

THE MECHANICS OF YOGA

How to Minimize Your Risk of Yoga Related Injury

A Yoga Book for Teachers and Students of All Disciplines



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How to Minimize Your Risk
of Yoga Related Injuries

A Yoga Book for Teachers
and Students of All Discipline

By Sam Dworkis

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The techniques, ideas, and suggestions in this book are not intended as a substitute
for proper medical advice. Consult your physician or health care professional before beginning this
or any new exercise program, particularly if you are pregnant or nursing, or if you are elderly
or if you have any chronic or recurring physical conditions. Any application of the techniques, ideas,
and suggestions in this book is at the reader's sole discretion and risk.

Table of Contents

Introduction	7
How Yoga Works	9
History of Yoga	11
Toward	14
Intrinsic vs. Extrinsic	17
The All Important Fascia	20
7 Principles	26
NeuroMuscular Laws	35
Bachin Alignment	43
Conclusion	44

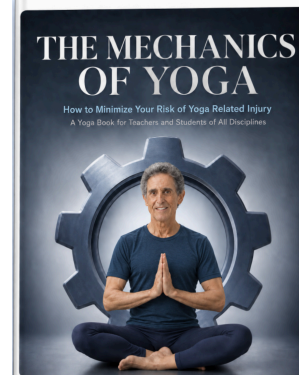
Table of Contents - continued

Pain Management - Part 1	46
Pain Management - Part 2	48
Pain Management - Part 3	53
Yoga & Aging	63
Meditation & Yoga	66
Spirituality & Yoga	70
Religion & Yoga	76
The Medical Benefits of Yoga	80
Q & A	86

Introduction

We live in remarkable times. For thousands of years, few people had access to any form of yoga training, and those who did sacrificed greatly in order to acquire that knowledge. Historically, the process was a disciplined, face-to-face, one-way flow of information from yoga teacher to student.

All of that has radically changed with the advent of books, videos, worldwide travel, and now with the Internet and email. I am the author of three yoga books including *The Mechanics of Yoga*, the extensive online book you are about to read.



My first book, *ExTension Yoga*, was published by Simon & Schuster. It is a carefully planned program of progressive yoga exercises (asana) designed for all normally healthy people, from couch potatoes to world class athletes and for everyone in between.

You do not have to be strong or flexible to successfully practice *ExTension Yoga*. In fact, this program is not about "trying" to enhance your flexibility, strength, and endurance; but instead, flexibility, strength, and endurance are profoundly enhanced as the result of learning how to "do" an appropriate yoga practice.

Note: I will explain later on how semantics plays a fundamental role in learning how to "maximize your yoga potential and minimize your risk of injury."

When I began writing *ExTension Yoga* nearly 20 years ago, most yoga books on the market had pictures of very flexible teachers demonstrating their poses. Through their pictures and words, the authors were encouraging their readers to try and do the exercises as demonstrated, as best they could.

Few of those books offered much information on how to do the exercises for people who were not as flexible as its models; and fewer yet offered even the possibility that yoga could or should be adapted for less flexible students. Instead, advice was generally given along the lines of: "Just keep trying and flexibility will eventually come." Or, "If it hurts, just don't go as far." I felt readers, regardless of their flexibility, needed more information on how to safely do the exercises and how to avoid yoga related injuries.

I wrote *ExTension* because far too many people quit yoga because they felt they weren't flexible enough; or they felt it was too difficult; or worse yet, people were quitting because they were afraid they'd injure themselves. What bothered me the most was that people felt that yoga was dangerous.

I wanted *ExTension* to be a different kind of book, where everyone regardless of flexibility or strength, could successfully practice and reap its benefits by learning how to adapt each and every exercise for their own unique level of flexibility, strength, or endurance.*

My second book, *Recovery Yoga* was published by Random House a few years later. It was a project conceptualized and developed from my own personal experience because just as *ExTension* was about to be released, I developed multiple sclerosis ... and the direction of my life and my understanding of yoga changed dramatically.

As my illness progressed, my body became racked with pain and injury; and my ability to practice even the easiest routines from *ExTension* became difficult. As a result, I began experimenting with adapting its exercises so that I could continue to successfully do yoga ... not try to do yoga.

As I slowly began to understand my changing body, the perception of "doing versus trying" became increasingly important to both my understanding of yoga and what I was able to get from it.

Recovery Yoga evolved into another carefully planned yoga program that I designed for three groups of people: Those who are chronically ill or severely injured; those who are dramatically out-of-shape; and those who are growing older but still want to successfully exercise.

This web-book is the bridge that connects both *ExTension* and *Recovery Yoga*. In so doing, it does three important things.

1. It explores the bio-mechanics of how yoga works.
2. It explains how "doing less correctly" gets you more.
3. And it explains what it means to "do yoga" rather than "trying to do yoga."

Although it might be difficult to understand at first, both *ExTension* and *Recovery Yoga* use exactly the same logic and principles that apply to everyone, *regardless* if you are flexible or tight, strong or weak, healthy or ill, young or old.

How can this be? How can both programs target such divergent groups of people, from highly trained athletes to chronically ill, injured, and aging people, yet use exactly the same logic and principles; logic and principles that minimizes your risk of injury and at the very same time, promotes enhanced strength, endurance, and flexibility. Continue on to the next page to find out how.

Chapter 1: How Yoga Works

How Yoga Works
The Mechanics of Yoga from a Western Perspective

The Principles by Which Yoga Works:

- No one is perfectly balanced: Everyone, to some extent or another, is imbalanced.
- Trauma, be it emotional or physical, exacerbates that imbalance *and* contracts soft tissue
- Aging further exacerbates imbalance and soft tissue contraction
- Yoga, when appropriately practiced, facilitates movement *toward* balance *and* reduces soft tissue contraction. But when inappropriately practiced, yoga can further exacerbate imbalance and contraction.

The term "yoga" can mean different things to different people. To me, yoga is merely the process of paying attention ... and exploring the movement toward "balance and union" of body, mind, and spirit. This website explores the many mechanics by which yoga assists this exploration.

However, yoga is a proverbial double-edge sword. When appropriately practiced, yoga can cut-away much of the imbalance and pain that interferes with daily life. On the other hand, when inappropriately practiced, the other edge of this proverbial yoga sword can exacerbate your imbalance, or increase your pain, or even injure you making your life even more uncomfortable.

Thus, this website also explores in depth, *how these very same* mechanics, when *inappropriately* used, can both create injury and/or exacerbate previous injury, illness, or structural imbalance.

I would like to share a letter I received from Paul Rebhan, a spiritual man and world traveler. His commentary, as with every communiqué used throughout this website, is used with permission:

I recently took a yoga class and the teacher was saying things like: "If you are not feeling pain, you are not doing it right." "If you get dizzy, it's ok" "If you are not giving 110% on every position, you are wasting your time" "We don't do any of that touchy-feely yoga here!" etcetera.

A few positions required our legs spread 3 feet apart ... at my height, 3 feet is no big deal, but to someone much shorter, like the woman next to me, it is a much greater stretch - he kept badgering her about things like that - very disturbing.

It was a really rough workout and after the class, I didn't feel any of the release that I felt with yours or any of the re-balancing that I feel with my own yoga.

Anyway, thought you might be interested in hearing about the experience ... not surprisingly, I don't think I'll be visiting that studio again.

Although I fundamentally honor all yoga systems, Paul presents a situation where no one wins. At best, this type of presentation often causes students with lesser abilities to quit yoga; and at worst, willing students can, and often do, become injured.

Paul's experience is unfortunately all too common and demonstrates a need for this website.

There is definitely a place for vigorous approaches to yoga but for it to be "yogic," I believe it must be taught in a way that does not adversely challenge the physical, emotional, *or spiritual integrity* of the practitioner. My experience is that by using the techniques shared in this website, anyone from world-class athletes to chronically ill and injured people can do "appropriate" yoga, with no one being excluded.

That's what I love about yoga: It's so "flexible." It can be "soft" (meditatively taught) or it can be "hard" (assertively or aerobically taught) or it can be anything in between. But to be "yoga," all systems need to be non-aggressive and certainly not demeaning. I therefore bring you back to my two fundamental questions:



What is yoga?

How does it feel?

The remainder of this web-book addresses these two questions in detail. The entire first section, "Mechanics of Yoga" and its chapters delves into the concepts and logic of ExTension and Recovery Yoga.

It all begins with the next page, "A Brief History of Yoga." It establishes the reasons why we, as Westerners, can benefit by looking at yoga today in relation to its historical foundations. The actual *Mechanics of Yoga* begins with the page after that.

Chapter 2: History of Yoga

A brief history of yoga from a western

Introduction:

The following is a generalized history of yoga that focuses primarily upon its physical orientation; and I fully acknowledge that yoga's actual history involves a complex spiritual evolution that has taken place over thousands of years. There is a more in-depth exploration of yoga's spiritual development and components in subsequent pages.

Throughout this website, I refer to *yoga* as a system primarily of physical exercises along with appropriate breath management that is designed to bring the practitioner *toward* a balance of body, mind, *and* spirit.

The word, *yoga*, is derived from Sanskrit, one of the world's most ancient languages. In its simplicity, *yoga* means: "a bringing together of the parts in order to create a union or balance of a person's body, mind, and spirit."

Our contemporary western concept of yoga has little, if anything, to do with anyone's religion or belief system. However, it must be said that our contemporary western approach to yoga is but a small part of the original "yoga" that developed thousands of years ago in India, and is still being taught throughout the world.



It is said that many thousands of years ago in India, various orders of high Hindu priests developed parallel concepts of yoga. They were ascetics, living a strict and disciplined lifestyle. Through the millennia and particularly in the south of India, the "yogis" as they were known, were vegetarians, wore minimal clothing, and lived literally close to the earth learning directly from nature.

In addition to their many other disciplined and spiritual practices, these spiritual ancients observed that in nature, the bodies of animals were almost always perfectly balanced. They exhibited profound flexibility, strength and endurance and were always living in balance with their environment.

When hungry, animals ate. When tired, they rested. And when injured, animals sought refuge in a quiet place and stayed until they healed, or died. Animals, the yogis observed, showed little fear or anxiety; but when they did, it didn't last long because animals, they surmised, did not appear to worry about the past or future.

From generation to generation, for thousands of years, and in concert with a deeply involved system of spiritual practices, "exercising the body in order to center the mind," was only a small component of the yogis' practice and teaching.

Through millennia, however, various yogis developed and codified a system of physical practices that emulated the perfection of nature. Their ancient yoga texts described how their intense practices both enhanced health and spirituality, thereby allowing them to merge with Universal Consciousness.

Historically, these ancient people lived in totally protected religious environments spending virtually all of their time in devotional prayer that included the exercises. It is important to note that until the beginning of the twentieth century, all yogis were devout practicing Hindu "priests"; which is not true today. Modern evolutionary approaches to yoga have created clear delineations between the Hindu religion and the practice of yoga.

Therefore, throughout the remainder of this website, I shall define *yoga* to mean simply, "a movement *toward* union or balance." So, let's repeat and make it very clear that my use of the term *yoga* in and of itself has absolutely nothing to do with Hinduism or with *anyone's* religion.



OK, getting back to that ancient priest class in India: Because of their highly protected life-style and because most of them were devout vegetarians living in a tropical environment, their bodies were extraordinarily supple. Kind of like Gumby, which is to say, their bodies were not at all like today's often uptight, often injured, and usually stressed-out-to-the-max western bodies.

As previously stated, through the eons many forms and approaches to yoga had developed, but only a few became popular in the West. Historically, most approaches to yoga focused upon various forms of devotional prayer while only some focused upon physical exercises and breath management.

Let's now fast forward to the beginning of the twentieth century. History records that several Hindu yoga-masters traveled to the west in order to share their religious and cultural beliefs. Having their faith and thousands of years of yogic practices behind them, these yoga disciples, or Swamis as they were called, began to lecture and teach.

The Swamis initiated a number of different approaches to yoga; most were Hindu based spiritual practices with many of them incorporating the physical components of yoga. In actuality, the physical components of yoga were but a small part of their overall teachings, yet there were a few Swamis who more or less specialized in the physically-oriented approach to yoga. Thus, yoga came to the west and again, because its original proponents were Hindu based, it is understandable why yoga had become associated with the Hindu religion.

In our western youth-oriented society, the most popular forms of yoga being taught today are combinations of yoga exercises and breath management known as *Hatha Yoga*, or simply, *yoga*. Although there are many popular styles of yoga ranging from the restorative and quiet, all the way to extreme forms of physically challenging yoga; all are based upon ancient exercises and all incorporate some aspects of breath management. When yoga exercises are appropriately practiced in combination with breath management, enhanced physical, emotional and spiritual health results.

And herein lies yoga's potential problem and the reason for this entire website. Because hatha yoga was originally but a small component of the entire system and because hatha yoga was practiced by people living a totally different lifestyle within a totally different culture from westerners today, the more traditional or *classical* approach to hatha yoga and breathing exercises offers a potential liability to a western body.

On the other hand, the entire purpose of this website is to understand and to adapt yoga exercise and breathe management in accordance with known physiological principles and laws in order to *maximize yoga's potential and minimize its liability*.

Let's begin by looking at what I believe is the one most important concept in yoga:

The Operative Word of Yoga is "Toward"

¹[Merriam-Webster's Online Collegiate Dictionary](#)

²Thanks to Mathew J. Taylor, MPT, RYT, for his generous feedback to this website (Used with permission):

"Another helpful description is that the final stage of an asana (the 'picture' in the book) is achieved through natural mini-stages in a sequence that progresses the patient from midline stability distally, restoring stability and motor sequencing to address both primary and secondary impairments. Each mini-stage can present a temporary disequilibrium by deviating the position of the center of gravity relative to midline or the base of support. When the mini-stage is mastered through integration of the equilibrium and righting responses as a whole, the asana proceeds along the continuum, generally from the core, proximal to distal toward the full postural pattern with symmetry along the midline, all key components of functional movement."

(See Taylor, Matthew, *Yoga Therapeutics in Neurologic Physical Therapy: An Ancient Practice in a 21st Century Setting* Neurology Report, Jun 2001). Also refer to Mathew Taylor's website www.yogatherapy.com for a wealth of valuable information on yoga and bodywork.

³Thanks to Terri Corral's feedback (Used with permission):

"In the chapter titled Toward you state that "an appropriate yoga practice is not about *trying*, but rather *doing*." It is my belief that an appropriate yoga practice is more about *being*. *Being* in the moment, *being* present, is what yoga is about. Accepting ourselves as perfect, as we are at the moment, any moment, is a difficult concept to express and communicate clearly. We are TRULY limited by the words we speak!! But this acceptance is an important concept. We each have our limitations. But through our yogic practice we reach our limits and experience who we are. As we stretch past our limits, just a little, we have an opportunity to flex and expand, strengthening who we are physically, emotionally and spiritually."

Chapter 3: Toward

The Logic of an Appropriate Yoga Practice:

The Operative Word Must Be . . . "Toward"

Introduction:

What does the term "yoga" imply? When we look at its etymology, *yoga* is a noun coming originally from Sanskrit; meaning literally to *yoke*, to *join*, or to *bring together the parts to meet the whole*. Merriam-Webster¹ defines yoga as:

capitalized: Yoga is a Hindu theistic philosophy teaching the suppression of all activity of body, mind, and will in order that the self may realize its distinction from them and attain liberation

non-capitalized: yoga is a system of exercises for attaining bodily or mental control and well-being

With respect to those who practice Yoga as a Hindu theistic philosophy, *ExTension* and *Recovery Yoga* is based primarily upon a western approach to yoga. As described in these chapters, all of its principles and concepts are based upon established neuromuscular principles and laws, physiology, anatomy, and kinesiology. For our purposes therefore, yoga may be further defined as:

a system of physical and mental exercises done with coordinated breathing, designed to move the body, mind, and spirit *toward* balance and union

In order to appropriately practice yoga as defined herein, we must recognize that the very structure of human anatomy and its internal composition makes it outright impossible for a human being to be perfectly balanced left-side to right-side, front-to-back; and that the introduction of stress, internally or externally only exacerbates that imbalance.

Because the word *yoga* literally means *union and balance*; and because the human body is not now, nor can it ever be perfectly balanced, then yoga when appropriately practiced, can only help a person move *toward* balance and union of body, mind, breath, and spirit.

Therefore, the operative word of yoga must be "toward:"



Because a human body can never be perfectly balanced, the operative word of yoga, therefore, must be toward. That is; an appropriate yoga practice can only help a person move *toward* union or balance.

Accordingly, you don't need to be flexible, or strong, or even ambulatory to do appropriate yoga. An appropriate yoga practice therefore has absolutely nothing to do with being flexible or strong.

In fact, an overly flexible person is as imbalanced as a person who is overly strong or tight. Both can lead to physical (or emotional) distress. In order to do "appropriate" yoga, one just needs to begin the process of moving **toward** union or balance of flexibility, strength, and endurance. Enhanced physical, emotional, and spiritual health is not yoga's goal, but ultimately *develops* from an appropriate yoga practice.

Enhanced flexibility, strength, and endurance are not yoga's goal: Instead, if there were a "goal" of yoga, it would simply be learning how to pay attention to how the body and mind responds to an appropriate practice.

It Is What It Is:

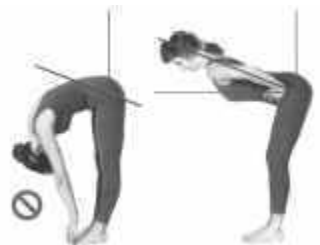
The term: **What Is** is defined as "how you are feeling right now, at this moment." **What Is** is not *trying* to get your hands to the floor; or *trying* to do a headstand, or *trying* to do a backbend, or *trying* to do any particular yoga exercise.

More importantly, an appropriate yoga practice is not *trying* to get your body to feel like it may have felt in the past ... or how you want your body to be now or in the future. In fact, right now, at this exact moment, **your body is how it should be**. If you were supposed to be different at this exact moment; you would already be there.

Semantics notwithstanding, an appropriate yoga practice, therefore, is not about *trying*; it is about non-aggressively *doing*.² My more spiritual colleagues might even prefer the concept, "an appropriate yoga practice is not about *trying*; it is about *being*."³



Probably for us as Westerners, the most difficult aspect of an appropriate yoga practice is learning how to give up "*trying* or *forcing*," but instead learning how to observe and appreciate our body as it actually is ... at this very moment. This is especially true if you perceive yourself as being "tight" or "out of shape" because of lethargy, or because you are chronically ill or injured.



Acknowledging your "*place of perfection*" is at the very foundation of an appropriate yoga practice. In other words, an appropriate yoga practice teaches you how to pay attention to how your body is feeling and performing right now at this moment ; *not* by trying to get your body to feel like it did a few years ago or even yesterday (which is living in the past). Or how you might *wish* might or *want* your body to feel or to perform (which is living in the future). Finally, an appropriate yoga practice is certainly not about giving up and doing nothing. It's learning how to do *less* in order to get *more*.

Your Place of Perfection:

As you initiate your daily yoga practice and as you pay attention to your body as it is *right now*; from your current "*place of perfection*," your body becomes receptive to positive change; *when it is not forced*.

Follow me through here: If you were already stronger, or more flexible, or healthier; you would *already* be there. *Trying to get stronger or more flexible is forcing*, and by definition, forcing moves you away from the "balance and union" of yoga.

Therefore, yoga poses when forced or aggressively practiced might be good exercise, and exercise definitely has its advantages; but yoga, **when appropriately practiced**, is an altogether different modality when it moves the body, mind, and spirit **towards** balance and union.

Two Most Important Questions a Yoga Practitioner or Yoga Teacher Can Ask:

I'm constantly asked: "What does yoga do?" My response usually takes people back when I say: "Yoga doesn't do anything."

As I stated above, I believe yoga has nothing to do with **trying** to achieve flexibility, strength, or for that matter, endurance. That being said, by using yoga as an appropriate tool, your body begins to move **toward** balance and union, and an integration begins to occur that transcends the physical body: You begin to experience increased flexibility, strength, and endurance ... physically, mentally, and emotionally.

The following chapter on Pain Management presents the logic and mechanics that differentiate an appropriate yoga practice from all other forms of exercise. That being said, in order to circumvent injury or even the feeling of, "I can't do that," there are two fundamental questions that all yoga practitioners and teachers ought to ask themselves:

- 1. What is Yoga?
- 2. How does it feel?

Chapter 4: Intrinsic vs. Extrinsic

The Concept of “Intrinsic Yoga” vs. “Extrinsic Yoga”
Explains the difference between yoga and other forms of exercise

When appropriately practiced, yoga is a totally "intrinsic" activity. This means there are no goals other than paying attention, without attachment, to its processes. There is no good or bad when doing an intrinsic oriented activity; it just "is what it is."



Sports, most exercise programs, and the dancing arts are all “extrinsic” oriented activities. For that matter, so is physical therapy and massage. In physical therapy, massage and most therapeutic modalities, the person is usually a passive recipient while the therapist manipulates the body in order to achieve a desired outcome or goal; such as improving joint mobility or muscle flexibility.

Weight training and aerobics also have specific goals. And of course, with sport, the main goal is *trying* to meet a standard or to beat the competition: to make a point or score, or *trying* to prevent it. Even within the dancing arts, specific movements are to be mastered and performances are to be given. All are examples of "extrinsic" activities.

On the other hand, yoga exercise when appropriately practiced, is done without *trying* and *without* goals. It is intrinsic. There are no goals in yoga other than to experience the pure joy of being present and by paying total attention to *what is*:

The differences and effects upon your body and mind are profound. Since there are no goals other than to experience the reality of *what is*, **an appropriate yoga practice therefore starts from your place of perfection**; that is, from a neutral place where your body feels no added discomfort or stress!

If you are in good or reasonably good shape, you can begin your yoga practice either by standing or lying down. But if you are chronically ill or injured, it's better to start by lying down with supports under any part of your body that is uncomfortable.

In other words, the very best way to start yoga is to begin without discomfort. I sometimes call it “starting from a neutral place.”

Then you can add appropriate and intelligent *incremental exercise components* that *appropriately challenge* your body without creating liability. Then can you enhance flexibility and

strength, *all without exacerbating discomfort*. When incremental components are added, it is possible to maximize benefit while minimizing liability...thereby reducing discomfort.

Adding such incremental components will, therefore, not traumatize irritate your body. (I'm going to speak more about this in a minute). So, rather than *try* to reach an extraneous goal such as *trying* to increase your flexibility, strength or endurance; an appropriate yoga practice encourages your body to explore its limits without forcing and therefore; flexibility, strength and endurance become merely a result of an appropriate yoga practice.

On the other hand, *trying* to increase strength, endurance, and flexibility might work—but trying might also create or increase stress thereby potentially compromising yoga's benefits.

