

No more needles at the dentist—just a tiny electric current instead

January 18 2016

If you're scared of the dentist's needles you're not alone – but new research means you might not have to put off that appointment again. A study published in *Colloids and Surfaces B: Biointerfaces* reveals how the dentist could give you anesthetic using a tiny electric current instead of a needle.

The researchers behind the study, from the University of São Paulo, say their new findings could help improve dental procedures and bring relief to millions of people who are scared of needles. It would also save money and avoid contamination and infection, they say.

"Needle-free administration could save costs, improve patient compliance, facilitate application and decrease the risks of intoxication and contamination," explained Professor Renata Fonseca Vianna Lopez, one of the authors of the study from the University of Sao Paulo in Brazil. "This may facilitate access to more effective and safe dental treatments for thousands of people around the world."

Dentists often have to carry out invasive and painful procedures in the [mouth](#). To minimize patients' discomfort, dentists use anesthetics that block the pain, which are administered using needles. However, many patients are extremely afraid of these injections, resulting in them postponing and even canceling visits to the dentist.

For these patients, an additional step is needed: dentists first give them a topical painkiller to reduce the pain – and associated fear – caused by

the needle. This can come in the form of a hydrogel, ointment or sprays; the most common are hydrogels that can contain lidocaine and prilocaine.

In the new study, the researchers investigated a way of getting these topical anesthetics into the body more effectively, to see if they could replace [needles](#) altogether. They found that applying a tiny electric current – a process called iontophoresis – made the anesthetics more effective.

The researchers first prepared the anesthetic hydrogels with a polymer to help it stick to the lining of the mouth. They added two [anesthetic drugs](#), prilocaine hydrochloride (PCL) and lidocaine hydrochloride (LCL). They tested the gel on the mouth lining of a pig, applying a tiny electric current to see if it made the anesthetic more effective.

The anesthesia was fast-acting and long-lasting. The [electric current](#) made the prilocaine hydrochloride enter the body more effectively; the permeation of the anesthetic through the mouth lining increased 12-fold.

The researchers say the technology has applications not only in dentistry anesthesia, but also in other areas such as cancer treatment.

"Over the last few years, our research group has been working on the development of novel [drug delivery](#) systems for the treatment of several skin and eye diseases," said Prof. Lopez. "The skin and eyes pose challenges for drug delivery, so we have focused on improving drug delivery in these organs using nanotechnology, iontophoresis and sonophoresis, which is permeation using sound waves."

The researchers now plan to develop an iontophoretic device to use specifically in the mouth and do some preclinical trials with the system.

More information: Camila Cubayachi et al. Needle-free buccal anesthesia using iontophoresis and amino amide salts combined in a mucoadhesive formulation, *Colloids and Surfaces B: Biointerfaces* (2015). [DOI: 10.1016/j.colsurfb.2015.11.005](https://doi.org/10.1016/j.colsurfb.2015.11.005)

Provided by Elsevier

Citation: No more needles at the dentist—just a tiny electric current instead (2016, January 18)
retrieved 9 May 2024 from

<https://phys.org/news/2016-01-needles-dentist-just-tiny-electric-current.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.