International Journal of
**Digital Health & Patient Care**
e-ISSN : 3023-851X
https://ndpapublishing.com/index.php/

# High-Fidelity Digital Burn Assessment: A Clinical Validation of the Digital Tool against Manual Lund and Browder Chart Gold Standard for Total Body Surface Area Estimation

**Mohd Shahrul Suondoh*[1,2], Salmi Mohamed Sukur[1], Mohammad Ali Mat Zain[1] and Rohaida Basiruddin[2]**

[1]*Department of Plastic and Reconstructive Surgery, Hospital Kuala Lumpur, Malaysia*
[2]*Azman Hashim International Business School, Universiti Teknologi Malaysia*

**Article Info**
Received:29 September 2025
Revised: 08 December 2025
Accepted: 15 December 2025
Published:30 December 2025

**Keywords**
Burn
Digital Tool
Total Body Surface Area
Diagnosis Accuracy
Mobile App
Malaysia

**ABSTRACT**

Precise total body surface area estimation is paramount for effective burn care. This study aimed to validate the E-Burn app, a digital tool, by comparing its total body surface area estimations against the established Lund and Browder chart, the clinical gold standard. A prospective, cross-sectional study was conducted on 101 burn cases. Total body surface area was independently estimated in parallel using both the E-Burn app and the Lund and Browder chart. Data were analysed using Wilcoxon signed rank tests, Intraclass Correlation Coefficients, and Bland-Altman plots to assess systematic difference, absolute agreement, and bias. The E-Burn app demonstrated excellent agreement with the Lund and Browder chart, achieving an outstanding Intraclass Correlation Coefficients of 0.997. Although a statistically significant median difference was identified ($p < 0.001$), Bland-Altman analysis quantified this as a clinically minor mean bias of -0.35%. Crucially, the 95% limits of agreement were impressively narrow (+1.32% to -2.02%), indicating minimal random variation and high consistency. The E-Burn app is a precise and highly reliable tool for TBSA estimation, with its minor bias being clinically inconsequential. While this single-centre study warrants future multi-centre validation, these findings robustly support the app's integration into clinical practice to enhance efficiency and consistency, critically supporting the development of future innovative digital burn tools in Malaysia.

## 1. INTRODUCTION

The effective management of severe burn injuries represents a formidable public health challenge, both globally and within Malaysia. For the patient, a severe burn is a life-threatening trauma [1]. For the clinician, it is a race against time where every decision carries immense weight. Annually, fire-related burns contribute to over 180,000 fatalities worldwide, with non-fatal cases imposing immense morbidity and straining healthcare resource [2–4]. This crisis is acutely felt in Malaysia, where a consistent five-year upward trend in burn cases at major referral centres like Burn Unit Hospital Kuala Lumpur (HKL), underscores a growing emergency. This escalating patient load, compounded by resource limitations and urban-rural healthcare disparities, places an immense weight on the system and highlights an urgent need for more efficient, accurate, and scalable solutions in burn care [1, 5–8].

At the heart of this clinical dilemma lies the initial assessment of the burn injury. The estimation of total body surface area (TBSA) is the cornerstone upon which all subsequent treatment is built, dictating critical decisions from intravenous fluid resuscitation formulas to the necessity and timing of surgical intervention [9–11]. Inaccurate TBSA assessment especially in early burn injuries can have catastrophic consequences, leading to either under- or over-resuscitation and resulting in severe complications such as burn shock, sepsis, acute renal failure, or compartment syndrome [10]. All of which dramatically increase morbidity, mortality, and healthcare cost [6, 12–14].

Studies indicates that TBSA miscalculations are pervasive, ranging from 5% to as high as 339% regardless of the provider's level of experience [15]. In a cross-sectional study of 208 patients, TBSA was overestimated in 60.58% of cases and underestimated in 13.46% with referring centres overestimating burns by a ratio of 5:1 compared to

*Corresponding author
*e-mail: syahroy86@gmail.com
ORCID ID: 0000-0001-8620-6226

Research Article/ DOI: 10.5281/zenodo.18048397

How to cite this article
Suondoh, M. S., Sukur, S. M., Mat Zain, M. A., & Basiruddin, R. (2025). High-Fidelity Digital Burn Assessment: A Clinical Validation of the Digital Tool against Manual Lund and Browder Chart Gold Standard for Total Body Surface Area Estimation. Int. J. Digital Health & Patient Care, 2(2), 79-85.

burn units [16]. Even among healthcare professionals (HCPs), traditional methods like Lund and Browder (L&B) chart can yield an average absolute error of 13% [17].

Despite its critical importance, the current clinical gold standard for TBSA estimation, the Lund and Browder (L&B) chart, is a manual, analogue tool fraught with limitations. Its application is often time-consuming and, particularly in non-specialized settings, prone to significant interobserver variability and error [18]. This subjectivity introduces a dangerous element of imprecision at the most critical juncture of care, undermining the foundation of the treatment plan [5].

