Analysis of the fluid management by hydroactive wound dressings with the help of an in vitro maceration model

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Introduction

Modern wound dressings are expected to maintain a humid wound milieu without allowing maceration at the wound edges. Such hydroactive dressings mainly consist of alginate or contain sodium carboxymethylcellulose. Both polymers form fibres that can be processed to fleece compresses or tamponade strips and exhibit a high fluid uptake. However, highly exuding wounds may lead to macerated wound edges. Moreover, during gel formation loss of shape can be observed which results in reduced wound coverage. Hence, the fluid management of hydroactive dressings was analysed using a special maceration model.

Results

Suprasorb® A demonstrated with just 10mL/g fluid uptake the lowest fluid holding capacity (figures 1 and 2). A low fluid uptake till break point of maceration was also found for Aquacel® (17mL/g), while Aquacel® Extra and Suprasorb® Liquacel exhibited significantly higher values with approx. 23mL/g and 28mL/g, respectively. Moreover, it could be shown that the sodium carboxymethylcellulose dressings exhibit a distinct shrinkage during fluid uptake with approx. 29% and 31% for Aquacel® and Aquacel® Extra, respectively (figure 3). Suprasorb® Liquacel showed with only 16% shrinkage significantly higher form stability. For Suprasorb® A no loss of surface coverage was observed. Moreover, with Aquacel® and Aquacel® Extra maceration already occurred before the dressings were completely soaked. Leakage with Suprasorb® Liquacel and Suprasorb® A was only observed after they were completely gelled.

Conclusion

An in vitro maceration model was successfully used to quantify and evaluate the differences between hydroactive wound dressings. This model is hence suitable to analyze the fluid management in an in vivo like situation in vitro.