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Bubblewrap for hypothermia prevention – the ultimate solution or yet another fancy gadget?

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Introduction

The cold climate in Norway demands a persistent prehospital effort to prevent hypothermia in the seriously ill or injured patient. The current trend among HEMS (Helicopter Emergency Medical Services) in Norway is to wrap the patient in bubblewrap during the prehospital phase. To our knowledge, no risk assessment of this procedure has been done and its efficiency in preventing hypothermia remains unclear. The aim of this study was to assess the insulating properties of bubble wrap using a standardized method. Wrapping in three cotton blankets was evaluated for comparison.

Methods

The experiment was performed at the SINTEF Work Physiology Laboratory, Trondheim, Norway according to test procedure NS-EN 13537 "Requirements for sleeping bags". The thermal manikin was wrapped in order to leave only the face exposed to air. The bubble wrap was three layer industrial quality and the cotton blankets were standard blankets, used at most Norwegian hospitals.

Results

The test results are reported in Table 1 below (mean values in bold):

The bubble wrap provided 69% of the insulation of the three cotton blankets.

Table 1:

Test	Blankets	I_t, r Clo-value*	I_{cl}, r $m^2 \cdot K/W$
1	**Cotton** Weight: 3148 grams Volume 30,4 L	**3.33** (3.25, 3.37, 3.37)	**0.395** (0.383, 0.401, 0.401)
2	**Plastic** Weight: 394 grams Volume 17,1 L	**2.53** (2.34, 2.62, 2.63)	**0.271** (0.242, 0.285, 0.287)

* 1 Clo = 0.155 m^2 °C/W. 1 Clo is the insulation provided by a standard business suit.

According to the NS-EN 13537 procedure, the bubble wrap's insulation corresponds to a sleeping bag with a comfort outside temperature of 18 to 20.4°C.

Conclusion

In dry and no wind conditions, three cotton blankets provide better insulation than bubble wrap. When rated as a sleeping bag, the bubble wrap performs adequately in temperatures above 18°C.

In order to establish the true value of bubble wrap for hypothermia prevention in prehospital care, a randomized real-life experiment is required.