Rethinking Pain Assessment in Knee Osteoarthritis: The Role of Movement-Evoked Pain

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Introduction

Relying solely on questionnaires in the knee osteoarthritis (KOA) pain studies may not adequately capture pain during weight-bearing tasks.

This study proposed a movement-evoked pain methodology to evaluate the short-term effectiveness of a topical lidocaine/tetracaine patch in reducing KOA pain.

Materials and Methods

Data were generated as part of a double-blind, randomized , crossover clinical trial (NCT01654302) of topical lidocaine/tetracaine patch , in 40 individuals with KOA. Participants were randomly divided into two groups. One group received the active patch during visit 1 and the placebo patch during visit 2, while the other group had the order of treatment switched. During each visit, two exercise sessions were conducted: the first without the patch, and the second after patch application. Patients used a commercially available stair-stepper machine for a maximum of 2 minutes during each exercise session, reporting their pain level after each exercise session.

Participants

Among 38 completers (23 women, 15 men; mean age 57.8, range 43-75),we studied changes in pain after exercise 1 (pre-patch application) for all participants.

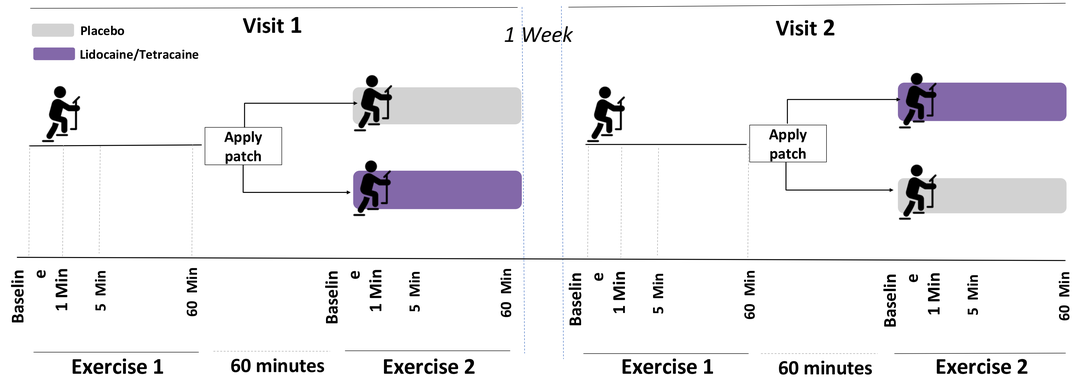


Figure 1. Study design.

Key Message:
Movement-evoked pain may be a relevant, sensitive outcome measure in knee osteoarthritis pain studies.

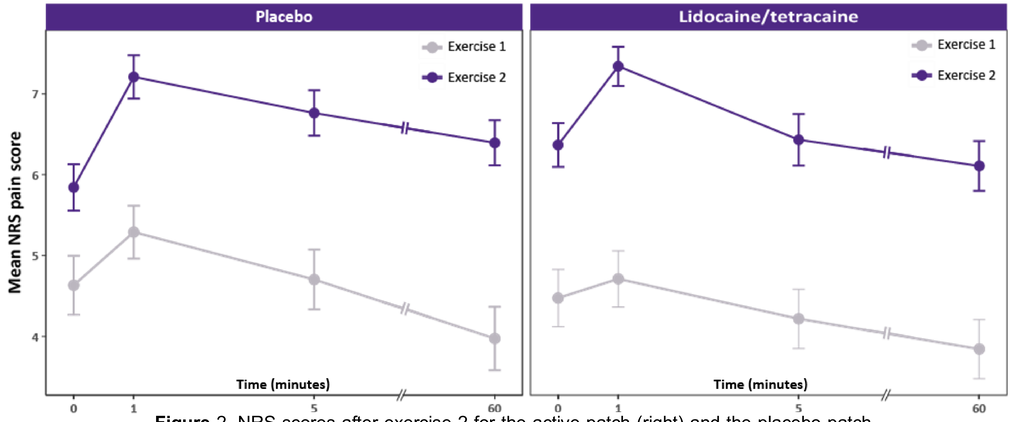


Figure 2. NRS scores after exercise 2 for the active patch (right) and the placebo patch (left).

Results

The analysis indicated a significant overall effect of exercise on inducing pain, with $F(3,223)=18.95$, $p< 0.001$. Mean pain rose from 6.1 at baseline to 7.3 at 1 minute post-exercise, then declined to 6.6 at 5 minutes and 6.2 at 60 minutes. The increase was observed at both visits, but was greater at Visit 1.

Using a mixed-effects model, we demonstrated a significant contrast in pain levels between the active patch and the placebo patch, in comparison to baseline values. Lidocaine/tetracaine reduced post-exercise pain more than placebo (mean difference -0.39, 95% CI -0.68 to -0.1; p=0.01).

Moreover, irrespective of the patch type, the presence of the patch on the knee significantly alleviated pain compared to its absence, and this effect remained consistent across all time points ($p < 0.001$).

Discussion

By employing a movement-based pain paradigm, we demonstrated the short-term effectiveness of a lidocaine/tetracaine patch compared to a placebo patch. We believe that movement-evoked pain can serve as an outcome measure in knee osteoarthritis pain studies.

Acknowledgments

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