

Krishnamacharya Healing and Yoga Foundation

Yoga Therapy Training 2007 – 2010

Stress and Yoga Therapy

presented by

Katja Bartl

STRESS AND YOGA THERAPY

"When I wrote the first paper on the stress syndrome in 1936, I tried to demonstrate that stress is not a vague concept, somehow related to the decline in the influence of traditional codes of behaviour, dissatisfaction with the world, or the rising cost of living, but rather that it is clearly a definable biological and medical phenomenon whose mechanisms can be objectively identified and with which we can cope much better once we know how to handle it."

Hans Selye

Introduction

Stress seems to be a common factor in our modern daily life. The term is used in a general way by most people, it is often cited as the explanation for many kinds of discomfort, especially when talking about illness.

In the course of the four-year yoga therapy training programme I was struck by the fact that the word "stress" came up again and again – either as a cause for disease, or as a contributing, accompanying or aggravating factor for various diseases, especially when, according to allopathic medicine, the cause of a disease is not known. Stress can be an impediment for healing as well. So, not being an illness in itself, it has a great role to play in the context of health and wellbeing. During my observations in two internships at the Krishnamacharya Yoga Mandiram in Chennai, India, I also had the opportunity to notice that most of the students there mentioned stress as one of their problems, or described themselves as being stressed. Very often that issue was dealt with by the care-provider either directly or indirectly even before addressing the main problem the student had come for.

However, the word stress in common usage does not have a clear meaning. It hides a lot of notions, but usually it is not clear what is actually meant by it. Most people use it to describe a feeling of being overwhelmed by responsibilities, tasks and expectations.

Nowadays many people seem to agree that our common life-style is stressful. Difficult conditions in the professional realm, like long working hours, or multitasking and the pace in which our life unfolds, are widely accepted ingredients of our modern lives. In everyday life most people would define themselves as stressed, in one way or another. Often stress accumulates over a long period of time, and may manifest as illness only much later. Many people manifest at least one superficial symptom of stress - nervousness, constant movement of fingers, stomach problems or simply difficulties in breathing normally and harmoniously.

In Italy where I live, recent research that was conducted by psychiatrists in Milan, demonstrated the impact of stress on the working population; they found that nine million Italians are affected by stress at their workplace, and seventy percent of them are women that divide their lives between work and family responsibilities.

It is easy to see that the causes for all this can be found in the domain of life-style, working conditions and the environment. Yet yoga teaches that the causes of illness or wellbeing do not lie outside oneself, but in the individual person, and especially in the realm of the mind. According to yoga and Ayurveda, the body will respond to the guidance of the mind.

All these ideas have made me realize the importance of the subject of stress. Even if the term "stress" is obviously not mentioned in old yoga or Ayurvedic texts, I feel that yoga can do a lot about it in the context of yoga therapy, and I have noticed also in my own practice that as yoga therapists we will be confronted with it continuously either in a direct or an indirect way.

Interestingly, stress as a concept did not even originally belong to western medicine but made its way into it in the last century. And when we look closely at the symptoms of stress, we can find a similar concept even in Ayurveda, where it is called "*prana prakopa*".

However, the concept of stress still seems quite a vague one, and a huge variety of meanings can be implied by this term. It covers a huge range of phenomena from mild irritation to all kinds of severe problems that can result in a real breakdown of health. Nowadays, the term is often used to describe more a state of mind than a physical discomfort, more in a metaphorical than in a literal sense. In this way, it could be understood as the indicator that demonstrates that illness is not an issue relating to the physical plane alone.

This paper is an attempt to explore this vast subject. I will trace the development of the understanding of stress in medical science to find out why it is such an important concept nowadays. I am aware of the fact that I am trying to mix two systems of health and healing which,

one could argue, should be kept apart. But since stress is such a common factor for many diseases, and since also people that look for help in yoga therapy use this term, I feel that it is appropriate to combine the two. Looking closely at what is understood by the term stress and examining its symptoms, we will see how yoga can be used to help with these. In the understanding of yoga as a therapy, as transmitted by the teachings of T. Krishnamacharya, when dealing with yoga for healing we do not examine the disease in itself, but the person who might be affected in some way by a disease.

After a short overview on the history of the concept of stress, I will explain what is commonly understood by this term and how stress can manifest in a person, as well as its link to illness from an allopathic point of view. After that I will give some short descriptions of the role of stress according to a few healing systems that include it in their approach to healing.

In the last part I will link the concept of stress to yoga, and give an outline of how we can work with it in yoga therapy.

History of stress research

It is not easy to find a consistent use of the word stress over the past centuries. Before the 1940s its use has been almost unknown outside the engineering profession. As Richard Lazarus describes in his book "Stress, appraisal and coping" (Lazarus 1984, p. 2), the word stress has already been used in the 14th century to mean strain. Then its meaning evolved from the idea of hardship in the 17th century to reflect some sort of force, pressure or strain; and it is this latter sense of the word that was then taken over into science and medicine. In an engineering analogy, stress had three components: the "load", that is the demand that is placed onto a structure; then "stress", the area affected by the load and the internal distribution of a force; and "strain" which describes the changes in form that results from load and stress (Lazarus 1999). It has been this model which perceives the body as machine-like, that has influenced the way that scientists, from the 19th century onwards, have introduced the concept of stress into medicine; and it is from this understanding that western medicine has developed its approach to illness over time.

Anyway, already in the 17th century the theory of Descartes about the mind's influence on the physical body (Hergenhahn 1992, p.98) was already a significant factor in the subsequent development of more refined theories of stress, or in general of the more holistic approaches in

medicine or psychology that followed later. This is precisely where yoga and other holistic systems can make an important contribution.

The idea that stress influences health was developed for the first time in the 19th century. The basic idea is that factors like environment or demands on individuals can create or contribute to illness: "The idea of the stresses and strains of modern life - the individuals' ability to cope with the pace of life - became an almost ritualistic belief in the nineteenth century, ... and in the twentieth century the pace of life was viewed as the root cause of much illness and disease." (Cooper 2004, p.2). Illness was then explained in terms of the relationship between a person and his or her environment.

Another important idea that developed in the 19th century was the concept of harmony in an organism. This means that the internal environment of living organisms has to remain fairly stable in order to function well (Cooper 2004, p.5). Nothing in the body should be allowed to deviate far from what is normal, otherwise the person will become ill. This is the concept that later evolved into the idea of "homeostasis".

Homeostasis in brief means that a body, in order to maintain its own consistency, continually adapts to inner and outer changes, compensating and neutralizing all kinds of disturbance. In order to do so it produces a number of reactions to counterbalance any input or change. Stress is seen as an outer disturbance, and the stress response is explained as the body's attempt to deal with it. This concept is still mechanistic (implying a simple functioning according to cause and effect) and reductionistic in nature (reducing complex life processes to simplistic components; Benson 2010, p.74); it implies that illness results from external agents, and health means to restore the body back to normal functioning.

But even if there have been earlier approaches that have considered stress as a factor for people's wellbeing, it was in the 20th century that stress became a more elaborate concept, mainly because of the work of Walter Cannon and especially Hans Selye, who was called "the father of stress".

At the beginning of the 20th century the American physiologist Walter Cannon paved the way for the introduction of a psychosomatic approach into medicine. He spoke for the first time of the two fundamental concepts that later contributed immensely to the theory of stress. One is the already mentioned idea of homeostasis, and the other is the so called "fight-or-flight-response", which means in Cannon's words that there is a reaction to "great emotional excitement" that is a preparation for action; either to attack (in the case when anger is prevalent), or to escape (in the

case of fear). Cannon perceived this response as a general pattern in any emergency situation, be it physical, social or emotional. He argued that the needs of the body in the fight-or-flight situation are essentially the same, and that is the reason why the reaction is the same (Cannon 1939).

Hans Selye then based his theory of stress upon this notion. His work concentrated mainly on the non-specific response of the body to any demand that is placed on it. In the 1930s he started his experiments on mice, and found out that every irritating substance that he injected into them provoked the same symptoms. The results of these experiments, together with the observation he had made years earlier as a medical student, that people with different diseases exhibit similar symptoms, brought him to the conclusion that any noxious agent would produce stress, which he defined basically as a failure of the organism to respond appropriately to a demand. (I will go more into detail about Selye's understanding of stress in the later chapter about stress).

What was still missing in Selye's concept, but came into discussion from the 1950s onward was the recognition that the onset of disease is not only a mechanical response to outer circumstances but is based on a communicative interaction between a person and its environment (Cooper, p.37). Consequently, stress research was introduced also into psychology.

In the 1960s and 1970s stress research was closely linked to psychosomatic theories. They tried to explore the variables that increased vulnerability to illness, as well as those factors which help to cope with illness. Psychosomatic medicine considers individuals as "ceaselessly interacting with the social and physical environment in which they are embedded" (Lipowski 1977, p. 235), providing thereby a more holistic view of health and illness. Along with this, it was recognized that even if the stress response was a general response to different stressors (meaning the factors that provoke stress), and the symptoms were not specific, not all individuals reacted in the same way to stress or the same stressors. There is a range of possible reactions. At this point the idea of "coping" and cognitive and emotional concepts came in, as they explained the individual's reaction to an outer (or inner) stressor not simply in a mechanistic and causal way, but included the differences that come about when the individual with its specific characteristics is taken into consideration.

So at about the same time the emphasis in stress research shifted towards the management of stressful encounters, and as a consequence a lot of self-help techniques began to appear, including recommendations of exercise, relaxation, meditation, biofeedback and more. They all had the "aim of providing an inner sense of energy and wellbeing, and thus a greater capacity for dealing with and building resistance to stressful encounters" (Cooper, p.102). All these approaches to stress

management are based on the idea that stress is not a direct response to a stressor, but rather that a person's resources and ability to cope mediate the stress response, thus allowing stress to be controllable.

From this premise many schools of thought have taken the issue further, but the important point they all share is the active role of the individual, and the influence of the individual's particular responses. Stress is not seen only as a mechanistic process any more, and the individual is taken into account, with all its cognitive, emotional, mental and environmental makeup.

One of the scientists who have worked on these mind-body interactions for healing, and especially in the field of stress management, is Jon Kabat Zinn who founded the "Stress Reduction Clinic" in Massachusetts where he introduced meditation and mindfulness training into the therapeutic programme to help people cope with stress, anxiety, pain and illness in general. In his centre, meditation and yoga are used to help people find their inner resources and achieve good health and wellbeing.

Another American scientist who in the 1970s contributed to the discussion about stress and how to deal with it, was Dr. Herbert Benson who discovered the "relaxation response" as being the body's opposite physiological reaction to the fight-or-flight response. I will come back to him and his work in the section about stress and disease.

Currently a lot of self-help material is available on the topic of yoga and stress or stress management, even on the internet or through books and dvd's. There are a lot of websites that promote yoga and meditation to combat stress. However, what they mainly promote are standardized exercises that are recommended for stress.

For example, on the website of the Mayo Clinic, after stating that yoga can be an effective way to reduce stress and anxiety, five exercises are listed that include a forward bend (uttanasana), the warrior 1 pose (virabhadrasana), neck movements, a seated twist (modification of matsyendrasana) and the cobra pose (bhujangasana), all of them presented also on video and with a detailed description on how to perform them.

Many of the popular techniques to reduce stress are derived from yoga. They include movement, controlled breathing, meditation, imagination and relaxation. It seems to be common understanding that any kind of meditation and yoga is helpful in reducing stress, as the above mentioned list of recommended asanas demonstrates. What can be found on this topic is either a general statement about how yoga in general helps to reduce stress, or a list of exercises that are recommended. What both do not take into account however, is the impact of the individual for

whom these exercises are designed; the unique and complex physical, emotional and mental constitution of a person, along with current problems, limitations and needs (in a wider sense) will have an important influence on how these exercises could or should be applied.

