The Safe and Effective Use of Acupuncture for the Treatment of Radiation Induced Side Effects

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Roswell Park Comprehensive Cancer Center
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Unwanted Effects of Radiation Therapy (RT)

• Cancer patients often experience debilitating side effects during and after their treatment.
• While conventional treatments exist to address these symptoms most are inadequate or may have their own unwanted side effects.
• As a result, many patients turn to complementary and alternative medicine modalities (CAM), including acupuncture, to reduce side effects, increase tolerance and efficacy of their treatment and support their immune system.
Acupuncture’s Role in Oncology Care

• Acupuncture is the insertion of very thin needles into specific points that correspond to various organ systems and body processes to support and optimize the functioning of these systems and processes by balancing and promoting the smooth flow of the body’s vital energy (qi), blood and fluids.
• Acupuncture works to promote health through the cultivation and preservation of yin and the activation of yang.
• Supporting and maintaining these interactions helps to treat disease, promotes a state of health and well-being and offers a protective mechanism that may prevent or lessen the occurrence of unwanted side effects during cancer treatment.
• As a result, the patient is more resilient and able to stay the course and receive maximum benefit by experiencing fewer debilitating side effects that may interrupt their treatment schedule and leave them with unresolved complications long after their treatment has finished.

RT in Cancer Treatment

• Cancer patients may be treated with radiation
  • as a primary therapy
  • in conjunction with chemotherapy or
  • secondary to surgery

• Those treated with radiation therapy (RT) often experience serious and difficult to treat side effects that
  • begin shortly after initiation of treatment and
  • linger long after treatment has finished
  • negatively impacting quality of life (QOL) and overall future health.
Side Effects of RT

- Common side effects experienced by those receiving RT include
  - xerostomia
  - reduced saliva production
  - dysphagia
  - nausea
  - emesis
  - fatigue
  - cognitive impairments
  - often result in treatment delays and loss of tumor control

RT Induced Side Effects & Current Conventional Treatment

- The severity and type of side effect experienced is influenced by
  - radiation field
  - dose
  - length of treatment

- Current conventional treatments for these side effects are
  - mainly palliative
  - often ineffective
  - have unwanted side effects of their own
Evidence for Acupuncture & RT Induced Side Effects

• Studies to evaluate the effectiveness of acupuncture in preventing or alleviating these symptoms have been conducted.

• Results from these studies have been mixed.

• Increasing evidence exists that acupuncture may provide a safe, effective and longer lasting alternative to conventional treatments for RT related side effects.
Inclusion Criteria & Study Characteristics

• Inclusion Criteria
  • Patients treated w/RT
  • Acupuncture to alleviate symptoms or side effects of RT
  • Randomized prospective trials

• Study Characteristics
  • Of 10 identified, 2 were feasibility studies for larger trials
  • All from university based centers with special institutions focusing on CAM treatments
  • Small number of trials & small number of patients – trial by trial comparison method chosen
  • Designs and statistical methods were very heterogeneous
  • Endpoints included well measurable items – QoL or patient reported reduction/improvement