The implication of *trying* becomes especially relevant when you have passed the ages and stages thresholds of 28-32, 38-42, 48-52 and so on. These implications are *especially* relevant if you have been, or currently are, chronically ill or injured. On the next page, you will come to realize that the harder you *try* to change your body, the more your body may react in the opposite way you intended. To understand these mechanics, we need to take a quick look at how your body is constructed. From there, it is easier to understand how an appropriate yoga practice can get you more...by doing less.

The Bachin Charts are used by permission of the Anatomical Chart Company, Skokie, IL.

Fascia and Muscle illustrations from C.D. Clemente: Anatomy. A Regional Atlas of the Human Body, 3rd Ed. Philadelphia. Used with permission.

- 1 A "tissue" is a group of similar cells united to perform a specific function.
- 2 vascularization is growth of blood vessels into a tissue with the result that the oxygen and nutrient supply is improved.
- 3 For an in depth study of ligament vascularization, [see](#):
- 4 Personal correspondence with Mathew J. Taylor, MPT, RYT, April, 2001, used with permission:

Taylor: Equally and in the case of ACLs for sure is the neurofeedback mechanism of the ligament conveying proprioceptive input to both the PNS and CNS via type III mechanoreceptors&this feed back loop is altered and modified with inappropriate stretching thus not only is the static integrity of the ligament and corresponding joint compromised, but the reflex loop for control is damaged. Takes the info beyond the massage level of physiology to high end exercise phys. On the other hand, because tendon is less vascularized, aggressive or consistent stretching in and around a joint often results in chronic tendinitis. I'm not sure this statement can be substantiated, particularly consistent &inappropriate or excessive yes, consistent with good technique should be fine as the dynamic muscular component will absorb the energetic load and dissipate the forces.

Dworkis: You are correct, but how may people understand and/or can employ "good technique." In any event, my statement needs clarification. I've changed that paragraph as follows: "On the other hand, because tendon is less vascularized; aggressive, excessive, or otherwise inappropriate stretching in and around a joint can result in chronic tendinitis." Taylor: Bingo5 ibid

Taylor: There is actually a good deal of cortex override that suppresses primitive brain tone and reflexes(the spastic stroke) thereby inhibiting contractions vs causing them. This is critical when we try to link the mind or frontal cortex functioning to motor or exercise performance. How germane to this audience I'm not sure, but if you want the docs and rehab people to climb on board, might need to acknowledge complexity similar to how you did with simplification of yoga.
Dworkis: I agree. Changes have been made and are now reflected above.

Chapter 5: The All Important Fascia

In order to better understand just how yoga works, we need to examine the specific physiological Principles and Laws that apply directly to yoga. But first, we need to take a closer look at blood, muscle, tendon, ligament and the all important fascia; collectively known as soft tissue.¹

1. [Blood](#)
2. [Ligament](#)
3. [Tendon](#)
4. [Muscle](#)
5. [Fascia](#)
6. [Hilton's Law](#)

Blood

Blood is the main transportation system of the body by supplying oxygen and nutrients. Blood gives the body its energy and promotes healing. Blood also transports the effluents of metabolism away from the body.

Ligament

Ligament is a dense, fibrous material that connects bone-to-bone. It needs to be very strong and in order to maintain stability, it needs to resist stretching. As compared to tendon and muscle, ligament is the least pliable and has the least apparent vascularisation.² As such, sudden over stretching and tearing of ligaments usually causes significant and debilitating injury.³

Look at the knee detail in Bachin's Skeletal System (click on [Bachin](#) to see the entire skeletal system; then left-click and select "BACK" to return to this page) It shows that ligament, unlike muscle tissue, is completely white indicating limited blood infusion. Accordingly, a severe ligament injury has little ability to heal itself and repair usually requires surgical intervention.

You obviously would not wish to intentionally irritate or tear a ligament. Yet when *trying* to do yoga, it is easy to stretch deeply into and around joints irritating both tendons and ligaments.

Both *ExTension* and *Recovery Yoga* clearly and definitely avoid deep joint and ligament stretching.

Tendon

Tendon is also a strong and dense fibrous material, but less so than ligament. Muscles do not directly attach to bones, but instead, merge into tendons and it is the tendon that attaches to bone. Although tendon is more vascularized than ligament, it is far less vascularized than muscle. Even though tendon is more elastic and vascularized than ligament, sudden or prolonged tendon stretching can create a chronic and debilitating inflammation of tendon, known as *tendinitis*.⁴



These two pictures illustrate the difference between muscle and tendon. Look at the picture on the left. Bend your arm, take your fingers and pluck that bony like structure that's close to your elbow joint. That's not actually bone; its *tendon*.

Now look at the photo on the right. Take your fingers and squeeze all around the thicker tissue which is the belly of your biceps *muscle*. Again, the differences in these tissues are profound. Muscle is fully vascularized, elastic and is designed to lengthen and contract.



Whenever you over exercise and experience that familiar muscle soreness, you have actually created micro-muscle tearing. But due to muscles' abundant blood supply, you heal quickly and your soreness rapidly dissipates.

On the other hand, because tendon is less vascularized; aggressive, excessive, or otherwise inappropriate stretching in and around joints can result in chronic tendinitis. One last thing here; as we continue to age, ligament and tendon become naturally less vascularized thereby increasing the risk of soft tissue injury. ("Ages and stages" will be discussed more in depth later on). Muscle is a fully vascularized, blood-infused tissue. When you look at [Bachin's Muscular System](#), you see that muscles are darker (more red) than tendons and ligaments.

Because muscle merges into tendon and tendon attaches onto bone, contraction of muscle creates skeletal body movement. The very nature of muscle movement always creates some micro tearing of muscle fiber (as well as accumulation of metabolic waste products). The extent of irritation is proportional to the intensity of muscle movement (resistance) as well as how "out of shape" the muscle tissue is.

Given their richly blood infused nature, minor muscle irritations usually heal quickly. More severe muscle injuries usually heal proportionally to the extent of the irritation as well as its location; specifically, the closer an irritation is to tendon, the longer it takes to heal. In any event, muscle injuries heal quicker than tendon injuries and tendon injuries heal quicker than ligament injuries.

Muscle

Muscle only contracts when stimulated.⁵ Under normal conditions, the brain sends a message to a muscle stimulating it to contract. Normally, after contraction, the muscle relaxes. Thus, during normal movement, including exercise, muscle tissue alternately contracts and releases and skeletal-muscular movement is created.

Muscle also contracts when it has been traumatized, but when traumatized, muscle does not readily return to its relaxed state. As muscle stays in a state of chronic tension, your body's energy and normal functioning is reduced. In addition, chronically contracted muscles pull on their attachments, causing the body to be pulled further off the plumb thus causing further soft tissue stress which in turn, causes further stress upon the "plumb line" which will be discussed later.

Fascia

It has been said that fascia is "the bag that holds the body together." Fascia, depending upon its location can be thick or thin. It is a whitish, sometimes transparent and prolific matrix of collagen fibers and fat cells that overlays your entire body, directly under your skin, from the top of your head to the tip of your toes.

Fascia also encapsulates virtually every structure within your entire body, including each muscle group, the individual components of each muscle, all your organs, glands, nerves and blood vessels.

All fascia throughout your entire body is interrelated. Although it connects everything, fascia has no specific, identifiable origin or insertion as muscles have.

Understanding the characteristics of fascia helps you to understand how yoga affects the body; and ultimately, the mind and spirit.

When fascia is over stimulated from any sort of traumatic incident, be in physical or sometimes, even emotional, its matrix twists, shortens and contracts; and in so doing, inhibits all circulatory and nerve processes that transverse through it. Think of your body being encapsulated in shrink-wrap that contracts and inhibits circulation of all underlying soft-tissue structures.

Thus fascia and its resultant contraction is a direct contributor to the stiffness and pain we experience following injury and illness; *all of which exacerbates as we grow older*.

Understanding the characteristics of fascia is the key to understanding how to create an appropriate yoga practice that maximizes yoga's benefits and minimizes its liability.

Through the years, physical and emotional injuries, micro-tears, simple pulls, little tweaks, and the wear and tear of daily life — all these everyday occurrences affect all of your soft tissue; and this is especially true for your fascia.

When injured or traumatized, soft tissue contracts. It has to. It's a way of making you slow down and allows an injury to heal while you continue to live your life. Contraction of fascia and muscle protects you from exacerbating your injuries. Unfortunately, as an injury “heals” (if in fact it ever really does), contracted fascia seldom releases back to its pre-injured state. You heal, but your body “remembers.”

As we age, the fascia in and around areas of a pre-existing injury usually contracts further. It appears that, about every ten years beginning from about the ages of approximately 28 to 32, fascia without intervention becomes less resilient and causes the muscles surrounded by it to become tighter and tighter.

Indirectly, this fascia tightening exacerbates preexisting injuries and pain (which is explained by Hilton's Law below). Have you noticed these ten-year thresholds as you've aged (28 to 32, 38 to 42, 48 to 52, etcetera)? Have you again begun to feel those long ago injuries that you thought were fully healed? Or perhaps at best, are you starting to feel sluggish and tighter? Why does this happen? Hilton's Law helps provide us with an explanation.

Hilton's Law as Applied to Fascia



When we visualize the muscles of the human body, we often think of the structures as individual muscles, as shown on the picture on the left. However, fascia is a broad diffuse matrix that encapsulates each individual muscle as well as **overlaying all** the individual muscle structures of your body, as shown on the picture on the right.

Hilton's Law says that the nerve root that supplies a joint, supplies all the muscles that attach to that joint, and the overlying skin. Hilton further states that "every fascia of the body has a muscle attached to it, and that every fascia throughout the body must be considered as a muscle."

Thus, when you have been chronically ill or injured, the muscles of your body often behave in two seemingly contradictory ways. Your muscles become soft and flaccid. They lose tone and mass. Yet at the same time, you feel as if almost every muscle in your body has contracted and tightened up making you stiff and sore. Why does this happen?

Keep in mind that fascia encapsulates each individual muscle, each muscle group, as well as the entire body. Fascia is usually a slippery substance, which allows your muscles to easily slide through and over each other, and allows muscles to lengthen and shorten within their "fascia casings."

Fascia allows individual muscles to move freely without binding. That is; unless you have been chronically ill or injured. Fascia then becomes less resilient and slippery. And notwithstanding aging alone, illness or injury only accelerates that contraction

Conclusion:

Nature created quite an amazing mechanism for protecting its creatures when they have become injured or ill. When injured or ill, what does an animal in nature do? Where does it go? Does it go about its daily activities such as foraging for food or communing with others? Does it take its young to soccer practice; or have friends over for dinner?

Well of course not! What an animal in nature does is to find a dark, safe, quiet little place in which to lie down until it recovers or dies. It does this because nature knows that to prevent further and perhaps irreparable damage, the animal needs time to heal; to immobilize itself for a time before it resumes its normal activities.

And herein lies the beauty of yoga. By understanding the nature of fascia and by adhering to the Seven Principles of a Highly Effective Yoga Practice (see next page), we don't necessarily have to succumb to fascia contraction as we age or when injured or ill.

The Bachin Charts are used by permission of the Anatomical Chart Company, Skokie, IL.

Fascia and Muscle illustrations from C.D. Clemente: Anatomy. A Regional Atlas of the Human Body, 3rd Ed. Philadelphia. Used with permission.

1 A "tissue" is a group of similar cells united to perform a specific function.

2 vascularization is growth of blood vessels into a tissue with the result that the oxygen and nutrient supply is improved.

3 For an in depth study of ligament vascularization, [see](#):

4 Personal correspondence with Mathew J. Taylor, MPT, RYT, April, 2001, used with permission:

Taylor: Equally and in the case of ACLs for sure is the neurofeedback mechanism of the ligament conveying proprioceptive input to both the PNS and CNS via type III mechanoreceptors&this feed back loop is altered and modified with inappropriate stretching thus not only is the static integrity of the ligament and corresponding joint compromised, but the reflex loop for control is damaged. Takes the info beyond the massage level of physiology to high end exercise phys. On the other hand, because tendon is less vascularized, aggressive or consistent stretching in and around a joint often results in chronic tendinitis. I'm not sure this statement can be substantiated, particularly consistent &inappropriate or excessive yes, consistent with good technique should be fine as the dynamic muscular component will absorb the energetic load and dissipate the forces.

Dworkis: You are correct, but how may people understand and/or can employ "good technique." In any event, my statement needs clarification. I've changed that paragraph as follows: "On the other hand, because tendon is less vascularized; aggressive, excessive, or otherwise inappropriate stretching in and around a joint can result in chronic tendinitis." Taylor: Bingo5 ibid

Taylor: There is actually a good deal of cortex override that suppresses primitive brain tone and reflexes(the spastic stroke) thereby inhibiting contractions vs causing them. This is critical when we try to link the mind or frontal cortex functioning to motor or exercise performance. How germane to this audience I'm not sure, but if you want the docs and rehab people to climb on board, might need to acknowledge complexity similar to how you did with simplification of yoga. Dworkis: I agree. Changes have been made and are now reflected above.

6 Hilton's Law: [From Principles of Osteopathy, 4th Edition, Dain L. Tasker, D. O. 1916.](#)

Chapter 6: The 7 Principles

The Seven Principles of a Highly Effective Yoga Practice
Allow You to Safely Practice & Teach Yoga Regardless of Style

The 7 Principles Directory

- ❖ [Introduction](#)
- ❖ [Principle 1: Applying Hilton's Law](#)
- ❖ [Principle 2: Pain is a Message](#)
- ❖ [Principle 3: Less Done Correctly Always Gets You More](#)
- ❖ [Principle 4: Proper Stretching](#)
- ❖ [Principle 5: ExTension Releases Tension](#)
- ❖ [Principle 6: Lengthening the Spine Increases Action](#)
- ❖ [Principle 7: The Importance of Yoga Breathing](#)
- ❖ [Brain Wavelength Patterns](#)

Introduction

As we go through life, we inevitably injure ourselves, either through accidents or simple wear and tear. We heal; but our soft-tissue; the muscles, tendons, ligaments, and especially the fascia of our body “remembers” the injury.

Let's take a moment to review the different "elements" of soft-tissue:

- ❖ Tendons attach muscles to bones; they are less vascular than muscles and take longer to heal when irritated or injured.
- ❖ Ligaments connect bone to bone and have minimal blood circulation; a serious ligament injury almost certainly requires surgery.
- ❖ Muscles move the body; they are infused with blood and when irritated or injured, heal quickly. quickly.
- ❖ And finally, permeating the entire body is fascia, yoga's most important connective tissue.

Understanding Fascia is the key to understanding how yoga works:

About every ten years — ages 28 to 32, 38 to 42, 48 to 52, 58 to 62 and 68 to 72 — our fascia becomes less resilient, and those past injuries cause it to become tighter and tighter.

As our fascia becomes contracted, other parts of our body suffer. And if other parts of our body suffer, our fascia contracts even more throwing our body off the "plumb," sometimes subtly, sometimes grossly.

When soft tissue contraction causes us to be off the plumb, even the simple act of trying to remain upright throughout the day can become fatiguing. When our body is out of alignment, muscles and fascia are constantly contracting to keep us upright and by nightfall, we are exhausted.

Appropriately practiced, yoga works on the surface level by releasing contracted fascia. Gently, layer-by-layer, an appropriate yoga practice relaxes and releases tight fascia ... and we begin to regain our energy.

Most exercise modalities, including many yoga systems, go deeply much too quickly, extending and hyper-extending the joints and spine too much setting up a chain reaction of irritation and pain within the muscles and especially, the fascia

Translation? If it hurts, don't do it. Lighten up, and you'll open up that fascia, and the rest of your soft tissue will respond. There really is no gain in pain. The proof is in Hilton's Law relating to soft tissue.

Principle 1: Applying Hilton's Law

If a joint, say for instance your knee becomes injured; the nerve root that supplies that joint becomes stimulated and causes all the muscles, tendons, and fascia that attach to that joint, to contract (as well as the overlying fascia and skin); it's the body's way of immobilizing the tissue so it can heal.

However, since the fascia was stimulated and because fascia is non-specific; meaning that your fascia permeates well beyond the area served by a specific nerve root, fascia contraction irritates distal nerves; especially those nerves that were previously stimulated due to old, previously long-forgotten injuries. What happens next is that muscles and joints far away from your newly injured knee will also begin to hurt. This is the inverse of Hilton's Law at play.

Throughout your life, all those physical and emotional injuries you had; all your illnesses, as well as the normal process of aging all cause fascia to contract. And as you age, fascia left to its own devices, contracts and can cause a nasty downward spiral.

Yoga is a powerful tool you can use to help mitigate fascia's propensity to contract.

So, now you want to practice yoga. If you are young and in reasonably good health, go ahead and practice yoga any way you wish, aggressively or not. Push it. Go for it. But I submit that if you are approaching middle age or if you have experienced injury or illness, aggressively pushing your yoga places you at risk for irritating soft tissue; especially tendons and ligaments.

And if you create such an irritation, it will cause the overlying and distal fascia to contract and that contraction of fascia causes additional soft tissue irritation. This is why you need to avoid pain; to avoid stretching into less resilient tissues such as tendons and ligaments.

If you've ever had surgery, you've experienced Hilton's Law; it feels as if every muscle in your body has contracted. Click for a further discussion of Hilton's Law, which is one of the key factors to understanding this system.

Principle 2: Pain is a Message

No Pain, No Gain was a message many of us bought into as we were growing up. Indeed, a certain amount of pain that we tolerated during our youth was a great motivator and (hopefully) in most instances, did not create long-lasting injury.

But as we grow older, adherence to that old adage can have devastating results. During yoga or any exercise, there is a significant difference between what I call an effective action and a pain. An effective action might burn, but it is almost a pleasant sensation. It makes us pay attention to the training effect, but all discomfort created by an effective action immediately dissipates after cessation of the activity.

Pain on the other hand creates a negative, unpleasant sensation such as a sharp, electric, pinching, searing or pulsing sensation that may or may not last beyond cessation of the exercise. You need to pay attention to the sensation you are creating.

The message in the pain is to "Stop!" When an animal in nature is injured, it doesn't go about with life's daily routines. It finds a dark place to hide and it lies down until it either heals or dies. Principle # 2 tells you that it is best to slow down or stop and rest until your body heals.

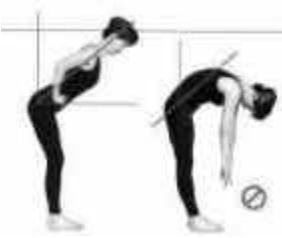
As a way of clarification: Just how long should you stop and rest until resuming your exercises? I am a firm proponent of: *If you don't use it, you lose it*. But *using* it does *not* mean *abusing* it. You need to learn when it is appropriate to resume your exercises and when it is appropriate to do something less intensive.

When you do resume your exercises; rather than *trying* to continue on where you left off, pay attention to the *feeling*. In most instances, it might behoove you to begin slowly; by doing less

and by adding more support, or by just not going as deeply. Or by doing another set of exercises altogether.

Principle 3: Less Done Correctly Always Gets You More

All your life — and especially during the fitness-crazed years — you've been told that good things have to be hard to get. If there's no pain, there's no gain.



Fortunately, we've gotten smarter, and we're getting away from that dangerous thinking. But it's still tough to believe that if a little is good, more isn't necessarily better.

The information in this program is clear: "Less done correctly will always get you more." Once you learn how to move with your breath and with proper alignment; extending your body without hurting your muscles,

tendons, fascia, or joints, less will always get you more.

This means less aggression, less effort, and less pain will afford you increased flexibility, strength, endurance, and tone. Review Toward for a more in depth discussion of why Less Done Correctly Always Gets You More.



Principle 4: Proper Stretching

Any time you create an action (a stretch or a feeling that something is happening) close to or in a joint, you are activating tendon or ligament. It is safer (and more productive) to create action first in the belly of a muscle (such as the hamstrings).

Then, as the tissue relaxes and begins to release, you can take the action closer toward the joint (which moves you toward the tendon) but never stretch deep into the joint (ligament). Review fascia for a more in depth discussion of the body's composition and how the different structures respond to yoga.

Principle 5: ExTension Releases Tension

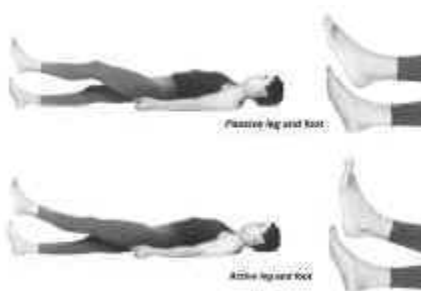
NOTE: ExTension differs from the medical term extension, which at end range; extension of the spine actually places a limb in a closed packed, compressed state. ExTension, on the other

hand, creates a neutral or even an increased space between joints that creates a "congruous alignment without excessive focal joint pressure." ¹

Any exercise program will improve how you feel, even if you move lazily through it. But if you extend your neck, limbs, spine, and fingers long as you exercise, the movements will feel better and work better. ExTension through your joints creates freedom of movement; compression restricts movement. This applies to all of your joints, including your knees, elbows, hips, and, especially, your spine. When you elongate through your joints, pain is reduced and you feel lighter. Compressing your joints causes you to feel heavier and oftentimes creates or exacerbates pain.

Test this out. lie down on your back, legs flat on the floor. Now lift your right leg and hold it about six to nine inches off the floor. Just hold it up. Notice how it feels. Does it become heavy or start to shake? It will probably become pretty uncomfortable as you keep holding it up. Put the leg back down and rest.

Now, you will learn how to create an “active” leg. Point your left heel away from you while you push through the ball of your foot and stretch your entire leg out away from you. Continue holding your leg up as you extend it long [Figs. 3 and 4]. Notice how much lighter your leg feels. Now for a moment, completely relax the foot and leg while you are holding it up. It becomes heavy again. Extend it once more. Lighter. Lower your leg and test this process with your left leg.



The ExTension you created released the tension of holding up your leg. It works with your arms, your spine, your head, and your neck. It will make any exercise you do feel and work better. ExTension Releases Tension. You'll see this phrase again and again throughout ExTension and Recovery Yoga.

Principle # 6: Lengthening the Spine Increases Action

In order to "get more by doing less," lengthen your spine (it doesn't matter if you are standing, sitting, or lying down) and your action increases. In actuality, you don't even need to physically lengthen your spine. Even if you simply "think" yourself longer, you will feel the action.

Principle # 7: The Importance of Yoga Breathing

An appropriate yoga practice begins by first paying attention to your breathing. I'm not meaning to be facetious when I say "breathing beats the alternative." A person can live without food for

about 30 days and without water for about three to six days. But a person can survive without the breath for only five to seven minutes before death.

Obviously, breathing is imperative to the sustenance of life. But the breath also has a profound effect upon the nervous system.