Over the last twenty years, a series of studies on yoga and stress management have been conducted, both in India and abroad (especially in the USA). Yet the very nature of the subject of stress with its difficulties of definition and empirical measurement renders research according to scientific standards almost impossible. It is difficult in this field to provide the parameters for assessment and reproducibility of a given situation. Often we are dealing with qualitative rather than only quantitative factors. Not everything in the context of yoga will work in the same way for everybody. Each encounter will have its own individual characteristics, and cannot be repeated with another person. Yoga itself has a vast variety of tools, that can be used singularly or combined in different ways.

Therefore I think that there is a need for a deeper examination of the subject. We need to understand that yoga is not only a physical practice as it is often presented in the west, and that it can not be used in a manual type style if we want to apply its tools effectively for healing. We have to examine in each case what kind of symptoms stress produces in an individual, and how they in turn influence that person. Therefore we also need to distinguish the various layers a person is made of from the point of view of yoga philosophy. When all of these factors are taken into consideration, only then perhaps will we be able to see how we can work with this otherwise confusing concept of stress in a therapeutic context.

What is stress and how does it manifest

To understand the concept of stress I will now present Hans Selye's theory of stress. Selye was an Austro-Hungarian endocrinologist who worked in the 1930s at Montreal University in Canada. The discovery of what he then called "stress" happened by chance. He carried out research with mice to find out how a hormone from their ovaries influences health in general. After injecting the mice with that hormone, he found that they all developed certain symptoms like peptic ulcers, enlarged adrenal glands and shrunken immune tissues; but the same symptoms would also occur in the control group where the mice were only injected with saline water.

That finding led him to carry out further experiments, and he found that all kinds of negative or challenging experiences produced the same set of symptoms, which he called the "general adaptation syndrome", and which later became to be known as the "stress response". He also remembered that as a young student he had noticed that many patients manifested a series of common symptoms, regardless of the specific disease that they were suffering from, such as loss of appetite, tiredness and weight loss. Selye recognized those symptoms as being a general physical and biological reaction towards a threat to the organism's physical integrity; they are a protective mechanism that brings the body back to its inner harmonious state, or homeostasis.

At around the same time the American physiologist Walter Cannon developed his theory of the "fight-or-flight-response" (see above). Both Cannon and Selye speak of a stereotypical reaction mechanism that occurs in the case of an outer threat to the body's state of physiological balance. Both theories are founded on the notion that in dangerous situations animals and also humans (at least in a former stage of their evolution, but we still function in the same way) have to quickly react and therefore mobilize some otherwise dormant potentials. That usually means activating the muscles (to be able either to fight or to run away), and therefore mobilize energy from its storage sites, while at the same time stopping other bodily processes that are not immediately necessary, like storage of energy, growth or repair.

This means that during the acute stress response all those processes in the body that are helpful for survival in a critical moment, are accelerated, like the increase of blood pressure, heart rate and breathing, whereas those processes that are not immediately required, such as growth, digestion, storage, reproduction and the immunity system, are slowed down. This gives us already a rough outline of the various possible symptoms of stress, as well as an idea of the bodily systems that will be affected by it. These symptoms may include high blood pressure, palpitations, sleeplessness, digestive problems, ulcers, skin problems, muscular tension and back pain, infections, infertility or impotence, irritability and loss of concentration, to name only a few.

In the normal course of things, after the immediate danger is over, the body should return to its normal functioning, and all the previously stimulated systems should come back to their normal rates. This is called the "relaxation response", and it lies in the domain of the parasympathetic nervous system, whereas the stress response is carried out by the sympathetic nervous system. Obviously, these two systems exclude each other; only one of them can be active at a given time. The sympathetic nervous system is that system in the body that mobilizes the body's resources during emergencies, when life gets exciting or alarming, and therefore is responsible to induce the

fight-or-flight response. It is constantly active, however, at a basic level to maintain homeostasis. The nerve endings of this system release adrenalin, and within seconds various organs respond. The sympathetic nervous system can accelerate the heart rate, widen bronchial passages, decrease motility of the large intestine, constrict blood vessels, cause perspiration, and raise blood pressure. A complementary role is carried out by the parasympathetic nervous system that promotes calmness and all vegetative activities of the body, like growth and storage. It is responsible for the activities that occur when the body is at rest, including digestion, defecation, urination, sexual arousal, salivation and lacrimation. The parasympathetic nervous system can take over after the response to an acute stressor is over. The problem is that over time, with prolonged phases of stress, the sympathetic nervous system is continuously shutting down the functioning of the parasympathetic nervous system and therefore the relaxation response, so that in time it gets harder for the body to relax and recover, even in those rare moments when no stress is actually occurring.

An interesting aspect of these two systems is that the sympathetic nervous system is stimulated during inhalation, while the parasympathetic nervous system gets triggered through exhalation – an interesting fact that I will come back to when discussing the importance of yoga and yoga therapy.

In the course of evolution, people with a quick and efficient stress reaction survived more easily in a dangerous environment; too much relaxation was not helpful further back in history. Some scientists say that this is exactly the reason why in the course of evolution those individuals that had a quick stress response at the first sign of danger were more likely to survive; so it is almost a genetic predisposition to have this immediate reaction to stress even nowadays rather than the opposite one (Bamberger 2007, p.24).

But the mechanisms to bring back the organism to its basic levels once the emergency situation is over, are also necessary, otherwise the body would be running on a high expenditure of energy all the time, and there would be no rest and reconstruction, and the long term effect of this might become stress related illnesses as mentioned before.

To sum up Selye's theory of stress we can say that the stress response is a generalized reaction of the body to a threat, and that stress resulting from whichever cause has always a physical, measurable reaction that is qualitatively the same but might differ in quantity. For Selye stress is a constant accompanying factor in people's lives because the inner balance of the human organism is constantly being threatened, and therefore we constantly experience stress responses to a greater

or lesser degree. In this context Selye also made the distinction between "negative" and "positive" stress, respectively called distress and eustress. Eustress can be described as the excitement about something that helps us to start new projects or carry out any creative task. Certain levels of eustress were seen to be a normal and healthy contributing factor to people's lives.

There is one more distinction Selye made that plays an important part in the field of stress research since. It has to do with the different phases of the stress reaction, or in other words with acute or chronic stress. This idea is important in relationship to illness, because the body, under the influence of acute stress usually returns to its normal state when the immediate threat is over, whereas the development of a pathological state can result from on going, unrelieved stress, or from a long period of continuous phases of acute stress.

In general, Selye talked about three stages: first the stage of alarm, when a stressor or threat is identified. This leads to the production of adrenaline and activates the fight-or-flight-response (carried out by the sympathetic nervous system, as we have seen before). The next stage is the called the phase of resistance in case the stressor persists. This is the phase where the organism tries to cope with the stress, and the body begins to adapt to the strains which in the long run will lead to the depletion of its resources. The third stage that follows is called exhaustion, where all the body's resources are finally depleted and the body is then unable to maintain its normal functioning. This in the long term will lead to an exhaustion of the immune system and disease will begin to manifest quite evidently.

At this point the stress response becomes more damaging than the stressor itself. As Sapolski states, the reactions in a stressful situation are usually very short sighted and costly for the body (Sapolski 2004, p.13), but they are necessary to respond efficiently to an emergency. So when stress is long-lasting, the body will have to pay the price. The consequences are manifold and affect all the different body systems. Actually, Sapolsky's description of the effects of long lasting stress go along this scheme of Selye, with the difference that what produces illness is not the depletion of the body's resources, but the effect of a long lasting stress response in itself on the various systems. What is meant to deal with an emergency, will have different effects when it is not stopped or continuously activated.

When energy is mobilized constantly at the cost of energy storage, there will never be any surplus energy; people will feel exhausted and will fatigue more easily. Constantly activating the cardiovascular system will lead to damage. As immediate processes are privileged against long term processes, no damage will be repaired and growing processes are slowed down or even come

to a complete stop. Immune reaction is suppressed, and in the long term people are more affected by infective diseases and have less resources to combat them.

As the stress response has an influence on all bodily systems, it is easy to see that prolonged stress can be harmful to all of them.

Stress can thus become harmful on two occasions. One is when the stress response is turned on too frequently and repeatedly, and the other is when the stress response cannot be turned off at the end of a stressful event. But we should not forget one important thing: while frequent or chronic stress can make people sick, it does not automatically lead to illness. This can occur, but it is here that the influence of the individual can determine the way he or she will respond to stressful situations.

When talking about stress nowadays, we have to consider a more complex situation than that which has been described so far. Stressors are not merely dangerous situations in our environment any more. We have to include psychological, emotional and mental stress as well, as they can have the same effect as the original fight-or-flight reaction. There can still be situations where we need to mobilize an immediate physical response. But very often stressors are of a different character. What is stressful today can simply be the anticipation of a stressful event, a huge workload, competition, or emotional and mental stress as much as external physical influences. Any change to the usual course of life can provoke stress, such as major life events.

Some researchers sustain that literally everything in this world can take the role of a stressor and provoke stress (Bamberger 2007, p.19), from very light changes in our daily routine to very powerful events or situations that really do threaten our physical or emotional existence.

Physiology of the stress response

I will now outline in detail the major effects of the above discussed stress response on the organism, divided into the main body systems, following the description of the role of stress in the evolution of mankind and the various possible consequences on the different body systems as given by the American biologist and neurologist Robert M. Sapolsky in his book "Why Zebras don't get ulcers" (Sapolsky 2004).

Hormone system

In times of stress a number of hormones like adrenalin, noradrenalin and glucocorticoids are released by the sympathetic nervous system and the brain. They are essential for mobilizing energy and thus vital to a correct stress response. Adrenalin and noradrenalin act within seconds, and glucocorticoids support this activity over the course of minutes or hours. Other hormones are activated as well, like those that help suppress reproduction (for example prolactin that is secreted by the pituitary gland), or substances that help to blunt pain perception.

While some glands are activated, the functioning of other hormonal systems is inhibited during stress, for example those that are responsible for the release of growth hormones or others involved in the reproductive process. Stress hormones such as cortisol and adrenalin increase the heart rate, blood pressure and breathing rate, and shut down metabolic processes such as digestion, reproduction, growth and immunity. Constant stress causes continuous release of these stress hormones which in the long term can have a negative influence on reproduction and body growth, digestive and reproductive cycles, and other metabolic processes.

Under stress that lasts for a long period of time, there can also be one more reaction besides the obviously negative effects of the stress response, which is called "adrenal fatigue". It means that the adrenal glands that produce hormones to help deal with stress, get fatigued over time. As a consequence the production of cortisol slows down, and stress can not be dealt with any longer in an efficient way.

Cardiovascular system

In the case of a physical threat, when a person needs to activate the stress response, the blood flow is increased, the heart beat is raised, the kidneys work more to reabsorb liquids and store them in the body. The effect on the blood returning veins is that they are constricted and therefore become more rigid to allow the blood to flow through them with greater force. As a further consequence the blood also returns to the heart with more force, distending its walls more than usual. At the same time, as blood circulation is increased and directed to the muscles, it is decreased towards less essential parts like the digestive tract or the skin.

The cardio-vascular stress response makes the heart and blood vessels work harder for a while, but if it lasts too long, it will lead to hypertension, rigidity of blood vessels and the thickening of the heart muscle. Another consequence and cause for cardiovascular disease is that the increased blood flow through the blood vessels can cause damage at those points where they are divided,

from larger into smaller ones. This damage can occur throughout the body at branch points in the arteries. At the inner lining of these vessels little craters of damage can form, and the result is an inflammatory process, that in turn can cause cells of the immune system to aggregate at those sites. Because during stress the blood is enriched with fat and glucose, they can also cluster together at those points, with the risk that they might be releasing plaques in other moments and increasing thus the risk for atherosclerosis and stroke. Even heart attack is more likely to happen in a heart and vascular condition that has been weakened in the way described above over a long time by stress. In a moment when further stress is added, the coronary arteries might constrict and not allow any flow of blood towards the heart because they are already clogged.

