


Fifty-one male college students were randomly assigned to the 5BX Program for Physical Fitness, a Yoga group, or a control group. After six weeks of daily practice, the Yoga group showed the greatest increase in flexibility as measured by the Wells Sit-and-Reach Test.


“U.S. doctors are beginning to question the potential for injury among those who practice Bikram yoga, the New York Times reported Tuesday.

“Participants typically spend 90 minutes doing 26 yoga postures—positions that some physicians worry are harmful—in a very hot room.

“‘Heat increases one’s metabolic rate, and by warming you up, it allows you to stretch more,’ said Dr. Robert Gotlin, director of orthopedic and sports rehabilitation at the Beth Israel Medical Center in Manhattan.

“‘But once you stretch a muscle beyond 20 or 25 percent of its resting length, you begin to damage a muscle.’

“Each week, he sees as many as five yoga-related injuries to the knees or the lower back. Postures that require extreme bending of the knees—squats and sitting backward on folded legs, for example—are the most likely to cause tears in knee cartilage.

“In Bikram yoga, students practice the ‘toe stand pose,’ a single-legged squat and the ‘fixed firm pose,’ sitting backward with bent knees.”


The Yoga training followed the recommendations of a National Plan for Physical Education of the Government of India’s Ministry of Education, and after administering several tests of physical fitness before and after a three-week program of Yoga training found the scores of such tests to increase. Measurements for both male and female participants included extent flexibility and dynamic flexibility.

“Those of us whose bodies are tightly bound have to persevere in gaining flexibility the hard way—through diligent practice and unceasing patience. Diving into the deep end of hip openers, we have an opportunity to use the mind to create a soft and supple path of least resistance.”

**Gilmore, Ruth.** Answers the question: “I am in my fifties, not very flexible and have done Yoga regularly for 2 years. The hamstrings are very tight from a lifetime of sport. The left hip joint ‘locks and feels crampish’ if when lying in semi supine position I straighten the leg, foot towards the ceiling, after having the knee (leg bent) towards the abdomen. Sometimes I can do a few repeats before this happens, but once it does I always stop the practice and the sensations cease. Could you give me advice over this issue please?” *Yoga & Health*, Oct 2003, p. 37.

**Gudmestad, Julie.** Loosen up your calves: Tight calves can interfere with your practice in ways you might not suspect, but frequent stretching can improve calf flexibility. *Yoga Journal*, May/Jun 2003, pp. 159-163.


“Many people struggle to lengthen their hamstrings, but working too aggressively can lead to injury. Here are some crucial tips for getting a safe stretch.”

**Iyengar, B. K. S.** Answers the question: There are many people who are flexible, bend their body very easily, but they often have pain and injuries. What must be the cause? Are we doing yoga just for flexibility, or with Guruji’s eye is there something beyond, where we have some sort of balance? What is lacking in the practice of flexible people and how should they practice so that there is no pain? *Yoga Rahasya*, 1999, 6(1):26-27.


“The key to greater flexibility is exercise, combined with stretching out the muscles before and afterwards.

“As we age, or if we lead an inactive lifestyle, collagen cross-links form in the tissues that connect our muscles.

“Over time, this collagen build-up limits our range of movement and causes stiffness, but stretching helps break apart this build-up to enable us to move more freely.

“The best forms of exercise for suppleness and flexibility are yoga and Pilates . . .
“Leicester chiropractor Tim Hutchful said: "My fittest patients are body builders and cyclists—they have strong muscles, but they are not flexible."

“Exercise in itself can cause problems because strong muscles tend to be less flexible.

“‘I know someone who has done upper chest work and has over-developed chest muscles and he is now round-shouldered.

“‘Pilates and yoga are great for flexibility and I advise patients to take up this type of exercise’ . . .”


“Perhaps yoga has little if anything to do with [physical] flexibility, but instead something far more accessible and fulfilling; perhaps [we can] benefit from and even like yoga despite making a snail’s progress in doing the poses.”


“As more and more people take up Bikram to lose pounds and gain strength, however, medical professionals are expressing concerns about the demands of yoga contortions performed in extreme heat.

