

Yoga Therapy in Practice

Understanding and Preventing Yoga Injuries

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Abstract: *To obtain an initial estimate of the extent, nature, and causes of Yoga-related injuries, we invited 33,000 Yoga teachers, Yoga therapists, and other clinicians to participate in a 22-question survey. The survey was conducted with the cooperation of the International Association of Yoga Therapists (IAYT), Yoga Alliance, and Yoga Spirit. 1,336 responses came from 34 countries between May and October of 2007. A majority of participants believed that the most common and the most severe injuries occurred in the neck, the lower back, the shoulder and wrists, and the knee. Poor technique or alignment, previous injury, excess effort, and improper or inadequate instruction were the most commonly cited causes of Yoga injuries. Individual āsanas were linked with particular injuries in a highly specific way. For example, neck injuries were attributed to sirsāsana (headstand) and sarvāṅgāsana (shoulderstand); lower-back injuries were associated with forward bends, twists, and backbends; shoulder and wrist injuries were linked to adho mukha svanāsana (downward-facing dog) and variations of plank pose (e.g., chaturanga dandāsana, four-limbed staff pose and vasisthāsana, side plank pose); and the knee was believed to be most frequently injured in vīrabhadrasana (warrior pose) I and II, virāsana (hero's pose), eka pāda rajakapotāsana (one-legged king pigeon pose) and padmāsana (lotus pose).*

Keywords: *Yoga, injury, risk*

Introduction

Most authorities seem to agree with the American Association of Orthopedic Surgeons that “the rewards of basic Yoga outweigh the potential physical risks, as long as you take caution and perform the exercises in moderation, according to your individual flexibility level.”¹ Nonetheless, an upturn in injuries has been noted in parallel to the increased popularity of Yoga, and a variety of factors are generally, but nonempirically, listed as the cause.² If Yoga is to be welcomed into the healing repertoire of medicine, then in addition to demonstrating its benefits, it is incumbent upon the Yoga community to estimate its liabilities, and determine, to the extent possible, how to “do no harm.” Understanding the causes and frequency of Yoga-related injuries is important for several reasons: 1) It will better allow the Yoga and healthcare communities to responsibly evaluate the benefits and risks of Yoga, 2) it will help protect practitioners and prevent injuries, and 3) it will therefore clear the way for intelligent and informed acceptance of Yoga by the wider healthcare community.

Yoga has been implicated as having harmful consequences in a number of academic and lay-press publications.¹⁻⁶ *Yoga Journal* published an excellent article on this topic in June 2003, entitled “Insight from Injury: If the Practice of Hatha Yoga Was Meant to Heal, Why Are So Many Yogis Getting Hurt?”⁴ Author Carol Krucoff underscores the issue of attitude right away, saying that she “learned the hard way that there is no showing off in Yoga.” After an injury while being photographed, she learned “respect for the importance of warming-up, proper sequencing, and having the right attitude.” Krucoff quotes many teachers and experts in the field, who note that Yoga injuries are most commonly caused by overzealousness and unrealistic expectations in students, inadequate training of teachers, poor technique, and large classes. Krucoff notes that the market-driven aspect of Yoga has “spawned a scramble for instructors as well, resulting in some teachers with inadequate training being hired.”

Pamela Paul's article “When Yoga Hurts,” appearing in *Time* magazine in October 2007,³ echoes these issues. Paul argues that the increased attendance at Yoga classes will logically lead to an increase in the overall number of Yoga-related

injuries. Paul also mentions that new Yoga students may be out of shape and expect Yoga to be easy, leading to injury from over-efforting. Here, the teacher's experience and guidance is crucial. Paul points to lack of adequate teacher training as a factor in the increase in injuries.

The *Time* article cites 13,000 documented Yoga injuries over a three-year period. With an estimated 14,000,000 people practicing Yoga, that is only one injury in a thousand. If this statistic is accurate, that makes Yoga safer than many other types of exercise. However, that figure was reported by the medical community (emergency rooms and physicians), not the by the Yoga community. Therefore, it is unclear whether the figure fully reflects the experience of Yoga practitioners who may not seek medical care for Yoga-related injuries.

