

ABDOMINAL ACUPUNCTURE REDUCES PAIN AT SPINAL LEVEL

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Acupuncture is known to reduce pain, although the exact mechanism is unknown. In a previous study, we demonstrated that abdominal acupuncture (AA) reduced laser-evoked potentials (LEP) amplitude and laser pain perception in healthy subjects (Pazzaglia et al., 2014). In that study we argued about the possible site of action of AA. 1) The reduced N2/P2 amplitude and laser pain rating suggest that AA could mainly act at level of the midcingulate cortex, which represents the main N2/P2 generator. 2) Since during AA the N2/P2 amplitude reduction was paralleled by an inhibitory effect on the N1 amplitude, which has an earlier latency than the N2 component, a primary site of action for AA in the SII area can be hypothesized. 3) It is also possible that AA may act on the input afferent to the cerebral cortex at a more peripheral level (peripheral fibers? spinal cord?), and that this effect may be mediated by an activation of the descending inhibitory control. Considering that acupuncture determines a peripheral stimulation, the last mechanism seems more likely.

The aim of the current study was to investigate the site of AA analgesic effect.

We recorded LEPs in 9 healthy volunteers (mean age: 29,6, range: 24-37; 5 female and 4 male) by using the 32 EEG scalp electrodes. The experimental protocol included 3 times:

- 1) baseline, in which LEPs to stimulation of the bilateral dorsal wrist and right foot were recorded before acupuncture;
- 2) acupuncture, in which LEPs were recorded during AA performed in the abdominal area corresponding to right wrist;
- 3) rest, in which LEPs were recorded 15 minutes after the needle removal.

The AA protocol was the same of the previous study (Pazzaglia et al., 2014)

The statistical analysis (one-way ANOVA) showed a reduction of N2/P2 LEP amplitude to stimulation of both wrist during acupuncture and 15 minutes after needles removal as compared to baseline, while LEP amplitude to foot stimulation was not modified.

