

The Resilience Bank Account: Skills for Optimal Performance



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The day-to-day life of a cardiothoracic surgeon and other high-stakes occupations is riddled with chronic stress punctuated by acute, sometimes life-threatening, crises. Additional stress from the realms of a surgeon's personal life can add to the silent burden surgeons often carry. The tolls paid for poor management of the cumulative stress load can impact surgeons and their patients, leading to errors of clinical judgment, burnout, early departures from practice, health issues, and substance abuse. This

article reviews 6 individual skills or habits that can, when proactively integrated into a daily routine, make the difference. The idea of investing in a resilience bank account is suggested as a metaphor for the reserve building and cumulative positive impact of these habits over time.

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Our best selves. We know it when we have it: we operate at a high level of energy, we are actively engaged with whatever we are doing, we are open to and feel warmth and compassion toward others, we are creative, and we feel as if the curve balls of life can be turned into home runs. High-stress occupations, such as law enforcement, the military, and surgery, demand that we do our best to show up, every day, at our best. Not showing up at our best has consequences for our patients: an American College of Surgeons survey found a large and significant adverse relationship between major medical errors, a surgeon's mental quality of life, and the 3 domains of burnout.¹

Our ability to show up at our best is influenced by 3 distinct but overlapping domains of our lives. First is the daily and often cumulative stress of our work and personal lives (eg, bureaucratic burdens, patient complications, personal relationship struggles, financial stress) that can slowly build, drip-by-drip, gradually impairing one's psychological and physical well-being.

The second domain is the force of significant external events (eg, divorce, illness or death of a loved one, major patient complication, or malpractice suit) that can acutely derail our ability to show up with anything other than the ability to just get through the day. For a surgeon already functioning on the edge of coping, such events can tip the scale of his or her life into crisis.

The third domain is our personal stockpile of genetics, familial psychological legacy, and surgical training, all of which have molded us into unique individuals with varying skills for successful adaptation and resilience. Worth noting is the high premium placed on self-sufficiency that is woven into the fabric of our surgical

training and culture that can, if over relied on, contribute to emotional isolation and covert depression.

Despite these complexities, there are several habits—sleep, exercise, meditation, gratitude, self-compassion, and connection—that can significantly improve one's resilience and help one thrive. I have coined the term resilience bank account (RBA) as a metaphor for one's personal "bank account" that will help provide the needed resilience reserves to meet these challenges. One's commitment and discipline to develop and maintaining these daily habits can be thought of as a process of making regular small deposits into their personal RBA, the cumulative effect of which is similar to compound interest that grows one's resilience over time. The goals of building a robust RBA are to improve one's (1) physical and mental health, (2) emotional flexibility and self-regulation, and (3) positively strengthen one's internal relationship to themselves and the outside world, all key foundations of personal resilience.

Given the intensity and time demands placed on surgeons, this review provides a list of high-value RBA habits supported by the literature that can be individually selected depending on interest or personal needs. By starting with 1 or 2 habits not currently practiced and committing to their implementation, one can begin to not only increase their ability to better weather the daily stress load and unexpected events in healthier ways but also thrive.

Sleep

"Lose your dreams and you will lose your mind."

—The Rolling Stones

The issue of sleep is understandably a hot-button item for surgeons. During training, surgeons learn to cope with significant sleep deprivation, and the ability to "carry on" is a critical and highly valued trait. Cardiothoracic surgery,

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with its cognitive, emotional, and physical demands, has parallels to the world of professional athletics, where sleep hygiene is an obsession because of its proven importance for performance outcomes.² Because cardiothoracic surgeons are equally obsessed with their performance, we too should be equally obsessed with closing the gap between “carrying on” and optimal performance. Thus, good sleep hygiene is the foundational habit of the RBA.

Sleep is driven by 2 systems: the circadian release of melatonin from the pineal gland, which coordinates the intracellular metabolic clocks throughout the body in preparation for the onset of sleep, and the accumulation of astrocyte-derived adenosine within the central nervous system,^{3,4} which creates “sleep pressure” (feeling sleepy) that increases over time. Two essential things occur during a typical 8-hour period of sleep. First is the clearance of adenosine and other molecules, such as β -amyloid (a protein associated with Alzheimer disease), by the nighttime escalation of central nervous system glymphatic activity, a glial cell-based lymphatic system. The second is the recurrence of 90-minute-long sleep cycles, each consisting of varying periods of nonrapid eye movement sleep (NREM) and rapid eye movement (REM) sleep.⁵ A key point to remember is that the 90-minute cycles of the first two-thirds of the night are dominated by NREM sleep, while the latter third is dominated by REM sleep. Thus, sleeping only 5 to 6 hours a night strips away vitally important REM sleep.