The attempt to investigate Yoga injuries is made difficult by many factors: the absence of any formal reporting protocol within the Yoga community, the wide range of severity of injuries, and the challenge of identifying the specific causes of any injury. Yet, there is little doubt that such injuries do occur. At the very least, they impair the experience of Yoga; and, at the other end of the spectrum, can lead to permanent injury, disability, and even death.²

The Survey

To initiate the process of self-scrutiny, we created a 22-item multiple-choice anonymous online questionnaire. We designed the survey over a four-month period, securing the opinions and advice of many Yoga teachers and therapists in the international community, as well as design advice from statisticians and researchers.

With the cooperation of three international organizations (IAYT, Yoga Alliance, and Yoga Spirit) and various other sources of Yoga teacher and therapist email addresses, we sent the URL of an online survey to more than 33,000 Yoga teachers and therapists.

After demographics, the survey centered on the range and severity of Yoga-related injuries and what the teachers/therapists believed to be their major causes. We asked respondents to share opinions based on their actual experience (not what they had read or been told) with their students, their clients, and themselves. Respondents were asked to report injuries only if they were reasonably sure that the practice of Yoga caused them, whether they occurred in their sessions, at home, or in another practitioners' presence. The order of the answer choices to the multiple-choice questions was randomized in each individual presentation, to minimize response bias. Respondents were not compensated in any way for participation.

Respondents

There were 1,336 responses to the survey, reflecting a response rate of 4%, from a total of 34 countries. The majority of responses came from the United States (81.4%), Canada (11.7%), Australia (1.3%), and the UK (1%). There were fewer than five responses each from the other 30 countries (Barbados, Brazil, China, Costa Rica, Finland, France, Germany, Greece, India, Iran, Ireland, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Puerto Rico, Saudi Arabia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and Venezuela).

The non-exclusive vocational status of responders was: Yoga teacher (91%), massage therapist (8%), bodyworker (8%), personal trainer (7%), physician (2%), and other (41%). The number of years the responders had been teaching Yoga/using it in their practice fit a normal distribution curve centered reasonably well at 5-10 years: 0-2 (9%), 2-5 (20%), 5-10 (27%), 10-20 (20%), 20-30 (11%), > 30 (7%), and other (6%). The "other" category included both teachers-in-training and retired teachers and therapists. Most respondents saw either 11-30 (35%) or 31-75 (35%) clients/patients per week. About 18% saw 1-10 clients, 10% saw 75-150, and 2% saw over 151.

Respondents were invited (but not required) to write in the style or tradition of Yoga they identified themselves with. Respondents listed a variety of Yoga styles or traditions, as follows: *Hatha* (16%), *Vinyasa* (10%), *Iyengar* (7%), *Anusara* (6%), *Ashtanga* (5%), *Kripalu* (5%), and *Flow* (3%). The authors believe that the "Hatha" designation generally indicates teachers and therapists who consider themselves eclectic, having no firm and/or exclusive ties to any particular school of Yoga.

Opinion Survey Questions and Results

Please estimate what you believe to be the percentage of people who do Yoga (primarily) for each of the following reasons. Averaging responses, the sample believed that the percentage of students/clients practicing primarily for each of the following reasons were: fitness and general health (53.4%); peacefulness, liberation, or a more enlightened life (18.2%); remedy for specific medical solutions (16%); remedy for emotional problems (9.7%); and other reasons (2.7%).

Are there more Yoga injuries today than previously? 39% of respondents answered yes, 36% answered no, and 25%

said that they did not know. Several individuals replied in the comments box that there could be no such thing as a “Yoga” injury, because properly executed, Yoga causes no injuries.

Why are there more injuries now than in the past? Only those who answered “yes” above were given this question. Respondents could select multiple reasons, and the following percentages of participants endorsed each reason:

Excessive student effort	81.4%
Inadequate teacher training	68.2%
More people doing Yoga overall	65.4%
Unknown pre-existing conditions	59.5%
Larger classes	47.0%

In your opinion, what injuries are most likely to result from Yoga practice for any reason (list up to five)? Respondents were asked to write in answers so as not to bias their reporting. This approach provided significant information for designing future surveys, but poor fodder for precise statistical analysis. Many of the answers gave generalizations such as strains and/or tears of muscles/ligaments/tendons, or injury to joints. When a particular part of the body was mentioned, the top five were neck, shoulder, low back, knee, and wrist. The data in Table 1 below were tabulated manually, noting the injury sites most often mentioned. While not definitive, it highlights areas of concern.

