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Introduction

Background: Patients are immobilised during surgery for a longer time. Due to the high intensity and the long duration of pressure and shear, they are at high risk for pressure ulcer development.

Aim: To compare the pressure reducing characteristics of 3 operating table mattresses in 4 different postures and to determine which internal air pressure of the dynamic air mattress resulted in the lowest interface pressure.

Methods

Design & participants: Quasi-experimental in vitro study involving 53 healthy volunteers.

Inclusion criteria:

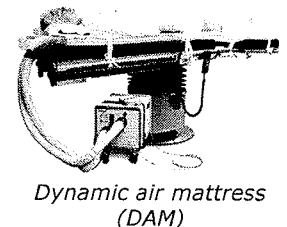
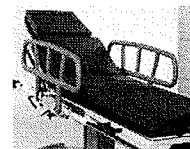
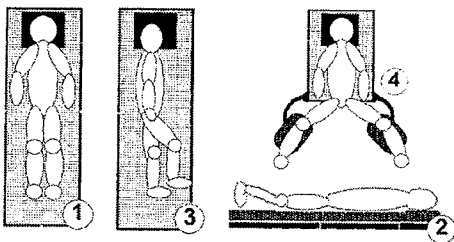
- Between 18 and 70 years old
- No physical limitations.

Postures: Supine (1), prone (2), 90° lateral (3) and Miles Pauchet posture (4) in a randomized order.

Pressure measurement: Interface pressure measurement with XSensor® pressure-mapping device.

Mattresses:

- Static air mattress (Repose®, Frontier Therapeutics, UK)
- Viscoelastic foam mattress (Viscosam®, Sampli, B)
- Dynamic air mattress (WarmCloud®, KanMed, SE)



Results

Between mattresses:

- In supine and Miles Pauchet posture, the dynamic air mattress and static air mattress had similar pressure reducing effects and were significantly better compared to the viscoelastic foam mattress ($P < .001$), see Table 1.
- The lowest median interface pressures in lateral position were measured on the dynamic air mattress ($M = 77.0$ mmHg) versus static air mattress ($M = 148.0$ mmHg, $P < .001$) and viscoelastic foam mattress ($M = 184.4$ mmHg, $P < .001$).
- The interface pressures on the 3 mattresses did not differ significantly in prone position ($P = .061$).

Table 1: Median interface pressures (mmHg)

	DAM	SAM	VEM
Supine	50.9	56.2	77.3
Miles Pauchet	68.3	67.2	89.0

Most favourable pressure of the dynamic air mattress in relation to the different postures:

- Prone posture: 20–25 millibar (15.0–18.8 mmHg)
- Lateral posture: 40–50 millibar (30.0–37.5 mmHg)
- Supine posture: 30–40 millibar (22.5–30.3 mmHg)
- Miles Pauchet posture: 30–40 millibar (22.5–30.3 mmHg)

Conclusions

- Compared to the viscoelastic foam mattress, the interface pressure was significantly more reduced on both air mattresses.
- The higher the contact surface of the body with the dynamic air mattress is, the lower the internal air pressure in the mattress should be.