

Precautions and prohibitions in Yoga?

A reasonable look at illness health and
homeostasis in yoga practice

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The large canvas.

Life is a challenge... and it's an even greater one to make our relatively short time on this planet meaningful and rich. Since humans began, our stories have been full of reflections on tragedies and suffering, joys and triumphs. Even in our comfortable western existence, there remains a deep yearning for inner peace. At an individual level we can often struggle with difficult emotions; fear, anxiety, anger, depression and loss. We can struggle with life's curved balls, setbacks and difficulties in our relationships with others. Life can seem very fragile and looking at the bigger picture it can be difficult to comprehend the immense suffering in the world and to make sense of our existence. Yoga, when based on sound principles can help us to make more sense of life and to live it in a more integrated and healthy way. An understanding of the homeostatic approach to life is fundamental to health. We are a complex arrangements of cells, organized into systems, which are constantly being regulated internally. Whilst many of these mechanisms tick over quite nicely without our knowledge, our habits can more easily affect others. Indeed. It can be strongly argued that slowly, over the years, our unconscious habits inevitably affect our ability to self regulate. Homeostasis becomes more imbalanced; we become less well regulated, leading to disease and ultimately death. Of course genetic makeup and external environment also affect us, I am not suggesting that we could live for ever by improving our regulation, but I am convinced that we could live more comfortably with ourselves.

Yoga, homeostasis and health

It's very difficult to start a discussion about yoga and health without first acknowledging that there are vast arrays of styles of yoga. It is unwise to say to someone who has health problems "go and do yoga" because you simply don't know what they are going to get. They may find a class that sits and chants, or one that is doing strenuous exercise in ninety degrees of heat. So, the following discussion is based on an approach to yoga that has at its heart an intention to integrate mind body and breath. Many systems of yoga will argue the same point... but I'll stick my neck out here and suggest that in my experience this is rarely the case.

Without wanting to labour the point yoga has, over its long history, evolved many different rationales for practice. Some are rooted in its cultural background, with semi mystical and religious overtones and some, more recent, versions have evolved in the competitive world of health and fitness and seem more to do with body culture than anything else. The view taken here is that yoga is to do with human integration, and the way we approach yoga is with this intention in mind. So, to the best of our understanding all the posture work and breath work should work with the needs of the body, thereby reducing somatic conflict. This point is essential in the discussion on precautions and prohibitions, if yoga is practiced purely as form of exercise it has to be treated as such and then falls under the same scrutiny as other vigorous exercise systems.

Evolution:

Since Darwin's discovery of the theory of evolution, everything changed. Our understanding of the place of human beings on the planet suddenly had context. We started to understand how we had got to be the way we are. Prior to evolutionary theory humankind was an enigma, obviously very different from all other animals but also quite like them; part of Darwin's difficulty at expounding his theory of natural selection was the general abhorrence felt by the populace that we were very like apes. Without the context of evolution, supernatural explanations for our condition were the most obvious ones, every religion has its creation story, and yoga was no different, The animating forces of prana ...breath of the Gods imbuing us with life was as good a story as any other, but Darwin changed all this; his carefully researched work showed how animals changed and responded to selection pressures... everything we are, is as a result of selection pressures crafting us into our present state. If we want to improve our understanding of the effectiveness of yoga, I suggest that evolution can teach us a lot. Perhaps the most remarkable thing about evolution is the balancing act of life itself. Right from the development of the first protoplasmic organisms to modern humans, the struggle has been to maintain a constant internal environment in a changing world, the more efficiently we do this the better our chances of survival.

