

# In-Vitro Assessment of Wound Dressing Bacterial Sequestration

Jodie Lovett,<sup>1</sup> Sarah Roberts,<sup>2</sup> Christian Stephenson.<sup>3</sup>

<sup>1</sup>Senior Development Technologist, <sup>2</sup>Principal Development Technologist, <sup>3</sup>R&D Director. Crawford Healthcare, Kind Edward Court, King Edward Road, Knutsford, Cheshire, WA16 0BE

## Introduction

The increased length of time without the skin's protective barrier in a chronic wound leaves them naturally susceptible to bacterial infection. Bacterial colonisation in a wound has been linked to delayed healing therefore it is desirable to keep bacteria in wound fluid away from the wound surface. Dressings for chronic wounds are designed to absorb excess wound fluid, therefore have the potential to take up bacteria present within this fluid. This test has been designed to understand the ability of a range of foam dressings to keep bacteria away from the wound surface following absorption and retention on compression.

## Aim

To test a selection of foam dressings for their ability to sequester bacteria through absorption and retention on compression.

## Method:

A single colony of *Pseudomonas Aeruginosa* was cultured overnight at 37°C. The culture was diluted 1:1000. 200ul of the diluted culture was plated out for Total Viable Counts (TVC) and incubated overnight at 37°C. 35ml of the overnight culture was then poured onto each dressing. The dressings were left until all of the fluid had been absorbed, and then for a further two minutes to ensure that the fluid was within the dressing as opposed to on the surface. The dressings were compressed by hand until no further fluid was able to be released. The released fluid from each dressing was then weighed, serially diluted and plated out for incubation overnight at 37°C. TVC was then conducted on each plate.

## Results and Discussion

35ml of fluid containing approximately  $7.34 \times 10^7$  CFU was added to each dressing at the start of the test (First bar on

graph one). Upon compression each of the dressings were shown to retain some of the bacteria absorbed; however the quantity of bacteria released from each dressing varied significantly.

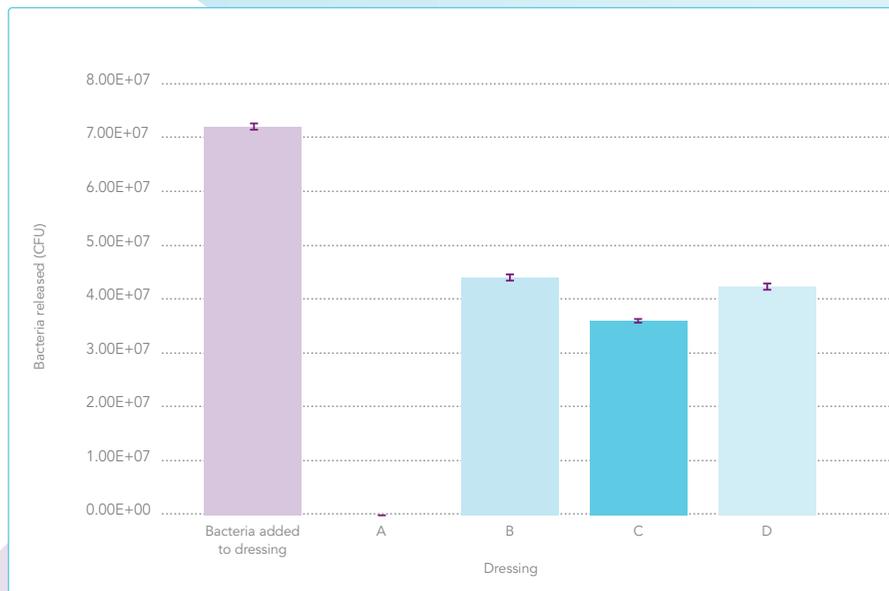
- Dressings C and D released approximately 69% of the fluid absorbed when compressed, and as a consequence allowed more bacteria to be released from the dressing.
- Dressing B released the highest quantity of bacteria upon compression followed by dressings D and C (see graph one).
- Dressing A released the smallest quantity of bacteria on compression, retaining a much higher percentage of the fluid absorbed (see table one).

## Conclusion

Of the dressings tested, Dressing A was shown to have the highest capability for retaining solutions containing bacteria, releasing the smallest quantity of bacteria upon compression.

\*Dressing A- KerraFoam Gentle Border (Crawford Healthcare); Dressing B- Allevyn Gentle Border (Smith & Nephew); Dressing C- Aquacel Foam (Convatec); Dressing D- Mepilex Border (Mölnlycke Healthcare)

*Dressing A was shown to have the highest capability for retaining solutions containing bacteria*



Graph one – CFU released from dressings upon compression. The first bar shows the initial CFU added to each dressing.

Sample	Average Fluid released upon compression	% fluid released	% fluid retained
Initial bacterial solution added to dressing	35ml	N/A	N/A
A	0.09g	0.26	99.74
B	23.98g	68.50	31.50
C	15.21g	43.45	56.55
D	23.83g	68.08	31.92

Table one – Fluid released from each sample on compression