

Medical > In Vivo > Wound healing

2

Non-invasive objective devices for monitoring the inflammatory, proliferative and remodelling phases of cutaneous wound healing and skin scarring.

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ABSTRACT

Objective evaluation of cutaneous wounds through the use of non-invasive devices is important for diagnosis, monitoring treatment response and can lead to the development of improved theranostic strategies. The need for objective monitoring of wound healing and scar formation is evident as this enables accurate diagnosis, evaluation and prognosis for clinicians and allows for the standardisation and validation of methodology for researchers. Therefore, this review provides an overview of the current application of non-invasive objective technologies for the assessment of wound healing through the different phases of repair. We propose that cutaneous healing parameters can be split into three core domains: anatomical, mechanical and physiological. These categories can be further subdivided with respect to specific phases of healing. There is no single instrument, which can measure all the parameters of healing simultaneously; thus, it is important to choose the correct device for the particular healing characteristics being monitored. However, multiprobe systems, which include a number of devices connected to one main unit, are useful as they enable multiple measurements of different parameters. Many of the devices have not been validated against histological examination. Additionally, some of the instruments have not been evaluated in all wound or scar types and may not be useful throughout all phases of cutaneous wound healing. In conclusion, non-invasive objective devices are useful in the assessment of cutaneous wound healing, as these tools can link the treatment and diagnosis by evaluating response to treatment and thus could aid as a marker for healing and scar maturation. © 2016 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd. **KEYWORDS:** biophysical assessment; objective technologies; quantitative measuring tools; scars; wound healing PMID:27060460 9DOI:10.1111/exd.13027