



Western Science vs. Eastern Wisdom

Some of the most extensive medical research on yoga therapy is being done in India, but will it ever be accepted by Western medicine?

by Timothy McCall, MD

It's 7:30 a.m. at the Vivekananda ashram—Prashanti Kuteeram, or "the abode of peace"—situated on a bucolic hundred acres outside the city of Bangalore, India. The third "Om" from the crowd assembled for morning Bhagavad Gita chanting is starting to fade when a familiar melody rises from the front row: the synthesized ditty that plays every time the Windows operating system starts up. It's the same sound I hear every morning back in Boston. An assistant has turned on the guru's laptop, which holds the slide show that will guide us karaoke-style through this morning's verses.

We've been up since 4:30, awakened as usual by the bell that clangs in the central courtyard of the Arogya Dharma ("health home"). Prayer and Om meditation started at 5:00 a.m., followed by asana class. The schedule is jam-packed till almost 10:00 p.m., when "Happy Assembly" ends, followed by lights out. Cross-legged on a thin straw mat that digs into my ankles, I sit with dozens of people (mostly Indians and Indian expatriates) with such ailments as asthma, arthritis, heart disease, and mental illness. As an American physician—conventionally trained in internal medicine—as well as a serious yoga student, I am here to learn how to reconcile these two parts of my existence. Over the years, I've heard dozens of stories from people who have successfully employed various types of yoga to deal with a wide range of problems, from menstrual cramps to fallen arches. In my medical training, however, I was taught to be suspicious of such anecdotal evidence. More recently, I've worked with my teacher, Patricia Walden, using yoga to treat people with such maladies as depression, breast cancer, and Parkinson's disease. Although we didn't study it empirically, my clinical impression is that these students benefitted enormously. While no doctor could make it through morning rounds without relying on his or her clinical judgment, that concept, too, is considered scientifically suspect by the medical powers-that-be.

Although there are dozens of scientific studies that have found yoga to be an effective treatment for a variety of medical problems from heart disease to carpal tunnel syndrome, most of this work is unknown to the average physician.

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While a few of these studies, mostly those which are conducted in the West, have gotten media attention here, the overwhelming majority of the scientific research into yoga happens in India. Most of this research is difficult or impossible to get a hold of in this country, which is part of the reason that most Western physicians (and most Western yogis) have never heard about it. And no one does more yoga research than the Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA).

Reconciling the old and new ways of knowing—the sacred, ancient teachings of yoga and the technology of modern science—is very much the key mission of SVYASA. The research foundation uses scientific tools to investigate the teachings of the Vedas and Patanjali and correlate them with current understanding of anatomy, physiology, and disease. Sitting in her office next to one of the research labs, Shirley Telles, an Indian physician, a Fulbright scholar, and assistant director of research at SVYASA, describes their projects in an accent that reveals traces of her years of schooling in Britain. The major areas of investigation, she explains, are six-fold: (1) the effect of various yoga practices on physiological variables, e.g., how right-nostril breathing affects the metabolic rate; (2) yoga in rehabilitation; (3) the impact of yoga on perceptual and motor skills; (4) yoga in occupational settings, for example, to prevent accidents due to monotony in railroad engineers; (5) yoga therapy in the treatment of various diseases; and (6) physiological correlates of higher states of consciousness.

Many of the projects are carried out in the research laboratories at Prashanti—the shorthand everyone uses for the ashram—or in conjunction with the local hospitals. Several of the investigations take place at or may be cosponsored by the country's most respected scientific establishments, including the All-India Institute of Medical Sciences (AIIMS) in New Delhi and the National Institute for Mental Health and Neuro Sciences (NIMHANS) in nearby Bangalore. The research staff at SVYASA includes 14 doctoral students whose projects involve yoga, with more doctoral students (from a new extension of the Hindu University of America) slated to join them.

One three-year SVYASA project now underway is examining the effectiveness of a comprehensive yoga program on women with Stage II and III breast cancer. Funded by the Indian government, researchers seek to enroll 200 women randomized on the day of their diagnosis to receive either the standard therapy (surgery, radiation, and chemotherapy) or the standard therapy plus yoga. Raghavendra Rao, Ph.D., who conducted the study, hopes to determine whether yoga can help reduce side effects of chemo and X-ray therapy, bring about

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favorable changes in the women's immune systems, and improve quality of life. The women will be monitored by measuring symptoms and psychological well-being, as well as with sophisticated assays of immune function—levels of various serum immunoglobulins, plasma cytokines, and lymphocyte subsets, including the helper and suppressor T-cells and Natural Killer (NK) cells.

