

offer an easy way to visually monitor wounds without the need of dressing removal.

Since this matter is of significant importance, we have perceived the recent letter by Richards and Falder as particularly compelling. Actually, our group is currently engaged in a project to covalently link a pH indicator dye to a wound dressing and hope to be able to report on it in the near future.

## Declarations of interest

None.

## REFERENCES

- [1] Richards H, Falder S. pH of a burn wound Falder. *Burns* 2018;44(8):2104–5, doi:<http://dx.doi.org/10.1016/j.burns.2018.08.028>.
- [2] Gethin G, O'Connor GM, Abedin J, Newell J, Flynn L, Watterson D, et al. Monitoring of pH and temperature of neuropathic diabetic and nondiabetic foot ulcers for 12 weeks: an observational study. *Wound Repair Regen* 2018, doi:<http://dx.doi.org/10.1111/wrr.12628>.
- [3] Power G, Moore Z, O'Connor T. Measurement of pH, exudate composition and temperature in wound healing: a systematic review. *J Wound Care* 2017;26:381–97, doi:<http://dx.doi.org/10.12968/jowc.2017.26.7.381>.
- [4] Sharpe JR, Booth S, Jubin K, Jordan NR, Lawrence-Watt DJ, Dheansa BS. Progression of wound pH during the course of healing in burns. *J Burn Care Res* 2013;34 e:201–8, doi:<http://dx.doi.org/10.1097/BCR.0b013e31825d5569>.
- [5] Schneider LA, Korber A, Grabbe S, Dissemmond J. Influence of pH on wound-healing: a new perspective for wound-therapy? *Arch Dermatol Res* 2007;298:413–20, doi:<http://dx.doi.org/10.1007/s00403-006-0713-x>.
- [6] Ono S, Imai R, Ida Y, Shibata D, Komiya T, Matsumura H. Increased wound pH as an indicator of local wound infection in second degree burns. *Burns* 2015;41:820–4, doi:<http://dx.doi.org/10.1016/j.burns.2014.10.023>.
- [7] Kassal P, Zubak M, Scheipl G, Mohr GJ, Steinberg MD, Murković I, Steinberg I. Smart bandage with wireless connectivity for optical monitoring of pH. *Sensors actuators. Sens Actuator B Chem* 2017;246:455–60, doi:<http://dx.doi.org/10.1016/j.snb.2017.02.095>.

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## Letter to the Editor

### The ideal wound dressing — Beyond the ideal



### A short comment on 'Properties of an ideal burn dressing: A survey of burn survivors and front-line burn healthcare providers' by T. Carta, J.P. Gawaziuk et al

Dear Sir,

We refer to the recently published article 'Properties of an ideal burn dressing: A survey of burn survivors and front-line burn healthcare providers' by Carta et al. [1]. This article is of great interest to everyone professionally involved in burn wound care, since everyone will have his or her own idea about the "perfect" wound dressing. Thus the aspect here, to include the ones having suffered from the consequences of burns, is a significant novel element in the pursuit of the ideal burn dressing. Interestingly, the perception of burn-victims of an 'ideal' burn dressing is in total concordance with the one of burn-care-providers as reported here and in a former study [2]; non-adhesive, antimicrobial and absorbent are the top three qualities such a dressing should come with. Similar properties have been determined by other workgroups dealing with wound dressings in general, including a Cochrane analysis reviewing burn dressings in the literature [3–5]. One aspect, which was found to be a minor criteria by Carta et al. was 'long-wearability' (seventh out of eight). This seems to be dependent on the type of wound investigated, as investigations considering burn wounds [2] and split-skin donor site wounds [6] delivered quite diverging answers to the question of frequency: the majority of surveyees favoured no dressing change until the wound has healed in split-skin donor site wounds, whereas the answer to the same question in burn wounds delivered a more heterogeneous pattern. Yet, close-meshed wound controls are necessary, especially in burn wounds due to uncertainties and different pathophysiology that are responsible for higher complication rates [7,8]. This enables an intervention as soon as the wound deteriorates.

Modern developments have brought up new-material dressings based on hydrogel or bacterial nanocellulose, that get quite close to fulfilling the desired requirements to represent the 'ideal' burn dressing [9–11]. Still numerous complications in wound healing are observed; the reasons apart from infections are still not fully elucidated. However, recent studies imply an association between healing progression and certain biomarkers, such as inflammatory mediators, pH, biofilm-forming or temperature [12–15].

Therefore, we would like to encourage further elaboration of wound dressings and propose an amendment to the properties of an ideal wound dressing: future smart wound dressings should be facilitating continuous monitoring of relevant wound parameters. A composite dressing, able to indicate such relevant criteria, could contribute to a more

efficient and comfortable care of (burn) wounds and epitomize a dressing beyond the ‘ideal’.

## Declarations of interest

None.

