Fibromyalgia & Gulf War Illness
Treatment Using Laser Stimulation of the Autonomic Nervous System

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Goals

• Brief review of history & epidemiology of fibromyalgia
• Discuss similarities and differences between fibromyalgia and widespread myofascial pain (and fibromyalgia and Gulf War Illness)
• Review autonomic nervous system dysfunction in fibromyalgia → resulting potential unifying neuroendocrinologic model of fibromyalgia
• Brief review of acupuncture’s autonomic effects
• Discuss how fibromyalgia and GWI can be treated via metal or laser needle stimulation of selected acupoints affecting autonomic nervous system
Fibromyalgia “Fun Facts”

- Widespread body pain affects ~3.6% of the US adult population
- Fibromyalgia prevalence ≥2% of the US adult population (>5 million)
- Prevalence estimates range up to 5%
- Similar prevalence in other countries

Fibromyalgia “Fun Facts”

- 1904 Gowers coined termed “fibrositis”
- 1945 Kelly describes local and distant referred-pain caused by “fibrositis” nodules
- History of fibromyalgia (aka fibrositis, tension myalgia, etc) closely intertwined
Oldest Description of Fibromyalgia?

“The evils of whole body impediment stay in the blood vessels, moving up & down along the channels... The wind, cold, and dampness settle in the flesh and compress the flesh, making the fluids coagulate to become froth. The froth is affected by cold and condenses. The condensation extrudes the textures of the muscles to make them split. The splitting causes pain... The evils can reach the Organs.”

Nei Jing, 200 BC

What Is Fibromyalgia?

• A syndrome (not a disease)

• Widespread tenderness in the trunk and extremities both anteriorly & posteriorly (11/18 points for 3 months in 3 body regions- per ACR)

• r/o definable (measurable) conditions
  (↑ sedimentation rate ↔ polymyalgia rheumatica, ↑ RF ↔ rheumatoid arthritis, ↑ TSH ↔ hypothyroidism)
No Clear Causation
↓
Frustrating For Clinicians To Treat!

What Is The Difference Between Fibromyalgia and Diffuse Myofascial Pain?
Similarities

- Widespread trigger points in the extremities and trunk
- Impairments in function related to same (up to 26.5% of those with fibromyalgia receiving disability)
- Sleep disturbances

Differences (Big)!

- 7:1 female to male ratio fibromyalgia (some report 8-9:1 ratio)
- 1:1 female to male ratio in chronic myofascial pain
- THE ASSOCIATED CONDITIONS
- 4-25 times more prevalent in individuals with fibromyalgia than in those not diagnosed with that condition
### Clinical Condition

<table>
<thead>
<tr>
<th>Clinical Condition</th>
<th>% Fibromyalgia Patients</th>
<th>% General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic headache</td>
<td>50%</td>
<td>5%</td>
</tr>
<tr>
<td>Dysmenorrhea</td>
<td>60%</td>
<td>15%</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>15%</td>
<td>2%</td>
</tr>
<tr>
<td>Interstitial cystitis</td>
<td>25%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Irritable bladder/ urethra</td>
<td>15%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Irritable bowel syndrome</td>
<td>60%</td>
<td>10%</td>
</tr>
<tr>
<td>Mitral valve prolapse</td>
<td>75%</td>
<td>15%</td>
</tr>
<tr>
<td>Multiple chemical sensitivities</td>
<td>40%</td>
<td>5%</td>
</tr>
<tr>
<td>Restless legs syndrome</td>
<td>30%</td>
<td>2%</td>
</tr>
<tr>
<td>TMJ syndrome</td>
<td>25%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Green Shade = Discussed in Epidemiology of Gulf War Illness

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### Similarities and Differences: Fibromyalgia and Gulf War Illness

- Fatigue, memory issues, muscle pain, bowel issues, rashes, multiple chemical sensitivities described in both
- Many conditions associated with fibromyalgia are not associated with GWI
- Women only slightly more affected than men in GWI (? fewer women in combat theater)
- Development of GWI has apparent relationship to chemical exposure(s)
Autonomic Nervous System (ANS) & Fibromyalgia

The missing link?