<table>
<thead>
<tr>
<th>No.</th>
<th>Study</th>
<th>Year of publication</th>
<th>No. of patients</th>
<th>Target symptom</th>
<th>Needlepoints</th>
<th>Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blom et al22</td>
<td>1996</td>
<td>38</td>
<td>Sarcoma</td>
<td>De 20, St 7, St 17, Li 15, St 3, St 5, St 6, P 6, H 7, Li 11, Li 10, Li 4, Si 3, Si 36, Liv 3, Sp 6, Sp 6, KI 7, KI 3, KI 5, Sp 3</td>
<td>Improvement, no significance; improvement also in placebo group</td>
</tr>
<tr>
<td>2</td>
<td>Che et al23</td>
<td>2008</td>
<td>12</td>
<td>Sarcoma</td>
<td>Cancer-related fatigue</td>
<td>General</td>
</tr>
<tr>
<td>3</td>
<td>Bulk et al24</td>
<td>2009</td>
<td>27</td>
<td>Sarcoma</td>
<td>Li 6, Li 4, St 36, Sp 6, Li 4, Ren 6(CV 6), Sp 6</td>
<td>General</td>
</tr>
<tr>
<td>4</td>
<td>Fossatius et al25</td>
<td>2011</td>
<td>109</td>
<td>Sarcoma</td>
<td>PC 6</td>
<td>Improvement with sham and verum acupuncture compared with standard care</td>
</tr>
<tr>
<td>5</td>
<td>Fossatius et al25 (feasibility trial)</td>
<td>2011</td>
<td>10</td>
<td>Sarcoma</td>
<td>PC 6</td>
<td>Improved benefit of verum</td>
</tr>
<tr>
<td>6</td>
<td>Fossatius et al25</td>
<td>2012</td>
<td>215</td>
<td>Sarcoma</td>
<td>PC 6</td>
<td>Improvement with sham and verum acupuncture compared with standard care</td>
</tr>
<tr>
<td>7</td>
<td>Meng et al26 (feasibility trial)</td>
<td>2012</td>
<td>23</td>
<td>Sarcoma</td>
<td>Ren 24, LU 7, K 6, Shenmen, Point Zava, SG 2, Laytix</td>
<td>No difference between verum and sham</td>
</tr>
<tr>
<td>8</td>
<td>Meng et al27</td>
<td>2012</td>
<td>86</td>
<td>Sarcoma</td>
<td>Ren 24, LU 7, K 6, Shenmen, Point Zava, SG 2, Laytix</td>
<td>Significant reduction of serotonin and improvement of QoL compared with sham acupuncture</td>
</tr>
<tr>
<td>9</td>
<td>Lu et al28</td>
<td>2012</td>
<td>42</td>
<td>Dysphagia</td>
<td>GV 24, GV 20, I 16, GB 20, SV 24, SV 23, ST 7, ST 6, St 5, St 12, St 11, ST 36, SP 9, SP 4, KI 3, Yintang</td>
<td>Improved</td>
</tr>
<tr>
<td>10</td>
<td>Simcock et al29</td>
<td>2013</td>
<td>145</td>
<td>Sarcoma</td>
<td>Li 12, Li 20, Solar plexus, Gland 2, Modified Point Zava, Shen Men</td>
<td>Significant improvement than standard oral care</td>
</tr>
</tbody>
</table>
Xerostomia

- 5 Trials
- Patients with RT in Head & Neck region
- 4 of 5 studies showed significant reduction with acupuncture
- Blom et al.
  - 38 patients – 20 true acupuncture, 18 superficial
  - Both groups showed significant increase in salivary flow rates post acupuncture
  - 12 sessions
  - Results usually persisted during the results year
- Cho et al.
  - 12 patients randomized to 2 groups
  - Standard arm = sham group; experimental group = 4 acupoints (ST 6, LI 4, ST 36, Sp6)
  - 2x week for 6 weeks
  - Inclusion criteria – minimum dose > 38 Gy & exposed volume of the parotid > 50%
  - Endpoints – non stimulated & stimulated saliva flow and QoL assessed by a xerostomia questionnaire, 8 item survey by MD Anderson Symptom Inventory Head and Neck
  - No statistical difference between groups – real acupuncture increased salivary flow and improved QoL

Xerostomia, cont.

