It is no secret that physical training is good for our health. Scientific studies have repeatedly shown that becoming physically fit enhances general health and can help to prevent or reduce the debilitating effects of high blood pressure, cardiovascular disease, stroke, diabetes, arthritis, and a variety of other chronic medical disorders.

Physical training and mastering physical challenges can also improve mood, cognition and emotional resilience. Many of the resilient individuals we interviewed have a regular habit of exercise and believe that staying fit has helped them, both during their traumatic ordeals and during their recovery. In fact, some of them credit physical exercise with saving their lives.

Surviving with the Air Force 5BX and the “daily dozen”

Korean War veteran Lew Meyer, whom we have mentioned earlier in the book, was a civilian firefighter working for the military in South Vietnam when his post in Hue was overrun by North Vietnamese soldiers during the Tet offensive in 1968. After three days of fighting, Meyer and 12 others were captured and force-marched through the jungle for an arduous five months, ultimately reaching Skid Row Prison, 60 km northwest of Hanoi. There Lew was imprisoned in a dark 8-by-4 foot cell, where he remained alone for the next 22 months. By the time of his release on March 27, 1973, he had spent more than five years as a POW; only then did he find out that he had been listed as Missing In Action (MIA) the entire time.

Meyer exercised in prison whenever possible, even when he felt tired or weak. Sometimes he jogged in tiny circles around his cell and sometimes he did isometric exercises, but at other times it was as many sets as possible of the Air Force 5BX, Army “daily dozen” or “JFKs” (exercises recommended by President John F. Kennedy’s Council on Physical Fitness). These widely known calisthenic routines contain a variety of exercises such as sit-ups, pushups, squat jumps, and jumping jacks. Meyer’s cell was so small that his fingernails would strike the wall leaving scratch marks when he did jumping jacks.

Lew continued to exercise even while shackled in leg locks that were embedded in the concrete floor of his tiny cell.

In the morning I asked them to take my legs out of the locks. I wanted to do my JFKs, my exercises. But they didn’t listen. So I started doing sit-ups. Then they pushed me back, yanked my leg locks off, removed them from the cell, and never put the leg locks on me again because the locks helped me do more sit-ups.

When transferred to a larger cell with roommates, Meyer increased the intensity of his workout routine and included his cellmates in practicing the Air Force 5BX and the Army daily dozen. They started with one repetition of each exercise and then progressed to two,
three and four repetitions. Devotion was matched with creativity: the routine often included “weight lifting,” using the smallest prisoner as a weight.

When we interviewed Lew, we asked how many pushups he could do at the height of his prison training. He responded, “One arm or two arms?” Anyone who has ever tried to do one-arm pushups knows how difficult they are and how much strength and balance is required. Most people, even if they can do numerous two-arm pushups, can’t do even one of the one-arm variety. Meyer could do 64.

One year into his captivity, Lew Meyer acquired a cellmate named Jim Thompson, a Green Beret who had been held in primitive camps in the mountains of South Vietnam and Laos for five years, where he was starved, brutally tortured and subjected to years of solitary confinement. When Thompson was finally transferred to the Skid Row prison in North Vietnam, he was gravely malnourished, weighing less than 100 pounds. Mike O’Connor, a fellow POW, couldn't believe what he saw when Thompson first arrived.

On their first morning together, Lew began the day with his customary exercise routine. When he got to push-ups, Thompson tried to join him but was so weak that his arms gave way and his face struck the concrete floor. He couldn’t do a single push-up.

Meyer then changed his routine and began to coach Thompson back to health. Each morning, the two began their day with exercise. At first Thompson could tolerate only deep breathing exercises and gradually some bending and stretching. Every day, Lew would patiently coach his roommate, and within six months, Thompson successfully completed the daily dozen. That was just the beginning.

