill in a sugar-coated way, chances are that he will not do that exercise in a routine way. However, make it a part of play and it is a different thing altogether.

The role of symmetry and balance in dance is another aspect, which sets it apart from other exercises such as aerobics. Indian classical dance, for instance, is built along the complex lines of Yoga and both in its training as well as its performance, it uses symmetry and balance to create poise. Like the bee which vibrates its wings thousands of times a minute, the birds which fly at great height and for unbelievably long spans of time, the monkeys which climb trees and swing from branch to branch, it is symmetry which is at the heart of the motion. In Bharatanatyam and indeed all Indian classical dance styles, whatever movement is done on the left is done on the right also. There is equal involvement of the arms and the legs. In each limb, every joint is involved. There is a rhythm and regularity in each set of movements. In a 3 minute piece with which the Bharatanatyam recital normally opens according to Kanaka Sudhakar the *Alarippu* (literally, the unfolding of petals) there is vigorous exercise of each limb, symmetrical on both sides, complete with bending, jumping, stretching and exercising the torso, the waist, the feet, the heels and the toes, besides the face and the neck. There are a total of 238 movements of the body in this one quick piece, along with moving the eyebrows, the eyes and the facial muscles in synchronicity with the rest of the dance. A child of six or seven can easily perform this while enjoying the crisp beat and the joyous movements, finishing with a sense of enjoyment and accomplishment. Bones and muscles never degenerate when used regularly and their growth slowly gets accelerated.

Popular prejudices offer a black-and-white picture of the brain versus brawn. We are often told that exercise develops the body while reading, writing and thinking are meant to develop the brain. Nothing could be more flawed. "A sound brain in a sound body" is not just a saying. It encapsulates the wisdom of our traditional societies. On the one hand, we know now that every cerebral activity, like reading and writing, solving a mathematical problem or participating in an intellectual seminar like this may be primarily concerned with the brain but it is also of clear relevance to the body and has a direct impact on it. Certain emotions, feelings and sensory reactions created by this activity have a bearing, however subtle, on the body and its health. Similarly, every kind of exercise has an impact on the brain and the nervous system. There is the direct effect when we need to plan and think about the exercise to be performed. At the same time there is the indirect effect due to the release of adrenalin, certain enzymes, hormones and other chemical substances in the blood due to these exercises.

Classical dance involves both the physical and the neurological halves of the body and dance students develop such a high quotient of ability to remember, calculate and plan that their academic record, too, improves significantly. In Indian dance training, the skills that are imparted are almost universal – from control of the body in every position and movement, except climbing, to a heightened sense of the body in space and overall alertness. There is also the refinement of reflex arcs, which control equilibrium and muscle tone, such as posture and the refinement of the fine neuro-muscular adjustments of a whole host of cooperating nerve fibres that belong to both the autonomous and the central nervous system. Now, the autonomous nervous system connects with the involuntary organs like the heart muscles, blood vessels of the respiratory system and the muscles of the digestive tract. Through connections that dance creates between the autonomous and the central nervous systems, the exercises of the skeletal muscles bring to bear a tremendous influence on them and heighten the balance between the reciprocal nerve fibres regulating the heart muscles, blood vessels and the intestinal tract. This indirect effect is very important in helping a child grow into a healthy adult, free from disease.

In his book, *The function of the Human Body*, Guy A.C.C. says: "Repetition is the great secret of success, to allow the whole coordinated performance to become smooth and satisfactory." He is talking only of sports and such like activity. Dance scores over them because it combines in itself a host of skills like speed, stamina, dexterity, endurance and grace, normally attained by different exercises such as building stamina by stamina exercises and speed by another set of exercises. This not only saves time but, as mentioned earlier, also comes with a high degree of genuine enjoyment.

Moreover, the source of the drive to dance is in the emotional mechanism, an age old and invaluable mechanism in the nervous organization of man.

In the course of one simple phrase, say "*Kita thaka tha dinginathom*" of Bharatanatyam, the ear listens to the gait, the eye follows the hands, the mind correlates the hands and feet to work together with the eyes and through repetition and intense practice a synchronization of the body, the mind and the soul, the *atman*, is achieved which is truly phenomenal. Since these dance styles are all danced in close contact with the ground, the well-known benefits of acupressure, achieved through a vast variety of steps, are also part of the healing effect of dance. Together with the emotional and expressional part of our classical dance tradition, known as *Nritya* and *Abhinaya* (the pure dance is known as *Nritya*) there is a great enhancement of dance's power to bring about neural integration. It is for these reasons that Indian dancers enjoy exceptional health, fitness and a disease-free body. Several cases of poor eyesight, low or high blood pressure and similar problems have been known to get cured within a few months of training.