“‘Heat increases one’s metabolic rate, and by warming you up, it allows you to stretch more,’ said Dr. Robert Gotlin, director of orthopedic and sports rehabilitation at the Beth Israel Medical Center in Manhattan. ‘But once you stretch a muscle beyond 20 or 25 percent of its resting length, you begin to damage a muscle.’

“Each week, Dr. Gotlin said, he sees as many as five yoga-related injuries to the knees or the lower back. Postures that require extreme bending of the knees—squats and sitting backward on folded legs, for example—are the most likely to cause tears in knee cartilage. In Bikram yoga, students practice the ‘toe stand pose,’ a single-legged squat and the ‘fixed firm pose,’ sitting backward with bent knees.

“‘Basically, the knee is a piece of bone with two strings of muscle on the top and bottom, and you can only tighten those strings so much,’ Dr. Gotlin said. ‘The more you flex the knee under load, the more pressure is exerted on the kneecap.’

“Bikram advocates maintain that the immediate warmth and simple movements at the start of each class are safer than traditional yoga.
‘The heat helps people work slowly and safely into the postures and makes injuries infrequent,’ said Jennifer Lobo, an owner of Bikram Yoga NYC. But David Bauer, a physical therapist in New York who also teaches yoga, said the enthusiasm and competition among participants could contribute to injuries.

‘When you are in a hot studio filled with hard-core Type A personalities, and everyone’s adrenaline and endorphins are pumping, you’re not feeling any pain,’ he said, ‘and it may mask how far you can go.’

‘The mirrored walls in Bikram studios may encourage students to concentrate on outward form, Mr. Bauer said. In contrast, more traditional yoga emphasizes an inward focus on breathing and individual limitations, possibly helping to curb injuries.

‘Learning where your body is and what your body can do is what yoga is about, not reaching for an ideal or modeling yourself after a picture in a book,’ Mr. Bauer said. ‘If you are just flexible and not strong, at the end of your range you are going to tear a muscle.’

‘Indeed, part of the Bikram yoga philosophy is the push to go a little farther every time a posture is performed. Each pose is done two times per class. Participants arch backward and bend to the side in ‘the half-moon pose,’ for example, and then do the movement again, trying to bend the spine even more.

‘Practitioners maintain that the spinal flexibility and strength cultivated in Bikram yoga can be vital in warding off the effect of aging on posture. Some physical therapists, however, question the value of excessive joint flexibility, saying it can lead to inflammation and pain.

‘The extreme range of motion yoga develops does not necessarily have an advantage, and it may be counterproductive,’ said Dr. Shirley Sahrmann, a professor of physical therapy at the Washington University School of Medicine in St. Louis.

‘Like dancers, practitioners of yoga cultivate overly flexible spines, which often cause problems in resting posture.

‘In my business,’ Dr. Sahrmann said, ‘I have more problems with people who have excessive mobility than limited mobility.’

‘The thigh socket, or ball-and-socket joint, at the top of the leg is another overworked joint in yoga. Bikram’s ‘tree pose’ requires standing on one leg and drawing the opposite foot to the top of the thigh. The point is to rotate the joint of the drawn-up leg outward as far as possible; but what looks good may not be what is best for the body.
‘More is not always better when it comes to joints,’ said Lee Staebler, a licensed physical therapist on the North Fork of Long Island, who is studying movement impairment syndromes at the State University of New York at Stony Brook.

‘Warmer tissues will yield more easily, but stretching beyond optimal limits can compromise joint tissue,’ Mr. Staebler said.

‘Ligaments, tough bands of fibrous tissue that connect bones or cartilage at a joint, do not regain their shape once they are stretched out, Mr. Staebler said. A loose joint can be like a loose door hinge that prevents the door from closing tightly . . .

‘Still, warnings about torn cartilage or painful wobbly joints are unlikely to keep Bikram devotees out of the saunalike studio they claim to find as pleasant as the beach.

‘People either cringe when you describe the heat, or they come and get addicted to it,’ said Christina Ha, a New York television reporter who first took up Bikram three years ago. On her doctor’s advice, Ms. Ha has now stopped doing Bikram because she is pregnant.

‘Physicians caution that exercising in heat 2 to 7 degrees above the body’s core temperature of 98.6 can be dangerous.

