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Mindfulness in Anesthesia: A Safety and Satisfaction Initiative

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Mindfulness in Anesthesia: A Safety and Satisfaction Initiative

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LESSON OBJECTIVES

Upon completion of this lesson, the reader should be able to:

1. List the causes and consequences of stress in anesthesia.
2. Identify the causes and consequences of mindlessness.
3. Define and describe the qualities of mindfulness.
4. List the evidence-based benefits of mindfulness.
5. Assess evidence for mindfulness-based improvements in patient safety.
6. Define mindlessness.
7. Assess evidence for mindfulness-based improvements in patient satisfaction.
8. Describe how mindfulness leads to satisfaction for anesthetists.
9. Perform basic, effective mindfulness techniques.
10. Integrate mindfulness techniques into your professional life.

Current Reviews for Nurse Anesthetists[®] designates this lesson for 1 CE contact hour in risk management/patient safety/medical errors.

Introduction

The perioperative environment is mentally and physically challenging, both for the patient and for the anesthetist. Anesthetists continuously encounter stressors, distractions, and the need to multi-task. The consequences of these events are fatigue, depression, disengagement, suicide, and burnout. The rates of depression and burnout among anesthesia providers are 42% and 48%, respectively!

While its roots are in Buddhist meditation, in recent years, a secular practice of “Mindfulness” has entered the American mainstream culture. In part thanks to work by Dr. Jon Kabat-Zinn at the Uni-

versity of Massachusetts Medical School, religious groups, universities, businesses, government agencies, schools, hospitals, prisons, and the military, now offer training in mindfulness meditation. Thousands of studies documenting physical and mental health benefits of mindfulness have inspired many corporations, including Fortune 500 companies such as Raytheon, Proctor & Gamble, General Mills, and Comcast to provide specific training in mindfulness. This lesson will explore various dimensions of mindfulness, both in general and specifically related to anesthesia providers, and introduce practical methods to incorporate mindfulness into your personal and professional life.

Mindlessness

Before we discuss what mindfulness is, let's investigate what mindfulness is not. The opposite of mindfulness is mindlessness (Table 1). We inherently know mindlessness because we spend much more time in this state of mind. Mindlessness is characterized by a feeling of being on autopilot. It occurs when we follow routines, have automatic behaviors and habitual thinking, termed premature cognitive commitments, maintain a single-perspective view, or think in absolute terms. These ritual patterns lead to errors, pain, boredom, and unhappiness. **Mindlessness occurs when people are multi-tasking, distracted, stressed, depressed, overloaded, and pressured; typical day in the life of an anesthetist.**

You most likely have experienced one or more of the following: rushing through setting up your anesthesia workstation, mis-programming an infusion pump, breaking or spilling a medication vial, surprise when a surgery is over and the sevoflurane is still above 3.5%, forgetting a patient's name almost immediately, snacking on chips without being aware that you've just finished the bag, or missing a freeway exit. These distractions represent mindlessness.

The old expression that practice makes perfect may also be viewed as "practice makes mindless." We become mindless when we encounter familiar structures and rhythms. A funny story is called a...joke. The sound a frog makes is a...croak. A kind of tree is called an...oak. If you have no money than you are...broke. The white of an egg is known as ...yolk??

It requires less mental effort to stereotype and categorize. Another common example of mindlessness is preoccupation with the future or the past. Dreaming about tomorrow or reflecting on yesterday

distracts from the present moment. This is often manifested as being outcome-centered and concerned with failure, rather than process-centered. In other words, a preoperative focus on postoperative outcome with little regard to the intraoperative course is a mindless outlook.

What are the costs of mindlessness (Table 1)? Mindlessness results in errors. These may be errors in judgment, errors by omission, even errors due to lack of knowledge resulting in medical mistakes, car accidents, etc. Mindlessness leads to learned helplessness—the sense of futility determined by unsuccessful past experiences. Mindlessness is also associated with: hurting others (such as an obedience to authority), loss of personal control (by the absence of intelligent choices), unsatisfactory relationships (lack of bonding and poor attention), as well as self-imposed restrictions that limit our self-actualization. Mindlessness may also be a root cause for many deviations from professional behavior.

Mindlessness is a detrimental and even dangerous mode of thought.