With time, Thompson's health improved enough that the two men devised an escape plan. Success would depend on preparation and on their ability to navigate the dense surrounding jungle. For over a year, they planned and trained for the extreme physical demands that lay ahead. Gradually their exercise routine became more and more challenging. For aerobic conditioning, they stacked their beds on top of one another and ran laps around their tiny cell, initially in their rubber-tire Ho Chi Minh sandals, and eventually barefoot to build up calluses. At the height of their training, Meyer ran for 24 hours without stopping until he noticed blood in his urine. Remarkably, Thompson ran for 15 hours.

Like Lew Meyer, fellow prisoner Rod Knutson believes that rigorous exercise fosters physical and psychological resilience.

I worked hard to stay in shape. In 1969, when I lived in a cell with seven guys, we had – I forget what we called it – an Iron Man Contest or something. It involved sit-ups and pushups, and they had to be regulation style pushups, regulation style sit-ups. A guy by the name of Cole Black won the pushup contest at 501 pushups. I won the sit-up contest at 1615. I was in bad shape after I did that, because I wore all the hide of my tailbone and I got boils. Every single morning we would practice for one more pushup. By the time we finally had the contest, it was all we had in us, period. And we even did it on a terrible diet.

Most of us did keep an exercise regimen. And it depended on the cell block you lived in, because sometimes you couldn't exercise. I lived in one cell block without floorspace.
All there was were the two pallets. And so if you wanted to walk, it was two paces to the end of your pallet, a turn, and then two paces back to the other end of your pallet. But there was always room to do sit-ups or pushups or deep-knee bends, or something like that.

Another thing. We had a guy who loved to walk on his hands, so he would teach us to walk on our hands. I frequently did handstand pushups or walked on my hands. When I got to the States, to a hospital in Oakland, the morning coffee show was to watch me come out of my room walking on my hands, walk down to the coffee urn and get a cup of coffee, and then come back.

For each of these POWs, rigorous exercise in prison was not just a hobby or a way to pass the time, it was a necessity. It helped them feel better and sleep better. It gave structure and purpose to their days and became a routine that enhanced confidence. It saved lives: Meyer described knowing four or five prisoners who didn’t make any effort to preserve their physical well-being. In his words, they said “they were planning to take a pill” to restore themselves to health when they got back to the States. Instead, he said, “all of them ended up dying within a few years after release.”

American POWs, having been through boot camp and many other advanced military training exercises, were already accustomed to physical challenges. They understood the value of making the effort to stay fit, even under adverse conditions. A retired sergeant, Bruce Norwood, describes the rigorous physical training in the military Ranger Indoctrination Program.

You’d get up at four, go on a twelve-mile run, come back and eat breakfast, do two hours on a very hard obstacle course. … It is a very organized type of training with continuous and constant feedback, both positive and negative. They first teach you to crawl, then walk, and finally run. It’s a great way to teach a new skill set. If you do something wrong you’re held accountable and told to correct it, or you might have to drop and give them fifty push-ups.

Exercise makes civilians tougher too

For civilians in far less stressful circumstances, physical exercise can be a valuable vehicle for improving physical and mental hardiness and self-esteem (Gould, 2000). A 2009 article by the Mayo Clinic notes that regular physical activity:

- improves mood
- combats chronic diseases
- helps manage weight
- boosts energy level
- promotes better sleep
- improves sex life
- can be fun!

Deborah Gruen, the young woman who was born with spina bifida, began team swimming when she was six years old because her sister swam and it looked like fun. Deborah immediately took to the water.

I’ve always been really comfortable in the water; I had a disability that impaired my walking but I always found that water leveled the playing field a little bit. I could keep up with everyone else. I really liked that and plus I didn’t need to use any sort of helping device, any sort of device to help me swim. I could just do it on my own … I could master the full turns, I could play on kickboards, I could swim across the pool; I could keep up with other kids during games.
The lifeguards at the neighborhood swimming club taught Deborah how to swim and she learned rapidly. When her sister, Michele, joined a local swim club, Deborah again followed her:

I joined too and the coaches treated me like I wasn’t anyone different. I didn’t kick as well as everyone else and I was slower than kids in my own age group. But, every once in a while in a swim meet, I do beat able-bodied kids, and if you’ve never swum before I’ll totally blow you away; it’s not even close.

