Original Article

sb&h

Scars, Burns & Healing
Volume 2: 1–3
DOI: 10.1177/2059513116672790
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav

sbh.sagepub.com
SAGE

Use of dermal regeneration templates in a low resource environment

Tom Potokar[1] and Pippa Anderson[2]

Abstract

Modern burn care in a sophisticated well-resourced centre in a rich country utilises an increasing number of expensive adjuncts to optimise outcomes such as dermal templates, cultured keratinocytes, biological and silver impregnated dressings. Translating the use of these into a low resource environment is not a simple matter of providing the materials free of charge and there needs to be careful consideration of both the positive and negative consequences and the impact on both an individual and a population level.

Keywords
Dermal templates, low resource environments, burns service systems, outcomes, health economics, population needs, Integra

It is acknowledged that under certain specific circumstances dermal regeneration templates such as Integra™ can provide excellent results in both acute and reconstructive burns surgery. However, even under the most ideal conditions complications are not uncommon, the most frequent being infection, especially if the Integra is applied late in an acute burn situation.[1] The paper by Godwin et al.[2] clearly shows that it is possible to achieve excellent results even in difficult circumstances and the associated logistical challenges have been well described. There are an increasing number of relatively 'high tech' and expensive adjuncts utilised in modern burn management in a well-resourced centre including dermal templates, cultured keratinocytes, biological dressings and silver containing products. Provision of any of these products free of charge (such as through donation which was the case in the Godwin paper) will certainly overcome some of the financial challenge (but not all of them as there are inevitable associated costs that go beyond the product itself). The question though, is not only how to make these affordable for the low-resource environment, but also how to estimate their utility within the context of an under-resourced and over-capacity health service. From a global perspective, we should be aiming for significantly less variability in outcomes and a significant decrease in the enormous discrepancy between outcomes from burn injuries in rich versus poor countries. This is only likely to be achieved through a comprehensive,

[1]College of Human & Health Sciences, University of Swansea, Consultant Plastic Surgeon, Welsh Centre for Burns & Plastic Surgery, Director Interburns (International Network for training, Education and Research in Burns), UK
[2]Head Swansea Centre for Health Economics, College of Human and Health Sciences, Swansea University, UK

Corresponding author:
Professor Tom Potokar, Centre for Global Burn Injury Policy & Research, College of Human and Health Sciences, Room 26, Haldane Building, Swansea University, Singleton Park, Swansea, SA2 8PP Wales, UK.
Email: t.s.potokar@swansea.ac.uk

integrated systems approach in the long run, but in the meantime, as demonstrated by the experience in Gaza, a considered and thoughtful approach with regard to the positive and potentially negative consequences of introducing sophisticated technologies should be welcomed and can help demonstrate what can be done even in adverse circumstances.

In terms of general principles, the following should be borne in mind when considering the introduction and use of expensive or sophisticated technologies, such as dermal templates, in a low-resource environment:

(1) Burns service systems improvement
(2) Value for money
(3) Local knowledge, skills, staff and equipment
(4) Perceived need versus real need

Burns service systems improvement

The use of sophisticated techniques and modern technology can certainly impact on an individual basis and would include not only dermal regeneration templates, but also complex microsurgery, tissue expansion, laser surgery, etc. However, on a population level, and from a public health perspective, what is needed in a resource-poor environment or low and middle income country (which is where most burn injuries occur) is a systems-based approach that addresses all aspects of burn prevention and treatment aimed at primary prevention (reducing the incidence), secondary prevention (reducing the extent of injury through appropriate first aid and initial management) and tertiary prevention (reducing the complications). This necessitates thinking not just about what works, but for whom and under what circumstances.[3] Failure to take this wider approach risks increasing the divide between those who are fortunate enough to have access to high tech care delivered by well trained and resourced staff and those (the majority) who are not. Clearly, any health professional wishes to do his or her best for the patient in front of them with the specific resources they have available and a systems approach should not jeopardize this, but utilisation of expensive and minimally available techniques and materials should be considered in the context of overall service improvement and the need to ensure that all patients have access to basic, competent services, which in the long run will reduce the need for the more complex and expensive specialist services.

In the acute burn scenario, to enhance success and decrease complication rates, any dermal template needs to be applied early ideally within the first 24–48 h. The reality is that many patients in a low-resource environment arrive late with contaminated or infected wounds, and the workload and general resources are such that early surgery is not possible. The focus of use is therefore likely to be reconstructive surgery (as was quite rightly pointed out in the Godwin paper). There are huge reconstructive needs, but there is a risk that focusing on complex reconstruction will detract from both prevention and acute care and thus the overall incidence and poor outcomes for burns will continue unabated.

Burns service systems improvement should be a government-led initiative with a clear strategy that takes into account the varied provision of care from rural clinic to district hospital to specialist centre and include those in the non-governmental sector such as charities and NGOs.

