

Absorbent dressings with superabsorbent polymers - a new generation of wound dressings -

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Introduction:

Superabsorbent polymers based on polyacrylates have been used with great success in baby diapers and ladies' hygiene products ever since the mid-1980s. They are also ideal for absorbing and retaining large amounts of liquids in wound dressings. In the treatment of wounds with excessively heavy exudation, they provide an alternative option which is genuinely useful in actual practice. The objective of the present study was to investigate the absorption capacity (with and without a load applied after the liquid has been absorbed), the REWET value, and the potential absorption of bacteria as compared to other products.

Material and Methods

Traditional absorbent dressings (V) with a cellulose core, and absorbent dressings with superabsorbent polymers embedded (SAP) or non-embedded (ZP) in a cellulose nonwoven fabric.

Absorption capacity: measuring of maximum absorption of normal saline / blood substitute solution after predefined periods of time (10 min, 1 h), in analogy to DIN 53923. Additionally the samples were treated with a load of 10 kg.

REWET: measuring of the amount of liquid released from a wound dressing. The wound dressing is impregnated with 20 mL blood substitute solution over a total surface area of 7 cm² and subsequently loaded with a weight of 126 g for 3 minutes. This is followed by a gravimetric determination of the amount of liquid released onto a piece of filter paper after 2 min under a load of 126 g. For the measurement of the moisture inhibiting layer a load of 2 kg was taken.

Surface colonisation: number of colony-forming units (CFU) determined subsequent to the absorption of a predefined solution of ATCC 9341 after 15 and 300 min, by means of an impression preparation (on agar plates).

Results

The technical properties for SAP, V and ZP are compared in Fig 1. Due to the longer time of absorption the potential risk of absorption pain is reduced (Fig 1). The absorption capacity of absorbent dressings with superabsorbent polymers (SAP) is more than twice as high as that of traditional absorbent dressings with a cellulose core (V) (Fig 2). As compared to regular absorbent dressings (V) or absorbent dressings with non-embedded superabsorbent polymers (ZP), the absorbent dressing with the embedded superabsorbent polymer (SAP) will release up to 88% less of previously absorbed liquids (Fig 3). This reduces the risk of REWET and of any potential maceration resulting from it (see Case). The bacterial load on the wound-contact surface of SAP is distinctly lower than in absorbent dressings with a cellulose core (V) (Fig 4).

Discussions and Conclusions

The new absorbent dressings with superabsorbent polymers are a genuinely useful alternative in the treatment of wounds with excessively heavy exudation. The dressing has to be changed less frequently; this means longer periods of rest for the wound, promotes healing, and reduces the risk of potential maceration and absorption pain. The patient's quality of life is thus improved.

Case with SAP: arterial leg ulcer

(Homecare Service / Medical Supply Store Wittlich, Bendorf, D)



Day 0
§ maceration in wound area
§ fibrinous coating

Day 10
§ 4th dressing change (intervals: 2-3 days)
§ maceration in wound area substantially reduced
§ fibrinous coating comes loose

Efficient protection of clothing

Very good horizontal distribution of wound exudate

				SAP	V	ZP	
Dimension of the product				[cm]	appr. 20.5x10.5	appr. 20.7x10.9	appr. 23x10.7
Dimension of superabsorber				[cm]	18.5x8.5	pulp not fixed	pulp not fixed
Thickness of the product				[mm]	appr. 2	appr. 3-4	appr. 6
Weight of the product				[g]	9.5	7.6	12
Max. Absorption	without pressure	blood substitute	60 min.	[g/g]	19.6	13.4	20.6
	with load (10 kg)	blood substitute	60 min.	[g/g]	15.3	8.8	12.9
	without pressure	with NaCl solution	60 min.	[g/g]	22.6	12.9	20.7
	with load (10 kg)	with NaCl solution	60 min.	[g/g]	16.4	8.5	14.0
Time of absorption (blood substitute)				[s]	20	4	4
REWET wound oriented side				[g]	0.1	0.7	>1
Side with the REWET moisture inhibiting layer				[g]	0.13	0.5	>1
Air permeability				[l/m ² h]	appr. 62	appr. 65	appr. 60

Fig 2 Absorption capacity of different wound dressing

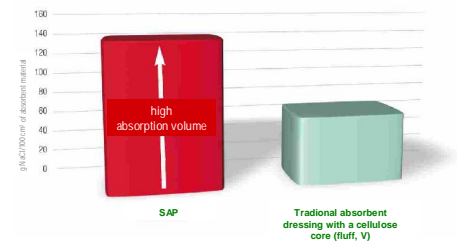


Fig 3 REWET properties (wound oriented side)

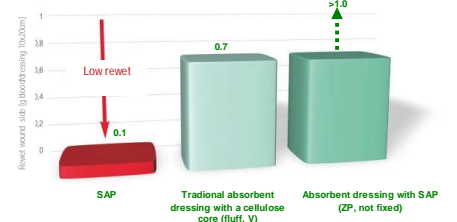
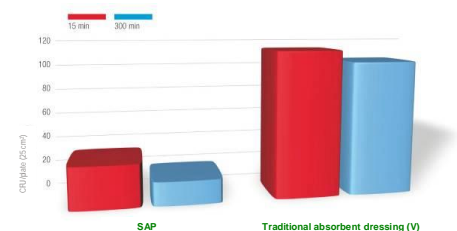


Fig 4 Surface colonisation



SAP: Vliwasorb®; V: Vliwazell®; Lohmann & Rauscher
ZP: Zetuvit® Plus; Hartmann

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