As a member of the US Paralympic team, Deborah practiced 8 times a week, swimming an average of 26 miles. By pushing herself far beyond her own initial expectations and the expectations of others, Deborah has discovered an inner reservoir of power that carries over into other areas of her life. Becoming familiar with and tapping into this inner reservoir has dramatically enhanced Deborah’s self-esteem.

Swimming has also helped Deborah understand the fortifying effects of support from others, including coaches and teammates.

We’re all on the same boat. It’s January and it’s like zero degrees outside, the pool is cold, it’s dark, and your coach is there and he doesn’t want to be there either and I’m going, “Oh this is really bad.” But then you come together and realize we have two hours, we’re clearly not going home, and you just get in and you do it. That’s when it really helps, when you have support from other people. When you have to go it alone, that’s when it becomes really difficult.

Finally, like many people, Deborah sees swimming as a good prescription for reducing stress.

I don’t worry because I have a disability. I worry about whether my term paper is going to be late, is my paper good enough? I swim it out. Swimming is so good for that. Really gets your mind off it. That’s why I love sports. I think everybody should learn to compete. It just takes out all the stress.

Training boosts recovery after trauma

General Hugh Shelton, the former Ranger, Green Beret and Chairman of the Joint Chiefs of Staff whom we have mentioned earlier in the book, has been a physical fitness advocate ever since he joined the United States Army as a young man. Shelton looks like a general. He is 6’5” with close cropped silver gray hair. He is thoughtful and articulate and speaks with a soft Southern accent. General Shelton is passionate about the military, about its mission to promote stability and peace throughout the world, about its focus on high ethical and moral standards and about the unwavering dedication and superior quality of its members. He is goal-oriented and shares his vision with exquisite clarity.

After retirement from the military, General Shelton chose a new career and became a highly successful business leader. As before, he continued to push himself physically, running an average of four miles each day and doing his own home repairs and heavy yard work. On a Saturday morning in March of 2002, Shelton had an accident of the kind that could happen to anyone. A ladder on which he was standing while trimming trees in his yard was struck by a branch. As he fell toward the ground, Shelton saw that he was about to be impaled by the chain-link fence that bordered the house, so he instinctively pulled his feet together, as he had so many times while parachuting, and twisted his body to avoid it. However, the fence caught his feet, forcing his head to strike the ground first.
Although he felt no pain, he initially could not breathe and, for a moment, thought he would die. He could not move his head, his arms, or his legs. As he lay motionless, knowing that he was seriously injured, he thought about the dangerous jumps he had survived during his days as an Army Ranger paratrooper. Some jumps had been at night from 20,000 feet with an oxygen mask and no light to see what lay below. What an irony, he thought, if after surviving a career of 246 life-threatening assignments in the military, he were to perish from a 10-foot fall in the back yard of his North Carolina home.

Forty minutes later, a neighbor finally heard his cries for help and alerted his wife, who called an ambulance. He was rushed to a local hospital, where doctors braced his neck and scanned his spinal cord. The results were not good. According to one doctor, the general would never walk again and might never regain the use of his hands. Shelton later learned that he suffered from “central cord syndrome,” where several cervical vertebrae compressed against the spinal cord, causing paralysis.

When Maj. Gen. Hal Timboe, Commander of Walter Reed Army Medical Center, learned what had happened, he immediately sent two surgeons from the prestigious Walter Reed Army Medical Center to examine Shelton. His prognosis improved: the military surgeons told him they needed to get him to Walter Reed immediately and that time was critical. His best chance for recovery would be to elevate his blood pressure to a level that would put him at risk for a heart attack or stroke, but it would get a much needed blood supply to the damaged area of the spinal cord. Several weeks later they performed surgery to decompress the spinal cord.

Fortunately, Shelton did not appreciate the severity of his injury and refused to give up. Until he was discharged from Walter Reed after nearly three months, he didn’t know that the medical staff believed he would remain a quadriplegic for life, and that on the day he was admitted to the hospital, his surgeon gave him a very low chance of ever walking again.