After meeting with with Dr. Rao at the Vivekananda city office in Bangalore, I rode on the back of his motorized "two wheeler" through the city, diesel-spewing autorickshaws buzzing around us, as he took me on a tour of the various hospitals where research is being conducted. At the cavernous M.S. Ramaiah Medical Teaching Hospital, we met S. Chandrashekara, M.D., D.M., head of the department of Clinical Immunology, who is conducting a three-year, randomized experiment that is comparing yoga to standard physical therapy in the treatment of rheumatoid arthritis. He is particularly interested in the "immune modulating" effects of yoga on this often debilitating autoimmune disease. Chandrashekara himself claims little knowledge of yoga but decided to conduct the experiment, he says, after noticing that "my patients who had taken up asana and pranayama were doing better." Results are expected in mid-2003.

On another day I visited the sprawling campus of NIMHANS where several yoga studies are currently being conducted. Bindu M. Kutty, Ph.D., is evaluating seasoned yoga practitioners using a Western-style sleep laboratory, where subjects are monitored via a video hookup and by continuous electroencephalogram (EEG) output displayed on a bank of color monitors in the lab. NIMHANS researchers also conduct experiments in conjunction with the "Art of Living" ashram, located on the outskirts of Bangalore. The community, led by the charismatic Sri Sri Ravi Shankar, promotes the healing benefits of a rapid yogic breathing technique they call Sudarshan Kriya Yoga (SKY). One particular researcher at NIMHANS, A. Vedamurthachar, Ph.D., himself a disciple of Shankar, has just completed a study showing that the technique helps facilitate recovery from alcoholism, a growing problem in India. Alcoholics who used SKY were found to have less anxiety and depression and lower levels of the stress hormones ACTH and cortisol.

Throughout India research is ongoing. In New Delhi, Ramesh Bijlani, M.D., head of the Department of Physiology at AIIMS, is currently involved in two projects on yoga, one of them on the insulin-releasing effects, if any, of selected asanas. The second is a randomized, controlled trial on the efficacy of yoga in the management of bronchial asthma. At Malar Hospital in Chennai (Madras), Kousalya V. Nathan, a naturopathic scientist, has just completed a pilot project

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investigating the use of various yoga techniques (breathing, meditation, and relaxation) in people who have recently had open-heart surgery. Her subjects had fewer than average post-operative complications and less need for pain medications—and were discharged on average two days earlier from the hospital.

In Delhi, at the Defence [sic] Institute of Physiology and Allied Sciences, chief scientist W. Selvamurthy has enrolled over 500 patients in a lifestyle intervention program for heart disease involving walking, a low-fat, high-fiber diet, and yogic meditation. The two-year study is nearing completion, and while the data are not fully collected and analyzed, he reports "encouraging results." A smaller, one-year study is currently underway at the Yoga Institute to assess the effects of a yogic lifestyle and various yogic techniques on the regression of coronary heart disease.

The methodology of older Indian studies has been criticized, but contemporary researchers are getting much more sophisticated. Control groups, randomization of subjects, and other hallmarks of Western investigative science have become standard. Telles, who herself is critical of older Indian research, says she is "very pleased" with the quality of the design of recent studies. The research in India is also qualitatively different from that in the West. They are not just studying 12 asanas for the relief of sciatica. Telles is particularly keen on projects attempting to correlate direct prescriptions from ancient texts with modern scientific understanding. "If hatha yoga texts call for 27 rounds of a particular practice four times a day and describe the effects," explains Telles, "we try to test it in just that manner."

A Different Take on Research

Many centers I visited that were most active in doing yoga therapy seemed to have different attitudes about what constitutes research than Western scientists (or their colleagues at Vivekananda). At the Krishnamacharya Yoga Mandiram, in Chennai (Madras), they do "subjective research based on work with individuals," this according to Kausthub Desikachar, Krishnamacharya's grandson and now the organization's executive trustee. He says, "Each time the student meets the teacher, the impact of the practice is evaluated and refined. This data is then compiled into our central database, which we use to analyze the impact of yoga in different cases." At a two-week yoga therapy conference I attended in Chennai, KYM teachers presented a procession of students with

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every conceivable malady who told impressive stories and demonstrated their programs—not data from studies—to validate the work.

