Music has pain-relieving effects, but its mechanisms remain unclear. We sought to verify previously studied analgesic components and further elucidate the underpinnings of music analgesia. Using a well-characterized conditioning-enhanced placebo model, we examined whether boosting expectations would enhance or interfere with analgesia from strongly preferred music. A two-session experiment was performed with 48 healthy, pain experiment-naïve participants. In a first cohort, 36 were randomized into 3 treatment groups, including music enhanced with positive expectancy, non-musical sound enhanced with positive expectancy, and no expectancy enhancement. A separate replication cohort of 12 participants received only expectancy-enhanced music following the main experiment to verify the results of expectancy-manipulation on music. Primary outcome measures included the change in subjective pain ratings to calibrated experimental noxious heat stimuli, as well as changes in treatment expectations. Without conditioning, expectations were strongly in favor of music compared to non-musical sound. While measured expectations were enhanced by conditioning, this failed to affect either music or sound analgesia significantly. Strongly preferred music on its own was as pain relieving as conditioning-enhanced strongly preferred music, and more analgesic than enhanced sound. Our results demonstrate the pain-relieving power of personal music even over enhanced expectations.

**Trial Information:** Clinicaltrials.gov NCT01835275.
Methods: In this retrospective high quality registry case-control study, IC and conventional care patients were identified through inpatient care registries and matched on pain diagnosis (ICD-10: M79), age, gender and socio-demographics. National drug registry data was used to investigate changes in DDD and costs from 90/180 days before, to 90/180 days after, index visits to IC and conventional care. The primary selected drug category was analgesics, complemented by musculo-skeletal system drugs (e.g. anti-inflammatories, muscle relaxants) and psycholeptics (e.g. hypnotics, sedatives).

Results: After index care visits, conventional care pain patients (n = 1,050) compared to IC patients (n = 213), were prescribed significantly more analgesics. The average (95% CI) group difference was 15.2 (6.0 to 24.3), \( \hat{p} = 0.001 \), DDD/patient after 90 days; and 21.5 (7.4 to 35.6), \( \hat{p} = 0.003 \), DDD/patient after 180 days. The cost of the prescribed and sold analgesics was significantly higher for conventional care after 90 days: euro/patient 10.7 (1.3 to 20.0), \( \hat{p} = 0.025 \). Changes in drug prescription and costs for the other drug categories were not significantly different between groups.

Conclusions: Drug prescriptions and costs of analgesics increased following conventional care and decreased following IC, indicating potentially fewer adverse drug events and beneficial societal cost savings with IC.


Abstract Service
Methods: Based on literature searches of acupuncture trials involving patients with headache and migraine, osteoarthritis, and back, neck and shoulder pain, 29 trials met inclusion criteria, 20 involving sham controls (n = 5,230) and 18 non-sham controls (n = 14,597). For sham controls, we analysed non-needle sham, penetrating sham needles and non-penetrating sham needles. For non-sham controls, we analysed non-specified routine care and protocol-guided care. Using meta-regression we explored impact of choice of control on effect of acupuncture.

Findings: Acupuncture was significantly superior to all categories of control group. For trials that used penetrating needles for sham control, acupuncture had smaller effect sizes than for trials with non-penetrating sham or sham control without needles. The difference in effect size was –0.45 (95% C.I. –0.78, -0.12; p = 0.007), or –0.19 (95% C.I. –0.39, 0.01; p = 0.058) after exclusion of outlying studies showing very large effects of acupuncture. In trials with non-sham controls, larger effect sizes associated with acupuncture vs. non-specified routine care than vs. protocol-guided care. Although the difference in effect size was large (0.26), it was not significant with a wide confidence interval (95% C.I. –0.05, 0.57, p = 0.1).

Conclusion: Acupuncture is significantly superior to control irrespective of the subtype of control. While the choice of control should be driven by the study question, our findings can help inform study design in acupuncture, particularly with respect to sample size. Penetrating needles appear to have important physiologic activity. We recommend that this type of sham be avoided.