The operating room is often compared to a cockpit and anesthetists analogized to pilots. However, most current physiological monitoring alarms in the operating room and intensive care unit do not provide predictive information or localize complications. Rather, they are constructed to identify thresholds. In light of fluctuations in physiologic rhythms and individual variability, false alarms are frequent. Not surprisingly, high false-positive rates render many alarms ineffective. An increasing volume of acquired data correlates with an increased likelihood that important data will be missed or considered erroneous. We often ignore alarms in an

Table 1
Mindlessness

Causes	Consequences
Habitual thinking	Errors
Routine behaviors	Learned helplessness
Autopilot	Hurting others
Multi-tasking	Loss of control
Distracted	Poor relationships
Stresses	Self-imposed limitations
Premature cognitive commitments	Poor professional behavior
Single perspective	Boredom
Thinking in absolutes	Pain
Future/past oriented	Unhappiness

attempt to control information overload and limit unnecessary sensory input. Input from one sensory modality may impede others, such that auditory processing interferes with visual input processing—like reading the same paragraph over and over again while you are simultaneously listening to the radio. This phenomena is made worse if simultaneous activities are very similar, suggesting competing demands on shared processing or neural systems.

It is estimated that information overload costs the United States economy over \$900 billion per year. Completing any given task without interruption is highly unlikely. Information overload lowers innovation, productivity, comprehension, and concentration.

Clinical judgment, which comes from various sources of information, is a consequence of integrating both explicit and implicit knowledge. Explicit knowledge is that which can be quantified, communicated, and easily formed into clinical practice guidelines. Implicit (tacit) knowledge, being intuitive and instinctual, is founded on skills, values, and experiences. During the decision-making process, the brain rapidly discerns changes and prioritizes prominent features before the content of the perception is actually analyzed. Clinical skills, such as turning the APL valve slightly during an inhalational induction or when observing paradoxical chest wall movement, or reducing the volatile anesthetic concentration in the presence of hypotension, involves tacit knowledge and preattentive processing. Accessing this information requires attentiveness and awareness (mindfulness).

Information overload costs the United States economy over \$900 billion per year.

Mindfulness Is Not Vigilance

Vigilance is the ability to sustain attention and alertness over prolonged periods of time. Increasing use of technology may lead to vigilance decrement (deterioration with time). Studies employing positron emission tomography (PET), functional magnetic resonance imaging (fMRI) and transcranial Doppler sonography (TCD) during signal discrimination experiments, showed declines in activity in the prefrontal cortex. However, subjects performing vigilance tasks have higher levels of epinephrine and norepinephrine, consistent with high stress levels, which would not be the case if vigilance decrement resulted from less brain activity. While vigilance tasks are stressful, mindfulness is energy restoring. Vigilance is increased by amphetamines, practice, performance feedback and rest. In contrast, mindfulness is enhanced by learning and specific exercises.

Mindfulness Is Not Concentration

Concentration is a foundation of mindfulness; however, mindfulness embodies a broader function.

Table 2
Characteristics of Mindfulness

- **Openness**
- **Curiosity**
- **Flexibility**
- **Acceptance**
- **Non-judgmental**
- **Present-centered**
- **Awareness**
- **Receptive to new data**
- **Multiple perspectives**
- **Process over outcome**
- **Create new categories**
- **Planning for possibilities**

Concentration is exclusive, while mindfulness is inclusive. An example of the differences between concentration and mindfulness is a study by Simons and Chabris (view on YouTube.com). Two groups of people pass a basketball around. While subjects count bounce passes vs. aerial passes, a man walks through the scene wearing a gorilla suit. About 50% of subjects do not notice the gorilla. While concentration helps acquire information, it restricts contextual perception.

Mindfulness Is Not Relaxation

While mindfulness is a form of meditation, it is not a form of relaxation. During mindfulness meditation, the electroencephalogram (EEG) of Buddhist monks showed long-distance phase synchrony (suggesting neural coordination) and very high amplitude gamma activity. Students using mindfulness, showed lower salivary cortisol and higher salivary IgA concentrations following psychological stress than did students who focused on relaxation.

Mindfulness Is Not Mind Fullness

Mindfulness practices were inspired mainly by teachings from the Eastern World, particularly from Buddhist traditions. Mindfulness is one of the eight elements of the Noble Eightfold path taught by Siddhartha Gautama, who founded Buddhism c. 500 BCE. It has since been widely adapted in secular settings, independent of religious or cultural contexts. In 1979, Jon Kabat-Zinn founded the Mindfulness-Based Stress Reduction (MBSR) program.

Mindfulness

Definition of Mindfulness

Mindfulness has been defined as, "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally, as if your life depended on it." Or "A kind of non-elaborative, non-

Table 3
Faulty Thinking—Mindlessness

- **Anchoring errors**
- **Lack of focus**
- **Distractions**
- **Inadequate communication**
- **Boredom and fatigue**
- **Slips in attention**
- **Lapses in attention**

judgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is.”