At the time, I didn’t realize how bad it was. It helped not knowing the extent of trauma. It wasn’t until the 83rd day at Walter Reed, the day before I walked out, that an assistant neurosurgeon came to my bed around five in the morning and said, “General, I’m out of here today and you’ll be walking out tomorrow. I gotta tell you, we never thought we’d see the day you’d walk.” That’s when the hair on the back of my neck stood up. That’s when I realized how bad it had been. That’s when it came back to me: during the second week of my stay, the OT and PT people came in and started talking about long-term rehab hospitals in New York and Texas. I kept thinking, “What’s wrong with Walter Reed?” I never realized I wasn’t expected to recover.

Shelton says that he owes much of his recovery to a physical therapist, Lieutenant Zack Solomon, who believed the Shelton would walk again one day. Solomon was a soldier’s soldier: disciplined, determined, positive. Solomon worked with Shelton twice a day in the hospital gym and swimming pool. And even though physical therapy was tiresome and painful, neither of them backed down. In fact, Shelton often volunteered to do more. The two were a team and with Solomon by his side, Shelton gradually, over the course of months, began to walk. Solomon’s loyal determination exemplifies the military ethic to “never leave one of your own behind.”

These days General Shelton gives speeches all across the country, continues to support his alma mater, North Carolina State University, and serves as a board member for numerous corporations. He not only walks without assistance, he exercises on a regular basis and keeps physically fit. He remains mentally and physically tough.
Physical exercise improves physical and mental health

It may seem obvious that physical exercise improves physical health, but do we know specifically how? A 2009 article in *Scientific American* (Ballantyne, 2009) summarized findings by a US Department of Health and Human Services committee on physical activity chaired by William Haskell of Stanford University. A committee member, Jonathan Meyers of the Palo Alto Veterans Affairs Health System in California, explains that

… when a person exercises, the heart muscle contracts forcefully and frequently, increasing blood flow through the arteries. This leads to subtle changes in the autonomic nervous system, which controls the contraction and relaxation of these vessels. This fine-tuning leads to a lower resting heart rate (fewer beats to pump blood through the body), lower blood pressure and a more variable heart rate, all factors that lower the risk of developing cardiovascular disease.

In their 2008 report, *Physical Activity Guidelines for Americans*, the committee found strong evidence that physical activity in adults lowers risk of:

- early death
- stroke
- Type II diabetes
- high blood pressure
- adverse lipid profile
- metabolic syndrome
- colon and breast cancer
- decreased levels of the hunger hormone ghrelin
- increased levels of the appetite-suppressing hormone peptide YY.

Further, the committee found that 3–6 months after starting an exercise program, formerly sedentary people had experienced a drop in levels of C-reactive protein (a marker for inflammation often used to assess risk of cardiovascular disease) of 30% on average – as much as would occur if given a statin drug. There was moderate evidence for lower risk of hip fracture, reduced bone density, and lung and endometrial cancer.

Aerobic exercise can also be helpful in reducing symptoms of depression. In a 1999 study of 156 middle-aged men diagnosed with major depression, James A. Blumenthal and colleagues (1999) found that 16 weeks of aerobic exercise was as effective in lowering symptoms of depression as 16 weeks of treatment with the antidepressant drug Zoloft. Although over 60% of participants in both groups had a good response, there were differences. Those who took Zoloft tended to responded faster, while those who exercised responded more gradually but were less likely to relapse and experience a return of their depressive symptoms. Many other studies find that exercise is substantially effective in reducing symptoms of mild to moderate depression (Barbour et al., 2007). For patients who receive psychotherapy, exercise may be a valuable adjunct. Aerobic exercise even appears to lessen mild symptoms of depression and sadness in normal people who do not suffer from major depression.

