

Comparative Assessment of a Novel Thin Polyurethane Foam Dressing

Ander Bugedo

Advanced Medical Solutions Ltd, Winsford, UK.



Advanced Medical Solutions Ltd

INTRODUCTION

Exudate management, the ability to maintain a moist wound environment, healthy skin protection and pain prevention are some of many key factors that contribute to successful wound management.

Effective exudate management can reduce time to heal¹, whilst a cushioning effect and gentle adhesion to the anatomy can help pain prevention and increase patient comfort.

A thin polyurethane border dressing (Dressing B²) has been developed intended for the management of non to lightly exuding wounds. The dressing is designed to be conformable, capable of managing low levels of exudate and breathable whilst being able to provide a moist wound environment; additionally, it facilitates ease of application and atraumatic removal.

The novel dressing has been compared in-vitro against a commercially available dressing³.

METHODS USED

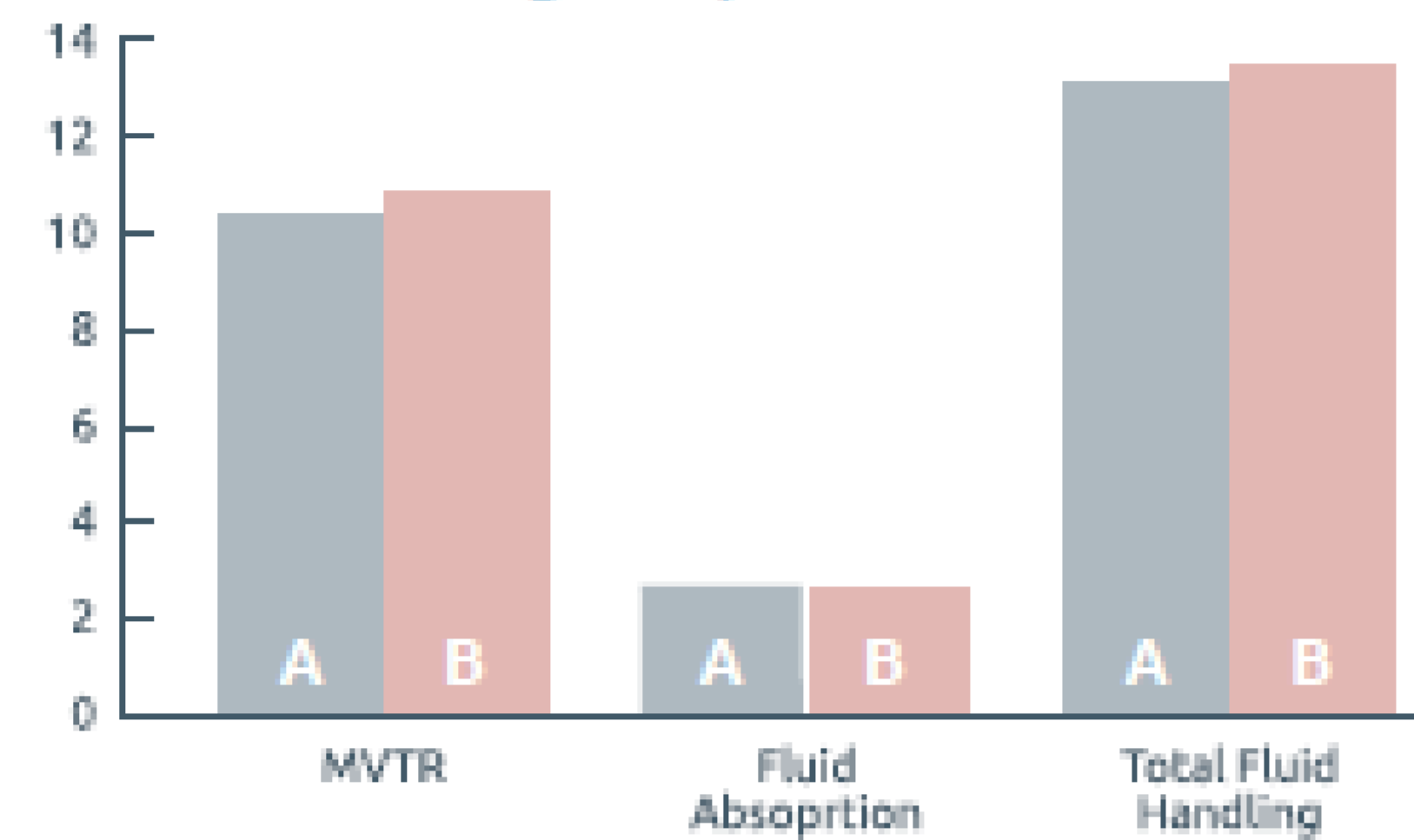
- ▶ **Total Fluid Handling⁴:** Samples are placed in a clean dry cylinder, solution A is added and the absorption, moisture vapour transmission (MVTR) and the overall fluid handling capacity are measured. This tests intends to replicate the exudate management properties of dressings in-vitro.
- ▶ **Peel Test⁵:** Adhesive samples are applied to a stainless steel plate and the maximum force required to peel the samples from the plate is measured using a tensiometer.
- ▶ **Lateral Fluid Migration:** 5ml of physiological saline solution mixed with a dye are placed on top of the dressing, the fluid absorption and lateral migration within the dressing is visually documented.