There is currently an epidemic of the insufficient sleep syndrome (ISS), a “voluntary” chronic pattern of shortened sleep (<7 hours) to accommodate work or lifestyle demands.⁶ Voluntary is in quotes to highlight that most people reduce their sleep due to pressure from external circumstances. The impact of ISS is profound: an increase in all-cause mortality of 12%,⁷ with abundant epidemiologic evidence demonstrating an increased risk of cardiovascular morbidity and mortality, hypertension, obesity, and metabolic syndrome, partly mediated by a chronic increase in sympathetic tone, ghrelin/leptin imbalance, and potentiation of the stress reactivity of the hypothalamic pituitary axis.⁸ In addition, ISS is a major risk factor for the development of dementia, perhaps driven by impairment of the glymphatic system’s clearance of β -amyloid.⁴

Cognitively and emotionally, ISS leads to dose-dependent impairments in one’s (1) ability to focus and sustain attention, (2) working, and long-term memory, (3) learning of complex skills, (4) ability to discriminate the value of rewards with increased risk taking and impulsivity, and (5) negative emotional reactivity and expression, mediated in large part by impairment of prefrontal cortical control over other areas of the brain.⁹ The heightened negative emotional reactivity of ISS impairs leadership skills by decreasing charismatic behaviors and increasing abusive supervision behaviors, which in turn leads to lower employee engagement and satisfaction.^{10,11} Unfortunately, people adapt to the pervasive and pernicious effects of ISS and interpret their way of being as normal, only to recognize how impaired they were once good sleep hygiene is restored.

Because ISS lops off the last one-third of the sleep cycle, REM sleep is the casualty. REM sleep is a hyperactive phase during which many areas of the brain become more active than when awake as they process emotions and information and integrate them with our neural autobiography—an information digestion process.⁵ REM is vital to recalibrate the brain’s ability to appropriately interpret the emotional state and intent of others; that is, it improves our emotional acuity. REM deprivation not only impairs this essential physician skill but also batters our creative problem-solving ability, something so important to the future of our specialty.

How to optimize sleep? First is to recognize that good sleep hygiene enhances productivity and that these increases in productivity dwarf the increased sense of accomplishing more by sacrificing sleep for work. Second is to make a personal commitment to sleep 7 to 9 hours per night, the critical number that virtually all humans require. Genetic exceptions are rare, and 7 hours is the minimum for optimal function.⁵ Other specific tactics include (1) go to bed and get up at the same time as much as possible, (2) ambient bedroom temperature of 65°, (3) avoid blue light for several hours before bed (TV, computers, phones) to avoid interfering with circadian rhythms or switch to the warm light option early in the evening, (4) eat dinner earlier to coordinate cellular circadian clocks with normal light/dark cycles, and (5) drink alcohol in moderation and not right before bed.

Exercise

“My mind works only with my legs.”

—Jean-Jacques Rousseau

Our modern lives are a mismatch with our evolutionary past.¹² Several million years ago, climate shifts changed Africa from a forested ecosystem to an open savannah. Our ancestors, omnivorous apes with bodies suited to living in trees, adapted by evolving skeletons that could support walking and running, a new necessity for hunting animals for hours at a time. Since the only weapons were sticks and stones for more than 1 million years, aerobic endurance and social cooperation became our ancestor’s best weapons. Over time our ability to run long distances evolved as we improved our ability to dissipate heat (from loss of body hair and enhanced ability to sweat) and our metabolic capacity (maximum oxygen consumption). Humans are the only primate with the aerobic capacity to support long-distance running, a skill only seen in horses, wildebeests, and social carnivores (wolves, hyenas). Simultaneously, our brains evolved to cooperate within a social structure to enable us to plan, spatially track, and communicate. Because 4-legged animals could only lose heat by panting, these evolved human hunters ran their prey into heat stroke, allowing them to catch and kill them with their simple weapons.

