Medical Acupuncture
-- Past, Present and Future

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Relevant Financial Relationship(s)
None

Off Label Usage
None
Learning Objectives

• Review medical acupuncture
  Background
  Concept
  Proposed mechanisms

• Discuss key evidence for acupuncture

• Reflect on integration in future practice
Task #1

• What do you know about acupuncture?
What is acupuncture?

• Technique of insertion and manipulation of fine needles
• Specific points (acupuncture points)
• Channels or meridians
• Manipulation of “inner energy” known as *Qi*
• Practiced for over 4,000 years
THAT'S ODD... MY NECK SUDDENLY FEELS BETTER...

EARLY ACUPUNCTURE
• >400 acupuncture points
• Locations where the Qi rises close to the surface of the body
• Microsystems
  - Auricular
  - Scalp
  - Palm
How might acupuncture work?

• No single mechanism explanation
• Variety of theories to address the physiological mechanism of action
  The Gate Control Theory of Pain
  Endorphins
  Indirect effects on autonomic system
  Altering brain chemistry by release of neurotransmitters
(A fiber)

(C fiber)

I = Inhibition neuron

T = Transmission neuron
• Provide health care providers, patients, and general public with a responsible assessment of the use and effectiveness of acupuncture for a variety of conditions
• NIH Consensus Statement (1997) found promising results supporting the efficacy of acupuncture in:
  Adult post-op pain
  Chemotherapy nausea and vomiting
  Post-op dental pain
Also noted other situations “where acupuncture may be useful as an adjunct treatment or an acceptable alternative…”

Addiction
Stroke rehab
Headaches
Menstrual cramps
Tennis elbow
Fibromyalgia
Myofascial pain
Osteoarthritis
Low back pain
CTS
Asthma
Acupuncture: Review and Analysis of Reports on Controlled Clinical Trials (WHO; 2003)

- Diseases, symptoms or conditions for which acupuncture has been proved through controlled trials-to be an effective treatment:

  Adverse reactions to radiotherapy and/or chemotherapy
  Allergic rhinitis (including hay fever)
  Biliary colic
  Depression (including depressive neurosis and depression following stroke)
  Dysentery, acute bacillary
  Dysmenorrhoea, primary
  Epigastralgia, acute (in peptic ulcer, acute and chronic gastritis, and gastrospasm)
  Facial pain (including craniomandibular disorders)
  Headache
  Hypertension, essential
  Hypotension, primary
  Induction of labour
  Knee pain
  Leukopenia
  Low back pain
  Malposition of fetus, correction of
  Morning sickness
  Nausea and vomiting
  Neck pain
  Pain in dentistry (including dental pain and temporomandibular dysfunction)
  Periarthritis of shoulder
  Postoperative pain
  Renal colic
  Rheumatoid arthritis
  Sciatica
  Sprain
  Stroke
  Tennis elbow
What does the evidence show?

• Nausea & vomiting
• Postoperative pain management
• Stress & anxiety
• Postoperative ileus
• Headache
• Back Pain
• Postoperative nausea and vomiting (PONV)
  2009 Cochrane Collaboration review of 40 trials involving 4,858 participants
  Suggest that use of P6 acupuncture point can reduce the risk of nausea and vomiting after surgery
Postoperative pain – pain score

Fig 2 VAS for postoperative pain intensity at 8, 24, and 72 h (0–100 mm). A WMD <0 indicates less pain with acupuncture compared with control. When the 95% CI does not include zero, the difference is considered statistically significant.
Postoperative pain – opioid consumption

**Review:** Acupuncture and postoperative pain (systematic review)
**Comparison:** 01 Acupuncture vs placebo control
**Outcome:** 01 Postoperative Opioid Consumption

