Hydrocolloid particles and petroleum jelly containing wound contact layer

KEY WORDS
- Dressings
- Exudate
- Hydrocolloid particles
- Wound contact layer

For the management of wounds with no or low levels of exudate wound contact layers may be used. When combined with an absorbent dressing these dressings are also appropriate for use in moderate to highly exuding wounds. A wound contact layer that contains hydrocolloid particles and petroleum jelly coated onto a mesh was evaluated and compared to itself in a blinded-user test. Each dressing was split into two parts and then marked with four different colour tags. Usability (packaging, application, aseptic handling of the dressing, ease of dressing removal, conformability, flexibility, possibility to cut to size, adherence to the wound bed) and user acceptance (haptic, optic, easy to use) scored very good/good. There was no difference noted between the products tested. Although the features of the dressing that were evaluated were clinically relevant, the results need to be confirmed in actual wound management.

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Wound contact layers are used for wounds with no or low levels of exudate, or combined with an absorbent dressing for moderate to highly exuding wounds healing by secondary intention (Andriessen, 2008). Combining a wound contact layer with a secondary dressing provides the clinician with a degree of flexibility when selecting dressings for various wound types. Primary dressings such as wound contact layers should be easy and comfortable to remove and not adhere to the wound bed (Andriessen, 2003). Biochemical changes upon drying out may cause the exudate to act as an adhesive, causing the primary dressing to adhere to the wound bed. Dressing removal may therefore be painful and cause damage to newly formed fragile tissue, delaying wound healing (Hollinworth, 2005).

The tested wound contact layer (WCL) contains hydrocolloid particles and petroleum jelly coated onto a mesh. According to the manufacturer, the hydrocolloid particles become hydrated, when in contact with the wound bed, and interact with the petroleum jelly to form a gel that creates a moist environment. This prevents adherence to the wound bed. When an appropriate secondary dressing is used, wound exudate drains through the WCL into the secondary dressing. Depending on the wound type and level of exudate the WCL can be left in place for several days.

MATERIALS AND METHODS

A user test was developed to evaluate a hydrocolloid particles and petroleum jelly containing WCL (Lomatuell Pro, Lohmann & Rauscher GmbH & Co KG) (*Figure 1*) on a dummy with a simulated wound. The multi-center user test was carried out in Germany over a period of six weeks and complied with the company's quality management standard procedures, ISO 14155 as well as German law. The test did not require ethics committee approval. For the test, the same type of WCL was packaged individually in inert pouches and marked with a different colour tag (yellow, green, black and white) (*Table 1*). One hundred eighty-five clinicians with experience in

Figure 1. Wound contact layer tested

Table 1. Number of colour-coded wound contact layers that were tested

Wound contact layer used	Colour coding	Frequency (%)
Hydrocolloid particles and petroleum jelly containing WCL	Yellow	85 (30.9%)
	Green	75 (27.3%)
	Black	62 (22.5%)
	White	53 (19.3%)
Total		**275 (100%)**

The same type of WCL was packaged individually in inert pouches and marked with a different colour tag (yellow, green, black and white)

Table 2. Participating clinicians

Profession	Frequency (%)
Nurses	124 (67.0%)
Physicians	47 (25.4%)
Physical and occupational therapists	6 (3.2%)
Pharmacists	2 (1.1%)
Other	6 (3.2%)
Total	**185 (100%)**

wound management, including nurses, physicians, pharmacists and medical assistants participated in the study (*Table 2*). The duration of an individual test was on average 30 minutes. The clinicians were instructed on the study procedures by a consultant prior to commencing the test. After each application and removal of the tested WCL on the simulated dummy wound, the clinicians filled out a questionnaire. The questionnaire was developed and provided by the sponsor of the study and used a six-point Likert scale (very good = 1, good = 2, satisfactory = 3, sufficient = 4, deficient = 5, insufficient = 6). The score yielded was given as a summation of the responses to the multiple items comprising the scale to compute and report the appropriate Cronbach's α coefficient for the summated total score (Norman, 2010). For the responses descriptive statistics for the summated total scores and sub-scores is given and includes, tendency (mean, median and mode) and variability (standard deviation and range) (Norman, 2010). For statistical evaluation using IBM SPSS, where appropriate a paired T-test or ANOVA was used. Tests were carried out at the 5% significance level and 95% confidence interval. The assumption was that a mean score of 3.5 or lower (6-point Likert scale) demonstrated that the WCL performed up to the mark or better.

