Critique author	**Ed Whitney**

Bibliographic Data	
Authors	Bauml J, Xie SX, et al.
Title	Expectancy in Real and Sham Electroacupuncture: Does Believing Make It So?
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Citation	Journal of the National Cancer Institute Monographs 2014;50:302-307.
Other information if relevant	

Methods	
Aim of study	To evaluate the relationship between response expectancy and treatment outcome in real and sham acupuncture over time
Design	Randomized clinical trial

Participants	
Population from which participants are drawn	Breast cancer patients who have developed joint pain following chemotherapy with aromatase inhibitors
Setting (location and type of facility)	The Abramson Cancer Center of the Hospital of the University of Pennsylvania
Age	59.7
Sex	67 women
Total number of participants for whom outcome data were reported	63

Inclusion criteria	A history of early stage breast cancer (stages I–III) who were currently receiving an aromatase inhibitor (Anastrozole, Letrozole, or Exemestane), had joint pain that they attributed to their AI for at least three months, with current pain at least 4 on a scale of 0 to 10 , present for at least 15 days in the preceding 30 days
Exclusion criteria	Metastatic (stage IV) cancer or a bleeding disorder
Other information if relevant	Inclusion criteria were reported in a separate article (Mao 2014)

Intervention Groups

Group 1	
Group name	Electro-acupuncture (EA)
Number in group	22
Description of intervention	Application by acupuncturists of 0.25 mm gauge needles 30 to 40 mm long until a “de qi” sensation was achieved, followed by connecting electrodes to the four needles adjacent to the most painful joints, with application of 2 Hz electrostimulation with a TENS unit
Duration of treatment period	Twice per week for 2 weeks followed by weekly treatment sessions for 6 weeks for a total of 10 sessions
Co-interventions if reported	Education on joint pain, staying physically active, and continuing with current medical treatments
Additional information if relevant	

Group 2	
Group name	Sham acupuncture (SA)
Number in group	22
Description of intervention	Insertion of non-penetrative Streitberger needles (which retract into the handle like a stage dagger) placed at non-acupuncture trigger points at least 5 cm from the nearest painful joint , connected to a TENS unit, followed by the acupuncturist turning on a blinking light but without any electrical pulse
Duration of treatment period	Same as EA
Co-interventions if reported	Same as EA

Additional information if relevant	
Group 3	
Group name	Waiting list control
Number in group	23
Description of intervention	Patients on the waiting list were told that they could receive 10 acupuncture sessions if they desired at the end of followup, even if they experienced improvements in joint pain while waiting
Duration of treatment period	8 weeks
Co-interventions if reported	Education on joint pain, staying physically active, and continuing with current medical treatments, as with the SA and EA groups
Additional information if relevant	

Special considerations for conduct of this study	- The authors developed and tested an Acupuncture Expectancy Scale (AES) in order to estimate the influence of patients' expectations on the outcomes of acupuncture - The AES asks patients to rate their agreement with four statements on a 5 point scale in which "Not at all agree" has a score of 1 and "completely agree" has a score of 5: - 1. My symptoms (such as joint pain and fatigue) will improve a lot - 2. I will be able to cope with my symptoms better - 3. The symptoms (joint pain, fatigue) will disappear - 4. My energy level will increase Thus, the AES has a minimum score of 4 and a maximum score of 20, where a higher score means greater expectation of improvement The baseline AES in the study population was 14.5 with a standard deviation of 2.7 and ranged between 7 and 20, and did not differ between the three groups

Primary outcome	

Outcome name and criteria for definition	- Responders, as measured on the Patient Global Impression of Change, rated on a 7 point scale from “very much worse” to “very much improved” - A “responder” is a patient who reports her joint pain symptoms as “much improved” or “very much improved”
Time points measured and/or reported	Responder status was measured 8 weeks after baseline Expectancy was measured at baseline and again at 2, 4, and 8 weeks after baseline
Differences between groups	- There were 11 (55%) responders in the SA group, 12 (57.1%) in the EA group, and only one (4.5%) in the waiting list control - Therefore, the SA and EA groups were equal on the main outcome measure - However, there was a statistical interaction between AES, treatment group, and treatment outcome - In the EA group, baseline expectancy scores did not differ between responders and non-responders; the patients whose symptoms improved had expectations which were equal to the expectations of patients who did not improve - In the SA group, there was a relationship between responders and non-responders on the AES scores; the patients who got SA and were responders had greater expectations of treatment than the patients who were non-responders - The authors performed an analysis in which pain reduction on a 100 point scale at week 8 was the dependent variable and baseline expectation was the independent variable - In this analysis, a one point increase in baseline AES was associated with a pain improvement of 7.9 points in the SA group, but there was no association of AES and pain improvement in the EA group - At higher baseline expectancy, percent pain reduction in the SA group ultimately surpassed what was seen in the EA group
Additional information if relevant	- There were differences between SA and EA with respect to the expectancy scores measured over time - The eventual responders to SA had the same expectancy scores at 2, 4, and 8 weeks that they had at baseline - However, in the EA group, although the responders and non-responders had had equal expectancy scores at baseline, the expectancy scores diverged at weeks 2, 4, and 8, such that at week 8, the responders had higher expectancy scores than the non-responders