<table>
<thead>
<tr>
<th>Study or subcategory</th>
<th>N</th>
<th>Acupuncture Mean (SD)</th>
<th>Control Mean (SD)</th>
<th>WMD (random) 95% CI</th>
<th>Weight %</th>
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<tbody>
<tr>
<td>01 Postoperative opioid consumption at 8 h</td>
<td>50</td>
<td>7.65 (6.90)</td>
<td>12.80 (6.60)</td>
<td>3.52 (-5.77, 12.83)</td>
<td>33.09</td>
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<tr>
<td>Lin and colleagues</td>
<td>30</td>
<td>20.40 (6.60)</td>
<td>24.19 (11.21)</td>
<td>3.52 (-5.77, 12.83)</td>
<td>33.09</td>
</tr>
<tr>
<td>Sim and colleagues</td>
<td>30</td>
<td>5.27 (1.37)</td>
<td>7.41 (2.02)</td>
<td>3.52 (-5.77, 12.83)</td>
<td>33.09</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>100</td>
<td>100.00</td>
<td>100.00</td>
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<tr>
<td>Test for heterogeneity: $\chi^2 = 3.61, df = 2 (P = 0.16), I^2 = 44.5%$</td>
<td></td>
<td></td>
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<td>100.00</td>
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<tr>
<td>Test for overall effect: $Z = 3.07 (P = 0.002)$</td>
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<td>100.00</td>
</tr>
</tbody>
</table>

**Fig 3** Cumulative postoperative opioid consumption at 8, 24, and 72 h (in mg morphine equivalents). A WMD < 0 indicates less morphine consumption with acupuncture compared with control. When the 95% CI does not include zero, the difference is considered statistically significant.
Fig. 2. Daily consumption of morphine in patients undergoing upper and lower abdominal surgery on each postoperative day. For upper abdominal surgery, results were obtained from 50 acupuncture patients (circles) and 48 control patients (squares). For lower abdominal surgery, data were obtained from 39 acupuncture patients (circles) and 38 control patients (squares). Data are expressed as mean ± SD. *Statistically significant differences (P < 0.0001) between first and other postoperative days in each group; #statistically significant differences (P < 0.01) from the control group.

Anesthesiology, V 95, No 2, Aug 2001
Figure 2. Changes in anxiety level as assessed by the STAI (State Trait Anxiety Inventory). A significant group difference ($F_{2,85} = 4.5$, $P = 0.014$), a group $\times$ time interaction ($F_{2,85} = 3.5$, $P = 0.02$), and a time difference ($F_{1,85} = 8.2$, $P = 0.001$) were observed among the three study groups. Please see text for details. I = Traditional Chinese Medicine group; II = Relaxation group; III = Control group.
Post-operative ileus

• Three RCTs in patients with abdominal surgeries improved GI motility with acupuncture
  - first bowel sound time
  - flatus passage time
  - excretion time
    - Sun P et al 1996
    - Liu XJ et al 1991
    - Zhang X et al 1998

• Addition of auricular acupuncture also relieved abdominal distension and discomfort after abdominal surgery.
  - Wan Q et al 2000
• Headache

2009 Cochrane Collaboration review of 22 trials involving 4,419 participants
Suggest that acupuncture is at least as effective as, or possibly more effective than, prophylactic drug treatment
• Back pain
  Meta-analysis by Manheimer et al. 2005 of 22 RCT
  Suggest acupuncture is an effective treatment of chronic low back pain.
Acupuncture – Minimal Risk

• Overall Risk 0 – 1.1 per 10,000
  - Bruising, soreness, bleeding
  - Vasovagal response
  - Pain at insertion site
  - Pneumothorax

• Infection rate negligible in two large prospective studies of 34,000 and 97,733 patients

  MacPherson et al. BMJ 2001
  White et al. BMJ 2001
Acupuncture Costs – avoiding surprises

• Medicare does not cover acupuncture services

• Many third-party payers cover acupuncture
  — Partially or totally
  — May pose limits on number of treatments
  — Indications for treatment

• $80-$120 per acupuncture session
Functional magnetic resonance imaging detects activation of the visual association cortex during laser acupuncture of the foot in humans

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Department of Nuclear Medicine (KME), Research Center Jülich, Jülich, Germany
Center for Cognitive Science II, University of Freiburg, Freiburg, Germany
Department of Anaesthesiology and Critical Care Medicine, University Hospital of Innsbruck, Innsbruck, Austria

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Abstract

The aim of this study was to investigate the effect of laser acupuncture on cerebral activation. Using functional magnetic imaging (fMRI) cortical activations during laser acupuncture at the left foot (Bladder 67) and dummy acupuncture, were compared employing a block design in ten healthy male volunteers. All experiments were done on a 1.5 Tesla magnetic resonance scanner equipped with a circular polarized head coil. During laser acupuncture, we found activation in the cuneus corresponding to Brodmann Area (BA) 18 and the medial occipital gyrus (BA 19) of the ipsilateral visual cortex. Placebo stimulation did not show any activation. We could demonstrate that laser acupuncture of a specific acupoint, empirically related to ophthalmic disorders, leads to activation of visual brain areas, whereas placebo acupuncture does not. These results indicate that fMRI has the potential to elucidate effects of acupuncture on brain activity. © 2002 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Laser acupuncture; Acupoint Bladder 67; Functional magnetic resonance imaging; Visual cortex
Fig. 2. Cerebral activation pattern induced by laser acupuncture.
DOI 10.1007/s10103-004-0296-8

