

The Relationship Between Peel Force Of Adhesive Dressings And Subjective Discomfort.

Peter Dykes¹, PhD and Rob Heggie², MSc.

¹Cutest Systems Ltd, 214 Whitchurch Road, Cardiff CF14 3ND, UK. ²Cardiff Biometrics Ltd, 92 Tewkesbury Street, Cardiff CF24 4QT, UK.

ABSTRACT

The study was an open within subject comparison of six adhesive dressings in 24 normal volunteer subjects. The test products were Mepilex[®] Border, Duoderm[®] Extra Thin, Biatain[®] Adhesive, Tielle[®], Versiva[®] and Alleevyn[®] Adhesive. The peel force of removal was recorded after 24 hours of application. The discomfort experienced by the subject was assessed by the subject's themselves using an electronic 100mm visual analogue scale (VAS). Overall Mepilex Border was given a significantly lower discomfort score ($p \leq 0.01$) than the other adhesive products. The rank order of the mean peel force was from most to least, Tielle, Alleevyn Adhesive, Duoderm Extra Thin, Mepilex Border, Biatain Adhesive, and Versiva. The peel force for Tielle and Alleevyn Adhesive was significantly higher ($p \leq 0.05$) than the other products tested. The correlation of VAS discomfort scores with peel force was poor suggesting that the level of discomfort on adhesive dressing removal is not entirely dependent on the peel force and that other factors play a role.

INTRODUCTION

Part of the pain and discomfort experienced at wound dressing change is attributable to the adhesive edge of the wound dressings. However in a clinical situation it is difficult to differentiate between the effects of the adhesive edge and the material directly in contact with the wound bed. Previous studies in healthy volunteers [1] have shown that the peel force of adhesive edges of wound dressings varies approximately two fold. In this study the level of subjective discomfort on removal of the adhesive edge of the wound dressings has been assessed in healthy volunteers and the relationship to peel force investigated.

AIM

The aim of this study was to relate the force required to remove adhesive dressings to the degree of discomfort experienced by the subject.

STUDY DESIGN

The study was an open within subject comparison of six adhesive dressings in 24 normal volunteer subjects. The test products were Mepilex Border, Duoderm Extra Thin, Biatain Adhesive, Tielle, Versiva and Alleevyn Adhesive. The test site was the lower back. Six test sites were identified on the lower back corresponding to the six test materials. The allocation of test materials to the test sites was randomised. The test products were applied to the lower back of each subject on day 1. The peel force of removal was recorded at day 2 (24 hours) as described previously [1]. The discomfort experienced by the subject at each removal was assessed using an electronic visual analogue scale (VAS) (Figure 1a & 1b).



Figure 1a. VAS discomfort meter - Subjects View.



Figure 1b. VAS discomfort meter - Result not seen by subject.

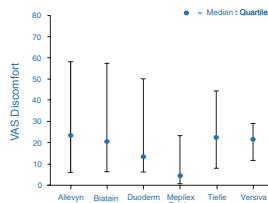


Figure 2. VAS discomfort scores.

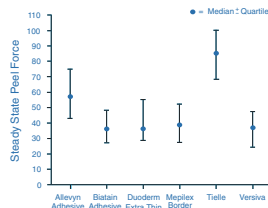


Figure 3. Peel force.

RESULTS

Overall Mepilex Border was given a significantly lower discomfort score ($p \leq 0.01$) by the subjects than the other adhesive products (Fig 2). There were no clear differences between the five other products tested. The rank order of the mean peel force was from greatest to least, Tielle, Alleevyn Adhesive, Duoderm Extra Thin, Mepilex Border, Biatain Adhesive, and Versiva (Fig 3). The peel force of Tielle and Alleevyn Adhesive was significantly higher ($p \leq 0.05$) than the other products tested. The correlation of VAS discomfort scores with peel force was poor.

DISCUSSION

It is clear from this study that Mepilex Border causes less discomfort on removal using a method that removes the dressing at a constant speed and angle to the skin surface. No differences in discomfort were apparent between the other adhesive dressings tested. This is despite the differences seen in peel force. Thus both Tielle and Alleevyn Adhesive had higher peel force but the levels of discomfort were comparable to other adhesive dressings tested. Overall the correlation of VAS discomfort with peel force was poor. It may be concluded that the level of discomfort experienced by the subjects on adhesive dressing removal is not entirely dependent on the peel force and that other aspects of skin surface adhesive interaction play a role.

REFERENCE

1. Dykes PJ, Heggie R & Hill SA (2001). Effect of adhesive dressings on the stratum corneum of the skin. Journal of Wound care; 10: 7-10.