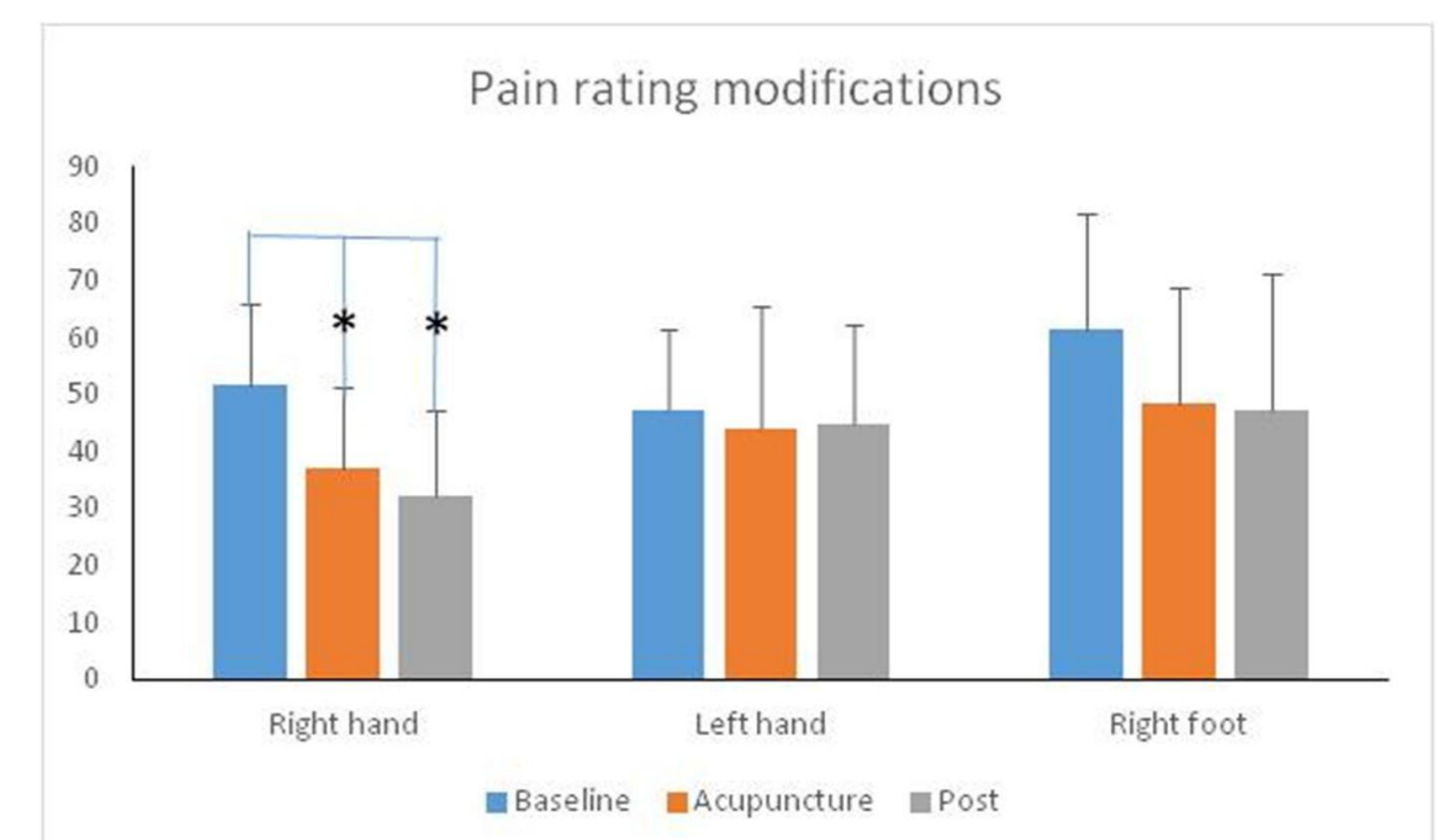
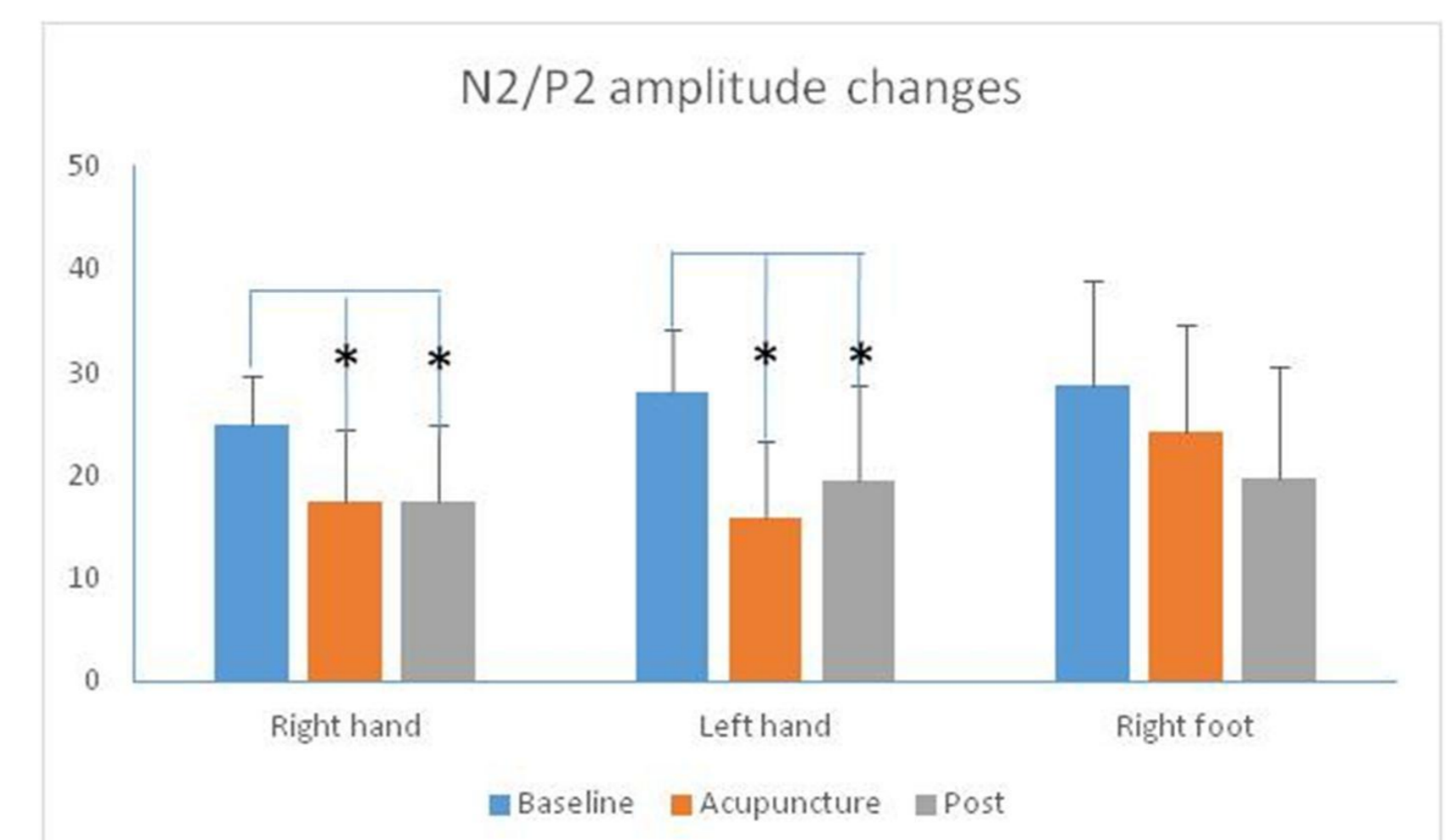
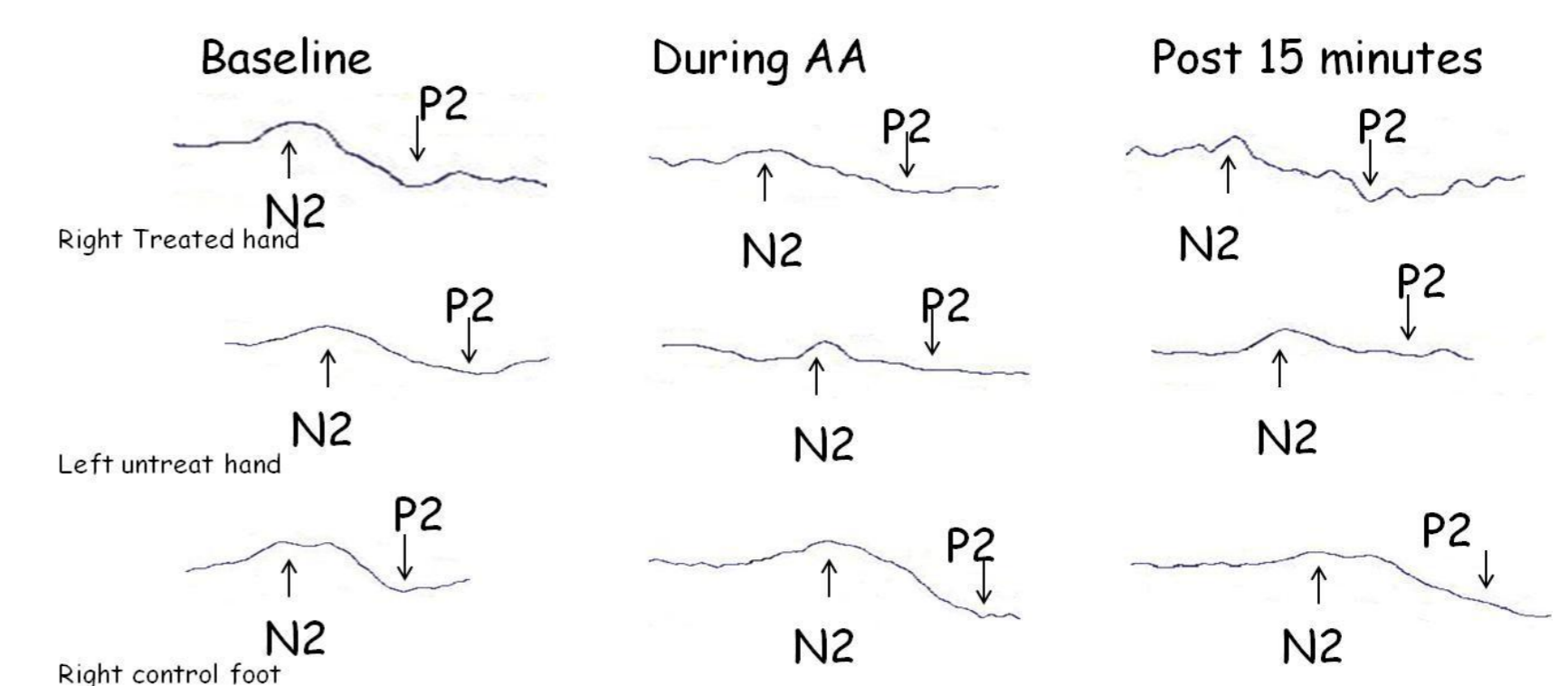
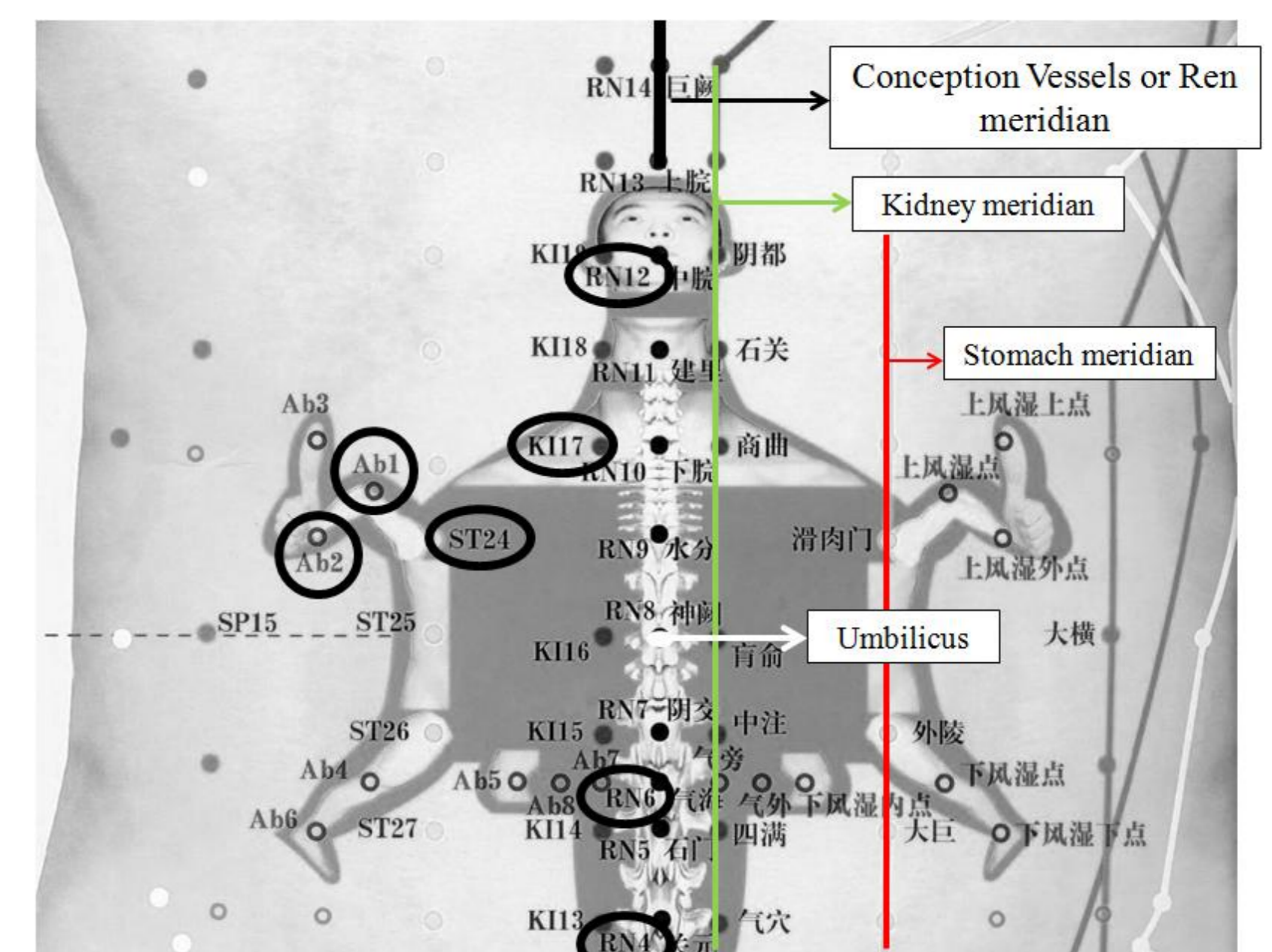
Concerning the laser-pain rating we found a statistically significant decrease only for the treated (right hand) during acupuncture and 15 minutes after needles removal as compared to baseline.

The results of our study, showing a reduction of LEPs amplitude and laser-pain rating in both wrist but not in foot, suggest that the AA analgesic effect occurs at spinal level and the confirm the previous results (Pazzaglia et al., 2014) that its effect lasts 15 minutes after needles removal.

Clinically, in somatic acupuncture the pain of the upper part of the body is treated by stimulated acupoints in the arms while for lower pain, the acupoints of the legs are treated: this is in accordance with the principle of spinal segmental innervation in modern neurophysiology.

Previous electrophysiological experiments support this hypothesis. Acupuncture seems to act in the spinal dorsal horn of cat (Zhao, 2008). The electroacupuncture reduced the expression of Fos in superficial dorsal horn of spinal cord (Zhao, 2008). There are evidences that electroacupuncture determines both a pre and post-synaptic inhibition of nociceptive response in spinal neurons (Zhao, 2008).

The results of a previous study on experimental muscle pain and LEPs (Valeriani et al., 2005) support the hypothesis of a segmental mechanism responsible for our results respect to a descending inhibitory control.



*p<0.05

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