Health:

If we are interested (in our yoga practice or teaching) in improving our overall well-being we need to understand this self-regulating process a little better. The term used to describe this process is homeostasis. Health is about our capacity to maintain homeostasis, if we can't we become ill and if, for some reason, the body is unable to restore homeostasis we will die. Much medical intervention is aimed at restoring homeostasis when the body's own mechanisms have failed. Evolution and Homeostasis are themes that are deeply woven into each other; in a sense natural selection can be seen as a long-term version of homeostasis – a species that can adapt and change to its changing surroundings will survive one that cannot simply won't. Every adaptation made during the course of our evolution has happened to improve our chances of survival. As we have evolved, the mechanisms that regulate homeostasis have become more and more sophisticated. The job of these mechanisms is to monitor both the external and internal environments and then make adjustments to make sure optimal conditions are maintained. Nervous systems have evolved to manage homeostasis; every aspect of our nervous system has at some point developed to improve our capacity to maintain healthy homeostasis. Primitive organisms developed simple sensors to monitor light, temperature, and nutrition, they also developed flagella to help move to or away from the conditions that they sought or wanted to leave. Knowledge of the outside world gained through the nervous system has no meaning if a muscular system hasn't developed alongside it; the neuromuscular system evolved alongside the sensory nervous system in order that appropriate action can be taken to restore homeostasis. We may have a sensory nervous system that informs us that we are hungry, but it's of no use if we don't have a muscular system that can help us catch food etc.

Homeostasis: All homeostatic control mechanisms have at least three interdependent components for the variable being regulated: There is the sensing component that monitors and responds to changes in the environment. When the receptor senses a stimulus, it sends information to a control centre, the component that sets the range at which a variable is maintained. The control centre determines an appropriate response to the stimulus. The result of that response feeds to the

receptor, either enhancing it with positive feedback or depressing it with negative feedback.

Example of homeostasis and the nervous system

Many of the mechanisms that regulate our internal environment are autonomic; this means we have no direct way of influencing them. For instance the calcium levels in my blood are regulated by the hormones calcitonin, parathyroid hormone and vitamin D. If blood calcium rises; calcitonin is released to reduce it, if blood calcium falls, PTH and vitamin D act together to raise levels. Without a blood test, I have no idea that this is going on, and no control over it, what I do know is that the margins for health are very narrow, and without this homeostatic mechanism working perfectly my health would suffer dramatically. The only possible way that I might consciously effect this mechanism is by making dramatic changes to my diet and reduce calcium intake to tiny amounts, or perhaps to reduce my exposure to sunlight and restrict my vitamin D intake, even then I'm not sure this mechanism would be the first to suffer.. but it might possibly have some effect. The point I'm really trying to make here is that to upset these very old homeostatic mechanisms, we have to step quite far outside our evolutionary parameters. A diet without calcium would be unusual for our ancestors, as would living without sunlight all the time.

We need to remember that these self-stabilising mechanisms have been refined over thousands of millions of years, and we wouldn't have survived if they hadn't worked reliably well. However, it is possible that some mechanisms are more vulnerable to upset than others. Ones that can be more readily 'wobbled' generally involve the neuromuscular system. (Because it is a voluntary system, and can therefore be habituated) First and foremost of these is the respiratory system and gaseous regulation in blood and tissues, secondly is the regulation of blood pressure.

The most visible self-regulatory process involving the nervous system is the much-touted stress response or fight / flight response. Our stress systems have been designed to cope with relatively short-lived stressors, such as predators or short fights.

In such circumstances, the sensors of the perceived threat are indeed our senses. Messages are relayed to various areas of the brain, particularly the hippocampus and amygdala, areas deep within the brain. These areas cause outpourings of the stress hormones, adrenaline, noradrenaline and glucocorticoids including cortisol. These chemicals act on the "effectors" of the homeostatic system to bring about the fight or flight response, by mobilizing fats in the body, releasing energy and heightening awareness.

When homeostasis is working well, as soon as the threat disappears, these chemicals should fall back to normal levels.

However, over the years, it has become apparent that this "old brain" stress response is not always helpful to our "modern lives". The stressors we are often exposed to nowadays are often long term, lower grade threats. But our stress response has remained the same. Instead of levels of stress hormones quickly returning to normal, they often remain elevated.

In fact, there is a very large body of evidence to suggest that chronically raised cortisol can actively damage the brain and immune system.