At the Iyengar Institute in Pune, there seemed to be little interest in doing scientific experiments on their own work—which is odd, given the number of Western studies that involve Iyengar Yoga. When I asked Geeta Iyengar, the daughter of B.K.S. Iyengar and now the principal teacher at his Institute, about research, her replies consistently used the word in the sense of figuring out how to help an individual student through experimentation.

Across the city at the Sun-Jeevan Yoga Darshan, aka Kabir Baug, a yoga therapy hospital that is run by a family physician and former disciple of B.K.S. Iyengar, S.V. Karandikar, the major focus is on treating some 800 patients who come for yoga therapy every week and on training therapists who'll work in rural areas where Western-style medical care is usually not an option. Although Karandikar, who also now calls himself Acharya Yoganand, has not conducted research in the usual sense, what he has done is amass case histories—more than 15,000 of them. And these are not just testimonials; whenever possible, he uses diagnostic tests (such as before-and-after X-rays) to document treatment effects.

Everywhere I went I heard stories. A Catholic nun at Prashanti told me how yoga had helped her recover completely from rheumatoid arthritis. At the plush Art of Living ashram, a gaggle of young, white-robed devotees gathered around to detail how they had used yoga to recover from asthma, ulcers, and sinus problems. At A.G. Mohan's center outside Chennai, a woman with residual left-leg problems and chest asymmetry from childhood polio said the practice had led to "fantastic changes in my body." At the Yoga Institute in suburban Mumbai (Bombay), a businessman spoke of anxiety that hadn't responded to medication or counseling but which was now much better thanks to yoga. Over the course of a month at the Iyengar Institute, I watched the still-vigorous 83-year-old guru teach a woman to undo a restriction in chest movement she'd developed after having metal wires implanted in her sternum during surgery at age 3 for a congenital heart disorder. She felt he had changed her life.

As a Western scientist, I know that I am not supposed to place too much weight on case histories; we were taught in medical school that so-called "anecdotal evidence" is notoriously unreliable and subject to false attributions, distorted memory, selection of only favorable cases, and deliberate manipulation. That is



why scientists demand controlled studies. However, to paraphrase Thoreau, some anecdotal evidence is very strong, as when you find a trout in your milk.

At Kabir Baug, one of Karandikar's current assistants, Anagha Bhide, had such an enormous spondylolisthesis—a roughly two-inch step-off between her lowest lumbar vertebra and the sacrum—that she could not control her legs and required a wheelchair. Using a system of lumbar traction involving belts attached to the wall and other techniques the doctor developed, she slowly recovered. One year later her X-ray had improved substantially. Two years later, it showed that her vertebrae were perfectly aligned. It also turns out that virtually every one of the 150 teachers at Kabir Baug—who all volunteer their services—is, like Bhide, a former patient. This evidence may be anecdotal, but it's hard to ignore.

A New Approach

Traveling from institution to institution, I was amazed at the enormous difference in their therapeutic approaches. Some teachings seem to directly contradict what is taught elsewhere. Desikachar, for example, says that Headstand (Sirsasana) is an unsafe pose for most students. Almost no one at KYM is taught it, while at the Iyengar Institute students in general classes may hold the pose for 10 minutes. Still, it was my distinct impression that nearly every method I saw was helping people.

SVYASA utilizes a system called the Integrated Approach of Yoga Therapy, which includes asana, chanting, kriya (yogic cleansing techniques), meditation, pranayama, lectures on yoga philosophy, and a variety of other elements. This system has been shown in dozens of studies to benefit people with such conditions as asthma, mental retardation, rheumatoid arthritis, and Type 2 diabetes, and it has improved visual perception, manual dexterity, and spatial memory.

At the Yoga Institute, Director Jayadeva Yogendra, Ph.D., says they don't even like to call what they do "yoga therapy," even though they teach courses aimed at diabetics, heart disease patients, people seeking relief from stress, and more. Yoga philosophy appears to play a big part of their program. All the asana, pranayama, and other techniques that they teach were simplified by founder Shri Yogendra (Jayadeva's father) to make them easier for the local "householders" who are the Institute's primary clientele.