Again Sudhakar tells us that while dancing, a dancer does not open her mouth. This enables the body to release the exhaled air, which is richer in carbon dioxide, through the nose only. However difficult the steps, the dancer keeps a cool, calm and pleasant face and tries to distribute the strain to all parts of the body. Over a period of time, she develops the ability to get more energy from less food and spend less energy doing the same kind of work that people usually do. She is relaxed all the time. Her movements are tension-free, smooth, without jerks. This is the quality that the dance imparts. Control of unnecessary movements

leads to control of expenditure of energy, which is again the route to good health. Above all, the balance between vigorous dance alternated with moments immediately thereafter of relaxation, as in a walk back or in the start of an *abhinaya* or an expressional segment, allows muscles to relax and to enhance the oxidative capacity of skeletal muscles. The more the muscle fibres metabolise alternative substrates like fatty acid ketones, replacing in part carbohydrates (blood glucose and muscle glycogen) as the major source of energy for maintaining prolonged contractile activity, the more the capacity of the dance to do a lot more with much less. That is why it is said that a dancer's endurance is far superior to that of even the best athletes!

Music as therapy

Coming now to the healing power of music, again. I will take the case of Indian classical music, with which I am most familiar, as an example. But of course the same principles apply to all traditional music systems.

In the beginning, the Hindus believe, there was *Nada Brahma*, sound as God. Almost all the great religions of the world talk about the Word that was there when the universe first appeared. In Patanjali's *Yoga Darshan*, divinity is defined as a special Being and is expressed by the original word (*Pranav*). What this original word was, nobody is sure, but in major *Yoga* commentaries it is called *OM*. Recent scientific discoveries have also confirmed that very soon after the Big Bang and before anything else appeared in the universe, primordial sound waves were produced. This has been the basis for the Indian belief that Sound is God, *Nada Brahma*. Hence the veneration for music and those who create it.

The corpus of Indian classical music, its theories, philosophies, methodologies and texts are both varied and vast. Its core is occupied by the belief that while at the surface level music affects moods, emotions and states of mind, at a deeper level it is a vehicle of worship and meditation. Just as sound has been with us through the evolutionary process and is an integral part of our activities, music, too, being a part of sound, is a natural outcome of this evolutionary process.

Recent Positron Emission Tomography (PET) studies conducted by scientists have shown that certain types of music activate neural pathways similar to those associated with euphoria and reward. These same pathways are activated in response to other pleasurable activities like eating and sex, giving rise to emotional happiness.

In classical music, as in deep meditation, the mind focuses on a single thought for a long time. When contemplation, reflection and concentration, *samadhi* (together called *Sanyam* in Patanjali's works) are done on a single thought, it produces a sense of well being and relaxation that stimulates or "tickles" the pituitary gland and releases those chemicals into the body which produce a sense of pleasure.

Though this process is not fully understood as yet, it is similar to what we feel when we hear soul-stirring music. It is known as the principle of equivalence. The major portion of the 100 billion neurons of the brain act like a laser on the sound waves of music and create much the same effect as happens during meditation. Different types of music, sung at different times of the time cycle and in different seasons stimulate feelings of sadness, anger, joy and peace.

According to a great contemporary Indian singer, Pandit Jasraj, he has managed to control blood pressure with music. He knows two doctors who have used music to control diabetes, to a significant extent. Music, he believes, has the power to cure insomnia, headaches, depression and other mental problems of mankind.

Swami Vasudevananda, a monk of the Gurudev Siddha Peeth, Ganeshpuri, near Mumbai, explains the purifying force of chanting of Mantras and of music thus: "Like everything in this universe, our body is made up of vibrating energy. Even though our body appears to be dense, every cell of the human body has its own frequency. There is a sound present in each tiny cell, however minute the cell might be. Wherever there's movement, there's vibration, there's sound. The body's inclination is to be in harmony with itself. All the different parts of the body, all its cells, want to move in unison, the way a shoal of fish or a flock of birds does, always moving but never bumping into each other. When this natural rhythm and harmony is disrupted in the body, that's when disease and disorders arise. However, when the vibrations of the chant sound within our bodies, the cells themselves respond; they resonate with the pure vibrations of the *mantras* (ancient ritual phrases) so that harmony can be restored.... Chanting calms and clears the mind and actually rejuvenates it. Everything that we listen to leaves its residue in the mind. Chanting the pure syllables of the names of God breaks through this mass of varied thoughts and impressions and opens us to a higher awareness, a clearer perception of ourselves and the world."

In normal life, we utilize only five to ten percent of our total mental potential. The rest remains untapped due to our inattention to the vast untapped source of consciousness. In this context, music, like meditation, can be redefined as a process of becoming increasingly familiar with our deepest layers of consciousness, from where thought processes originate and where it merges in the end. Like an ethereal balm, music eliminates psychological, social and cultural conditioning gathered consciously or unconsciously over the entire period of the evolution of humankind.