Injury Site	Number of Times Mentioned
Neck or cervical spine	674
Shoulder (including rotator cuff)	661
Low back (including sacrum, SI joint, sciatica)	644
Knee	597
Wrist	414
Back or spine (any area)	392
Hamstring	332
Hip	112
Leg (including ankle or foot)	64
Groin	52
Other areas mentioned less frequently: Elbow, headaches, nausea, emotional (or psychological), nervous system.	

Table 1. Areas of the body most likely to sustain a Yoga-related injury.

How frequently might Yoga practice result in each of the following injuries or conditions on a scale of “0” (never) to “5” (most frequent)? Respondents were asked to give a number rating for each of the potential injuries listed. Table 2 shows the average rating for each, listed in descending order of frequency.

Injury or condition	Avg Frequency - on a scale of 0 (never) to 5 (most frequent)
Low back	3.79
Shoulder or rotator cuff	3.23
Wrist or hand	3.13
Knee	3.05
Hip problems	2.69
Hamstring	2.57
Neck	2.47
Headaches	1.99
Groin strain	1.56
Lower leg or foot	1.50
Pregnancy issues	1.24
Thoracic or rib pain	1.04
Bruise from fall	0.96
Cardiac problems	0.81
Fracture	0.56
Eyes	0.54
Stroke	0.40

Table 2. Relative frequency of injuries resulting from Yoga practice.

What are the most serious injuries (disabling and/or of long duration) that you have seen? This question was designed to get an overview, rather than hard numbers. Respondents were again asked to write in answers. We neglected, however, to remind respondents that answers should be based upon injuries *resulting from* Yoga practice. Instead, many answers described serious injuries or chronic conditions that prompted people to take Yoga. Often it was unclear whether injuries cited had resulted from Yoga or from some other source. A substantial number of respondents noted that they had seen *no* serious injuries as a result of practicing Yoga (see “None” below in Table 3). In tallying the write-in answers for Table 3, we attempted to include only those relating to injuries that occurred during

Yoga practice. The results may be helpful in reminding both teachers and students of the areas of the body at greatest risk for serious injury.

Area of Injury	Number of Times Noted	Percentage
Low back, including sacroiliac, sciatica	231	19.44%
Shoulder, including rotator cuff	219	18.43%
Knee	174	14.65%
Neck	110	9.26%
Hamstrings	107	9.01%
Wrist or hand	67	5.64%
None	66	5.56%
Back or spinal (unspecified area)	49	4.12%
Hips	44	3.70%
Discs (herniated)	43	3.62%
Groin	25	2.10%
Fractures (various locations)	17	1.43%
Lower leg or foot	14	1.18%
Cardiac problems	5	0.42%
Stroke	4	0.34%
Eyes	3	0.25%
Pregnancy issues	3	0.25%
Thoracic or ribs	3	0.25%
Trauma or bruise from falling	3	0.25%
Headaches	1	0.08%

Table 3. Most serious injuries (disabling or of long duration).

In your opinion, what are the three most common causes of Yoga injuries? Respondents were first asked to write in answers to avoid the survey authors’ bias. (In a separate later question, they were asked to consider specified causes). Although the wording varied, the causes most often cited were (1) overzealousness, ego, or excess effort; (2) poor technique and/or alignment; and (3) improper or inadequate instruction, and/or poorly trained teachers. These responses fit fairly well with opinions expressed in the lay press.^{1,3,4} However, poor alignment has not, to our knowledge, been mentioned in any previous published discussion of Yoga injuries. The write-in answers do not yield easily quantifiable statistics. However, the follow-up question, asking respon-

dents to rate the likelihood of a list of factors to cause a Yoga-related injury, gave similar results.

How likely, on a scale of “0” (never) to “5” (most likely), is each of the following to cause an injury during Yoga practice? Respondents were asked to give a number rating for each of the factors suggested as possible causes of injury. Table 4 below shows the average rating for all responses regarding each factor.

