

### STUDY OBJECTIVE

The study aims to compare a light-deactivated adhesive to medical-grade adhesives used in incisional negative pressure wound therapy applications

### INTRODUCTION

- **Surgical site infection (SSI) and surgical site complications (SSC) represent a significant burden on healthcare<sup>1-3</sup>**
  - Increased patient morbidity and mortality
  - The financial burden costs the US \$3.5 to \$10 billion annually
- **Incisional dressings are essential to keep the incision site clean and protected<sup>4-6</sup>**
  - Adhesive strength must keep dressing in place
  - Can require more frequent dressing changes
  - Strong adhesives can cause medical adhesive-related skin injuries (MARS)
- **Research demonstrates that incisional negative pressure wound therapy (iNPWT) can help prevent SSI and SSC in specific patient populations<sup>4,7</sup>**
- **Current dressings balance adhesive strength with the risk of MARS to allow a seven-day wear time**
- **A new UV / near UV light-deactivated adhesive (non ambient light ) provides the strength of acrylic adhesives but releases at peel strengths less than silicone once deactivated**

### METHODS

- **Study compares the light-deactivated adhesive, exposed and unexposed, to two acrylic adhesives (Acrylic A and B) and a silicone adhesive utilized by common legally marketed incisional NPWT dressings**
  - All testing occurred on one healthy volunteer's skin using the left and right ventral forearm, with the hair removed
  - Test samples consisted of 2" X 1" strips using portions of dressings with only film components; 8 samples for five conditions
  - Randomly adhered to the healthy volunteer's skin in groups of 5 using a sample from each condition. Measured maximum and average peel strength (Figure 1)
- **Light sensitive Adhesive Condition**
  - Unexposed condition represents full strength condition
  - Exposed condition represents switched condition to promote release

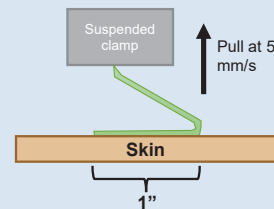


Figure 1: Experimental diagram of peel test

#### Statistical Analysis

- One-way analysis of variance
- Pairwise t-test to determine significant differences between conditions
- All p-values corrected for multiple comparisons using Benjamini-Hochber method
- $P < 0.05$  indicates a significant difference

### RESULTS

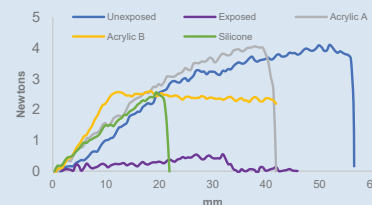


Figure 2: Representative peel test outcome for each condition

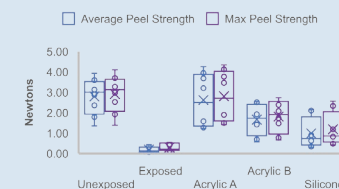


Figure 3: Box and whisker plots for average and maximum peel strength

- **The light-sensitive adhesive achieves equivalent or superior peel strength compared to acrylic and silicone adhesives used in iNPWT dressings in unexposed condition**
  - Unexposed light-sensitive adhesive is significantly stronger than Silicone (Avg & Max  $p=0.004$ ) and Acrylic B (Avg. & Max  $p=0.034$ ); Acrylic A is significantly stronger than Silicone (Avg  $p=0.01$  & Max  $p=0.034$ )
- **Exposed light-sensitive adhesive peel strength is significantly lower compared to all other conditions**
  - Unexposed (Avg. & Max  $p=0.001$ ); Acrylic A (Avg.& Max  $p=0.004$ ); Acrylic B (Avg.& Max  $p=0.004$ ); Silicone (Avg. & Max  $p=0.034$ )

### DISCUSSION

- **The light-sensitive adhesive demonstrates the necessary strength to maintain dressing integrity in the unexposed state**
  - Dressing integrity is essential for minimizing the risk of infection and wound dehiscence
  - Incisions across joints require high-strength adhesives to maintain dressing integrity
- **The exposed state of the light-sensitive adhesive peels more gently than the silicone adhesive commonly used in iNPWT**
  - Minimizes pain experienced by the patient
  - Minimizes risk of SSC caused by the removal of surgical dressings
  - Simplifies dressing removal and potentially saves time for clinicians

### CONCLUSION

**The light-sensitive adhesive achieves strong peel strength but releases more gently than silicone, addressing the challenges of required adhesive strength with minimal risk of MARS.**

#### References:

1. Alem et al. Spine 2020
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4. Morgan-Jones et al. Wounds Int. 2019
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6. Fidalgo de Faria et al. Int J Nurs. Studies Advances 2022
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