In New Delhi recently, Dr. Richard P. Brown, a top scientist in the field of advanced experiments in the ways in which *Yogic* techniques of breathing, *Pranayama*, relieve stress, enable people to connect better and be healthier, said that these techniques of rapid breathing activate a nerve, Vagus, that connects with the diaphragm and some of the organs, including the heart and the brain. As a result of this stimulation, messages are sent along three different pathways to tell the body to shut off areas of worry—in the frontal cortex and in the brain stem - and then to the limbic system, which controls positive emotions, awakening it. At the same time, says Dr. Brown, hormones like the Cuddle hormone, experienced during sexual activity and the birth of a baby are released, encouraging bonding. Amazingly, he says, these *Yogic* techniques even control eating disorders. "People often soothe themselves by eating. But after this course (of special exercises of *Yoga*) as the tension drains off, people can actually begin to lose weight. The hormone that promotes connectedness also has a relationship with a peptide hormone. Controlling the release of this hormone can in turn influence hunger and the body's ability to take only the required amount of food."

Is it any wonder that one of our oldest texts, the Skanda Purana, contains a verse that emphasizes the value of dance and music thus:

"Uttering the name of God once, by yourself, is equivalent to hearing His name being

chanted one crore times; Offering *havan* (sacrificial fire) to His glory once is equivalent to uttering His name one million times yourself; Singing and dancing to His glory once is equivalent to offering *havan* one million times; *Geyam Geya Samam Vidhuhu*: There is no possible equivalent to the act of Geyam (a composite word which includes *gayan*, i.e. singing, *vadya*, instrumental music and *nritya*, dance) for the glory of God."

Meditation expands, empowers and heals through the arts

Meditation is at the centre of any artistic activity, in the form of Dhyana that enables an artiste to connect with his/her inner being on one end and with the outer universe on the other, during his/her creative process. To understand what meditation can do in terms of performing any task better, particularly a creative activity that leads to healing through that work, we need to first understand the mind which is the main instrument for both meditation and the subsequent activity.

Let us look at the physical structure of the brain, that apparatus which contains in some cavity of the cerebrum, the thing we call the 'mind'. A piece of your brain, the size of a grain of sand contains: one hundred thousand neurons, two million axions and one billion synapses, all talking to each other.

Consciousness appeared in humans as the result of interaction between evolutionary and cultural pressure. This interaction takes place not only with the external world but also with people with whom we communicate.

It is essentially an interaction between the brain and culture, the one using a neural language and the other a spoken one. The byproduct of this interaction parallels what we in India understand by the word "*sanskara*". Its nearest parallel in Western terms is the DNA chain in humans. What we know for sure is that it is the end product of a complex learning process, happening over many millennia.

According to Prof. V.S. Ramachandran, named by *Newsweek* as one of the "hundred most prominent people to watch in the next century", "all artistes, poets and creative people can thank a rare and irregular behaviour of the brain called *synesthesia* for accidentally cross wiring unrelated parts of their brains in a way not seen in most people". He concludes that one in 200 persons are "blessed" from this accidental cross wiring. He does not think they "suffer" from this disorder, which makes the 'victims' link totally unrelated things almost spontaneously.

In other words the artiste connects things in ways that are not 'normally' seen. The product created by this crosswire circuitry is, naturally, at the very least *different* and at it is best magical and miraculous in its originality and power to communicate. Ramachandran sees universal principles of perception behind great works of art. Art is hyperbolic, always exaggerating and amplifying the truth, he says, giving the example of baby gulls, which identify their mother only by the red dot on her beak and rush to her for food. Experiments showed that they were equally excited when shown a stick with three red lines on its tip and to which they rushed for nourishment! Had the baby gulls been human they would have hung the stick with three red lines on the wall as a piece of art, a great metaphor which strikes a chord within them!

This celebrated author of "Phantoms in the Brain: Probing the Mysteries of the Human

An artiste or a person trained in arts can address problems in new ways, find more imaginative solutions through a holistic stream of knowledge and different, plural perspectives on life. Art also becomes a key route to attaining individual and community health.

This is so because our body is continually undergoing change. Indian classical arts like dance are built on this knowledge. It lies at the heart of the belief that the *sharira*, the body, is the link between the earth and the cosmos, between humanity and divinity and that the cycle of matter is forever revolving, forever dying, forever creating a new physical body. The arts are therapeutic in nature, being akin to *Yoga*, the healing discipline. Behind the apparent good health, longevity and incredible stamina of most dancers, musicians and visual artistes lies the fact that the very nature of the work they do, i.e. sing, dance, paint, sculpt, in short create a work of art, is an endless source of pumping of metaphorical iron, adrenalin, vitamins and nutrients into the body even as they help to rid it of disorders, imbalances and disease. Practice of classical dance enables development of extraordinary powers of observation, expression and stamina happens by learning classical dance.