Using a 6-point Likert scale (very good = 1, good = 2, satisfactory = 3, sufficient = 4, deficient = 5, insufficient = 6) the following product features were assessed: usability (packaging, WCL application, aseptic handling of the dressing, ease of dressing removal, conformability, flexibility, possibility to cut the dressing to size, adherence to the wound bed) and user acceptance (haptic, optic, easy to use) (*Table 3*). Answers to questions that required a written comment were grouped by topic.

RESULTS

One-hundred eighty-five clinicians performed the tests using a total of 275 individually packaged and colour coded WCL. When asked about removing the product from the packaging under aseptic conditions, the majority of clinicians scored easy (n=167; 60.7%) or very easy (n=65; 23.6%) (*Figure 2*). Of the clinicians, 69 (2.5%) gave additional comments on packaging: sixty-four clinicians noted the packaging to be fit for purpose, however, two reported it was easily torn on opening. A further two clinicians reported opening to be difficult and one noted it was difficult to remove the foil from the product using a non-touch technique.

The majority of clinicians (n=248; 90%) scored all the WCLs to be optically pleasing (very good and good). When asked about the haptic (sense of touch) of the products, more than 220 (80%) scored all the WCLs as very good and good. When asked about the moisture content of the WCLs, 145 (52.7%) scored appropriate, 122 (44.4%) of the products tested scored very moist/moist, and 80 (2.9%) scored rather dry/dry (*Figure 3*). Regarding rating oiliness, the clinicians rated all the tested WCLs (n=275; 100%) to be smooth and to contain sufficient grease in order not to dry out quickly.

When applying the dressing, clinicians were asked to rate conformability, flexibility, tension and cutting to shape of the tested WCLs. All products (n=275; 100%) scored 'good' for these features. When asked if the tested WCLs adhered to the simulated dummy wound on removal of the dressing, the majority scored dressing removal to be very good/good (n=220; 80%) for all tested

Table 3. Assessment of the different product features

When assessed	6-point scoring scale	Product features
On opening the packaging, before application of the product	Very easy = 1, easy = 2, not that easy = 3, a bit difficult = 4, difficult = 5, very difficult = 6	Removal of the product from its packaging
During product application	Very good = 1, good = 2, satisfactory = 3, sufficient = 4, deficient = 5, insufficient = 6	Optical properties, haptic, conformability, flexibility, tension, cutting the dressing to wound size
	Very moist = 1, moist = 2, appropriate = 3, rather dry = 4, dry = 5, very dry = 6	Moisture
	Very oily = 1, oily = 2, less oily = 3, appropriate = 4, hardly oily = 5, not oily = 6	Oiliness
	Very smooth = 1, smooth = 2, less smooth = 3, rather rigid = 4, rigid = 5, very rigid = 6	Smoothness
	Very greasy = 1, greasy = 2, less greasy = 3, appropriate = 4, hardly greasy = 5, not greasy enough = 6	Greasiness
During dressing removal		Adherence to the dummy wound, loss of petroleum jelly, drying out of the dressing
Overall		Comments and suggestions

WCLs. When asked to assess if there was loss of petroleum jelly from the WCLs, the clinicians answered satisfactory for all (n=275; 100%).

DISCUSSION

WCLs are intended for use as a single dressing in wounds of various aetiologies with no or low levels of exudate. They may also be used as primary dressing combined with a secondary dressing for moderately exuding wounds. The clinicians noted no significant differences between the colour coded samples tested regarding usability aspects (dressing application; ease of dressing removal; conformability; flexibility; possibility to cut the dressing to size and removal of the dressing. This result indicates a lack of bias as for the test one and the same type of WCL was used.

Moisture content was scored rather dry for only 2.9% (80) of the WCLs tested. Moisture content plays an important role in preventing dryness and mechanical damage of the fragile wound bed tissue (Sibbald, 2011). Moreover, adherent and dried out primary dressings may cause excessive pain on dressing removal (Sibbald, 2011), which significantly reduces patients' quality of life. Although for the user test a simulated wound on a dummy was used, the properties of the WCL may be beneficial in a clinical setting. A similar type of WCL as used for the test, which also contained hydrocolloid particles and petroleum jelly, was evaluated in a clinical study. The study compared the WCL with tulle gras in partial thickness burns and skin graft donor sites and demonstrated a significantly ($p<0.05$) faster healing time in favour of the hydrocolloid particles and petroleum jelly containing product (Tan, 2009).