Factor that Might Cause Injury	Average Likelihood - on a Scale of 0 (Never) to 5 (Most Likely)
Ego	4.37
Excess effort	4.31
Poor technique/alignment	4.16
Inadequate instruction	4.13
Improper instruction	4.10
Poses done too fast	3.67
Pressure from teacher/group	3.53
Overly loose muscles/ligament	3.50
Undisclosed prior condition	3.40
Poor warm up	3.24
Overly tight muscles/ligaments	2.98
Class size	2.96
Teaching sequence	2.89
Fatigue	2.75
Poor overall conditioning	2.71
Poses held too long	2.40
Osteoporosis	2.04
Overweight	1.96
Falls	1.96
Advanced Age	1.88
Prop defect	1.40

Table 4. Relative likelihood of various factors to cause a Yoga-related injury.

For each listed injury, please write in any Yoga pose you most often associate with causing it. As with several earlier questions, the write-in responses were so varied that we cannot give detailed comprehensive summary statistics. It is possible, however, to glean which *āsana* or categories of poses were most frequently associated with certain injuries. These are shown in Table 5 below.

Injury	Frequently Associated <i>Āsana</i>
Neck	<i>sirsāsana</i> (headstand), <i>sarvāṅgāsana</i> (shoulderstand), <i>halāsana</i> (plow pose)
Shoulder/ Rotator cuff	<i>chaturanga dandāsana</i> (four-limbed staff pose), <i>adho mukha svanāsana</i> (downward-facing dog), <i>vasisthāsana</i> (side plank pose), <i>ūrdhva dhanurāsana</i> (upward-facing bow), all binds
Low back, sacrum, sacro- iliac joint	seated and standing forward bends, twists, backbends
Knee	<i>virabhadrāsana</i> (warrior pose) I and II, <i>utthita trikonāsana</i> (extended triangle pose) <i>padmāsana</i> (lotus pose), <i>eka pāda rajakapotāsana</i> (one-legged king pigeon pose), <i>virāsana</i> (hero's pose)
Wrist/Hand	<i>adho mukha svanāsana</i> (downward-facing dog pose), <i>chaturanga dandāsana</i> (four-limbed staff pose), <i>adho mukha vrksāsana</i> (handstand), <i>bakāsana</i> (crow pose), <i>vasisthāsana</i> (side plank pose)
Hamstring	<i>paschimottānāsana</i> (seated forward bend), <i>uttānāsana</i> (standing forward bend), <i>parsvotanāsana</i> (intense side stretch pose)
Hip	<i>utthitatrikonāsana</i> (extendedtriangle pose), <i>virabharāsana</i> (warrior pose), <i>eka pāda rajakapotāsana</i> (one-legged king pigeon pose), twists
Lower leg/foot	<i>virabhadrāsana</i> (warrior pose), balancing poses, jumping poses, <i>virāsana</i> (hero's pose), <i>padmāsana</i> (lotus pose)
Groin	<i>hanumanāsana</i> (monkey pose), <i>utthita trikonāsana</i> (extended triangle pose) and other wide-leg standing poses, lunges, <i>baddha konāsana</i> (cobbler's pose), <i>upavishta konāsana</i>
Thoracic/Rib	twists, backbends
In pregnancy	twists, inversions, <i>dhanurāsana</i> (bow pose), <i>salabhāsana</i> (locust pose), <i>nāvāsana</i> (boat pose)
Fracture	<i>adho mukha vrksāsana</i> (handstand), balancing poses, forward bends
Eyes	inversions, forward bends (standing)
Cardiac	inversions, fast <i>vinyasa</i> practice, excess effort or heat, arms overhead in standing poses, poses that constrict chest or abdomen, improper breathing
Stroke	inversions, fast <i>vinyasa</i> practice, excess effort or heat, arms overhead in standing poses, improper breathing
Trauma, falls	<i>sirsāsana</i> (headstand), balancing poses

Table 5. Matching Injuries and *Āsana*

Preventing Injuries in Yoga

We will now consider how a Yoga teacher, Yoga therapist, or student can prevent the most commonly reported Yoga injuries. The recommendations below address the four top-stated *causes* of injury: poor technique and/or alignment, previous injury or condition, excess effort, and inadequate or improper instructions from teachers. These four causes are of course interrelated, and addressing any one will often be a gateway to addressing the others.

The specific instructions included below come from our combined training in Iyengar Yoga and *Anusara* Yoga; we acknowledge that other styles may approach these postures differently. While many of the suggestions will be familiar, and follow basic principles of biomechanics and *ahimsā* (non-harming), it is important to reflect on how consistently they are being applied by teachers and students in practice.