For example, there is evidence that people under long term stress, such as post-traumatic stress disorder survivors can show signs of damage to the hippocampus on MRI scans. As this area is involved in learning and memory, there are often associated deficits. (1)

Another study also looked at memory defects in patients with raised cortisol due to Cushing's syndrome, depression and PTSD and again identified hippocampal atrophy. (2)

Also interesting and heartening is the finding that nerve cell damage can recover, without cell loss, after chronic stress of some duration...(3)

Perhaps one of the main anxieties about teaching is the notion that students may hurt themselves unwittingly without any warning signs. Thus leaving the teacher exposed to litigation. In the main this is a very unlikely scenario. The body is deeply imbued with pain receptors; these are themselves mechanisms for homeostasis. If we do something to our body that risks damage, the body responds loudly and we stop doing it. Illnesses like leprosy that destroy nerve endings including pain receptors are dangerous for that reason, the sufferer is unable to respond appropriately to pain and discomfort and the consequences are

devastating. It is important in yoga practice that we lead students to an awareness of the level of discomfort they are in. We need to develop a more nuanced approach to the sensations that develop from comfort, go through effort into discomfort strain and finally pain. When we take these signals seriously it is almost impossible to cause damage to the body, particularly if the way yoga is taught pays close attention to the biomechanics of the musculoskeletal system. The other areas of worry regarding occult damage to ourselves or our students are when dealing with hypertension, and eye disease. The worry regarding hypertension is along the following lines.

High blood pressure if sustained leads to an imbalance of pressure between the inside of an arterial wall and the outside of the arterial wall at the capillary level. If the pressure inside the artery gets too great the artery may burst; if this happens inside the brain, the results are of course catastrophic, and stroke or death may result. Over a more chronic period, damage to kidneys, eyes and brain may occur. This is why high blood pressure is taken so seriously by the medical profession, and is usually treated by hypertensive drugs. If the blood pressure is brought down the risk of stroke is similarly reduced.

Now when we go upside down there is an increase in blood pressure in the brain this has been measured and is a well know effect, the thinking then goes that if you are already hypertensive, this increased pressure will increase the risk of stroke, Hence the prohibition on doing inverteds if you have high blood pressure. However there are other factors in play here. The risk is only real if there is a differential in pressures on the inside and outside of the arterial wall. What we also know is that intracranial pressure also rises when we go upside down this is regulated by changes in flow of cerebrospinal fluid (csf). In fact the relationship between csf flow and intra cranial pressure has been established for a long time it is known as the Monroe-Kellie hypothesis (*Mokri B (June 2001) "The Monro-Kellie hypothesis: applications in CSF volume depletion"*). What this means is that as we move into inversion both inta-arterial pressure and intra cranial pressure rise together, thus a differential between the two does not develop, and risk of stroke does not increase. This is supported by the lack of epidemiology, there doesn't appear to be any correlation in the medical literature to support the notion that risk of stroke increases with inversion, and as far as we are aware doctors are not

given guidance to prevent hypertensive patients from bending forwards. It does make sense however to develop inversions slowly, particularly inversions like head-balance. It only makes sense to practice these poses... or any other poses for that matter when they can be done without accruing unnecessary muscular tension.

There is, reassuringly enough, a body of evidence that shows that yoga in general can be a very positive step towards reducing hypertension in at risk groups.

A slightly different scenario is seen in the case of glaucoma, one of the commonest causes of blindness in people over 40. It is an ill-understood condition, but probably has some connection with raised pressure within the eye causing damage to the optic nerve.

The front of the eye is filled with a watery substance, which usually drains into the bloodstream, keeping the intraocular pressure within normal limits. In glaucoma, this drainage can get blocked leading to a damaging rise in the intraocular pressure.

There is a significant body of evidence from 1970s to the present day that headstand or inversions generally, cause an increase in intraocular pressure, and particularly when performed for extended periods, or in susceptible individuals, may exacerbate glaucoma.

