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Review

Burns education: The emerging role of simulation for training healthcare professionals

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ABSTRACT

Burns education appears to be under-represented in UK undergraduate curricula. However current postgraduate courses in burns education provide formal training in resuscitation and management. Simulation has proven to be a powerful modality to advance surgical training in both technical and non-technical skills. We present a literature review that summarises the format of current burns education, and provides detailed insight into historic, current and novel advances in burns simulation for both technical and non-technical skills, that can be used to augment surgical training. Addressing the economic and practical limitations of current immersive surgical simulation is important, and this review proposes future directions for integration of innovative simulation strategies into training curricula.

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Contents

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Abbreviations: ATLS, Advanced Trauma and Life Support; ED, emergency department; EMSB, Emergency Management of Severe Burns; TBS, The Burns Suite; TBSA, total body surface area.

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1. Introduction

In the UK, burns patients account for about 175,000 emergency department admissions and 15,000 hospital admissions each year [1]. In the USA, acute thermal injuries requiring treatment affect nearly half a million patients each year, with approximately 40,000 hospitalisations and 3,400 deaths annually [2]. Within the last decade, the burn care community has seen an improvement in predicted mortality; this reflects the structured, multidisciplinary approach to burn-injured patients, early surgical excision and wound closure, and general advances in the intensive care of patients [3].

This emphasises the importance of providing core knowledge of acute burns assessment and management to trainees and healthcare professionals involved in the care of burns patients. From a surgical perspective, the huge physiological shifts seen in the acute inflammatory phase of a burn can be a rich source of information for teaching, because core topics such as ''skin physiology'', ''metabolic medicine'', ''fluid resuscitation'', and ''wound healing'' can be easily taught around a burns patient, for example as part of a problem-based learning curriculum. Furthermore, the mid- to long-term management of major burns patients can also cover other important core topics, because they require special nutritional, psychological, and rehabilitation needs, all contributory to the multidisciplinary team approach to patient care. Burn-related injuries and associated phenomena can be encountered in numerous clinical specialties including emergency medicine, plastic surgery, trauma, dermatology and general practice, and methods to better integrate this more widely into the curriculum should be sought.

This article will begin with an overview of current burns education within undergraduate and postgraduate surgical curricula in the UK, followed by an account of important advances in burns education nationally and internationally. Particular focus will be attributed to novel simulation strategies, related technological advances and future horizons in burns education. We will aim to engage the reader in surgical education as a discipline, and burns education as a niche to be targeted, highlighting future avenues to optimise burns education.

2. Undergraduate training

In 2008, a U.K.-based survey of 31 medical schools found that ''burns'' was not explicitly mentioned in any of the core curricula; however, all medical schools allowed their students to select a special study module or elective in burns [4]. Furthermore with the centralization of burns services nationally and the development of ''Regional Burn Care Networks,'' some medical students may never rotate through a burns unit if it is not part of their university or peripheral hospital placements, but may face involvement in burns management if they subsequently work in emergency departments. More recently a cross sectional study, involving final year medical student representatives from 29 UK medical schools found that only 13% of undergraduate curricula provided structured burns teaching, with a maximum of 4 h allocated over the entire duration of the degree [5]. In addition, a study of randomly selected final year medical students (244 of 300 students responded) from 23 UK medical schools found that only 45% of medical schools provided formal burns education [6]. This data highlights that there is an under provision of burns education in the undergraduate curriculum, which should ideally be addressed in order to improve knowledge and confidence, to better enable future graduates in managing burn injuries.

3. Postgraduate training

In the UK, there are only two short currently available postgraduate courses that address burns management and involve simulation scenarios; namely the Advanced Trauma and Life Support (ATLS) [7], which lasts 3 days, and the Emergency Management of Severe Burns (EMSB) [8], a 1-day course for all healthcare professionals involved in burn care. Globally, the most prominent and available course programme available is the Advanced Burn Life Support (ABLS), approved by the American Burn Association [9]. There are 3 ABLS option programmes: a hands-on ''live'' simulation course, a convenient on-line resource, and a comprehensive handbook [9].

3.1. *Advanced Trauma Life Support (ATLS)*

The Advanced Trauma Life Support (ATLS) course for doctors teaches a systematic, concise approach to the early care of the traumatised patient [7]. Developed and backed by the American College of Surgeons nearly 40 years ago, ATLS is vital to guiding care for the injured patient in the emergency department (ED), and its principles are applicable to any trauma scenario. Its training provides ''a common language'' that can save lives in critical situations and has now been adopted in over 45 countries worldwide, with the Royal College of Surgeons of England providing it in the UK. ATLS covers the majority of critical trauma scenarios in adults and children, and also addresses the variation in trauma management in specific population groups (e.g. the elderly and pregnant women).

Within the course manual, ''burns'' (referred to as ''thermal injuries'') spans an entire chapter. The course consists of lectures, skills stations in small groups, as well as simulations of which several are contextualised. Final assessment takes the form of an end-of-course ''moulage examination'' (simulated trauma scenario) and a written multiple choice question test, both of which must be completed satisfactorily in order for candidates to become ATLS-certified.

3.2. *Emergency Management of Severe Burns (EMSB)*

The EMSB training course was originally developed by the Australian and New Zealand Burns Association and has also been adopted by the British Burn Association [8]. EMSB is a 1-day course, targeted at doctors, nurses and allied healthcare professionals involved in burn care and its main aim is to effectively deliver the principles of the overall acute management of severe burn victims, including first aid. In addition,

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