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Letter to the Editor

Frailty and more: Age-related outcome factors in burns

Dear Editor,

Age is one of the most important outcome predictors in burns [1]. It is commonly accepted that chronological age does not necessarily reflect the biological age of patients. Accordingly, Ward et al. could show in their recently published paper 'Frailty: an independent predictor of burns mortality following in-patient admission' that implementation of a frailty index independently predicts in-hospital and one-year mortality for burns of any size [2]. Moreover, combining the Modified Baux Score and the Frailty Score could even further improve mortality prediction. We completely agree with the authors' conclusion that routine integration of a frailty index on cases involving elderly patients, would definitely improve clinical decision-making in stratifying patients for optimal burn care.

However, we believe that evaluating frailty is just one approach to incorporate biological age in the assessment for patient stratification. Elderly burn patients may present without frailty; however, their skin may display advanced age-related alterations, which can also influence patient performance. Intrinsic ageing produces thinner, atrophic skin [3] impacting burn depth and burn wound progression. Moreover, numerous extrinsic variables, most importantly UV radiation, smoking and pollution, play a role in accelerating skin ageing [4]. In contrast to intrinsically aged skin, skin subjected to extrinsic ageing (mainly UV exposure) presents as hypertrophic, dull, rough and with deep wrinkles [3]. In addition to these visible changes, age-induced alterations (summarised in Table 1) in cellular compartments, extracellular matrix components, the immune system as well as the inflammatory state have been described [5,6].

Although wound healing is not intrinsically impaired in the aged population, alterations have been observed at basically any stage of this process (reviewed in Ref. [5,6]). Considering intrinsic and extrinsic factors for ageing, we assume that biological skin age is highly variable within a population of approximately the same chronological age and may vary even within a single individual.

In order to reliably link biological skin age to patient outcome after burn trauma, easily quantifiable biomarkers would be highly desirable. So far a number of different biomarkers have been suggested to assess biological (skin) age including assessment of shortening of the telomeres, the hormonal status, general inflammatory markers or apoptosis markers [3]. So far, very few have been investigated that directly link biological age to patient response to burn injury. Driven by their observation that elderly patients are more likely to develop full-thickness injuries from partial-thickness thermal burns Farinas et al. set out earlier this year to determine local inflammatory responses in young and aged patients [7]. Apart from changes in macrophage numbers and activation state, they could also identify two signalling molecules (CCL5/RANTES, and EGF) that significantly differed between the two groups analysed. These results suggest it would be worthwhile to further investigate the local wound (immune) environment in order to improve and personalise care for burn patients [7].

As Ward et al. [2] concluded in their recent paper, it would be certainly interesting to expand frailty assessment to patients less than 65 years of age, *i.e.* the young elderly (60–65), and to patients at risk of early senescence. Furthermore, we propose a more elaborated stratification system by including not only the frailty aspect, but also biological skin age. We are aware that further research is much-needed to

Table 1 – Summary of alterations in aged skin (modified from Ref. [5,6]).

	Alteration upon age
Keratinocyte proliferation	↓
Keratinocyte migration time	↑
Fibroblast proliferation	↓
Melanocyte count	↓
Collagen	↓
Macrophage count	↓
Langerhans-cell count	↓
Inflammation	↑
T-cell infiltration	↓
Microvascularisation	↓

identify highly predictive biomarkers associating biological skin age to burn patient outcome. We believe this development could considerably contribute to a more differentiated and patient-oriented standard of care.

Conflict of interest

None.

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Letter to the Editor

Just the tip of the iceberg — Inconsistent information on a global scale and the need for a "standard" model of burn 1st aid

In: "Consistency an issue?" — A review of UK burns service online information on burns first aid" (Burns Vol 45 1 Feb 2019) Kilshaw and colleagues provide a timely reminder of continuing problems with selling the message of burn 1st aid (BFA). However, the article reveals only a microcosm of a much larger and far more complex situation than inconsistent online presentation of domains among UK burns services.

Currently, there are multiple factors contributing to inconsistencies in BFA information relayed to the public not least of which is the lack of consensus on parameters of BFA — i.e. method, temperature, duration and delayed benefit of cooling. [1,2] (Lack of consensus is also evident in the choice of preferred dressing post cooling [3], traditionally also considered an element of BFA) [4].

The lack of consensus is apparent in published recommendations from a range of agencies including burns associations, resuscitation councils, hospital burns units, national, regional and state burns services, government health agencies, non-profit foundations, charity and support groups, 1st aid organisations, military institutions and the UN as well as many differences seen in burn care guidelines for practice in EMS [5].

Decision making methods also seem to vary and many recommendations are shaped by local interpretations of the evidence base, practical considerations, parroting of models from "expert" bodies or subject to commercial sponsorship arrangements. This occurs in the absence of any national regulatory body with the oversight capabilities to marshal the plethora of suggested approaches into a single model or the legislative or medical authority to mandate recommendations to a single responsible agency.

In my presentation at the ANZBA 2018 conference, "Towards a standard model of burn 1st aid — one step forwards two steps back" I presented published BFA recommendations from 24 recommending agencies. This data identified 13 different durations for burn wound cooling alone despite best evidence suggesting a "gold standard" of 20 min [4].

Data from 46 provider agencies in 6 countries and 3 continents also showed more than 19 different cooling approaches including withholding of cooling altogether, a not uncommon practice in the US EMS. The use of caveats by EMS