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At the KYM, as well as with the similar approach taught by A.G. Mohan (himself a longtime student of Krishnamacharya), instruction is always one-on-one; no two students will get the same program. And the asanas are much gentler than in most systems, with full attention placed on the breath as you move repeatedly in and out of the poses. Movement is sometimes coordinated with chanting or recitation of a mantra.

While medical classes at the Iyengar Institute and Kabir Baug differed from each other, in both places they appeared to be a hybrid of yoga and physical therapy with students doing exercises using all kinds of belts and ropes, blankets, pillows and other props. Neither system uses any kriya or meditation and the Iyengars only recently added pranayama to medical classes. At Kabir Baug, each student's regimen is personalized by Dr. Karandikar after an interview, examination and his review of the results of blood tests and X-rays. At the Iyengar Institute, the personalization of therapeutic asana was so precise that it could be hard to fathom. A dozen students might be in supported setu bandha sarvangasana (bridge pose) for a variety of conditions, yet no two appeared to have the same constellation of bolsters, blankets and blocks propping them up.

The Limits of Science

The enormous variety of approaches gives students a lot of choice, but it is enough to drive a Western scientist crazy. With dozens of major styles of yoga, hundreds of individual practices (asana and asana sequences, pranayama techniques, kriyas, etc.), and the variations on these techniques used with individual students and in different systems, there are simply more combinations of possible treatments than it will ever be possible to sort out experimentally.

Because of this incredible complexity, in order to do studies, scientists need to simplify. One technique that they rely on is the standardized protocol. Everyone in the experimental group gets exactly the same dose of Prilosec for their ulcer or exactly the same 11 asanas for their carpal tunnel syndrome. That way, if researchers find a significant difference between the experimental group and the control group, they can be reasonably certain the effect was due to the experimental intervention.

The problem here is that the whole concept of a standardized protocol bumps up against a core principle of therapeutic yoga. Most of the experienced

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therapists I have observed insist there can be no standardized anything, for each student is unique. Different bodies and minds, with different abilities and weaknesses, require individualized approaches. Geeta Iyengar says that even something that might have worked with a student one day may not work with the same person the next. If the student has just strained her back or had a particularly stressful day at work, the entire program may need to be changed on the fly. Desikachar is so opposed to one-size-fits-all approaches he says that he now regrets including pictures of asana in his book *The Heart of Yoga* (Inner Traditions, 1999) for fear they might encourage readers to try things on their own without personalization and proper supervision.

The best of the yoga therapy that I observed appeared to be an art as much as a science. Skilled teachers would plan a course but would often modify it based on the student's progress and on what they'd observed. In medical class, B.K.S. Iyengar, legendary for his therapeutic prowess, would sometimes put a student in a pose, take one look, and immediately take the person out. Whatever his theory for choosing the posture, as soon as he saw the result, he knew it was not right.

Perhaps the student's face had turned a little red or his breathing wasn't as free. Standardized protocols do not allow for this kind of improvisation.

Some institutions, like Vivekananda and the Art of Living, have been willing—at least for the purposes of science—to standardize. The irony is that if standardization does lower the quality of therapeutics, we might end up amassing the most scientific support for methods that are not the best yoga has to offer. This is no trivial matter, since the results of studies can influence which institutions get funding and, someday perhaps, which teachers get licensed or reimbursed by insurance companies.

But even the institutions that simplify and standardize for the purposes of science might not do so in real life. At SVYASA, each major disease has a prescribed set of asana and other practices. But the physician who evaluates all patients at Prashanti, R. Nagarathna, M.D., often modifies the regimen in light of the patient's condition. And while everyone at Art of Living learns SKY, the people that I met at the ashram stress that it's only a small part of the overall package they offer; it's just easier to study than the entirety of what they do.

Differences between what is studied and what people really do illustrate one way that science, for all its ability to illuminate, can also distort. Since studying

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the way yoga is used in the real world turns out to be too complex, compromises are made. You might say that what the scientists are doing is collecting meticulous information about an artificially stripped-down version of reality.

Of course, much of what yoga does can never be measured by science. Healing—transcending the *duhkha* (suffering) that marks human existence—often takes place on a spiritual plane. Unfortunately, there's no "spirituogram" that can quantify this aspect of yoga, so science does not look there much.