Metaphorically then, our brains and muscles grew up together, like Siamese twins, so they are physiologically intimate. Skeletal muscle (30%-40% of total body mass)

developed into a secretory and endocrine organ that participates in a muscle-brain endocrine loop.¹³ Skeletal muscle secretes hundreds of myokines and other molecules in response to contractions and proliferation, including many that act directly on the brain. Exercise-induced and muscle-derived systemic elevation of cathepsin B, irisin, and β -hydroxybutyrate all cross the blood-brain barrier and act on the hippocampus (critical in memory formation, spatial mapping, decision making, and control of context, fear, and emotions) to promote brain-derived neurotrophic factor (BDNF) expression. BDNF is a protein molecule essential for many aspects of neuronal physiology (neural differentiation, increasing neural connections and plasticity, and triggering brain mitochondria to use oxygen more efficiently), and it plays a dominant role in mediating the cognitive benefits of exercise.

As little as 3 months of aerobic exercise increases hippocampal volume by 12% on functional magnetic resonance imaging.¹³ Aerobic exercise also benefits cognitive function by promoting direct release of BDNF from the brain and by increased cerebral angiogenesis driven in part by muscle-derived lactate crossing the blood-brain barrier where it binds to brain lactate receptors and stimulates vascular endothelial growth factor production.¹⁴

The brain benefits of regular aerobic exercise are multiple and substantial: (1) 30% to 40% reduction in risk of developing Alzheimer disease with the risk decreasing more with increased fitness, (2) significant protection against the normal cognitive decline seen with aging,¹⁵ and (3) improved memory, learning, motor skills, and executive function.¹⁶ In addition, each acute bout of exercise also causes significant improvement in (1) cognitive tasks that depend primarily on the prefrontal cortex—attention, concentration, working memory, reasoning, and planning, (2) enhanced mood state, and (3) decreased stress level, with effects lasting up to 24 hours.¹⁷ These ubiquitous positive effects are driven by an exercise-induced increase in multiple neurotransmitters, neuromodulators, and neurotrophins, including dopamine, norepinephrine, endogenous opioids, endocannabinoids, and BDNF.

Many other distinct myokines communicate with the liver, gut, pancreas, fat, bone, vascular bed, and skin.¹³ Interleukin (IL) 6 is one example. After an acute bout of exercise, there is an exponential increase in IL-6 (up to 100 times that of basal levels), with return to normal in 2 hours. Unlike the chronic elevation of IL-6 levels from fat cells in obesity that results in chronic systemic inflammation, these acute and transient elevations of IL-6 are not associated with nuclear factor- κ B activation and are independent of tissue necrosis factor, consistent with the role of IL-6 in the metabolism of exercise rather than inflammation. In this scenario, IL-6 works as an energy-management molecule in the muscle and systemically to enhance insulin sensitivity, lipolysis, and fat oxidation. This is but one of the many pathways that plays a role in the improvement of the metabolic syndrome seen with exercise.

Exercise has multiple other salubrious benefits, including a robust inverse association between exercise

capacity and all-cause mortality,¹⁸ improved sleep,¹⁹ and improved regulation of appetite with better dietary choices.²⁰ Finally, because we lose approximately 10% of our muscle mass with each decade of age, we risk losing the beneficial systemic influences just described. Resistance training (weight lifting) is the best strategy to combat age-related muscle atrophy, not only for myokine-related metabolic power but also for better neuromuscular performance.²¹ Thus, an optimal program would include both aerobic and resistance training on a regular basis.

Meditation and Mindfulness

“The quality of your mind determines the quality of your life.”

—Sam Harris

In his *Waking Up* meditation app, Sam Harris, a philosopher and meditation expert, calls the voice in our heads “the most rambling, chaotic, needling, insulting, insufferable person you will ever meet” and that it is “like having some maniac walk through the front door of your house and follow you from room to room and refuse to stop talking.” Our relationship to this maniac can sometimes be one of near codependency and even fusion. Meditation is the workout that helps loosen this mental knot, providing freedom from the suffering generated by this relationship. Meditation can be a life-changing path to greater compassion for ourselves and others, to increased social connection, and to a more positive leadership influence.