- (1) De Barros et al. "progressive optic neuropathy in congenital glaucoma associated with sirsasana yoga position", *Ophthalmology, lasers and imaging* July/ aug 2008 39/4 339-40
- (2) Gallardo et al. "progressive glaucoma with headstand" *Advances in Therapy* Nov 2006 23/6 921-25

The social ape:

Internal regulation is only part of the picture of homeostasis. Recent works by leading neurobiologists and evolutionary biologists have shed light on the role of emotions and feelings in human beings.

It seems that emotions and feelings evolved as a means to regulate complex social interactions. Social groups develop because they give a greater chance of survival than remaining an individual. Socialisation demands certain trade offs, a member of a group cannot simply do what it wants, like take all the food for instance. Taking all the food maybe what the individual wants, but there needs to be some social pressure to stop this happening, the emotion of anger from other members in the group helps regulate behaviour. Altruistic behaviour probably developed as a 'I'll scratch your back if you'll scratch mine'. Primates have some of the most complex social groupings in the animal world; they also show a sophisticated array of emotional activities. Our closest relatives the chimpanzees and bonobos both live in close social groups and their respective societies are regulated with very different emotional behaviour. Chimps, apparently, have a very authoritarian approach to keeping social order, the young are intimidated into behaving well, and if they step out of line, they get beaten by the higher males. It is not uncommon for young male chimps to vomit or defecate through sheer anxiety if an adult male near them has been antagonised. Chimps are ruthless hunters, and will go to some lengths to intimidate rival bands, who get too near their territory. Bonobos (who look almost identical) have a very different approach, inter-social disputes are resolved by frantic bouts of sex, any partners go. Same sex, young, old it seems to make no difference. Not surprisingly, there is little social anxiety within social groups,.. but they seem less good however at defending territory.... Human beings seem to occupy a position somewhere between the two!

However, the obvious observation that comes out of this is that emotions act as a social homeostasis, binding groups into some sort of social cohesion. When things aren't running smoothly, we feel emotional and we tend to act on those feelings to change things. When social interactions go wrong we suffer, and it's not just that we suffer by feeling miserable, we suffer internally as well. Babies that have little or no interaction with carers suffer dreadfully, without touch and comfort, a baby

can die even if it is fed and watered. As we become older, we are more resilient but we still depend on each other for our emotional health. Our internal milieu is changed by the way we interact with others. Long term unhappiness elicits similar stress responses as those outlined above, Health doesn't simply demand that we eat well and exercise, we need also to pay attention to how we feel physically and emotionally and act as intelligently as we can on those feelings.

Perspective:

Physical health has, in the past, been largely left to doctors and more recently alternative therapists. Emotional health has been the realm of priests and analysts. Yoga teachers are neither of these things, we aren't trying to heal the sick or analyse psychological problems. However, we do brush against both the psychology and physiology of our students. People often choose yoga rather than an 'exercise class' because it seems to offer more, taken seriously, it can be a truly holistic system. So how do we approach the problems that people bring to class?

If we are to take seriously our concerns to be holistic rather than reductionist; we need to consider homeostasis as our prime objective. Another way of looking at it is to say we are trying to 'normalise' human function. Or perhaps even more precisely, steer people towards normal function. Very few people, if any, function at their optimum, it probably isn't possible for the majority of us. However, many of us could move more in that direction. I'm not just talking about lifestyle choices here. Of course whether we smoke, drink, or eat too much will affect our health. It's easy to feel judgmental about these things, but it's worth remembering that even these things are attempts to maintain some emotional homeostasis, perhaps trying to replace something lacking elsewhere. These aren't the central theme of yoga. In yoga we are looking at how we move, how we breathe and how we feel. In fact, we are looking at how we inhabit our bodies. When we start to really pay attention to how we are, we notice more clearly the things that cause us discomfort and the things that make us feel better. If we stop noticing, we are more likely to move away from homeostasis. Think about how animals behave; when they are tired they sleep, when they are hungry, they eat and when they are wakeful they are active, they act on their feelings and in doing so they regulate

their lives. Modern life often takes us away from the ability to respond to feelings, but if we ignore them for too long illness can be one of the consequences.