The yogis have known for thousands of years that there is an intimate connection between the body, the mind and the breath; and that emotions are directly affected by breathing.

The yogis have known for thousands of years that there is an intimate connection between the body, the mind and the breath; and that emotions are directly affected by breathing.

Accordingly, the yogis developed intricate methods of controlling the breath as a method of controlling the mind and body; metabolism, and emotions. As an example from current culture, how many times has it been said: "Take a deep breath and relax." The yogis have known about this connection for tens of centuries.

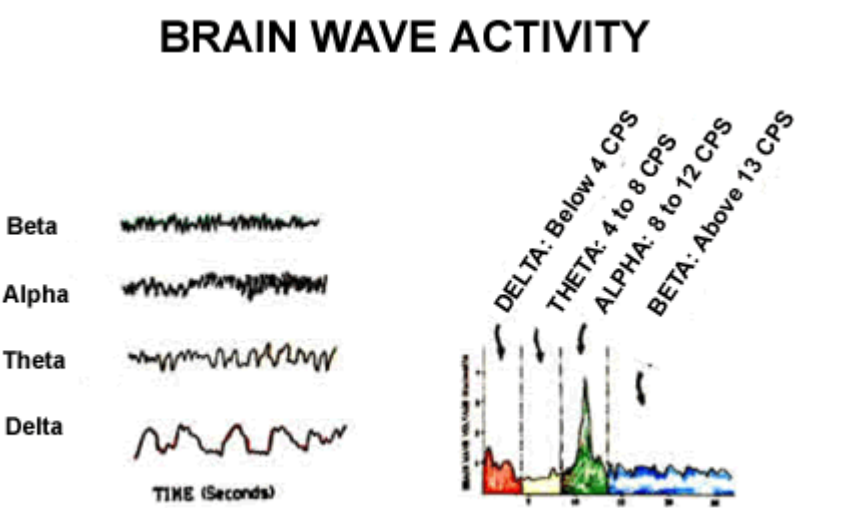
When we are stressed or feel highly threatened; when we are in a pressure situation or in crisis, our normal regular breathing patterns change. What would be a normally quiet and soft breath is replaced with shallow, rapid breaths, and sometimes we even unintentionally hold our breath. But when this occurs, our ability to think and to effectively move our body becomes compromised.

All our physiological processes are controlled by the nervous system. One branch of the nervous system, called the sympathetic nervous system (SNS), is affected by how we breathe. Rapid and shallow breathing depletes carbon dioxide, which causes the sympathetic nervous system to become activated. This results in increased heart rate and blood pressure, which leads to sweaty palms and feet, high levels of anxiety (the flight or fight syndrome), and more. Yoga breathing is an effective method that helps restore and maintain normal carbon dioxide levels.

Yoga exercises become more comfortable and powerful when inhalation and exhalation flow freely. The subtle flowing of air into and out of the nose stimulates a relaxation response, which directly affects the brain and nervous system. Breathing through your nose also warms and filters the air further reducing its impact upon the nervous system. Normal breathing oxygenates your blood and removes the noxious byproducts of metabolism and respiration. Controlled yoga breathing (pranayama) when appropriately practiced accelerates this process.

Research programs consistently show that yoga-controlled breathing affects brain wave patterning as measured on EEG. For instance, when a person is active, physically or mentally, such as when involved in any kind of task orientation, the brain evokes an electrical patterning of more than 12 cycles per second and is known as beta or task orientation.

However, when a person is in a relaxed and quiet, eyes closed, sitting or laying down position; and when that person is focusing on a single object, be it music, a candle flame, or one's own breath, the brain slows its electrical patterning down to about 8-12 cycles per second, which is known as "alpha." And an alpha state is associated with meditation. EEG shows that meditation is always enhanced (deepened) when the relaxed subject is also doing controlled yogic breathing.



Therefore when a subject is in a meditative state, the brain produces alpha waves. When a subject goes from a 'closed eyes,' relaxed state to an 'eyes open,' cognitively demanding condition (or an outwardly focused action), brain waves speed up and increase in beta activity, which is clearly associated with "task orientation." Physical exercise, such as sports and other goal-oriented activities are focused cognitive activities and place the brain clearly into beta orientation.

You would think that the physical exercises of yoga; especially demanding exercises that require profound balance and concentration or that require moving the body into and out of "positions" would be considered forms of focused cognitive activity. And as such, they would be expected to produce brain waves largely in the beta range. But they don't.

Under laboratory conditions, even newly trained yoga practitioners are able to evoke an alpha state when correctly doing slow and methodical eyes closed yoga exercises. This might not be too impressive given the nature of yoga and especially, when subjects do these exercises with eyes closed.

However, a most interesting phenomenon takes place when experienced yoga practitioners execute physically complicated and demanding yoga exercises with eyes open. The more experienced the practitioner, the quicker and more congruent alpha is generated. In other words; the more experienced the practitioner, the quieter the brain becomes and the meditation becomes deeper. And as documented by EEG, when a yoga practitioner adds the component of controlled yoga breathing, meditation becomes deeper. An appropriate yoga practice then, can truly be considered as "Meditation in Action".

Brain Wavelength Patterns

To further understand how yoga can be "meditation in action," you would need to know that there are four wavelength patterns generated by the human brain as measured by EEG (electroencephalogram).

- Delta is characterized as 0-3 cycles per second and is generally associated with unconsciousness to deep sleeping.
- Theta is characterized as 4-8 CPS and is associated with sleep or a very deep relaxed state.
- Alpha is characterized as 8-13 CPS and is associated with unfocused attention or a relaxed mental and physical state.
- Beta is characterized as above 13 CPS and is associated with mental and physical activity (otherwise known as: task orientation).

I participated in a research project at Wright Patterson Air Force Base that observed brain function during rest, exercise, task orientation (physical and mental coordination exercises), and yoga.³ (See more of this research at [Yoga is Meditation in Action](#)).

Alpha is generated during meditation
or generally when the mind and body
is in a quiet and relaxed position; either
sitting or lying down with the eyes closed

Because normal exercise generates a broad beta spectrum, the researchers, among other things, wanted to determine if an alpha state could be generated in the brain during all ranges of yoga based exercise, from simple to complex, even with eyes open.

Because yoga is said to be "meditation in action," we postulated that an experienced yoga practitioner should be able to perform virtually any yoga posture, regardless of how difficult or advanced, and be able to generate alpha; if the body was kept in balance and avoided forcing, straining or "trying." In other words, through "ExTension releasing tension," the brain would generate alpha, not beta as associated with task orientation.

Creating such balance means activating your entire body, that is, using the “ExTension releases tension” principle equally through the hands and arms, feet and legs, spine and neck. Maintaining an equal feeling of ExTension throughout your body while you move. If, for example, you extend your hands but keep your legs soft, there is imbalance within your body, and your brain must remain active to keep you from falling over.

We found that you can go into a moving alpha state (even with your eyes open!) by creating that balanced state of ExTension in all the muscles of your body and by breathing deeply and easily. In fact, you can be meditating while you exercise.

A basic exercise in the *ExTension Yoga* program is the Arm Flap, which is the beginning part of the Sun Salutation. In it, the balance of your body, mind, and breath is experienced through movement. Through the Arm Flap, the feeling of ExTension begins to come into focus by activating all your muscles; by widening your shoulders, activating your hands with fingers extending and thumbs stretching away thus activating the entire hand; elbows extending away from shoulders; legs active, spine lengthening; lungs expanding.

As your whole body becomes "active," there is no tension what-so-ever. Thus, you'll learn how to bring on a state of active rest, of energetic relaxation ... of mediation in action.

1 Thanks to Mathew J. Taylor, MPT, RYT, for clarification: personal correspondence April, 2001.

2 An internet search using the terms "EEG + breathing" provides dozens of interesting hits.

3 Investigation of Brain Wave Activity During Yoga Postures and Meditation; Andrew Junker, PhD and Sam Dworkis, Dayton, OH 1986. This work was incorporated in Junker's subsequent doctoral thesis.

Chapter 7: NeuroMuscular Laws

How Yoga Works: The Neuromuscular Laws
Less Done Correctly Always Gets You More

Introduction

This chapter draws mostly upon my previous neuromuscular therapy training in order to explain how yoga works. Although based on older and perhaps archaic physiological laws and principles, they never-the-less offer you a workable model of how to maximize your benefit and minimize your liability through yoga.¹

Let's for a moment assume you are a fit yoga teacher who has never experienced the debilitating effects of significant injury, chronic illness, or aging. In order to be a really excellent teacher, you must know why many of your students struggle with their yoga and why so many of them drop out. The following Principles and Laws can explain why:

Contents:

- 1. [The Law of Facilitation](#)
- 2. [Davis' Law](#)
- 3. [Pfluger's Law](#)
- 4. [Arndt Schultz Law](#)
- 5. [Hilton's Law](#)
- 6. [Conclusion](#)

The Law of Facilitation (Reoccurring Injuries)

"When an impulse has passed once through a certain set of neurons to the exclusion of others, it will tend to take the same course on future occasions, and each time it traverses this path the resistance will be smaller; the passage of these neural impulses become even easier for all succeeding impulses."²

Commentary:

Have you ever experienced an injury that you thought long ago was completely healed, but it has reappeared; and worse yet, you keep re-injuring it? This happens because pain that is transmitted through a specific neurological pathway becomes "facile" or "easily accessed," and therefore is said to become "facilitated" or that a facilitated pathway has been created.

The pain then continues or re-occurs along this pathway or groove as a result of even the slightest stress. Keep in mind that it is important to remember that whenever soft tissue is stimulated, it contracts.³

Furthermore, a facilitated pathway becomes more active the older you become, because fascia contracts with age (which is discussed more in detail in the following chapter). As fascia contracts, pressure on neurological pathways increases thereby exacerbating pain. Then, a nasty cycle of *pain--contraction-and increased pain* ensues.

A regular appropriate yoga practice effectively rehabilitates contracted fascia; and when hyptertonic (tight) fascia relaxes, acting in accordance to the inverse of Hilton's Law, pressure is released on those nerves passing through that fascia.

This in turn effectively reduces stimuli into the joint that supplies that fascia and ultimately releases the stimuli on the muscles that attach to that joint. (You will want to re-read this chapter after you read about Hilton's Law, which is discussed in more detail below).

Davis' Law (Over Stretching)

When muscle ends are brought closer together, the pull of [tonus](#) is increased, which shortens the muscle, which may even cause [hypertrophy](#); and if muscle ends are separated beyond normal, tonus is lessened or lost, thus muscles becomes "weak."⁴ Commentary:

Commentary:

When you *try* to hold stretches for prolonged periods of time, you may enhance flexibility, but you also risk weakening muscle structures. If the object of an appropriate yoga practice is to "move toward balance and union" and also to "maximize benefit and minimize liability," then excessive stretching seems contrary to yoga. Davis' Law addresses why "doing less gets you more."

Pfluger's Laws:⁵

Law of Unilaterality

If a mild irritation is applied to one or more sensory nerves, the movement will take place usually on one side only, on that side which is irritated.

The Law of Symmetry

"If the stimulation is sufficiently increased, motor reaction is manifested, not only by the irritated side, but also in similar muscles on the opposite side of the body"

Law of Intensity

Reflex movements are usually more intense on the side of irritation; at times the movements of the opposite side equal them in intensity, but they are usually less pronounced.

Commentary:

Have you ever noticed that when a specific muscle group on one side of your body becomes injured or chronically sore, the same muscles on the other side of your body also became sore? This is the "Law of Symmetry" and "The Law of Intensity" at work.

The Law of Radiation

If the excitation continues to increase, it is propagated upward, and reactions take place through centrifugal nerves coming from the cord segments higher up.

The Law of Generalization

When the irritation becomes very intense, it is propagated in the medulla oblongata, which becomes a focus from which stimuli radiates to all parts of the cord, causing a general contraction of all muscles of the body. The body is then said to become "generalized."

Commentary

The progressive nature of Pfluger's Laws explain why the entire body ultimately becomes so painful and "uptight" when it becomes *generalized and why everything* hurts. The person can't stand to be touched anywhere and the body is in a chronic state of fatigue.

Generalization can occur after considerable or sustained physical or emotional trauma. Furthermore, the pain of generalization can become worse just when going through the "[ages and stages](#)" thresholds, as described in the next section.

Understanding these mechanics is especially relevant for yoga teachers who work with people who are generalized; for the harder those who are generalized "try" to do their yoga, the more uncomfortable they become (and may even exacerbate their condition).

Arndt Schultz Law

Weak stimuli activate physiological processes; very strong stimuli inhibit them.

Commentary:

In combination with the above laws, Arndt Schultz Law clearly supports the supposition that ill, injured, and generalized people benefit by *doing less in order to get more*.

In technical terms, it can be said that the appropriate amount of *action* generated within a yoga exercise: 1) avoids excessive stimuli, 2) serves to interrupt afferent impulses, 3) decreases resistance to stimulus, and therefore 4) releases tight tissue and nerve compression that brings about improved neural integrity and balance.

An appropriate yoga practice therefore decreases hypertonic tissue (tightness), helps to restore flexibility, strength, and endurance; and increases circulation.

Hilton's Law

As one of the most important concepts that explains how yoga works, Hilton's Law essentially states that the nerve root supplying a joint supplies the muscles attaching to that joint, as well as the overlying fascia and skin.

Commentary:

Let's assume you are doing some "aggressive" yoga and you end up irritating, say the hamstrings of one of your legs. But it's not just the hamstrings that are affected. Because fascia is a non-specific broad matrix of fiber that overlays your entire body, including all your other muscle groups; fascia contracts both at the point of the irritation as well as further away from the hamstrings.

Contracted fascia tends to irritate nerves of the hamstrings as well as those of other muscle structures away from the point of irritation; *even more so* if you have experienced previous injuries. Then the [facilitated pathway](#) that is created has consequences to your muscles that are further away from the hamstring injury.

For example, let's say twenty years ago, you sustained a lower back injury that you thought was completely healed. However, you have now injured your hamstrings. The contracting fascia affecting your hamstrings also migrates upwards toward your back.

The nerves passing through the contracting fascia over your back then become irritated and because a facilitated pathway exists, the muscles of your back readily contract causing pain in an area you thought was completely healed.

If an irritation (physical or emotional) is substantial enough, and if enough facilitated pathways exist, fascia throughout your body will contract which then causes your body to respond in accordance with Pfluger's Law of Generalization.

It then feels like every muscle in your body has tightened and you become both physically and emotionally sensitive — almost hyper-sensitive — to being touched and even to loud noises.

Your entire body hurts and you feel really uptight. In fact, your overall "uptightness" can be felt in your skin, which also literally begins to tighten. And then to add insult to injury, your energy level begins to drop. Is it any wonder you feel "uptight?"

Another way to look at how this mechanism works is to assume you are now in or approaching middle age. When you were young, you could "go for it" whenever you wanted. Even though you could stress and abuse your body, it responded. Sometimes there was pain, but you could work through it. Your coaches or instructors told you, "No pain, no gain." They seemed to be right. You became stronger, and your endurance grew.

But that was years ago, and you have since passed through one or more of those ten-year *ages and stages thresholds* that will be discussed in the next chapter.

So let's assume that it's been a quite a while since you've done regular exercise and it's time to begin again. The author of the new book you just bought, or your new exercise instructor or — worse yet — your inner voice tells you to try really hard and to "go for it" just like in the old days.

And so you do. But now for days afterwards, you are hurting everywhere, all over your body. You feel as if you overstretched and over exercised everything and you are really uncomfortable. Here's what's happened.

As you attempt to restore your former flexibility, strength, and endurance, you become tighter. Why? Just the very nature of aging causes your fascia to contract. And because you've irritated old facilitated pathways you don't feel better — you feel worse, so you have to quit — yet again.

You went too deeply too quickly. And this is what Hilton's Law is all about. If you go too deeply too quickly, you stand to irritate your fascia. When fascia is irritated, it contracts. As it contracts, the underlying muscles become stimulated. And so on. As your fascia contracts, you experience more pain and lethargy; not the flexibility and energy you wanted.

During my study of NeuroMuscular therapy, I found that soft tissue contraction and pain can be resolved quickly by initially working at the level of the superficial fascia, near the surface; not by deeply working into muscle or deeper layers of fascia. That was one of the reasons I changed my approach to yoga exercise.

In my therapeutics practice, I learned that doing less and working superficial soft tissue first, affords quicker, safer, and longer lasting results.



When these very same concepts are applied to yoga exercise (as is presented in the yoga-exercise routines of *ExTension* and *Recovery Yoga*), superb results are likewise obtained particularly when practiced, at least initially, at the level of the superficial fascia.

Accordingly, an appropriate yoga practice is both created and enhanced not just in the doing of asana, but by avoiding over stimulation of soft tissue and waiting until it is ready to respond. An appropriate yoga practice is created when we avoid pushing, forcing and pain by not going too deeply too quickly; particularly when ill, injured, or as you are passing through the ten-year thresholds.

Conclusion

When yoga is appropriately practiced without pain or strain, the underlying mechanical causes of soft tissue contraction and its resultant pain are addressed. By releasing soft tissue contraction slowly over time, the body gradually moves toward neuromuscular balance. The stress upon the nerves that pass through soft tissue is reduced...and pain decreases. "Appropriate" yoga is, therefore, an effective treatment in chronic fascia dysfunction, such as fibromyalgia and chronic muscular pain.

It is imperative to differentiate between the physicality of younger people who have yet to go through their first or second "ages and stages" thresholds, with those who have. Before going through their thresholds, healthy younger people can vigorously and aggressively practice yoga, or for that matter virtually any sport, usually with minimal consequence. If and when injured, younger people can heal quickly and will soon be able to resume their activities.

But for those who have already passed through one or more "ages and stages" thresholds; or for those who have experienced enough of life's traumas to have moved them toward -- into generalization, will pay a price for vigorous or aggressive yoga.

However, it is important to clarify that anyone, from world class athletes to chronically ill or injured people, who practices yoga by adhering to *ExTension* and *Recovery Yoga's* principles and laws will almost always more readily "maximize potential and minimize liability" than those who aggressively practice.

You may think that this approach to yoga can only be a non-aerobic yoga workout. But that's not true! It can be both. With sufficient practice and understanding, the program can become extraordinarily aerobic.

Because many different vigorous approaches to yoga are currently being taught today, I need to make it absolutely clear that there is no judgment with regard to any approach to yoga.

On the other hand, **there needs to be a clear yogic alternative that supports changing and aging physiology. Why? Because life's traumas never really heal and their remaining [afferent pathways](#)** create a very real potential for future liability.

Does this mean that everyone who has experienced an injury, or that everyone who has passed through one or more of the ages and stages plateaus will become generalized or will experience a soft tissue "facilitated pathway" and pain? The answer is an unqualified no.

As we grow older and as we pass through the "ages and stages" thresholds, we very well might pay a price when we participate in physically demanding extrinsic activities, but participation is what life is all about. That being said, an appropriate yoga practice as we grow older allows us to "minimize liability while maximizing potential."

Finally, again in technical terms, it can be said that:

Yoga, when appropriately practiced, allows a reversal of the stress-tension-pain cycle which is accomplished when yoga exercise along with coordinated breath management interrupts [afferent impulses](#) to the spinal cord, thereby reducing the intensity of nervous activity within tissues while mechanically forcing out toxic irritants, which accumulate at nerve receptor sites.

[Hypertonic tissue](#) then relaxes; circulation is increased and the body begins movement toward normal neuromuscular integrity and balance. An appropriate yoga practice of yoga exercise and breath management addresses the progression of pain from acute, to chronic phases, in terms of the above physiological Principles and Laws.

1 Thanks to Julio Kuperman, MD, an anatomist who correctly criticized my use of older "laws" during one of my seminars (see below commentary). Also thanks to St. John, Paul LMT and Walker, Judith LMT, and their NeuroMuscular Therapy Seminars 1988-1991. NeuroMuscular Therapy is based upon and influenced by various physiological principles adapted from Dorland's Medical Dictionary, (W.B. Saunders Co., Philadelphia, 1994). Thanks also to Mitch Hackerman, PT, for his discerning evaluation of the NeuroMuscular Laws).

Thanks to Travell J, Simons D., Myofascial Pain and Dysfunction: The Trigger Point Manual (Williams & Wilkins, Baltimore, 1993).

Commentary: The founders of today's NeuroMuscular therapeutic techniques may have taken "poetic license" when interpreting Pflugers and Arndt-Schultz Laws. Both Pflugers and Arndt-Schultz were 19th-20th century physiologists and were then on the cutting edge of understanding the physical world around them. A considerable body of knowledge has been developed far and away from what they knew then, but in no way negates their original postulates. In any event, after completing a review of the literature, I feel St. John and Walker, in spite of some criticism they have received, were close enough to the mark. I therefore feel comfortable using their interpretation of the Laws developed by Pflugers and Arndt-Schultz as a way of explaining, in part, how yoga works.

The concept of Centrifugal Nerves was first postulated by Ivan Pavlov who discovered the existence of a basic pattern in the reflex regulation in nerves. The term "centrifugal nerves" was first used in Pavlov's 1883 doctoral thesis:

a. Peripheral receptors which receive the irritating action convey impulses via afferent nerves to the central system
b. Nervous centers convey the stimulus to the centrifugal nerves
c. Efferent nerve conductors (pass that stimulus to) ... tissues

[German Physiologist E.F.W. Pflugers \(1829-1910\) described the course of myofascial pain: USIRG is the acronym which stands for the Laws of Unilaterality, Symmetry, Intensity, Radiation, Generalization.](#)

Arndt-Schultz Law has even a more interesting history. Over a century ago Schultz's experiments (1888) showed that many chemical agents had the effect of stimulating the growth and respiration of yeast. The phenomenon became known as the Arndt-Schultz Law and was widely referred to in the pharmacological literature and became one of the scientific principles on which homeopathy is based. One of the well-known laws of drug reaction, the Arndt-Schultz Law, states that "Minimal doses of a drug stimulate, medium doses inhibit, and large doses destroy cellular activity." It is interesting to note that St. John was far from the first to use Arndt-Schultz to explain phenomena solely of interest to him. For example:

Bio-stimulatory effects of laser are governed by the Arndt-Schultz Law of Biology i.e. weak stimuli excite physiological activity, strong stimuli retard it. The implication of this for wound healing is that, as treatment of a wound is continuing and there appears to be a slowing down of healing, a reduction of the laser dosage may be needed. By virtue of the Arndt-Schultz Law and the changed responsiveness of the tissues, what was originally a stimulating laser dose may have become an inhibitory dose of laser.