MATERIALS USED

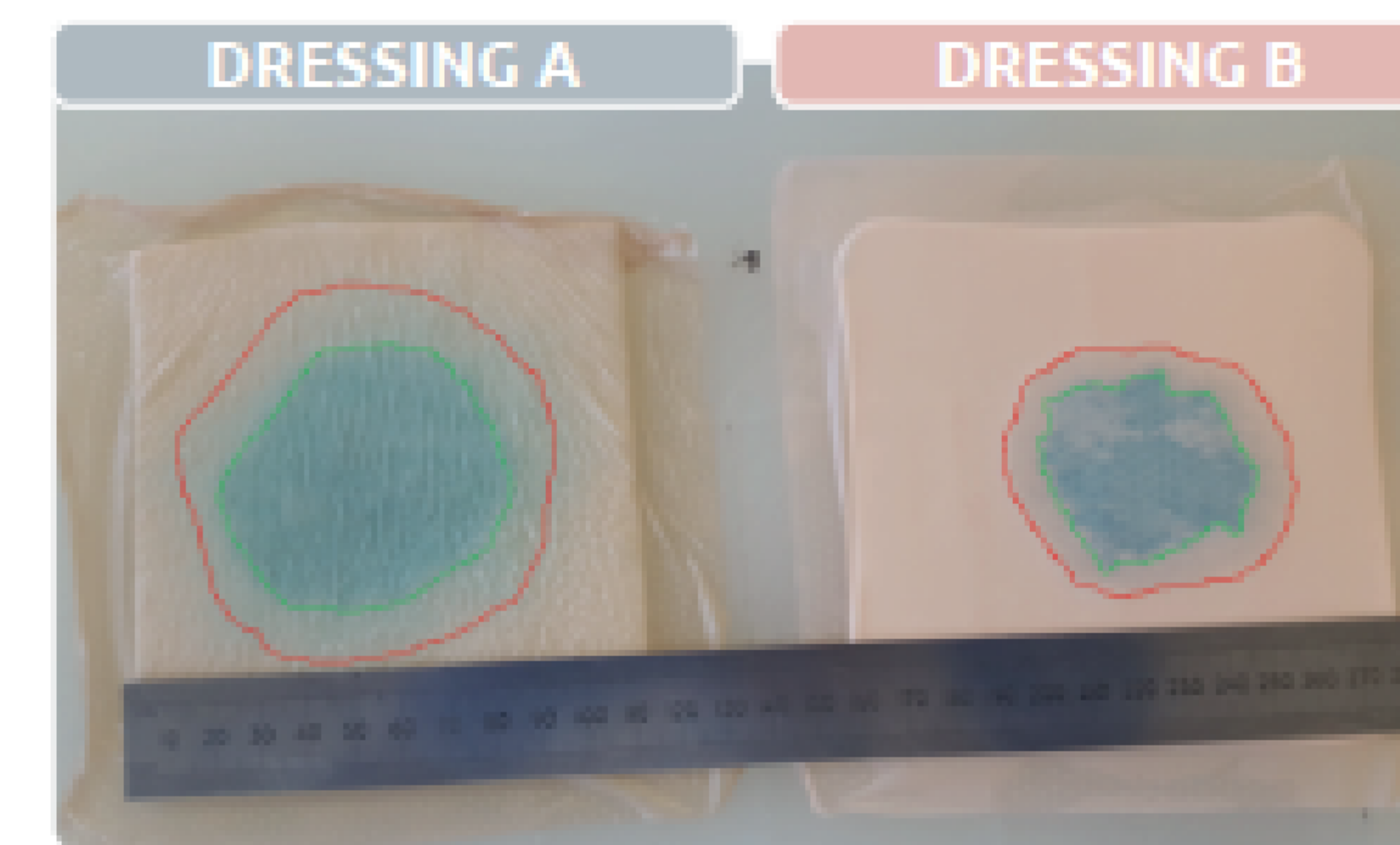
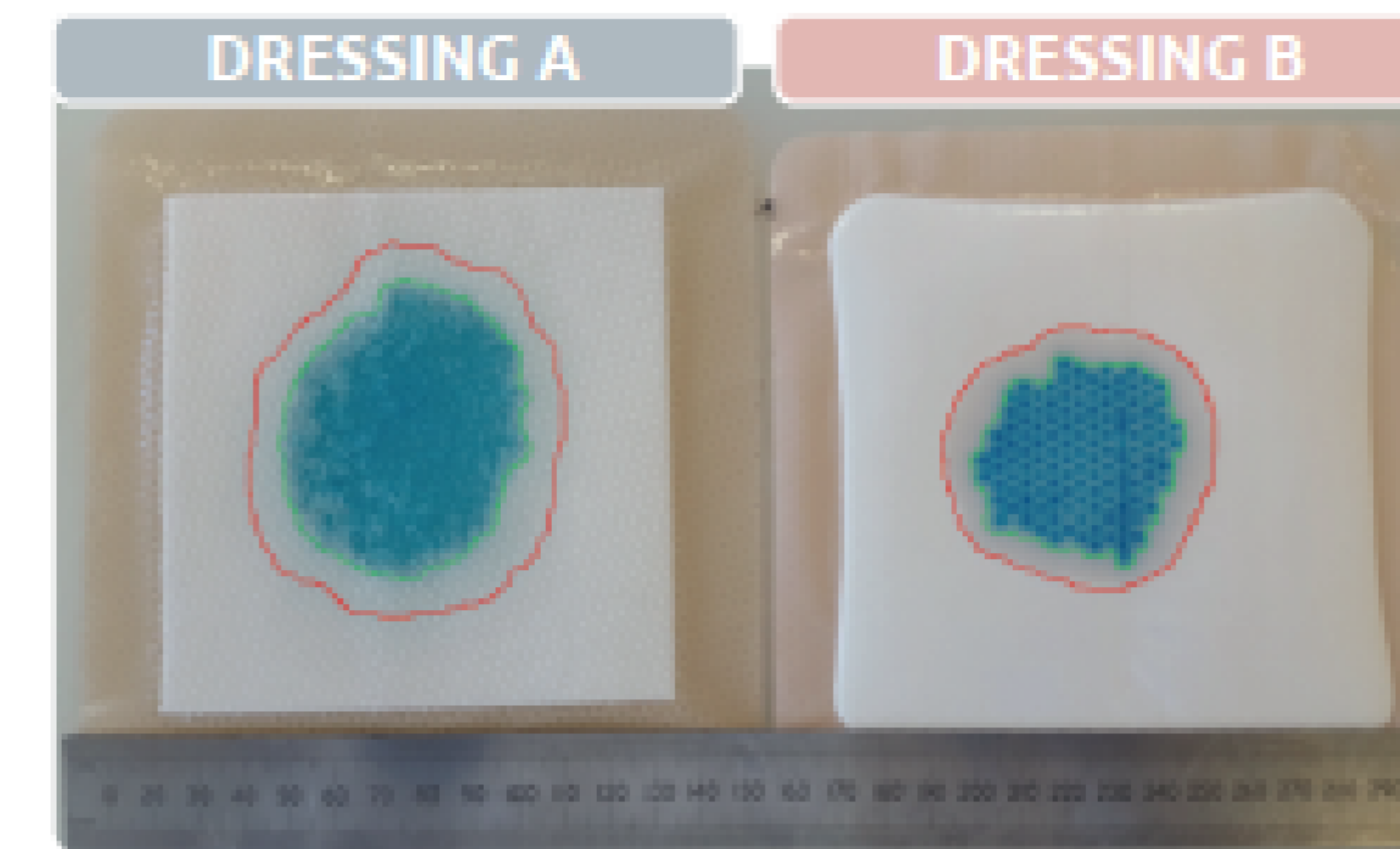
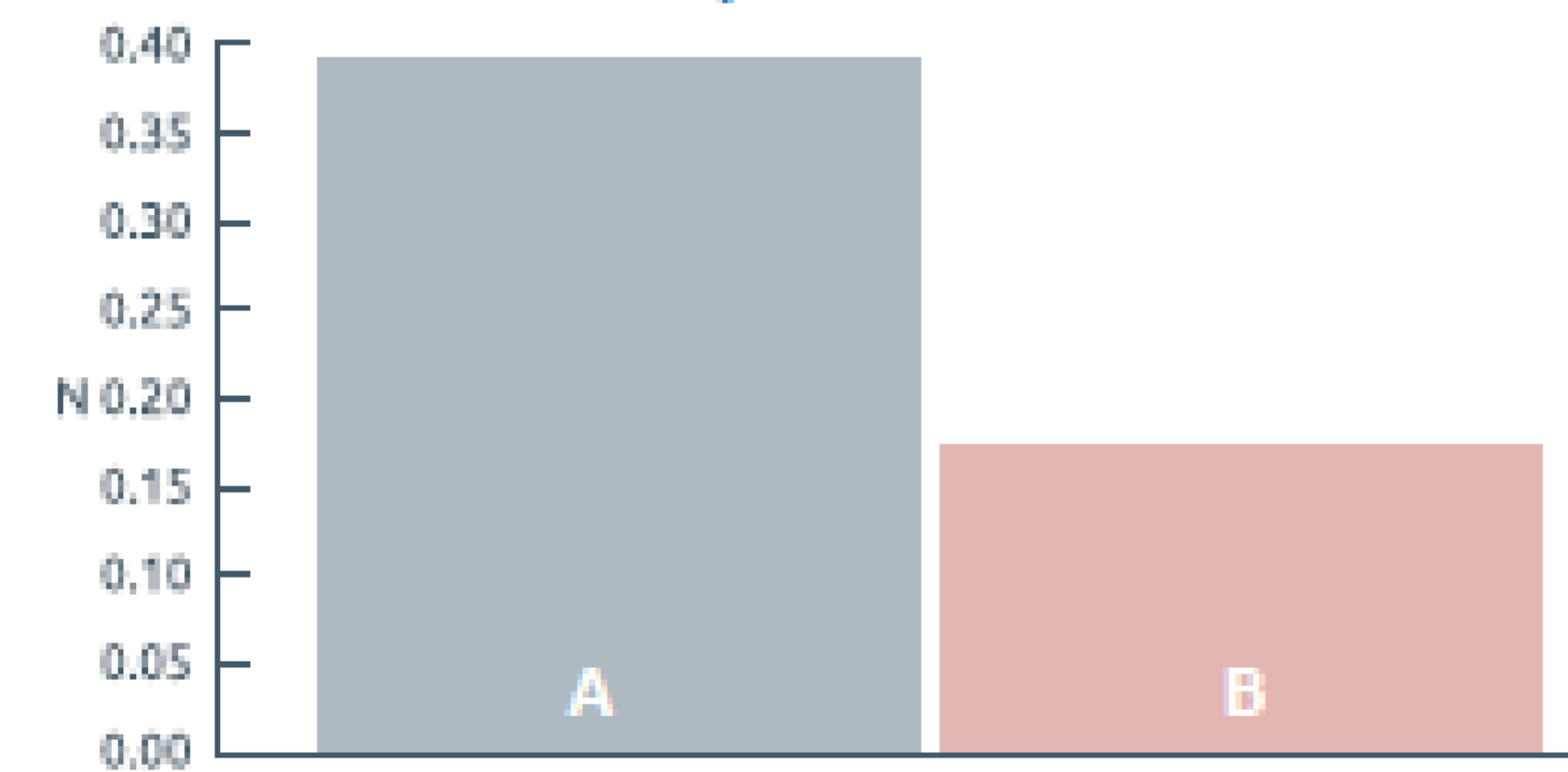
- ▶ **Dressing A³:** A commercially available thin, absorbent, conformable atraumatic self adhesive polyurethane foam island dressing with a perforated silicone wound contact layer.
- ▶ **Dressing B²:** A comparable thin, absorbent, conformable atraumatic self adhesive polyurethane foam island dressing with a perforated silicone wound contact layer.