<table>
<thead>
<tr>
<th>SANS Effects</th>
<th>PANS Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>“fight or flight”</td>
<td>“rest and digest”</td>
</tr>
<tr>
<td>↑ alertness/vigilance</td>
<td>↓ alertness/vigilance</td>
</tr>
<tr>
<td>↑ heart rate and contractility</td>
<td>↓ heart rate and contractility</td>
</tr>
<tr>
<td>↑ breathing rate &amp; bronchodilitation</td>
<td>↓ breathing rate &amp; bronchoconstriction</td>
</tr>
<tr>
<td>↑ cardiac/skeletal muscle blood flow</td>
<td>↓ cardiac/skeletal muscle blood flow</td>
</tr>
<tr>
<td>↓ gut blood flow</td>
<td>↑ gut blood flow</td>
</tr>
<tr>
<td>↓ cutaneous blood flow</td>
<td>↑ cutaneous blood flow</td>
</tr>
<tr>
<td>↑ blood sugar</td>
<td>↓ blood sugar</td>
</tr>
<tr>
<td>↑ temperature</td>
<td>↓ temperature</td>
</tr>
<tr>
<td>↓ gut contractility</td>
<td>↑ gut contractility</td>
</tr>
<tr>
<td>↓ bladder contractility</td>
<td>↑ bladder contractility</td>
</tr>
<tr>
<td>↓ salivation</td>
<td>↑ salivation</td>
</tr>
<tr>
<td>↓ lacrimation</td>
<td>↑ lacrimation</td>
</tr>
<tr>
<td>↓ digestion</td>
<td>↑ digestion</td>
</tr>
</tbody>
</table>
ANS Physiologic Dysfunctions in Fibromyalgia

(as opposed to functions)

Autonomic Nervous System Imbalance in Fibromyalgia (relative degree of tonus)

<table>
<thead>
<tr>
<th>Clinical Condition</th>
<th>SANS</th>
<th>PANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraine</td>
<td>↑ initial phase</td>
<td>↑ later phase</td>
</tr>
<tr>
<td>IBS (diarrhea predominant)</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>IBS (constipation predominant)</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Interstitial Cystitis</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Raynaud’s-like phenomenon</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Aseptic Prostatitis</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Idiopathic Urethritis</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Skeletal Muscle Tone</td>
<td>↑</td>
<td>-</td>
</tr>
</tbody>
</table>

IBS= irritable bowel syndrome
SANS= sympathetic autonomic nervous system
PANS= parasympathetic autonomic nervous system
**Literature Support**

- Migraine (Petrouka, 2004)
- Irritable Bowel Syndrome (Mazur, 2007)
- Interstitial Cystitis (Pacak, 2001 in cat)
- Endometriosis (Possover, 2005)
- Idiopathic Urethritis (Husmann, 2006)
- TMJ Syndrome (Rodrigues, 2006)

All described elevated SANS pathogenesis!

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**Medications Demonstrating Efficacy for Fibromyalgia**

<table>
<thead>
<tr>
<th>Good Efficacy</th>
<th>Marginal Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregabalin</td>
<td>NSAID agents</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>Opioids</td>
</tr>
<tr>
<td>Duloxetine</td>
<td></td>
</tr>
<tr>
<td>Milnacipran</td>
<td></td>
</tr>
<tr>
<td>Cyclobenzaprine</td>
<td></td>
</tr>
</tbody>
</table>

NSAID = non-steroidal anti-inflammatory drugs
No One Has All The Answers!

Neuroendocrine Model of Fibromyalgia
Brain

Hypothalamus = Controller

Hypothalamus

• SANS and PANS responses of the organism are opposite in their effects
• Hypothalamus is the central nervous system site that controls the balance of these responses
• Circadian rhythms of sleep as well as appetite regulation, mood, and temperature also are regulated at the hypothalamic level
Hypothalamus

• SANS output from its posterolateral nuclei → interomediolateral nuclei of spinal cord

• PANS output from its anteromedial nuclei → vagus nerve

• Controls cortisol + catecholamine release through the HPA axis. *(SANS activation with slower onset and longer duration)*

• Controls descending inhibition of pain at the spinal cord dorsal horn through descending pathways from the rostroventral medulla, periaqueductal gray, and locus ceruleus