Preventing Injuries in Yoga When Prior Injuries or Conditions Exist

With regard to previous injuries or conditions as a cause of new injuries, teachers and studios must ask, and students need to inform their teachers, about any pre-existing conditions. Nevertheless, these conditions may remain undisclosed. Therefore, teachers should be proactive in mentioning any contraindications of a pose. Teachers must have the requisite knowledge of the body to know how to adjust a student's practice to avoid risk related to preconditions. In each section below, we have noted when particular care is advisable.

Preventing Injuries in the Neck

The cervical spine is the most vulnerable part of the spine because it is the most mobile. The two types of poses in which the most care is needed to protect the neck are backbends and inversions.

In backbending, vertebral compression and nerve impingement occurs when a Yoga student is too aggressive, thrusting the head and neck back in *bhujangāsana* (cobra pose), *ūrdhva mukha svanāsana* (upward-facing dog pose), or *ustrāsana* (camel pose). This is particularly true in poses such as *ustrāsana* in which gravity will play a part in taking the head back. The key instruction (and awareness) that will protect the neck is to arch the head back only after achieving the maximum possible arch in the thoracic spine. It is also helpful to maintain some muscular tone in the front of the neck. With these protective actions, the arching movement is spread evenly through the vertebral column.

The inverted poses most implicated for neck injuries are *sirsāsana* (headstand) and *sarvāṅgāsana* (shoulderstand). In

sirsāsana, it is essential for the student to understand how to use the arms and shoulders to support the body's weight. Pressing the arms down and lifting the scapulae elongate the neck even while weight-bearing. Without this support from the foundation of the pose, excessive weight on the neck vertebrae may cause injury. In *sarvāṅgāsana*, blanket support may be required to prevent excess flexion of the neck. When the pose is performed flat without blankets beneath the shoulders, the vertebrae of the neck are forced into 90 degrees of flexion, pinned to the floor by the body's weight. Ligaments, tendons, discs, and muscles connecting these vertebrae are all at risk. With the shoulders and upper arms elevated on folded blankets, less flexion of the neck vertebrae is required, and inevitable pressure on this area will be shared by the shoulders. Students must prepare by strengthening and stretching the neck and shoulders before attempting these fully inverted poses. In addition, abdominal strength and vigorous stretch in the legs significantly reduce collapse of the body weight into the neck.

Preventing Lower-Back Injuries in Forward Bends

Considerations of the anatomy of the spine, pelvis, and legs are relevant here. The risk in most forward bends, such as *uttānāsana* (standing forward bend) or *pascimottānāsana* (seated forward bend), is that tightness in the hamstrings will restrict the pelvis from tilting, causing excessive flexion in the lumbar spine rather than flexion of the hips. This excessive lumbar flexion could result in sprains of spinal ligaments or muscles, such as the dorsal and lumbar paraspinal musculature and quadratus lumborum, and could also cause disc herniation, or osteoporotic wedge fracture. Here, previous injury, excess effort, inadequate instruction, and poor technique are a treacherous combination.

Students will benefit from the instruction to tilt the pelvis forward toward the legs as a first step to any forward bend, especially one in which gravity will increase the intensity of the pose. Broadening the thighs helps this pelvic tilt, as does bending the knees and extending the thoracic spine away from the pelvis.

Students also can be instructed not to pull aggressively with their arms to go deeper into a forward bending pose. In *uttānāsana*, for example, support such as a table, a chair, or two blocks could be used for the hands, to lessen the weight of the upper body as it descends and to discourage aggressive pulling.

Proper preparation is also a key factor. A hip-flexion pose with the spine supported, such as *supta padāṅgusthāsana* (reclining big toe pose), is an excellent preparation for more demanding forward bends such as *uttānāsana* and

pascimottānāsana. This supine pose will lengthen the hamstrings while providing support and proper length for the spine. Teachers must take note of which students need this preparation, and be sure to include it in the class.

Preventing Lower Back Injuries in Twists

Excessive flexion of the lumbar spine is also a risk in seated twists, such as *ardha matsyendrāsana* (half lord-of-the-fishes pose), and flexion combined with rotation puts particular force on the spinal discs. Sitting with the hips up on a folded blanket can help the pelvis tilt forward, maintaining the natural arch and length of the lumbar spine, even while one leg folds in toward the chest.

