A Comparison of the Wear Time of Dressings with Silicone Adhesives
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Introduction
Dressings that utilised soft silicone adhesives are widely-used and common in the treatment of chronic wounds. Soft silicone dressings provide gentle, pain-free removal, preventing trauma to the skin, but can be difficult to remain adhered to awkward areas. The ability of a dressing to adhere to a patient is dependent on a number of factors. These include the resistance of the dressing to edge-roll on contact with clothing and bedding, the flexibility of the dressing, and the strength of the silicone adhesive. Also important is the ability of a dressing to retain fluid, as if the peri-wound area is wet or macerated. A hydrophobic silicone adhesive will not stick.

Aim
To compare foam dressings with a silicone adhesive to quantify design features that aid dressing retention/fixation.

Method
Dressing lift
The resistance of dressings (12.5x12.5cm, or nearest available size) to edge-roll was tested using a novel rolling simulator (see figure 1). Lateral forces were applied across the dressing surface by the presence of a weighted cotton bed sheet in order to simulate forces experienced by the dressing when adhered to a patient in a bed. The dressings were tested on the simulator for one minute at a constant rate of rotation, after which the percentage lift of the dressings was measured. A one minute test was selected to provide a controlled comparison of the dressings. Four replicates were tested of each silicone foam dressings.

Dressing flexibility
A bending length test was used to measure the flexibility of the sacral shape of each dressing. In this test, the length that a dressing freely bends over an edge is measured in order to quantify the flex of the material. The larger the value for bending length, the more flexible a material. Three replicates were conducted of four different silicone foam dressings.

Fluid retention
Fluid retention was determined by saturating a 12.5x12.5cm (or nearest available size) dressing with Solution A, heated to a temperature of 37°C. A uniform weight (5g) was then applied to the dressing to apply a total compression of 30mmHg in order to quantify the fluid released on dressing compression. Three replicates were conducted of four different silicone foam dressings.

Results & Discussion

Volunteer Evaluation (VE)
Dressings were assessed for wear time in a healthy volunteer evaluation, in which four volunteers wore six foam dressings (7.5x7.5cm, or nearest available size) on their outer thighs for a 7-day test period. The percentage lift and wear times of each of the dressings was assessed.

Dressing flexibility
The simulator demonstrated a scenario where a dressing is repeatedly subjected to rolling contact with a bed sheet. This type of contact would be expected if a patient is bed-bound or largely immobile. The consistent speed and force enabled a controlled environment to directly compare each dressing.

When dressings experience edge-roll from clothing or bedding, they could easily go on to become completely detached from the patient—which could lead to risk areas no longer being protected, or costly use of multiple dressings. It is therefore important to understand the impact of lateral forces from movement in bedding.

Fluid retention results as a percentage of total absorptive capacity, are shown in table 2.

Conclusion
The results indicated that not all silicone foam dressings share design features to aid fixation and adherence to a patient. The rolling simulator showed the large difference in dressings’ ability to remain adhered when subjected to lateral forces against bedding. Flexibility (bending length) tests showed trending between flexibility and fixation. The volunteer trial provided similar results to the in-vitro testing, showing the benefits of in-vitro studies in dressing selection.