Learning Environments and Mindfulness: The Inside Matters, Too.

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https://mindfulsurgeon.ucsf.edu
Nothing to disclose
Mindful Surgeon: Context

A Surgery Resident’s Day

**80 hour workweek**

- **4:30a** Wake up
- **5:30a** Hospital (Get numbers)
- **6-7a** Round
- **7:30a** OR
- **6-8p?** Round
- **8p** Home

2 days off in every 14 weeks off per year

5 years of clinical training

Discretionary Time

- **8:30p–4:30a** 8 hours
- **8 hours**

- **5 hours**

- **3 hours**

- **3 hours**
Mindfulness
Some definitions and background

A specific skill set:
• Interoception (recognition of thoughts, emotions and sensations in real time)
• Acceptance (emotional regulation, non-reactivity to stimuli)
• Meta-cognition (conscious awareness of cognitive control processes)

A formal curriculum:
• Derived from secular, codified Mindfulness-Based Stress Reduction (MBSR)
• Breathing, sitting, lying and moving meditation practices to teaching skills through EXPERIENCE
• Scientific background, exercises, home practice
Mindful Surgeon

Mindfulness-Based Stress Reduction (MBSR)

8 consecutive weeks
2hr class each week
20min/day formal practice
Mindful Surgeon

Multiple Iterations

Studies since 2016:

- Surgery Interns (n=40) longitudinal, pilot RCT
- Mixed-level surgery residents (n=18), cohort
- Surgery and Anesthesia faculty (n~70), SWT
- Surgical and non-surgical interns (n=45), pilot RCT

Mindful Surgeon: Longitudinal RCT

21 Interns
12 Intervention
9 Controls

Internship Begins *
June, 2016 Baseline
Mindfulness Training 8 wks
or Control

October, 2016 Post-

Internship Ends *
June, 2017 1-year f/u
Enhanced Stress Resilience Training

“ESRT”

Five Ways to Ritualize Formal Mindfulness Practice

1. RISE, PEE, MEDITATE (RPM)
   Practice when you first rise, before the day gets in your way. THREE dedicated minutes can change everything.

2. PEE, MEDITATE, BED (PMB)
   Try 3 MINUTES for 3 DAYS, morning or night, and see what happens.

3. INCLUDE YOUR PEOPLE
   Include your partner in a body scan, or Belly Breathing with your kids.
   Inhale deeply and slowly: imagine a balloon in your belly that expands when you inhale. Pause at the top of the inhale, and listen for your heartbeat. Exhale out of the nostrils, emptying the lungs of air. Focus on your body sensations for each moment, in silence.

4. MINDFUL WALKING
   Walk to or from any destination without doing anything else (no texting, talking, eating, etc.). See your surroundings, feel your footsteps and notice the muscles involved in motion. How does it feel to balance? Is it propel yourself forward? For 3, 5, or 10 minutes, you can mindfully walk quickly or slowly.

5. SCHEDULE MEDITATION TIME
   Like you’d schedule a meeting or exercise, schedule when you will meditate every day and protect it.

6. MAKE IT FUNDAMENTAL, NOT OPTIONAL
   Like brushing your teeth - if you forget, you notice all day and over time it’s unhealthy. Even when tired, brushing feels good. It’s fundamental, and people like being around you.

15 Informal Ways to Practice

<table>
<thead>
<tr>
<th>Morning</th>
<th>Work</th>
<th>Evening</th>
</tr>
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<tbody>
<tr>
<td>Frame the day: Consciously say something to yourself to begin your day (‘Focus’, ‘Joy’, ‘Ease’).</td>
<td>Rounding: Feel your footfalls as you walk the halls. Feel your jaw and shoulders. Is there tension? Can you release it?</td>
<td>Driving home: Just drive. Feel your seat, your shoulders, your hands. Take a breath. Does anything change?</td>
</tr>
<tr>
<td>Brushing your teeth or Taking a shower: Notice the bristles on your gums and the water hitting your skin. Try and just feel. Without thinking.</td>
<td>Standing at the bedside: Purposely shift the weight on your feet, or stand evenly on both. Notice the sensation of moving or being grounded.</td>
<td>While exercising: Be completely present in your body: Your breath, your sensations, the space around you. Can you recognize your thoughts? Notice your emotions?</td>
</tr>
<tr>
<td>First sip of coffee or tea: Notice the smell, the feeling in your mouth. How does your body respond?</td>
<td>Cleaning hands: Push dispenser and inhale; Rub hands and hold breath; Step forward and exhale.</td>
<td>Eating your evening meal: If you can, just eat fast or slow. Notice your hunger, the smell of your food, feel the texture and how your body responds. Try just eating for 3 minutes.</td>
</tr>
<tr>
<td>Stepping outside: Take a breath, look at the sky. Feel the temperature. What kind of day will this be?</td>
<td>Crossing Thresholds: in the elevator: Enter and inhale, hold your breath and ride, exhale when the doors open.</td>
<td>Bringing your work home: Notice if you are multi-tasking – how your focus shifts between family, self and work. How does it feel to do several things at once? Try just doing one thing, with your family or self, for 3 minutes.</td>
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Look around and take in your surroundings, focus on something you didn’t notice before.
Learning Environments – The Inside Matters