‘Dr. Nieca Goldberg, chief of women’s cardiac care at Lenox Hill Hospital in New York, said that because of the stress that extreme heat places on the heart through the demand for increased circulation, people with medical disorders should not do Bikram yoga.

‘If you smoke, are overweight or have high blood pressure, this is not the exercise for you,’ she said.

‘Some practitioners of Bikram report dizziness, nausea, muscle weakness and cramping. Dehydration is the most probable cause, said Dr. Catherine Compito, an orthopedic surgeon specializing in sports medicine at New York-Presbyterian Hospital.

‘In extreme cases, losing electrolytes through perspiration can cause cardiac arrhythmia.

‘Your body can only tolerate so much fluid loss,’ Dr. Compito said. She added that in high heat, the normal mechanisms for restoring the body’s optimal core temperature cannot function. Evaporation cannot cool the skin. Cool air currents cannot move the hot air away from the body.

‘Over time, Dr. Compito said, adherents of hot yoga may be able to condition their bodies to work out safely in the heat, but she questioned whether the practice offered any advantages over other types of exercise. For stalwart Bikram devotees, however, she recommended drinking more water than the single bottle most take to class.

‘Drinking before, during and after is really the way to go here,’ Dr. Compito said.”


“A truly flexible home practice includes both ends of the spectrum: effort and release, structure and fluidity, discipline and freedom. Such a practice allows us to shift our mind away from any specific outcome, so we really feel the sensations in our muscles, the energy of our breath, and the wide repertoire of emotions that rise to the surface of our consciousness.”

Little, Tias. Answers the question: “I’m naturally very flexible. But a teacher once told me that flexible people are more likely to become injured than people with stiff muscles. Why is this true? If I’m naturally flexible and the asanas require flexibility, then how do I prevent injury?” *Yoga Journal*. Article available online: http://www.yogajournal.com/practice/753_1.cfm?ctsrc=nlv80.

Marlon, Yogi. Answers the question: “I spend 4-8 hours a day, seven days a week training for the 2004 Olympics, both lifting weights and running. Although I warm up with stretches, I seem to be getting tighter and tighter, which puts me at high risk for injury. *Can yoga really help*? How much would I need to do?” Article available online: http://www.askyogimarlon.com/archive/a Flexibility_for_athletes.html.


There were 27 male physical education university students in the experimental and control groups, and they were measure before and after 10 ten weeks of Hatha-Yoga or physical education classes for changes in extension-flexion ranges of the left ankle, hip, hip and trunk, and neck. Statistical analysis of the results showed a significant increase in flexibility for the hip, hip and trunk, and neck for the Yoga group.

“I’d be a millionaire if I had a dollar for every person who says ‘but I’m too stiff for Yoga.’ In fact this excuse makes about as much sense as a golfer saying, ‘until I can play like Tiger Woods, I won’t start playing golf.’

“Although most people think that Yoga is about tying yourself into a pretzel, this is only a small part of the physical aspect of Yoga which may (or may not!) develop over the years. Flexibility is certainly not a prerequisite before you start. In fact the only requirement is that you can breathe because Yoga actually teaches us to breathe better, deeper and more consciously, and the physical postures are built around the breath.”


“. . . Because in supported poses we do less, we feel more. Restrictions and barriers dissolve, our focus clears, and we are less reactive to the situations in our lives. We can naturally stretch further without feeling stopped. Openings appear deep inside that overflow, and sometimes this can surprise us. In that moment, we can choose our response: joy or fear, contraction or expansion, freedom or pain. The choice we make matters less than the fact that, suddenly, there are more options. We are no longer stuck. Yoga is not about stretching. Yoga is about opening to a greater reality.”

Pilates and Yoga provide welcome benefits. Medical News Today, 2 Jun 2005. Article available online: For more information, call the ACSM Communications and Public Information office at 317-637-9200, ext. 117 or 127.

‘Pilates and yoga, often referred to as ‘mind-body’ activities, show promising benefits which include increased flexibility, improved quality of life, relief of the symptoms of menopause, and some reduction of lower back pain. The findings came from two studies presented today at the 52nd American College of Sports Medicine (ACSM) annual Meeting in Nashville, Tenn.