2 Law of Facilitation: Also see: Leon Chaitow

3 Stimulation is stimulation (contraction is contraction). Once facilitation of the neural structures of an area has occurred, any additional stress impacting on the individual leads to a marked increase in neural activity in the facilitated segments, and not to the rest of the (normal, 'unfacilitated') spinal structures. The stress can be of any type – emotional, physical, chemical, climatic, mechanical, indeed absolutely anything which imposes adaptive demands on the person as a whole and not just this particular part of their body. Korr tells us that when subjects who have had facilitated segments identified were exposed to physical, environmental and psychological stimuli similar to those encountered in daily life, the sympathetic responses in those segments were exaggerated and prolonged. The disturbed segments behaved as though they were continually in, or bordering on, a state of 'physiologic alarm.' From Korr I (ed) Sustained sympatheticotonia as a factor in disease The neurobiological Mechanisms in Manipulative Therapy Plenum Press New York 1978 ([as quoted Dr. Leon Chaitow](#)).

4, 5, 6 St. John, Walker, and Travell. ibid.

7 [Hilton's Law: from Principles of Osteopathy, 4th Edition, Dain L. Tasker, D. O. 1916.](#)

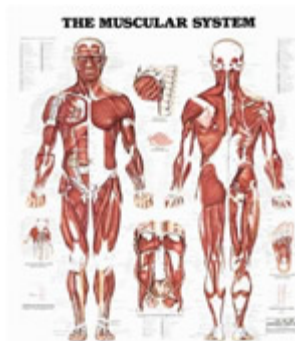
Chapter 8: Bachin Alignment

The Bachin Charts
The Skeleton System and The Muscular System

"Bachin Alignment" may be the key to understanding yoga: I believe you can learn more about yoga from these two Bachin Charts than from any other single reference.

During the 1940's, medical artist Peter Bachin developed several significant charts. One is called *The Muscular System*, which shows muscles and tendons in remarkable detail. Another is *The Skeletal System*, which shows bones and ligaments likewise in remarkable detail. In addition, *The Skeletal System* illustrates *The Plumb Line*, or how your skeleton presents when the soft tissue of your body is in perfect balance throughout your body.¹

The Skeleton and the Plumb Line



When you were young and when your body was undoubtedly in better balance than it is now, you had no trouble standing directly upright. The strength and flexibility of the muscles in the front of your body were in near-perfect balance with those in the back of your body. Nothing pulled you forward or backward. You were *on the plumb*.

Look again at both Bachin charts. The muscles shown in "The Muscular System" are in perfect balance, front and rear. The plumb line drawn on

"The Skeletal System" runs directly through the center of the body and reflects this soft-tissue balance.

Those examples are the ideal because when that balance occurs, your skeleton, not your muscles, supports your body upright. What does this mean? Stand up for a moment. Stand as straight as you comfortably can. Now lean forward, just shifting your weight forward but keeping your heels down.

Stay there for a while. What do you feel in the front of your body? Bring your head a little bit farther forward. Feel the "loading up" of the muscles on the front of your shins? Your thighs? Imagine standing imbalanced like this all day long. Every day. Year after year.



Many of us do. Not intentionally, of course. You may have had an accident, or other trauma, or simply gotten used to poor posture. Whatever the cause, as imbalanced soft-tissue chronically contracts over time, your body will *adapt* or *accommodate* to the discomfort of the loaded and soon to be very tight muscles. After a while, you will no longer feel the discomfort. You will simply become fatigued well before your day is over. And you won't understand why.

Well, here are a few reasons why:

The first one is very simple: If the muscles in your body are imbalanced, and the tighter ones, say, in the front of your body are trying to overcome the weaker rear muscles, they are constantly fighting each other to keep your body erect. It's so subtle that you don't notice it, but this is one reason why you are so tired well before the end of your day.

The second is a bit more complicated: When your body is out of balance and chronically tight, your body can't absorb proper nutrition. This accelerates your fatigue and causes your body's soft-tissues to become tighter. As you find your body becoming tighter and more lethargic, it becomes more difficult to exercise and you feel even more tired. At this point, many people gain weight because they just begin taking in more calories than they expend.

Conclusion:

When your body is off the plumb, your muscles are no longer in balance. You become chronically tired; your strength, endurance, and flexibility decline. You lose your once good posture. By using appropriate yoga as a tool, you can take active responsibility for getting yourself back on the plumb.

The beauty of an appropriate yoga practice is that, over time, you can "encourage" your body to again move "in the direction of balance and union." What can be better for enhancing your health?

1Bachin Charts are used by permission of the Anatomical Chart Company, Skokie, IL.

The Anatomical Chart Company has its origins in the charts meticulously painted by the medical illustrator Peter Bachin during the 1940s and 50s. Bachin, born in Austria in 1897, came to America by hiding between potato sacks on a ship.

Approximately three years were spent painting each of the 5 original anatomical charts in the collection, of which the Skeletal System and Muscular System remain the company's best-selling charts. (See www.anatomical.com/)

Chapter 9: Pain Management Part 1

The Pain Threshold Model: Chronic Pain
and What It Means to be "Over Stimulated"

Preface:
Yoga and Pain Management

I can not over emphasize the importance of this chapter; not just for chronically ill and injured people, but for all yoga students regardless of health, physical ability, or age.

Although this chapter speaks to people with chronic illness, severe injury, aging people, *and those who work with them*, **do not** be deceived by preconceptions: The very same logic and principles that applies to *Recovery Yoga* also applies directly to *ExTension* and for that matter, to all styles of yoga.

The following principles therefore, apply to everyone who does yoga: Disciplined athletes to couch potatoes ... weekend warriors to the chronically ill or injured ... beginners to advanced practitioners ... and everyone in between.

This chapter clarifies the important difference between "trying to do yoga" and "doing yoga;" and although subtle, knowing the difference has a major effect on your, and everyone else's, yoga practice. **More importantly, knowing the difference between "trying" and "doing" is imperative for people in chronic pain and for those who are chronically ill.**

Finally, for those of you who are in chronic pain: Before you read the following material and before you apply these techniques to your own practice, I need to caution you: These techniques, when correctly practiced, are designed to decrease your level of distress (reduce your stimulation); and in so doing, will decrease your chronic level of pain. **Be cautious:** Just because your chronic pain has subsided, does not mean you are "cured."

People who practice the following techniques don't realize they are still injured and will often, prematurely, resume strenuous activities that immediately reactivates their pain. My advice is to use the following techniques to reduce your pain ... and then, over the course of the next few days and weeks, apply the *Recovery* and *ExTension Yoga* system of exercising to progressively restore your flexibility, strength, and endurance. In so doing, you have a much better chance of "maximizing your potential and minimizing your liability."

Introduction:
Yoga and Pain Management

Chapter 9: Pain Management Part 2

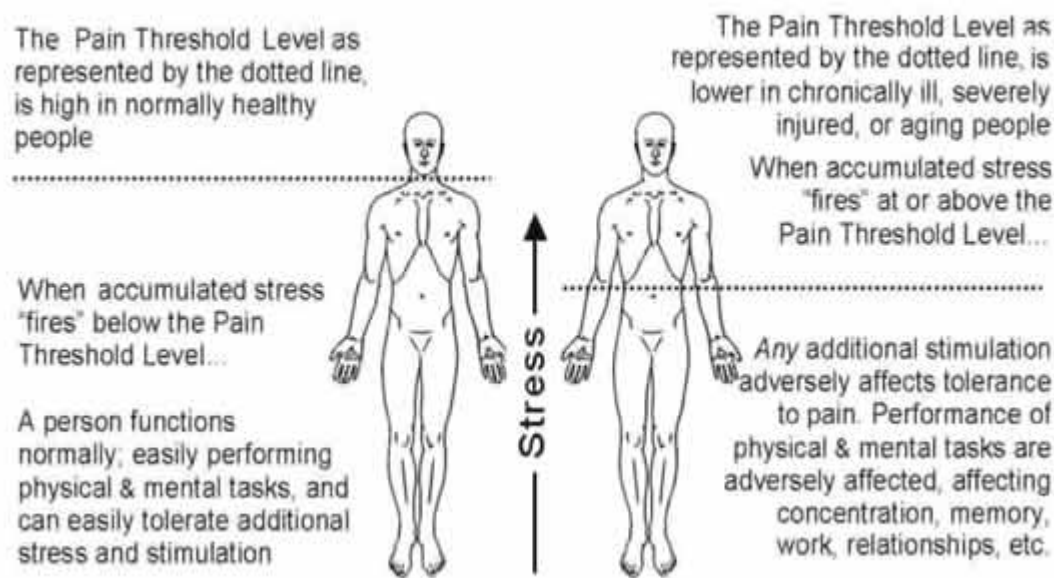
The Pain Threshold Model: Chronic Pain and What It Means to be "Over Stimulated"

Yoga and Pain Management:

Of the countless trauma that affects and shapes our lives, some are but minor irritants while others challenge our very existence. Large or small, significant and insignificant, all stressful events have an accumulating affect upon our body, mind, and spirit.

The accumulated stress of daily life, and how we respond to it, may be represented in following graphic which I call, "The Pain-Threshold Model." The dotted line represents a person's "pain-threshold level," which is normally higher in healthy people and considerably lower in chronically ill, injured, or aging people.

The Pain-Threshold Model



Accumulated stress and stimulation typically fires below a person's normally high threshold-level, as depicted with the normally healthy "person" on the left; and the person is able to tolerate a considerable amount of stress and stimulation before feeling "overloaded." Everyday physical and mental tasks are easily performed.

In the years following the onset of my illness, my approach to practicing and teaching yoga significantly changed. This chapter bridges the gap between how I now practice and teach as compared to how I previously practiced and taught when I was a normally healthy, full-time yoga teacher. Prior to my illness, I had extensive experience teaching students at all levels, and although I especially enjoyed working with athletes, I ironically developed an affinity for working with chronically ill and severely injured students. Little did I know then that I would myself become chronically ill, with reoccurring bouts of debilitating MS-driven physical disability.

Again, please **do not** be deceived by preconceptions. By personally practicing the concepts and logic I offer in this chapter, I've learned how to "do" my yoga in a way that is different than before, even though it might look similar to my practice and teaching before the onset of my illness. Although I still teach athletes as well as my many chronically ill and injured students, **nothing is the same.**

Today, in my sixth decade of life, if you were to watch my morning yoga practice, you would never know I have a debilitating chronic illness; that in the mid 1990's, after experiencing near paralysis in both arms and shoulders and having become clinically depressed while gaining nearly 30 pounds, that I would ever do yoga again; much less the advanced yoga I'm now able to do.

As I reflect back to those years before my illness, when I was a full-time yoga teacher and neuromuscular therapist, I know I did good work in helping my chronically ill and injured students. However, now that I have experienced chronic illness for myself with ongoing bouts of severe debilitating pain, I have direct experience of what chronic illness and pain feels like; and had I known then what I know now, I would have done things differently in helping my students to facilitate their wellness and healing.

The logic and methodology by which I now personally practice and teach yoga defines this chapter. Although I instruct chronically ill and injured people to begin their yoga program differently than healthier people, the very same principles and logic described in this chapter are the very same principles I teach to everyone; athletic or not, younger or older, regardless of health or physical ability.

The beauty of the system is that by applying its logic: (1) chronically ill and injured students are able to experience the unmitigated joy of relief as they learn how to establish their basic yoga foundations; (2) physically capable students are thrilled to finally experience a significant yoga work-out that expands their flexibility, strength, and endurance, all without the pain or strain, and **especially** without the inevitable soreness and stiffness that used to follow afterwards; and (3) because they are no longer "trying to do" their yoga, more athletic yoga students are learning how to "do" their vigorous yoga with less potential of exacerbating old injuries or of creating new ones.

Yet surprisingly, all these groups are using the very same principles, logic, and concepts as presented. imperative

On the other hand, when illness, injury, or even normal aging causes the pain-threshold level to lower, as with the "person" on the right, the exact same amount of stress and stimulation as before, will be now be perceived as overwhelming and causes the person to struggle with life's daily tasks.

Said another way: Normally, accumulated stress and stimulation “fires” well below the pain-threshold-level and you can easily cope, even in the face of adversity. Although there are many factors that affect the amount of stress in your life; chronic illness, injury, and normal aging lowers the pain-threshold level causing you to become increasingly sensitive to the numerous normal and abnormal stress and stimulation that life throws at you.

The following list offers some typical examples of conditions, factors, and events that affect stress. Some are within your ability to control while others are not:

- ❖ Accumulated illnesses
- ❖ Old and current injuries
- ❖ Your age and genetics
- ❖ Your diet & nutritional intake
- ❖ The effects of seasonal changes
- ❖ Your emotional and spiritual health
- ❖ Your work and its impact on your life
- ❖ Your relationship with family and friends
- ❖ Your health care and the medications you take
- ❖ Environmental pollution, noise, and overcrowding
- ❖ Your personal finances and your relationship to money
- ❖ Appropriate or inappropriate exercise, including yoga

If accumulated stress and other adverse events accumulate to the point where, if over time, accumulated stress or stimulation continually “fires” at or above your pain-threshold-level (as depicted on the right side of the above graphic), it will be perceived as an assault by your nervous system.

In order to protect itself from further attack, your body's fascia will then begin to contract. When your body's fascia contracts, it is usually felt first in and around areas of old injuries and surgeries. In acupuncture terminology, this particular response to fascia contraction is known as a "facilitated pathway." Continued stimulation into a facilitated pathway causes the reemergence of pain from old injuries you thought had long ago healed ... and because of the increased pain, additional soft tissue begins contracting that begins a vicious cycle of contraction, increased pain, and additional fascia contraction. Additionally, overall fascia contraction is further exacerbated by stress.

And herein is the crux of the problem: When you can't appropriately manage your stress, and when pain and stress continues to build, the effect is that your pain-threshold level will decrease and/or your stimulation will continue to increase ... which causes your body's overall fascia to continue contracting ... and with the increasing cycle of elevated pain and fascia contraction, there comes a point by which your ability to normally function ceases.

In the terminology of both neuromuscular therapy and *Recovery Yoga*, such people are referred to as being "generalized."

Generalization:

A result of fibromyalgia or other conditions that cause a major contraction of the body's fascia:

Medically speaking, generalization is a result of, or is similar to having "fibromyalgia" or any number of conditions that adversely affects a person's overall fascia; and as a result, adversely affects their quality of life. For an excellent educational website on fibromyalgia and myofascial pain, refer to the following website:

<http://www.sover.net/~devstar/index.htm>

Having fibromyalgia or being generalized are difficult conditions for the medical community to diagnose; and oftentimes, the patient is left with inadequate treatment feeling frustrated, emotionally unsupported, and alone. Worse yet, and unfortunately way too common is when their complaints are dismissed by doctors (and family) as being psychosomatic in nature.

Unless you have been there yourself, generalization is very difficult to comprehend. If you are a normally healthy yoga teacher or body therapist and you work with chronically ill or severely injured students, your intention is obviously to alleviate their immediate distress while facilitating their long-term recovery. However, without an experiential or even a conceptual understanding what it means to be generalized, a condition that often eludes medical professionals, the yoga teacher or body therapist's best intentions are unfortunately and commonly ... not enough.

Most yoga programs and body-work interventions will usually provide some degree of short-term pain reduction, which is without a doubt, rewarding to both client and teacher. Unfortunately the client's pain almost always returns without satisfying the core issue of long-term pain reduction.

What it feels like to be generalized:

When stimulation “fires” well above a person's pain-threshold-level, most everything that person does, even the things that were once easy and joyful ... becomes painful and overbearing: The normal stresses and stimulations of life that were once easily managed, now becomes unbearable. You are said to be "generalized" when:

- ❖ Your previous ability to multi-task is compromised as is the quality of your work; and it becomes increasingly difficult to complete even common tasks.
- ❖ You go through your day wishing it to be over and when you go to bed exhausted, you go down with the hope and expectation that tomorrow will be a better day. But when you awake in the morning already tired, deep down, you know the day will only get worse.
- ❖ As the day grinds on, virtually any stimulation be it bright lights, loud noises, being too cool or warm, etcetera becomes uncomfortable. But when it all gets worse, even normal conversations or a loving touch can be annoying, irritating, or even excruciating. Your entire body literally tightens up to each and every new stimulation and you soon feel so physically, emotionally, and spiritually “up-tight,” that you come to the point where you feel as if you can't take it any more ... but you have responsibilities and obligations, and you have to press on.
- ❖ Just as the day before, you can't wait to get to bed; but even so, you fear the inevitable that you will awaken the next morning feeling just as tired and exhausted as you did this morning.

And the worst thing of all is that those around you, including your family and co-workers, can't understand or appreciate how bad you feel or how hard it is for you to get through your day.

Conclusion:

I've created the above Pain-Threshold Model with the intention of describing what it means to be generalized. **Remember this:** As soon as a generalized yoga student "tries" to do an exercise, or when a body-therapist goes too deeply too quickly, the increased stimulation only causes additional soft-tissue contraction ... and with it increased pain.

In the next section, I present a protocol I've developed that has never failed to help people in chronic pain to feel better. Even so, the foundations for *Recovery* and *ExTension Yoga* are not a cure for illness, chronic injury, or the discomfort that accompanies aging. They are instead, logical and sensible guidelines for helping a person to move *toward* balance and union; and along with that movement comes a reduction of the stimulation that is responsible for chronic pain and distress.

A Special Acknowledgement

I profoundly acknowledge and appreciate **BKS Iyengar** for introducing me to the use of props for supporting the body of chronically ill and injured students.

Also thanks to **Paul St. John** and **Judith Walker** for teaching the elements of neuromuscular therapy.

Their combined teaching led me to the understanding, logic, and techniques that allows *Recovery Yoga* to be such an effective tool in managing the effects of generalization and chronic pain.

Chapter 9: Pain Management Part 3

Yoga & Pain Management
How to Get More by Doing Less

Introduction:
The Natural Progression of Recovery Yoga:

As a result of pain, lethargy, medication, and other factors, it's common for generalized people to gain weight. Their physicians, along with prescribing various medications, will often recommend exercise. Unfortunately, most exercise programs including yoga, can leave generalized people feeling the same as or worse than before; especially when they are intent on *trying* so hard to get well.

Once generalized people make the decision to begin yoga, they are understandingly impatient in wanting to start a program in hoping that it might bring them relief; and accordingly the last thing they want from their first class is to hear a lot of talking. That's completely understandable, but prior to introducing their first exercise, I cannot over state the importance of explaining the logic of the system.

When generalized people come into my studio, the first thing I talk about is what it means to be generalized. Once they understand what that means, and once they identify with the Pain-Threshold Model along with the other concepts from the previous section, it's not unusual for new students to weep ... they weep because it is the first time they feel truly understood; and it's a feeling they haven't had from their doctors and often, not even from their own family.

Yoga for generalized students must start with relaxation:

The harder generalized people try to do any kind of stretching or strengthening, be it yoga or any other exercise program, the more likely they will exacerbate their discomfort and pain. They must first reduce their "over-stimulation" and/or elevate their "Pain Threshold Level."

In order to reduce stimulation and to elevate their "Pain Threshold Level" (as represented by the dotted line in the graphic on the previous page), students must first learn how to relax and de-stress their nervous system. [Click here to review the Pain Threshold graphic.](#)

Said another way: **It doesn't matter how long it takes to create profound relaxation. In order for yoga to be successful, generalized people must first learn how to profoundly relax their body.**

I've had some generalized students relax so quickly that they were ready to begin exercising shortly after "assuming the supported position." (I will both show and describe the "supported position" below). Typically, however, most people need to stay in "the position" for ten minutes to an hour before they feel relaxed enough to appropriately begin exercising.

I've had many students tell me that when "assuming the supported position," they haven't felt this relaxed in recent memory; and many ask to stay it in for the remainder of their class. While in "the position," I've seen many generalized students fall into a deep sleep, also something many tell me afterwards that they haven't experienced in recent memory.

Teaching relaxation to generalized students is both an art and a science and is much easier said than done, as you shall see below.

All students shown in the following photos were generalized, and had previously "tried" to do yoga or other exercise programs elsewhere. They always ended up with the same result; within a few hours after class, they experienced increased pain that persisted for days afterward.

The importance of breath management:

I've talked about the importance of controlled yoga breathing in [The 7 Principles of a Highly Effective Yoga Practice](#) as well as in many of my [yoga essays](#). In both of my previously published books, [Recovery Yoga](#) and [ExTension](#). I've written extensively about the necessity and benefits of incorporating breath management at all levels of yoga exercise, from the most basic to the most advanced, and for all levels of ability, from world-class athletes to quadriplegics ... and for every one in between.

In the following sequences, I'll describe the process of teaching generalized people how to do yoga: Not by "trying" to do yoga exercises, but by first supporting the body and teaching how to profoundly relax. I'll then introduce the logic and process of gentle breath management.

And finally as a precursor to actual exercising, I show how to coordinate breathing with basic easy-to-do movements of the body. Firstly, let's take a look at The Art and Science of Relaxation.

The Art and Science of Relaxation:
Introducing "The Supported Position"

When a person is generalized and when soft tissue is under continual assault, it's nearly impossible to effectively stretch or strengthen the body. Unless a generalized person is first able to create and experience compete relaxation, yoga or any other form of exercise will only stimulate an already over-stimulated body, causing an increase in soft-tissue contraction and an exacerbation of their overall discomfort and pain.

Make no mistake about it: Effectively slowing and controlling breathing is at the very core of this program. Yet when people are generalized, it is nearly impossible for them to relax.

It is therefore, not enough to ask generalized students to lay down on the floor and expect them to relax ... because they can't. When the entire body's fascia has contracted, the back of the neck tightens and causes the chin to move upward. This further exacerbates neck and shoulder tightness, and as the shoulders rotate inward, the secondary tissues of respiration such as the pectoralis minor and intercostals shorten and eventually will interfere with the ability to breathe easily and deeply.

A generalized person's overall body tightness along with its compromised breathing can be circumvented by placing the person in the "supported position," which is similar to what astronauts use (Photo 1).

By bending the person's torso at the waist, and supporting the head, torso, shoulders, arms and hands as well as the knees and feet, the body becomes unaffected by both gravity and fascia's contraction. When supported appropriately, the person can finally and profoundly relax.

Even when appropriately supported, there are some people who come into class that are so over stimulated, it is almost impossible for them to relax. In these cases, I further modify the relaxation pose by placing light sandbags on their wrists, ankles, and sometimes over their belly, eyes and forehead (Photos 2 and 3).*

One of the many factors that makes teaching this approach to yoga both an art and a science, is sensing if sandbags should be applied; and if so, how many and where. Another example might be noticing things like the hands in Photo 1 being slightly lower than the shoulders; of recognizing it as a potential liability and then knowing what to do about it.

