

Seeing past the burns

You have been burned. The pain is intense and you begin to wonder how serious the long-term damage will be. Will you need surgery? Will you have scars? The key to answering these questions is assessing how deep the burn is. Initial estimates by clinicians are accurate in around two thirds of cases, leading some people to have surgery they do not need while others wait longer than necessary for intervention. But a clever new technology has the power to change this.

Burn injuries have a significant impact on people's quality-of-life, their movement and their self-confidence. In some cases, severe burns can kill¹. Death rates from burns are highest in lower socioeconomic groups, making good burns management an equality issue^{2,3}. Treating burns victims, which can involve surgery, is also a cost on health services and the wider economy⁴.

Correctly assessing the depth of intermediate burns is essential to ensuring patients get the right treatment⁵. It can be the difference between preventing permanent scarring and sepsis⁶. An accurate assessment can improve outcomes for patients, meaning better healing, fewer scars and better movement in the affected areas⁶.

Diagnosing the thickness of burns is particularly challenging⁷. For example, when someone burns their arm, it may be superficial in parts but could extend to all layers of the skin in other areas of the arm. Doctors sometimes take a biopsy for lab analysis to help assess the depth of the burn. However, this can leave an additional scar and give misleading results in cases of 'partial thickness' burns.

Thanks to laser technology, measuring the depth of a burn is painless for patients and leaves no mark. Laser Doppler imaging (LDI) is 95-100% accurate when assessing the depth of intermediate burns – even if the burn is worse in some areas of the skin than others^{7,8}. By measuring blood flow in the wound, based on how light reflects off red blood cells, LDI creates a 'map' of the burn area. This allows clinicians to estimate the time for healing and decide which patients need surgery or alternative treatment.

A study has shown that such laser technology provides an accurate estimate of healing time up to 48 hours quicker than traditional methods⁸. This saves time, allows for early intervention, and reduces needless surgery - all of which is better for patients and more efficient for health systems.

Medtech: value for people

- This technology gives burns victims the best possible chance of recovery with fewer scars^{5,6}
- Faster decision-making means rapid intervention for those who need it⁶
- Fewer patients undergo unnecessary surgery⁷
- Non-invasive, accurate assessment of severity of burns

Medtech: value for governments

- Faster, more accurate decisions, enabling more efficient use of healthcare resources⁷
- Better patient outcomes through non-invasive assessment
- Optimises outcomes and reduces inequalities as burns injuries disproportionately affect lower socioeconomic groups^{2,3,4}
- Delivers value through innovation and supports high-quality jobs in Europe

Medtech: value for regulators

- A faster and more accurate alternative to traditional burn assessment by clinicians^{7,8}
- A non-invasive alternative to histological assessment of burn tissue following punch biopsy where a round area of skin and tissue are removed using a sharp, hollow cutting instrument^{6,7}.

Medtech: value for payers

- Optimises outcomes by ensuring timely assessment and intervention^{5,6}
- Reduces unnecessary surgical intervention⁷
- Cost savings when used in cases where there is uncertainty about depth of burn injury and healing potential of burn wounds¹⁰



NOTES

- 1) Brusselsaers N, Monstrey S, Vogelaers D, et al. Severe burn injury in Europe: a systematic review of the incidence, etiology, morbidity, and mortality. Crit Care. 2010;14:R188.
- 2) Edwards P, Green J, Roberts I, et al. Deaths from injury in children and employment status in family: analysis of trends in class specific death rates. BMJ. 2006;333:119. Epub 2006 Jul 7.
- 3) Peck M, Molnar J, Swart D. A global plan for burn prevention and care. Bull World Health Organ. 2009; 87:802–803. Available at: <http://www.who.int/bulletin/volumes/87/10/08-059733/en/>. Accessed 10 March 2015.
- 4) World Health Organization. Burns Fact sheet N°365. May 2012. Available at: <http://www.who.int/mediacentre/factsheets/fs365/en/>. Accessed 10 March 2015.
- 5) Kaiser M, Yafi A, Cinata M, et al. Noninvasive assessment of burn wound severity using optical technology: A review of current and future modalities. Burns. 2011;37:377–386.
- 6) Monstrey S, Hoeksema H, Verbelen J, et al. Assessment of burn depth and burn wound healing potential. Burns. 2008; 34:761–769.
- 7) Jaskille AD, Ramella-Roman JC, Shupp JW, et al. Critical review of burn depth assessment techniques: Part II. Review of laser doppler technology. J Burn Care Res. 2010;31:151–157.
- 8) Kim LH, Ward D, Lam L, et al. The impact of laser doppler imaging on time to grafting decisions in pediatric burns. J Burn Care Res. 2010;31:328–332.
- 9) Jeng JC, Bridgeman A, Shivanan L, et al. Laser Doppler imaging determines need for excision and grafting in advance of clinical judgment: a prospective blinded trial. Burns. 2003;29:665–670.
- 10) NICE medical technology guidance 2. moorLDI2-BI: a laser Doppler blood flow imager for burn wound assessment. Issued March 2011. Available at: <http://publications.nice.org.uk/moorldi2-bi-a-laser-doppler-blood-flow-imager-for-burn-wound-assessment-mtg2/clinical-evidence>. Accessed 10 March 2015.