Simple eye exercises built into dance help repair common eye defects such as far-sightedness and near-sightedness. Normal eye exercises are no substitute because unless a child's creative faculties are involved in the exercise and unless he/she is given a sugarcoated pill of fun and play, chances are that the child will not exercise in a routine way. Make it a part of play and it is a different thing altogether.

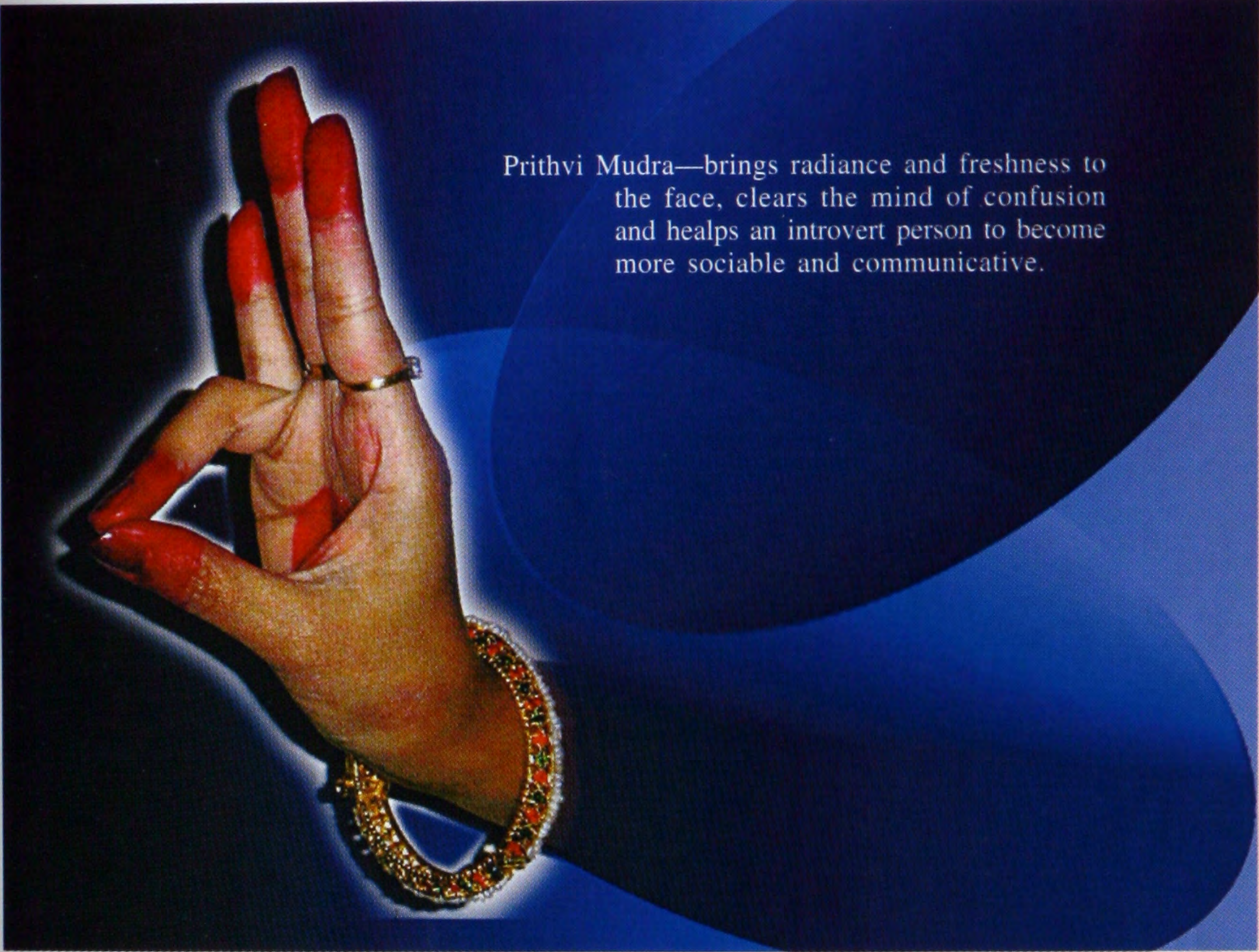
A dancer's body bends, jumps, stretches, and leaps. And this is accompanied with the exercise of the torso, the waist, the feet, the heels, the toes, the face and the neck. Symmetry and balance is another aspect, which sets dance apart from other exercise systems such as aerobics. In every classical style, whatever movement is done on the left is done on the right also. There is equal involvement of the arms and the legs. In each limb, every joint is involved. There is a rhythm and regularity in each set of movements. The brain versus brawn paradigm is wrong.

