81

Fader M[1], Bain D[1], Cottenden A[1]
1. University College London

PADS AND PRESSURE: AN INVESTIGATION INTO THE EFFECTS OF ABSORBENT INCONTINENCE PADS ON PRESSURE MANAGEMENT MATTRESSES

Aims of Study

Pressure ulcers and incontinence often co-exist and are more common in older people(1). Urinary incontinence has been found to be a significant risk factor for pressure ulcers (2) and there is a strong association between poor mobility and continence problems (3). Patients using pressure management products are therefore also likely to be using absorbent pads but the effect that pad wearing has on pressure-relieving products is unknown. The aim of this study was to determine the effects that absorbent pads have, in both dry and wet states, on the pressure-relieving properties of standard and pressure management mattresses.

Methods

An instrumented articulated anthropometric phantom (Patent IPC 94928968.0) with simulated soft body 'tissues' in the gluteal and sacral areas was used as the 'subject' (Figure 1). The soft tissues of the pelvic region are a silicone polymer compound with the same mean instantaneous static hardness value as the buttock tissues of a cohort of elderly volunteers (mean age 68.2 years, SD 3 years) (4). The silicone compound was moulded in a CNC-generated mould representing the shape derived from numerical topography data acquired by laser scanning the same cohort of volunteers. The phantom is fixed on a ceiling-mounted guidance system for positioning on different surfaces. The phantom produces reproducible pressures (co-efficient of variation around 2%) compared to humans and is the method recommended by the European Pressure Ulcer Advisory Panel (EPUAP) for testing pressure management products (5).

A commonly used, commercially available absorbent pad and pant system for moderate to heavy incontinence was selected (Tenaform Super, SCA Hygiene Products AB, Göteborg, Sweden). This was tested with three different mattresses: (A) a standard foam mattress, (B) a visco-elastic foam mattress and (C) a surface-cut visco-elastic foam mattress. Mattresses (B) and (C) are marketed as pressure management mattresses. The phantom was raised and lowered onto the three mattresses in three states: *naked,* wearing a *dry pad* and wearing a *wet pad* following a standard operating protocol. The pressure mapping device Xsensor version 4 (Xsensor Technology Corporation, Calgary, Canada) was used to record the distribution of pressure over the sacral and ischial areas of the phantom. Peak pressure was used as the primary outcome variable and 10 repeats were made on each mattress under each condition.

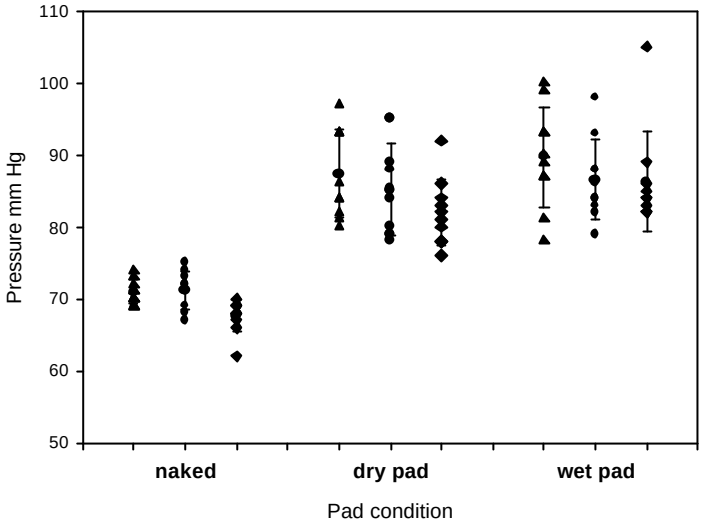
Results

The table below shows that the presence of an incontinence pad between the patient and the mattress raises the peak pressure by around 20-25%, a difference that is likely to be of clinical importance. Peak pressures frequently occurred over areas of pad folds. Absorbent pads are folded and compressed for packaging and creases occur in the pad folds. Additional testing showed that pads that were 'smoothed' by hand had significantly lower peak pressures than 'unsmoothed' pads. There were no significant differences between *wet* and *dry* pads.

Mattress	**Naked** mmHg (mean,SD)	**Dry pad** mmHg (mean,SD)	95% Confidence interval (difference between means)
A. Standard foam	70.9 (SD1.6)	87.3 (SD6.1)	15.06-17.73
B. Visco-elastic foam	71.2 (SD2.57)	85.2 (SD6.42)	9.4-18.59
C.Surface-cut foam	67.6 (SD2.27)	82 (SD4.64)	10.96-17.83

The graph below shows the data and standard deviations from 10 repeats on each mattress under each condition.

Peak pressures (SD) recorded from three mattresses (standard, visco-elastic, surface-cut foam) under three conditions (naked, dry pad, wet pad)



Key - ? standard foam ? visco-elastic foam ? surface-cut foam

Figure 1 Anthropometric phantom

Conclusions

This study demonstrated that absorbent pads have a substantial adverse effect on the pressure redistribution properties of mattresses. Pad folds appear to contribute to this effect. Absorbent pad manufacturers should consider engineering pads that minimize disruption to pressure management. Further examination of continence and pressure management products is necessary to establish optimum combinations.

References

1.Guralnik JM, Harris TB, White LR, Cornoni-Huntley JC. Occurrence and predictors of pressure sores in the National Health and Nutrition Examination survey follow-up. J Am Geriatr Soc 1988 Sep;36(9):807-122.

2.Spector WD, Fortinsky RH (1998) Pressure ulcer prevalence in Ohio nursing homes:clinical and facility correlates. J Aging Health 10(1) 62-80

3. Sgadari A, Topinkova E, Bjornson J, Bernabei R. Urinary incontinence in nursing home residents: a cross-national comparison. Age Ageing 1997 Sep;26 Suppl 2:49-54

4.Bain DS, Nicholson N, Scales JT.A phantom for the Assessment of Patient Support Systems. *Med Eng & Phys*. 21 (1999).293-301

5. European Pressure Ulcer Advisory Panel, Working Group 2, Guidelines for the measurement and presentation of interface pressure data on support surfaces, January 2002