A novel taste test for nasolacrimal obstruction using Denatonium Benzonate (BITREX) (BITREX™)

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Aim: To evaluate a novel non-invasive technique (known as the 'bitter taste test') of investigating the patency of the nasolacrimal duct in healthy asymptomatic eyes.
Material & Methods: This is a double-blind, randomized controlled trial. Participants between the ages of 18 to 35 (n=28) with normal lacrimal function were randomized to the intervention group (Bitrex, 100 parts per million denatonium benzoate and sterile water, n=14) or to the control group (sterile water only, n=14). The drops were administered in the conjunctival cul-de sac of their right eye. Participants refrained from eating or drinking for one hour prior to the study, during the study and for an hour afterwords. All participants were pre-treated with tetracaine in their right eye to mask any difference in sensation. The experimental solution was administered via three drops spaced one minute apart. The primary outcome was whether or not participants reported a strong, persistent bitter taste in their oropharynx within two hours. The secondary outcome was the time-to-taste. All participants received irrigation of the lacrimal system to confirm anatomic patency. Statistical analysis with Fisher's exact test was done using GraphPad online software.
Results: All participants in the intervention group reported the presence of the bitter solution (n=14). None of the participants in the control group reported bitterness (n=14). This difference was significant ($p<0.001$, Fisher's exact test). Time-to-taste was within 15 minutes for 71% of the intervention group (n=10); within one hour for 86% (n=12); and within 2 hours for 100% (n=14). The bitterness typically persisted for several hours. All participants had normal lacrimal systems to irrigation. No adverse events were reported.
Conclusion: The bitter taste test demonstrates a promising ability to assess nasolacrimal duct patency under physiologic conditions in heathy participants. Its simplicity and non-invasive nature are ideally suited as a screening test for 1st line eyecare professionals and primary care physicians.