As in the forward bend, a preparatory floor pose can give support to the spine and prevent excessive flexion. In *jathara parivartanāsana* (revolved abdominal pose), for example, the student presses his or her shoulders into the floor, then twists the legs to the side, with the floor helping to maintain length in the spine and evenness in the shoulders.

Props such as blocks or pillows can be used to prevent injury from excessive effort in reclining twists, and to support the student when the shoulders, arms, or legs cannot rest easily on the ground. In seated twists, the teacher should instruct students not to use their arms to force themselves into a more aggressive twist.

Preventing Lower-Back Injuries in Backbends

In backbends such as *ustrāsana* (camel pose) or *ūrdhva mukha svanāsana* (upward-facing dog pose), injury to the lumbar area often occurs because the thoracic spine does not bend, forcing the lumbar spine into overextension. Here, an overzealous student may over-contract the lower back, going for the outer shape of the pose without regard to technique or awareness. In many cases, it is up to the teacher to create this awareness in students. Student overzealousness in backbends is often a misunderstanding of how backbends are to be practiced; many will assume that exploiting the flexibility of the lower back is the intention of such poses. The following instructions (or similar instructions, in the language familiar to a particular style or class) will help to prevent injury: "Maintain steady strength in your legs, and root your tailbone down. Lift up through the whole upper body and bend in the upper back as much as you can. Curl your head, shoulders, and chest back." Teachers also need a keen eye for asymmetries in student's bodies that could stress isolated parts of the spine.

Preparatory poses for active backbends include passive backbends supported with props to encourage symmetrical length of the thoracic spine, *bhujangāsana* (cobra pose)

to practice the tailbone stabilization and active extension in the thoracic spine, *setu bandhāsana* (bridge pose) to simultaneously strengthen and stretch the front thighs and increase thoracic and shoulder mobility. A preparatory variation of *ustrāsana* (camel pose) can also be practiced with the arms or elbows reaching behind to the seat of a chair instead of the feet.

Preventing Injuries in the Shoulders and Wrists

Adho mukha svanāsana (downward-facing dog pose), *chaturanga dandāsana* (four-limbed staff pose), and *vasisthāsana* (side plank pose), all poses that require bearing weight on the arms and hands, have been linked in our survey to injuries of the shoulders and wrists or hands. Many students will diligently try to achieve the full pose even without the technical instructions or strength required to do so safely. Again, the watchful eye of a teacher alert to over-efforting and poor alignment can make the difference between learning and injury. When there is a range of abilities in a class, the teacher must accommodate and not ignore those who cannot yet safely practice these poses, and provide alternatives in flowing sequences such as *sūrya namaskar* (sun salutation).

The following actions in these poses will reduce the chance of injury significantly. First, spread the fingers of the hand or hands and press down evenly through all parts of the hand, avoiding passive weight-bearing on the wrist. Then stabilize the arm or arms by contracting all arm muscles, pulling energetically up away from the floor. Move the upper arm(s) toward the back of the body, using the shoulder blade muscles of the upper back to position the humeral head toward the back of the shoulder joint. Turn the upper arm(s) laterally as well, with the biceps muscle revolving forward. Then expand the chest and lift the weight off the hands as much as possible by recruiting strength in the torso muscles. These actions can all be practiced initially at a wall, or with the knees on the floor, to reduce weight-bearing while skills are developed.

Preventing Injuries in the Knees in Standing Poses

The knee is situated between the long bones of the upper and lower leg, and shares muscles with both the hip joints and ankle joints. This makes the knee dependent on the alignment and mobility of both the hips and ankles for its safety. Wide-legged standing poses such as the *vīrabhadrāsana* (warrior pose) series put such a demand for stretch on the hip muscles that the safety of the knees can be compromised.

Overzealous and uninformed students may attempt to go deeply into one of these standing poses, even if the force

of the pose is being transmitted to the knees rather than to a healthy stretch in the hips. A narrower stance, which puts less demand on the hip and thigh muscles, is a safer way to start. Other preparations could include using the support of a chair for the bent leg, or practicing near a wall.

A basic safety cue for students is to align the center of the knee with the center of the foot, if the knee is to the side, in front, or in back of the heel. Encourage students to adjust their stance to reflect the actual, not “ideal,” opening of their hips. Another safeguard is to use the muscles’ strength evenly around the joints, avoiding the uneven pulls that often cause knee pain. To protect the front leg’s knee from hyper-extending in *utthita trikonāsana*, press down the mound of the big toe and do not lock the knee.

