

Smartphone Based Delivery Of Oropharyngeal Exercises For Treatment Of Snoring: A Randomized Controlled Trial

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Abstract

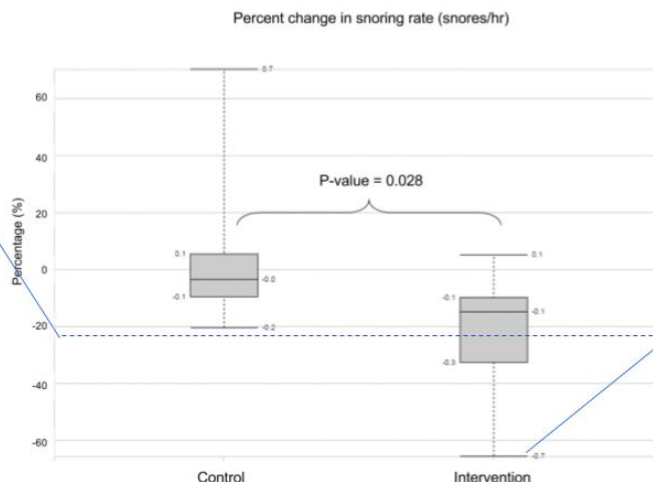
BACKGROUND: Upper airway exercises for snoring treatment can be effective but difficult to administer and monitor. We hypothesized that a brief, relatively simple daily upper airway exercise regimen, administered by a smartphone application, would reduce snoring and encourage compliance.

METHODS: Targeted vowel sounds causing tongue base movements were incorporated into a voice-controlled smartphone game application. Participants with habitual snoring, apnea hypopnea index (AHI) ≤ 14 events/hour, and BMI ≤ 32 kg/m² were randomly assigned to perform 15 minutes of daily gameplay (intervention group) or 5 seconds of daily voice recording (control group) and to audio record their snoring for 2 nights/week for up to 12 weeks. Sounds above 60 dB were extracted from recordings for snore classification with machine learning support vector machine classifiers.

RESULTS: Sixteen patients (8 in each group) completed the protocol. Groups were similar at baseline in gender distribution (5 males, 3 females), mean BMI (27.5 \pm 3.8 vs 27.4 \pm 3.8 kg/m²), neck circumference (15.1 \pm 1.6 vs 14.7 \pm 1.7 inches), Epworth Sleepiness Score (8 \pm 3.5 vs 7 \pm 4.0) and AHI 9.2 \pm 4.0 vs 8.2 \pm 3.2 (events/hr). At 8 weeks, the absolute change in snoring rate (> 60 dB/hour) was greater for the intervention group than the control group (-49.3 \pm 55.3 vs -6.23 \pm 23.2; p=0.037), **a 22% and 5.6% reduction, respectively**. All bed partners of participants in the intervention group reported reduced snoring volume and frequency, whereas no change was reported for the control group.

CONCLUSIONS: Smartphone application administered upper airway training reduces objective and subjective snoring measures and improves sleep quality.

22% mean reduction in snoring rate for the intervention



65% largest individual reduction in snoring rate for the intervention