Hypothalamic Dysfunction in Fibromyalgia

• Systemic catecholamine release via the HPA axis +

• ↑ Hypothalamic SANS output to the interomediolateral cells of the spinal cord +

• ↓ Descending pain inhibition at the spinal cord level =

• Sensitization of primary nociceptors (and wide dynamic range neurons)
Clinical Research Support

- Plasma catecholamine concentrations are increased in patients with fibromyalgia

- Elevated catecholamine levels are associated with hyperalgesia

- Persistent hyperactive sympathetic nervous system (SANS) activity occurs in fibromyalgia (most apparent at night)

- Reduction in the stress response in those with fibromyalgia to a variety of stressors that predominantly affects corticotropin and epinephrine

- Blunted stress response and increased basal sympathetic hyperactivity may indicate an impaired ability to modulate the ANS, in terms of turning on and turning off the system

  “Alterations in hypothalamic function likely contribute to this impaired stress response”

Synthesis of Findings

• Chronic absolute ↑ activity of SANS output centrally
• → ↑ serum catecholamine
• → ↓ responsiveness of catecholamine to stress in fibromyalgia
• → ↓ responsiveness of corticotropin in fibromyalgia (↑ CSF levels of sP in fibromyalgia → ↓ CRH release)

Clinical Research Support

• ↓ release of the opioid β-endorphin, corticotropin, and cortisol (anti-inflammatory properties that may reduce pain)
• ↓ CRH neuron effect on hypothalamus and other central ANS sites’ effect on descending pain inhibition, including medullary catecholaminergic groups and locus ceruleus norepinephrine
Clinical Research Support

- Women have smaller increases in plasma catecholamines in response to exercise stress than men
- Women have smaller increases in corticotropin in response to a brief psychosocial stress
- ? Central reason for increased fibromyalgia in females

B-endorphin
Paleocortex Input to Hypothalamus

- Right insular cortex $\rightarrow$ sympathetic outflow to the hypothalamus
- Left insular cortex $\rightarrow$ parasympathetic outflow
- Orbitofrontal + medial prefrontal cortex areas $\rightarrow$ hypothalamus allows emotions to directly influence autonomic balance
- Amygdala integrates behavioral and autonomic responses from the somatosensory cortex and limbic system structures (medial prefrontal cortex, orbitofrontal cortex, cingulate gyrus, hippocampus, anterior & medial thalamic nuclei)
- Amygdala effect on hypothalamus inhibitory

Clinical Research Support

- Abnormally high metabolic activity seen in the thalamus, amygdala, hippocampus, cingulate gyrus, and other limbic system structures in fibromyalgia patients
  

- Psychological stress causes degranulation of mast cells (many estrogen receptor positive) $\rightarrow$ neurogenic inflammation
  
  Eutamene et al. J Physiol 2003; 553(3) 959-966
‘I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO’

Peripheral Mechanisms
**Neurogenic Inflammation**

- Physiologic phenomenon that occurs in vivo
- Efferent (antidromic) outflow from the spinal cord (dorsal root reflexes, or DRR) causes nociceptive C-fibers to release substance P (sP), calcitonin gene related peptide (cGRP), and somatostatin from their terminal axons
- → bradykinin, histamine, and serotonin release from local vasculature (plasma), platelets, & macrophages
- → further activate those nociceptive neurons
- = a local positive feedback loop results

**Peripheral Sensitization & Neurogenic Inflammation**

[Diagram showing the interaction between inflammatory and neural pathways]
Neurogenic Inflammation Effects

- Local edema → fibromyalgia nodules?
- Widespread neurogenic inflammation → widespread myofascial tenderness (fibromyalgia tender points?) without overt presence of inflammatory cells
- Neurogenic inflammation via dorsal root reflexes and the propriospinal pathways → ascending and descending sensitization of nociceptors in adjacent spinal levels → spread of pain and tenderness to wider areas of the body
- Sensitization of primary nociceptors → sensitization of wide dynamic range neurons in the deeper spinal cord lamina, which have much wider cutaneous receptive fields as well as afferent sensory input from viscera (visceral hypersensitivity?)

