



## PRESSURE INJURY PREVENTION WITH A UNIQUE MULTI-LAYER FOAM DRESSING: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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### Aims and objectives

Pressure injuries (PI) are a ubiquitous problem in both hospital and community settings, with incidence rates reported to be over 10% within European nations<sup>1,2</sup>. Their presence is associated with an increased hospital length of stay, readmission and mortality<sup>3</sup>. Many institutes now incorporate PI prophylaxis programs to prevent PIs and their negative sequelae. These programs are recognized as cost-saving, with an estimated €2 billion potential savings as reported by the EU commission's recent findings<sup>4</sup>. Many PI prevention programs include standard measures such as air mattresses and turning procedures. However, PIs may still occur, particularly in high-risk patients. Five-layer dressings have been observed in independent trials to add further protective benefit than standard PI procedure alone<sup>4</sup>.

This study aimed to evaluate via meta-analysis whether the use of a unique five-layer foam dressing in addition to standard PI protocol can reduce the incidence of sacral PIs in at-risk patients across multiple health settings, compared with standard care.

### Materials and Methods

Electronic databases including PubMed, Embase, and the Cochrane Library were systematically searched in October 2023. Included studies were randomized controlled trials (RCTs) and detailed outcomes following the use of a specific five-layer foam dressing (ALLEVYN<sup>◇</sup> LIFE; used in addition to standard PI protocol) compared with PI protocol alone in at-risk patients (Table 1).

Table 1. PICO criteria for inclusion into the systematic literature review

Characteristic	Inclusion Criteria	Exclusion Criteria
Population	Human patients with any wound type or those receiving pressure injury prevention strategies	Non-human or healthy participants
Intervention	Five-layer hydrocellular polyurethane foam dressing (HPFD) (with or without educational regime)	Other dressing variants
Control	Other or previous dressings	No treatment
Outcome(s)	Incidence of pressure injury	Any other non-PI related outcome
Study type	Randomized controlled trials	Non-randomized comparative observational studies, Non-comparative clinical reports (case series/reports), survey data or subjective comparisons with other dressings

Meta-analyses were carried out in R. Binary meta-analyses were performed using the 'metabin' function and reported using odds ratios (OR) with 95% confidence intervals (CI). A random effects model was used where heterogeneity ( $I^2$ ) met or exceeded 50% and a common effect model where heterogeneity was less than 50%. Sensitivity analyses were performed where appropriate, for example to determine the impact of small study effects.

### Results

Out of 784 articles identified, 3 RCTs were included<sup>6-8</sup>. Two studies were considered 'near-misses'<sup>4,5</sup>; Beeckman *et al.*<sup>4</sup> was excluded due to pooling of the intervention dressing with other dressings and Gazineo *et al.*<sup>5</sup> was excluded because of confounding variables within the intervention arm that meant patients were at higher risk of PI. In total, the 3 includes studies reported on 1150 patients, of which 561 received the intervention and 589 received standard care.

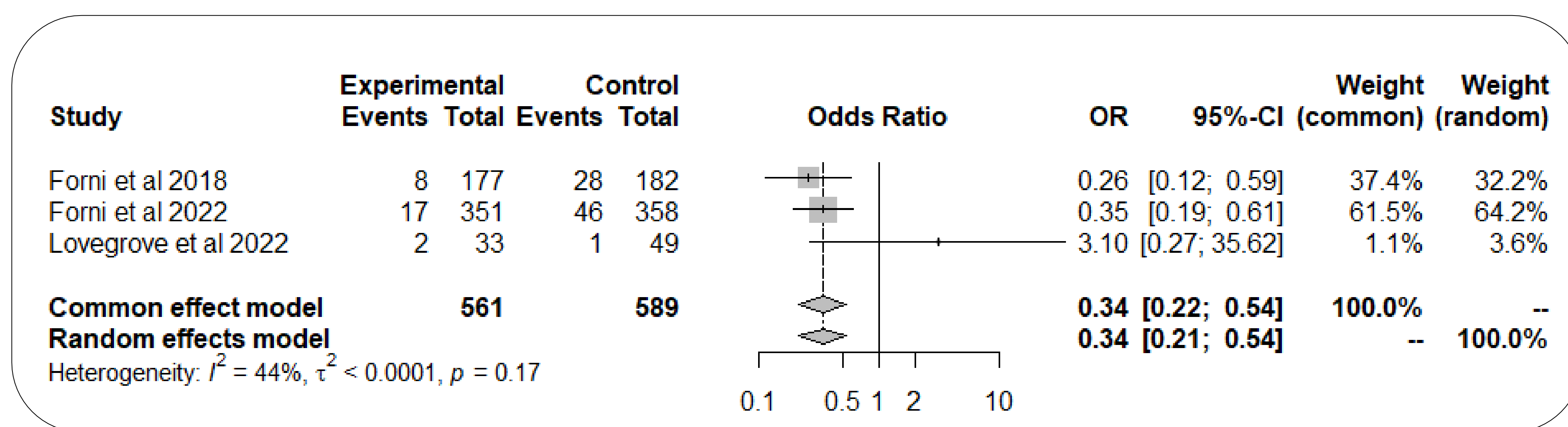


Figure 1. Forest plot showing fiver-layer dressing with PI protocol versus PI protocol alone for sacral pressure injury incidence.

As shown in Figure 1, a statistically significant reduction of 66% in the odds of developing a PI was observed with the use of the unique five-layer dressing, as opposed to using standard care alone. Sensitivity analyses performed to investigate the impact of incorporating data from Gazineo *et al.* demonstrated that there was a significant impact on the heterogeneity of the analysis and a conclusion of a high likelihood of small study effects.

### Discussion and Conclusion

The findings from this study demonstrated that a unique five-layer dressing can significantly reduce the odds of developing a sacral PI by 66%. All studies included in this analysis involved using the five-layer dressing in addition to a standard PI protocol, suggesting that there is additive benefit to incorporating this dressing into existing PI protocol that does not already include a five-layer dressing. These current clinical findings can be explained by the unique mode of action possessed by the five-layer foam dressing, including its independent moving layers and frictional energy absorption<sup>9</sup>. Notably, all studies included patients from a hospital setting and so the findings may be limited to this demographic, although some data exists to show benefits of using five-layer dressings to prevent PIs in a community setting, too<sup>10</sup>. Furthermore, data reported in this study is solely based on sacral ulcers, additional studies are needed that consider other PI prone regions.

In conclusion, healthcare providers should consider incorporating a five-layer foam dressing into their PIP protocols to further reduce the odds of at-risk patients developing sacral pressure injuries. Future studies should focus on investigating the effect of five-layer dressings in community settings and other anatomical sites at-risk of PI.

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