Illness;

How does illness occur? We may be unlucky, it may be in our genes; we may have genetic vulnerabilities to certain conditions. We may have contracted illness through our lifestyles. We may have had an accident that predisposed us to certain problems. We also become ill because its part of being human, and generally our homeostatic mechanisms put us back to rights. If we contract some virus, the body will raise its temperature to hasten the production of antibodies, and to make conditions more difficult for the virus. We get a fever, the virus is subdued.

Today, and perhaps always, there seem to be a raft of illnesses that are hard to pin down, IBS, CFS, ME, fibromyalgia, tension headaches and many more. Pains in muscles and joints account for an enormous amount of time off work. With such problems there is no magic cure, but bringing people slowly back into touch with themselves is often extremely helpful, to get them to sense and feel how they move, how they breathe and how they are emotionally. It's only when you know these things that you can do something about them. Without this knowledge, you have to rely on someone else to fix you.

YOGA: How we teach;

If we take this onboard, it seems obvious that the main objective in teaching yoga is to remove things that lead people away from homeostasis and add things that move them towards it. This may sound simplistic but it is actually extremely helpful; the difficulty is identifying what people do that is harming, and knowing what to add that is helpful. Perhaps the first thing to consider is that good relaxation will remove many of the things that people do to themselves that cause problems. So, getting people to lose tension is a pre-requisite. The skill is in getting people to move again without bringing their old tensions with them, this takes regular and interested practice. The goal of the practice must be to watch when unnecessary tension creeps in, and to then try and repeat the movement without the tension. Of course this process is about developing awareness more than

anything else, and the intention is that awareness seeps into every aspect of life - not just the way the knee is pointing in asana.

This is quite a shift in emphasis from many of the forms of Yoga that are around at the moment. It also makes sense that postures are developed around sound bio mechanics and well understood movement patterns that improve the overall use of the body. How do we make judgements about what is useful and what is not? Well again, we can appeal to our understanding of the evolution of the body and look at the way the body has evolved to move, this gives us some security in its intrinsic safety. Breathing also doesn't generally go wrong because we stop trying to breathe enough; usually we do something that interferes with the breath, so again we are looking for what it is we do that is interfering with optimal breathing. To some extent this approach is trying to relieve teachers of the burden of being healers... we are not trying to mend people, rather start to provide an environment where healing might be possible. The intention is to be as inclusive as possible; we should try not to separate people by illness anymore than we should by race or religion; someone with a heart condition still needs to move in all the ways a healthy person does, to breathe as effectively as possible. If we find easier ways to make people move, it will help whatever the condition they have. What we are defining here is a philosophy of teaching that is inclusive, if we are to deal with illness with its associated precautions and prohibitions how we teach needs to be part of our perspective.

If I think of one of my evening classes, I have one man who has had a brain tumour, one woman with a replacement knee, one man with depression and another with anxiety... and they are the ones I know about. As the intention of the class is to progress towards postures and to stop when unhelpful tension comes in they all benefit.. There is no emphasis in getting into poses, just moving towards them. Sometimes, this approach is criticised for not taking people to their edge, not challenging them enough. But this is an issue for the teacher really, as a teacher gathers experience the capacity to encourage different students to different levels improves; this is a skill we need to develop. A broader argument where classes are set up for conditions, again focuses on the condition rather than the person, it is the condition-orientated approach that we are trying to get away from. It is true that when someone is so limited in movement it may be best to see them

individually or in small groups, and terminally ill students often gain something from being with people in the same situation, but these are the exception rather than the rule. There are also arguments to be made for classes for the very elderly, wheel chairs etc, but where possible I think an inclusive approach orientates us the right way, to see the human being not the illness, to concentrate on health, not conditions.

1. "Does stress damage the brain?" JD Bremner. *Biol Psychiatry* 1999 Apr1;45(7)797-805
2. "Glucocorticoids and hippocampal atrophy in neuropsychiatric disorders" RM Sapelsky. *Arch Gen Psychiatry* 2000 Oct;57(10) 925-35
3. "Chronic stress-induced hippocampal vulnerability" C D Conrad. *Rev neuroscience* 2008;19(6) 395.411