Value for money

Dermal templates are extremely expensive and consideration has to be given to what could be done with the same amount of money if put towards other improvement initiatives. Health economic studies can help to inform policymakers and healthcare decision-makers, enabling them to identify which interventions, policies or services provide the best value for money. Policymakers, as well as hospital managers and departmental leads who have increasingly limited budgets, have to consider the opportunity cost of spending some of their budget on specific interventions; money spent on dermal templates will limit the funds available for other patients and interventions. Thus, evidence of value for money—that is, the relative balance of the benefits and outcomes against the (opportunity) costs from all perspectives—is vital to inform decisions about use of dermal templates. This issue becomes more complex when a costly intervention is provided free by an external funding body such as a charity or NGO, or even a philanthropic individual. These are real issues that have to be considered on a daily basis by all health service providers throughout the world. In general, healthcare is provided based on a system of equity (each according to his/her needs) rather than equality (the same for everyone), but even within this model there are multiple confounding factors—for an individual who does not have access to even simple burn care then, this is their 'need', whereas when access is available then complex

surgical reconstruction might be an individual's 'need', and balancing these difficult and diverse needs, taking into account value for money, population versus individual 'rights' and available resources is the job of policymakers and strategic planners.

Local knowledge, skills, staff and equipment

Before introducing any new technology, it is imperative that the knowledge, skills and staffing levels as well as available equipment are considered. Performing a complex surgical intervention without access to appropriate nursing care and long-term rehabilitation is doomed to failure. The premise of learning to walk before you run is important here and it is essential that the basics of comprehensive burn care are already fully in place before introducing new non-essential techniques. In the case of non-governmental funded services, especially when supported by international agencies, NGOs, etc., it is vital to consider the long-term plan. If expensive sophisticated techniques have been introduced, will these still be able to be funded in the future? And what will the legacy be? Primarily it should be a well-run service able to provide a good standard of burn care, accessible to all those who require it to an internationally agreed standard.[4] Again the context here is critical; a short-term emergency situation with a predicted time frame and number of patients that require treatment that can be fully provided from acute care through to discharge is not the same as a chronic underfunded and unstable environment where a long-term strategy needs to be developed with clear measurable objectives and a realistic timeframe.

Perceived need versus real need

Unfortunately, there is a temptation within modern society in general, but particularly within medical care, to be drawn to the latest innovation, whether a medical device, therapeutic agent or surgical technique. Keeping up-to-date with modern advances is important, but so is a thorough critical appraisal of the utility, practicality, efficacy, efficiency and effectiveness:

Utility:	is it useful?
Practicality:	are the conditions appropriate for its use?
Efficacy:	does it work?
Efficiency:	what is the wasted effort? (success to failure ratio)
Effectiveness:	what is the total benefit?

Hand hygiene is an excellent example that fulfils all the above criteria, yet is rarely achieved[4] and implementation of a strategy to ensure 100% compliance with hand hygiene may in fact be one of the 'real' needs as opposed to the 'perceived' needs of more sophisticated medical technology.

Conclusion

Ensuring high quality burn care and prevention in regions with limited resources, in disaster situations and conflict scenarios is a complex process and the specific situation needs to be assessed taking into account the points mentioned above. An overburdened rural district hospital with minimally trained staff and extensive basic needs is clearly not the environment to introduce complex reconstructive techniques. A facility that has achieved a certain standard of service delivery,[5] where the costs involved are not going to impact on providing adequate care to other patients and there is stringent evaluation of outcomes and effectiveness (as in the Gaza experience) might be.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

1. Bargues L, Boyer S, Leclerc T, et al. Incidence and microbiology of infectious complications with the use of artificial skin Integra in burns. *Ann Chir Plast Esthet* 2009; 54: 533–539.
2. Nicoli F, Rampinelli I and Godwin Y. The application of Integra in a challenging context. *Scars, Burns & Healing*, 2016. DOI: 10.1177/2059513116672789.
3. De Savigny D and Adam T (eds). *Systems Thinking for Health Systems Strengthening*. Geneva: Alliance for Health Policy and Systems Research/World Health Organization, 2009.
4. Thi Anh Thu L, Thi Hong Thoa V, Thi Van Trang D, et al. Cost-effectiveness of a hand hygiene program on health care-associated infections in intensive care patients at a tertiary care hospital in Vietnam. *Am J Infect Control* 2015; 43: e93–99.
5. Potokar T, Moghazy A, Peck M, et al. (eds). *Setting Standards for Burn Care Services in Low and Middle Income Countries*. Swansea: Interburns, 2013. Available at: http://interburns.org/wp-content/uploads/2013/12/Interburns-Standards-Report-2013.pdf.

How to cite this article

Potokar T and Anderson P. Use of dermal regeneration templates in a low resource environment. Scars, Burns & Healing, 2016. DOI: 10.1177/2059513116672790.