A proposed two-component model consists of: 1) Self-regulated attention; attending to the changing fields of objects (thoughts, feelings, sensations), from moment to moment. Maintaining awareness on immediate experience allows increased recognition of mental events in the present moment. 2) Orientation to experience; maintaining an attitude of curiosity, openness, and acceptance. **My definition of mindfulness is: intentionally paying attention with a non-judgmental and curious attitude as if many lives depended on it... because they do!**

Normally, our minds are full of “stuff.” We ruminate, and much of that rumination is focused on the past or on the future. Mindfulness focuses our brains on what is being sensed at each moment for the purpose of becoming more aware of one’s own mental processes, listening more attentively, enhancing flexibility, and recognizing bias and judgments.

Characteristics of Mindfulness (Table 2)

Harvard Psychologist, Ellen Langer has identified several characteristics of mindfulness including: 1) Create new categories. Rather than having pre-conceived categorization, do not categorize or continuously form new categories as new data is examined independently. 2) Receptive to new data. A non-biased openness to novel information. 3) View situations through several perspectives. This entails flexibility and being aware of others’ views and perspectives. 4) Valuing process over outcome. Being process-driven rather than focused on just the end result.

Mindfulness-based Safety

Patient

The Institute of Medicine estimates that one medication error occurs per hospitalized patient per day; approximately 1.5 million *preventable* adverse

drug reactions per year. Each year in the United States, 100,000 people die from medication errors and the same number from hospital-acquired infections. More Americans die *each month* of preventable medical injuries than died in the Sept. 11, 2001 terrorist attacks. **One way in which mindfulness improves clinical practice is by reducing medication errors.** The medical education system encourages a state of mindlessness in that we are taught to regard learned facts as *unchanging* and *absolute* and to commit patients to preconceived schema and categories. Doubt and uncertainty are not well tolerated. Most misdiagnoses are due to faulty thinking (Table 3) rather than lack of knowledge, which fortunately may be reduced by mindful practices.

High reliability organizations (HROs), such as nuclear power stations, the airline industry, and aircraft carriers, effectively manage innately risky technologies and complex environments, thus serving as models for reducing errors. Within these organizations, employees maintain a high level awareness of *processes*, view problems through *multiple perspectives*, think in terms of failure rather than success, continuously try to identify how things might go wrong, and plan for possibilities. HROs are resilient, improvise, and use “out-of-the-box” thinking. Each of these characteristics is firmly embedded within the context of mindfulness. In medicine, we often take the opposite approach, assuming things will go well. When I take a patient into the operating room to deliver an anesthetic, I assume a successful outcome. Acknowledging that the administration of anesthesia is very safe may actually undermine my ability to remain mindful and consequently decrease patient safety.

Mindfulness is related to, yet distinct from vigilance, concentration, relaxation, and mind fullness.

“Anesthetists are attentive,” yet physical presence in the operating room is insufficient for optimizing patient safety. Mindful presence is paramount. Anesthetists are challenged to detect subtle physiologic changes. Attention greatly improves our ability to perceive fluctuations in a stimulus, while fluctuations in attention have detrimental effects on performance. Dr. Atul Gawande has written about the importance of performing checklists. However, the power of checklists in reducing errors and adverse events is dependent on their mindful completion.

“Anesthetists are proficient multi-taskers.” We listen to, read, think about, and co-process multiple bits of information simultaneously. Sadly, multitasking, especially during complex and potentially dangerous tasks, leads to slower and less accurate performance. When attention is divided

between two concurrent processes, the performance cost is increased reaction time. People who are regularly bombarded with several streams of electronic information do not pay attention, control their memory, or switch from one task to another as well as those who prefer to complete one job at a time. Those that view themselves as adept at multi-tasking have a difficult time filtering out relevant information and are less efficient at arriving at solutions. Dual reaction time tasks engage additional cortical regions that are not activated by the component tasks. An essential component in the ability to differentiate between relevant and irrelevant information is working memory capacity. In order to retain information in working memory, it is necessary to ignore surrounding interfering stimuli. Mindfulness improves working memory capacity and increases gray matter (Table 4). Being mindful allows anesthetists to better observe patients' responses while remaining focused and aware throughout their care.

Mindful practice enhances patient safety by reducing medical errors and improving patient-centered care.