In this example, because the person in Photo 1 is generalized and because her overall fascia is already tight and contracted, the seemingly insignificant lowering of the arms and stretching of the fascia at her shoulders and chest, has generated increased tension of an already over-stimulated nervous system ... and was enough to further increase her overall discomfort. It even compromised her ability to sustain a deeper breathing pattern.

If this person were not generalized, the support in Photo 1 would have felt fantastic. As it turned out, after I elevated her arms up to the level of her shoulders, she sighed audibly in relief, and soon fell asleep. Later on, she was able to



photo 1a



photo 1b



photo 1c

appropriately slow her breathing and begin her actual yoga exercises.

If generalized students "try" to do even the most basic yoga exercise (or any other kind of exercise) before completely and totally relaxing, the body rebels against the added stimulation; and the harder they try, the more uncomfortable they become. On the other hand, once generalized students are able to completely relax their body, they can begin the slow process of restoring functional flexibility.

Restoring functional flexibility always must come first. In order to achieve optimal success using yoga as a therapeutic intervention, the person must first be able to relax fascia's tightness before working on strength and endurance.

This touches on an important concept that I will discuss later: Any attempt at building strength or endurance prior to first establishing functional flexibility only increases the risk of causing additional stress and tension, along with the increased risk of exacerbating old injuries or promoting new ones.



photo 2



photo 3a



photo 3b

Managed Breathing is the Most Important Component of Yoga:

After students have settled into "the supported position," I wait until they have completely relaxed before introducing the most important component of yoga: Managed (controled) breathing.

How long I will wait is a function of their physical presentation; of how relaxed they appear to be. When generalized people have been in a chronic state of pain and exhaustion for a long time, the skin around their mouth and eyes appears drawn and tight. The skin around the forehead and between the eyebrows is furrowed and their eyes appear slightly red to extremely bloodshot.

In most cases, it usually doesn't take long for the person's face to relax and for the eyes to begin clearing; and for their breathing to become more rhythmic. If they haven't fallen asleep, I'll then introduce the first in a series of gentle, easy-to-do exercises that are designed to coordinate their breathing along with the movement of their body.

Although aspects of breath management are taught in virtually all yoga programs, breath management is absolutely essential when learning *Recovery Yoga*. Because generalized students are already over-stimulated, it is extremely imperative that they **not try** to deep breathe, but to simply and gently slow down their breathing. A few of the key-phrases I use when introducing the concept of breath management are:

- Allow the breath to be silent or invisible at the nose
- Never force or try to deepen the breath ... just allow it to become deeper
- Relax the tounge, the lips, and the throat
- Allow your open or closed eyes to "look" downward toward the chest as you invite the breath in and out
- And finally, invite the exhalation to be slightly longer or slightly deeper than the inhalation. For example: Inhale for the count of two, and exhale for the count of three.

For "homework," I encourage all new students to practice their breathing skills at home, after they retire to bed. I also recommend they use a number of pillows to support their body similar to what we do in class. Later on, almost every new student tells me that their sleeping has improved and that they are waking up in the morning feeling much more refreshed.

The first yoga exercises --

Coordinating breathing with moving the body:

The first objective after learning how to create relaxation is to learn how to gently slow down and deepen their breathing.

Because students are instructed to move their body only in coordination with either a slow and gentle inhalation or exhalation, they learn to slow down of all their yoga exercises, thus allowing the opportunity to actually pay attention to what feels comfortable and what does not. At this point, I actually begin slowing the tempo of my verbal instructions, thus supporting the concept that there are no time limits; and accordingly, students tend to slow down even more.

The essence of "yoga" --

Integrating body-mind-and breath:

If we are working on the basic premise that "yoga" means, "the movement toward balance and union," then we want to be doing our yoga in one of two ways: Either we want to be completely and totally relaxed (as with the supported position), -or- we want to be completely and totally physically involved within any given yoga exercise. That being said, "to be completely and totally physically involved" does not mean to be aggressive or forceful. By being completely and physically involved and integrated, students can promote restoration of a broken-down body as well as athletically enhance flexibility, strength, and endurance; both can be done without "trying hard," but instead by practicing appropriately.

I can not over emphasize the importance of understanding the following concept: Students must be totally relaxed and be able to control their breathing before doing any "physical integrating exercises." The process of physical integration is accomplished by *fully activating the body along with controlled breathing*. Fully activating the body is accomplished, in part, by gently extending through both arms and hands, and both legs and feet; as is taught in *ExTension Yoga*.

The following photos present a series of "exercises" that creates what I call, "the body-mind-breath" connection, and begins the process of learning how to be "completely and totally integrated" within each and every yoga exercise that is practiced.

Although the logic and reasoning behind the concepts I teach all new students are described in depth elsewhere in this website, I will briefly review them here:

I instruct students that the best way to initiate mind-body-breath integration is by "activating" both hands and feet (**Photos 4 and 6**) along with slow controlled breathing. In fact, creating such a physical integration actually has a profound effect upon the brain's ability to relax and slow down ([See Meditation and Yoga](#)).



I then ask students to experience the phenomena of "extension releases tension," by doing some of the modified exercises from the *ExTension Yoga* program.

By simply and gently extending through both arms & hands and legs & feet, even when the body is fully supported as shown, both the feeling of "extension" or lengthening along with the release of tension ("ExTension") can be felt. This is when I ask students to begin the process of coordinating the movement of their body with their breathing.

By encouraging students to avoid even the slightest amount of strain or pain, I ask them to practice the following techniques that establish and build their fundamental foundations:



Begin by asking to "activate" (extend) both arms & hands, and both legs & feet (Photo 6). Then ask for very gentle slower and deeper breathing; with exhalations just a little bit deeper than inhalations. When ready, start the exercise by taking a slow, gentle inhalation while at the very same time, beginning to slowly bend the right arm at the elbow. The object is to coordinate the movement of your arm up to 90 degrees with the inhalation. When the arm achieves 90 degrees, your inhalation should be complete (Photo 7). You can now choose to hold the arm upward and continue breathing or you can complete the exercise. When you are ready to complete the exercise, begin to lower your arm in coordination with your slower and longer exhalation. The object is to conclude your exhalation at the very moment your hand returns to the support (Photo 8). Repeat three times. Upon conclusion of the exercise, release the extension of the hands & arms, feet & legs totally, and completely relax your entire body. Although you are totally relaxing, you should continue to control your breathing, by making it somewhat slow and deep, but without any hint of strain or discomfort.

Repeat a total of three times using only the right arm; and then three times using only the left arm. One coordinated inhalation brings the hand up by bending at the elbow; and one coordinated exhalation brings the hand back down to its support.

Let's now talk about reality. You are being asked to fully coordinate the bending of your arm at the elbow with a specific breath; and to exactly finish that movement at the very moment you conclude your breath. It probably won't happen and I don't want you to be concerned about it. No one can coordinate their breathing exactly with the movement of their body. The object therefore, is two-fold: 1: To simply slow your breathing and coordinate it with the movement of your body, and 2: To simply pay attention to what's happening. For example, an experienced yoga practitioner doing this very same exercise might be asking himself:

- ❖ Was the movement of my arm smooth or jerky?
- ❖ Was my breathing smooth or jerky?
- ❖ How close did I actually come to completing the arm movement and the breath together?
- ❖ Did my arm bend to 90 degrees, or was it more or less?
- ❖ How active was I able to keep the other parts of my body while I was concentrating on this particular movement? Was I able to keep both of my feet active? What about my other hand and arm?
- ❖ Did I remember to totally relax after the exercise and keep my breathing smooth and gently deeper?

The object of these exercises are not to try to create exact coordination of body and breath, but instead to learn how to pay attention to the reality of what is happening and that over time, through attention and repetition, the body will begin to move toward balance and union.

There really is no right or wrong way to do yoga; other than to reinforce that if yoga is done in a way that increases your exposure to injury, or if it exacerbates pain and discomfort, you might want to question its efficacy. That being said, it seems to me that yoga is all about learning how to "maximize potential and minimize liability." By learning how to do yoga without forcing or trying; generalized students can move a long way toward reducing their discomfort and begin moving "toward balance and union," with everyone else increasing flexibility, strength, and endurance along with reduced risk of injury.



When ready, the next progressive sequence is to "breathe" your arms, one at a time, up and down without bending at the elbow. (Photos 9, 10 & 11). Begin by activating both arms & hands, and both legs & feet. Start by "inhaling up" your right arm, fully extended and feeling your elbow and full arm "extending" , toward the ceiling; and then to "exhale" it down back to its support. While the arm is moving, be certain to keep it "extending" until it reaches its support.

The key is to keep the fingers moving away from the elbow (which stretches the hand and the elbow), and to keep the shoulder moving downward toward the support, which also helps to promote "extension" of the elbow and entire arm.

You can begin this sequence by first "inhaling up" your right arm and then "exhaling it down" back to its support. Repeat three times using just the right arm. Then repeat the sequence using just the left arm. As always, rest when necessary and never "try" to complete all sequences in sequence if you are tired or are in pain. Upon conclusion of the exercise, release the extension

of the hands and feet totally, and completely relax your entire body; although you should continue to control your slow, deeper breathing.

The next exercise is "breathing" alternate arms; except this time, all movements are only done during the exhalation. Starting with both arms on their support, the right arm "exhales up" to 90 degrees, while the left hand stays on its support. You can stay with one arm up and one arm down for as long as you wish, breathing smoothly and deeply. Then when you are ready, you will "exhale" the right arm down while at the very same time, the left arm is going up, coordinating your exhalation with the "wind-milling" arms. **It's important to remember that when an arm is moving, you need to keep the fingers and elbow extending ... because, "extension releases tension."** Do three "wind-mills" and complete your sequence by breathing down the left arm. Repeat the sequences as many times as you feel comfortable and then completely and totally "let go" after its conclusion.

Although the object of this exercise seems to be that one arm ends up pointing at the ceiling while at the very same instant, the other arm has reached the support ... but just as before, the true object of the exercise, as with every other exercise in the program, is to slow down your breathing, pay attention to what's happening so that you can avoid pain or strain. And eventually, the progressive nature of the program will begin to challenge your body sufficiently so that appropriate change is created.

Another variation of the above exercise is to "breathe" both arms up and down at the very same time (Photo 12). As always, intend to slow both your breathing and accordingly, the movement of your body.



photo 12

Whether you are moving only one arm, or both arms together, always remember to move with your breathing, keep your entire body active during the entire sequence, and when you have completed a sequence, totally relax and let go; and continue to control your slow, deeper breathing. As always, simply stop all movements when you tire or when you feel the slightest bit uncomfortable.

Amazingly, such seemingly benign exercises pay enormous dividends in both foundation building and in relaxation, as anyone who practices these sequences correctly will tell you.

Throughout the above sequences, the students learned how to equally "activate" **both** of their hands and feet, thus creating the feeling of "extension." They then learned how to apply that feeling of "extension" throughout both hands & arms and throughout **both** feet & legs, even when one arm was bending and lengthening in coordination with the breath.

The feeling of "ExTension" (extending throughout the entire body while simultaneously "giving up" tension) is exquisitely felt as compared to the very same exercises without extension. I'd like you to do the following experiment: Do these same "exercises" again, ensuring that you are doing them with "active" feet (feeling as if the soles of your feet are stretching) and with "active"

hands (ensuring your fingers stay together with the thumbs moving away - feeling as if the palms of your hands were stretching), are fingers-hands and elbows.

Then, do the very same exercises again, but this time, without "extending" your hands and feet. It won't take long to feel a precipitous difference between what it feels to be active or not. Once you learn how to be active in your yoga exercises, without creating tension, everything changes.

In both Recovery and ExTension Yoga, it is imperative to know the difference between being "active" and being "passive."

While learning the above exercises, along with their purpose and logic, I remind you of the two most important questions a yoga student should ask: What is Yoga? and "How does it feel?"

Because "yoga," in this approach to yoga means: "the movement *TOWARD* balance and union," I remind you how important it is to "stay active" throughout your entire body during this and all yoga exercises, and in order to "maximize potential and to minimize liability," to continually pay attention to "how it feels".

Reminders:

Each and every exercise in this program is progressive and sequential. I tell students that it is of little importance to "try" to do all the exercises in the program; that the number of exercises they do is far less important than "how" they do "what they can do, not by trying to do what they can't do."

Students are always encouraged to return to a previous exercise if what they are currently doing evokes even the slightest amount of discomfort.

Additional instructions relating to the above exercises can be found in the [Recovery Yoga Excerpts](#) section of this website.

Acknowledgement

*With profound acknowledgement to BKS Iyengar for introducing the use of props to support the body of chronically ill and injured students. Also thanks to Paul St. John and Judith Walker for teaching the elements of neuromuscular therapy. The combined teachings of both systems have led to the understanding, logic, and techniques that makes *Recovery Yoga* an effective tool in managing the effects of generalization.

Chapter 10: Yoga & Aging

A Yoga Perspective On How The Body Changes
As We Grow Older... And What To Do About It

Introduction:

Everyone ages differently depending upon a multitude of different factors. Among them are genetics, extrinsic environmental factors such as the air we breathe and the food we eat, the wear and tear from the multitude of life's accidents both big and small, and even intrinsic factors such as how we feel about work, family, and finances.

The human body undeniably changes as we age and eventually, the body dies. Notwithstanding the principles of normal aging, the average human body goes through what I call, *Ages and Stages*.

Although certainly anecdotal, I've interviewed many hundreds of yoga students and therapy clients through the years, and the *Ages and Stages Theory* has always held true ... including the conversations and concurrence with the large number of doctors and physical therapists I've discussed this with through the years. After reading this material, you might ask yourself if the *Ages and Stages Theory* also applies to you.



Your body has a nifty little mechanism that helps to facilitate your healing process. When ill, and *especially* when injured, your body tightens up in order to protect itself from further injury. This mechanism contracts the fascia of your body; which is basically, the connective tissue surrounding your entire body from the top of your head to the tip of your toes. Fascia lays directly under your skin and also surrounds and encapsulates virtually every muscle and muscle group, along with every organ and every gland in your body.

When you were a child and young adult, your body was fairly resilient. When you were injured or ill, your body healed quickly and you were soon able to resume your daily activities and get on with the business of life. But things changed as you grew older. As your body went through its first "transition" somewhere between the age of 28-32, and about every ten years past that, you discovered that your body became less resilient and you found that it took increasingly longer to recover.

This is because about every ten years past ages of about 28-32, there is a natural contraction of your overall fascia. The "bag that holds your body together" begins to tighten up. It becomes

less resilient and basically interferes with your normal healing process. Normal aging of fascia along with its natural contraction also affects the circulation of fluids and nutrients.

Did you notice that as you passed through your first "transition" (that is, as you passed through the age of 28-32), you began to "re-experience" injuries you thought were long-ago healed? As you went through subsequent ten-year thresholds, did you notice that you experienced more and more of these older injuries. Notwithstanding old injuries, have you noticed that as you pass through each of these Ages and Stages, your body responds less quickly or not nearly as lithely as it did before that last ten-year "transition?"

The very same mechanism that protects you when you are injured is the very same mechanism that causes you to re-experience your old injuries as you age. Notwithstanding actual injury or illness, about every ten years after the age of 28-32, your fascia contracts even more. Stress, be it physical or emotional, contributes to fascia contraction.



Here is another way to look at this phenomenon. When an animal in nature is injured, it simply looks for a dark and quiet place in which to lie quietly and it allows nature to take its course; it will heal or die. Another thing about animals in nature; they are always stretching. They stretch when they first arise from sleeping and they stretch often during the day.

Overall, animals in nature take pretty good care of themselves. Basically, with the exception of some higher primate species including humans, animals live pretty much "in the present," seemingly striving to avoid personal and extraneous environmental stress.



Not so with us humans. When injured or ill, we almost always prematurely resume our active and busy lifestyles before we fully recover. And in so doing, fascia will continue to contract in

order to protect us from further damage. In addition to illness and injury, the stress from our daily lives also causes our fascia to contract. In other words, aging *and* life's responsibilities with its multitude of physical and emotional trauma, causes fascia to contract.

It's when we can both understand and appreciate fascia's contraction when it is stimulated; be it from injury, illness, stress, or from the natural process of living and aging, that we can begin to appreciate *why* yoga can have such a profound affect upon our body and mind ... and even more so when yoga is "appropriately" practiced.

When we recognize that over-stimulation will only contract soft tissue, it makes absolutely no sense to force our yoga, or to "try" to get our body to become flexible; *especially* if our body is injured, ill, or after it has gone through one or more of the age transitions. (Elsewhere in this web-book, we learn that fascia is a soft tissue that responds to stimulation and will contract, in part due to Hilton's Law).

If you were ill or injured, or if you have gone through one or more of the "age thresholds described above; then even the slightest "forcing" or "trying" would most probably further contract your fascia causing you additional contraction (like what you experience the day after a yoga class). Therefore, when you do yoga in a way that exacerbates your tightness, even just a little bit, I'm compelled to ask you: "Where is the 'yoga' in that?"

This is **not** to say an "appropriate" yoga must be **always** be passively or softly practiced. Far from it, but an appropriate practice must be performed in such a way that it appropriately challenges a person's "current" or "present" physiology without significantly causing over stimulation. Obviously then, an appropriate yoga practice would be considerably different for a physically fit person as compared to that of a chronically ill, injured, or aging student.

If you are a yoga teacher and offer a student a yoga exercise or routine, the operative questions must be: *What is yoga* and *How does it feel?* The logic and principles of *ExTension* and *Recovery Yoga* present how to appropriately practice and teach in a way that supports changing physiology; be it through illness, injury, or just the natural process of growing older.

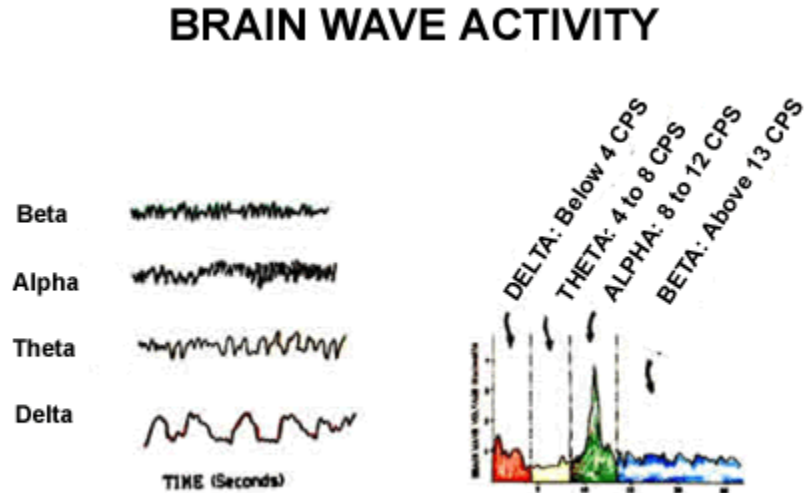
Appropriate practice and teaching should not done by rote, but by applying the knowledge and application of these neuromuscular principles and laws that moves a person **toward** strength, endurance, and flexibility **in a balanced, harmonious way**. And as a result of that harmonious balance, you will also move toward enhanced spirituality.

Chapter 11: Meditaton & Yoga

Meditation In Action
The Yoga 'Brain Wave' Research Project

Introduction:

As I presented in [The Seven Principles of a Highly Effective Yoga Practice](#), there are four wave length patterns generated by the human brain that are measured by EEG, (electroencephalogram): They are: Delta, Theta, Alpha, and Beta.

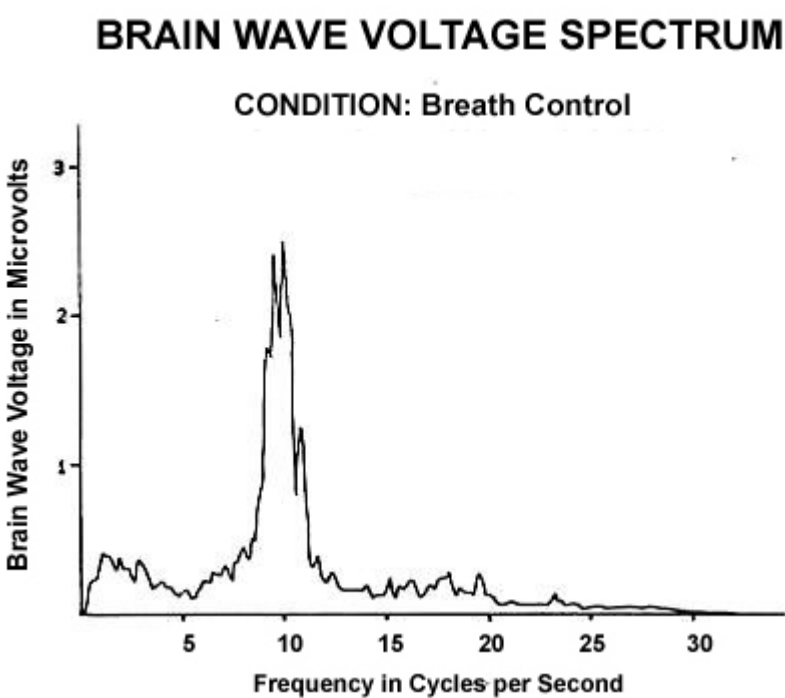


When we are physically or mentally active, the brain typically evokes an electrical patterning of 13 cycles per second and up. When your EEG registers more than 13 cycles per second, your brain is considered to be in *beta* or *task orientation*.

On the other hand, when you are in a relaxed and quiet state; when your eyes are closed and you are sitting or laying down but not asleep, your brain wave activity also slows down and moves into the 8 to 12 cycles per second range. Your brain is then considered to be in *alpha*.

However, when you focus on a single object, be it music, a candle flame, or your own breath, brain wave activity begins to peak its electrical patterning in the 8-12 cycles per second range. This EEG pattern of peaking within the alpha range is directly associated with normal meditation (as compared to profound and deeper states of meditation generated by aesthetics).

As a yoga student, it's interesting to note that EEG research consistently shows that when a relaxed person closes the eyes, meditation always becomes enhanced (or deepens). Further research confirms that when the subject then slows and controls breathing, alpha waves become more congruent and begin to spike within the 8 to 12 cycles per second spectrum ... a phenomenon that is associated with deeper meditation.



Said another way; when your eyes are closed and you are in a relaxed meditative state, your brain produces alpha waves. The more relaxed you are (and the slower and more controlled your breathing becomes), the deeper your meditation.

But when you go from a *closed* eyes, relaxed physical and mental state, to an *eyes open*, outwardly focused action, your brain waves speed up. As alpha decreases and beta increases, as brain wave activity increases to beyond 12 cycles per second, your brain is said to be in "task orientation."

Mental activities, such as carrying on a conversation or problem solving; or engaging in physical exercise, such as sports and other goal-oriented activities, are said to be "focused cognitive activities" and place your brain clearly into beta orientation.