The term meditation, like the word sports, is a generic one that refers to a variety of activities. Here I focus on 3 types of meditation as defined by Singer and colleagues²²: (1) Breathing and Body Scan (BBS), (2) Loving Kindness (LK), and (3) Observing Thoughts (OT). To understand how these meditation practices interface with the mind, it is useful to consider the notion of bottom-up and top-down mental pathways. Bottom-up refers to the myriad of internal neurologic processes and stimuli from external events that generate emotions and thoughts independent of our intentions, while top-down refers to the intentional cultivation of thoughts and emotional states that can influence those subterranean neurological processes. The 3 different types of meditation can be thought of as sitting atop these 2 pathways, with BBS and OT meditation serving as a gatekeeper for bottom-up pathways and LK meditation as a top-down influencer of them.

BBS meditation, a primary component of the popular Mindfulness-Based Stress Reduction (MBSR) program, involves intentionally directing one’s attention to the breath and, after noticing when the mind wanders, gently redirecting attention back to the breath. Body scan meditation further hones this skill but is centered on bodily sensations. OT meditation, also taught in MBSR, trains the ability to allow thoughts to rise and fall without becoming hooked by the story or emotional content by sidestepping the following pitfalls of (1) buying into the internal story as true, (2) internally challenging the

thoughts/emotions with other thoughts/emotions, such as “I shouldn’t have these thoughts”/or internal irritation for having the thoughts, (3) paying too much attention to them thereby sapping oneself of valuable cognitive resources, and (4) minimizing thoughts or emotions as “nothing” which only amplifies the neurologic itch. With OT, the skill honed is similar to a bullfighter who sees the threat but neutralizes its power by calmly stepping aside as it charges toward him, short-circuiting the developing rumination and its negative mental health impact.

LK meditation entails the active generation of friendliness and goodwill toward a series of imagined people, starting with someone for whom there are already positive feelings, making it easier to kick start the generation of warm compassionate feelings. With the psychological ball rolling, one then moves on to other people, including oneself, and ultimately, to people with whom there is a difficult relationship. The intention here is very different from the other 2 types of meditation in that it is a constructive practice that is effortful in the attempt to generate positive emotions and compassion for others, even for individuals who are personally challenging to the meditator.

In a rigorously designed study, Singer and colleagues²² evaluated the mental and physical outcomes of these 3 types of meditation in meditation-naive individuals. One group was trained for 3 months in BBS, followed by 3 months of training in OT and then 3 months of LK for a total of 9 months. Another group underwent the same length of training but the sequence was BBS, LK, then OT. Finally, 1 group was only trained in LK for 3 months. Before meditation training and after completion of the different modules, the Trier Social Stress Test (a highly stressful test that induces feelings of unpredictability, uncontrollability, and social threat similar to the everyday experiences that create chronic stress) was administered, and perceived stress and cortisol levels were measured (Table 1).²³

In all 3 meditation types there was an increase in the study participants’ subjective level of focus, positivity of affect, warmth, and energy, and a decrease in thought distraction.²² There were, however, unique and significant differences found between the different practices. Perceived stress was significantly reduced in all practices, but stress cortisol responses were only significantly reduced by the OT and LK training.²³ Functional magnetic resonance imaging evaluation of the 3 meditation types revealed increases in cortical thickness in distinct areas of the brain related to each type of meditation: prefrontal cortex for BBS, frontoinsula with LK, and inferior frontal and lateral temporal cortices with OT training, and the degree of thickening correlated with

training-induced behavioral improvements in the same individuals.²⁴

An exciting aspect of these studies is the development of the notion of tailoring specific meditation strategies to the desired outcome. For example, it is well known that chronic exposure to situations that can generate significant empathic responses (ie, health care) can contribute to burnout and emotional exhaustion. LK meditation can serve as an antidote.²⁵ Short-term training in the generation of compassionate feelings has been shown to shift the internal response to highly emotionally aversive stimuli from one of avoidance to one of warmth and positive feelings through activation of the frontoinsula part of the brain and the oxytocin and opioid neurotransmitter system.²⁶

Finally, it is critical to emphasize that one can derive real benefit from meditation without an extensive time commitment. As little as 13 minutes a day, if practiced daily, is beneficial.²⁷ Possibilities include starting with one of the outstanding meditation apps with instruction and guided meditations from world-class teachers, attending a local 8-week MBSR course, or for those with a deeper interest, attending a retreat.