Anesthetist

Borrowing from Alcoholics Anonymous of when not to drink, the acronym HALT is used: Hungry, Angry, Late or Tired. Similarly, the Federal Aviation Association risk management handbook, uses the acronym IMSAFE for when not to fly an airplane—Illness, Medications, Stress, Alcohol, Fatigue, or Emotional. The commonality between each of these situations is that they all enforce mindlessness.

Mindfulness reduces the incidence of medical errors. Maintaining sterility, using infection precautions, and avoiding needle stick injuries are more easily accomplished when fully aware and attentive to your tasks and surroundings. Anesthetists are also safer, in a medico-legal sense, when patients are safer. When the patient has an uneventful peri-operative course, there are fewer legal repercussions and negative communications from patients, surgeons, colleagues and administration. As mindfulness increases job satisfaction (see below) and decreases errors, it concurrently improves job safety.

Mindfulness-based Satisfaction

Patient

When you are fully engaged in communicating with others, relationships are enhanced and more fulfilling. Patient satisfaction with the doctor-patient relationship and confidence in the anesthesia provider helps produce a smooth and healthy peri-operative course. Communication, rather than outcome, is one of the leading factors in both patient satisfaction with care and a patient's decision for taking legal action. Mindfulness-mediated improvements in patient safety concomitant with reductions in error rates will necessarily enhance patient satisfaction.

Anesthetist

Decreased mind-wandering is a better predictor of happiness than the activities in which you are engaged. During high baseline attentiveness, activities are more fulfilling. Intrinsically pleasant experiences (food, sex, critical OR cases) are more intense and satisfying, while ordinary experiences (washing dishes, commuting, cleaning, "bread

Table 4
Increases in Gray Matter with Short-term Mindfulness Practice
(8 week MBSR course + average 27 minutes/day)

Brain Region	Function
Hippocampus	Cortical arousal and responsiveness. Regulation of emotion.
Insula	Conscious awareness. Morphological/functional changes (not after 8 weeks).
Posterior cingulate cortex	Self-awareness. Self-related thinking, intrinsic control and memory.
Temporal parietal junction	Conscious experience of the self. Social cognition, and compassion.
Lateral cerebellum/ cerebellar vermis	Regulates appropriateness of cognitive and emotional processes.
Brainstem (locus coeruleus, nucleus raphe, pontsegmentum)	Norepinephrine and serotonin systems. Modulates arousal, attention, stress response, well-being.

& butter” cases) are more vibrant and fascinating. Can you imagine—no boring cases? Several benefits associated with life satisfaction are listed below (Table 5).

- **Mindfulness and physical health:** After just eight weeks of training, mindfulness meditation boosts our immune system’s ability to fight off illness. Mindfulness also helps slow the aging process, prolong life, and has been a valuable treatment for fibromyalgia, psoriasis, and pain.
- **Mindfulness and mental health:** Mindfulness increases positive emotions while reducing negative emotions and stress. Indeed, it may be as good as antidepressants in fighting depression and preventing relapse. Mindfulness correlates with self-esteem, self-acceptance, and general well-being.
- **Mindfulness and the brain (Table 4):** Mindfulness increases the density of gray matter in brain regions linked to learning, memory, emotion regulation, and empathy.
- **Mindfulness helps focus:** Mindfulness helps us tune out distraction and improves memory and attention skills.
- **Mindfulness reduces pain:** Mindfulness is an effective form of pain management: reducing negative somatic feelings and psychological distress while improving mood.

- **Mindfulness fosters compassion:** Mindfulness training increases altruism. It increases activity in neural networks involved in understanding the suffering of others.
- **Mindfulness enhances relationships:** Mindfulness correlates with marital satisfaction and improves communication.
- **Mindfulness and parenting:** Children of parents who practice mindfulness have better social skills, while the parents report being happier with their parenting skills and with their relationships.
- **Mindfulness and teaching:** Teachers trained in mindfulness have lower blood pressure, less negative emotions and symptoms of depression, and greater compassion and empathy.
- **Mindfulness and health care professionals (Table 6):** The practice of mindfulness has a variety of general benefits as listed above. In addition, mindfulness may specifically help health care professionals cope with stress, connect with their patients, develop leadership, and improve their quality of life.