As with any holistic endeavor, measuring the constituent parts is not the same thing as understanding the sum of those parts. Reductionist science may tell us that yoga decreases systolic blood pressure and cortisol secretion and increases lung capacity, serotonin levels, and baroreceptor sensitivity, but that doesn't begin to capture the sum total of what yoga is.

Reconciling Science and Yoga

If we are going to reconcile the science of yoga and the science of medicine, we may need to change the way we think. "We need a new paradigm," insists Geeta Iyengar. We have to acknowledge there are different ways of knowing. There may be wisdom in this method, refined over thousands of years by trial and error and deep introspection, that cannot be captured by current science. No matter how much time and energy we invest in researching yoga scientifically, we will never be able to forego what we learn by our own experience and our direct observation of students.

To be fair, however, we need to look seriously at science's critique of yoga. Our personal experience and even compelling anecdotes can be misleading. In ancient systems like yoga, superstition may be perpetuated along with genuine insight. We don't know precisely which elements of what we do work and which don't, and we often do not know why. Perhaps one reason there are so many different systems of yoga is because nobody can agree on what works best.

There will probably never be scientific validation for each element of yoga, much less all the possible combinations. Some of yoga's aims, like equanimity, compassion—and also, for that matter, enlightenment—are difficult if not impossible to quantify. We must take some of what we know about yoga on faith—not a faith based on blind acceptance of doctrine, but one grounded in our



everyday experience, on and off our yoga mats. We see yoga with our own eyes and we feel it in our bones, the sinews of our muscles, and even in our souls. While not perfectly reliable, such evidence cannot and should not be ignored.

There exists a middle ground, however, between uncontrolled observations and the throttle-to-the-floor reductionist science. It is a type of research known as "outcomes studies." In such experiments, no effort needs to be made to standardize the approach or to isolate single interventions. Iyengar could change the treatment plan every five minutes and that would be just fine.

In outcomes studies, you just simply compare how well people with a certain condition react when treated with one approach versus another. Dean Ornish's landmark studies on reversing heart disease used this technique to investigate a comprehensive lifestyle program that included yoga, a low-fat vegetarian diet, walking, and several other elements.

By and large, however, Western scientists aren't too fond of outcomes studies. Because you never can tell exactly which elements of the program were effective and which were merely along for the ride, such studies are considered less rigorous, and so less believable. But unless the research is planned to separately evaluate the effects of Triangle Pose (in all its variations), left-nostril breathing (with every possible combination of breath ratios), adopting an attitude of nonviolence, and the thousands of other discrete elements that make up the practice of yoga, isolation is an unrealistic goal anyway. Since in the real world these practices are almost never done in isolation, any such studies wouldn't reflect what yogis actually do. This is part of a bigger problem with the reductionist paradigm of modern science: It tends to ignore the additive effects of different practices that may help explain yoga's effectiveness. But synergy can be captured in outcomes studies.

Good yoga studies can help us understand which practices and which systems work well (or not at all) for particular disorders. While reductionist mechanisms will never capture all that yoga is, understanding the parts can provide insight into the whole. There are potential pitfalls, though. It is entirely possible that some systems which lack an interest in conducting research or the infrastructure to carry it out may have the techniques that are the most effective. Science could help sort this out if researchers were to conduct head-to-head comparisons of different yoga styles as well as different approaches within the same style.

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Well-done yoga studies, of course, also confer scientific legitimacy on the discipline in the minds of doctors, policymakers, and the general public. This could be vital in the years to come if yoga therapy is to help meet the needs of our aging population. I was surprised to learn that at some of the most active centers that I'd visited—Vivekananda, KYM, as well as Kabir Baug—more than 90 percent of the students there had taken up yoga to relieve a medical problem. As the baby boomers move into the decades where chronic conditions such as high blood pressure, arthritis, diabetes, and heart disease become common, and as they search for healing options consonant with their values, we can expect more and more people coming to yoga for medical reasons.

Some view this "medicalization" of yoga as a problem; they worry that doing yoga for a bodily affliction trivializes this great spiritual tradition. But this didn't concern the masters that I had met on my journey. "Everyone comes to yoga because of some kind of suffering," says N.V. Raghuram, a senior teacher at Prashanti. In other words, it doesn't matter what brings a person to yoga, a bum hip or a desire to find God: Duhkha is duhkha.



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