Gratitude

“What separates privilege from entitlement is gratitude.”

—Brene Brown

Gratitude is an other-directed emotion and is defined as an “estimate of gain coupled with the judgment that someone or something else is responsible for that gain.”²⁸ The marked impact of gratitude on well-being and resilience are hypothesized to work through the μ -opioid receptor (MOR) system ubiquitously located throughout the brain.²⁹ The MOR system plays a key role in positive affect and reward, social motivation, and long-term affective bonds. It also plays a central role in the relief from physiologic stress by balancing the direct action of corticotropin-releasing factor on the induction of an acute stress response within the brain. Concretely, this can be imagined as the stress evoked by a life-endangering event, and the subsequent MOR-generated swell of gratitude one feels for surviving or toward someone who helped. Beyond these acute stress episodes, gratitude-provoking activities, which will be described next, likely activate the MOR system, as evidenced by the subjective reports of decreased stress with the regular practice of gratitude.

Table 1. Impact of Different Types of Meditation on Perceived Stress and Serum Cortisol Levels

Impact	BBS-3 Months	LK-3 Months ^a	BBS, followed by LK	BBS, followed by OT
Perceived stress reduction, %	26	36	39	31
Stress cortisol reduction, %	Unaffected	32	48	51

^aNote the impact of LK training alone on stress cortisol levels

BBS, Breathing and Body Scan; LK, Loving Kindness; OT, Observing Thoughts.

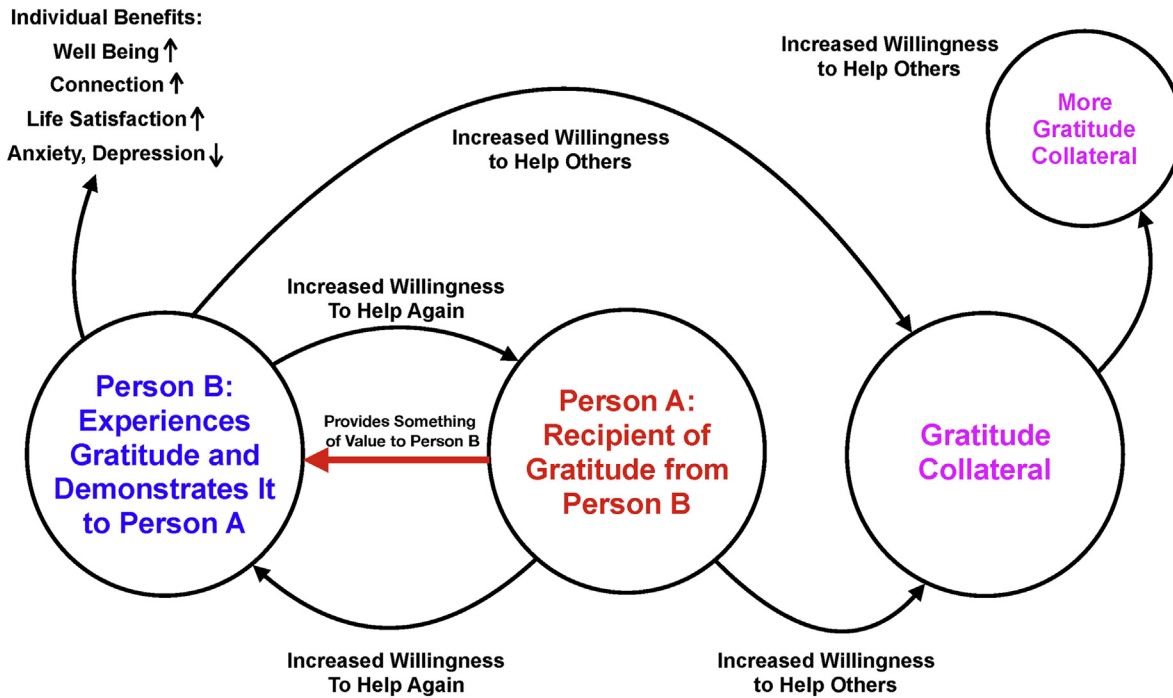


Figure 1. Person A provides something of value to person B who, by expressing gratitude, initiates gratitude's upward spiral.