In addition, aerobic exercise has been shown to decrease anxiety. This is true for normal healthy individuals as well as for people diagnosed with generalized anxiety disorder and panic disorder. Exercise may be particularly helpful for people with “anxiety sensitivity,” which refers to misinterpreting and catastrophizing the physical sensations that generally accompany anxiety, such as perspiration, rapid heart rate, and rapid breathing. People with anxiety sensitivity often imagine that these symptoms are actually being caused by a serious
life-threatening illness such as heart failure. Researchers believe that during vigorous aero-
bic exercise, the “anxiety-sensitive” person is forced to tolerate many of the same symptoms
(that is, rapid heart rate, sweating, and rapid breathing) that frighten him or her during
periods of anxiety. Over time, the “anxiety-sensitive” individual who continues to exercise
vigorously can learn that these symptoms of arousal are typically not dangerous, and the fear
that these symptoms trigger gradually decreases in intensity (Salmon, 2001).

Abundant scientific evidence shows that physical exercise also can improve brain function
and cognition, which includes thinking and memory (Cotman & Berchtold, 2002). Researchers
from the University of Urbana-Champaign recently reviewed findings from 111 animal and
human studies and concluded that aerobic exercise can improve attention, planning, decision
making, inhibition and memory. These positive effects of exercise may be related to a number
of recent findings: exercise training has been shown to increase cerebral blood volume (15)
and perfusion of the hippocampus, increase the size of the hippocampus and serum levels
of BDNF (16), and increase brain volume (prefrontal cortex) in older adults (9 in Erickson).
In fact, exercise in midlife is associated with decreased rates of developing dementia and
Alzheimer’s disease (Andel et al., 2005). Among patients already diagnosed with dementia,
even among normal elderly individuals, exercise may slow age-related memory decline.

Exercise may even enhance your sex life. In 2009, Benson Hoffman and his colleagues at
Duke University Medical Center reported on 200 depressed adults, aged 40 years or older,
who were sedentary and generally overweight. They divided the participants into three
groups, assigning one group to exercise by walking, running, or biking, 30 minutes a day, 3
days a week, to 70–85% of their heart rate reserve. The other two groups received either an
antidepressant (Zoloft in its generic form) or a placebo pill. After four months, the partici-
pants took the Arizona Sexual Experiences Questionnaire (ASEX). The test results indicated
that the group that exercised reported better sex than the placebo group, and marginally
better sex than the Zoloft group.

**Exercise, resilience and the brain**

A number of different neurobiological mechanisms may help to explain the antidepressive,
anti-anxiety, and stress-protective effects of aerobic exercise. First, exercise has been shown
to increase concentrations of chemicals that are known to improve mood (e.g. endorphins)
and lessen depression (e.g. serotonin and dopamine).

Second, regular exercise helps to protect against the hormonal effects of chronic stress.
During stress, the hypothalamic–pituitary–adrenal (HPA) axis releases high levels of the
stress hormone cortisol, which over time can damage neurons in the hippocampus. The good
news is that this response may be dampened in exercise-trained individuals. Dampening of
the HPA axis would most likely mean lower cortisol production, less brain exposure to cor-
tisol, and therefore less damage to neurons in the hippocampus.

A third potential neurobiological mechanism involves neurogenesis, the making of new
brain cells by “turning on” relevant genes. Aerobic exercise enhances the growth of neu-
rons in the brain by increasing production of neurotrophic (growth) factors such as BDNF.
(“Neuro” means “brain” and “troph” means “nourish.”) BDNF is a protein that is known
to promote the growth and repair of brain cells. BDNF and other growth factors play an
important role in cell survival, formation of connections between neurons based on how
these neurons are used, the repair of damaged nerve cells, and learning (Duman et al., 2001;
Krishnan & Nestler, 2008). Stress, especially when chronic, is known to reduce the produc-
tion of these neurotrophic factors.
Aerobic exercise may even protect against the effects of future stress and depression. Carl Cotman and Nicole Berchtold at the University of California, Irvine (2002) assessed level of depression in 19,000 adults at the beginning of their study and again eight years later. They found that regular exercise over the eight-year period predicted freedom from depression. Not all studies, however, have found such a protective effect for physical activity. Assessing the capacity for aerobic exercise to prevent stress-induced anxiety, depression, and cognitive decline is an important and exciting area for future research in both animals and humans.

