### Use of a vibrating kinetic anesthesia device reduces the pain of lidocaine injections: A randomized split-body trial

*To the Editor:* Infiltrative lidocaine is the most common anesthetic for dermatologic procedures; however, many patients complain of injection pain.[1] Vibration analgesia has been shown to reduce the pain of steroid,[2] filler,[3] and botulinum toxin[3] injections; intraoral lidocaine injections[4]; and lidocaine injections for digital nerve blocks.[5] The effect of a vibrating kinetic anesthesia device (KAD) on the pain of cutaneous lidocaine injections has not been studied in the context of biopsy and excisional surgery. This study compared subject-rated pain and preferences for buffered lidocaine injections administered with (intervention) and without (control) assistance of a KAD on the left and right sides of 1 of 3 randomly assigned body sites (nasofacial sulcus, lateral forehead, or lateral back).

This open label, randomized, controlled, split-body trial was performed at the University of Pennsylvania with institutional research board approval. The subjects were healthy adult volunteers who were able to tolerate lidocaine injections. Vulnerable populations and subjects with pain-related neurologic conditions were excluded. Investigators randomized subjects manually by using cards in sealed envelopes according to the scheme in Fig 1.

For each injection, investigators used a 30-gauge needle to inject 0.5 mL of room temperature 1% lidocaine buffered with 8.4% sodium bicarbonate at a 90-degree angle over approximately 5 seconds. When used, the KAD (Blaine Labs, Santa Fe Springs, CA) was activated on the skin adjacent to the injection site for the duration of the injection. Subjects rated the pain of each injection by marking a 100-mm visual analog scale (VAS) and then reporting injection preference and whether they were bothered by the KAD.

Sample size was calculated to detect a clinically significant change of 10 mm on the VAS scale with use of an effect size estimated from previous studies.[2] Descriptive statistics were presented with use of means, medians, percentages, and measures of precision as appropriate for the outcomes of interest, and a paired *t* test was used to evaluate the effect of the intervention.

Fig 1 shows participant flow and randomization. Table I shows self-reported demographic data of the 47 participants. The median pain score was 26 mm

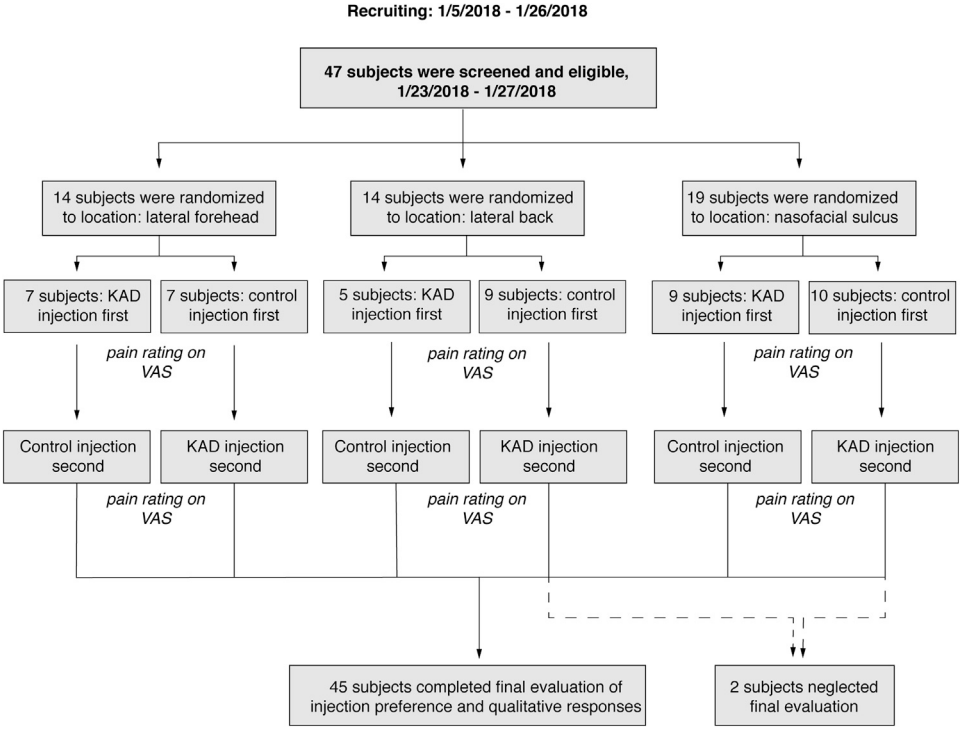


**Fig 1.** Participant flow and randomization. Two subjects rated both injections but did not complete the final page of the questionnaire, which asked subjects to choose preference of injection and indicate whether they were bothered by the kinetic anesthesia device (KAD). *VAS*, Visual analog scale.

**Table I.** Self-reported demographic data of the participants (N = 47)

| Characteristic | n (%) |
|---|---|
| Median age, y (min, p25, p75, max) | 26 (20, 23, 31, 64) |
| Sex | |
| Male | 20 (42.6%) |
| Female | 27 (57.4%) |
| Race/ethnicity | |
| White (non-Hispanic) | 20 (42.6%) |
| Asian | 13 (27.7%) |
| White (Hispanic) | 8 (17.0%) |
| African American | 5 (10.6%) |
| Native American | 1 (2.1%) |
| Injection location | |
| Lateral aspect of the back | 14 (29.8%) |
| Lateral aspect of the forehead | 14 (29.8%) |
| Nasofacial sulcus | 19 (40.4%) |
| Order of injection | |
| KAD first | 21 (44.7%) |
| KAD second | 26 (55.3%) |

*KAD*, Kinetic anesthesia device.

(interquartile range, 13-34 mm) for injections without the KAD versus 7.5 mm (interquartile range, 5-16 mm) for KAD-assisted injections. KAD-assisted injections provided a mean decrease in pain of 15 mm (95% confidence interval, 9.8-20.1 mm) (decreased pain score, $P < .0001$; decrease >10 mm, $P = .0295$). Of 45 subjects, 33 (73.3%) preferred the KAD-assisted injection, whereas 6 (13.3%) preferred the injection without the KAD and 6 (13.3%) had no preference. When asked whether the KAD bothered them in any way, 35 of the 45 subjects (77.8%) replied no and 10 (22.2%) replied yes. Subjects' age, sex, injection location, and order of receipt of injection were not significantly associated with pain levels or effect of the KAD.

Limitations of this study included a lack of blinding to the intervention and the use of healthy volunteers.

This study demonstrates that vibration analgesia with the KAD significantly decreased the pain associated with lidocaine injections, with an effect comparable to that of established strategies such as buffering and use of warm lidocaine.[1] The strong patient preference and low side effect profile for this analgesic technique merit consideration for its inclusion in daily practice.

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