## REFERENCES

- [1] Carta T, Gawaziuk JP, Diaz-Abele J, Liu S, Jeschke M, Logsetty S. Properties of an ideal burn dressing: a survey of burn survivors and front-line burn healthcare providers. *Burns* 2018;0:8-12, doi:<http://dx.doi.org/10.1016/j.burns.2018.09.021>.
- [2] Selig HF, Lumenta DB, Giretzlehner M, Jeschke MG, Upton D, Kamolz LP. The properties of an “ideal” burn wound dressing — what do we need in daily clinical practice? Results of a worldwide online survey among burn care specialists. *Burns* 2012;38:960-6, doi:<http://dx.doi.org/10.1016/j.burns.2012.04.007>.
- [3] Wasiak J, Cleland H, Campbell F, Spinks A. Dressings for superficial and partial thickness burns. *Cochrane Database Syst Rev* 201328(3), doi:<http://dx.doi.org/10.1002/14651858.CD002106.pub4> CD002106.
- [4] Metcalf DG, Parsons D, Bowler PG. Clinical safety and effectiveness evaluation of a new antimicrobial wound dressing designed to manage exudate, infection and biofilm. *Int Wound J* 2017;14(1):203-13, doi:<http://dx.doi.org/10.1111/iwj.12590>.
- [5] Sharma G, Lee SW, Atanacio O, Parvizi J, Kim TK. In search of the optimal wound dressing material following total hip and knee arthroplasty: a systematic review and meta-analysis. *Int Orthop* 2017;41(7):1295-305, doi:<http://dx.doi.org/10.1007/s00264-017-3484-4>.
- [6] Kamolz LP, Giretzlehner M, Trop M, Parvizi D, Spendel S, Schintler M, et al. The properties of the ideal donor site dressing: results of a worldwide online survey. *Ann Burns Fire Disasters* 2013;26:136-40.
- [7] Norman G, Christie J, Liu Z, Westby MJ, Jefferies JM, Hudson T, et al. Antiseptics for burns. *Cochrane Database Syst Rev* 2017; 12:7, doi:<http://dx.doi.org/10.1002/14651858.CD011821.pub2> CD011821.
- [8] Keck M, Herndon DH, Kamolz LP, Frey M, Jeschke MG. Pathophysiology of burns. *Wiener Medizinische Wochenschrift* 2009;159:327-36, doi:<http://dx.doi.org/10.1007/s10354-009-0651-2>.
- [9] Wasiak J, Cleland H. Burns dressings. *BMJ Clin Evid* 2015;14: pii: 1903.
- [10] Boonkaew B, Kempf M, Kimble R, Supaphol P, Cuttler L. Antimicrobial efficacy of a novel silver hydrogel dressing compared to two common silver burn wound dressings: Acticoat™ and PolyMem Silver®. *Burns* 2014;40(1):89-96, doi:<http://dx.doi.org/10.1016/j.burns.2013.05.011>.
- [11] Poonguzhali R, Khaleel Basha S, Sugantha Kumari V. Novel asymmetric chitosan/PVP/nanocellulose wound dressing: in vitro and in vivo evaluation. *Int J Biol Macromol* 2018;112:1300-9, doi:<http://dx.doi.org/10.1016/j.ijbiomac.2018.02.073>.
- [12] Power G, Moore Z, O'Connor T. Measurement of pH, exudate composition and temperature in wound healing: a systematic review. *J Wound Care* 2017;26:381-97, doi:<http://dx.doi.org/10.12968/jowc.2017.26.7.381>.
- [13] Patel S, Maheshwari A, Chandra A. Biomarkers for wound healing and their evaluation. *J Wound Care* 2016;25(1):46-55, doi:<http://dx.doi.org/10.12968/jowc.2016.25.1.46>.
- [14] Lindley LE, Stojadinovic O, Pastar I, Tomic-Canic M. Biology and biomarkers for wound healing. *Plast Reconstr Surg* 2016; 138(3 Suppl):18S-28S, doi:<http://dx.doi.org/10.1097/PRS.0000000000002682>.

[15] Bennison LR, Miller CN, Summers RJ, Minnis AMB, Sussman G, McGuinness W. The pH of wounds during healing and infection: a descriptive literature review. *Wound Pract Res* 2017;25:63-9.

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## Letter to the Editor

**Response to the article: “The impact of skin allograft on inpatient outcomes in the treatment of major burns 20-50% total body surface area — A propensity score matched analysis using the nationwide inpatient sample” by Sheckter et al. (Burns, 45, 2019)**



Dear Editor,

With interest I have read the article “The impact of skin allograft on inpatient outcomes in the treatment of major burns 20-50% total body surface area — A propensity score matched analysis using the nationwide inpatient sample” by Sheckter et al. (Burns, 45, 2019). It is always good that “assumptions” are tested using a scientific approach and the results put the use of allografts in a new light.

A few comments need to be made, however:

- It should have been made clear that this research, and therefore its conclusion, is most likely solely about cryopreserved allografts, the type of allograft preferred in the United States. Glycerolized allografts are more commonly used in Europe and in some other countries around the world [1,2] (source: Euro Skin Bank, Beverwijk, the Netherlands). This type of allograft has different immunologic properties [3] and while it is unknown and unlikely that outcomes with glycerolized allografts would have been different, it should have been mentioned in the article.