Research Evidence

- Active trigger points have markedly increased concentrations of inflammatory mediators
- Muscle sites (soleus) distant from those trigger points demonstrated lesser elevations of these inflammatory mediators (higher than normal)
- → central nervous system sensitization

Ascending Pathways

- Primary nociceptors relay through the lateral spinothalamic tract to the lateral thalamus to the somatosensory cortex to localize painful stimuli (neospinothalamic).

- Wide dynamic range neurons send afferent signals through the paleospinothalamic tract to the anterior and medial thalamus relay to limbic system structures which subserve the emotional and behavioral reactions to the painful stimuli (paleospinothalamic).

- Completes positive feedback loop.
Too Much Information!?  

Simplified Model

A Variety of Insults Can Initiate Positive Feedback Loop!
Gulf War Illness

- Veterans with highest pyridostigmine and pesticide exposure have greater incidence of GWI
- Dose dependent risk noted, both in number of days used as well as amount used
- PB exposure of 22 doses (usual dose for a week) associated with greater risk of GWI

Gulf War Illness

- Organophosphate pesticides → AChE inhibition
- Pyridostigmine bromide → AChE inhibition
- 33% DEET applicator and 75% lotion used in Gulf War (civilian 10-25%) - neurotoxic and works synergistically with organophosphate pesticides
- Permethrin has central & peripheral nervous system toxicity, enhances ACh release
Gulf War Illness

- 100,000 troops may have been exposed to low level sarin and cyclosarin after Khamisiyan munitions explosion
- Coalition bombing reportedly destroyed 20 metric tons of sarin at Al Muthanna and Muhammadiyat
- Cancer and changes in brain structure and function in a dose response manner to nerve agent exposures
- Possible long term effects of sarin exposure including fatigue, headache, and depression noted in Tokyo subway sarin attack survivors

Gulf War Illness Model Adaptation

- Decreased pain threshold
- Stress
- Increased suffering
- Injury
- Abnormal paleocortical activation
- Abnormal autonomic outflow (SANS)
- HPA axis
- Organ dysfunction
- Visceral hypersensitivity
- Neurogenic inflammation
- Widespread tenderness
- Pyridostigmine
- Organo phosphates
- DEET sunscreens
- Sarin
Gulf War Illness

- HPA axis abnormalities
- reduced pituitary ACTH
- increased ACTH & cortisol suppression to dexamethasone, though serum cortisol level normal
- autonomic dysfunction not well defined *(change in heart rate variability, pupillary reaction to medication, tilt table response)*

Gulf War Illness

- neuropsychological changes attention and executive system including memory visuospatial skills, psychomotor skills, and mood/emotional functioning
- cortex and hippocampus aptosis
- reduced functioning in brainstem, basal ganglia, and hippocampus
- hippocampal and basal ganglia volumes reduced on MRI, reduced blood flow insula and frontal cortex on SPECT imaging
Gray Matter Loss in Fibromyalgia

- individuals with fibromyalgia exhibit a 3.3 times greater age-associated decrease in gray matter volume when compared with healthy controls.
- Each year of fibromyalgia ~ 9.5 times the normal loss of gray matter with aging.
- Functional significance of gray matter atrophy in fibromyalgia might include impaired endogenous pain inhibition and deficits in cognitive function.
- Altered brain morphology associated with cognitive impairment in fibromyalgia adjacent to and partially overlaps brain regions associated with pain modulation.
Using Ancient Knowledge To Treat Autonomic Dysfunction

Acupuncture Knowledge Base

Human Embryonic Development

6 weeks 7 weeks 8 weeks
**Governor Vessel Development**

- **Primitive knot**
- **Primitive streak**
- **Notochord**
- **Frontonasal prominence** - differentiates to form the forehead, nose, philtrum, and adjacent gingival tissue (ending at stomatodaeum)

- **This occurs by 6 weeks post conception!**

**Ectoderm → Governor Vessel → Most Yang (SANS) Area of Body**

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**Conception Vessel Meridian Development**

- **Lateral embryonic fold** ~3 weeks forms chest and abdominal cavities
- **Branchial arches fuse at this time anteriorly to form neck and jaw**