Preventing Injuries in the Knees in Other Poses

Padmāsana (lotus pose) is another example of a pose that requires a great degree of flexibility in the hip. If the hips are tight, students often force the pose by pulling the foot up with their hands, which puts tremendous dysfunctional stress on the ligaments and tendons around the knees. Proper preparation might include standing poses and seated or reclining hip openers to gain mobility. Alternative poses can be offered, such as *baddha konāsana* (bound-angle pose), and *sukhāsana* (easy pose) with props under the hips, knees, and possibly also under the shins.

To prevent overzealous students from forcing the pose, the teacher needs to model and guide precise methods of entering these poses without suddenly or forcefully pulling the foot and leg into the pose. Again, the teacher’s experience, training, and watchfulness is essential; students commonly need feedback on this pose to understand whether they are safely moving into the posture.

To prevent injury in *virāsana* (hero’s pose) and *eka pāda rajakapōtāsana* (one-legged king pigeon pose), a prop such as a block or folded blanket under the hips will lessen the demand for knee and hip flexibility. People with previous knee injuries or surgeries should progress very carefully to gradually regain range of motion in these poses.

Summary of Recommendations

In summary, we offer several recommendations toward the goal of greatly reducing the incidence of Yoga injuries:

- 1) Teachers must be trained how to plan a safe Yoga practice for the population of students at hand, using alternate forms of poses as needed.
- 2) Studios and teachers can require a self-assessment of each

new student's level of experience, strength, and flexibility in order to guide them toward an appropriate level of class.

3) Students can be advised before taking class that pre-existing conditions will affect their practice, and they can be encouraged to seek help in adapting the practice according to their needs.

4) The teacher and student must both know what constitutes appropriate levels of effort. This requires training for the teacher and education for the students by the teacher.

5) The teacher must know how to spot overzealousness and alignment risks before injuries occur.

6) If classes are large, assistant teachers can help to watch for overzealous and poorly aligned students.

Conclusions

Data from this survey can be a useful starting point for a further investigation of injuries sustained doing Yoga, with the ultimate goal of education for both teachers and practitioners. For this survey, no attempt was made to pre-screen respondents regarding their anatomical or medical knowledge or to verify the reports of injury. However, the strengths of the resulting data lie in the number and wide distribution of the people involved, and the striking agreement in opinion across many styles as to both the causes of injuries and areas of the body most vulnerable.

There is a significant challenge inherent in this kind of investigation. Teachers, therapists, and students often have strong allegiances to their style, their peer-group, their own teachers, and their *gurus*. This may make them reluctant to report or even acknowledge to themselves that certain injuries have occurred. This is the road to self-deception, and to disguising harm rather than preventing it. The therapeutic

Yoga community must have the courage and common sense to freely admit and actively examine the small amount of harm that is inadvertently done. This will allow us, as a community, to avoid far greater harm to individuals and to the discipline of Yoga itself.

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References

1. American Academy of Orthopaedic Surgeons. Tips to prevent yoga injuries. <http://orthoinfo.aaos.org/topic.cfm?topic=A00063>, March 14, 2007.
2. DeBehnke DJ, Brady W. Vertebral artery dissection due to minor neck trauma. *Journal of Emergency Medicine*. 1994 Jan-Feb;12(1):27-31.
3. Paul P. When Yoga Hurts. *Time*. 2007 Oct 15;170(16):71.
4. Krucoff C. Insight from Injury: If the practice of hatha yoga was meant to heal, why are so many yogis getting hurt? *Yoga Journal*, June 2003, issue 174:120-124, 203.
5. Kelly J. In Yoga, you can indeed try too hard. *Pittsburgh Post-Gazette*. Wednesday, December 06, 2006.
6. Bertschinger DR, Mendrinis E, Dosso A. Yoga can be dangerous: glaucomatous visual field defect worsening due to postural Yoga. *British Journal of Ophthalmology*. 2007 Oct;91(10):1413-4.
9. *The Yoga Sûtra of Patânjali, Translation and Commentary by Swami Satchidananda*. Buckingham, VA: Integral Yoga Publications; 2004.