- Meng et al. Shanghai Group – Fudan University – 2 trials
  - 1st feasibility
    - Determine whether randomized trial w/sham as comparator practicable
    - Data showed significant increase in QoL & reduction of xerostomia
  - Then prospective randomized trial
    - 86 patients randomized – 40 true acupuncture; 46 sham
    - Endpoints QoL and stimulated & unstimulated salivary flow rates
    - Significant improvement in QoL and salivary flow rates in early phase week 3 & follow up at 1 & 6 months in true acu group
- Simcock et al.
  - Compared acupuncture w/ oral care chronic xerostomia after RT for head & neck cancer
    - 7 oncology centers in UK
    - Inclusion criteria – prior RT (at least 18 months) w/ at least 1 parotid in the target volume (without any dose constraints)
    - Crossover design beginning 4 weeks after the end of the 1st intervention (acupuncture vs oral care) was used
    - Weekly for 8 consecutive weeks – 20 mins per session
    - Significant improvement for xerostomia, but saliva measurement unchanged for both groups
Cancer-related Fatigue

- Pilot study
- Randomized, modified, double-blinded, placebo-controlled
- 54 patients
  - Surgery alone or in combination w/ chemo w/ indication for RT
- Standard arm - acupuncture 1 or 2x week for 4 weeks
- Control arm – sham mimicking true acupuncture
- 26 of 27 in true acupuncture arm completed
- Fatigue improvement better in true arm
- Physical & mental distress & QoL improved as well, but not significantly
- Clear benefit shown in reducing fatigue

Nausea & Emesis

- 3 trials from the same group
  - 1st Trial
    - 267 patients – 109 acu, 106 sham, 62 standard care
    - Patients had received RT to abdominal/pelvic region
    - Nausea lower in acu group than standard of care
    - Almost all expected large antiemetic effect, no difference between acu & sham group observed
  - 2nd Trial
    - Pilot study of 10 patients
  - 3rd Trial
    - 215 patients
    - True & sham acu close to (before or after) 1st RT session
    - 30 mins. 3x week for 1st 2 weeks
    - 2x week for remaining course of RT
    - True acupuncture not more effective than sham
    - Both had significant nausea reduction
Dysphagia

- 42 patients after RT for head & neck cancer
- Changes in MD Anderson Dysphagia Inventory Score from baseline to 12 months and QoL
- Subgroup received testing for salivary flow rates & cytokines, including plasma transforming growth factor and interleukin to identify a biological explanation for changes observed
- Study results not yet published, however design may be promising to support acupuncture use in this population

Table 1: Studies evaluating acupuncture to alleviate radiation-related side effects in cancer patients

<table>
<thead>
<tr>
<th>No.</th>
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<td>Cho et al.</td>
<td>2008</td>
<td>12</td>
<td>Xerostomia</td>
<td>Li 6, Li 4, St 36, Sp 6, Li 4, R 6CV 6, Sp 6Ki 3, St 36</td>
<td>Significant improvement</td>
</tr>
<tr>
<td>3</td>
<td>Bakh et al.</td>
<td>2009</td>
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<td>Cancer-related fatigue</td>
<td></td>
<td>Improvement</td>
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<td>4</td>
<td>Eshkol et al.</td>
<td>2011</td>
<td>109</td>
<td>Emesis</td>
<td>PC 6</td>
<td>Improvement with sham and venut acupuncture compared with standard care</td>
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<td>5</td>
<td>Eshkol et al.</td>
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<td>10</td>
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<td>GY 24, GV 20.1, 16, GB 20, SY 24, SY 23, ST 7, St 6, Si 5, Li 2, Li 11, ST 36, SP 9, SP 6, KA Yinting</td>
<td>Ongoing</td>
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<td>145</td>
<td>Xerostomia</td>
<td>Li 12, Li 20, Salivary Gland 2, Modified Point Zero, Shen Men</td>
<td>Significant improvement than standard oral care</td>
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How Acupuncture Points Are Chosen

- Along Meridian Pathway
- Local, Adjacent, Distal
- Auricular
- Point Category
- Existing Pathology
Auricular Acupuncture Points

Frequently Used Points – LI 4
Frequently Used Points – Stomach Meridian
Location of Salivary Glands vs Facial Points