Apaan Mudra—Prevents all kinds of gastric,
stomach-related problems

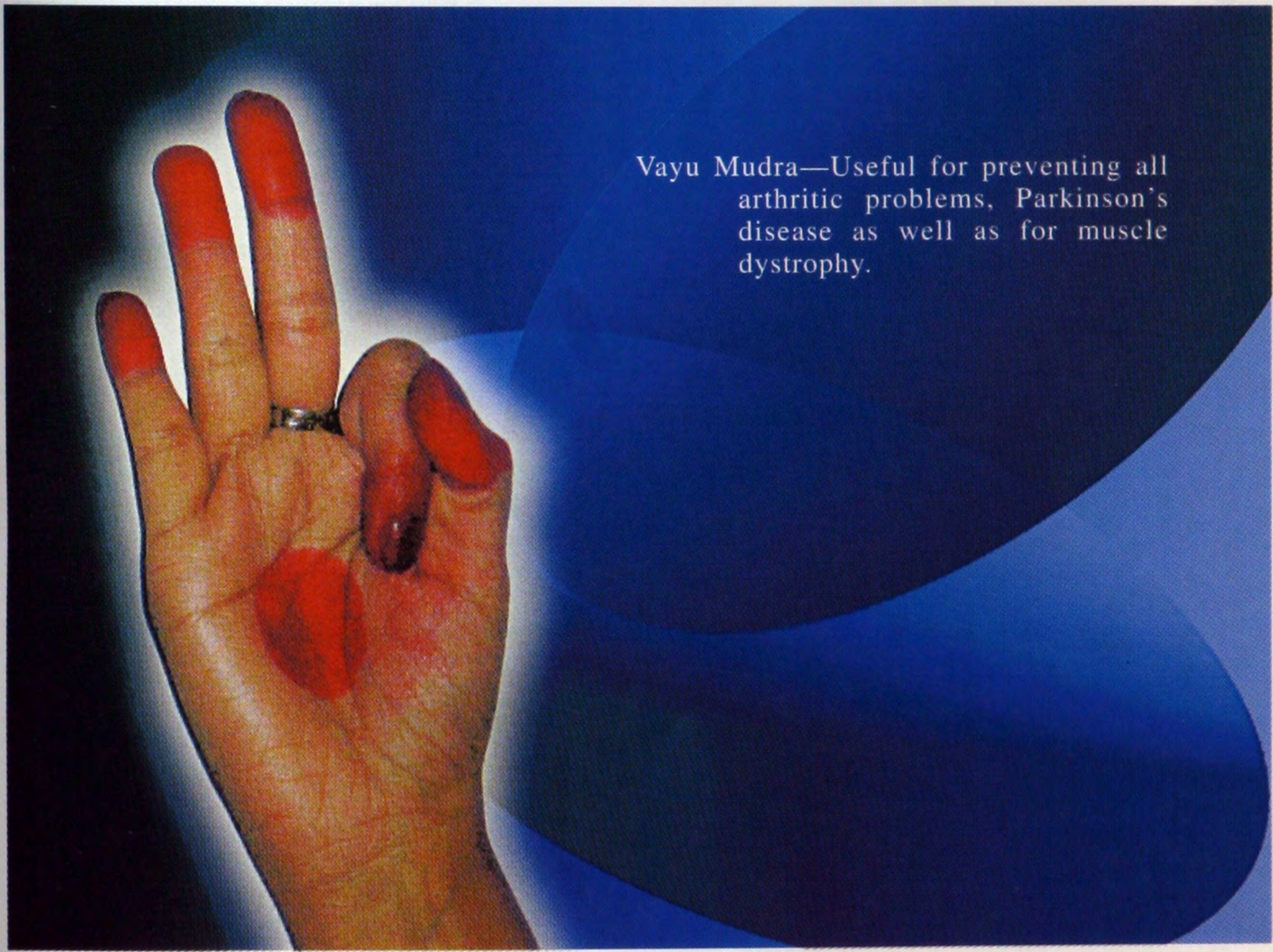


Hridaya Mudra—useful for preventing and
helping cure heart blockages

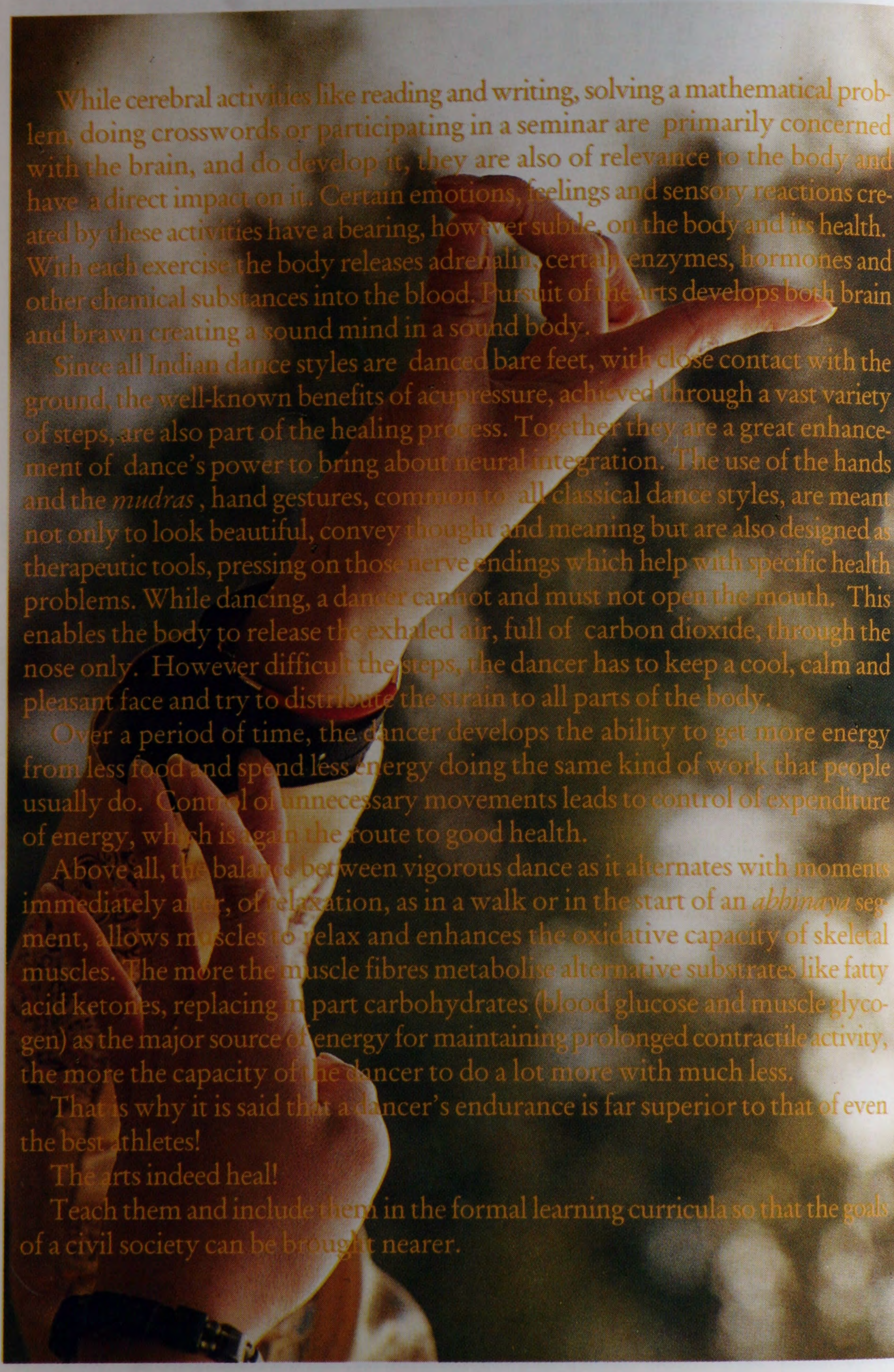


A close-up photograph of a right hand in the Prithvi Mudra (Earth Gesture). The thumb and index finger are joined at the tips, while the middle, ring, and little fingers are extended straight out. The entire hand, including the fingers and palm, is coated with a thick layer of bright red paint. The hand is positioned against a dark blue background with lighter blue curved shapes. A gold ring is visible on the ring finger, and a gold bracelet with colorful beads is on the wrist.

Prithvi Mudra—brings radiance and freshness to the face, clears the mind of confusion and helps an introvert person to become more sociable and communicative.

A close-up photograph of a right hand in the Vayu Mudra (Air Gesture). The thumb is extended straight out, and the index finger is bent so its tip touches the tip of the thumb. The middle, ring, and little fingers are extended straight out. The entire hand, including the fingers and palm, is coated with a thick layer of bright red paint. The hand is positioned against a dark blue background with lighter blue curved shapes. A gold ring is visible on the ring finger.

Vayu Mudra—Useful for preventing all arthritic problems, Parkinson's disease as well as for muscle dystrophy.