You would think therefore that yoga's physical exercises, especially demanding yoga asana (exercises) that require profound balance and concentration, or asana routines that require rapidly moving the body into and out of asana, would be considered forms of focused cognitive activity. As such, they would be expected to always produce brain waves largely in the beta range. But that's not necessarily so.

Under laboratory conditions, even newly trained yoga practitioners are able to evoke an alpha state when doing slow and methodical exercises with eyes *closed*. This might not be too impressive given the nature of yoga. However, a most interesting phenomenon takes place when experienced yoga practitioners execute physically complicated and demanding yoga exercises with eyes *open*.

Alpha is generated quicker and with more congruency. In other words; the more experienced you are as a yoga practitioner, the quieter your brain becomes which allows for a deeper meditation. As further documented by EEG, when an experienced yoga practitioner adds deeply controlled yoga breathing to the very same exercises, the congruence of generated alpha (the meditation aspect) becomes even more observable.

**An appropriate yoga practice,
therefore, can truly be considered as
*Meditation in Action***

The research project that I participated in at Wright Patterson Air Force Base with Dr. Andrew Junker, observed brain function during rest, exercise, task orientation (physical and mental coordination exercises), and yoga. Our results were congruent with the literature, which is that alpha is generated during meditation *or* generally when the mind and body is in a quiet and relaxed state; either sitting or lying down with the eyes *closed* and that beta is produced during task orientation with eyes either open or closed. Our investigation also found something else not previously well documented.

Because normal exercise evokes brain waves within the broad beta spectrum, we wanted to determine if an alpha state could be generated in the brain during all ranges of yoga based exercise, from simple to complex; both with eyes shut (which is expected to generate alpha), but also with eyes *open*.

Because master yoga teacher BKS Iyengar always said that yoga is *meditation in action*, we postulated that an experienced yoga practitioner should be able to perform virtually any yoga posture, regardless of how difficult or advanced, and still be able to generate alpha; especially if the body were kept in relative balance employing the *ExTension Releases Tension* model of avoiding forcing, straining or trying. ([Click here to see correspondance from BKS Iyengar regarding this project](#)).

The *ExTension Releases Tension* model is to maintain an equal feeling of extension throughout the entire body during asana. This is accomplished by equally activating through both hands and both arms, both feet and both legs, and through the spine and neck. If, for example, one were to extend the hands, arms, and legs, but allow one or both feet to remain soft, there would be an imbalance within the body that either keeps the brain in beta orientation, or imbalance limits congruency if the brain is able to attain alpha.

Conclusion:

By first breathing deeply and easily, and then by creating a balanced state of "extension" throughout the body, our research confirmed that even a newer yoga practitioner can create a deeply congruent alpha state with eyes open. Thus, yoga exercise can truly be called *meditation in action* ... even with open eyes. (For more on meditation, see Principle # 7 in [The Seven Principles of a Highly Effective Yoga Practice](#)).

Chapter 12: Yoga & Spirituality

A dialog on the spiritual aspects of yoga

As stated in [History](#), *Recovery* and *ExTension Yoga* defines a Western approach to yoga which is physically based; and when appropriately practiced, leads one *toward* a balance of body, breath, and mind. It is my both my personal and professional experience that movement *toward* such physical balance helps to promote an increased spiritual awareness.

I in no way claim to be a spiritual master, but instead merely a yoga teacher and technician of the body learning how the body's appropriate use of "yoga exercise and breathing" both promotes and enhances feelings of spirituality.

Accordingly, I asked Richard Miller, PhD, a western yogi; a proponent and expert in merging the spiritual arenas of east and west, to review my site. The following dialog is used with permission.*

Richard Miller

When first looking-over the site, what strikes this mind is that the approach is body centered and there is no inclusion of Consciousness (call it God, Awareness, Spirit, whatever) as the underlying principle. I don't agree with your comment that: "Muscles move our body." This cannot be the underlying principle when we inquire, what moves the muscles?

I wonder if there is a way of building into your site the underlying spiritual principles of Yoga. I assume you are trying to write for the average western reader. But I find leaving out this most basic movement of Yoga what keeps Yoga at the body level.

Sam Dworkis Replies

I totally agree with you that yoga's underlying principal goes well beyond the physical. However, until now, I've not incorporated "Consciousness" into this site because I've wanted it to be a pragmatic resource for yoga teachers and accordingly did not want it to be perceived as ethereal. I've felt all along that I should leave such discussions for other teachers and web sites more qualified than I.

On the other hand, my intention is to create a web resource that reinforces yoga-exercise so it maximizes benefit and minimizes liability; and in so doing, allows yoga to gently awaken and enhance the Consciousness that is inherent in us all. I tend to approach yoga's spirituality from the back door, so to speak.

Although I incorporate the Spiritual in my teaching, I usually wait until beginning students appear comfortable with asana before I introduce spiritual matters. In other words, I see my work as helping students discover spiritual awareness by offering an experiential integration of body, mind and breath. Once students begin to experience for themselves "the light of inner consciousness," through their yoga, I'll facilitate their transition toward inner-awareness and spirituality.

I'm curious if you teach "Consciousness" from your very first student contact and if so, is that more because you already attract those who are seeking spiritual guidance rather than a person who is looking more for just physical fitness? In your early years, did you always emphasizing the spiritual first?

Richard Miller

From the beginning of my experience with Yoga, inquiry was always present. I could never separate the spiritual of yoga from its physical component. While there were years when I was engrossed in the physical aspects of hatha yoga, the meditative aspect of the practice was always close by.

In all the classes I've ever taught, there was always some reference to Yoga being more than the physical. While these were not always direct references to the spiritual, the hint was always there and my ears were always listening for the student who perceived the hint to go deeper into the inquiry of what lies behind the physical, what is the home ground of all movement, i.e. Awareness (or whatever name we give this unnamable).

These days (for the past many years) I unequivocally teach the spiritual dimension of Yoga to each and every incoming student. It is my passion and I realize life is too short to hold myself back from what I feel is this one's endeavor. I want to place it on the table squarely so that the incoming student can see it directly and know that he/she does not have to hold back in any way. If they are not interested, and what I have to offer does not appear appealing, I am equally unequivocally interested in steering them into the class that meets their interest.

What I often experience, however, is how starved students are for the spiritual. They have practiced yoga for years in the physical and are feeling the deeper pull but not knowing how to express it. When I met my spiritual teacher, Jean Klein, after moving from teacher to teacher and teaching-to-teaching, I knew what I was looking for but could not quite grasp it, as it was so intangible. In the first class I had with Jean, which was with the hatha as well as in dialogue, Jean pointed me directly to myself as Consciousness.

This direct pointing brought me to a standstill and the recognition of myself as That. I have eternal gratitude for his emphatic pointing out that instruction, which no other teacher had done for me until that moment. Of course when the student is ready the teacher appears. All teachers and teachings to that moment had each prepared me for my meeting with Jean. Some teachers had shown me a piece of the truth; others had helped me see what is not truth. So there is equal gratitude for all the teachers along the way.

I experience that we are each an expression of Consciousness. As such, we each express different facets of Consciousness. Consciousness loves knowing Itself in every possibility. This is the joyousness of life expressing Itself in infinite varieties of experience.

I think of it this way... timeless eons ago, we, as Consciousness, split ourselves into infinite pieces and scattered, or projected ourselves around the entire cosmos. Every thing and person we see is our self, looking back at our self. We are each going about taking these projections back into ourselves. And since there are an infinite number of projections of myself, there are infinite joyous occasions to take myself back into myself. Yoga, to me, is living this understanding that everything I see is myself. In this there is infinite compassion and love because we are always looking at our self in every manifestation.

We each are doing exactly what Consciousness wants because we are not separate. Physical, psychological, spiritual, we're all doing exactly what we should be doing at every moment. It's beautiful, this being alive.

Your site pulls responsive seekers into the teachings. My thought, in viewing your site, is to have some place in it where the person who is looking for Truth can go and hear (read) the direct teachings as well as the indirect. Then that student can come to you with their unequivocal need for spiritual awakening.

A question I keep in mind, as I hear you do, is how each aspect of yoga, be it hatha, pranayama, dhyana, etc. can bring the student to knowingly knowing themselves as Consciousness. Each piece of the discipline of yoga is a pointer to our infinite Wholeness. I like to point this out in the beginning so that those students are ripe can hear it from the very beginning. Those who are not ready hear something else. Joy to you. Your thoughts?

Sam Dworkis Replies

Thank you for engaging in this dialog. I feel we are philosophically closer than we are apart and you are helping me to clarify my thoughts. I'm now developing a page devoted to "spirituality" and will use it to explain in more detail how a **physical** approach to yoga is but another tool of conscious awareness; otherwise known as Consciousness.

Would you be willing to clarify your comment above? Knowing now that I am creating such a place, what do you mean by "...the direct teaching as well as the indirect. Then the student can come to you with their unequivocal need for spiritual awakening."

Richard Miller

Yoga suggests a progressive teaching. The student slowly builds understanding through the eight-fold ladder of ashtanga yoga...yama, niyama, asana, pranayama, etc. The teaching unfolds progressively, step by step supporting the student to build the steadiness and insight necessary for the experiential realization that they are not separate. This is often called the progressive or indirect path.

Patanjali suggests, however, that the 'goal' of yoga is always close at hand because it is never the product of effort, which is a contradiction in terms with the definition of Yoga. In the direct path the student is informed from the very first moment that they are not separate, all is One and that it is only their striving to obtain that keeps them from this realization. All efforting and striving, from the perspective of the direct path is born in conflict and suggests that we need to be different than we are in order to realize who we are. This is a contradiction. Striving takes us away. When yoga finally empties of all striving and we rest just as we are, we stand not in opposition to gravity but instead at peace within ourselves.

These two paths are compatible and support each other as the progressive path of purification helps eliminate the misperceptions that keep the mind identified with its movements and prevent the insight of Oneness from being established. The direct path informs the student all the way along that who they are is already present and identification as an ego-I and striving for perfection is again a contradiction.

As I experience it, the physical asanas help empty the physical body into pure sensation and open the student to the deeper energy body. Pranayama supports this emptying process. Working with the manomaya and vijnanamaya koshas empty identification with emotion, feeling, thoughts and imagery, opening the body into its inherent and uncaused joyfulness of the anandamaya kosha. Then, through persistent inquiry into the nature of the witness, the body and mind merge into awareness without identification.

This is what I mean by the above statement. I like the five koshas as a map of yoga because they reveal the structures of identification (body, feelings, emotions, thoughts, etc.) that make up our sense of separateness. Dis-identification does not mean dissociation. It entails being able to feel and think, welcoming all the structures of personality, but no longer being captivated into them. Once freed to be, these structures then serve as pointers to the awareness that is always present in the background.

It appears to this mind that everything in the universe is an expression of Awareness. What, then, is there to repress if everything is 'me'? Who can I be angry with but myself. All, whom I love is 'myself'. This feels to me to be at the root of compassionate understanding. When everything is intuited to be me, the only response can be love. Asana, pranayama, etc. then appear as doorways into our infinite nature as Beingness, or Awareness.

Each inquiry of asana, pranayama, etc. can be paired with a kosha that we are investigating through the practice. Each step is inquiry into its true nature, which is always revealed as the next underlying kosha, which ultimately empties into awareness. This was a long answer but I hope it helps clarify what I meant.

* Per personal correspondence with Richard Miller, April-May, 2001, edited for brevity. For an in depth study of spiritual and traditional aspects of yoga, I refer you to a list of "Spiritual Links" at the end of [Yoga Links](#). Included are an array of important links to areas of study that are well

beyond the scope of this website. What is within this website's scope is my knowledge and understanding of how an appropriate practice of the physical components of yoga can help us to maximize the benefits from hatha yoga and to minimize its liability.

As a way of further clarifying my teaching style, the following selections are adapted from email dialogs and are used with permission.

Terri Corral; Certified Kundalini Instructor asked:

I wonder why you suggest continually asking "What is yoga?" Once you have defined it for yourself, why continue to ask again? However the question "How does it feel?" is ever so important to ask as it keeps us in the experience of yoga! Scanning one's body to "feel how you feel" provides valuable feedback to the student and aids in keeping one in the experience.

Sam Dworkis Replies:

It's all semantics; but how many of us westerners practice yoga more physically than spiritual? If, perhaps, the student were reminded that the practice isn't just a fitness program, but that there is a much bigger picture, might that be helpful? If so, perhaps a gentle reminder to consider what they are doing (what is yoga?) might help that student to explore more of the intrinsic benefits of the practice.

I appreciate your position about alignment and I appreciate your perspective that you are speaking for only yourself. During the past twenty-five years, I have taken classes around the world from master and minor yoga teachers from as many different disciplines as I could find. In addition, I have an accumulation of yoga books from all disciplines and from all perspectives. Most are beautifully produced and share wonderful messages about yoga.

As I remember back to the many classes I've taken and as I look through these many books, my overriding concern is that if the body becomes stressed doing asana, might our spiritual potential or even our spiritual desire become compromised? A yogi aesthetic who becomes injured during asana might say "Thank you God," and use that injury for a deeper spiritual meaning. But a normal westerner who becomes injured during asana might just be inclined to chuck it and go look for another form of physical (and perhaps spiritual) program. Ergo, my intention is to share with yoga teachers from all traditions how to maximize physical benefit and how to minimize physical liability and thereby enhance one's spiritual potential.

Anna Edwards

The British Wheel of Yoga, Worchester, U.K.

Your description of life stages are spot on as I have seen both with my own students and myself. (I'm the same age as you) All injuries take longer to heal as we age and our bodies certainly "remember" long ago injuries and stresses whether physical or emotional. As teachers it is essential we take this into account and start from where the student "is" not from where they think they would like to be. Isn't this one way of beginning to introduce the Spirituality side of yoga? The Bhagavad-Gita says "Do thy work in the peace of Yoga and, free from selfish desires, be not moved in success or in failure. Yoga is evenness of mind - a peace that is ever the same."

Chapter 13: Religion & Yoga

The Conflict Between Yoga and Religion

I received the following letter from a reader who wanted to know why she was experiencing such a conflict between her religious studies and her yoga practice. I was so taken by her question that I wrote the following essay in response. She wrote:

Dear Sam
I read your website and wonder if you could help me. I have been practicing yoga for several years. I have also learned TM which I thought was not to do with religion but to do with releasing tension.

I recently started a religious studies course and have a book, which says that TM and yoga should not be followed. However, both yoga and TM feels okay to me and the more I practice the calmer I get. This helps with my depression.

Do you know why there is so much conflict? I really can't understand this at all. I am finding this very upsetting. Please help.

Many thanks.
Susan

My response follows:

Dear Susan

I thank you for your question and want you to know that your dilemma regarding the conflict between religion, yoga, and TM is not all that uncommon. Although you practice both yoga and TM, and although you feel better by doing it, there are people of influence in various religious communities who will tell you that what you are doing and feel ... is wrong. This essay should help you to better understand why.

Although there might be some parallels between TM (Transcendental Meditation) and yoga, I have not studied TM and I cannot discuss their parallels with certainty. On the other hand, having studied and practiced yoga for over 30 years, I feel I understand why some religious believers say negative things about yoga and why, in effect, they think your personal experience with yoga is wrong.

To answer your query, we must first consider three questions: “What is yoga and why do we feel better when we practice it?” “What is the difference between religion and spirituality?” And the last is: “Why do some religious believers think yoga is wrong and why do they say it should not be practiced.”

What is Yoga and why do we feel better when we practice it?

I've written various essays regarding the origins of yoga and why we feel better after practicing. Rather than repeat what I've already written regarding its history, I invite you to read (or re-read) [The History of Yoga](#). Understanding yoga's history is part of the answer to your question.

There are pragmatic and scientific reasons why we feel physically and emotionally better after practicing yoga. To review its mechanics and logic and *how* and *why* we feel better when we practice yoga, I invite you to read (or re-read) Part 1 of my website, [The Mechanics of Yoga](#). The fact that you feel better both physically and emotionally is the result of a simple “cause and effect” relationship of your body's response to natural laws and body mechanics as described in *The Mechanics of Yoga*.

Although this is not a forum to discuss, compare, or debate non-secular beliefs with the laws of nature and evolution, many people believe our body, and nature in general, is the direct creation of God. On the other hand many others believe evolutionary forces of nature created our body; and that those forces of nature might, or might not have been, the creation of God. To fully respond to the remainder of your question therefore, we need to differentiate between “religion” and “spirituality.”

What is Religion?

“Religion” can be defined as a set of common beliefs and practices generally held by a group of people, often codified as prayer, ritual, and religious law. Religion also includes ancestral or cultural traditions, writings, history, and mythology, as well as personal faith and mystic experience.*

What is Spirituality?

“Spirituality” can be defined as concerning itself with matters of the spirit: Spiritual matters are those involving nature, not merely as material biological organisms, but as beings with a relationship to that which is beyond both time and the material world.*

Is Yoga Religious or Spiritual?

Having Hindu origins, traditional yoga has evolved from a set of beliefs and practices with a history, tradition, and mythology that is without question, religion-based. However, in modern times and in Western culture, many other different styles and approaches to yoga have developed that are entirely secular (non-religious) in their methodology. Even so, it can still be argued that people who practice the physical culture of yoga and who outright reject its Hindu origins, are still invested in a methodology or system that has rituals, laws, and techniques that has a positive effect on and enriches their lives.

The difference between "Intrinsic" and "Extrinsic" wellness:

An “extrinsic” approach to wellness is where we rely primarily on others to take care of our health needs; where we rely on others tell us what is right or wrong, or how we should feel or what we should believe. Most modern approaches to yoga, (including *ExTension* and *Recovery Yoga*), are “intrinsic.”

An intrinsic approach to wellness is when we take primary responsibility for ourselves to improve our physical and emotional well being; where we learn how to trust our own inner voice to do the right thing; and in so doing, we feel a deeper connection with people and with the environment around us. When we practice intrinsically, we learn how to trust in ourselves and how to feel a deeper connection with the earth below our feet (feeling “grounded”). And in so doing, we experience a deeper sense of physical balance and inner quietness.

For further reference and discussion, you may refer to the [Intrinsic vs. Extrinsic Yoga](#) chapter of my website.

Accordingly, by definition, the practice of modern yoga (as contrasted to “traditionally oriented yoga”) is a spiritual practice that enriches the practitioner's personal relationship with nature; and if a person practicing yoga is religious and believes in God, it enriches the practitioner's belief in God as an adjunct to the practitioner's faith.

For further reference and discussion, you may refer to the [Spirituality and Yoga](#) and the [Meditation and Yoga](#) chapters of my website. *See "[Religion](#)" and "[Spirituality](#)" in Wikepeida.

Why do some religious believers feel yoga is bad and should not be practiced?

Because yoga has Hindu origins; because yoga has a methodology of its own; because practitioners can find relief (healing) as a result of their own intervention; ... and ... even though yoga can open spiritual channels that augment God-Consciousness, there are some religious believers who feel their interpretation of the bible is the only way to salvation and that only God has the ability to heal. These are the religious believers who passionately reject yoga or anything else that is not expressly taught by their leaders, or how they interpret their religious texts.

On the other hand, there are believers who feel the work of God is all around us; in the Earth, in all of nature, and in the human body, mind, and soul. These believers trust that God wants us to take personal responsibility for our own well being and health; and that yoga is one of many different methods available to us that fosters self-responsibility.

When you read from your religious texts and when you are confronted by people of religious conviction who tell you your yoga practice is wrong, there is nothing you can say; there is no logic you can offer; nor is there a scientific argument you can make, that will dissuade them from believing their way is the only way to achieve the grace and love of God.

Therefore, my advice to you, as a person of faith, is to ask *yourself* how you feel after practicing yoga; if the feelings you generate from your own personal practice are good feelings or evil feelings. And based upon your own feelings and intellect, what do *you* think God would want you to do and feel.

Chapter 14: The Medical Benefits of Yoga

Excerpts from *Yoga as Medicine: A book by Timothy McCall, M.D.*

Excerpts from *Who Will Stop the Pain: A book by Arthur Klein and Dava Sobel*

For many years, I enjoyed periodic conversations with Dr. Timothy Mc Call, M.D., a board-certified specialist in internal medicine who developed a deep interest in yoga many years after he began practicing medicine.

Along the way, Dr. McCall decided to write a book on yoga and medicine, and in between his many trips to India, interviewed a number of leading yoga exponents of various disciplines, including myself, on what they, as yoga teachers, did to help people with chronic illness and physical dysfunction.

I was honored to contribute my perspective on yoga's effect on chronic pain in several places throughout his book, and was pleased to contribute extensively for his chapter on fibromyalgia.

The result was his landmark book, *Yoga as Medicine: The Yogic Prescription for Health and Healing*, published in 2007 by Bantam Books in association with Yoga Journal. [\(Click here to purchase his book directly from Amazon.com\).](#)

"Yoga appears to be effective in the treatment of a wide variety of health conditions," writes Dr. McCall. At the very beginning of his book, Dr. McCall relates a survey published by the London-based Yoga Biomedical Trust showing yoga's efficacy for a wide range of medical conditions:

Medical Condition	Number of People Reporting	Percentage Helped by Yoga
Alcoholism	26	100
Anxiety	838	94
Arthritis & Rheumatism	589	90
Asthma or Bronchitis	226	88
Back Disorders	1,142	98
Cancer	29	90
Diabetes	10	80
Duodenal Ulcers	40	90
Heart Disease	50	94
Hemorrhoids	391	88
High Blood Pressure	150	84
Insomnia	542	82
Menopausal Disorders	247	83
Menstrual Problems	317	68
Migraine	464	80
Neurological & Neuromuscular Diseases	112	96
Obesity	240	74
Premenstrual Syndrome	848	77
Smoking	219	74

Source: The Yoga Biomedical Trust, London

McCall, MD, Timothy, YOGA AS MEDICINE (Bantam Dell) 2007, pp.4-5

Authors Dava Sobel and Arthur Klein did an extensive survey on back pain and back pain resolution. Their findings were published in their book, *Backache Relief*,* showed that many traditional western medical practitioners, including doctors and back surgeons, are uninterested in non-high-tech modalities. Klein and Sobel also contend that certain surgical procedures have significant risks factors attached, and that chiropractic spinal manipulation can exacerbate conditions such as herniated disc.

Their book considers a wide range of non-medical practitioners, including physical therapy (physiotherapy), yoga, massage, shiatsu, dance, rolfing, kinesiology, Feldenkrais, Tai Chi, and an equally wide range of treatments. The results of their survey, shown below, was reprinted in my first book, *ExTension Yoga*, with generous permission from the publishers:

WHO WILL STOP THE PAIN?
by Arthur Klein and Dava Sobel

	Temporary Relief (%)	Long-Term Relief (%)
Yoga Instructors	4	96
Psychiatrists	0	86
Physical Therapists	8	65
Acupuncturists	32	36
Chiropractors	28	28
Osteopathic Physicians	15	28
Neurosurgeons	8	26
Family Practitioners	14	20
Massage Therapists	63	10
Neurologists	4	4

Questions & Answers

A compellation of questions and answers from my readers

Although this is recommended reading, I encourage you to first read the entire [Mechanics of Yoga](#) section.