Research Article

Reduced Need for Rescue Antiemetics and Improved Capacity to Eat in Patients Receiving Acupuncture Compared to Patients Receiving Sham Acupuncture or Standard Care during Radiotherapy

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3Department of Oncology-Pathology, Karolinska Institutet, Stockholm, Sweden
4Division of Clinical Cancer Epidemiology, Department of Oncology, Sahlgrenska Academy, Gothenburg University, Gothenburg, Sweden
5Division of Obstetrics and Gynecology, Department of Clinical and Experimental Medicine, Linköping University, Linköping, Sweden
6Division of Nursing, Department of Oncology and Department of Medical and Health Sciences, Linköping University, Linköping, Sweden

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Volume 2017, Article ID 506351, 11 pages
https://doi.org/10.1155/2017/506351
Antiemetic Prescription

### Table 1: Routines for antiemetic prescriptions.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Antiemetic type</th>
<th>Name and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first occurrence of mild nausea, prescribe</td>
<td>Antihistamine with antiemetic effect</td>
<td>Meclizine 25 mg 1–2 tablets/day</td>
</tr>
<tr>
<td>At first occurrence of severe nausea or occurrence of vomiting, instead prescribe or if not satisfactory nausea control, also add</td>
<td>Serotonin-receptor antagonists</td>
<td>Ondansetron 8 mg 2 tablets/day or granisetron 1 mg 1 tablet/day or tropisetron 5 mg 1 tablet/day</td>
</tr>
<tr>
<td>If not satisfactory nausea control, also add</td>
<td>Corticosteroids</td>
<td>Betamethasone 4 mg 2 tablets/day</td>
</tr>
</tbody>
</table>

Description of the standardised clinical routines for prescription of antiemetic medications. mg = milligram. If the patient agreed to consume medications.

Delivery of Acupuncture – True vs Sham

- 7 physiotherapists trained in acupuncture delivered either true or sham treatments
- Treatments were 30 minutes in length, started on the 1st day of radiation, delivered 3x week for 1st two weeks, continued 2x week for the remainder of radiation
- Engaged in everyday conversations with patients, but avoided the subject of emesis
- 1-3 patient treated simultaneously in different rooms
True Acupuncture Group

- Bilateral P6, traditional antiemetic point
- Stainless steel acupuncture needles manufactured in Korea, 0.25 x 40mm inserted to depth of ⅛ body inch (cun)
- 1 cun = the width at the widest part of the patient’s thumb
- Needles manipulated 3x (start, middle & end) during tx
- Manipulation consisted of lifting & thrusting until de qi sensation obtained

Frequently Used Points – P6
Sham Acupuncture Group

- Physiotherapist delivers sham acupuncture to a non acupuncture point 2 cun proximal to P6 using “Park’s sham device”, a non-penetrating telescopic sham needle, 0.25 x 40mm
- Stainless steel, manufactured in Korea, looks identical to a regular acupuncture needle
- Needle glides up into handle instead of penetrating skin – gives the illusion of penetration
- Sham needle held in place by bottom plate and double sided stick tape
- Sham needle manipulated 3x during session – needle touches but does not penetrate skin

Park’s Sham Device
Antiemetic Use

- [% of patients consumed antiemetics]
- [% of patients did not consume antiemetics]
- [% of patients were able to eat as usual]
- [% of patients ate less than usual]

Standard care: n = 62
Active acupuncture: n = 89
Sham acupuncture: n = 94

Figure 2: Proportion (%) of patients consuming antiemetics or not (left) and with capacity to eat as usual or not (right). Measured in patients in the verum acupuncture group: n = 89, sham acupuncture group: n = 95 (n = 94 graded eating capacity), and standard care group: n = 62, when all three groups had received 27 Gray (mean) dose of radiotherapy.

