The occurrence and subsequent healing of small, superficial acute wounds such as cuts and abrasions is a familiar everyday process and in healthy skin, these wounds usually heal without consequences.

In the clinical setting, the investigation of any wound processes is dependent on the use of models. Small identical standardized wounds are required to perform wound healing studies in order to compare different wound treatments on an intra-individual basis. Obviously, current methods such as transepidermal water loss measurement using an emery wheel for dermabrasion were considered an option yet considered too invasive. A novel abrasion model could be used to evaluate wound healing and make comparisons between different wound dressings and thirdly to compare the wound healing rate and overall cosmetic outcome of wounds treated with these dressings.

Methods: A total of ten healthy volunteers were enrolled in the open-label, randomized, intra-individual comparison. On the forearms of each volunteer five standardized, superficial abrasions wounds were induced by scratching the skin repeatedly with a surgical brush until first signs of uniform glistening and punctuate bleeding was observed. Three dressings intended for moist wound healing were randomly allocated to the test area. All in- and exclusion criteria were verified before inclusion of panelists. Informed consent was obtained from all subjects and the study was approved by an independent ethics committee.

Wound Induction: In total, 5 standardized, superficial, abrasive wounds were induced on the forearms of the volunteers. A template was applied to the skin and 1.2 cm epidermal abrasive wounds were induced with a single pass of a 3 cm diameter surgical brush by scratching the skin repeatedly until first signs of uniform glistening and punctuate bleeding. No anesthetic was required for this procedure. In two panelists an additional wound was induced and a skin biopsy taken directly after induction for histological evaluation.

Discussion and Conclusion

In this open-label, randomized, intra-individual comparison it could be shown that uniform and identical standardized wounds created using an abrasion technique could be employed reliably to detect differences in the performance of wound dressings intended for the healing of superficial wounds. In general moist wound healing showed better results compared to dry wound healing with an earlier onset and a better outcome of healing. Superficial cutaneous wounds treated with a polyurethane or a hydrocolloid product demonstrated superior rates of repithelisation and overall cosmetic outcome.

The primary purpose of this study was to produce standardized identical abrasive wounds, to reflect more closely, the clinical situation in superficial wounding. The accuracy and reproducibility of each wound induction was found to be identical, enabling standardized comparisons. In particular, the wounds can be created under identical conditions, and are of identical surface area and depth, as supported by histological examination. No anesthetic was required prior to wound induction. The wound model itself can be considered the clinical equivalent of every day abrasions and grazes. Furthermore, these wounds are adjacent to each other within the same body area, making clinical examination more comparable.

In general products intended for moist wound healing showed better results compared to dry wound healing with an earlier onset and a better outcome of healing. Superficial cutaneous wounds treated with a polyurethane or a hydrocolloid product demonstrated superior rates of repithelisation and overall cosmetic outcome.

Assessment of Cosmetics Outcome/Acceptance: Cosmetic outcome was assessed using a visual analog scale. Investigator evaluated best for the polyurethane and hydrocolloid product with very high mean scores close to the maximum score of 10. The panelists judged cosmetic outcome similar to the investigators judgment, however their mean scores were lower, yet the trend was the same (Figure 6).

Superficial cutaneous wounds treated with a polyurethane or a hydrocolloid product demonstrated superior rates of repithelisation and overall cosmetic outcome.

References
Available on request.

The products used in the clinical studies are available under the brand Hansaplast as well as Elastoplast depending on the respective country in which the brand is available.