Overview:
Frame the Learning Environment

The Inside Matters

Why and How
• The Learner – mental training, cognitive load
• The Practitioner – well-being and performance
• The Institution – culture, reform and self-awareness

All interconnected, cross-influential
The Learning Environment

Complexity

Medicine is an *art* and a *science*

Physicians strive to be complex
- Intellect/Empathy
- Sacrifice/Guidance
- Humility/Strength

Historically, duality represents conflict
- Logic/Emotion
- Mind/Body
- Systems/Culture
Need for Evidence

*Linear vs. complex*

Mechanistic and linear approach
- Thinking, teaching, interventions
- Evidence-based medicine
- “Bench to Bedside”

Implementation is essential
- Behavior and culture are key
- Things get complicated

Nielsen, Behav Res Ther, 2018
The Inside Matters

*Critical inter-relationships*

- **Learners** – Emotion and cognition (cognitive load)
- **Practitioners** – Mind and body (perception and performance)
- **Institution** – Culture and systems (reform)
Why It Matters To All of Us

Broken relationships

Alcohol and substance use

Depression

Suicide

Decreased quality of care and increased medical errors

Decreased patient satisfaction

Decreased productivity and professional effort

Physician turnover
Why It Matters To Learners

- Burnout and stress
- Diminished learning, memory, decision making
- Decrements in executive function
- Changes in brain architecture

Liston, PNAS, 2009; Jha Emotion, 2010
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>MINDFULNESS</th>
<th>OR</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>EMO EXHAUSTION</td>
<td></td>
<td>0.24</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>DEPERSONALIZATION</td>
<td></td>
<td>0.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SEVERE STRESS</td>
<td></td>
<td>0.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HIGH ANXIETY</td>
<td></td>
<td>0.21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MOD-SEV DEPRESSION</td>
<td></td>
<td>0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SUICIDAL IDEATION</td>
<td></td>
<td>0.25</td>
<td>&lt;0.001</td>
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Naturally-occurring “mindfulness” makes a difference
Inside Learners: Emotion and Cognition

A static character trait? Or a skill to be developed?

MBIs: peak performance, prophylaxis

• Professional athletes
• Marines
• Urban School teachers
• Incarcerated youth

Why is adoption within Medicine so slow?

Jha, Emotion, 2010
Inside Learners: Cognition and Learning

- Effort
  - Manage the Intrinsic Load
- Purpose
  - Capitalize on the germane Load
- Noise
  - Reduce the Extraneous Load

Mental ‘Noise’ criticism, doubt, lack of focus (Stress)
Mindful Surgeon pilot RCT

2-fold greater increase in WMC
\[ \eta^2 = 0.20 \]

10-fold less decrement in CC
\[ \eta^2 = 0.16 \]

* Cohen’s d=0.91 is approximately equivalent to \( \eta^2=0.17 \)
Why It Matters To Practitioners

*Process-Centered Skills: Teaching the horse to drink*

- Stress, burnout and diminished satisfaction affect decision-making, patient care and career longevity

- More exercise, more money, changing institutions, may help, but external answers to our problems are not always possible or may take time

- Self-regulation is a skill broad applicability, making us more resilient, even as we strive for broader changes
Learned coping:

“Right now we use anger as a coping mechanism. It’s a very temporary fix, (and) doesn’t help anyone.

I think that anger and shortness are (culturally) learned behaviors in surgery.”

“… You start responding differently to the same stressors. You don’t necessarily like the person you’re becoming. The ED calls …and you’re immediately mad at them (although) they haven’t done anything.

Then you look back and think: “that’s not who I am; I don’t want to be that way.”
Why It Matters To Practitioners

Distorted thinking:

If I get stressed I tend to spiral in my mind. I start thinking I’m doing it all wrong, maybe I’ll never be good, maybe everyone else is already good.

It can spin out of control…

… I really like procedures, but my hands are always shaky... On OB,…vaginal repairs, (especially if I’m not) expecting it.