Capacity to Eat

Figure 3: Proportion (%) of patients with different levels of eating capacity during and after radiotherapy in the verum and the sham acupuncture group. The number of patients decreases over time due to the individual length of radiotherapy. Two patients did not answer, reason unknown.
Nausea & Vomiting

Intensity of Nausea

Fig. 3. Proportion (%) of the patients in the venous-acupuncture group, the sham-acupuncture group and the standard-care group who experienced nausea or vomited at the cross-sectional comparison. P-value compare the venous-acupuncture group to the other patients (sham-acupuncture plus standard care).
Effects of Brain Irradiation (BI) Leading to Cognitive Impairment

- Profound oxidative stress & inflammatory stress
- Loss of hippocampal neurogenesis
- Persistent changes in neuronal structure & synaptic plasticity
- White matter impairment
- Blood brain barrier (BBB) damage
- Decreased capillary density
Evidence for Acupuncture in BI

- Evidence suggests acupuncture is effective in treating several neurological disorders
  - Stroke
  - Depression
  - Fatigue
- Acupuncture’s therapeutic effect comes from stimulating acupuncture points resulting in adenosine A1 receptors & nerve fibers transfer the signal
- Neuroimmune system modulation has also been reported
- EA immediately after middle cerebral artery occlusion prevented extensive BBB damage & inhibited neuroinflammation, 2 important elements of irradiation-induced brain injury

Acupuncture Points Used

- **Du 20 (Baihui)**
- **Du 26 (Shiugou)**
EA – Method of Delivery

- 5 mins. after BI
- EA applied for 30 mins
- Wave type – dense sparse
- Frequency – 2/15 Hz
- Intensity – 3 mA

Effects of EA after Brain Irradiation (BI) in Rats

- Therapeutic effects of electroacupuncture (EA) immediately after BI in rats
- Changes in cognitive function, neurogenesis and synaptic density were detected at varying time points post irradiation
  - Early Phase
    - protect blood brain barrier (BBB) in hippocampus & cortex
    - inhibit neuroinflammatory cytokine expression
    - upregulate angiogenic cytokine expression
    - levels of neurotransmitter receptors and neuro peptides in the early phase
  - Delayed Phase
    - protected spatial memory and recognition
    - prevented the onset of cognitive impairments
  - Cellular/molecular level
    - preventive effect on cognitive dysfunction not dependent on hippocampal neurogenesis
    - Reduced the loss of synaptophysin expression
Acupuncture for Dysphagia after Chemoradiation in Head and Neck Cancer: Rationale and Design of a Randomized, Sham-Controlled Trial

Weidong Lu, MB, MPH, PhD1,*, Peter M. Wayne, PhD2, Roger B. Davis, ScD3, Julie E. Buring, ScD4, Hailun Li, MS4, Laura A. Goguen, MD5, David S. Rosenthal, MD1, Roy B. Tishler, MD, PhD6, Marshall R. Posner, MD6, and Robert I. Haddad, MD6

Potential participants identified from Head and Neck Cancer clinic at DFCI

Participants contacted
Eligibility assessed and consent obtained

Baseline interview, questionnaires

Randomization
Active acupuncture 12 sessions
1/2 wk x 24 wk
with standard of care
N=21

Sham acupuncture 12 sessions
1/2 wk x 24 wk
with standard of care
N=21

6th visit, patient interview, questionnaires

12th visit, exit interview, questionnaires

6 month follow-up, questionnaires

Courtesy acupuncture
1/wk x 6 wk (optional)

Figure 2: The study design and the flow of the participants through the trial

Table 3
Acupuncture points, locations and related nerve innervations for the study of dysphagia