**Endoderm → Conception Vessel → Most Yin (PANS) Area of Body**
**Shu Points, SANS, & Osteopathy**

<table>
<thead>
<tr>
<th>Organ</th>
<th>Shu Point</th>
<th>Spinal Level</th>
<th>Sympathetic Segmental Innervation</th>
<th>Osteopathic Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>BL-13</td>
<td>T3</td>
<td>T2-T5 (T2-T7)</td>
<td>T3-T9</td>
</tr>
<tr>
<td>Pericardium</td>
<td>BL-14</td>
<td>T4</td>
<td>T1-T4 (T1-T5)?</td>
<td>C8, T1-T8?</td>
</tr>
<tr>
<td>Heart</td>
<td>BL-15</td>
<td>T5</td>
<td>T1-T4 (T1-T5)</td>
<td>C8, T1-T8</td>
</tr>
<tr>
<td>Liver</td>
<td>BL-18</td>
<td>T9</td>
<td>T7-T9 (T5-T10)</td>
<td>T6-T11</td>
</tr>
<tr>
<td>Gallbladder</td>
<td>BL-19</td>
<td>T10</td>
<td>T7-T10 (T5-T10)</td>
<td>T6-T11</td>
</tr>
<tr>
<td>Spleen</td>
<td>BL-20</td>
<td>T11</td>
<td>T6-T10 (T5-T11)</td>
<td>T7-T10</td>
</tr>
<tr>
<td>Stomach</td>
<td>BL-21</td>
<td>T12</td>
<td>T6-T10 (T5-T11)</td>
<td>T7-T10</td>
</tr>
<tr>
<td>Triple Heater</td>
<td>BL-22</td>
<td>L1</td>
<td>Cortex T6-L2</td>
<td></td>
</tr>
<tr>
<td>(Adrenal)</td>
<td></td>
<td></td>
<td>Medulla T11-L1</td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td>BL-23</td>
<td>L2</td>
<td>T11-L1 (T10-L2)</td>
<td>T9-L2</td>
</tr>
<tr>
<td>Large Intestine</td>
<td>BL-25</td>
<td>L4</td>
<td>Proximal 2/3 T11-L1 (T6-L1)</td>
<td>T9-L1</td>
</tr>
<tr>
<td>Small Intestine</td>
<td>BL-27</td>
<td>S1</td>
<td>Distal 1/3 L1-L2 (T6-L2) (White-fferent S2-S4)</td>
<td>T6-T11 duodenum &amp; jejunum</td>
</tr>
<tr>
<td>Bladder</td>
<td>BL-28</td>
<td>S2</td>
<td>T11-L2 (White-fferent S2-S4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S2-S3 parasympathetic</td>
<td></td>
</tr>
</tbody>
</table>

**Acupuncture & ANS Stimulation**

- **SANS**
  - Governor Vessel most sympathetic
  - Sympathetic “switches” on posterior surface of extremities

- **PANS**
  - Conception Vessel most parasympathetic
  - Parasympathetic “switches” on anterior surface of extremities

*Can selectively influence SANS or PANS deficiencies in fibromyalgia via acupuncture!*
Metal or Laser Stimulation of Acupoints

Restore Autonomic Balance

Pilot Study Results

Metal Versus Laser Needles for Musculoskeletal Pain
Results: Knee & Shoulder Arthritis

<table>
<thead>
<tr>
<th>Acupuncture Needle Type</th>
<th>VAS Pain Score (0-10)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>metal</td>
<td>5.9</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>laser</td>
<td>3.1</td>
<td></td>
</tr>
</tbody>
</table>

Results: Cervical & Lumbar Pain

<table>
<thead>
<tr>
<th>Acupuncture Needle Type</th>
<th>VAS Pain Score (0-10)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>metal</td>
<td>3.7</td>
<td>= 0.053</td>
</tr>
<tr>
<td>laser</td>
<td>2.9</td>
<td></td>
</tr>
</tbody>
</table>
GERAC Laserneedle Arm

1,395 subjects studied!