Gratitude can be practiced one of 4 ways. The first is by contemplations that involve intentionally cultivating awareness and recognition of those things in life that bring personal rewards, such as family, work, relationships, and other more ephemeral qualities such as awe in response to one's life and place in the universe.

Second is a gratitude journal where one writes a small list of things one is grateful for, typically every day. The contemplation and journal methods are individual efforts that cultivate a more consistently grateful orientation in life thereby promoting gratitude's mental and health benefits.

The third and fourth methods are active demonstrations of gratitude directed at the person or persons that created a positive impact by (1) writing a gratitude letter (or card or email) and then sending it or reading it to them, and (2) demonstration of gratitude directly to the person (appreciation). These last 2 practices have the added benefit of positively impacting another person.

Regardless of the type of gratitude practice, the important thing is to bring the right intention. Mindlessly writing in a journal without reflection or proffering a hollow thank you or contrived appreciation is at best a waste of time and at worst ringing the hollow bell of "have a great day" like psittacisms. For contemplations or journaling, success depends on creating the time (5-10 minutes is all that is necessary) to reflect on the things that one feels grateful for. In writing a letter or offering a thank you or appreciation, it is important to be specific and to acknowledge the effort or sacrifice the person made and to make it clear what it meant to you personally.

Fostering a practice of gratitude by any of 4 the methods increases overall life satisfaction and hope and decreases anxiety and depression.³⁰ Within a social

context (family or work), the practice of gratitude has a powerful positive prosocial impact (Figure 1). Specifically, the act of writing a letter or showing appreciation of others impacts the recipient of gratitude in 3 ways: (1) it increases their sense of self-efficacy or confidence, (2) they feel valued, and (3) it diminishes their fear of rejection and mistakes, all of which greatly foster an increased willingness to help others in the future (gratitude collateral) and to again help the original giver of gratitude.^{31,32}

Gratitude's effects on individual well-being combined with its relationship-enhancing impact on the dyad of gratitude giver and recipient and its proven ability to significantly foster increased helping behavior within the dyad and outside of the dyad, spreading as a collateral effect, make the practice of gratitude a vital personal and professional leadership practice.

Self-Compassion

"A moment of self-compassion can change your entire day. A string of such moments can change the course of your life."

—Christopher Germer

This practice may be both one of the hardest paradigm shifts for a surgeon to accept and one of the most important because of its enhancement of psychological well-being and resilience and because of its value as a leadership skill, especially in the world of medicine. Self-compassion (SC) shifts the focus on our shortcomings, struggles, and mistakes from shame, self-criticism, and rumination to one of emotional resilience.³³

How does SC work? Imagine that you are helping a friend or close person deal with a failure or personal

Table 2. Impact of Practicing Self-Compassion in 4 Areas of Emotional Difficulty

Emotional Difficulty	Effect of Self-Compassion	Behavioral Outcome
Emotional labor	Increased authenticity	Increased personal power
Anger/fear/disgust/shame	Decreased threat	Increased calm
Isolation	Increased compassion	Increased connection
Fear of failure	Increased motivation	Increased engagement

struggle in their life. Most of us would readily provide emotional support and try to help in any way possible, all while recognizing that the very same issues could haunt us at some point. SC turns these compassionate helping behaviors 180 degrees onto ourselves.

First, a word about empathy vs compassion. Empathy is the process of resonating with another’s emotional state, be it negative or positive. Empathy for emotional or physical pain elicits the same feelings being experienced by another through activation of the same brain regions, the anterior insula and anterior middle cingulate cortex. Empathic distress results from overidentification with the sufferer and can generate a strong sense of aversion and a desire to withdraw to avoid negative feelings.

Compassion—a feeling of concern for another’s suffering coupled with a desire to help—is an antidote and preventative for empathic distress. Because compassion operates through a neural network distinct from empathy that is related to positive emotions and prosocial behavior (spanning the medial orbitofrontal cortex and striatum), activation of this network can derail the development of empathic distress.²⁵

Thus, in the face of a perceived or real failure, mistake, or personal shortcoming, our threat system is activated along with the entire cascade of physiologic stress-related processes. Internal self-criticism and self-flagellation stokes the fires of this process, and if allowed to drift into a ruminative state, keeps the chronic stress response in high gear. SC is the antidote. By consciously activating our neurologic compassion circuits, the threat response is diminished, allowing more rapid recovery and ultimately, a more emotionally and cognitively balanced approach to the actual problem.