<table>
<thead>
<tr>
<th>Name</th>
<th>Chinese Point Name</th>
<th>Location</th>
<th>Innervations</th>
</tr>
</thead>
<tbody>
<tr>
<td>GV24</td>
<td>Shenting</td>
<td>0.5 cm² directly above midpoint of anterior hairline.</td>
<td>The branch of the frontal nerve.</td>
</tr>
<tr>
<td>GV20</td>
<td>Baihui</td>
<td>On the midpoint of the back 0.5 cm² directly above posterior hairline, approximately on midpoint of line connecting auricular points</td>
<td>The branch of the great occipital nerve.</td>
</tr>
<tr>
<td>ST6</td>
<td>Tianzhuo</td>
<td>In the lateral aspect of the neck, in the posterior border of m. sternocleidomastoidus, postero-oblique to Point</td>
<td>The cutaneous cervical nerve, the emerging portion of the great auricular nerve.</td>
</tr>
<tr>
<td>GR20</td>
<td>Fengmi</td>
<td>In the depression between the upper portion of m. sternocleidomastoidus and m. trapezius, on the same level with Fengchi.</td>
<td>The branch of the lesser occipital nerve.</td>
</tr>
<tr>
<td>CV14</td>
<td>Chongling</td>
<td>In the depression in the center of the sternohyoid groove.</td>
<td>The branch of the facial nerve.</td>
</tr>
<tr>
<td>CV23</td>
<td>Liangquan</td>
<td>Above the Adam’s apple, in the depression of the upper border of the hyoid bone.</td>
<td>The branch of the cutaneous cervical nerve, the hypoglossal nerve, and the branch of the greater auricular nerve.</td>
</tr>
<tr>
<td>ST7</td>
<td>Xiaguan</td>
<td>At the lower border of the thyrohyoid muscle, in the depression anterior to the stylohyoid process of the mandible. This point is located with the mouth closed.</td>
<td>The sympathetic branch of the facial nerve and the branches of the ansa cervicalis nerve.</td>
</tr>
<tr>
<td>ST16</td>
<td>Tanze</td>
<td>One finger breadth anterior and superior to the lower angle of the mandible where m. masseter attaches at the prominence of the mass, where the teeth are clenched.</td>
<td>The great auricular nerve, facial nerve and masseteric nerve.</td>
</tr>
<tr>
<td>ST3</td>
<td>Daiei</td>
<td>Anterior to the angle of mandible, on the anterior border of the attached portion of m. masseter, in the groove of the depression appearing when the chin is lifted.</td>
<td>The facial and buccal nerves.</td>
</tr>
<tr>
<td>LI32</td>
<td>Jiaji</td>
<td>At the radial side of the index finger, distal to the metacarpophalangeal joint, at the junction of the end and middle phalanx. This point is located with the finger slightly flexed.</td>
<td>The dorsal digital nerve of the radial nerve, and the palmar digital proper nerve of the median nerve.</td>
</tr>
<tr>
<td>LI11</td>
<td>Qupe</td>
<td>When the elbow is flexed, the point is in the depression at the lateral end of the transverse cubital crease, midway between olecranon process and the lateral epicondyle of the humerus.</td>
<td>The posterior and lateral cutaneous nerves, cutaneous nerve of the arm, in the cubital sulcus.</td>
</tr>
<tr>
<td>NT16</td>
<td>Zusanli</td>
<td>1 cm below Oleh, one finger breadth from the anterior crest of the tibia, in m. tibialis anterior.</td>
<td>Superficially, the lateral cutaneous nerve and the cutaneous branch of the saphenous nerve; deep, the deep peroneal nerve.</td>
</tr>
<tr>
<td>SP9</td>
<td>Xingjing</td>
<td>On the lower border of the medial condyle of the tibia, in the depression on the medial border of the tibia.</td>
<td>Superficially, in the medial saphenous nerve; deep, the tibial nerve.</td>
</tr>
<tr>
<td>SP6</td>
<td>Sanying</td>
<td>1 cm directly above the tip of the medial malleolus, on the posterior border of the medial aspect of the tibia.</td>
<td>Superficially, in the medial saphenous nerve; deep, in the posterior cutaneous nerve.</td>
</tr>
<tr>
<td>K3</td>
<td>Taijia</td>
<td>In the depression between the medial malleolus and medial calcaneus, at the level with the tip of the medial malleolus.</td>
<td>The medial saphenous nerve, on the course of the saphenous nerve.</td>
</tr>
<tr>
<td>SI5</td>
<td>Xingyang</td>
<td>Middle between the medial ends of the two epyphyses.</td>
<td>NA.</td>
</tr>
</tbody>
</table>