**How can you use exercise to increase your resilience?**

For most of human history, people have spent their waking hours engaged in the physical demands of daily life. The human body evolved for living as gatherers, scavengers, toolmakers, hunters, and artisans. Like our hunter-gatherer ancestors, modern humans are living with a genome, body, and brain that evolved with physical activity at its core and that is designed to respond rapidly to relatively short bursts of physical stress. However, over the past few centuries, with the advent of the industrial revolution and advances in technology, we have adopted a dangerously sedentary lifestyle, rarely engaging in physically demanding work and often sitting for long hours in front of a computer or television set. Writing in *The Lancet*, German researchers Rainer Hambrecht and Stephan Gielen (2005) reported that modern humans, per kilogram, use only about one-third of the energy expended by our Paleolithic ancestors. In fact, in 2009, Steven Blair of University of South Carolina’s Arnold School of Public Health reported that the Aerobics Center Longitudinal Study found that 25–35% of American adults were living very sedentary lives (i.e. worked at sedentary jobs, had no regular physical exercise program, and were inactive around the house) (American Psychological Association, 2009). This kind of sedentary lifestyle has many drawbacks, and in the context of this book, we can say that it does not serve to boost resilience.

While many Americans do exercise with some regularity, building resilience goes beyond “routine maintenance” exercise; to become more resilient, we need to challenge ourselves. One strategy relevant to physical training is known as “stress inoculation” (Lyons & Parker, 2007), which involves continually pushing the limits of strength and endurance. In order to maximize the growth-enhancing effects of stress inoculation, one must first learn to accurately assess the upper and lower limits of optimal stress exposure. As we’ve said, stress that is too mild leads to no growth – merely maintenance – or even decline. However, too much stress (i.e. stress that is unmanageable or overwhelming) can also lead to weakening or sometimes even to physical and/or emotional breakdown.

Like most world-class athletes, champion cyclist Lance Armstrong adheres to a training program that is rigorous, methodical and based on good science. In their book *The Lance Armstrong Performance Program*, Armstrong, Chris Carmichael, and Peter Joffe Nye (2000) describe a stress inoculation physical training program that recommends exercising within precise upper and lower target heart rates, not too low and not too high. Heart rate is a good measure of physiological stress for those who are training to increase cardiovascular fitness and resilience. Armstrong explains,

> I use my heart rate ceilings for my training rides. They keep me in my upper aerobic capacity to avoid crossing my lactate threshold, which is when the body can no longer process oxygen quickly enough to remove waste products associated with energy production. The object is to end my training ride having ridden almost entirely aerobically. … (pp. 81–82)

> Growth and change won’t occur unless you push past your comfort zone, but pushing too hard increases the likelihood that you will give up. Far better to experience success at each step of a progressive process. Building confidence fuels the persistence to pursue more challenging changes. (Loehr & Schwartz, 2003, p. 179)

The US Army Combat Stress Control Handbook describes a similar program for building physical fitness:

> To achieve greater tolerance or acclimatization to a physical stressor, a progressively greater exposure is required. The exposure should be sufficient to produce more than the routine stress reflexes. Well-known examples of acclimatization are heat acclimatization, cardiovascular (aerobic) fitness, and muscle strength … you can become aerobically fit only by exerting yourself to progressively greater degrees of physical effort. … In other words, you must stress the system. After doing that for several days, the same effort raises the heart rate and sweating only a little. You become less short of breath and the effort seems much easier. To become more aerobically fit, you have to increase the work stressor even more until the body again shows the stress of increased heart rate, shortness of breath, and sweating. … The issue for master fitness trainers is how to keep the physical work stressors and stress in the positive range, which increases strength and fitness. They must control the stressors and stress so they are not extreme – too little or too much. (Department of the Army, 2003, pp. 29–31)

Cliff Welch, a Special Forces instructor, describes it this way, “If you do things in incremental steps, you know, harder and harder, the person will get better. They’ll get stronger and they’ll get harder. And that starts from day one of basic training, and it never really ends the whole time you’re in the service.”