Metabolism

When activating energy and its flow to the muscles, the body must take it from its storage places – fat deposits, liver or non-exercising muscle. One of the consequences of this process can be the undernourishment of the muscles during a longer period of stress. Another negative consequence is that there is too much fat and glucose permanently circulating in the bloodstream, leading to cardiovascular problems, as described in the previous section. This is also important with regard to diabetes. As one of the consequences of the stress response is that energy is not stored anymore, fat cells become insulin-resistant, or the insulin present is not enough to store fat and sugars in the body cells, especially as its production is also inhibited by the stress response (by stopping storage). So in a person who is at the threshold of diabetes, a period of stress can cause the illness to manifest.

Digestive system

Stress can have two different effects on the consumption of food. In some people stress leads to a loss of appetite, in others it increases food intake in a mechanical and mindless way, depending on the different hormones that are secreted. In the first phase of a stressful situation, it is mainly glucocorticoids that are released into the bloodstream. As often daily stressors are small and frequent, this is what is secreted mainly, and its effect is to increase the appetite, which makes people likely to eat more than they need, leading potentially to obesity or weight gain. Another effect of the stress response is increased motility of the intestine (to get rid of excess weight in an emergency situation), which means that liquids are not absorbed sufficiently, and the

result could be diarrhea. Also IBS (Irritable Bowel Syndrome) is one of the stress-sensitive disorders because it involves the colon being too contractile.

(Interestingly in this context, research has demonstrated that traumatic stress early in life, like abuse or natural calamities, greatly increases the risk of IBS later. This implies that childhood trauma can leave a vulnerability, a large intestine that is hyper-reactive to stress later).

One of the main digestive disorders connected with stress are ulcers. Ulcers were one of the symptoms that already Selye had noticed in the mice he did his experiments with. Since then, peptic ulcers have emerged as the most recognized disorder by a broad public as being a stress related disease. In long lasting stressful periods there are frequent times when digestive processes are inhibited, and in the case of the stomach this means saving energy by impeding the normal constant thickening of its walls which is done to protect against gastric liquids that are used for digestion. When the stressful phase is over, the stomach walls are thinner, but acid production starts as normal again. After a few cycles of this, an ulcer can easily form. This means that the formation of ulcers do not so much happen during acute stress, but rather in the following recovery phase. This implies that frequent stressful periods are more dangerous for the formation of an ulcer than one long and continuous period.

Another reason for the formation of ulcers is the decreased blood flow towards the stomach (which is a non exercising muscle) when the stress response is activated, and consequently less of the accumulated acids are being flushed away.

Reproductive system

In the general description of the functioning of the stress response we have already seen that reproduction is one of the processes that are inhibited in order to divert the body's resources to areas where they are immediately needed in an emergency.

In men, during stressful times the production of testosterone, the principal male sex hormone that is responsible for normal sperm development, is slowed down. Problems like impotency and premature ejaculation arise in periods of stress as it is the parasympathetic nervous system that needs to be active for normal sexual activity; but in moments of stress it is inhibited by the functioning of the sympathetic nervous system.

In women, where the reproductive process is more complex than in men, the delicate hormonal balance can easily be interrupted in stressful situations, as research has shown (Sapolsky 2004, p.131). Lower amounts of reproductive hormones during stress can disrupt the menstrual cycle

in its various phases, influencing ovulation, the building of the uterine wall, or the regularity of periods.

But stress also has an impact on sexual desire in general in both men and women, as well as on a possible disruption of pregnancy (miscarriage), as blood flow towards the uterus may be reduced in cases of prolonged or high stress.

Immune system

The effects of stress on the immune system differ slightly from those on the other systems that I have described so far. While in the systems already described there is a general redirection of the body's resources in response to an emergency situation to where they are immediately needed, in the case of the immune system something different happens: in the first phase of acute stress immunity is boosted, and therefore its activity increased. But very quickly its responses decrease, probably to avoid autoimmunity reactions. So in phases of prolonged stress, the body's immune system is eventually suppressed. It usually returns to normal levels, yet if a person continues to be exposed to stress, then the level at which the immune system stabilizes will be lower than it should be. An inhibited immune response slows down the recovery from illness, and the suppression of this system increases the risk of infections and also cancer.

On the other hand, if the first phase of increased immune response continues for too long, as in the case of on going stress, the recovery phase no longer takes place, and a person is likely to develop an autoimmune reaction because of the altered state of the immune response.

Apart from these systems, research on the various physiological functions of the body confirms that stress has an impact also on the perception of pain, on memory (due to damage in the brain after prolonged cortisol circulation), on sleep and on the aging process, as well as being a cause of depression (Sapolsky 2004).

This shows that there are many illnesses and diseases that may be directly linked to stress as a cause; in addition there are those conditions for which stress may not be the primary cause, yet can be an important contributing factor, as in the case of borderline diabetes and others that can more easily emerge in a stressful period.

All the described phenomena are not to be simply taken as what necessarily needs to happen under the influence of stress, but they describe what can happen. As the more recent approaches to stress

research like coping, perception and appraisal have shown, the response to stress is not only a mechanistic procedure. The physiological stress response is modulated by many factors, including psychological, emotional and cognitive ones.

Research findings also show that the stress response diminishes when there is an outlet for frustration or the accumulation of stress, like any activity that is experienced as positive and that also distracts from the stressor itself (Sapolsky 2004, p.255). One of the potential outlets (besides creative work or imagination) was found to be movement or exercise in general. This makes sense when we remember that the stress response was once a reaction to an immediate physical threat, and all those parts are activated that would allow for either aggression or flight. In this sense, physical movement will help consume the surplus of energy and therefore bring that reaction down, because the activated energy in this case is utilized.

Mental or emotional stress

So far I have mainly given a description of the physiological stress response of the body. But as mentioned before, stress does not only originate in physical strain, but can have its source in other realms as well. It can be caused by a variety of mental or emotional conditions, like pressure at work, an impending important event, relationship problems or the death of a family member. Any major change in life, positive or negative, can result in mental or emotional stress, mainly depending on how we interpret that event. In today's world, physical stressors are no longer the most common cause of the stress response; mental and emotional factors are much more common today. However, for the organism it does not make any difference if a stressor is material (illness, injury, difficult environment) or psychological (inner conflict); it will simply react in the same way.

If stress of a mental origin is allowed to last for too long, also temporary states of mental illness may occur, like depression, panic attacks, fear, anger, low self-esteem, burnout, loss of interest, or a nervous breakdown.

Mental stress can more easily be ignored than physical one, yet it can have the same harmful impact on the body and a person's life.

The connection between stress and disease

The interrelatedness of body and mind that holistic health systems proclaim, means that stress can contribute to, if not cause, any physical problem. Conversely, physical illness and injury can contribute to stress. Together it leads to a cycle of stress – illness – more stress – more illness. Reducing stress can help to maintain or re-establish a more balanced state, and therefore allow the body to heal better by itself. On the mental level it can help to deal with a disease in a better way, and therefore reduce suffering.

In the western world around fifty to seventy-five per cent of all consultations with a health specialist stress plays a major role, and it is a higher risk factor with regard to mortality than smoking (Servan-Schreiber 2006, p.15). The most commonly prescribed categories of medicines are those connected to stress: antidepressants, tranquilizers, sleeping drugs, antacids, high blood pressure medicines or those for high cholesterol levels.

In this chapter I will explore some approaches to illness and health from the point of view of a few health systems, both western and eastern, that include an approach to stress that may be shared also by yoga therapy.

Psychosomatic medicine

This is one of the first complete systems that include the importance of the mind for processes in the body. In the 1920s this branch of western medicine became established as an interdisciplinary field to study the connections between social, psychological and behavioural factors and their influence on bodily processes and wellbeing. One important idea is that the mind has a strong influence on physical processes, and that bodily symptoms can therefore be related to mental or emotional processes as well.

Psychosomatic illness originates with emotional stress or damaging thought patterns, but can have physical symptoms. One of the first scientists to do a lot of research in this sector, was the Hungarian psychoanalyst Franz Alexander (1891 – 1964) who linked unresolved unconscious conflicts that led to chronic emotional tensions with specific somatic disorders (Cooper 2004, p.40), especially those that did not have a clear cause, like hypertension.

In the field of psychosomatic medicine, stress is recognized as a major influencing factor in the different phases of physical illness (as onset, presentation, maintenance and resolution). In modern

society, psychosomatic aspects of illness are often attributed to stress, making its remediation one of the important factors in treating or preventing illness.

Dr. Herbert Benson's Relaxation Response

The American cardiologist Herbert Benson is the founder of the "Institute for Mind Body Medicine" at the University of Massachusetts. He was one of the first western physicians to bring the idea of spirituality and healing (in a more profound sense) into medicine, and his institute has done extensive research work for over forty years on the ways stress can have an impact on health, while also developing treatments to alleviate it.

Benson found that there is an exact opposite reaction to the fight-or-flight response in the body, which he called the relaxation response. It includes a decrease in blood pressure, lower pulse rate, diminished respiratory rate and an improved sense of mental and spiritual wellbeing. It is suggested that the body can be influenced by meditation, breathing techniques and yoga to bring about this reaction. The first experiments in the 1970s were done with practitioners of a particular meditation technique (Transcendental Meditation), and they showed that their metabolism, rate of breathing and heart rate decreased during meditation, and that they had slower brain waves (Benson and Proctor 2010, p.57). What Benson found to be the two basic steps in all the techniques that stimulate the relaxation response are the repetition of a sound, word, prayer or movement, and the passive setting aside of intruding thoughts while returning to that repetition. From the earliest studies up to the present, Benson's work shows that using the mind in a certain way to elicit the relaxation response, physiological changes occur that can be useful in countering the harmful stress response.

When we acknowledge that physical health is dependent on thoughts, feelings and behaviours, then it is also true that they in turn can influence physical wellbeing. This approach leads the individual to take control of their lives, and to use their own inner healing power to reduce stress and other negative behaviour or thoughts, and therefore to maintain or regain health.

Dr. Benson has been struggling to provide scientific proof for his approach, and thus has had to use reductionist models of health and illness himself, even if he was well aware that the processes that he tried to describe were much more complex. By doing so, he discovered some interesting results: "A certain mind body treatment may help hypertension, depression, or insomnia. At the same time, this treatment will counter the *overall* physical and mental manifestations of stress through the calming of brain activity and altering hormones and gene expression" (Benson and Proctor 2010, p.216). This Mind-Body-Medicine can be complementary to medical treatment,

and it provides that part in which the patient can actively participate in the process of healing or preventing illness.

In his last book, entitled "The Relaxation Revolution", Benson takes his mind-body-approach one step further, beyond the body and the mind, to include also a spiritual or religious component that can enhance the potential for healing. He describes this spiritual attitude (to life in general) as "letting go", "submitting to a Higher Being" or "surrendering", thus putting the human will with all its anxieties and uncertainties in a second place. "Physiologically, 'letting go' breaks the connection of the body and the mind with unproductive, stressful thought patterns and responses, and opens the door to the relaxation response and all the healing potential that it can provide" (Benson and Proctor 2010, p.223).

Hamer's New Medicine and other related theories

In the 1980s, the German physician Ryke Geerd Hamer developed this approach to illness and especially cancer. He is a controversial figure in the field of medicine, yet his theory is interesting with regard to the onset of an illness and its link to stress. His interest in this subject started with a tragedy that occurred in his family. His son was shot in a strange incident while sleeping on a boat. Soon afterwards, he himself developed a cancer, despite having been very healthy before. His conclusion was that the tremendous shock of the death of his son had led to the cancer, a hypothesis on which he conducted a lot of research in the following years. (Hamer's theory is based on observation and case studies alone, and one of the criticisms in the medical community has been the lack of scientific proof.)

In his view, in a situation of immense shock the stress is so great that the body loses all its normal capacities of control and adaptation, but body and brain nonetheless have the task to deal with the stress, and activate corresponding areas in the brain and tissues in the body where the illness then can develop, mainly in the form of a cancer.

