

In vitro Measurement of the Impact of Transfer and Positioning Devices on Microclimate when Left in Place Following Use.

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INTRODUCTION

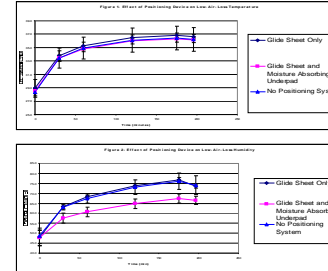
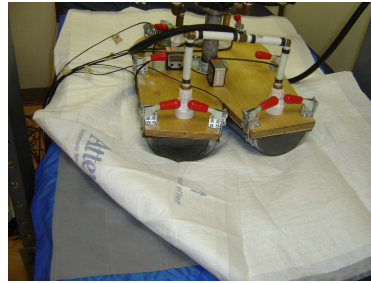
Frequent repositioning of bed-bound patients is a common strategy for preventing pressure ulceration. One strategy to aid patient repositioning and reduce related injuries to healthcare workers has been developed; however, critics have questioned the value of these devices and claim the devices interfere with the prophylactic microclimate properties of low- and high-air loss systems.

RESULTS

SUMMARY

Table 2- Summary of the results and conclusions.

Factor	Results	Conclusions
Temperature	The positioning system* did not significantly increase the interface temperature for the low-air loss mattress.	The positioning system* used in this study is compatible with low-air loss temperature reducing strategies.
Humidity/moisture	The positioning system* improved humidity management and provided temporary relief from accumulation and buffered sudden changes in relative humidity	When used as per manufacturer's recommendation (i.e. with the underpad), the positioning system* improves and extends humidity relief provided by repositioning.
Pressure/distortion	The positioning system* allows for quick and easy repositioning.	The use of a positioning system reduces the risk of injuries to health care workers performing frequent repositioning on bed-bound patients.
Compatibility	The methods used in this study allow for quantitative and statistical determination of the compatibility between microclimate managing mattresses and positioning systems.	Compatibility between a positioning system and microclimate managing support surfaces is crucial. Non-compatibility results in loss of desirable performance characteristics.



• After three hours, the positioning system did not significantly influence the temperature at the surface-indenter interface on the low-air loss surface (Fig. 1, alpha = 0.05).

• The positioning system alone did not significantly influence the relative humidity at the surface-indenter interface; however, when used with a moisture-absorbing under pad, the positioning system reduced the relative humidity by approximately 10% RH (Fig. 2, alpha = 0.05).

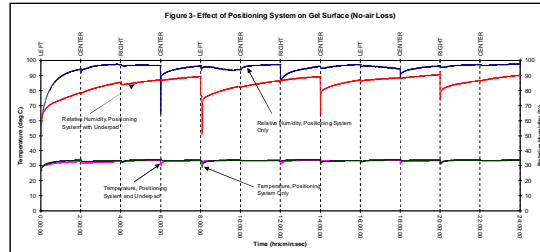


Fig. 3- No-air Loss Gel Surface

• After 24 hours, the repositioning system maintained a humidity buffering effect when used in combination with the underpad.

• Repositioning creates minor relief in humidity and temperature stresses.

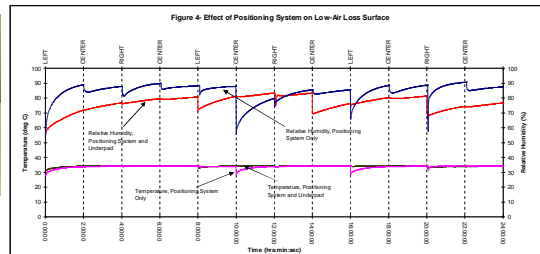


Fig. 4- Low-air Loss Surface

• The repositioning system buffered relative humidity when used in combination with the underpad.

• Microclimate stress relief created by repositioning is more pronounced on a low-air loss surface.

ACKNOWLEDGEMENTS

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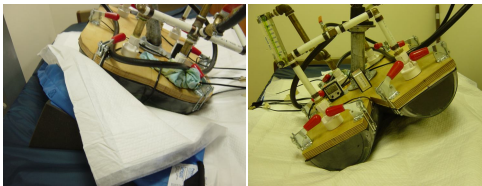
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Table 1- Review of factors correlated to pressure ulcer development.

Factor	Mechanism	Relief Strategy
Temperature	Causes cellular stress; increases metabolic rate by ~10% per degree Celsius; induction of sweat response;	Low- and high-air-loss technologies; air-fluidized support systems; repositioning to air-wash tissues.
Humidity/Moisture	Increases friction; lowers breaking strength of skin; maceration;	Moisture absorbing materials to wick moisture away from tissue; Repositioning to air-wash tissues.
Pressure/Distortion	Mechanical Stress / Impaired circulation	Frequent Repositioning; pressure reducing surfaces; increased immersion;

A ridged thermodynamic pelvic indenter was used to deliver load, heat, and water vapor to the surface of a commercially available positioning system* on a low-air loss and a no-air loss gel mattress. The temperature and humidity at the interface were continuously logged.



*Prevalon Turn and Position System, Sage Products