RESULTS

Fluid Handling Comparative Assessment



Peel Force Comparative Assessment



The total fluid handling characteristics of dressing B are comparable to those of the commercially available Dressing A ($p=0.512$). This is the result of both dressings exhibiting similar fluid absorption capabilities ($p=0.792$), and both presenting similar rates of moisture vapour transmission ($p=0.460$).

The maximum peel force exhibited by Dressing A was significantly greater than Dressing B ($p=0.000$); Dressing B consistently showed lower peel forces whilst still providing a satisfactory degree of adhesion.

Upon application of 5 ml of physiological saline solution, both dressings absorbed the total volume of fluid; however, the absorption mechanisms were observed to differ slightly. While Dressing A exhibited faster absorption rate, the fluid migrated primarily in a lateral orientation, on the other hand, Dressing B was observed to absorb the fluid slightly slower but the fluid migration was observed to be predominantly vertical.

The green zone, highlights the area where the initial absorption has taken place and it is clearly visible as a result of the blue dye content. The red zone highlights the subsequent moisture migration across the dressing area.

DISCUSSION

- ▶ The total fluid handling characteristics provide the clinician a good *in-vitro* correlation of the potential exudate management capabilities of the dressings assessed. This is vital when deciding what dressing to choose in order to manage the challenges associated with wound exudate.
- ▶ Pain is common experience for patients with wounds⁶, consequently, a low peel force profile is a critical factor for an adhesive wound dressing; low peel forces will translate into reduction of pain for the patient upon dressing removal as well as an easier dressing change procedure for the Healthcare Provider.
- ▶ Removal of excess exudate from the wound whilst providing a moist wound environment is one of the primary functions of the wound dressing; *in-vitro* research assesses the fluid absorption dynamics in a dressing where greater vertical fluid migration versus lateral fluid migration is deemed desirable as it results in a better peri wound area protection and prevents from complications associated with poor exudate management.

CONCLUSION

- ✔ The comparable fluid handling characteristics of Dressing B vs. Dressing A is predicted to validate the intended use of Dressing B based on satisfactory outcomes observed through the clinical use of Dressing A.
- ✔ Based on the lower maximum peel forces observed on Dressing B in relation to Dressing A, it is predicted that the dressing will support atraumatic removal, minimising pain associated with dressing changes, thus, improving patient comfort and facilitating dressing change procedures.
- ✔ The lower lateral fluid migration observed in Dressing B may provide an effective protection to the peri-wound area and minimize the potential for skin maceration.
- ✔ **IN VITRO DATA SUPPORTS DRESSING B AS AN OPTIMAL CHOICE FOR THE HEALTHCARE PROVIDER WHEN TREATING NON TO LIGHTLY EXUDING WOUNDS.**