The onset of illness in this sense corresponds to an immense shock or stress, in which the biological limit of functioning is reached and exceeded, and illness is the bodily expression of that, due to lack of other immediate solutions. This limit is called the "threshold limit value" (Bertoli 2010, p.83); it is important though to remember that this value is individual and differs for different people: while "normal" stress is recognized by the brain, there is also acceptable stress (that is still recognized by the brain as such, yet the brain is able to cope with it, even if not in complete normality) and non-acceptable stress that the brain reacts to in a negative way because the limits that it is used to respond to, are exceeded by far. This means that there is a physiological

limit that should not be exceeded, otherwise there will be more or less important consequences on our biological functioning. Stress in this sense can be measured based on the activity of the sympathetic and parasympathetic nervous system. In normal stress, there will be a balance between the two, with alternating phases. In a moderately stressed person there will be a predominance of the sympathetic nervous system, that can recover only from time to time activating the relaxation response. In this state a person can function even over longer periods of time. When it comes to non-acceptable stress however, all values are so high that the brain will consider this situation as great danger for the individual's integrity (Bertoli 2010, p. 83/84). Based on Hamer's theory of the shock at the beginning of an illness, there have been approaches that have taken this idea further; for example research into the psychological causes for an actual symptom or the differentiation between conscious and unconscious stress, as could be presented by an event that happened during childhood, widening further the discussion about stress and its consequences on health: causes for stress and resulting illness can therefore be real, imaginary, symbolic or even virtual (Bertoli 2010, p.85/86).

The new medicine of emotions

In 2003 the French neurologist and psychiatrist David Servan-Schreiber has presented an approach in which he tries to unite his background in western psychiatry with a new and unconventional holistic view of healing. He works at the University of Pittsburgh in America where he is the cofounder of the "Center for Complementary Medicine".

His approach is based on the discovery of the "emotional brain", a part of the brain that has a different structure and functioning from the rest of the brain (which is called the cognitive brain), and which works independently from it. This part of the brain controls all those functions that are responsible for wellbeing and a large part of the body's physiology, such as heart beat, blood pressure, release of hormones, digestion and immunity. It is primarily concerned with survival. It is also called the limbic brain, and in the evolution of the brain it came before the development of the neocortex or cognitive brain.

Logic, language or rationality do not have their origin in this part of the brain, and therefore it is much more easily influenced through the body. The limbic brain "knows" the body much better. Emotional problems or stress have a direct influence, through this emotional brain, on the physiological functioning of the body. Under extreme stress the cognitive brain can be "switched off", and it loses its capacity to determine people's behaviour, while reflexes and instinctive

behaviour suddenly arise. This is the reason why the typical stress response is triggered in moments of emergency or stress (Servan-Schreiber 2003, p.19)

One of the main concepts in Servan-Schreiber's work is called "emotional intelligence". Based on the work of Daniel Goleman, it is a broader concept than that of the classical intelligence quotient IQ because it includes the knowledge and management of emotions for the measurement of intelligence as well. It has been found that this kind of intelligence is mainly responsible for general success in life and that it leads to the reduction of stress and to health and wellbeing (Servan-Schreiber 2003, p.29). Emotional intelligence comes about when both parts of the brain work harmoniously together and create a balance between direct, instinctive reactions and rational ones. The limbic brain supplies the energy and indicates the direction for an action, while it is the cognitive brain that regulates its execution.

Furthermore, the emotional brain has a direct link to the heart. When there is imbalance in the emotional brain, the heart also suffers (Servan-Schreiber 2003, p.50). But the opposite is obviously also true; the heart can influence the emotional brain. In our common understanding we talk about the heart being the seat of the emotions, and this seems to be confirmed by science which even speaks of the heart as a little brain (because of a network of thousands of neurons) that is capable of perception and reaction on its own. In addition, it secretes hormones that directly influence the brain. So the significance of the heart for the emotions is not only metaphorical, but the heart really perceives and feels; and when it does so it influences the physiology of the whole body in a positive way (Servan-Schreiber 2003, p.52).

Thus one of the ways to influence the connection between the heart and the brain, and to work directly on the physiological consequences of stress or tension, is called the "coherence of the heart". It is based on the way that the autonomous nervous system with its two complementary parts (sympathetic and parasympathetic nervous systems) works. Usually the two of them work alternately, and according to which one is active at a given moment, the heart beat will accelerate or slow down. The variability of these ups and downs is normal, and also important for health; when measuring the heart frequency there is a constant physiological change in it. It is called coherence when the differences follow a regular pattern, which means that the heart adapts perfectly to little stimulants in either direction, and it is in balance between stimulation and relaxation. It has also been shown that this coherence state can be provoked by pleasant thoughts. And it has been shown that without this coherence, disease linked to stress can develop much more easily. Coherence training therefore involves techniques to help the parasympathetic nervous system to work well, and to return the body to harmony after a stressful stimulation (Servan-Schreiber 2003, p.60/61).

The contribution of this approach to the field of stress is interesting, because it does not search for the solution to stress outside the individual (by changing outer situations or stressors), but in the capacity to deal with it from the inside. Wellbeing will arise automatically if a person is able to bring about the coherence of the heart by controlling physiological changes within, even if the outer situation is not changed at all. It represents a way of learning how to live with exterior stressors, without letting them disturb the inner stability of a person.

What is promoted by this approach is not only a relaxation technique, rather an approach to behaviour that can be integrated in daily activities; yet it is derived from eastern techniques of meditation or yoga. The method has been used and tested in California in the Heart Math Institute. The first steps of the technique comprise concentration on the breath (which has already been shown to stimulate the parasympathetic response and thus to lead to physiological calm), followed by visualisation of the heart region and positive concentration on it. The effects of this simple practice are a positive feedback towards the brain that physiologically the body is well. The limbic brain in response will send positive signals to the heart, and the coherence is enhanced. This balance between heart and brain stabilizes the autonomous nervous system, thus preparing a person to react better in any situation.

The author and his team have also found that people who regularly practice yoga or meditation can reach the state of coherence much more easily and quickly, as if the regular practice has had an impact on the general physiological responses of the body (Servan-Schreiber 2003, p.76).

Another interesting aspect when dealing with stress is the importance of exercise. In many research studies it has been found that exercise is generally helpful in dealing with anxiety and stress. A person can cope better with stressful situations, and the killer cells of the immune system do a better job when there is regular exercise, while they are usually reduced in number during stress (Servan-Schreiber 2003, p. 183). This positive effect of movement may be due to the natural production of endorphins that provide us with a sense of wellbeing and stimulate the limbic brain (which has a large number of endorphin receptors), which in turn activates the immune system where more killer cells are produced.

With regard to the above described concept of coherence, people who exercise regularly also seem to stimulate both the parts of the autonomous nervous system more often and therefore train the heart to variate more, which has a good effect on general health.

There are four factors that are important with regard to effective movement or exercise, and it is here that we can find an interesting link to yoga practice as well. Firstly, regularity; it does not have to be long, but regular (Servan-Schreiber 2003, p.193). Next, a person should always respect his or her limits and not push beyond them. In time these limits will change. In addition, it is more

motivating to start in a group of people with whom to share this experience. And lastly, a person has to like the exercises.

The techniques that are used by this school comprise, apart from exercise, breathing and positive use of the imagination, acupuncture, the simulation of sunrise and dietary recommendations. All of them aim at the activation of the innate forces of self-healing, mostly through activating the parasympathetic nervous system that in turn has the capacity to calm and heal the organism deep within (Servan-Schreiber 2003, p.260/261). This approach is not a specialist or mechanistic one, but it looks at the manifestation of an illness in a wider sense. The same importance that is given to physiological processes when dealing with diseases is also given to life style, diet, presence or absence of stress and the environment, because all of them together make up the complex situation of an individual person. What is important in the treatment of an illness is to develop a strategy that includes all the various factors, and that the effect of it has to be stronger than the illness itself. If we can access the core of the emotional being and re-establish its coherence, then the organism will heal itself.

I have chosen these theories for this chapter because they all provide some interesting ideas that we can also find in yoga or Ayurveda, and they show that in recent years a lot of new research into these fields has been done even by western science. One of the most important underlying ideas is that living organisms have the power to heal themselves, once the right environment is provided. Living organisms tend towards an inner balance (homeostasis), and can purify themselves

In general, today I think we can say that even in the medical profession in the west there is a greater openness to complementary health and healing systems. Prevention and healing in a broader sense has gained importance against the practice of curing symptoms; and other holistic medical systems like Ayurveda, Chinese medicine or acupuncture have established themselves besides allopathic medicine, especially when dealing with chronic disease, or in situations where the relevance of the mind in the disease process has been recognized. Yoga has also found a place in this list (Dalmann 2007).

Yoga and Ayurveda as health systems

"Healing is as ordinary a human experience as it is mysterious.

From the moment of birth, we suffer discomforts, diseases, and injuries. Whether these are episodes or chronic conditions, whether minor or life threatening, there is an inner power of recovery and restoration at work – even up to the final moments of life. Healing is a natural gift. The quest to understand, awaken, and enhance this gift, both in ourselves and in others, is among the more self-interested and generous human efforts." (TKV Desikachar 1998, p.121)

In this chapter I will take a closer look at yoga and Ayurveda and the contribution they can give in the field of stress and its management, following on from the western approaches that we have already examined.

Yoga and Ayurveda are two closely linked spiritual sciences that originate in the Vedic tradition of India. While Ayurveda is the Vedic science of healing of the body and the mind, yoga is the Vedic science of self-realization that builds on a well-functioning body and mind. Both share a number of basic concepts about the functioning of the body and the mind, and they emphasize the self-empowering aspect of their practices and treatments which is particularly relevant to the subject of stress and our understanding of its origins and possible approaches to treat it.

Ayurveda

Ayurveda has its roots in the *Samkhya* philosophy (one of the six philosophical schools in India that developed over the centuries), and it shares its basic ideas about the dual nature of life as expressed by the concept of the interplay of *purusa* (the Self) and *prakriti* (matter). Everything in nature is made up of the five elements earth, water, fire, air and space. These five elements form the material reality of the universe. In a living body, they take the form of the three humours (*vata*, *pitta* and *kapha*) for the performance of all physical and mental functions (Verma 2001, p.24). For Ayurveda health is order, or balance of all the body's functions and systems, whereas disease is disorder or imbalance. "When the balance of any of these [bodily] systems is disturbed, the disease process begins. [...] Thus imbalances of the body and mind are responsible for physical and psychological pain and misery" (Lad 1984, p.37). Health is seen as the interplay of external

and internal factors, and the processes of both disease and healing involve the whole human being, not only that part of it in which a disease manifests.

Ayurveda as a holistic science considers how any disease or imbalance is expressed in the complex human being, and which layers or parts of it are involved. It covers all aspects of health and wellbeing, including the physical, emotional, mental and spiritual planes (Frawley 1999, p.4). "Like the rest of the Hindu tradition, this system of well-being does not believe that body or cosmos works like a machine and time is linear. The cosmos is an ever-changing dynamic whole and so is the human body. Time is cyclic. For treatment and cure, [the] body cannot be taken in fragments and an individual should be treated in all physical, mental, social and spiritual contexts" (Verma 2001, p.25).

As mentioned in the introduction, in the context of Ayurveda there is a condition that could be compared to what is called stress in western medicine. It is called *Prana Prakopa* or *Vata Prakopa*. The word *prakopa* in Sanskrit means that something is very angry or disturbed, and *prana* or *vata* indicate that the element "air" is involved. This is an interesting factor because "air" is considered to be linked to movement, it is "the subtle energy that governs biological movement" (Lad 1994, p.29). As such it is related to the neurological system and to all those processes in the body and mind that involve movement or processing, like for example digestion or creativity. When this element is vitiated through choices we make in our life (like life-style, food, company, work situation or attitudes), the element of air gets disturbed in the system because it is constantly provoked or stimulated. This stimulation builds up over time, until it leads to illness that is mainly neurological in nature, and symptoms may include: sleeplessness, anger, trembling, dry skin, wrinkles, belching and bad digestion, disturbed menstrual cycle, disturbed breathing, bad smell in the mouth, IBS, accelerated heart rate - the same symptoms that we have already observed for stress.