Of course, most people reading this book are not aspiring to become world-class athletes or SF soldiers. But how much exercise is enough to enhance resilience? And what type of exercise is best for your physical health? How about for your mental health? Is it best to exercise alone or with others? Should you consider hiring a trainer so that you can learn proper exercise techniques? What about cross-training?

These are complex questions that we will not cover in this book. However, bookstores and libraries are filled with excellent books that outline sensible and scientifically sound exercise programs geared toward maintaining good health. At the most basic level, panels of experts agree that most adults should exercise for at least 30 minutes at a moderate level of intensity nearly every day of the week.

A note of caution is also in order: this material is not intended to take the place of medical advice. Before beginning any exercise program, it is always wise to check with your doctor, who can assess any conditions you may have that would limit the amount and types of exercise that are appropriate for you.

**Physical resilience requires recovery**

Exercise physiologists emphasize that we do not build strength, agility, and coordination only by exercising. Instead, we need to alternate periods of exercise with periods of rest. This
is true both in the context of an individual workout and in the longer view of a weekly fitness routine, where you will give your body more challenges on some days than others. Without the opportunity to recover, the body becomes exhausted and worn down.

Recovery includes proper nutrition; the old adage “you are what you eat” applies. The USDA Dietary Guidelines (2005) recommend a diet composed predominantly of a variety of fruits, vegetables, and whole grains. Modest amounts of lean meat, legumes, and low-fat dairy products are included, while fats and sugars are to be eaten sparingly. In terms of caloric intake, USDA recommendations range from 1600 to 2400 calories a day for women and 2000–3000 calories a day for men. Younger adults generally need more calories than older adults because our metabolism tends to slow down with age. Still, the more physically active you are, the more calories you need to maintain your weight. Thus, if you are under 30 and get plenty of exercise, your appropriate calorie consumption will be higher than that of someone who is over 40 and/or who leads a more sedentary life. A healthy diet also involves limiting intake of alcohol – for some people, avoiding it altogether – and avoiding tobacco, as well as other substances of abuse.

Sleep is another key component of recovery and is essential to good health and well being. For most adults, this means about 8 hours of sleep every night. Among other benefits, adequate sleep is necessary for optimum coordination and reaction time, according to Harvard Medical School physiologist Martin C. Moore-Ede, whose 1993 book The Twenty-Four-Hour Society remains a classic. In his 1998 book Power Sleep, Cornell University psychologist James B. Maas points out that many of us go through years of our lives at less than peak performance because we are chronically mildly sleep deprived. And The Lance Armstrong Performance Program (Armstrong et al., 2000) affirms that while training, most athletes need 8–10 hours of sleep per night.

Moreover, it has become increasingly clear that the benefits of sleep go far beyond just feeling alert and rested. In 2000, researchers in Australia and New Zealand reported that “16 to 60 percent of road accidents involve sleep deprivation,” and that “people who drive after being awake for 17 to 19 hours performed worse than those with a blood alcohol level of .05 percent … the legal limit in many European countries” (CNN, 2000). At the 2009 annual meeting of the Associated Professional Sleep Societies, researchers presented evidence of the association between inadequate sleep and weight gain. Also in 2009, the American Heart Association reported a study headed by Lisa Rafalson of the University at Buffalo that linked inadequate sleep (less than 6 hours per night) to the onset of Type II diabetes (American Heart Association 2009).

Of course, we recognize that getting a healthy amount of sleep is easier said than done, given our busy schedules and the rapid pace of our society. This is particularly true for the many people who suffer from insomnia, sleep apnea, or other sleep disorders. Although diagnosing and treating sleep disorders is beyond the scope of this book, there are many good resources for sleep hygiene. What we wish to emphasize in this chapter is that good sleep hygiene enhances recovery, physical and emotional health, and resilience. In fact, Lance Armstrong has included a “dare” to get plenty of sleep on his Livestrong.com wellness website.

