

Safe Photo-Thermal Release Medical Tape

This technology is a temperature sensitive photo-release tape that adheres to human skin to reduce the risk of medical-adhesive-related skin injuries. The tape is composed of a temperature sensitive polymer and a near-infrared absorbing layer for thermal feedback.

What is the Problem?

Medical adhesive tapes are an integral part of healthcare delivery and are used in all care settings to cover and secure to the skin wound dressings or critical medical devices such as intravenous (IV) lines. Medical tapes consist of pressure-sensitive adhesive (PSA) applied to a plastic or fabric backing that functions as a carrier for the adhesive, providing structural and protective properties. The combination of different backings and adhesives determines the characteristics of the tape, including levels of adhesion and water resistance, and informs nurses' decisions in the selection of the appropriate tape for a patient in a specific situation. Without means of safe removal, these stronger adhesives are difficult to painlessly remove from the skin and may cause medical-adhesive-related skin injuries (MARSIs), including skin tears and an increased risk of infection. Lower-adhesion medical tapes may be applied to avoid MARSIs, leading to device dislodgement and further medical complications. There is a need for a high adhesion tape that can transition to a low adhesion tape upon removal.

What is the Solution?

The solution is a temperature sensitive photo-release tape. The PSA has a temperature sensitive polymer additive that transitions when heated above skin temperature but below the skin pain threshold. A near-infrared (NIR) absorbing layer in the tape is coupled with an NIR optical wand with thermal feedback. This new NIR optical wand was designed for rapid and noncontact release, with short NIR exposure causing the tape to heat and reduce adhesion, allowing for lower-adhesion removal. The unique properties of this multifunctional system (tape and portable NIR wand) may allow even stronger skin adhesion for critical medical devices while concurrently reducing the risk of MARSIs upon photo release and easy removal.

What Differentiates it from Solutions Available Today?

While high-adhesion medical tapes are effective and easy to apply, the adhesion of these tapes can increase over time, leading to a painful and time-consuming removal process that may ultimately result in tape-induced injuries. Lower-adhesion medical tapes increase the risk of critical device dislodgement and is classified as a medical error. ThermoTape is the first temperature-sensitive tape that functions in the human skin temperature range. In vitro testing

Technology ID

BDP 8689

Category

Device/Other
Selection of Available
Technologies

Authors

Eric Seibel

Learn more



has demonstrated retention of high adhesion at normal skin temperature (35 °C), and 67.5% reduction in peel force adhesion when raised to 45 °C both in vitro and in vivo. A recent clinical trial showed statistically significant results for pain reduction when heat was used for removal. ThermoTape can potentially significantly reduce the risk of MARSII while simultaneously providing the high adhesion required for secure attachment of medical devices during hospital care.

Patent Information:

[US11878499B2](#)

References

1. Saniel D. Lim, Carl C. Svanevik, Mark E. Fauver, Leonard Y. Nelson, Ann-Marie Taroc, Ashley F. Emery, Eric J. Seibel(43983) ,
<https://asmedigitalcollection.asme.org/medicaldevices/article/14/2/021001/1066050/Proof-of-Concept-of-a-Surrogate-High-Adhesion>, Journal of Medical Devices