Yogic texts suggest that one should work mainly with pranayama on these conditions, because by doing so *vayu*, the element of wind, can directly be influenced. The breath should become calm and smooth, and because of the strong link between the body and the breath all body functions will also calm down.

This is interesting when working with yoga therapy because it can give us a hint on where to work with a person who has problems with stress in the framework that Ayurveda provides.

Yoga

Traditionally in India, Ayurveda and yoga are closely linked sciences. In older times, Ayurveda was studied before yoga because it deals mainly with the body, and only when the body was fit and healthy, a person was ready to take on the deeper studies of yoga that were mainly spiritual in character. Yoga was considered to bring a person to a natural state of balance (as described in Patanjali's Yoga Sutras and other texts like the Hatha Yoga Pradipika), and had thus preventive and curative value.

Most of the ideas in yoga physiology are derived from Ayurveda. The main concepts of relevance here are the idea of the three *dosas*: *vata*, *pitta* and *kapha*, and the concept of *prana* as the life force (not just the air that we breathe). Each of the three *dosas* has certain characteristics, and when in imbalance, can either be too much or too little for a proper functioning of the organism. So when taking the step from yoga to yoga therapy, this can be useful in determining the kind of practice that we want to use, and the area of the body that we want to focus on (in correspondence with the seat or functioning of the *dosas*).

Yoga as a health system does not replace other forms of therapy or treatment, but it compliments them. As it is not invasive in nature, it can accompany other forms of therapy, to bring support and balance and to facilitate the body's own capacity for self-healing. In yoga, the patient or student takes responsibility for his or her healing and does not delegate it to a specialist. In an interview, TKV Desikachar described the part yoga can play in healing in the following way: "Yoga helps the entire system of a person to function better, and when this happens, the effects of medicines or other treatments in general get intensified, the need of medicines is reduced, the person's trust grows, and subjectively he or she feels better. It is in this sense that yoga contributes to a positive evolution of illness ... Yoga is not a medicine, it is a discipline. And as a discipline it helps to improve the state of wellbeing." (Almini 2002, p.144)

I will now look at some of the definitions yoga and Ayurveda use for disease and health to provide an idea of how yoga and yoga therapy can give their unique contribution to the treatment of illness, like for example the effects of stress.

Dukham

The word *dukham* is usually translated with suffering. Its meaning however, is much more specific. "*Kham*" describes the (small) space in the heart, and "*du*" means a tight feeling. *Dukham*

therefore is the tight feeling in the heart, something that is not pleasant, the opposite of *sukham*, which means the expansion of the heart and comfort. What seems important in this definition is that it does not mention a condition or disease, but how we feel about that condition. This is what defines illness. We can feel either *dukham* (suffering) or *sukham* (comfort) in any given situation; *dukham* is when we feel unwell, *sukham* when we feel well, even if the body is unwell. The same situation might therefore be *dukham* for one person, and *sukham* for another.

Apart from this individual perception of suffering, the concept of *dukham* seems interesting when we think of the effects caused by stress. A person under the influence of stress will contract and feel under pressure instead of free and open.

Vyadhi

This is a word that appears in the Yoga Sutras of Patanjali (YS 1.30), and it is commonly translated as illness. It is something that affects the whole system and that can be expressed on all levels. Usually any imbalance in one of the body's systems, structures or faculties is called disease, as according to the definition "*dhatu (structures) rasa (liquids) karana (senses) vaisamyam (imbalance)*".

Again it reveals an interesting meaning when we look at the sanskrit syllables of which it is composed. "*Adhi*" means the clarity in the heart or self, and "*vi*" means a separation; *vyadhi* therefore is a disconnection from our self.

In relation to stress we have seen that there is a lot of imbalance in the various systems during the stress response. A number of chemicals and hormones are released and accumulated in the body which obviously alters the delicate balance of the human system.

In the wider sense of the word *vyadhi* we can also see the pressure from outside in a stressful situation that shifts a person's attention from the self to another identification.

Roga

Another sanskrit term that is used to describe illness is *roga* which means the breaking up of strength or an uncomfortable feeling from which we want to get away. Again it is more the feeling than a set condition that defines illness.

This again can relate directly to stress and its effects on the human system, as it erodes a person's strength and can break up the connection to the real source of strength inside.

Svastha

In Ayurveda mainly the concept of *svastha* is used to describe health or wellbeing. "Sva" is the self, and "stha" means to stay with it. So health is when we connect with and relate to our self, whereas usually we attach ourselves to projections and identifications. The underlying idea is that when we attach too much to those identities, we get sick.

In yoga and Ayurveda there are three categories of illness, and they can give us another helpful tool to understand stress and to work with it. The first is called *adhyatmika*, and it refers to that kind of illness that comes from within, where the patient is responsible for the illness, on a physical, mental or emotional level (like for example smoking that leads to cancer). This is quite easy to deal with, because the person can take responsibility for it by making the according changes. In the case of stress very often this category can be applied, at least in part as seen before, because there is always an inner elaboration of the stressful situation, and the unique reaction of an individual is important.

The next category is called *adhibautika*, and its cause lies outside the person (like a dog-bite for example), where there is little space for responsibility or even choice. Referring to stress, here we can talk about those outer life or work conditions that cannot be changed in themselves.

The last one is called *adhidaivika* and includes those situations that are beyond control, like natural calamities, that can also provoke a lot of stress.

The last two categories are difficult to deal with, as often these outer circumstances can not be changed, and the cause for the disease is not in the control of the individual, but yoga can still make its contribution to help change people's attitudes towards outward situations and thus cope better with them.

The *Panca Maya* Model

This model from one of the early Upanisads, the Taittiriya Upanisad (around 700 BC), explains the human body as being not only a physical or material entity, and therefore provides a basis for the holistic approach of the Indian healing traditions. It is also in this text that the word yoga appears for the first time when describing the 5 *kosas* (layers) that all living beings are made of. From gross to subtle, the five layers are: *anna maya*, the physical body, then *prana maya*, the energetic body, *mano maya*, our mental faculties, *vijnana maya*, our personality, and

ananda maya, the seat of emotions and happiness. All five layers are interconnected with one another, and therefore influence each other.

This model is accepted by all healing systems in India, and it has important consequences in the field of healing: The human being is seen as a multidimensional being, and thus also disease is multidimensional and an approach to healing should be the same. It means that we have to look at disease on all the different layers, even beyond surface appearances. What affects one level, can manifest in others also. A symptom can be expressed in quite another level from that level at which the illness has been caused.

This is an important premise with regard to how one is to work with an individual on these different levels. When working on one level (for example with asanas on the level of the physical body), all the other levels will in turn also be affected.

There are more implications when applying this concept for healing: there may be a similar situation (cause), but the symptoms that different individuals manifest will not necessarily be the same, or even on the same level. Illness will always be expressed individually, even when the causes are the same. The opposite situation is also possible: causes may be different, but people manifest similar symptoms. Ulcers for example can form because of a variety of situations, one of them being stress. What is therefore required from the therapist is an in-depth assessment of the person in relation to a specific condition, not of an illness on itself. So when observing people with their symptoms, a therapist should always keep an open mind and not get into a pattern of classifying symptoms under specific conditions.

Taking all this into consideration this model provides a very helpful framework also for yoga therapy. It reminds us that a person is made of different layers, and that we need to work on all those layers to help deal with a problem. The message we give on one level will also reach the others. In cases where a person is not able to use the physical level (maybe because of paralysis) there remains a lot that can be done other levels, like visualizing to move a limb; this can eventually also have a positive effect on the physical level.

We will see in a later chapter how yoga therapy addresses all those different dimensions of a human being, by using a multitude of tools that influence different layers at different intensities. This model is also important when applying yoga therapy for the consequences of stress. As we have seen in the first part, the effects of stress are multi-dimensional and manifest as a broad range of symptoms, including physical, physiological, mental and emotional. So when dealing with a person who suffers from stress, yoga therapy can provide a wide range of techniques to intervene exactly where needed.

Yoga and Yoga Therapy

"When a person is ill, the whole person is ill. There is illness, there is the recognition of this situation, and there are the suffering and the worries that are produced by the illness. And there also is a certain hope that something can be done to get better. So the illness involves the person in its wholeness, not only a single part of it." (TKV Desikachar in: Almini 2002, p.146/147)

In this chapter I want to give an outline of yoga therapy as taught by the Krishnamacharya Yoga Mandiram in Chennai, India, concentrating on the basic concepts and ideas, as well as a short description of how yoga therapy is linked to yoga itself.

Medical science and yoga deal in different ways with the same subject: suffering. While medical science studies illness and works mainly in the field of pathology, yoga is based on an understanding of the mechanisms that help sustain health and goes beyond pathology to find the tools that can bring more wellbeing into people's lives.

The connection of body and mind as proclaimed by yoga, can be a source for illness, as we have seen. Whatever happens in the mind, is also expressed in the body. The influence of the environment or outer circumstances is not a direct one, but it is filtered by the mind.

As the connection between the two can be a source of disease, it can also be used for healing. If the mind is in a calm and focused state, it can reassure the body that everything is all right, and it will promote calmness also on a physical and physiological level. Such a calm mind can be attained by yoga techniques, such as asanas, breathing exercises, and meditation.

The *Yoga Sutra* of Patanjali, dating back to around 200 BC, are one of the fundamental texts of the philosophical school of yoga. The *Sutra-s* describe the nature and workings of the human mind, and one basic premise is that body and mind are inseparable. Dr. Kausthub Desikachar explains in the following way: "... Patanjali's *Yoga Sutra* lays out the roadmap of yoga. The basic premise of Patanjali's teaching is that our human mind is both the source of and solution to our problems. If the mind is distracted or agitated, then we get into trouble. But if the mind is focused and calm, it helps us solve the problems we encounter in everyday life and leads us forward on the

path towards our spiritual core. This is the simple essence of the teachings of yoga." (K. Desikachar 2005, p.21).

Patanjali's basic message is the same as that of the already mentioned *Panca Maya* model, that is that all aspects of the human system are interrelated, and that yoga's various tools can be used to treat the human system holistically.

The definition of yoga that Patanjali gives right at the beginning of the *Yoga Sutra* is interesting: "*yogah citta vrtti nirodha*" (YS I.2), which is translated as "yoga is to direct the mind on a chosen focus and maintain that focus without distraction" (K. Desikachar 2005, p.21).

It has been mentioned throughout this paper that the mind plays an important role in conditioning our experience of life; the same is true when dealing with disease. We have also seen in the first part that many western holistic approaches agree with this premise and have built their theory and practice upon it. Patanjali's *Yoga Sutra*, which has been widely considered for centuries the most authoritative text on yoga, makes this clear from the beginning. We can already see that here lies one of the reasons why yoga can be used for therapy in the widest sense, and why it can contribute in particular to the treatment or management of stress and the disorders that stress provokes. Yoga seems to be the opposite to stress already by definition.

In the following part I will give an overview of the particular traits of yoga therapy, as well as take a closer look at the *Yoga Sutra*, especially by examining a few *sutras* that have a direct implication for yoga's therapeutic use, in particular with regard to stress management.

In yoga as well as in yoga therapy, we need to consider three factors that are in a close relationship to each other: the student or care-seeker, the teacher or care-provider, and "care" as the link between the other two. The word yoga is often translated as "link" or "union", hence the importance of this relationship. As we will see, from this premise it is a small step that leads from yoga as a practice to yoga therapy. In former times yoga was always taught as a personal practice and discipline, according to the student's needs and background. In its most fundamental meaning and usage, yoga practice has always been "therapeutic", or at least a tool on an individual's personal journey, helping with problems on all the various previously mentioned levels.