Mindfulness-based therapies (MBT) and interventions are prevalent. A 2013 meta-analysis of 209 MBT studies involving over 12,000 participants, indicated MBT is superior to some treatments

Table 5
Mindfulness-based Satisfaction

Physical health	<ul style="list-style-type: none"> • Enhanced immunity • Slows aging, live longer
Mental health	<ul style="list-style-type: none"> • Enhance positive emotions • Reduce stress • Reduce depression • Improve well-being • More self-acceptance
Brain	<ul style="list-style-type: none"> • Increase gray matter (memory, learning, empathy, emotion) • Enhanced electrical connections
Focus	<ul style="list-style-type: none"> • Better memory and attention skills • Tune out distractions
Pain	<ul style="list-style-type: none"> • Less pain/negative somatic feelings • Improve mood • Reduced psychological distress
Compassion	<ul style="list-style-type: none"> • More altruistic • Appreciate others’ suffering
Relationships	<ul style="list-style-type: none"> • Marital satisfaction • Improved communication
Parenting	<ul style="list-style-type: none"> • Better social skills • Happier parental relationships
Teaching	<ul style="list-style-type: none"> • Teachers—more compassion, empathy, lower blood pressure, less negative emotions

Table 6
Benefits of Mindfulness
for Anesthetists

- **Improve efficiency and safety**
- **Healthy attitude to outcomes**
- **Better observe patients' responses**
- **Stay grounded/centered**
- **Improve relationships and communication**
- **Reduce stress**
- **Fortify openness to new information**
- **Boost clarity of thoughts**
- **Remain focused and present regarding your patient**
- **Reduce burnout**
- **Enhance performance**
- **Develop a sense of flow**
- **More empathy, compassion, caring**
- **Deepen insight and intuitive wisdom**
- **Enhance satisfaction with career/family life**
- **Improves physical well-being**
- **Increase resilience**

(psychoeducation, supportive therapy, relaxation, imagery), and as effective as traditional cognitive behavioral therapy (CBT). MBT was more effective in treating psychological disorders such as anxiety and depression, than it was in treating physical or mental conditions. A meta-analysis on the efficacy of various forms of meditation was commissioned by the US Agency for Healthcare Research and Quality. Mindfulness meditation programs improved multiple dimensions of psychological stress, including anxiety, depression, and general distress. Effects were comparable to what would be expected from the use of antidepressants or CBT in a primary care population.

Practicing mindfulness, even for a few weeks, brings physical, social, psychological and spiritual benefits.

Physicians are more likely to suffer burnout and be dissatisfied with work-life balance than comparatively educated, United States cohorts. **Physicians participating in a mindfulness program displayed more empathy, improved attitudes and decreased burnout.** Family practitioners in a similar program (8 weekly 2.5-hour sessions + one 7-hour session, then 10 monthly 2.5-hour sessions) showed enhanced mindfulness that correlated with improvements in mood, empathy, burnout, and per-

sonality factors (conscientiousness, and emotional stability). Health-care professionals participating in a mindful communication program showed sustained improvements in well-being and attitudes associated with patient-centered care.

Developing Mindfulness

Meditating

Meditating 30 minutes/day for 8 weeks increases gray matter in the hippocampus (learning, memory, and emotional regulation), temporal-parietal junction, and cortex (empathy), and cerebellum (emotion regulation).

- **Mindfulness is learned.** It is an acquired skill requiring mentoring.
- **Start with breathing awareness.**
- **Do not just notice, but really notice,** what you are sensing in a given moment—see, hear, smell, feel.
- **Tune into all of your body's physical sensations.**
- **Appreciate that your thoughts and emotions are evanescent.**
- **Practice mindfulness** while doing everyday activities (eating, walking, talking, intubating).
- **Be open-minded.** Assuming you know, means not considering new information.
- **Reduce automaticity,** continually create new categories and think outside the box.
- **Focus on process over outcome**—the entire perioperative course.
- **Be non-judgmental.** Remove emotions like patient bias.

Some Exercises Used in MBSR Programs

- **Body scan:** Focus attention at your toes and slowly move to the top of your head. Be aware and accepting of whatever you sense.
- **Walking meditation:** Focus on body movements as you take each step, feet touching and leaving the ground.
- **Loving-kindness meditation:** Extend compassion starting with yourself, then branching out to someone close to you, someone you respect, then to an acquaintance, then to someone with whom you have conflict.
- **Raisin exercise:** Use all your senses to observe a raisin, from how it feels to how it smells and tastes.

Anesthesiology-specific Mindful Practices

- **Patient-focused approach:** General anesthetic inductions are often not patient-focused. Be the leader in redirecting this focus.
- **Performing checklists, timeouts, double-checks:** Assume there is an error and try to be the first to find it. Listen to the timeout or go over the blood product labeling as if you have never seen it before.

