

Researchers invent a quick-release medical tape that minimizes neonatal skin injury

October 29 2012

Commercial medical tapes on the market today are great at keeping medical devices attached to the skin, but often can do damage—such as skin tissue tearing—once it's time to remove them.

A research team from Brigham and Women's Hospital (BWH) has invented a quick-release tape that has the strong adhesion properties of commercial medical tape, but without the ouch factor upon removal.

The team was led by Jeffrey Karp, PhD, BWH Division of Biomedical Engineering, Department of Medicine, senior study author in collaboration with The Institute for Pediatric Innovation which defined the need and requirements for a new neonatal adhesive based on national surveys of neonatal clinicians.

The study detailing the tape design will be electronically published on October 29, 2012 in the [Proceedings of the National Academy of Sciences](#). The research was conducted in collaboration with Robert Langer, PhD at the Massachusetts Institute of Technology.

The tape which achieves strong adhesion when securing medical devices to skin, but could also easily peel off safely, utilizes a three-layer design approach that sets a new paradigm for quick-release medical tapes.

"Current adhesive tapes that contain backing and adhesive layers are tailored to fracture at the adhesive-skin interface. With adults the adhesive fails leaving small remnants of adhesive on the skin while with

fragile neonate skin, the fracture is more likely to occur in the skin causing significant damage," said Karp. "Our approach transitions the [fracture zone](#) away from the skin to the adhesive-backing interface thus completely preventing any harm during removal."

The approach incorporates an anisotropic adhesive interface between the backing and adhesive layers. The anisotropic properties of this middle layer means that it has different physical properties dependent on direction. For instance, take wood, which is stronger along the grain than across it.

The researchers employed [laser etching](#) and a release liner to create the anisotropic interface resulting in a medical tape with high shear strength (for strong adhesion) and low peel force (for safe, quick removal). Once the backing is peeled off, any remaining adhesive left on the skin can safely be rolled off with a finger using a "push and roll" technique.

"This is one of the biggest problems faced in the neonate units, where the patients are helpless and repeatedly wrapped in medical tapes designed for adult skin," said Bryan Laulicht, PhD, BWH Division of Biomedical Engineering, Department of Medicine, lead study author.

There are more than 1.5 million injuries each year in the United States caused by medical tape removal. Such injuries in babies and the elderly—populations with fragile skin—can range from skin irritation to permanent scarring.

Provided by Brigham and Women's Hospital

Citation: Researchers invent a quick-release medical tape that minimizes neonatal skin injury (2012, October 29) retrieved 24 April 2024 from <https://medicalxpress.com/news/2012-10-quick-release-medical-tape-minimizes-neonatal.html>

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