As this website continues to generate responses, I find myself in dialog with many of my readers. Used with permission, these dialogs are here to help you refine your understanding of ExTension and Recovery Yoga; and how and why it differs from most yoga styles being taught today. As always, newer additions are placed at the top of the page. Names are used with permission:

A note to my readers:

If you haven't already done so, please be certain to read [The Pain Management section](#). Part 4 of that section contains an extensive dialog between myself and a yoga student who began his yoga practice because he was in chronic pain. If you are injured, chronically ill or otherwise are in chronic pain, or you are a yoga teacher who works with such students, it is well worth your time and effort to read.

The following dialog concerns a reader's chronic injuries from running and his use of the John Barnes system of Myofascial Release. Steven R from Columbus Ohio, is a 40 year old runner who, as a result of reading my website, purchased my book *ExTension Yoga* and began practicing.

Steven:

I came across your work after already having discovered that fascia only responds to gentle forces. I first learned that from reading John Barnes' Myofascial Release Manual. I want to run. I'm a runner and I love it. I believe our bodies, when healthy, are designed to run provided we run properly and softly. But I'm now age 40 and I did not understand that when I was younger ... because today, I'm racked with chronic injuries and overall tightness. A brief synopsis of my injures are:

- ❖ A severe fall in high school that injured my left side on the ribs, left hip on greater trochanter (to the bone), and left lateral knee (to the bone)
- ❖ Severe ankle sprains on both ankles that left them with limited range of motion and permanent swelling.
- ❖ A bike accident as a child that resulted in a deep cut and now a scar on my right side just above my pelvic rim, and
- ❖ I've over trained to the point of severe soreness countless times (stomach, chest, calves, thighs, hamstrings, you name it).

1) Can *Extension Yoga*, done properly with controlled breathing and active extension and never pushing too hard, eventually restore fascia that is badly bound by scar tissue, like in my ankles and hips and left outer thigh and hamstring. I will continue to do Barnes releases on them, but I'm finding that it will take forever without some way of employing my mind and body in movement and stretching in order to re-balance my body. Can that process happen and what will I experience along the way to know?

2) I am very interested in somatic re-education. I'm sure you're aware of the concept of "sensory-motor amnesia" where we are tight in a certain motion, our minds don't go there anymore, and we aren't aware of it. Those chronically tightened areas can't relax because we've lost control of them and don't use them.

What I've read about somatic re-education is that you basically find modes of movement that are painful or difficult, and gently move back and forth into that very movement, being precise about the direction that is most difficult. For example, I find that inverting my ankles on purpose, with no weight on them, induces an uncontrollable shake because my injuries were inversions.

What I'd like to know from you is whether it is advisable to do this while in *ExTension Yoga* positions. For example, my left hamstring and the region between that and the outside of my leg, is chronically tight. I feel pain when I try to stretch that area. (Your hamstring stretches, the forward bend and lying down with legs up the wall, do not cause pain.)

I sense this as being a key area for my entire body and that if it were to release and be restored, the vast majority of my body would be able to respond. Those scars on my left side are very dense and I can feel them pulling everything to the point of pain.

I find when I'm doing the hamstring stretch on the wall that if I bend my leg maybe 20 degrees and bring my knee toward my chest by taking my left foot off the wall maybe 6 inches, it is uncomfortable to move my leg gently side to side. Is it advisable to do this?

The pain is only slight. It depends on how far I go and how fast I go. When I do it slowly and gently, it seems ok. I don't know yet how effective it is because it hasn't been long enough. I'd really like to know your opinion.

Sam Responds:

When you ask: "Can ExTension & *Recovery Yoga*, done properly with controlled breathing and active extension and never pushing too hard, eventually restore fascia that is badly bound..." My answer is that it's impossible to predict if ExTension & *Recovery Yoga* will "eventually restore (damaged) fascia." That being said, ExTension & *Recovery Yoga*, when appropriately practiced, will move your body *toward* restoration. How much fascia releases is impossible to predict, but it will move in that direction.

You ask: "I will continue to do Barnes releases on them, but I'm finding that it will take forever without some way of employing my mind and body in movement and stretching in order to re-balance my body." My simple answer is that the way to get the Barnes system to work better is to employ the ExTension principles of breath control: Inhale and observe (holding steady, not stretching nor creating "action"), then exhale and explore by moving "toward" the action. This process is discussed in the Pain Management section of my website.

You ask: "What I'd like to know from you is whether it is advisable to do (somatic re-education) while in ExTension & *Recovery Yoga* positions." My response is that ExTension & *Recovery Yoga* IS somatic re-education, except that I refer to it as "neuromuscular re-education."

ExTension & *Recovery Yoga* is designed through its logic, and through the understanding and adherence to its various neuromuscular principles and laws, to slowly, over time, re-educate the tighter, more contracted areas of soft-tissue to move "toward" union and balance. The very same logic and principles also addresses the looser and weaker tissues that also move toward balance and union.

Steve, there's no question that working on your own is difficult, but it's certainly not impossible. You should read and understand the material in my website, and how its logic and principles directly applies to your body. Then as you do the actual exercises, you should keep at the forefront of your consciousness that "less done correctly gets you more," that "breathing beats the alternative," and that "yoga is the movement toward balance and union."

Finally, you must NOT TRY to do what you can't do, but instead learn how to pay attention to what you can do without pain or strain. When you talk about "somatic re-education as finding modes of movement that are painful or difficult, and gently moving back and forth into that very movement, being precise about the direction," let me say that for you, this is ill advised, because if I were to teach you directly, I would show you how to create "somatic re-education WITHOUT exacerbating your pain.

Regarding your running: I agree with you that the body was designed by Nature to run...especially when the body is young and healthy. That being said, I also believe that Nature doesn't want the body to run when it is injured. Does an animal in Nature, when injured,

continue to run, or does it find a quiet and safe place where it curls up and waits for Nature to do its thing. Animals in Nature that are injured slow down and wait ... until they either heal or die.

When we are injured, we human beings will use our will and desire to circumvent nature's proclivity to want us to lay low which will prevent us from starving to death; but instead of slowing down as Nature wants us to do, we will apply that same will and desire to prematurely get back "into the hunt," and in so doing, we exacerbate our injuries. Does that sound familiar to you?

At your level, ExTension & *Recovery Yoga* is designed to first address your injuries and without pain or strain, to move your body "toward" balance and union. After that is accomplished (without expectation of how long it would take), the very same program using the very same logic, principles, and laws, is designed to begin enhancing your flexibility, strength, and cardiovascular endurance. But if you move too quickly or try too hard at any stage within the program, you can easily exacerbate your existing injuries, and retard your recovery; or worse yet, you can create new additional injuries.

My position is that we can use Nature's intelligence to accelerate the healing process. I believe ExTension & *Recovery Yoga* is an intelligent program that works *with* Nature to facilitate healing. In fact, when you read between the lines throughout my entire website, you will clearly see that Nature is the thread that ties everything together. ExTension & *Recovery Yoga* is simply a process that moves us toward balance and union. It does nothing more, and it does nothing less

Steven Responds:

Thank you for your response. Here's what I've learned:

- 1)** It is not clear whether ExTension & *Recovery Yoga* can clear up my internal fascia scarring, but if I stick to the "less done correctly is more" philosophy, my body will definitely move toward balance over time. I shouldn't have any expectation of time frame. I should trust nature's, and my body's, intelligence. I need to trust the process.
 - 2)** Barnes releases can be enhanced by inhaling with a hold, and exhaling while gently stretching the tissue into "action", always observing and feeling and exploring.
 - 3)** I should allow my body to rest, heal, and re-balance before pushing it. (I did push with these injuries in place... many times... but I haven't done that in about 2 years. I haven't run in several years. I agree that nature doesn't want an injured body to run. Nature has been emphatic on that point... with intense pain J I have, however stretched improperly. I will no longer stretch that way).
 - 4)** I should not do somatic re-education exercises in modes of motion that would be painful if I were not to do them gently. Rather, I should trust ExTension and *Recovery Yoga* principles to re-educate my body and movement.
- Thanks so much for taking the time to give such a thoughtful response.

The following multi part question from CG, covers many subjects that are important to all yoga practitioners and teachers. They include questions on breathing during asana, discipline, depression and spirituality,

CG:

It has been my experience (I have also encountered the concept in various breathing practices), that the inhalation is for action and the exhalation is for release. You have reversed this in your program, or nearly so. Is that because it is essential for the over stressed person to relax as they begin to move? Wouldn't it make them more tired or are the movements so subtle that it isn't really exertion at all.

Sam Responds:

You are quite correct when you say, "the exhalation is for release." But release of what? If in fact, exhalation releases tension, then when we are doing asana, it makes sense to exhale into the action in order to release superfluous tension.

In beginning level yoga, I teach students to focus initially on slowing and softening the exhalation along with easy-to-do body movements (see the page on Pain Management in my website). This is because a slow, soft exhalation promotes quietness of the brain while at the same time, it sharpens the ability to focus on what the body is feeling.

Once the student has learned how to coordinate exhalation during these easy exercises, the student can then begin, slowly over time, to apply that very same attention of breathing and awareness of body to more complex and demanding asana.

If the person is stiff, slow controlled exhalation with appropriate stretching enhances flexibility. If the person is weak, slow controlled exhalation during load-bearing exercises promotes strength. The use of slow, controlled exhalations then, allows the brain to settle while the body activates. The logic that supports this concept is discussed further in my website chapter on Meditation.

Make no mistake about it: The logic supporting slow controlled breathing coordinated with asana that is recommended for chronically ill or injured people, is the very same logic that applies to normally healthy yoga students, as it does for the most advanced practitioner.

CG:

It must take a great deal of discipline, as you know, just to get out of bed if you have chronic pain. All that you have done considering your situation, is tremendously impressive and any one who can practice your method on their own from a book is also quite determined. It is rare. Not everyone has that.

Sam Responds:

I agree that it's extremely rare for people to discipline themselves, especially when working from books. That's why it's enormously helpful for people to initially work with someone who is skilled in both communication and yoga, who can explain the reasoning and logic behind a program, and can motivate students to take personal responsibility for using the program to maintain his

or her health.

Patience IS the key. Even though nature wants the body wants to move "toward homeostasis," the process of change is slow and potentially risky; especially because most everyone in our culture is impatient and wants results NOW.

CG:

Depression and fear add to the load of stress. Physical relaxation would definitely help the body but have you found anything to help the spirit...

Sam Responds:

From my perspective on yoga and from my experience of what works, yoga when appropriately practiced, at whatever level attainable, helps the body over time, to move "toward" balance and union. In so doing, the practitioner begins to slowly integrate body, mind, and spirit. This process is not magical, nor do we obtain balance and union from the cosmos, or from shaktiput (a peak experience, spirit possession, epiphany, religious rapture, nirvana, clear light, or illumination), but is earned by discipline, again, at what ever level is attainable. As I've written extensively throughout my website, the operative word is "Toward."

CG:

Can you see any way for a therapist to integrate these things using your program. What are your thoughts on this?

Sam Responds:

The very best thing a therapist can do is to personally practice the program thereby developing an experiential understanding of how yoga works. In so doing, the therapist comes from a place of authenticity, which is something that people in distress gravitate toward. Otherwise, whatever the therapist says is just another theory that the patient might or might not relate to, much less practice.

John Billings and I corresponded on the subject of yoga injuries and aging. John studied with me during the 1980's when he was about age 30. I remember him as being remarkably flexible and strong.

John Billings:

I believe health and fitness are different! My new goal is not to do advanced poses, but to do poses at an advanced age...because if you can still do yoga at 80, that's real health, not just fitness.

After reading your web-book and especially the *Ages and Stages* section, I want to learn *ExTension Yoga* . The first reason is that I believe it's more healthful than what I'm doing now. For a couple of years, I've been having pain directly attributed to my yoga practice.

The second reason is the alpha-wave phenomenon. I have noticed vinyasa does not lead to that peaceful feeling I used to get as described by Dr. Herbert Benson's Relaxation Response. (Ed. Note: Vinyasa is an aerobic flowing approach to yoga that promotes extreme flexibility and endurance).

My wife, interestingly, is beginning to notice the same thing in her own practice. Vinyasa, at least as we practice it, creates stress. She much prefers the Gentle Yoga I also teach. So I am very interested in your Wright-Patterson experience and anything else on the subject. Yoga should definitely produce waves in alpha range.

I have been in power yoga classes where there is just mass jumping around and it leads me to reflect on your two fundamental questions: “What is yoga?” and “How does it feel?”

I'm now 46. When I was 17, I was able to do remarkable things with my body - things that also feel good. The injuries started when I got into all this Ashtanga jumping around.

Sam's Note: There is nothing wrong with Ashtanga style yoga or for that matter, any style of yoga. On the other hand, it seems to me that all styles of yoga need to be definitely modified when injuries begin to surface; which is the sole purpose of learning the logic behind ExTension Yoga.

John Continues: It will probably help to know what I mean by injuries. Apart from the current pain below both shoulder blades, which goes all the way around to the ribs almost in front, there is sometimes a "sticking" feeling in my left shoulder joint, usually when going into Pincha Mayurasana (the scorpion pose). So I adjust around it.

Also, and of more concern, I have what appears to be chronic medial right knee soft tissue damage. This came from trying to raise my leg overhead in Natarajasana. I can do on left side, carefully, but not at all on right. I also now have to be careful with that knee, because any pose that requires lateral movement or twisting of tibia from knee joint that causes pain. I cannot do advanced Marichyasana, for example. This may change, but right now I'm very careful with that knee.

Sam, I have begun to wonder not only what is the purpose of these poses, but I've also been thinking about the epidemic of yoga injuries

Sam Responds:
ExTension Yoga is a system that honors your current restrictions and pain, and teaches you how to move along without exacerbating your condition. From your description, it appears as if you strained the fascia in and around your shoulder blades and the tendons/ligaments in and around your knees. I'm guessing you need to practice more gently and stretch less deeply. That's not to say you can't continue to do advanced asana; it is to say that you might do them without forcing.

I want you to review my website's pages on "Ages and Stages," "Fascia," and most importantly, the "Pain Threshold" chapter. They will help to explain why 1) you are suffering now at this time in your life, and 2) why the masses who are now growing older are starting to join you in injury and pain. I also want you to review the remaining pages in *the Mechanics of Yoga* section. They will further clarify why you are suffering.

As you read through the Mechanics section, always be thinking in the back of your mind, "How do I apply what I'm reading to my personal practice and teaching."

John Billings:
Actually I expected such an answer from you, and you haven't disappointed me. I agree with you, and add that what actually feels good during practice can later be very painful. For instance, a few days ago I started to practice an Ashtanga move which involves pressing and lifting from seated pose into a handstand. Or at least trying to do this, about ten times. Now my back, on both sides below shoulder blades, is so painful it sometimes hurts to breathe. But the lift did not hurt at the time, because of endorphins and what may be called "yoga high".

I have noticed that real injuries began when I started doing "advanced" poses in vinyasa. This is partly the "yoga high", and also the repetition inherent in vinyasa. So it's time to sit and ask what is the purpose of yoga; or, whether I should even try these things. Is yoga health or ego, or something else? I'm rapidly developing new understanding, and you are an important source.

Inversions, Menstruation, and Yoga:
A continued dialog with John Billings

John Billings:
We commonly say, "people with thus and so conditions should not do inversions. But what about all those other poses, like down dog and standing forward bends, that definitely put hips above the head? Is the inversion thing just a superstition?"

Sam Responds
Inversion cautions are far from superstition. Inversions are known to elevate blood pressure and increase inter-ocular pressure. When I introduce inversions to my on-going students, I always remind them that inversions are not recommended if you have high blood pressure, glaucoma, or detached retina. At that point, I discourage new students with eye conditions from ANY inversions until they have cleared their yoga classes with their doctor.

In most other cases, because dog pose (and standing forward bend) may be considered as "baby inversions" and because their affects are considerably less than full inversions, dog pose is a good alternative to full inversions.

I might be inclined, if a student has high blood pressure for example, to offer a modified dog pose where the hands are on a bench, which minimizes the degree of lowering of the head. Then, if the student reports any feeling of increased pressure in the head, I would immediately offer, as a preparatory exercise, laying on the back with the legs partly up the wall...and extending them higher as is tolerated.

But let's assume for a moment that just laying on the floor with the legs partly up the wall still causes a feeling of increased head pressure, then what? Then, simply add props, such as folded blankets behind the torso, so that the student's head and torso is slightly elevated off the floor, like a wide "V" so the head and shoulders are slightly higher than the hips.

John Billings:

That's the best advice I have heard so far. I also think it also has to do with the length of time the pose is held; we typically hold inversions longer than other poses. This may be why the standing forward bends such as *uttanasana*, *prasarita padottanasana*, etc. are not contraindicated, especially in the Iyengar school.

And what about women practicing yoga during menstruation? I've been exchanging emails with a woman yoga student who said: "Inversions during menstruation should be an individual decision. I have always believed that when a woman listens to her body (nothing teaches this more than yoga) she will know what is best for her. I was happy to see Yoga Journal cover this topic in an article written by an M.D. I have been a Registered nurse for many years specializing in women's health and the rationale behind not doing inversions did not make good science sense to me. Inversions might be fine for some and not for others. The article in Yoga Journal covers this issue well. It is in the April 2004 issue. The bottom line is to evaluate each client individually. What works for one client may not work for another."

I (John Billings) responded to her by saying: "O K, I know that article, but are people ready to drop the ritual contraindications about inversions? You appear to be way up on the subject. I am going to start teaching *The Truth*, which appears to be that whatever feels good is good, and whatever feels bad is bad! Now we are all enlightened..."

Sam Responds:

Having some degree of insight gained from nearly thirty years of practice and teaching, I'm not too sure I totally agree with " *The Truth* " being "whatever feels good is good..." For instance, (and admittedly this is extreme, but it serves to make my point), certain drugs, both legal and illegal might feel "good," but might have devastating potential repercussions.

The same goes with yoga. Certain sustained inversions for instance, might feel good, but for some people, sustained inversions might create damage. The same goes for backbends. For instance, I've seen hyper flexible women do extreme, spine compressing backbends and love them. Except that over the long run, I've seen that compression of vertebra disks has led to chronic pain in later years.

I think there are basic cautions that should be honored, such as always avoiding compression in the spine, even when there is no pain.

This goes double for the cervical spine. Yes, some students severely compress their spines and don't feel pain. In fact, they might even love the feeling; but my position as both a teacher and practitioner is that the potential for damage by compression far exceeds any temporary "feel good" benefit.

Barbara writes:

I suffer with major depression and panic attacks. I was wondering if you could offer some words of advice as to how you may be able to help me. I've tried yoga here and there, but it's hard to even get out of bed let alone have the energy to do a class. I've gone to a few yoga schools, but the classes were too hard and it was clear that all they wanted was to get my money. If you can help in some way I'm desperate for relief.

Sam Responds:

I'm sorry to hear about your difficulties. I know what it is to be depressed because I've been there myself. There is no quick way out of depression but how you will feel when you get to the other side, is well worth the time and effort you must spend to get there.

The very first thing I'd do if I were you is to find a psychotherapist or a professional counselor to help you with your depression. If you can't get a referral from someone you know, then you'd have to do what I did ... go to the yellow pages and find someone in your area. In any event, I believe it's best to seek an older therapist of your own sex. If money is a problem, you must not let that stop you. A good therapist will work with you regardless of your ability to pay.

Regarding yoga: Forget classes for now. The single most important thing you can do is to begin a gentle "walking meditation." That would be taking a ten to twenty minute walk EVERY SINGLE DAY; and while you are walking, start to gently control your breathing with your walking. Start today!

Begin by walking maybe to the end of your block and back. Do not walk quickly, but do not plod along either. Once you maintain a gentle walking rhythm, you can start controlling your breathing with something like "inhale for two steps, exhale for three steps." Or if you're totally comfortable, perhaps you can comfortably "inhale for three steps, exhale for four." Walk slowly and find your rhythm.

It doesn't matter how many steps you can take with each inhalation and exhalation, except to remember that you always (1) Want to take more steps on exhalation than inhalation, and more importantly, (2) NEVER NEVER try to walk fast, or to try to extend your breathing beyond what is totally comfortable. In other words, you are to GENTLY coordinate your breathing with gentle walking.

You should never get yourself out of breath, nor should you walk so long that you become fatigued. Walk in the morning or in the early evening and avoid the heat of mid-day.

Again Keri, please remember that depression happens to many of us. It's like any other illness that takes us over. We don't ask to get sick, but when we are, the very best thing we can do, is acknowledge our illness, and then “begin taking steps” to get better. Sometimes, we cannot stop illness from invading our bodies, but when it does, we can take charge of how we respond to that illness. Walking meditation and seeking professional help will start you on your path to recovery.

Randy Jellen of Lisle, Illinois, Asks:

What yoga exercises would you recommend for my scoliosis?

I have a small scoliosis, and so, my natural curves in my spine are a little more "flattened" than normal. Not a lot, but there is some. I was wondering mostly about the cervical curve because my chiropractor says I should really try addressing it more with traction and so forth to try restoring a more normal curve to it. I was wondering if there are any asanas (yoga exercises) you could suggest to help restore the cervical spine?

Sam Responds:

There are many variables involved that contributes to your “success or failure” in your quest to deal with your flattened cervical spine, with genetics playing the most pivotal role. However, with that said, I believe yoga is the one very best exercise modality that can help to restore a more natural curve to the spine.

I'm frequently asked the question, “Are there any yoga exercises you can recommend to help my (fill in the blank).” My response is always the same; “The very best way to deal with any problem is to simply and consistently...practice yoga.”

In both my books and throughout my website, I make an argument that when we move through and beyond our 30s, yoga works best when it is practiced without aggression or forcing. When practiced on the level of fascia, the Wiggle and Waggle (as presented in *Recovery Yoga* and in my website), is to my way of thinking, the *one* most important yoga exercise we can do. However, it is only one exercise and admittedly, although it feels terrific and give remarkable results when appropriately practiced, it plays only a minor role in helping us move the entire body “toward” balance and union. In other words, my recommendation is not to rely on only one or even a few yoga exercises to address your scoliosis, but to be maximally effective, we need to maintain an intelligent and well-balanced yoga program.