Conclusions	
Key conclusions of study authors	- High pre-treatment expectations of a positive response are likely to lead to a favorable response to sham acupuncture - However, high pre-treatment expectations of a positive response are not likely to influence the clinical response to electro-acupuncture; rather, the expectations of patients treated with EA are influenced by the effectiveness of EA, such that patients who are not responding to EA develop lower expectations of EA as their symptoms fail to improve, and the patients whose symptoms are improving come to have more favorable expectations of acupuncture - These differences between SA and EA challenge the notion that acupuncture responses are "all placebo"

Risk of bias assessment		
Domain	Risk of bias Low High Unclear	Comments
Random sequence generation *(selection bias)*	Low	Details of randomization were published separately (Mao 2014)
Allocation concealment *(selection bias)*	Low	
Blinding of participants and personnel *(performance bias)*	Low	The sham acupuncture used a needle which looks as if it is penetrating the skin even though it operates more like a stage dagger, which retracts into the sleeve of the device as it is placed on the sham acupuncture point; similarly, the sham device was hooked up to what looked like an active TENS unit for the delivery of an electrical current
Blinding of outcome assessment *(detection bias)*	Low	

Incomplete outcome data *(attrition bias)*	Low	
Selective outcome reporting? *(reporting bias)*	Unclear, probably low	The protocol at clinicaltrials.gov shows the trial as ongoing but not recruiting patients Also, the protocol shows the primary outcome as the improvement in the Brief Pain Inventory score and lists the Global Impression of Change as a secondary outcome; the article reports both outcomes but discusses the Global Impression of Change first; This may have been a matter of how the paper was organized rather than how it was conducted
Other bias		

Sponsorship if reported		
Study funding sources if reported	The National Center for Complementary and Alternative Medicine at the NIH	
Possible conflicts of interest for study authors	The funding agencies had no role in the design or conduct of the study	
Notes:		

Comments by DOWC staff

- The presentation of the relationships between expectancy scores and treatment response is slightly confusing, but becomes clear if the reader bears in mind the difference between baseline expectancy scores and the expectancy scores that change over the 8 week course of the study
- In the sham acupuncture group, the baseline expectations seem to have been maintained between baseline and week 8; the responders started out with higher expectations than the non-responders, and the expectation differences remained the same as the study progressed
- In the real acupuncture group, the baseline scores appear to have been the same in responders and non-responders; as the non-responders failed to improve, their expectancy scores dropped, and the expectancy scores diverged from those of the responders
- Figure 3 does not show actual data, but rather the mathematical relationship between baseline expectancy scores and the percent improvement in Brief Pain Inventory scores; this is why the points lie in a perfect straight line
- Figure 3 displays the finding that a patient who received sham acupuncture and started out with high expectations of its benefits experienced greater pain reduction than a patient who had real acupuncture but started the study with low expectations of its benefits
- The authors reject the notion that response to acupuncture is "all placebo," but the entire framework for understanding placebo responses remains fluid and undefined; it is preferable simply to note that expectancy is a principal determinant of response to acupuncture, and that a patient who expects significant benefits from acupuncture is more likely to report benefits from sham acupuncture than a patient with low expectations of acupuncture is to report benefits from true acupuncture
- The authors have made a contribution to the acupuncture by actually measuring a "treatment expectancy" construct which is often left to speculation
- It is important to bear in mind that the expectancy scores reflect the expectations of the patients of acupuncture on their side-effects of aromatase inhibitors, and not on the course of their breast cancers
- It is also important to note that the primary outcome of global impression of change did not differ between real and sham acupuncture, which is consistent with what is found repeatedly in other studies of the same type

Assessment by DOWC staff	
Overall assessment as suitability of evidence for the guideline ☐ High quality ☒ Adequate ☐ Inadequate	Adequate for some evidence that in the setting of chronic joint pain arising from aromatase inhibitor treatment of non-metastatic breast cancer, the symptomatic relief from acupuncture is strongly influenced by the expectations with which patients approach treatment, and that a patient who expects significant benefits from acupuncture is more likely to derive benefits from sham acupuncture than a patient with low expectations is to derive benefits from real acupuncture. On average, real and sham acupuncture do not lead to significantly different symptom responses, but different treatment expectations do lead to different symptom responses.

If inadequate, main reasons for recommending that the article not be cited as evidence	

Additional references if relevant
- Mao JJ, Xie SX, Farrar JT, et al. A randomised trial of electro-acupuncture for arthralgia related to aromatase inhibitor use. Eur J Cancer. 2014;50(2):267–276. - Mao JJ, Xie SX, Bowman MA. Uncovering the expectancy effect: the validation of the acupuncture expectancy scale. Altern Ther Health Med. 2010;16(6):22–27.