LIMITATIONS

Although clinicians with extensive experience in wound management conducted the evaluation, the dressings were applied on a dummy with a simulated wound, which was chosen as a model for practical reasons to allow for a large enough sample. The features tested of the WCLs were selected based on what was presented in the literature as clinically relevant. The clinical performance of WCLs should be confirmed in a clinical environment.

CONCLUSION

Based on the clinicians findings, the tested WCL was easy to use. Although the features of the evaluated WCL were clinically relevant, the results need to be confirmed in actual wound management.

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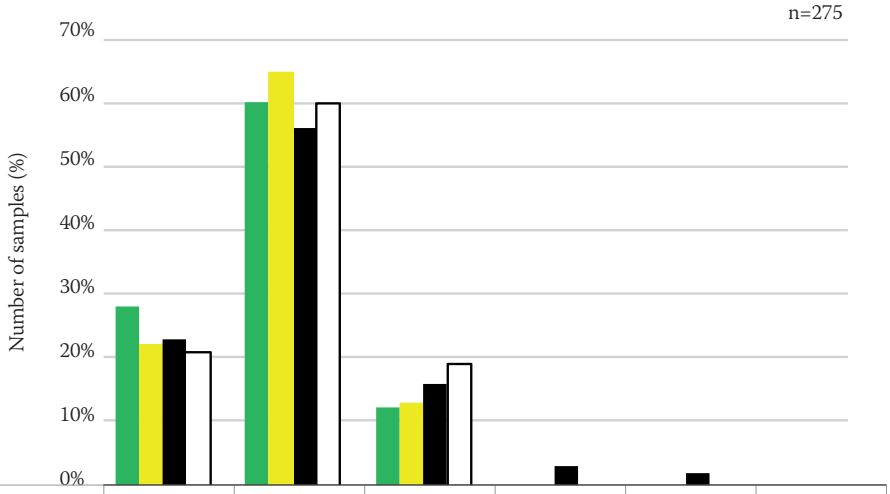
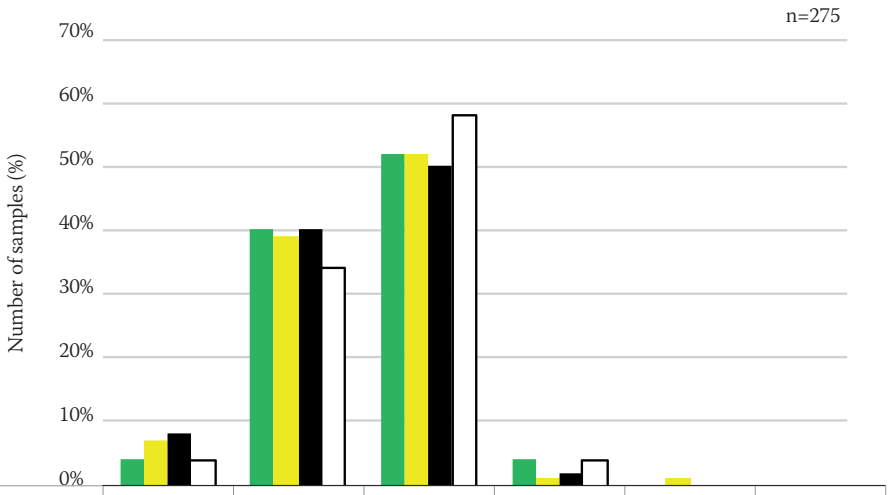
Figure 2. Removing the product from its packaging



	very easy	easy	not that easy	a bit difficult	difficult	very difficult
Green	28%	60%	12%	0%	0%	0%
Yellow	22%	65%	13%	0%	0%	0%
Black	23%	56%	16%	3%	2%	0%
White	21%	60%	19%	0%	0%	0%

The same type of WCL was packaged individually in inert pouches and marked with a different colour tag (yellow, green, black and white).

Figure 3. Moisture content



	very moist	moist	appropriate	rather dry	dry	very dry
Green	4%	40%	52%	4%	0%	0%
Yellow	7%	39%	52%	1%	1%	0%
Black	8%	40%	50%	2%	0%	0%
White	4%	34%	58%	4%	0%	0%

The same type of WCL was packaged individually in inert pouches and marked with a different colour tag (yellow, green, black and white).