

COMMENTARY

Acupuncture in the context of diffuse noxious inhibitory control

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The paper by Tobbackx et al., entitled 'Does acupuncture activate endogenous analgesia in chronic whiplash associated disorders? A randomized cross-over trial' (Tobbackx et al., 2012) in this issue examines the effects of acupuncture on symptoms related to cervical acceleration-deceleration injuries. The authors applied a refined methodology to introduce measures that allowed different aspects of the endogenous pain-modulating network to be distinguished. According to Wall and Melzack, (noxious) stimuli can lead to opioid-mediated analgesic effects (Wall and Melzack, 2002), especially via the so-called diffuse noxious inhibitory control (DNIC) network (Le Bars et al., 1979a,b). In order to test this hypothesis, Tobbackx et al. used both local pressure pain and temporal summation of pressure pain stimuli applied to the subjects' neck and calf as a model of conditioned pain modulation. Examinations were performed without and after inflation of an occlusive cuff around the subjects' arm.

The authors report two major findings. At first, local pressure pain sensitivity increased significantly over time following acupuncture when compared with relaxation with or without the model mentioned. Secondly, temporal summation of pressure pain did not differ between acupuncture and relaxation.

Tobbackx et al. suggest that the local increase of the pressure pain threshold may indicate that acupuncture results in activation of endogenous analgetic networks. But how might the lack of effect be explained in the model of conditioned pain modulation?

Initially, following painful stimuli, peripheral mechanisms (sensitization) cause primary hyperalgesia. That area is surrounded by a larger zone of secondary hyperalgesia, caused by mechanisms underlying central sensitization (Wall and Melzack, 2002). In the present trial, acupuncture could reduce this area of hyperalgesia by increasing the respective pressure pain threshold. It would have been interesting to know whether other mechanical pain thresholds were also affected/increased. The increase in thresholds following acupuncture was not only apparent in an area directly affected by chronic whiplash (subjects' neck), but was also evident at a distant site (subjects calf). This suggests that acupuncture acts via endogenous anal-

getic networks, influencing central sensitization and manifesting as a generalized hypoalgesia. Tobbackx et al. administered a continuous pain stimulus (occlusive cuff); thereafter, no differences in pain thresholds were observed. Several possible processes may be able to account for this observation and two of them should be highlighted: Firstly, the staircase model of increasing stimuli may have failed. Increasing repetitive stimuli may lead to a phenomenon called 'wind-up', making neurons more sensitive to other input. The repetitive pressure algometry could act as such a stimulus. Since a decrease in threshold was not detected, it might be possible that the acupuncture and also relaxation effects abrogated 'wind up' phenomena. In support of this hypothesis, a recent trial demonstrated a major increase in a similar model of chronic whiplash patients including aspects of temporal summation without therapeutic intervention (Lemming et al., 2012). Secondly, due to the nature of the chronic whiplash-associated disorder, the subjects had already shown at some point a lack of their ability to activate and benefit from their endogenous analgetic network. As noted by the authors, a trial comparing acupuncture to a test inducing DNIC showed that the acupuncture stimulus has to be appropriate to the estimated level of the patients' possible analgetic network recruitment (Schliessbach et al., 2011). In the present trial, the acupuncture stimulus was reported to be rather gentle (deqi was not always achieved).

This trial is of great interest. It highlights once more that acupuncture research has become a recognized part of pain research. Pain research is a broad field in which specialists make great strides towards understanding and revealing the underlying reciprocity between neural, endocrine and immune systems (Chapman et al., 2008). Trials hitherto examining acupuncture mechanisms have focused on central imaging (Huang et al., 2012). The present trial demonstrates that acupuncture targets key mechanisms involved in the pain-modulating network. It thereby also makes a strong statement that acupuncture research is far more than an inconclusive complementary therapy; today, acupuncture has opened up to the scrutiny of basic research.

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Conflicts of interest

The author has no competing interests to declare.

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