Note: 1 cm, a measuring unit in acupuncture, approximately 1 inch
Figure 3. Acupuncture points used for chemoradiation-related dysphagia in head and neck cancer. To avoid the radiation field, acupuncture points needed before week 4 after CRT (phase 1, solid round circles) were selected to avoid the chin and neck area. Additional points were added at week 4 after CRT visit (phase 2, solid diamonds) and at the week 12 after CRT (phase 3, solid triangles). Electroacupuncture was added starting with the third visit.
Abbreviation: CRT, chemoradiation therapy.

Table 4
Acupuncture treatment strategy and treatment phases for HNC patients with dysphagia

<table>
<thead>
<tr>
<th>Phases of Treatment</th>
<th>Treatment Intention</th>
<th>Treatment Visits</th>
<th>Points, Stimulation and Number of Needles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reduce anxiety regarding needing; familiarize patient with procedure; initiate body response</td>
<td>1st and 2nd</td>
<td>ST36, SP9, K3, LI11, GV20, GV24, Yintang, mild; 13 needles ***</td>
</tr>
<tr>
<td>2</td>
<td>Increase intensity; expand to facial area; continue body response</td>
<td>3rd-7th</td>
<td>Add LI12, ST7, ST5, CV24; Add electroacupuncture moderate; 22 needles</td>
</tr>
<tr>
<td>3</td>
<td>Increase intensity; expand to the back and front of neck; maximize body response</td>
<td>8th-12th</td>
<td>Add SI16, GB20, CV23, continue electroacupuncture; 27 needles</td>
</tr>
</tbody>
</table>

***Acupuncture point selection will remain at phase one until the 4th week post CRT, regardless of the number of acupuncture sessions received.
### Table 5

Sham acupuncture point locations

<table>
<thead>
<tr>
<th>Sham points</th>
<th>Anatomical Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>3 cm above the tip of the medial malleolus, 2 cm posterior to the posterior border of the medial aspect of tibia.</td>
</tr>
<tr>
<td>No. 2</td>
<td>2 cm above the superior lateral border of the patella and 2 cm posterior to the line of connecting with the Anterior Superior Iliac Spine (ASIS)</td>
</tr>
<tr>
<td>No. 3</td>
<td>1 cm above the superior medial border of the patella and 1 cm posterior</td>
</tr>
<tr>
<td>No. 4</td>
<td>3 cm above crease of wrist on the posterior lateral aspect of the forearm, midway between TW 6 (Zhigou) and LI 6 (Pianli).</td>
</tr>
<tr>
<td>No. 5</td>
<td>On the lateral side of the upper arm, 1 cm above LI11 (Quchi), midway between LI12 (Zhouliao) and the pathway of Lung meridian.</td>
</tr>
<tr>
<td>No. 6</td>
<td>3 cm directly above the midpoint of the anterior hairline and 1 cm lateral to the midline on the right side.</td>
</tr>
<tr>
<td>No. 7</td>
<td>3 cm directly above the midpoint of the anterior hairline and 1 cm lateral to the midline on the left side.</td>
</tr>
<tr>
<td>No. 8</td>
<td>1 cm directly below the depression posterior and inferior to the mastoid process, GB12 (Wanggu).</td>
</tr>
</tbody>
</table>