There are many neurobiological factors associated with recovery, optimal performance, and resilience. The neurobiology of optimal performance and recovery is highly complex. One important area of investigation involves regulation of the SNS. For example, in 1989, Richard Dienstbier from the University of Nebraska reviewed a series of studies showing that people tend to perform best when their SNS activity is low at baseline, accompanied by a robust increase of norepinephrine and epinephrine during stress, and followed by a relatively rapid return of these neurotransmitters to baseline levels once the stress is over. We
believe that resilient individuals, who perform well under stress, are likely to fit Dienstbier’s
description: they maintain the SNS within an adaptive window of activation, not so high
as to cause incapacitating anxiety and fear, but high enough to appropriately respond to
danger.

One of the neurochemicals that helps to modulate the norepinephrine response to stress is
Neuropeptide Y. When norepinephrine is released during periods of high stress, neuropeptide
Y is released with it. As described briefly in Chapter 1, NPY helps to decrease anxiety and
restore calm after stress, in part by inhibiting the further release of norepinephrine. This helps
to keep the SNS from “overshooting.” Support for the stress-modulating effects of NPY has
come from an innovative series of studies conducted by Yale University and National Center
for PTSD researcher Charles A. Morgan MD (Morgan et al., 2002, 2004). Morgan, an expert in
the neurobiology of resilience, found that Special Operations soldiers with high levels of NPY
performed better during extremely stressful training procedures than did soldiers with lower
levels of NPY. Some researchers have referred to NPY as a neurobiological resilience factor.

Another neurochemical that has been linked to stress recovery, performance during
stress, and resilience is dehydroepiandrosterone (DHEA). DHEA is an adrenal steroid that
is released under stress and helps to protects against the potentially damaging effects of
cortisol. In his studies with elite Special Operations soldiers, Morgan found that a higher
ratio of DHEA to cortisol was associated with better performance during intensive survival
training and stressful underwater navigation.

Building physical fitness habits

While many types and intensities of exercise have medical and psychological benefits, for those
of you who wish to use exercise as a means to enhance physical and emotional resilience, and
become better prepared to deal with stress, we recommend an exercise regimen that is man-
ageable but at the same time challenging. In 2008, The Department of Health and Human
Service recommended at least 2 hours and 30 minutes of moderate intensity aerobic exercise
(i.e. walking fast or pushing a lawn mower) or 1 hour and 15 minutes of intense aerobic activity
(e.g. jogging or running, swimming laps) as well as 2 days of muscle strengthening activities.
In general, even greater health benefits can be achieved for those who exercise more than these
basic guidelines. We believe that such a regimen should incorporate the following elements.
1. Learn as much as you can about how physical fitness can improve your health and well-being.
2. Consult your physician before beginning a physical fitness program.
3. Try different forms of physical exercise. Cross-training has many benefits.
4. Develop a set of well-defined goals for your physical exercise regimen and try to stick to
those goals. Record the details of your workouts to ensure that you are achieving your goals.
5. Consider working with an experienced trainer or coach as you build your fitness.
6. Reward yourself as your goals are met.
7. Gradually increase the intensity of your cardiovascular and strength training. While
continually repeating the same comfortable routine with the same level of intensity
each time you workout may help to ward off some medical illnesses, it will not do as
much to enhance your physical resilience. To increase your physical, as well as mental
and emotional strength, you need to stress yourself and your body beyond your normal
comfort zone but not to the point of damage.
8. After each workout, allow your body to recover adequately before beginning your next
workout.
9. Practice healthy eating and sleep habits.
10. Find friends or family members who will support your physical training. Even better, train with a friend or family member who also has the goal to become more resilient.

11. Notice and focus on the positive feelings and greater sense of self-esteem and mental toughness that typically accompany increases in physical resilience.

12. Try to reach the point where being physically fit becomes part of your sense of self, a part of who you are.

There is no easy way to become physically fit and resilient. It takes planning, desire, drive, consistency, perseverance, and the willingness to live with discomfort. But the benefits are many. For Hugh Shelton, being physically resilient prepared him to face and overcome possible paralysis. For Deborah Gruen, it leveled the playing field. For Lew Meyer, it meant living to see another day.

References


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