Evolution of Acupuncture Needles

Laserneedle
12 laser system
allows treatment with laser at multiple acupoints
Depth of Laser Light Penetration

Laser Treatment Examples
Future Opportunities

**IV Laser Stimulation**

**Intravenous Blood Irradiation**

- Intravenous laser blood irradiation was accomplished for the first time approximately 25 years ago in the former Soviet Union.
- Laser light was brought directly into the flowing blood through a one-way-catheter.
- In-vitro-tests soft laser irradiation of white blood cells produced beneficial effects in expression of interferons, interleukins, and immunoglobulins.
- Strong mitochondrial energetic effects (ATP, giant mitochondria, cellular respiration).
Intravenous Blood Irradiation

- performed with extremely low power (1-3 mw) laser
- exposure time of 20-60 minutes
- performed daily (up to 10 treatments) with a break on the weekend

Laserneedle Study in Fibromyalgia

- In a private pain clinic in Germany
- 246 fibromyalgia patients received usual care including medication
- 82 received traditional acupuncture as well
- 72 received Laserneedle acupuncture 10 treatments plus intravenous laser treatment (“at least 3”)
- 5 weeks of treatment
### VAS Pain Score Fibromyalgia

<table>
<thead>
<tr>
<th></th>
<th>Onset</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>MED</td>
<td>8.7</td>
<td>6.8</td>
</tr>
<tr>
<td>ACU</td>
<td>8.5</td>
<td>6.0</td>
</tr>
<tr>
<td>LAS</td>
<td>8.5</td>
<td>4.4</td>
</tr>
<tr>
<td>LAS+IV</td>
<td>8.9</td>
<td>2.9</td>
</tr>
</tbody>
</table>

*MED = medications, ACU = needle acupuncture, LAS = laser acupuncture, LAS+IV = combination of laser acupuncture with intravenous laser irradiation*

### Pain Disability Index Fibromyalgia

<table>
<thead>
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<th>End of study</th>
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<tr>
<td>MED</td>
<td>54</td>
<td>51</td>
</tr>
<tr>
<td>ACU</td>
<td>48</td>
<td>36</td>
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<tr>
<td>LAS</td>
<td>49</td>
<td>35</td>
</tr>
<tr>
<td>LAS+IV</td>
<td>52</td>
<td>22</td>
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</tbody>
</table>

*MED = medications, ACU = needle acupuncture, LAS = laser acupuncture, LAS+IV = combination of laser acupuncture with intravenous laser irradiation*
Depression Index Fibromyalgia

<table>
<thead>
<tr>
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<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>MED</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>ACU</td>
<td>37</td>
<td>24</td>
</tr>
<tr>
<td>LAS</td>
<td>42</td>
<td>12</td>
</tr>
<tr>
<td>LAS+IV</td>
<td>40</td>
<td>12</td>
</tr>
</tbody>
</table>

MED = medications, ACU = needle acupuncture, LAS = laser acupuncture, LAS+IV = combination of laser acupuncture with intravenous laser irradiation

Fibromyalgia Treatment

Limited but Favorable Experience
Fibromyalgia Treatment – Laser or Metal Needles

- Fibromyalgia, Chronic Fatigue Syndrome, (and Gulf War Illness) patients are energetically depleted in both PANS and SANS (Yin & Yang)
- Stimulation of sympathetic switches in arms and legs (Wong) to build Yang/SANS
- Mingmen treatment +/- parasympathetic switches to build Yin/PANS (all chronic conditions have Yin deficiency)
- Ongoing development - determining whether PANS or SANS is the most deficient in each person affected

Autonomic Balance - The Challenge

![Autonomic Balance Graph](chart.png)

- Yin (PANS)
- Yang (SANS)
Measuring ANS Objectively

- Resting pulse rate
- Blood pressure
- Temperature - central/peripheral
- Sweat output
- Constipation versus diarrhea
- Urinary frequency versus hesitancy
- Meiosis versus mydriasis
- ? other
Conclusions

• Satisfactory, well-tolerated treatments for fibromyalgia and chronic fatigue syndrome have been sparse to date
• In part, this is because an adequate model of their pathogenesis has been lacking
• GWI has significant overlap of its symptoms and laboratory findings with fibromyalgia
• Interventions to improve the health of veterans with GWI have had limited success

Conclusions

• This neuroendocrine model (and preliminary clinical results) suggest acupuncture stimulation of ANS offers a potential avenue to reduce the symptoms and hence improve the quality of life of veterans with GWI
• Laser acupuncture offers a pain-free, essentially risk free method of treating pain and restoring autonomic nervous system homeostasis
• Further investigations of the potential benefits of laser stimulation of the autonomic nervous system to treat GWI, fibromyalgia, and CFS would prove beneficial