The practice of SC involves 3 distinct internal operations that can be developed into a habit³⁴:

1. Mindfulness—the recognition of painful thoughts (self-criticism and flagellation) and emotions associated with the failure or mistake and separation of self from one’s thoughts and emotions, thereby preventing overidentification with them,
2. Common humanity—the recognition of our common human nature and struggles, putting the brake on the tendency to feel isolated and shameful, and
3. A genuine desire to help and care for ourselves by stopping the self-judgment and instead treating ourselves with kindness by internally validating how we feel, talking to ourselves in a more encouraging manner, or doing an activity that brings us pleasure.

The habitual practice of SC has been consistently shown in multiple studies to increase the ability to

effectively deal with significant life stressors, to enhance perspective taking and forgiveness, to lower levels of anxiety, depression, and burnout, and to decrease cortisol and other markers of inflammation.^{34,35} An additional mechanism of SC’s effects is through the enhancement of one’s authenticity—the subjective feeling that one is currently in line with one’s inner values, attitudes, traits, and emotions.³⁶ Incongruent experiences between one’s inner self and outer expression are a form of emotional labor and are associated with anxiety, depression, and lack of trust and connection in relationships. SC is a prime cultivator of authenticity by reducing fear of being negatively evaluated and minimizing shame, both of which can constrict and pose barriers to authenticity.

A misconception about SC is that it will lead one to be soft by stealing the harsh internal critic thought (incorrectly) to be so necessary to improve or change. Just the opposite occurs. Harsh internal criticism, just as is true of harsh external criticism, creates stress, fear, and avoidance, whereas SC, through the process of acceptance and forgiveness does just the opposite,³⁴ thereby fostering a greater willingness to step up to the plate and improve.

SC, like gratitude, is also a powerful leadership skill (Table 2). By serving as an antidote to internal negative emotional states, SC turns emotional challenges into positive outcomes of greater value. Finally, because practicing SC naturally fosters the practice of compassion for others, it is a critical piece of our effectiveness as clinicians and of our ability to find joy in medicine.

Connection to Others

“People organize their brains with conversation. If they don’t have anyone to tell their story to, they lose their minds. Like hoarders, they cannot unclutter themselves. The input of the community is required for the integrity of the individual psyche. To put it another way: it takes a village to organize a mind.”

—Jordan Peterson

Loneliness is a river of misery whose banks are overflowing into our modern world, despite our being more “connected” electronically than ever. In an entire issue of the *Harvard Business Review* dedicated to loneliness in the workplace,³⁷ former Surgeon General Vivek Murthy notes that loneliness is increasing dramatically due to more people living apart from family and friends, increased time spent in front of computers, and the increasing and relentless distractions of our digital world. Surgeons are not immune to the centrifugal forces pulling us apart, and the loss of the doctor’s dining room in many hospitals is another nail in the coffin of connection.³⁸

Social loneliness—the lack of friends and colleagues—is not typically an issue for surgeons because we often have friends and colleagues at work and in our medical societies. These relationships, although valuable, often lack the depth of connection and trust that is so necessary for our emotional and physical health. Instead, the real (and usually unspoken) problem is emotional loneliness (EL)—the absence of someone in our lives who can serve as a nurturing confidant and who can affirm the value of our existence.³⁹

Surgeons are at high risk for the pernicious impact of EL due to (1) the demands of having to always be “on” or at the top of their game and the emotional labor that is required to maintain that state, (2) a cultural milieu that necessarily values self-sufficiency and ability to endure regardless, (3) the inculcated sense, starting in residency, of EL as being weak and a character flaw, (4) the ubiquitous fear of professional consequences if one were to reveal significant personal struggles and challenges, and (5) a lack of confidants who are trusted and who value us that are a safe haven where these personal struggles and challenges can be completely unpacked. The end result of these forces is that surgeons often suffer in silence or the suffering comes out sideways.