ORIGINAL ARTICLE

Peter Whittaker

Laser acupuncture: past, present, and future

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Abstract Laser acupuncture is defined as the stimulation of traditional acupuncture points with low-intensity, nonthermal laser irradiation. Although the therapeutic use of laser acupuncture is rapidly gaining in popularity, objective evaluation of its efficacy in published studies is difficult because treatment parameters such as wavelength, irradiance, and beam profile are seldom fully described. The depth of laser energy transmission, likely an important determinant of efficacy, is governed not only by these parameters, but also by skin properties such as thickness, age, and pigmentation—factors which have also received little consideration in laser acupuncture. Despite the frequently equivocal nature of the published laser studies, recent evidence of visual cortex activation by laser acupuncture of foot points, together with the known ability of laser irradiation to induce cellular effects at subthermal thresholds, provides impetus for further research.

orders—conditions confirmed to be present in this individual [3]. Although an extensive narrative of thousands of years of acupuncture theory and practice is beyond the scope of this review, a brief description is necessary to provide context for the discussion of laser acupuncture.

Acupuncture theory and practice

A central tenet of acupuncture contends that energy (Qi—pronounced CHEE), flows through the body along defined subsurface paths [1, 2]. The maintenance of good health requires that such flow be in balance. Conversely, any disturbance in this flow results in an energy imbalance, either an excess or a deficiency, which in turn results in disease. Acupuncture attempts to regulate and restore energy balance by stimulating specific points along the paths and hence treat the disease. Traditional
Table 1 Positive laser acupuncture studies (arranged in order of increasing wavelength); – information not provided, \textit{cw} continuous wave laser irradiation, \textit{X} multiple treatments

<table>
<thead>
<tr>
<th>Reference no.</th>
<th>Subject</th>
<th>Laser parameters</th>
<th>Acupuncture points, number</th>
<th>Blinded treatment</th>
<th>Sham group</th>
</tr>
</thead>
<tbody>
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<td>[54]</td>
<td>Pain</td>
<td>Laser parameters</td>
<td>Treatment time (s)</td>
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<td>[19]</td>
<td>Smoking cessation</td>
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<td>[21]</td>
<td>Dental analgesia</td>
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<td>[57]</td>
<td>Carpal tunnel syndrome</td>
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<tr>
<td>[66]</td>
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<td>[77]</td>
<td>PONV</td>
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<td>[67]</td>
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<td>[65]</td>
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<tr>
<td>[89]</td>
<td>Stroke-related paralysis</td>
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<td>[91]</td>
<td>Dry eye</td>
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<td>[48]</td>
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<td>Dental analgesia</td>
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<td>[92]</td>
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<td>[68]</td>
<td>Weight loss</td>
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<table>
<thead>
<tr>
<th>Wavelength (nm)</th>
<th>Power (mW)</th>
<th>Frequency (Hz)</th>
<th>Beam diameter (mm)</th>
<th>Treatment time (s)</th>
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<td>632.8</td>
<td>2</td>
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<td>cw73–3,500</td>
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<td>24</td>
<td>900</td>
<td>–</td>
<td>10–15 \textit{X}</td>
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\textit{a}Not stated, but deduced from information provided in the paper
Table 2  Negative laser acupuncture studies; cw continuous wave laser irradiation, X multiple treatments

<table>
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<tr>
<th>Reference no.</th>
<th>Subject</th>
<th>Laser parameters</th>
<th>Acupuncture points, number</th>
<th>Blinded treatment</th>
<th>Sham group</th>
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<td>Wavelength (nm)</td>
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<td>[70]</td>
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<td>5.6</td>
<td>&gt; 8 included ear points</td>
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<td>[93]</td>
<td>Whiplash pain</td>
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<td>[81]</td>
<td>Nausea in dental surgery</td>
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<td>1.5</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*aNot stated, but deduced from information provided in the paper
*bResults from one component of a multifaceted study
Questions?

MCLee@salud.unm.edu
References


