

Introduction

When there is increased friction and/or tension at the interface between the skin and the wound dressing, shear forces loosen the connections between the epidermis and dermis, which causes the separation of the two skin layers and allows interstitial fluid to seep into the newly created space to form blisters. The presence of wound exudate (or any moisture, such as perspiration), even at normal healing levels, can exacerbate the risk for skin blistering and stripping because moisture increases friction forces and softens the skin, which weakens its outer layers. The development of skin blistering and stripping can negatively affect both patient and practice, and poses potentially damaging financial ramifications. A limited number of studies have examined the effect of different dressings on skin stripping and blister prevention, there are no conclusive recommendations regarding the most appropriate and effective choice of postoperative wound dressing. To aid this, the study outlined aimed to determine the skin stripping effects of a test dressing against an *in vitro* epithelial cell model.

Methodology

- Epithelial cells were seeded into 6-well plates at a 1×10^5 density and incubated until a confluency of 80% was reached.
- Cells were allowed to dry and dressings were applied and made to conform to the cell monolayer.
- Plates were incubated at room temperature to allow for dehydration effects of the dressings on the cell monolayer.
- Dressings were 'stripped' from the cells over 7 days.
- Crystal violet solution was added to the wells, aspirated, and washed.
- Once dry, the cells were visualised using phase contrast microscopy in comparison to untreated cell and mechanical removal controls.

Results

Non-adherent test wound dressings did not demonstrate significant stripping effects over the 7 days treatment. There was no damage to or removal of the cell monolayer compared to the untreated controls. Overall confluency of both treated and untreated cells had decreased by 4 days. Mechanical removal controls demonstrated significant disruption to the cells without causing significant damage to the adherent surface (Figure 1).

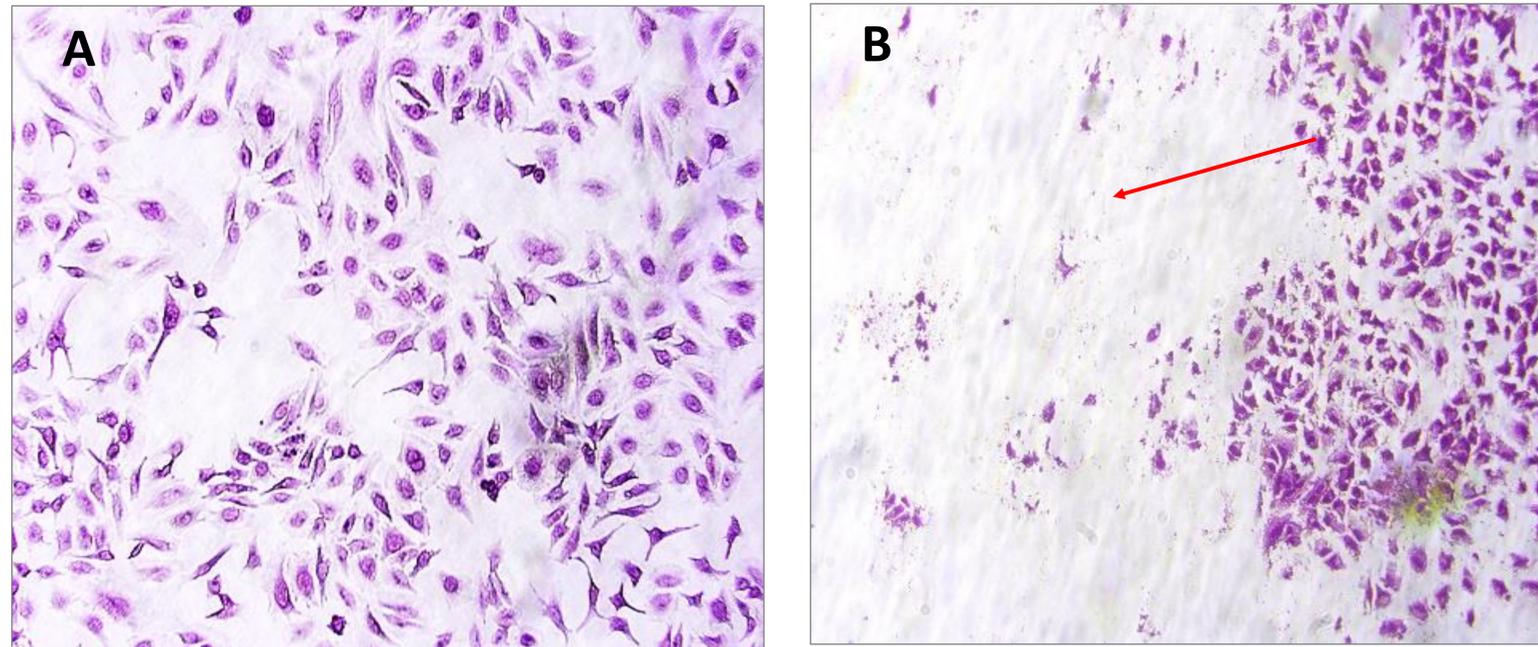


Figure 1. Crystal violet staining of untreated HeLa cell monolayer. (A) compared to the cell monolayer after mechanical removal (B). Red arrow indicates areas of mechanical cell removal.

Discussion and Conclusions

- This model provides a rapid alternative *in vitro* solution to investigate skin stripping effects of wound dressings on an epithelial skin layer.
- The model is reproducible and does not require human or animal participants or a clinical study. It provides visualisation of the effects on epithelial cells over a 7 day test period.