While cerebral activities like reading and writing, solving a mathematical problem, doing crosswords or participating in a seminar are primarily concerned with the brain, and do develop it, they are also of relevance to the body and have a direct impact on it. Certain emotions, feelings and sensory reactions created by these activities have a bearing, however subtle, on the body and its health. With each exercise the body releases adrenalin, certain enzymes, hormones and other chemical substances into the blood. Pursuit of the arts develops both brain and brawn creating a sound mind in a sound body.

Since all Indian dance styles are danced bare feet, with close contact with the ground, the well-known benefits of acupressure, achieved through a vast variety of steps, are also part of the healing process. Together they are a great enhancement of dance's power to bring about neural integration. The use of the hands and the *mudras*, hand gestures, common to all classical dance styles, are meant not only to look beautiful, convey thought and meaning but are also designed as therapeutic tools, pressing on those nerve endings which help with specific health problems. While dancing, a dancer cannot and must not open the mouth. This enables the body to release the exhaled air, full of carbon dioxide, through the nose only. However difficult the steps, the dancer has to keep a cool, calm and pleasant face and try to distribute the strain to all parts of the body.

Over a period of time, the dancer develops the ability to get more energy from less food and spend less energy doing the same kind of work that people usually do. Control of unnecessary movements leads to control of expenditure of energy, which is again the route to good health.

Above all, the balance between vigorous dance as it alternates with moments immediately after, of relaxation, as in a walk or in the start of an *abhinaya* segment, allows muscles to relax and enhances the oxidative capacity of skeletal muscles. The more the muscle fibres metabolise alternative substrates like fatty acid ketones, replacing in part carbohydrates (blood glucose and muscle glycogen) as the major source of energy for maintaining prolonged contractile activity, the more the capacity of the dancer to do a lot more with much less.

That is why it is said that a dancer's endurance is far superior to that of even the best athletes!

The arts indeed heal!

Teach them and include them in the formal learning curricula so that the goals of a civil society can be brought nearer.

Mind” quotes fellow neuroscientist Francis Crick who said there is nothing metaphysical or physical and everything has an explanation in neurosciences. He believes that everyone has the ability to imagine but that the difference between a schizophrenic and a great artiste is only that the former fails to differentiate between imagination and reality.

Yet another celebrated neuroscientist, Baroness Susan Greenfield, gives us neurological explanations for the meaning of self and mechanisms of belief. Explaining the difference between the mind and consciousness, Greenfield, Professor of pharmacology at Oxford says “traditionally the mind is a personalization of the brain. Consciousness is the first-hand experience of the brain. The two are entirely different concepts. The mind is made up of the physical connections between neurons. These connections evolve slowly and are influenced by our past experiences and therefore everyone’s brain is unique. Whereas the mind is rooted in the physical connections between neurons, consciousness is an emergent property of the brain. They are connected yet different. You can lose your mind and still be conscious. Similarly, when you go to sleep at night or when you are under the effect of anesthesia you don’t think that you are going to be losing your mind.”

All this brain and mind research has begun to produce concrete evidence for something that Buddhist practitioners of meditation have maintained for centuries. Mental discipline and meditative practice can change the workings of the brain and allow people to achieve phenomenal levels of awareness and health.

Researchers at the University of Wisconsin working with Tibetan monks have translated those mental experiences into the scientific language of high-frequency gamma waves and brain synchrony or coordination. And they have pinpointed the left prefrontal cortex, an area just behind the left forehead, as the place where the brain activity associated with meditation is especially intense.

“We found that the long-time practitioners showed brain activation on a scale never seen before”, says neuroscientist Richard Davidson. “Their mental practice is having an effect on the brain in the same way golf or tennis practice enhances performance.” It demonstrates, he says, “that the brain is capable of being trained and physically modified”.

Of course this has turned on its head the previous belief, which was just the opposite—connections among brain nerve cells were fixed early in life and did not change in adulthood. In just one decade, the past one, advances in brain imaging and other techniques have enabled scientists to acknowledge the concept of brain development and “neuroplasticity”. Davidson says his latest results from the meditation study take the concept of neuroplasticity a step forward by showing that mental training through meditation (and presumably other disciplines of Yoga) can change the brain’s circuitry.

The findings are the result of a long collaboration between Davidson and the spiritual leader of the Tibetans and Buddhists worldwide, the Dalai Lama. In 1992, after learning about Davidson’s research into the neuroscience of emotions, the Dalai Lama invited him to Dharamsala. Buddhists have a centuries old tradition of intensive meditation which traveled everywhere from India as “dhyana”, becoming “Chen” in China and “Zen” when Buddhism reached Japan.