Elizabeth Molfese, Lake Park, FL, is a yoga teacher who recently began studying with me. The ExTension and *Recovery Yoga* model has challenged her very assumptions about yoga. She asked a series of valuable questions via email:

Elizabeth Molfese:

How to instruct people in a firm and gentle way to stay with the modification best for them, rather than forcing themselves into the moderate and more flexible postures for which they are not ready. I haven't formally introduced yamas and niyamas and am thinking it may be time to emphasize.

Sam Responds: I can't speak for other teachers. I subtly introduce the yamas and niyamas, not from a classical yoga perspective, but more from a neuromuscular perspective emphasizing how an aggressive practice tends to move one away from “balance and union,” and even more so when the student is chronically ill, injured, or aging.

Elizabeth Molfese:

How to awaken students' self-awareness? How to encourage them to listen and feel their body, rather than encourage forcing? For instance, this is what I now say in class: “Do your yoga with patience, strength and compassion, and by not by pushing the edge”

Sam Responds: Teachers can elicit significant changes in students' perspective by simply changing the words they use, for example “Do your yoga with patience, strength and compassion by intelligently challenging your edge.” I also encourage teachers to use “toward” rather than “to.” And “do” rather than “try.”

Elizabeth Molfese:

How to reinforce students' resisting a personal time out? Is it a reflection on me because I don't want to interrupt the flow taking too many time outs? What can I say or do to establish personal body intelligence and moderation in students?

Sam Responds: During a student's first class, I introduce a couple of “relaxing-active exercises,” which require little energy output, yet they keep the student from cooling-down. I encourage students to do such postures at any time; whenever they have a need to slow down even when I'm maintaining a tempo. I continually reinforce the concept of “it's not how much you do, it's *how* you do” that matters.

Elizabeth Molfese:

How do I reassure interconnecting body openings with a student fixated on their challenging areas?

Sam Responds: I explain from the very first class that yoga is “all about ‘union' and ‘balance.’” Using the logic as presented in my website, I make a very compelling argument that yoga works better (1) when not being aggressive anywhere within the body and (2) to particularly avoid stressing ALREADY stressed out areas which will only serve to exacerbate “challenged” areas.

Elizabeth Molfese:

What is the best way to introduce new yoga poses? Initially introducing new practices by modeling compromises working the room – is it inappropriate to address students from the front of the room? Anonymously suggesting doesn't always hit its mark. Is there a gentle, nurturing technique(s) eliminating self-consciousness? Should I ask permission – just like touching?

Sam Responds: Teaching, just like yoga, is indeed a delicate balance between demonstrating and working the room. That being said, I believe it's wholly inappropriate for a yoga teacher to teach solely from the front of the room unless there are extenuating circumstances, such as during informal workouts with students. Otherwise, when students are paying, the teacher needs to be totally present and that is impossible while the teacher is doing yoga along with the class.

That being said, it's totally ok for a teacher to demonstrate poses, but when a yoga teacher demonstrates from HIS or HER perspective, the student often TRIES to emulate and either becomes hurt or frustrated by TRYING to achieve what he/she perceives as “the right way to do the asana.” The problem, of course, is that the teacher has been practicing for years and presents an unattainable perspective of the asana.

When personally demonstrating, I often “tone-down” the exercise so as not to present something unattainable. What works better is to work the room and ask permission for students to model exercises, I set the proper environment in the very first class by saying something like, “Hey gang, we're all learning together and it really works well when I sometimes ask you to show the rest of us what you are doing.” After, “trust” is established; I won't need to continually ask for individual permission before I stop the class to “come look here.”

After permission was initially granted, I'll something like, “hey, take a quick look here. See how Sally is rotating her pelvis in dog pose and look how she's keeping her shoulders wide, and her neck soft. See how she's creating extension (ExTension) throughout her entire body.” Establishing such strategies takes a moment and helps enormously.

How To “Find Your Hamstrings

Jim Sturiale asks:

I've been reading *ExTension Yoga* and have a question regarding the hamstring stretches in the book - particularly the standing forward bend. It's really more of a problem than a question: I ALWAYS feel the stretch in the tendons behind my knees, NEVER in the belly of the hamstrings themselves. In fact, even with the hamstring stretch against the wall, that you recommend for those who are having problems feeling the stretch in the hamstrings. The results are the same. Either no feeling of stretch at all, or a fairly intense feeling in the tendons behind the knees. I've tried other poses (not in your book), such as Prasarita Padottanasana (Wide-Legged Forward Bend), and that seems to work much better. Is this a good substitute pose? Or would you suggest something else?

Sam Responds: Your inability to feel (isolate) your hamstrings is a common problem and it definitely needs to be addressed. Otherwise, you risk the potential for future injury. This is not to say that you WILL injure yourself, but let's remember that our intention in *ExTension* and *Recovery Yoga* is to minimize liability and maximize potential.

Through the years, I've encountered students who have had significant problems in isolating their hamstrings. One most poignant example was an Israeli woman who was exceedingly flexible. When visiting Florida, she wanted to take a class with me, and I was definitely impressed with her yoga ability and became caught up in the intensity of teaching her. After a brief warm-up, I began showing her more and more advanced yoga poses and kept asking her, “Do you feel your hamstrings now?” to which she kept responding, “No!”

Pose after pose, I asked and she responded, “No!” Finally, I asked her the one most important question that I had, in my blind enthusiasm, failed to ask at the beginning of our session, “do you have any previous injuries or operations that I should know about.”

She responded, “Not really, except that when I was in the army, I stepped on a land-mine and although it could have been much worse, I don't really feel my legs much anymore.”

I could have very easily have injured her and was lucky I didn't. The purpose of this story is to impress on teachers and their students that there are many reasons why students don't feel particular yoga exercises. Some of those reasons could indeed be a result of previous injuries. Often, however, the inability of a student to feel an isolated hamstring stretch is simply a result of years of contracted soft-tissue of the posterior side of the body, from the torso down to the heels.

ExTension and *Recovery Yoga* works so effectively is because we don't TRY to stretch tight soft-tissue. We recognize that tightness and the inability to isolate soft-tissue had taken years and years to develop. Accordingly, we coax soft-tissue to open, we don't force it.

When “trying” to pull taffy, it will oftentimes just snap. Instead, it's better to lightly and repeatedly pull and release until it slowly begins to give way.

You haven't been able to isolate your hamstrings YET, but don't give up hope. Other than that Israeli woman, although it might take a while, there hasn't ever been another failure in my teaching career to help students' isolate their hamstrings. That being said, I want you to go back to the wall and follow the instructions in the *ExTension Yoga* book. I want you to be certain that you are working on only one leg at a time. That's why you need to bend one leg and place it's foot directly vs. the wall. You must keep the leg you want to isolate BENT throughout the exercise. How much you bend it is a function of your overall tightness. Without me looking at you, I can't really advise you how much to bend it, but you must bend it enough so that the tendons behind the knee are totally and absolutely not engaged.

Then, in order to activate your hamstrings (NOT really your hamstrings, but the fascia surrounding your hamstrings), you MUST totally understand the material in my website about

the differences between fascia and muscle. You must understand the concept of working TOWARD, not TO. You must understand the concept of BACHIN ALIGNMENT, because you must keep your foot active, but not tense.

Then, you must not TRY to stretch your hamstrings. You must take a deep inhalation and then, ONLY on the exhalation, begin to subtly, and I mean SUBTLY, begin to lengthen, minutely lengthen, your leg WHILE at the very same time, you begin moving both sitting bones MINUTELY downward (you do this by anchoring your other foot directly vs. the wall and keeping that knee directly in alignment with its foot and hip-socket (maintaining Bachin Alignment).

Only create lengthening during your exhalation. Repeat only three times and then give it a rest. Then repeat 3x during three exhalations.

You probably won't feel anything for a while. Don't despair. If after several attempts, give it up and do something else. It will eventually come, but remember, the harder you try, the less you will get it. But once you do get it, your entire yoga practice should transform, because you can (and should) use the very same technique while doing all your yoga exercises, from the most basic to the most advanced.

Jacqui, M.D.:

Please comment on when to practice yoga after an acute injury.

Sam Responds: From my clinical experience as a neuromuscular therapist in dealing with acute injury, I find that fascia rarely responds to intervention, be it extrinsic (therapist facilitated) or intrinsic (patient facilitated i.e., yoga). During the acute phase of injury, it seems to me that over-stimulated fascia can not properly respond to appropriate stretching....In essence; fascia simply wants to be left alone until nerve stimulation subsides.

Until stimulation subsides, I find a therapeutic intervention rarely works. However, if I wait a week or so after the traumatic incident, fascia, in most cases quickly responds to therapeutic intervention and specifically the more yoga a patient has done using techniques similar to *ExTension Yoga* concepts, the quicker the response.

As an interesting aside, my therapeutic interventions first consist of manual fascia stretching followed by a trigger-point like therapy as pioneered by Janet Travell, MD (*Myofascial Pain and Dysfunction*; Janet G. Travell, MD & T Davis G. Simons, MD, Williams & Wilkins, Baltimore, 1983). The major difference in technique, of course, is that Dr. Travell used injection therapy and I use manual therapy. It is interesting to note that during my trigger-point therapy, (consistent with *ExTension yoga* concepts), less pressure appropriately applied always promotes quicker and more long-lasting results than application of a deeper and longer-held pressure. This is totally consistent with the *ExTension Yoga* concepts: Appropriate stretching is done on the level of fascia which, by definition, necessitates doing less; which gets you more.

In my practice, a therapeutic intervention is merely a "jump-start" for yoga exercise. In other words, before and during the sub acute phase, the patient usually feels "tight as a drum." Stretching exercises are difficult to execute and are potentially dangerous as injury exacerbation is omnipresent. My conclusion: Until the patient becomes sub acute, neither my therapy nor yoga-exercise is can be effective.

Linda of Orlando, Florida:

More "ex-tension" details

I loved *ExTension Yoga* and read it through and applied the concepts immediately. Do you have more materials that cover proper "ex-tension" of more of the poses. In any event, I am glad to see some people are questioning the "traditional" yoga poses and safety.

Sam Responds: I'm not questioning traditional yoga poses as much as wanting, through my books and website, to give you tools for making your yoga work best for your particular body-style and age.

With hundreds, if not thousands of yoga "poses" along with their variations, it's obviously impossible to offer specific instruction for them all. On the other hand, by understanding the mechanisms of yoga, you can do virtually any pose while "maximizing your potential and minimizing your liability."

In essence, my intention is to help you become your own best teacher whether practicing at home or when enjoying the camaraderie of others in yoga classes and seminars. I'll always encourage you to take classes, but to always remember that no one knows what is better for you than you - especially when you pay attention to the two most important questions in yoga: *What is yoga?* and *How does it feel?*

Sheri Kauhausen, of Vancouver/Burnaby, Canada:

Why is shoulder stand contraindicated in shoulder stand?

I have been trying to find out why, in yoga, the shoulder stand is contra indicated for people with high blood pressure, but the downward dog is okay. Could you explain how, exactly, BP is affected by true inverted positions. And, again, why the downward dog is okay for people with high BP.

Sam Responds: As the heart pumps blood throughout the body, each subsequent beat causes another "shot" of blood to move into the arterial system, which "pushes" the previous "shot" along its journey throughout the body and eventually back to the heart. But what prevents all your blood from pooling in the legs during the blood's journey from the heart? After all, cardiac output isn't nearly strong enough to push any given "unit" of blood all the way to the legs and back to the heart on a single contraction. To resolve this problem, nature has created an arterial

system with an array of one-way valves that keeps the blood from pooling. In other words, after each cardiac contraction, each “shot” of blood moves along and is trapped by a one-way valve until the next contraction pushes the blood along. Eventually, the blood is circulated all the way back to the heart and the entire process begins again.

However, when a person goes upside down and as the blood is no longer "secured" by these valves, blood pressure in the legs drop and pressure builds toward the head. (This is why beginners usually feel leg tingling and a “full” head during inversions). However, this is most usually an insignificant problem because the body has mechanisms during inversions that: 1) prevent blood from excessively pooling in the head, and 2) sense when blood is not appropriately moving into the legs. Accordingly, in order to counter the reduction in blood in the legs during inversions, there is an increased cardiac output.

Hence, a regular inversion practice creates a subtle form of cardiovascular enhancement because the heart must beat stronger in order to get the blood back up into the legs.

Notwithstanding these built-in safeguards, there is a minor increase in interocular and intracranial pressure during inversions, which is basically why people with detached retina or high blood pressure need to avoid full inversions.

But dog pose is not an inversion because the legs are not inverted. Accordingly blood from the legs doesn't flow in opposition to the one-way valves and even though the head is lower than the torso, interocular or intracranial blood pressure doesn't appreciably rise. Well, because the torso is partially "inverted", intracranial and interocular blood pressure does increase slightly, but usually not enough for major concern. In any event, as a teacher, I don't recommend that students with high blood pressure or detached retina do full dog poses right off. I like to do other things first, like supported dog poses with the hands higher than the floor, beginning with the “wobble and waggle,” as shown in *Recovery Yoga*; and also doing the on-the-back exercises with the legs up against the wall, as shown in *ExTension Yoga*.

Elizabeth Martin, of Westford, MA:

"Ages and Stages" concept:

Do you mean to say that every ten years our practice may become more limited, and we should just accept it? I've talked to so many people at Kripalu about pain. The conclusion has always been that I have to figure it out for myself. Do you have any information about arthritis? I would greatly appreciate any direction you could give me about it.

Sam Responds: NO, we don't have to just accept pain and NO, we don't have to accept that our bodies will contract as we grow older and NO, we don't have to accept that arthritic pain is inevitable. When appropriately practiced, yoga can offer us some very important tools that can help manage or even reduce chronic pain.

As we grow older; how do we want to go about the aging process? If we do nothing as we pass

through those "ten year thresholds," there is every tighter and less mobile as we age. However, that "normal" propensity for contraction does not have to take place. Using yoga as a tool, we can intervene through appropriate stretching and strengthening. By understanding and applying the principles given in www.extensionyoga.com, we can slow down or possibly even reverse fascia's propensity to contract.

As a person in chronic pain, you did the right thing to seek appropriate medical advice. With that said, let's talk about your arthritis. Chronic pain is caused by nerve stimulation (in your case, a diagnosed arthritic condition). Because of Hilton's Law, that stimulation will contract most, if not all of the proximal soft tissue. But, because ancillary soft tissue (fascia in particular), distal from the principal stimulus will also contract, even more pain is created.

When yoga is appropriately practiced, it is possible to reduce contraction of ancillary soft tissue (primarily fascia) and thereby reduce pain. These mechanisms are fully discussed in my website so there is little need to go into detail here.

I hope my response has given you some degree of hope. As we discussed at KYTA, I have been developing these ideas and concepts as a result of studying with some amazing people through the years and from paying attention and learning from my own experience with chronic illness and chronic pain.

**Adhithana Ellen Pfeffer, The Yoga Connection, North Caldwell, NJ:
About Spirituality:**

I understand that you're working on the page regarding spirituality. So far, what you have so eloquently said about yoga is more about the physical practice than anything else. However, it's not the physical practice that keeps me coming back to yoga, it's the deep stillness and experience of SELF, and PURE AWARENESS (Perusha) that keeps me in it. Yoga, in the final analysis, is an experience that is always available; one only needs to become aware of it. You have not fully addressed the fact that the entire system of yoga comes out of the basic inquiry of all humanity: WHO AM I? And the desire of humanity to transform and transcend to a higher state of awareness, consciousness, functioning. Yoga is a complete evolutionary path, not just an ancient system of exercise.

Sam Responds: I've had a few other responses such as yours but not nearly as well-expressed. I feel it is important to note that as a Westerner "living" in a western body, it might benefit us to think of yoga asana as a system designed to: maximize physical potential; minimize physical liability, and maximize our spiritual awakening and awareness. In other words, understanding asana's effect on the human body in its minute detail teaches us *how* the physical exercises of yoga can both benefit and *harm* us.

Speaking from both personal experience and from being a teacher for 25 years, when we injure ourselves or just experience the smallest discomfort during asana, we are at risk of minimizing

yoga's spiritual influence. With full respect for your feelings, I am not willing to take that risk. What may seem like a physical program on the outside, is extraordinarily spiritual on the inside.

Shoosh Crotzer, Mobility Limited, Morro Bay CA:

Another View of *ExTension Yoga*

In your description about the theory of why extension makes the limb feel lighter, I have a different thought on that. I agree with the concept and the movement, but my studies have led me to believe that by extending, the musculature is resisting gravity more, and therefore creates the lighter feeling. You said that it causes a release of tension in the limb being extended. Let's use an example.

By holding the arm out in front, with a bent elbow, it becomes heavy with time. If you then lengthen and extend out to the fingers, we both know that the arm lightens. However, you say that the reason is a release of tension from the bent arm. My bent arm was not tense, though. Some might even say it was more relaxed, hanging loosely. To me, it wasn't the tension that caused the weight, it was gravity pulling it down because the center of energy became the bent elbow, and the energy pulled down. By extending, the energy moves all the way out to the fingers, causing more resistance to gravity, and therefore the lighter feeling. What do you think about this?

Sam Responds: Of course your bent arm was tense...you just didn't perceive it as being so. Assuming you are keeping a limb elevated; then in order for the limb not to succumb to gravity, soft tissue has to "fire" in order to keep the limb from falling. Whenever soft tissue activates, it contracts and tension is created. The longer it is held, the more "tense" the limb becomes. Maybe extension is just a feeling but the result is the same ... extension releases tension.

Shoosh Crotzer continues

In your hamstring test, on pages 32-3, you are holding behind the knee. Doesn't this inhibit the stretch?

Sam Responds: Holding behind the knee does not need to inhibit stretch. In fact, a person has a better chance of invoking an appropriate response when APPROPRIATELY extending the leg. What the person does is to hold the bent knee and then (on exhalation) begin to extend an ACTIVE foot toward the ceiling while at the same time grounding (in the most subtle way) sitting bones downward. The intention is to activate biceps femoris and avoid tendon activation.

I've recently taught a 24-year-old woman with abnormally enhanced flexibility, yet she couldn't isolate her hamstrings in any mode forward bending. The only way we could get her to isolate hamstrings was when I facilitated a unilateral hamstring PNF stretch with a bent knee. (Why is it better to work unilaterally when the client has difficulty isolating an appropriate response?) After experiencing the correct feeling, she was then able to easily and accurately isolate the appropriate hamstring response in all modes of forward bending.

Shoosh Crotzer continues:

One area that I have begun working on intensively over the last 2 years is pelvic alignment. On the same hamstring pages (32-3), I agree with all that you explain, except that you don't mention the pelvis. If a person did this, imitating figure 7, they could conceivably have rolled or tilted their pelvis to accommodate the knee lift without really knowing it. They would have the false sense of length, but only because they were working from the pelvis rather than the hamstring.

I know that you know this, as a teacher, but I have become a real taskmaster about it lately. Of course, it has stemmed from 25 years of my doing things incorrectly and only recently realizing, as a result of new-found problems, that I am a symptom of this lack of pelvic awareness. Imagine my shame and sense of failure that during all these years I never understood this correctly, nor was any teacher ever able to point it out to me! My apparent flexibility overshadowed the fine-tuning and hid my weaknesses. All your work discusses this indirectly.

By pointing out lengthening, for example, in forward bends, don't you think that it also must come from a core awareness of the position and balance of the pelvis for people to be able to create the proper angles that you so beautifully point out?

I know that this book was written in 1994, so we have both learned a lot since then. I would like to hear your comments.

Sam Responds: You are absolutely correct. Your observations and comments are totally valid and "pelvic awareness" was not adequately addressed in my book and therefore needs to be addressed in more detail here:

Let's assume you wish to stretch a rubber band between your index fingers from being flaccid to an average stretch of a factor; let's say to a "three or four" on a level of one to ten (with one being flaccid and ten being close to busting the rubber band). In order to stretch it, you could stabilize your right index finger and pull away two inches with your left. The rubber band stretches.

Or, you could stabilize your left finger and pull away two inches with your right index finger and the rubber band stretches.

Or, you could pull away with both index fingers and the rubber band again stretches, BUT, you ended up with a more "balanced" stretch within its fibers and you moved each index finger LESS in order to achieve the desired stretch.

When stretching hamstrings, we want to consider the same concept. What we don't want to do is to just lengthen our legs. That would be analogous to pulling the rubber band with only one finger. What we want to do is create an appropriate response by "doing less to get more" which is done by stabilizing the pelvis (at minimum) or by learning how to appropriately move sitting bones downward simultaneously when the leg extends. In so doing, the student quickly

discovers that hamstrings stretch not only quicker, but the feeling becomes much more balanced than by just lengthening the leg.

Anna Billingham, Dip. B.W.Y. Worcester, United Kingdom, writes:

In several of our past email exchanges, you talk about the ExTension approach to aerobic yoga. Is there anyway I can find out about it?

Sam Responds: You've taken some aerobic yoga classes, I'm sure. So have I. But I've often come away feeling as if my body was abused, rather than appropriately used. Well, I like to refer to the ExTension approach to aerobic yoga (EAY) as simply a pumped up version of ExTension Yoga. As always ... it's designed to do what you CAN do, not what you CAN'T.

You can try it yourself. Just begin with a couple of slow, concise, appropriate *ExTension Yoga* Sun Salutations, paying strict attention to your breathing and each and every movement within the twelve positions. Then, keeping each movement coordinated with your breath, begin moving through the positions a little more quickly, but still strictly adhering to the detail. Then, as your body accommodates to the increased speed, speed it all up again ... until you've done UP to 108 cycles. Before I became ill, I used to do 108 Sun Salutations twice weekly and it would take between 23 and 24 minutes. Because of my illness, it's no longer advantageous for me to heat myself up; so I might do ten or twenty Sun Salutations and stop before my body heats up.

During my recent seminar in Ashville, I did about thirty minutes of EAY with a handful of more advanced students before a couple of the classes. Even though I had not done 30 consecutive minutes of EAY in years, I even surprised myself by not being even the slightest bit sore or winded afterwards ... which is a strong testament to the appropriate character of ExTension Yoga.

Nancy Freedom from Berkeley, CA writes (responding to my request for comments or questions):

I may have misunderstood who your audience is. You say it's for students and teachers. (Would not) a simpler presentation ... help ... beginners who are unwisely using the instructions without a live teacher not to injure themselves.

Sam Responds: My work has been to provide resources for both lay persons, yoga "professionals" as well as for the healthcare community. Accordingly, I recognize that no vehicle can appropriately reach all audiences. My website is intended to be a continuation of both my books and is intended for the more inquisitive mind. I intended the footnotes to go beyond the text in order to provide substantiation for many of my assertions. I know that I sometimes get lost in the minutia of detail as well as my "erudite" writing style and this is exactly why I wholeheartedly welcome any feedback you can offer regarding repetition and clarification within the pages of the website.