### Table 6

Summary of outcome measures and testing schedule

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Description</th>
<th>Baseline</th>
<th>x2mos Tx</th>
<th>x4 wk post CRT</th>
<th>x8 wk post CRT</th>
<th>x12 wk post CRT</th>
<th>x20 wk post CRT</th>
<th>x12 mos from baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>History/physical</td>
<td>Cancer history and treatment</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Weight changes</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Feeding Tubes</td>
<td>Presence and absence of feeding tube and time-to-removal</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>QOL: MDADI</td>
<td>Dysphagia-specific QOL</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>QOL: FACT-H&amp;N</td>
<td>General cancer-specific QOL</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>QOL: XQ</td>
<td>Xerostomia-specific QOL</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Dietary Consistency</td>
<td>Monitor dietary continnous</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>TCS</td>
<td>Monitor treatment expectation and credibility</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinding</td>
<td>Assess treatment blinding effect</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFSS study</td>
<td>Assess the oral-pharyngeal and oropharyngeal phases of dysphagia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salivary flow-one</td>
<td>Assess salivary flow production</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TGF-β1/IL-6**</td>
<td>Assess TGF-β1/IL-6 levels</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

MDADI: The M.D. Anderson Dysphagia Inventory

FACT-H&N: The Functional Assessment of Cancer Therapy-Head and Neck

XQ: Xerostomia Questionnaire

TCS: Treatment Credibility Scale

VFSS: Videofluoroscopic swallowing study

*only patients who participate in the mechanistic tests need to take these tests.
Acupuncture for Chemoradiation Therapy-Related Dysphagia in Head and Neck Cancer: A Pilot Randomized Sham-Controlled Trial

WEIDONG LU,1 PETER M. WAYNE,1 ROGER B. DAVIS,2 JULIE E. BURING,3 HAILUN LI,4 ERIC A. MACKLIN,4 JOCHEN H. LORCH,4 ELAINE BURKE,4 TYLER C. HADDAD,5 LAURA A. GOGUEN,6 DAVID S. ROSENTHAL,7 ROY B. TISHLER,6,8 MARSHALL R. POSNER,6,8 ROBERT I. HADDADb

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CONCLUSION

A blinded, sham-controlled, randomized clinical trial to evaluate the effectiveness of verum acupuncture in treating dysphagia-related QOL in patients with advanced stage of HNC undergoing intense CRT found the procedure to be feasible, safe, and well tolerated. Dysphagia-related QOL improved with both active acupuncture and sham acupuncture. A future, more definitive trial, is warranted.
Published in final edited form as:

**Acupuncture for non-palliative radiation therapy related fatigue: a feasibility study**

Jun James Mao, MD, MSCE, Terry Styles, MD, Andrea Cheville, MD MSCE, James Wolf, BA, Shawn Fernandes, BS, and John T Farrar, MD PhD

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Figure 1. *Lee fatigue scale score among clinical trial participants (N=16)*

We did not collect post RT data from the first 3 subjects.
Higher number indicates higher fatigue as well as higher energy.
Table 3

Patient’s global impression of fatigue as compared to baseline

<table>
<thead>
<tr>
<th>Patient Global Impression of Change</th>
<th>Mid-RT (N=16)</th>
<th>End-RT (N=16)</th>
<th>Post-RT* (N=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worsened</td>
<td>1(6%)</td>
<td>2(13%)</td>
<td>1(7%)</td>
</tr>
<tr>
<td>Stable</td>
<td>11(69%)</td>
<td>8(50%)</td>
<td>2(15%)</td>
</tr>
<tr>
<td>Improved</td>
<td>4(25%)</td>
<td>6(38%)</td>
<td>10(78%)</td>
</tr>
</tbody>
</table>

Abbreviation: RT-radiation therapy.
*We did not collect post RT data from the first 3 subjects.

STandards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) Guidelines
### Conclusions

- Acupuncture has been shown to be effective in treating side effects related to radiation therapy in cancer patients
- The current literature is mixed
- Clinical trials must be standardized
- Higher-powered studies are necessary
- STRICTA guidelines for acupuncture protocols must be followed to guide future research and improve translation into clinical practice
References


