



A review of smartphone applications in burns care.

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Introduction

In this 21st century, Smartphone technology has become an indispensable pillar for the everyday functioning of society. The rapid improvement in smartphone technology has led to its increasing integration into medical as more than simple an adjunct to medical treatment

Up to 87% of physicians use a smartphone or other type of device (i.e. tablet) in their workplace.

While many smartphone applications have been developed for use in the burns setting, the evidence for their validity and efficacy in actual clinical practise is less clear.

Aim

To review the literature in order to assess the evidence for the use of smartphone's and applications in the management of burns,

Methods

A comprehensive search of MEDLINE, EMBASE and Google Scholar databases was conducted to identify clinical articles up until July 2019.

Clinical studies describing 'smartphones', 'applications', 'apps' utilised in a burns' setting were identified and considered in the final review.

Studies not available in English or full text, non-clinical studies, studies describing non-smartphone/tablet technology and unrelated to such technology in burns wounds were excluded.

Table 1: Summary of articles

Author, Year	Application, Details of study	Outcome
Barnes, 2015	Mersey Burns Application: Smartphone/tablet application aids in assessment of TBSA and calculation of fluid resuscitation protocols in burns, RCT	- Mersey Burns Application showed greater consistency in TBSA estimation and fluid calculation than clinical assessment using Lund & Browder Chart. Mean values were overall similar. Application easier to use compared with chart for inexperienced clinicians/students.
Blom, 2017	App: A telehealth communication smartphone program, with standardised data pro-forma to assist rural clinicians to link in with a burns' expert. , Qualitative	- Improves rural clinical confidence and empowers them to safely manage burns victims - Ongoing difficulty of burns' experts treating patients with photos only - Lessened privacy concerns c/w use of whatsapp and other applications
Cheah, 2018	3D Burn Resuscitation Application: Users paint burnt area onto a 3d generated model, allows estimation of TBSA & resuscitation needs, RCT	- 3D Burn applications has a greater accuracy(Under-estimated by 1.9%) with measurement of TBSA c/w Rule of Palm(Over-estimated by 10.6%), Rule of Nines(Over-estimated by 19.7%), Lund Browder Chart(Over-estimated by 8.3%) - Time of using application significantly longer than using traditional examination means
Fontaine, 2018	E-Burns Application: A TBSA calculator for smart-device based application, Letter to Editor	Used widely in France, however no comparisons derived from article.
Godwin, 2015	Peregrine – A smart Device application with 3 functions: - TBSA calculation - Fluid Formula Recommendations - Serial Photography RCT	- Peregrine and paper-based Lund-browder charts assessed TBSA values without significant difference - Peregrine allowed increased speed of TBSA calculation
Jaspers, 2017	FLIR ONE thermal imager for assessment of burn's wounds - FLIR ONE thermal camera would take photos then assess temperature differences between burn wound and healthy skin	Excellent reliability of the FLIR ONE to discriminate between burns healing <21 days and >21 days. Moderate validity requires further large trials to assess efficacy

Kilnberg, 2017	Mobile Phone Application for remote consultations and referrals of burn injuries , Mixed-Methods Approach	Benefits: Good UI, Easy to Use, Useful for remote clinicians Issues: Technical difficulties regarding certain aspects of user interface, Unfamiliarity, Limited Proforma
Morris, 2014	Comparison of Mersey Burns Applications + UBurns Apps for generation of fluid resuscitation in burns, RCT	uBurn and Mersey Burns applications were faster than a control(general purpose calculator) All 3 applications demonstrated similar magnitude of error, and similar evidence of learning effect
Wallis, 2016	Smartphone App + Cloud-Based Consultation System for management of rural burns injuries, Qualitative Study	Describes the actual function of the smartphone + Cloud Based Consultatio System
Hasselberg 2017	Smart-phone based tele-communication set up in Africa: Qualitative study	Challenges to initiating a smartphone-based consultation system include: - Image quality an diagnostic accuracy - Ease of using user interface

Results

- 10 articles met inclusion criteria for use in final review
- 6 articles described development and implementation of burn's assessment application, while the other 4 described applications aimed at improving telehealth process
- All articles evaluated these applications as beneficial to the treatment of burn's care, however ultimately required further testing for validation

Chase, J., iPads and other drugs. *Medical Marketing & Media: The interactive Guide* 2013: p. 10 - 11

Wurzer, P., et al., Smartphone applications in burns. *Burns*, 2015. **41**(5): p. 977-89.