The Dalai Lama was interested in having Davidson explore the workings of the monks’ meditating minds. He dispatched eight of his most accomplished practitioners to Davidson’s

lab at the University of Wisconsin. The Buddhist monks had been trained in the Tibetan *Nyingmapa* and *Kagyupa* traditions of meditation for an estimated 10,000 to 50,000 hours, over 15 to 40 years. Ten student volunteers with no meditation experience were also tested after one week of training.

In his report on this work, Marc Kaufman in *The LA Times-Washington Post* describes the procedure adopted. The monks and volunteers were fitted with a net of 256 electrical sensors and asked to meditate for short periods. Thinking and other mental activity are known to produce slight but detectable bursts of electrical activity as large groupings of neurons send messages to each other and that's what the sensors picked up.

Both groups were asked to meditate specifically on unconditional compassion. Buddhist teachings describe that state which is at the heart of the Dalai Lama's teaching, as the "unrestricted readiness and availability to help living beings."

Davidson found that the results unambiguously showed that meditation activated the trained minds of the monks in significantly different ways from those of the volunteers. Most important, the electrodes picked up much greater activation of the fast moving and unusually powerful gamma waves in the monks and found that the movement of the waves through the brain was far better organised and coordinated than in the students. The meditation novices showed only a slight increase in gamma waves activity while meditating but some of the monks produced gamma wave activity more powerful than any previously reported in a healthy person, said Davidson. This "dose response"—where higher levels of a drug or activity have greater effect than lower levels—is what researchers look for to assess cause and effect.

From the above it is clear that meditation activates the intensely loving and healing properties of the cosmos. This in turn releases cosmic energy in the meditating person. A profound example of this healing is to be found in music and dance such as *raga* music or Zen dance. The word *raga* itself translates as (cosmic) love. True to its composite nature the cosmos is said to contain 999 *ragas*, cosmic harmonies in which each *raga* or harmony is a melodic configuration that is like a *mandala* in itself.

When dance or music or any other creativity activity is practiced over a long period of time with concentration and inner intensity, a kind of meditative calm envelops the performer. In scientific terms, this increases the alpha levels associated with the calm, receptive state of mind to levels, which are not replicated even in sleep. Synchronisation of the two hemispheres of the brain happens and stress hormones steadily get lowered while the circulation improves. Levels of lactic acid, a by product of tension and anxiety, drop and both the heart rate and the blood pressure come down to normal levels. Besides the research done at Wisconsin several other studies have reiterated the major finding that those who practice meditation over long periods of time develop a strong immune system, have an improved memory and longevity, even in aged persons, improves.

In conclusion, we need to know what exactly is meditation and how it is to be practiced. Meditation is a deliberate suspension of the stream of consciousness that normally fills the mind. While there is infinite number of meditation techniques they all have one goal: to induce mental tranquility and physical relaxation, to de-stress the person meditating and to bring him/her closer to the self.

Though normally a beginner does take lessons in meditation, it is possible to teach it to yourself using books or videos and applying some basic principles. All you need is to believe in yourself and give yourself a few minutes of free time, maybe five to begin with to start with then increase to ten or fifteen minutes. As with everything else in life, the key word is practise and if you continue to practise the meditation technique that you have chosen, you *will* get there. A quiet environment, comfortable clothes and a comfortable sitting position, like sitting on a straight-backed chair, the classic meditating position, cross-legged on the floor or even on the bed is all you need to begin. Keep a watch on the spine, which must be erect throughout and keep the eyes closed throughout. Visual distractions chew up an enormous amount of our energy and should be kept at bay.

Begin by sitting quietly and breathing rhythmically and slowly. Different meditation techniques stress different paths from here on. One is to focus on the breath, watch it as it comes and as it goes out. Begin by focusing thought on the point just below the nostrils and above the upper lip. It is from this 'doorway', the '*nasika dwar*' that the breath begins its journey into your body and it is again through this route that it exits the body. If watching your breath does not excite you, focus on a religious symbol, a word or phrase repeated rhythmically. This word or a phrase is called a '*mantra*' in India and transcendental meditation is through this technique with a chosen '*mantra*' given to the disciple by the teacher.

The beginner will discover what the traditionalists mean when they use the word "*chalayeman*" to describe the mind. It denotes the mind's unstable, always moving, mercurial characteristic, jumping like a monkey from one thought pattern to another. When this happens, as it inevitably will for a long, long time, do not fight it. Observe it as if you were outside yourself and 'seeing' an activity that is happening to someone else. Over time, with practice, the mind will wander less and less and the span when the mind is perfectly in equipoise will gradually grow longer. Slowly but surely the meditative state will become longer, more natural and in time become a part of your being. But when that happens you will nearer to finding life's answers by yourself than at any other time in your life!



Kuttiyattam maestro Ammanur Madhva Chakiyar (88) engages the rasika with his drishti on his hasta mudra.

