Reviewer's report

Title: Transcutaneous electrical nerve stimulation mitigates simulator sickness symptoms in healthy adults: a crossover study

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Reviewer: John F Golding

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Biomed_TENS_MS_Chu_2013

Transcutaneous electrical nerve stimulation mitigates simulator sickness symptoms in healthy adults: a crossover study (Chu et al 2013)

Summary

This is an interesting and generally well written paper. Although the topic of acupuncture/ acupressure/ TENS as a possible counter-measure for motion sickness is not new, this study presents new data which should increase knowledge about this area. There are a number of areas in which the paper could be improved. I have listed these below in approximate order of appearance in the paper.

The Line Numbers refer to the line numbers on the manuscript I received.

Detailed comments

(Line 96 ) “…. Most pharmacological agents that are recommended for the prevention of MS failed to show responses that were stronger than those of placebos [12]. …”

This very strong assertion needs qualifying. There are some quite effective drugs, the main problem is side-effects. See ref Murdin et al for a recent review of effective anti-motion sickness medications. (Murdin L, Golding J, Bronstein A . Managing motion sickness. BMJ (2011) 343: 1213-1217.)

In addition to the comment above, please correct typo error (in line 504) the Ref 12 in the ref list … the name of the author is JRR Stott.

(Line 105) -“…. Cyclic manual pressure or electrical stimulation to the Neiguan (P6) acupuncture point suppressed MS symptoms of nausea and vomiting ….. “

Here, at the outset of this paper, it would be useful to mention to the reader of this Journal that some studies concluded these are ineffective, for example your refs 30, 31. Also other studies reported negative findings , here is an example: Miller KE, Muth ER. (2004) Efficacy of acupressure and acustimulation bands for the prevention of motion sickness. Aviat Space Environ Med, 75: 227-34.
For the TENS and TENS + SS sessions ….

Please give some details as to what happened in the Control condition.

…. subscales, disorientation symptoms were predominant, followed by nausea symptoms ….

Please give reader some idea of what proportion of subjects experienced actual nausea, by each condition. The scale scores do not give the reader a ‘feel’ for how sick these subjects were. In addition it would be useful to state if any subjects had to terminate early due to nausea. This could be given in text or added to one of the Tables in Results.

The mechanism of TENS is unclear. We simultaneously stimulated 2 sites in our TENS protocol with ….

This is interesting. It would be worth giving an opinion on why there are such great differences between studies in the effectiveness of TENS or acupuncture against motion sickness. Some studies such as this one find it is effective. By contrast others find this is completely ineffective. The readers of this paper would be interested in possible reasons for such differences between studies, eg, perhaps different stimulation methods, possible placebo or suggestion effects, maybe differences in the particular types of individuals who will respond, genetic or racial differences, etc.

…… MSSQ-B scores, ~20) [20, 21].

What is the 20? Is this an average value? This could be made clearer.

The severity of SS in the current study, as reflected by total SSQ score, was considered significant ….

I realise that theses scales are useful, but see my comment above (about line 275) concerning the meaning of these scores for the understanding by an average reader. Does this mean that most subjects had definite nausea?

….. with previous reports, HR and sympathetic activity (low-frequency ratio) were elevated while parasympathetic activity (high-frequency ratio) was suppressed ….

Reports vary as to whether motion sickness produces increased HR or decreased HR, ie parasympathetic to sympathetic balance changes, etc. Eg, see your ref Benson ref 51. Effects can vary even within an individual with an initial sympathetic effect shifting to a more prolonged parasympathetic effect. The nature of the motion stimulus is also important. If the nature of the stimulus is active and arousing (a simulator is a good example) perhaps HR increases are more likely. Low frequency motion passively experienced often produces motion sickness with reduced HR. It would be useful to inform the reader that HR is not a consistent correlate of motion sickness.

Figures: please could it be made clear what the error bars are …. SE ? SD ? 95%CI ?
Final comment:
I very much enjoyed reading this paper which I found thought provoking and very interesting. I hope the comments above are useful.

I would very much appreciate (via the editor) a pdf copy of the other paper quoted by the authors. I could only get the abstract and not the full paper. (ie : 18. Chu H, Li M-H, Juan S-H, Chiou W-Y: Effects of transcutaneous electrical nerve stimulation on motion sickness induced by rotary chair: a crossover study. J Altern Complement Medicine 2012, 18(5):7.)

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare I have no competing interests,