Mind Body Medicine
and pain

CDR Jeffrey Millegan, MD MPH
Disclosure/Conflicts of Interest

• There are no commercial conflicts of interest to disclose
• The opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.
• I am a military service member. This work was prepared as part of my official duties. Title 17, USC, § 105 provides that ‘Copyright protection under this title is not available for any work of the U.S. Government.’ Title 17, USC, § 101 defines a U.S. Government work as a work prepared by a military service member or employee of the U.S. Government as part of that person’s official duties.
• There is no external funding for this work.
What is Mind Body Medicine?

• Medical discipline based upon the inseparable connection between the mind and the body

• Unmanaged and overwhelming stress can turn into illness and dysfunction and possibly disease

• There are self-care modalities that can increase one’s capacity to manage stress and increase resilience
The Three Legged Stool of Mind Body Medicine
The Brain During Stress

- Amygdala control during stress conditions
- Emotional regulation
- Loss of prefrontal regulation
- Bottom-up attention
- Emotional habits
- Striatum
- Hypothalamus
- Amygdala
- Emotional associations
- Emotional reflexes
- NA, DA

Nature Reviews | Neuroscience
How Stress Affects the Whole Body

Central Nervous System
Perception - Narrowed
Memory - Coarse, Imprecise
Learning - Blocked
Conditioning - Defense
Tendency - Regress or Perseverate
Tone – Fight or Flight

Autonomic Nervous System
Heart rate increases
Blood pressure increases
Oxygen need increases
Breathing rate increases
Palms, face sweat
Blood sugar increases
Adrenalin flows
Digestive tract shuts down
Blood vessels constrict in hands, face

Muscular System
Tension
Ready for Action
Jaws Clench
Body Braces for Action
Comparing Normal and Maladaptive Responses to Stress

![Diagram showing stress response over time with two lines representing normal and maladaptive responses. The red line shows a higher and more frequent response to stressors compared to the green line, which indicates a more stable and lower response.]
Resiliency Self-Care Modalities

- A regular meditation habit
  - Mindfulness, yoga, mantra etc...
- Recuperative sleep
  - Sleep hygiene, positive sleep thoughts, creating a buffer zone
- Resiliency-building thought habits
  - Cognitive restructuring, positive psychology, finding meaning in adversity
- Social connection cultivation
- Diet/Exercise
Meditation

A unique, measurable state of the brain that is different from

- Stress
- Normal awake
- Sleep
The Benefits of Meditation

- Reduced heart rate, breathing rate, oxygen consumption (1-3)
- Reduced oxidative stress (4-5)
- Improved attention and focus (6-8)
- Changes in genetic expression (9-10)
- Increased positive emotion and reduce depression/anxiety (11)
- Increased compassion (12)
- Improved social connection (13)
- Improved emotional regulation (14)
Pain-specific Benefits

- Reduces pain-related brain activation (15)
- Reduced pain catastrophizing (16)
- Reduced self-reported pain disability (17)
- Increase compassion (12)
Pain-specific Benefits

- Reduces pain-related brain activation (15)
- Reduced pain catastrophizing (16)
- Reduced self-reported pain disability (17)
- Increase compassion (12)
Pain Catastrophizing

• This is
  • Tendency to magnify threat of pain stimulus
  • Feel helpless to pain
  • Inability to inhibit pain-related thoughts

• Associated with
  • Pain severity
  • CNS pain processing
  • Higher healthcare utilization
  • Disability/pain-related activity interference
Meditation Techniques with scientific evidence of benefit

- **BREATHE**
  - Diaphragmatic Breathing
  - Body Scan
  - Autogenic Training
  - Progressive Muscle Relaxation
  - Focused Meditation
    - Transcendental
    - Repetitive thought
    - Loving Kindness
    - Contemplation
    - Mantram Repetition
- **Mindfulness**
- **Imagery/Visualization**
- **Qigong/Tai Chi**
- **Yoga Stretching**
- **Repetitive Movement**
TWO BASIC STEPS OF MEDITATION

1. A mental focusing tool, such as watching your breath, or repeating a word, phrase, prayer or visualizing a soothing image.

2. A quiet, aware, ‘non-judging’ attitude, gently directing your mind back to your point of focus when you notice yourself caught up in other thoughts.
Increasing Scientific Evidence for Multiple Conditions

**Strong to moderate evidence**
- Cardiovascular disease (18, 19)
- Hypertension (20, 21)
- Insomnia
- Pain (23-33)
  - Chronic
  - Low back pain
  - Arthritis
  - Acute pain
  - Fibromyalgia
- Surgical outcomes (34, 35)
- Cancer treatment tolerance (36)
- Depression (11)
- Anxiety (11)

**Limited evidence**
- Allergies (37)
- Dermatological disorders (38)
- Diabetes (39-41)
- HIV progression (42, 43)
- Irritable bowel syndrome (44-47)
- Pregnancy outcomes (48)
- Chronic obstructive pulmonary disease (49)
- Tinnitus (50)
It also saves money (51)

- Total healthcare utilization reduction of 43% more than controls
- Reduces
  - clinical encounters by 41%
  - Imaging and lab by 50%
  - Procedures by 21%
  - ER visits from 3.6/yr to 1.7/yr
MBM for Pain: Seven Week Program

- **Session I:** Stress Physiology, Relaxation Techniques
- **Session II:** Building a Practice and Recuperative Sleep
- **Session III:** Mindfulness, Positive Psychology and Cognitive Restructuring
- **Session IV:** Qigong and Developing Cognitive Resiliency
- **Session V:** Yoga, the Power of Journaling and the Inner Critic
- **Session VI:** Enhancing Social Connection and Communication
- **Session VII:** Putting It All Together
Mind Body Medicine Course Results
Did you engage with the content and learn anything?

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often did you meditate over the last week?</td>
<td>0-1 day per week</td>
<td>3-4 days per week</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Comfort with meditation</td>
<td>Neutral</td>
<td>Comfortable</td>
<td>0.004</td>
</tr>
<tr>
<td>Understanding of meditation</td>
<td>Fair</td>
<td>Good</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Understanding of cognitive restructuring</td>
<td>Poor</td>
<td>Good</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Understanding sleep hygiene</td>
<td>Fair</td>
<td>Good to Very Good</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Understanding value of social support</td>
<td>Fair to Good</td>
<td>Very Good</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Mind Body Medicine Course Results

Functional Outcomes

• Statistically significant improvement (p<0.05) in:
  • Perceived disability from pain (12%)
  • Perceived stress (11%)
  • Sleep quality (8%)
  • Healthier coping with stress (11%)
  • Depression (10%)
  • Physical/psychological quality of life (10%)
Preliminary Healthcare Utilization and Opioid Use Analysis

- Oct 2017 Healthcare Cost Analysis
  - Case Control comparison of healthcare utilization costs for 9 months before MBM and 9 months after MBM (55 cases, 365 controls)
  - Average Net Cost Reduction of $1761 per chronic pain patient
    - Case: avg reduction of $745 per patient  Control: avg increase of $1016 per patient

- Jan 2018 Opioid Utilization
  - Case Control comparison of opioid utilization (Morphine Equivalent Dose [MED]) for 9 months before MBM and 9 months after MBM (55 cases, 365 controls)
    - Avg # of Patients on Opioid:  Case: 29% drop (14/mo – 10/mo)
    - Case: Avg MED reduced in half from beginning of study to end of study (37.5 to 18.6)
References


References


References


References

References