“One study looked at the effects of yoga on quality of life and flexibility in perimenopausal and postmenopausal women. Researchers at Richard Stockton College of New Jersey in Pomona studied six women, ages 44 to 62, who participated in a one-hour-long yoga class twice a week for eight weeks. Participants were also given a home exercise program, and instructed to practice on the days when they were not in class. The yoga program used in the study was iyengar, which focuses on a specific sequence of poses that address menstrual disorders, menopause and pregnancy.

“Five of the six women who participated in the yoga program had an increase in low back flexibility, and five out of six had reduced menopause symptoms,’ said M. Alysia Mastrangelo, Ph.D., PT, lead author of the study. ‘Those who experienced menopause relief had a decrease in hot flashes and night sweats.’
“Mastrangelo points out that a benefit of increased flexibility is that this often helps reduce lower back pain. In addition, more flexibility can one to more easily perform activities of daily living such as housekeeping, gardening and shopping . . .”


Abstract: Changes in body flexibility due to the regular practice of yogic asanas and physical exercises were studied on 40 healthy physically active middle aged (40-48 years) men. Subjects were randomly divided into two equal groups. In group A, selected yoga asanas were administered daily for 1 hour for 6 months, while group B had physical exercise training programme for the same duration. The flexibility measurements were made using Leighton Flexometer at the level of neck, shoulder, trunk and hip, prior to and after the six month of the course in both the groups. There was improvement in neck rotation in both the groups, while the shoulder flexion-extension and hip flexion-extension values increased only in the yoga group after training. There was no significant change in trunk flexion-extension in either group.


From the publisher: “A wide range of poses are taught and modified to help both beginning and intermediate students experience the benefits of yoga. No matter how flexible you are, these customized workouts allow you to progress at your own pace. [The 35 easy] workouts include: relaxation, energizing, flexibility, strengthening, and many more.”


Schumacher, John. Answers the question: “I have difficulty reaching my foot in extended-leg poses. Is it better to attempt reaching for my foot or to use a strap until am more comfortable with those positions?” Yoga Journal, Jan/Feb 2004, p. 36.


Yee, Rodney. Power Yoga for Beginners: Flexibility video. Living Yoga.


Of Related Interest


“A reference text on concepts and principles of flexibility, of interest to professionals and students in exercise science, health/fitness, sport and physical therapy, and massage therapy, as well as practitioners of dance, yoga, and martial arts. Offers chapters on properties of connective and soft tissues, neurophysiological aspects, and anatomy and flexibility of various areas, as well as information on relaxation and social and emotional aspects. [The] second edition contains five new chapters on topics such as joint manipulation and chiropractic adjustment, controversial stretches, and stretching for specific conditions.


“Cal’s [Kerri] Barrett wishes her athletes—or anyone in the general population—had the luxury of enough free time for two or three yoga classes a week. She’s got a work-around strategy, though: specific exercise in a program called Active Isolated Stretching, developed by kinesiologist Aaron Mattes of Sarasota, Fla.”

**Cooley, Bob.** Stretcher to the stars: Fitness expert Bob Cooley. (An interview.)

On the Meridian Flexibility System, which “combines resistance stretching and yoga to increase both strength and flexibility.”


**Keller, Rachel.** How far can you stretch? Article available online: http://www.yoga.com.


“. . . if there is one element in the pursuit of body excellence and peak performance that athletes overlook, it is stretching, say health-care and fitness experts.

“When you increase flexibility, you can prevent injuries, increase circulation and nerve function, says Dan Norman, a physical therapist and certified strength and conditioning specialist at Boulder Center for Sports Medicine.

“‘What it comes down to is tight musculature affects biomechanical changes,’ he says.”

**Olcott, Rich.** The hypermobile client, the hypermobile therapist. Article available online: http://www.amtamassage.org/journal/olcott.html.

**Ongoing Research**

**Joan Smith**
Clarkson College
Omaha, NE
For her master of science degree in nursing education, Joan Smith is studying the effects of Hatha-Yoga on children’s flexibility and balance. She currently teaches Hatha-Yoga 3 days a week to adults and 2 days a week to the children in her study population.