EL involves painful feelings of isolation and disconnection from others or a more vague and recurring gnawing sensation of chronic distress. EL can manifest as symptoms of depression or sleep disturbances and may lead one to seek relief through substance abuse.⁴⁰ The challenge is recognizing the symptoms for what they are. Unfortunately, in the hectic and demanding life of a surgeon, that gnawing sensation or chronic distress is often ignored, tolerated, or falsely attributed to a range of other possible causes. Even when EL is recognized, it may of necessity be swept aside because of a feeling of being trapped by the realities enumerated previously. Unfortunately, EL tends to beget more EL, because lonely people tend to withdraw and isolate more, compounding the entire process.³⁹

EL is not just a benign feeling of no consequence. The need for social connection is baked into our genes. Evolutionarily, as hunter-gatherers, we had to work together to find food and raise offspring (ie, to survive).¹² Thus, EL or experiencing significant criticism, rejection, or feeling marginalized, or all of these, is physiologically registered as a life threat with increased cortisol levels, amygdala activation, activation of areas of the brain implicated in aversive aspects of pain,⁴¹ and diminished high-frequency heart rate variability, an index of parasympathetic control of the heart.⁴²

Positive social interactions—positive comments, conversation, physical touch—are so salubrious in large part due to their stimulation of oxytocin secretion by the posterior pituitary. Oxytocin not only increases trust, collaboration, social perception, and social cognition⁴¹ but also plays a major role in the modulation and recovery from stress. Indeed, through its ability to increase high-frequency heart rate variability, oxytocin may be part of the mechanism through which positive social support affects cardiovascular health.⁴²

The long-term health consequences of chronic EL are equivalent to smoking 15 cigarettes daily and are even greater than obesity. EL significantly increases the risk of cardiovascular disease, anxiety, depression, and dementia. It also limits creativity and impairs other aspects of executive function, such as reasoning and decision making, thereby impacting work performance.^{37,40} Because of its often vague and nonspecific symptoms, EL may be a significant “hidden” or “unrecognized” contributor to emotional and workplace performance problems.

The solution to EL is recognition and connection. First, mindfulness meditation can improve recognition and acceptance of EL and promote equanimity with negative emotions, which can generate a greater willingness to engage with others in daily life.⁴³

Second, everyday prosociality is a powerful antidote to EL. By intentionally developing the habit of being a giver—someone who is nice when interacting with others, who takes the time to have lunch with a colleague, who offers unanticipated praise, or who engages in conversation with another person about their life—one can dramatically boost their sense of connection and happiness. Recipients of everyday prosociality are nearly 300% more likely to engage in similar behaviors, thus spreading the prosocial contagion and improving workplace or family culture.⁴⁴

Third, joining a group outside of work and family may be one of the most powerful antidotes to EL. Creating a group of 6 to 10 committed people who meet regularly in strict confidence and who can talk with open vulnerability not only provides a safe space to talk candidly about one’s personal and professional struggles but can also be a vehicle for personal growth and change. The Mayo Clinic initiated a Compass program (Colleagues Meeting to Promote and Sustain Satisfaction) where groups of 6 to 10 physicians met twice a month for more than 6 months, led by a trained facilitator.⁴⁵ The program was effective in improving meaning and engagement and in reducing some domains of burnout. Ninety-five percent of the participants found the groups valuable and wanted to continue.

Another example is the Authentic Connections Groups formed for women physicians at the Mayo Clinic in Scottsdale, Arizona.⁴⁶ In a randomized trial of a weekly 1-hour structured relational group session compared with physicians spending protected time as desired, Luthar and colleagues⁴⁶ found that women in the structured group at the 3-month follow-up had significant reductions in depression, other global symptoms, and parenting stress, all accompanied by significant reductions in cortisol levels, while simultaneously experiencing an increase in self compassion, feeling loved, and physical affection.

In conclusion, as cardiothoracic surgeons, we are inherently in a leadership position in all facets of our professional and personal lives, be it in the clinics, operating room, meetings, or with our loved ones. Much like the technical skill and habit development over time that allows us to become superb surgeons, the intentional cultivation of these habits is a foundation of our ability to

thrive and generate a more cohesive force of awareness, kindness, optimism, and compassion, all while simultaneously holding onto our demand for excellence in all that we do.

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