- **Listening:** Each monitor, piece of equipment, and alarm has a distinct tone. We are experts at distinguishing between them yet fail to hear anything at all if our mind wanders. Listen, not just hear, every word spoken, every sound and the absence of sound in the operating room. Be aware of non-verbal cues and clues.
- **Scanning:** Every 5-10 minutes, start at the far left of the room and slowly scan across looking at *everything* in the room (clock, IV pole, catheters, tubes, monitors, pictures on the walls, surgical field, ventilator, anesthesia machine, everything). Doubt you have established optimum settings, micro-manage ventilatory parameters, calculate fluid shifts and blood volumes, refill vaporizers, restock IV supplies. These mental exercises will keep your mind active, involved, and focused on your patient. Scan the entire room within 5 minutes, so that you are ready to begin again.

Mindfulness is enhanced when practiced during typical daily activities, including in the operating room.

Summary

To incorporate mindfulness requires a paradigm shift. Anesthetists strive to be “experts.” Mindful practice requires maintaining a sense of curiosity, a “beginner’s mind,” open and allowing for new possibilities. Welcome uncertainty. “Difficult” patients become “interesting,” the “obstinate” surgeon is “dedicated,” and “unsolvable problems” become “research opportunities.” Through mindfulness use all available intrinsic and extrinsic data to improve decision-making. The anesthesia provider and patient benefit from greater safety and improved satisfaction inherent in a mindful perioperative environment.

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Tips for your Clinical Practice: Key Points

- **Mindlessness** is associated with judgmental errors, errors of commission and omission, and medical errors; it can be a root cause of professional behavior deviations.
- **Information overload** leads to focusing on one monitoring modality while shifting attention away from others. People bombarded with multiple electronic modalities do not pay attention, control their memory, or multitask as well as others who complete one job at a time.
- The Institute of Medicine estimates that 1.5 million **preventable errors** occur annually in hospitalized patients; 100,000 of these patients die of medication errors. Mindfulness can reduce this number.
- Process awareness rather than **focus on outcome** is a key element in patient management.
- The **mindful anesthetist** should maintain senses of curiosity and uncertainty (allows for new possibilities); difficult patients should be considered interesting and difficult surgeons dedicated.
- Allegedly **unsolvable problems** lead to research opportunities.

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MARK ONLY THE ONE BEST ANSWER PER QUESTION ON YOUR ANSWER CARD. MARK THIS PAGE AND KEEP FOR YOUR RECORDS.

In accordance with AANA directives, you must get 80% of the answers correct to receive one credit for each lesson, and "if there is a failure, there is no retaking".

POST-STUDY QUESTIONS

1. **Mindlessness often occurs when you are:**
 - A. Distracted.
 - B. Focused.
 - C. Attentive.
 - D. Alert.
2. **Consequences of mindlessness include:**
 - A. Enhanced concentration.
 - B. Improved vigilance.
 - C. More medical errors.
 - D. Greater patient satisfaction.
3. **Common causes of mindlessness are:**
 - A. Thinking out-of-the-box.
 - B. Focusing on process over outcome.
 - C. Being open-minded.
 - D. Habitual thinking.
4. **Characteristics of mindfulness include:**
 - A. Non-judgmental.
 - B. Premature cognitive commitments.
 - C. Habitual thoughts.
 - D. Following routines.
5. **The word(s) NOT associated with mindfulness are:**
 - A. Awareness.
 - B. Present-centered.
 - C. Curious.
 - D. Outcome-focused.
6. **The following characterize tacit knowledge:**
 - A. Explicit.
 - B. Quantifiable.
 - C. Intuitive and instinctual.
 - D. Easily formed into clinical practice.
7. **High reliability organizations (HROs) are characterized by:**
 - A. Mindlessness.
 - B. Single perspective view.
 - C. Thinking in terms of success.
 - D. Process-focused.
8. **Mindful practice is associated with:**
 - A. Increased work-related stress.
 - B. Improved immunity.
 - C. Decreased hippocampal gray matter.
 - D. Memory lapses.
9. **Anesthesia providers practicing mindfulness are likely to experience:**
 - A. More fatigue.
 - B. Less burn out.
 - C. Reduced empathy.
 - D. More conflicts.
10. **Developing mindfulness involves:**
 - A. Being aware of your surroundings, your thoughts and your feelings.
 - B. Perfecting the practice of multi-tasking.
 - C. Focusing on the outcome of every surgery.
 - D. Removing all doubt and relying on your assumptions.

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