I feel surprised and nervous…I’m totally shaky! I see it, I feel it and my confidence erodes.
Inside Practitioners: Mind-Body Connection

Perception Effects Experience

Chronic or overwhelming stress influences:

- Burnout
- Psychological vulnerability
- Creativity
- Performance

A different way of training: *Experiential not intellectual*
Mindful Surgeon
Experiential Learning

8 consecutive weeks
2hr class each week
20min/day formal practice
Feasible and Acceptable

- High demand
- No attrition
- High attendance (11% vs 15% absences)
- Consistent and persistent home practice
- Broad integration

mean practice days/week = 5

mean minutes/day = 14.82
Mindful Surgeon, fMRI - BOLD

Emotional Regulation Task, whole brain analysis

- Interoception (Self-Awareness)
- Executive Control Hub (Emotional Regulation)

Unique areas of activation
Only in MBSR participants, post-intervention
Mindful Surgeon, fMRI - BOLD

*Emotional Regulation Task, ‘Region of Interest’ analysis*

When faced with emotional stress, MBSR group showed unique activation of brain regions considered to be neural substrates of problem-solving, emotional regulation and self-awareness.

Does increased activity correlate with enhanced capability???

“At work, I am much less reactionary to pages, nurse requests… I have somehow gained some ‘space’ between certain stimuli and my reaction to them.

I take a moment to understand my role and how it relates… improving my interaction with them, with my patients.”

“I thought I’d be learning a relaxation technique, but this is work. At first I thought it was sort of ridiculous, but it has changed me. ..changed how I think.

Before I go in the OR to update the chief - especially if I have something that will upset him - I do the breathing, I focus, and I am clearer, explain better, I’m not nervous.”
<table>
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<th>Self-confidence</th>
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<td>…I really like procedures, but my hands are always shaky... On OB,…vaginal repairs, (especially if I’m not) expecting it. I feel surprised and nervous…I’m totally shaky! I see it, and my confidence erodes.</td>
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<td>…<em>but this helped me take a second,</em> to see this response and note it. Now I can float back to the top and say ‘oh this uncomfortable, this is stressful – of course it is! This stuff is hard. For everyone.”</td>
</tr>
</tbody>
</table>
| …*I focused on my breath,* …one really deep breath, ..I FELT it, the focus, and all I heard was my senior. *My hands were still and I believe I did it better than ever.*  
*I didn’t know I could be present.* I always thought meditation couldn’t work for me, that I couldn’t do it, but now I see that I can. I do. |

Lebares, JAMA Surg, 2018
The Inside Matters: Culture and Reform

*Culture is Highly Influential*

Culture is an essential factor for any reform

Work hour reform
- Cultural shift (2003-2008)

Skills lab
- From closets to classroom and curricula

Quality improvement (OR safety)
- Depends on a shared ‘culture of safety’

Culture? Logistics? Need? Hurdles?

Inside Institutions: Culture and Reform

Key Interviews, Focus Groups, Field Notes

Skill set, professional mastery

Self-care IS patient care
Self care is a matter of service

Flexible expectations, try for a routine, use when you can
Less stress, better sleep
Infrastructure → Building Stakeholders

- Leadership Support
- Meetings and Demonstrated Value

- Knowledge of Evidence
- Evidence-Focused Grand Rounds

- Personal Experience
- Iterative Beta - Testing
Time

Protection

80-hour Work Week

Protection from Pagers

No Retribution for Participation

Strategic Planning and Scheduling

Educational Days

GR Summer Hiatus

Calling on Strong Leadership Support
Cosmology of Change
### Inside Institutional Reform

*Implementation Science and Complexity Theory Integration*

<table>
<thead>
<tr>
<th><strong>Task</strong></th>
<th>Tailored solutions and iterative processes</th>
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<tbody>
<tr>
<td><strong>Theory</strong></td>
<td>Understanding unpredictability, uncertainty, emergence, interconnection</td>
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<tr>
<td><strong>Intervention</strong></td>
<td>Anticipate complex interventions and complex settings</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Expect change in culture, politics, and characteristics</td>
</tr>
<tr>
<td><strong>Tools and methods</strong></td>
<td>Realist evaluation, long-term case study, stakeholder analysis, systems mapping, social network analysis</td>
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| **Research Aims** | Focus on turning evidence into practice  
Sustained improvements may depend on intervention adaptation |
Post-middle-east conflict—devastating PTSD and suicide rates

Unprecedented mandate to “Equip their minds”

Collaborated with Penn, pursued the evidence

Developed a system of mental training for resilience

First pilot in 2008, first longitudinal cohort 2009

Cornum, Amer Psychol 2011
Lester, Amer Psychol 2011
Summary

*The inside is critical*

- For addressing old problems in new ways and new problems in effective ways
- For improving ourselves – not as an onus, but as an opportunity
  - We didn’t adopt QI because we were sloppy
  - Or checklists because we were negligent
  - Or bundles because we didn’t know what to do
- We reform our practices and build new systems because we care about being *BETTER*
- To change ourselves, our behavior, our culture, our institutions, our systems, we need to understand the inside
Thank You