The process of yoga therapy starts when the care-seeker reaches out for help, and thus begins to take responsibility for his/her own health. As with yoga itself, it is a self-empowering process where the care seeker takes an active part.

When entering into a process of healing, more important than the medical definition of a disease is the experience of that disease for the care-seeker in his or her actual situation. In this context TKV

Desikachar has given a helpful definition of disease and illness: "The disease is defined biomedically. But the illness is the human experience of the disease." (Desikachar 1998, p.122). Each individual will have a different response to disease and therefore a different experience of illness; so what the care provider is actually dealing with is rather the aspect of *dukham* (suffering) and not that of *vyadhi* (illness), even if a person's experience comes from *vyadhi*. In the *Yoga Sutra* it is stated that *vyadhi* can lead to suffering (*dukha*), negativity (*daurmanasya*), physical expression (*angamejayatva*), and disturbed breathing (*svasa prasvasa*) (YS I.31). Here we see how the different dimensions of a human being can be involved in the process of illness, and that they are all linked. To consider this in the context of yoga therapy means to look at a human being in his or her completeness and complexity, and therefore to examine the human system in its wholeness. As a result, to change one aspect means to change the other aspects as well.

Yoga in itself is seen as a process of changing *samskaras* (patterns), and its use for therapy can contribute exactly in this field. Illness is a pattern, health is also a pattern. When we live with an illness or negative situation, our body creates a pattern to live by, and often it is easier to maintain this pattern than to change it for a healthier one. In the *Yoga Sutra*, Patanjali talks about these patterns and the process of transformation, especially in the third chapter. In *sutra* 9 of the third chapter he presents the process of changing *samskaras* of the mind from an agitated state to a focused one through yoga. In the context of yoga therapy, the care provider provides the tools for this transformation to happen, consistent with the constitution of the student. What is implied here is that what happens in the mind, extends everywhere else, according to the concept of "mind-over-body". When the mind is agitated or in a negative state, this will also spread to the body and be expressed in accelerated body functions and an agitated breathing pattern as well. When the mind is focused, the breathing is smooth and the body functions are normal. Again we see how this is exactly the opposite condition as what we experience under stress.

In the following *sutra* (YS III.10) the idea of the practice also being a pattern is expressed. The practice that is done regularly influences the inner patterns of the mind. One central idea of yoga practice is hinted at here: we need to practice to get somewhere, and then we need to practice to stay there (concept of *yoga* and *ksema*, respectively a further step and its maintenance; this idea of practice is also expressed in another important yoga text, the *Hatha Yoga Pradipika*, in chapter 1, sloka 65 and 66).

Thus yoga therapy can be seen as a process of intervention with the tools of yoga to our basic system (*prakriti*); we do something with our body, breath and mind that is not usually done (YS III.13) to change the basic constitution in order to suit new requirements or needs, or in the case of

illness, to arrive at a new and healthy state. One of the distinguishing characteristics of stress is that it also creates patterns, habitual pathways that are self-perpetuating through which it affects the human being. So through yoga we try to create patterns that are different and will have an effect that leads in the opposite direction.

An interesting aspect here is that patterns are located in *vijnana maya* or the fourth layer, the level of the personality. Yoga is situated in the same level. One consequence of an effective yoga practice will be a change in this layer. Real change is thus not only an intellectual or mental change, but will have deeper consequences. What we can see here is that it is not enough to work on the superficial symptoms of stress, but that for a therapy to be successful the process has to go deeper and create a change in a human being's deeper layers.

So how does yoga change old patterns? In the *Yoga Sutra* we are given some tools: *yama* and *niyama* (principles of right conduct), *asana* (postures), *pranayama* (breathing), *pratyahara* (control of the senses) and *dhyanam* (meditation), among others (YS II.29). All of them can be used to facilitate a new pattern, in the various layers.

Considering this idea in the context of stress it seems particularly important to change those patterns that contribute to the stress response and through which a person gets affected by stress, and to create new patterns that allow the stimulation of the relaxation response in the body and mind, and establish a new way of being in the situation. The accumulation of stress can thus be interrupted, or its intensity can be experienced as less.

In a later *sutra* (YS III.35) Patanjali presents another interesting idea about suffering: suffering comes from the confusion of what is *purusa* and what is *prakriti*. When we identify with *prakriti*, and forget about *purusa*, there will be suffering. This is an important message for us as yoga therapists; because on one hand there might be illness, but suffering comes from the identification with that illness. Translating this idea onto the subject of stress, we can say that there might be a stressful situation in someone's life, but this does not necessarily mean that the person does actually suffer from it. And furthermore it gives a hint that for healing to happen we do not only have to rely on the mind that can also be full of ignorance (*avidya*), but help to get in contact with and bring forth something deeper than that that does not change and that is in our heart. And also the consideration that all the changes that happen in one's life are not part of *purusa* but of *prakriti* can give a person the strength and confidence to deal with any situation in life as well as with illness.

These are some of the important ideas for yoga therapy that we can extract from the *Yoga Sutra*.

They can give us an understanding also about the difference between the "healing" and "curing" of an illness. A disease can be present in someone's life, yet it does not necessarily cause the person to suffer. It depends on the feeling of discomfort that a person has about the disease. There can thus be cases where a person is "cured" (the symptoms vanish), but not profoundly "healed" because the feeling of being hurt still remains. On the opposite, someone can be "healed" but not "cured" as the symptoms do not go away (such as in cases of terminal illness), but the feeling about it is not negative, and the person learns to live with the disease. Yoga can also contribute to alleviate the negative effects of some medical treatment (as in the case of chemotherapy for cancer), and it can help the person to relax and get to a state of psychological wellbeing in spite of the disease.

Yoga has a certain role in curing diseases, as it can help to reduce the symptoms, but often it is more efficient in the field of healing, when it helps a person to accept his or her situation and to make the best out of it, and when it takes the person on a deeper journey towards the Self. Healing is an active, internal process that cannot be done from the outside.

This last concept also refers to one derived from Ayurveda, which describes the pacification of symptoms (which is called *samana*) as in contrast to a complete healing (*sodhana*) which is a long and slow process. Both are valid, and for both there are means to achieve them. Yoga therapy can have an impact on both, depending on where the goal lies.

For the subject of stress this means that there are two approaches possible with yoga; either we can work on the symptoms that are provoked by the exposure to stress and help reduce them. The other approach is to go beyond the symptoms, in search of deeper lying causes for the stress and try to remove those. In this sense yoga can help not only to resolve stress related diseases, but also to help people live with a certain amount of stress more efficiently and positively, even if it does not completely disappear from their lives.

To summarize, we can say that yoga therapy is a holistic approach towards a person that is considered multi-dimensional and consists of several layers that are connected to each other. It is not invasive and therefore a complimentary practice to other systems of therapy. It is a self-empowering process that leaves the responsibility with the patient or student, and thus gives the student an active role in the whole process.

Considering all these factors, it seems obvious that yoga therapy has to be an individual process that is tailored for one individual student at a time. As already mentioned, in former times yoga

was always taught in this manner, as a relationship between the individual teacher and student. What was appropriate was taught to the student, taking into account many factors, such as age, occupation, limitations, physical and mental predisposition and many others. This same principle is even more important in the context of therapy when we are dealing with specific conditions or disease.

The needs and requirements of a given moment or situation have to be taken seriously, and the complex structure of a person on all levels has to be examined. Any illness will manifest in a specific way in an individual and produce different symptoms in different people. It is the singular interplay of an individual and an illness or condition that determines the kind of practice that this person should do, not the illness in itself. In yoga therapy there are no ready-made recipes for each kind of disease. The techniques of yoga cannot be applied in a standardized or mechanical way, with the presumption that a certain technique will have one specific effect on the body or mind of each person in the same way. The human system is far more complex than this kind of approach allows.

Dr. Martin Soder, a medical doctor and yoga therapist from Berlin, explained in one of the modules of the yoga therapy training that actually the same is true even for medicines, as new research has shown. When a person is taking a medicine, this medicine will provoke a specific reaction in the holistic human being, but we cannot know beforehand what exactly this reaction will be. It is like an external agent coming to act on or in a system, and the effect on that whole system will depend on many factors. The same will happen with the tools of yoga when they are applied to a human system.

The approach taken by yoga therapy towards stress will demonstrate even further the flexibility and importance of this principle of adaptation to the specific needs of the individual, because, as seen above, stress itself impacts on each individual in a unique way. Under stress the different layers of the person interact in complex and often unexpected ways, and therefore a holistic approach such as that taken by yoga therapy will prove far more effective both in the treatment of stress related symptoms and when applied to stress management in general.

Therefore, in the yoga tradition of T. Krishnamacharya there are no given postures that can help with any condition. Postures and the other yoga tools can be helpful to a person, depending on that person's background and how a posture is taught (with appropriate modifications or variations). This is the principle that is taught as *viniyoga*, another term that is derived from the *Yoga Sutra* (YS III.6) and that means the appropriate and continuous application of the tools. So it refers to

choosing the right tool and then implementing it in the most appropriate way (K. Desikachar 2005, p.111).

There is a nice story in Samkhya philosophy to make this point clear: it says that when it rains, different things happen in different places. If it rains onto the ocean, nothing happens. If it rains onto a dry field, life comes back. If it rains onto a field just before the harvest, everything is destroyed (Almini 2002, p.2). So there are no prefixed solutions but the intelligent application of all of yoga's tools in different situations.

Practical application of the tools of yoga in the case of stress

So far we have seen a broad picture of how stress can affect the human system and various approaches to illness in general. In this last chapter I will give an idea of how yoga therapy following the teachings of T. Krishnamacharya can work with stress and the conditions it provokes in a human being.

It should be clear by now that these suggestions are not to be taken as a recipe and simply to be applied in any case of stress. As shown in the previous chapter, there cannot be a list of practices that will help to deal with stress in general (or any other specific condition); we always have to consider the whole complex context of a person, including his or her environment, possible symptoms, medical history, needs, capacities, and many other factors. This is especially true in the case of stress where there can be a long list of various symptoms in a person, and they can manifest to a very different degree. For this reason I will not mention specific exercises or techniques, but give more general indications for each of the tools that I wish to examine. In this sense, this chapter is written for people with some understanding of yoga who are able to apply these ideas.

First we should quickly summarize the general effects of stress on the body and its various layers. The body's reaction to stress is that of an emergency situation where a lot of hormones and enzymes are released quickly to activate the muscles. Heart rate and breathing rate are accelerated, and the whole body goes into a state of alert where a general tension is created. Therefore contraction can show in various parts of the body, for example in the neck and shoulder region, in the intestine or in the lower back.

On the mental level stress can leave a person with the feeling of continuous pressure and a resulting helplessness as there seems to be little control over the factors that provoke stress. Apart from this, on-going stress can contribute to other diseases that are either latent or about to emerge, as mentioned before. So in yoga therapy these have to be included, and to be treated along with the stress. Often when stress is the cause of other conditions, they will recede automatically when the issue of stress itself is addressed.

We also need to remember that the hormones and enzymes that are produced during the stress response accumulate in the body when they are not needed, and can subsequently produce undesired effects.

To deal with stress in yoga therapy it is useful to differentiate between two opposite types of practices. In general, we can divide yoga practices in two categories: *brahmana* and *langhana*. While *brahmana* means expansion and includes tonification, activation, opening and growing and is thus stimulating in general, *langhana* means contraction or reduction, and this kind of practice has a calming effect, including purification, elimination and closing. When neither of these effects prevail, there is a third category that is called *samana*, and it denotes a balance between the other two, leading to calmness and focus at the same time.

These categories can be of great help when creating a yoga practice, but again we should not treat them as fixed categories. We could rather use them as a linear model where one category blends into the other, and the specific effect of one tool on a person will determine if it is *langhana* or *brahmana* in nature for that person and in that precise context.

However, one can determine between practices which are more stimulating or more calming in general. The yoga techniques that are mainly *brahmana* include inhalation and holding the breath after the inhalation, all backward bends, dynamic movement and strong postures, *bandhas*, chanting with a high pitch, and sound or images for visualization that are connected to heat, *movement or strength*.

Yoga practices that are *langhana* in nature are for example exhalation and holding the breath after the exhalation, forward bends and twists, slow movements or static postures, relaxation, chanting in a low pitch, and calming sounds and images.

It is striking how these two categories can also be compared to the activities of the sympathetic and parasympathetic nervous systems, as described in an earlier chapter. We have seen that during an acute stress response or in phases of long lasting stress some of the body's functions are increased while others are inhibited. It is the sympathetic nervous system with its functions that over-performs, while the parasympathetic nervous system does not work at all. Therefore recovery

and relaxation are the elements that are mainly missing, whereas the values of many other systems are all raised. *Brahmana* practices support the working of the sympathetic nervous system, while the *langhana* type will have a strong effect on the parasympathetic nervous system and therefore help to relax and recover from the stress response.

With the knowledge of these two categories and the *Panca Maya* model, there can be an almost infinite variety of combinations of the tools of yoga for a personalized use. The stimulating effect of one tool can be further enhanced by adding another *brahmana* component; or it can be limited to the level of the body (through a strong *asana*) while at the same time using a more gentle focus or a more *langhana* kind of breathing, chanting or visualizing, to work on another layer differently.

For the approach of yoga therapy to stress, as a general rule, we need to concentrate on those practices that will have a more *langhana* effect on the body and mind, or that include at least one component that will allow the system to calm down and recover, while using the more *brahmana* components with caution.

However, this does not simply mean avoiding *brahmana* practices and instead using exclusively *langhana* ones. As mentioned, a whole range of combinations can be used to work simultaneously on different layers of the person. It might depend on the degree to which a person is stressed, and the specific symptoms manifested. In situations of acute stress, relaxation almost always has to be the first step. But if a person is suffering from continuous and prolonged stress, he or she might also require increased energy and strength to face the situation. There could be many possible combinations: the mind needs rest while the body needs some activity, or the other way around. There could be a situation where a practice starts in a more *brahmana* way and ends with *langhana*, especially if done in the evening and sleeplessness is one of the accompanying symptoms of the stress.

On the other hand, a practice could start with relaxation and relevant exercises, to end in a slightly more active way to provide the energy and strength needed for a full day of work. So we should always bear in mind the context of the person, and combine the various tools accordingly.

What we also need to consider is that stress often accompanies other conditions that need specific attention. For example when stress is accompanied by high blood pressure or ulcers we have to first concentrate on relaxation; and this is why, generally speaking, more importance will be given to relaxation inducing practices. As we have already noted, an organism that is relaxed or is at least able to relax easily, is also more likely to promote self-healing.

What follows is an outline of some ways to work with a person suffering from stress. As mentioned, it is important that this be understood not as a mechanized manual, but rather as a set of guidelines along some of the principle tools we use in yoga therapy.

Asana

This term indicates not only the classical postures of yoga but also the movement leading into and out of a posture, along with the accompanying attention to breathing.

When dealing with a person who suffers from stress, in general all the asanas that are *langhana* in nature are good, such as forward bends, mild twists or lying positions, and movement that is performed slowly and gently. It is also important to rest in between asanas, so we could include more and longer phases of rest in the practice.

Generally, seated or lying positions can be helpful to facilitate relaxation; but as in the case of a person who is already sitting a lot during the day (for example at work), gentle movement in a standing position (like gentle back bends) could be more useful.

Special attention should be given to those areas of the body that are tensed, or where any symptoms manifest. Very often in the case of stress muscles become tensed, and this can be expressed in various areas of the body. For example, tension and contraction in the neck and shoulder region, or back pain and digestive problems are quite common in this context.

So in yoga therapy we give exercises that provide gentle movement to those areas, combined with the breathing, especially when linked with a long and smooth exhalation. In order to relax a very tight neck and nape region a cushion to lie on when in a lying position can be used. Oil application on these areas is also good, especially as stress is related to increased *vata* in the system (physiological functioning is accelerated; see the part on *Vata Prakopa*), and the oil also has a positive effect on this element.

To help promote a state of calmness and relaxation in the student, the frequency and intensity of transitions in the practice should be limited (for example transitions from a standing to a lying position, or too many different postures with many changes).

Gestures and bringing the hands to different body parts can help in shifting the attention from too *much mental activity to the body level and on an area that needs attention; symbolically this can also reinforce the idea of taking care of oneself and healing of an area that is affected by disease.* It can also help to focus and keep the attention focused, which is often difficult for someone who experiences stress.

As we are dealing with a form of suffering, and have seen before that *dukham* is related to the space in our heart, special attention should be given also to the heart region. As T.

Krishnamacharya has said, this area has ten times the number of synapses that our brain has, which means that there are more physiological nervous units there, so any disturbance or tightness in the *anahata* region will have consequences for the whole human being. In the yoga practice we should ensure that there are no tensions or restrictions, and to work on an opening of the heart area.

Another consideration is attention to the correct alignment of the *chakras*, because this will influence and improve the functioning of the nervous system in general. Alignment is understood not only as the *chakras* being in one straight vertical line, but also as maintaining the right distance between the different *chakras*. Both will not be achieved in the case of illness; for example scoliosis will produce a slight shifting out of the vertical alignment, or kyphosis will reduce the distance between the *chakras*.

It could be a good idea to practice in the evening, which will help to create relaxation after a busy day. Otherwise the practice could be split up into a slightly more active part in the morning to give some energy and focus for the day, with a relaxing part in the evening. A few simple movements and breathing could even be helpful during the day, for example in a break, even at the work place.

In the case where a care-seeker has also high blood pressure, many of the asanas need modifications, because any pressure on the heart area should be avoided, as well as too much pressure on the abdomen (that in turn will press on the lung cavity). So most of the forward bends should be done either onto a chair (so as to limit the extent of the movement) or with opened legs to avoid the pressure on the abdomen. It is also recommended to keep the head slightly up in those movements or postures where it is usually moved close to the ground (as in *uttanasana*, or *vajrasana* with forward bend), and to avoid quick movements that bring about a drastic change in position.

Exercises that open the chest and the abdomen can be helpful, as well as dynamic movement in general as it increases blood circulation.

Pranayama

All old yoga texts talk about the importance of long and smooth breathing, either in the context of wellbeing or of spiritual evolution (*dirgha* – long and *sukshma* – smooth; YS II.50).

The importance of the breath derives probably from the fact that it is understood as the link between the body and the mind, and any changes in either of them are immediately also expressed in a change of the breathing pattern. On the contrary, through the breathing we can influence also the body and the mind, and therefore pranayama is considered the most important of the tools of yoga.

It also has a direct influence on *prana* or the life force, and it helps to purify the body on subtle levels. One of the fundamental ideas in classical yoga practice is the cleansing of blockages or obstructions in the system to improve its functioning. When there is *sukha* ("good space"), pranic forces will flow more freely and restore the normal functioning of the whole system.

Breathing involves the movement of the thoracic and the abdominal cavity which are separated by the diaphragm. They are like two balloons that react in relation to each other; if one's volume is increased it presses on the other (Kaminoff 2007, p.4/5). In stressful situations the diaphragm as well as the abdominal muscles tend to be tense, and thus do not allow a deep and full breathing. This is one reason why people with a high stress level often have a fast and superficial breathing pattern.

In many cases concentrating on and awareness of the breathing can considerably alter one's state of mind. The breathing process has to be made conscious, with the utilization of abdominal breathing, which can be initialized by a slight contraction of the abdomen on the exhalation (aided by a slight pressure of the hands placed on the belly).

When considering the different phases of the breathing, it is the exhalation that is linked to the relaxation response in the body and the mind, as we have already seen in the chapter about the relaxation response and the functioning of the parasympathetic nervous system. Through a long and smooth exhalation the muscles relax, and the mind becomes calm.

So in most cases in which stress plays a role, the initial approach is usually to work on the exhalation, and related techniques. A long and smooth exhalation, a breathing ratio in which the exhalation is longer than the inhalation, appropriate holding of the breath after the exhalation (which should not be too long, otherwise it will change towards a *brahmana* effect instead a calming one), *krama* on the exhalation (again only up to a considerate number of breaks; otherwise the effect will be the opposite), are all examples of how to help bring forth a deep relaxation through the use of the breathing.

Another technique that can be helpful is to direct the exhalation into those parts of the body where a problem manifests in the form of tension or pain, and to release these consciously through the breath.

As a breathing technique, the exhalation is usually done with a slight contraction of the abdomen; therefore it works mainly on the *apana* region, which is related to elimination in a broad sense. Here we are talking not only about the elimination of waste products of digestion that accumulate in this region, but also about the elimination of mental or emotional "waste". In the case of stress, there is often an accumulation of physical, mental and emotional tension all over the body, and to work with the exhalation that stimulates the activity of *apana* will favour the liberation from tensions in general, and especially from toxins that accumulate in the body through the physiology of the stress response.

For people who have never done yoga or who are very unconscious of their body and breathing, it may be difficult to work with the breath at the beginning, and they may even get confused or more stressed when asked to do so. In this case it is more effective not to begin with breathing techniques, but with the use of a sound instead. To produce the sound they will automatically exhale, yet without getting confused by the concentration on the exhalation alone.

The use of sound is a good option also when the breathing is very shallow, as is often the case under the influence of stress. The sound can slowly be made longer or repeated several times in order to lengthen the breathing capacity.

Other techniques to focus the mind can be *nadi sodhana*, or *sitali* to cool and calm the system. *Sitali pranayama*, together with palming the eyes is a helpful technique for relaxation (even more so when a gentle sound is added to it). Also the technique of breathing and moving the attention to different body parts while placing the hands on that part, can help the person to relax that area aided by a visualization of that relaxation taking place along with the exhalation.

If one of the accompanying factors of stress is sleeplessness or difficulty in falling asleep, there could be a short pranayama practice in the evening, right before going to bed or even when the person is already in the bed and could fall asleep right after the practice. It should consist of a long exhalation and possibly retention of the breath after the exhalation, in a lying position, and could combine the various options mentioned before, as sound or visualization.

Visualization or *Bhavana*

Visualization is often used in the process of healing because it works directly on the level of the mind, and as mentioned yoga emphasizes the importance of the mind and its influence on the body.

In the practice of visualization (as well as in any other meditative practice or the use of mantras), the mind has to hold a chosen focus for some time, and through the act of doing so becomes more stable than it will normally be under stress. This already leads to a change in the mind's patterns, and it will be even more significant when the chosen focus is in the same direction of calm and stability. As a consequence it will also lead to a change in the body's patterns.

There are many options for visualization that can be used to relax the body and mind, especially images that have a cooling and calming aspect, like a quiet lake or the moon. Before deciding on an image, we have to carefully investigate together with the care-seeker what that image means for him or her, and what kind of associations it provokes. Often it can be a good idea to let the care-seeker choose an adequate image that best expresses the idea of calmness or relaxation. Instead of images, concepts such as calmness or freshness can be suggested. All of these can be visualized also in the various body parts, thus bringing the sense of relaxation that the image provokes into the whole body.

For example an image for visualization could be a stone that falls into a lake and the circles on the water that ripple outwards from a centre. The person can then imagine this picture in his or her throat, and link it with the breathing. With every breath the circles expand more, covering the whole body and going even beyond the body to include the surroundings.

Another example could be the gentle ebb and flow of the ocean waves on the shore, linking this movement with the breathing once again (on the inhalation the wave comes in, on the exhalation the wave recedes).

As another example to release tension, flowing water can be used as an image; the person can imagine that the water will take away the tension or pain and leave the part clean and relaxed.

If the mind is always busy and not able to rest, an image of stability (or the concept of it) can be introduced at some point into the practice.

Watching the breath can also be a *bhavana* for visualization, observing the inbreath and the outbreath, the passage of the air into the body, the filling and emptying of the lungs, the quality of the breath and other aspects.

Instead of images or concepts, the student can also be asked to visualize a calming colour in the various body parts, or expanding throughout the body from a centre, or coming into the body with

the inhalation and expanding everywhere with the exhalation. There are an infinite number of possibilities which can be utilized to bring relaxation to the student.

Mantra

Sound produces vibrations in the body and can therefore stimulate different areas or responses in the human system. It is a more subtle tool than for example *asana*, and works mainly on the deeper levels of a human being.

Yoga has been presented as a change of patterns, from a disturbed to a healthy pattern. *Mantras* can play a big part in this transformation, helping the mind to move into a more calm and focused state. It seems to work like a cleansing of the mind, either through the repetitive use of the same *mantra*, as well as through the quality of the sound. Together with *asana* and *pranayama* (and much more as both of them) it creates a powerful movement inside the person.

To relax the system we can use soft, relaxing chanting, with a lower pitch and gentle sounds that can either accompany a movement or the practice of *pranayama*, or be done on their own.

A few examples of sounds that have a soothing effect are: *Santih* (= peace), *Maa* or *Om*.

Very often a *mantra* is chosen according to the visual focus or general theme that we want to give to a practice. So the sound will be a name or aspect of that same focus, as for example *Om Somaya Namah* could be a *mantra* that can be used when either healing or the moon is involved. *Soma* refers to the moon as a healer, as the king of medicines; in addition the sound *so* has a calming and soothing quality, and is therefore helpful when dealing with stress. This *mantra* can be combined with the visualization of the moon.

If the practice revolves around the idea of water, a suitable *mantra* that fits this aspect could be *Om Apaya Namah* (*apa* = water).

Life-style

As explained earlier, stress can be seen as a typical expression of "*vata prakopa*". *Vata* is increased in the system; all those components that reduce *vata* in general should therefore be recommended, such as regularity in sleeping and eating, or exercising (especially the *langhana* kind of exercise as described above), moments of relaxation throughout the day, dedicating some time to pleasant activity to counterbalance stress, and many more.

Very often these changes are the most difficult to make because life style habits are deeply rooted. But if the person can at least make time and space for a daily (even short) yoga practice, this will already interrupt the often frenetic life of a care seeker with the problem of stress. A new pattern can be established which can slowly take form in a person's life, and so these changes become easier with time.

I have presented some of the most commonly used tools of yoga here, and I have kept them separate to discuss their specific use and their contribution to dealing with or managing stress. One or more of them combined can be used for a practice, and the care-provider will choose and combine them according to the specific needs of a person. It must also be said that the more tools we combine with the same purpose in mind, the more powerful a yoga practice becomes, because the practice will be enriched by a fuller and deeper sense of meaning and purpose. It can then take effect on all the various layers of a human being that have been described earlier in a more complete way.

There is an additional important point that must be made regarding yoga therapy that is even more relevant to practices designed for individuals suffering from stress. This is that yoga as a self-empowering practice needs a person that takes steps to change something in his or her life. Yoga's tools can function only if they are practised with sufficient commitment and regularity. Here though lies an obstacle, especially in the west, where we do not have a tradition of this kind of regular practice. This is often exacerbated in individuals under stress because they often lead a life that is frenetic in many aspects, and lacking in the kind of rhythm conducive to yoga practice. Even the idea of submitting themselves to a regular practice that interrupts that normal rhythm of life can present a challenge. Furthermore, if the focus of the practice is oriented towards relaxation, this might present such a contrast to their usual speedy life-style, so that it can be difficult for such people to commit themselves to a regular yoga practice. In this case we must find a way to encourage them to practise in the first place, even if that practice does not yet have all the characteristics it will eventually need in order to become effective. We first need to find a way to motivate our student to practise regularly; if this really is a problem, we could ask them to simply give it a try for some time. When a change in their life or in at least one aspect of it is experienced as a result of the practice, then they might be more likely to continue. So when setting the goal of the practice, we need to consider these short-term and long-term objectives, and we need to recognize that this point is part of the over-all situation.

The tools of yoga that have been suggested so far are helpful for dealing with and reducing the symptoms of stress. This is the aspect of *samanam*, the pacification or removal of negative and undesirable symptoms. As TKV Desikachar puts it: "Though yoga has many solutions for the symptoms of stress, they are ... symptomatic solutions. We can remove tension through asana, and calm the emotions with pranayama. ... The stressful symptoms will be removed for a while but will soon reappear." (Desikachar 1998, p.169)

This is certainly true in many cases where yoga practice is used for therapy as long as the symptoms are present, and is abandoned once this goal is achieved. If the stressful life situation persists, then the practice to help address it should be continued; or at least some of the elements that are useful in that moment, such as a breathing practice to create a calming effect.

However, for people who begin a yoga practice for a very specific reason, such as the reduction of stress, and experience the beneficial impact of the practice on their specific problem, the door is opened for a more profound and ongoing yoga practice that might lead through a process of self-discovery (*svadhyaya*) to the recognition of the deeper causes of one's situation. Then a deeper healing (*sodhana*) becomes possible.

In the view of yoga in the tradition of T.Krishnamacharya, and as explained centuries ago in Patanjali's *Yoga Sutra*, all suffering originates in *avidya*: wrong understanding. Together these two form a continuous cycle. To work on the mind and its obstacles that prevent clear perception is the way recommended by these teachings to remove the suffering. As mentioned, here lies the power of yoga to release a person from attachment to false perception of the self and accompanying identifications, and to connect with a deeper source.

However, at this point we must also acknowledge that not all people who come to yoga therapy and have chosen to use yoga's tools for their well-being or to deal with an illness are interested in the philosophy of yoga and in its potential for transformation. They will not follow the path of yoga further, once their problem has been resolved. Some may become interested and involved in the deeper aspects of yoga, but as therapists we have to respect our student's goals. A vaster spectrum than the *samanam* aspect can be offered, but it is our student's choice how far he or she wants to go.

T. Krishnamacharya has once said about meditation, that if there is only one moment in the practice where the mind enters in the other state, that makes the practice worth doing, because that moment will last in some way and can shift or change something. In my view the same is true for all yoga practice. If it can produce even only one moment in which the person can connect with a

deeper source, disconnecting from outer identifications, then the practice will take another form, going beyond simply a symptom removing exercise.

Conclusion

In the modern world, stress has become present on all levels of life: affective, material, environmental, and professional. The response to it can be seen as the body's natural reaction to any kind of demand that disrupts life as usual. In one form or another, it is present in everybody's life.

Examining the evolution of the term stress and various approaches in research, we can see that there has been a great change in the way stress is perceived. There have been corresponding changes also in methods of the treatment of stress over the past decades. While stress was once commonly understood mechanically as being an outer disturbance only, it has gradually come to be seen as a situation where inner and outer factors come together.

Individuals vary in their ability to cope with stress. How a situation is perceived and general physical health are two factors that determine how a person will respond to a stressful event or to repeated stress. This shift of focus is also reflected in the strategies that are currently being proposed to cope with it. Very often we cannot eliminate stress from our lives but we need to learn how to manage and live with it in a better way. I believe that here lies the main contribution of yoga therapy in the field of stress, and this contribution has also been recognized by various exponents of western medical systems.

In those approaches that I have presented in greater depth, we can see how some aspects that have always been a fundamental part of the teachings and practice of yoga have been valued. Some of them have even adopted various elements that derive from yoga into their treatment of stress.

The importance of the mind and its influence on the body; the use of movement (exercise), breathing, sound and images to bring forth relaxation; regularity in daily activities and in exercise; the discovery of the dimension of the heart and the various other layers that influence general wellbeing; these are only a few of the ideas that have their origin in yoga, and that make yoga therapy a valid option when dealing with stress and stress related symptoms.

In this way, various basic ideas that derive from yoga have found expression even in the more holistic western schools of medicine. However, what is lacking is the application of yoga for healing in that unique and individualized way that yoga has always been and that defines yoga

therapy. The approaches that I have examined here have surprised me as far as the theoretical basis was concerned, because there they include a lot of knowledge that derives from yoga philosophy where it has been presented more than two-thousand years ago; yet when it comes to the practical application of these concepts, usually standardized programmes for treatment or stress management are proposed.

Anyway, I think that a connection has already been made between the various healing traditions. Both sides can benefit from this gradual process of growing together. Now the view of yoga therapy can contribute even further, by emphasizing the importance of the individual not only in the phase of diagnosis, but also and more importantly in the phase of treatment.

Limitations

The subject of stress is immense, and so also is its relationship to various disciplines. I have given an outline of its meaning that includes the experience of stress for an individual on all levels, as they have been described by yoga philosophy. I am aware that there could be other approaches, more scientifically based, that include the possibility of some extent of empirical measurement, such as the different stress measurement scales that have been developed and used, especially in the United States of America. I have not mentioned them in this paper because I believe that the subjective experience of any outer factor is much more relevant in determining the stress level of an individual than standardized scales, that do not take into consideration qualitative factors.

So in presenting approaches to stress and stress management, my choice has been limited to those that I felt close to the approach of yoga and yoga therapy. What has been presented is only a limited selection from this field of study, and they are presented as examples, not necessarily as the most important exponents. I am sure that there are many other interesting approaches that equally combine the different healing systems or take inspiration from them.

In addition, there has been a lot of research during the last decades on the subject of stress and stress management and its contribution to various medical conditions, as well as on the effect that yoga or other eastern disciplines can have in dealing with stress. It would have been impossible to include their findings into this paper, even in a generalized way.

When speaking of the tools of yoga, I have chosen to present only a few in greater detail. I have deliberately not talked about meditation as a tool, but included two kinds of meditative practices (*bhavana* and *mantra*) instead. Meditation is one of the general recommendations that one can find in the field of stress management. Yet the term is not specified, and there are many different kinds of meditation. Going back to Patanjali's *Yoga Sutra* and its eight limbs of yoga (YS II, 29), all the stages that follow after *pratyahara* (limitation of the senses) are together considered the process of meditation, including concentration, merging and complete integration. Apart from the first of these (*dhyana* or concentration on one subject), they are not a conscious, active process that one can direct or control. The later states of the meditative process come about on their own; a person can only prepare for them to happen. This is why I have excluded the term meditation from my presentation, and have preferred to concentrate on a few examples of meditative practices that still fall under the term *dharana*.

The whole process of meditation was originally meant to help deepen an understanding of the sacred forces of life; whereas nowadays it is often reduced to an activity that helps a person to relax and to cope better with stress. Again it needs to be said that yoga can offer help in dealing with undesired symptoms, but it can also offer deeper healing or spiritual transformation, and in this context the term meditation in itself has its relevance.

Lastly, I would like to add a personal note. I have chosen to write a theoretical paper instead of a project report based on the practical application of yoga in a specific field of health or illness. The main reason for this choice is principally because I live in an isolated area, and it would have been almost impossible for me to find a relevant number of people with the same condition to propose a practical project.

I also did not want to offer this kind of project to a hospital or any other structure because I firmly believe that yoga has a different effect on a person that chooses deliberately to practise it as opposed to a person who is sent to a class. The conditions are not the same; and as it should be the care-seeker that takes the first step to start the process of yoga therapy, I abandoned this idea.

Writing this thesis, I have experienced a lot of its content in my own life, as it has been a great challenge. This has been an interesting process for me, and I have learnt to see the very small and insidious ways stress enters into daily life. Maybe one of the worst aspects of chronic stress is that we become accustomed to it. Gradually growing into a greater awareness of the nature and

workings of stress through the work on this thesis has helped me also on a personal level to live differently with what life may present, and which can or cannot be perceived as stress. For sure, my own yoga practice has saved me in this whole process!

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