In response to these challenges, digital health technologies offer a paradigm shift. Digital health technology emerges not as a mere convenience but as a potential lifeline [18–20]. Mobile applications and artificial intelligence (AI) hold the potential to standardize burn assessment, enhance diagnostic accuracy, and streamline clinical workflows [21]. However, the promise of these innovations can only be realized through rigorous clinical validation that builds trust and overcomes the reluctance of some healthcare professionals to adopt new technologies. By improving the precision of the initial diagnosis, these technologies free up clinicians to focus on other critical aspects of patient care and, most importantly, the potential for patient survival and recover [18, 22, 23].

This study, therefore, serves as a critical catalyst for modernizing burn care in Malaysia. By rigorously validating a novel digital tool against the established gold standard, this study aims to provide the robust evidence needed to integrate high-fidelity technology into practice. The goal is to enhance clinical outcomes, reduce life-threatening complications, and optimize healthcare efficiency, paving the way for a new standard of burn care in the nation.

## 2. MATERIALS AND METHODS

### 2.1. Study design

This study employs a prospective cross-sectional study design with randomized sampling from January 2025 until April 2025. The quantitative component will objectively measure the clinical utility of the mobile app, with the primary objective of determining its accuracy in TBSA estimation compared to the current gold standard.

### 2.2. Study Setting and Participants

This study was conducted within the specialized environment of the Burn Unit at Hospital Kuala Lumpur (HKL), a major tertiary referral centre for burn care in Malaysia. This setting provides a high volume of diverse burn injury cases, ensuring the relevance and generalizability of the findings. The key participants in this study were the experienced front-line healthcare professionals (HCPs) in burn care directly responsible for the initial assessment and ongoing management of burn patients. This group includes medical officers and plastic surgeons.

### 2.3. Study Protocol and Data Collection

The study was structured around a core intervention cycle focused on the seamless integration and parallel evaluation of E-Burn[20], a widely available digital burn tool on the Google Play and the App Store (Figure 1) with traditional method, L&B chart (Figure 2), within the clinical practice of the HKL Burn Unit. All participating healthcare professionals (HCPs) first completed a structured training program to ensure proficient and consistent use of the application.

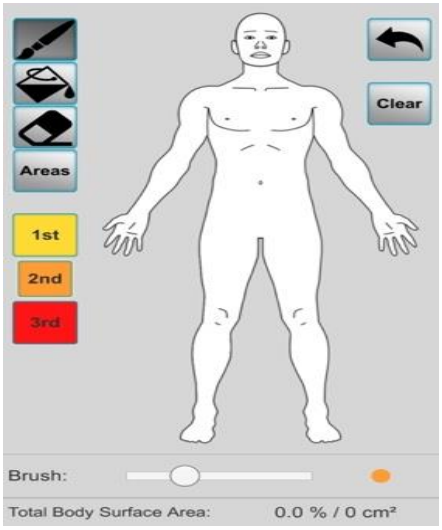


**Figure 1.** Digital tool app "E-Burn"

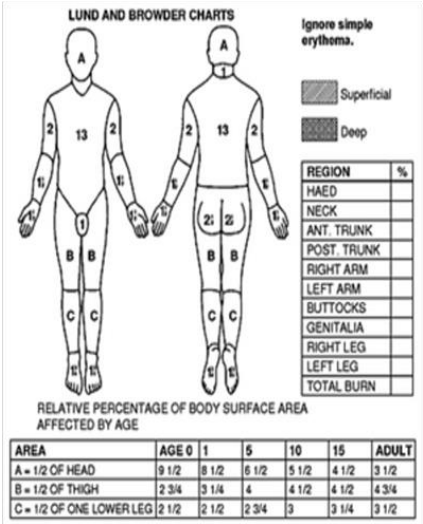


**Figure 2.** Lund and Browder (L&B) chart

The training session comprised a detailed presentation on the app's features, followed by hands-on demonstration using both traditional method and mobile app. To ensure proficiency, each HCP was required to complete several simulated case vignettes, representing various burn patients and sizes on mannequin, until they could consistently and accurately operate the application.

Following the training, a parallel, comparative assessment of total body surface area (TBSA) was conducted for each pf the 101 study participants that consist of burn patients. Throughout the study period, on-site support was provided by plastic surgeons to address any technical queries and ensure adherence to the data entry protocol. Experienced HCPs performed the TBSA estimation using the E-Burn app and traditional method L&B chart and validated by plastic surgeons. This parallel method was designed to minimize observational bias. The paired TBSA estimations from both methods, along with anonymized patient demographic data, were systematically documented on a standardized data collection from and entered a secure database for analysis.

Quantitative data was systematically collected and recorded in a secure database and research pro-forma. This includes the paired TBSA estimations from the L&B chart and the E-Burn app for each case, along with anonymized patient demographic data. This dataset forms the empirical basis for the primary analysis of diagnostic accuracy.

### 2.4. Statistical Analysis

The quantitative data was subjected to a rigorous statistical analysis to determine the level of agreement, reliability, and bias between the E-Burn app and the Lund & Browder chart. For the 100 paired TBSA estimations, a multi-faceted analytical approach was used. A Wilcoxon signed-rank test was employed to identify any statistically significant systematic difference between the median TBSA values produced by the two methods. To quantify the degree of absolute agreement and reliability, an Intraclass Correlation Coefficient (ICC) will be calculated, where values approaching 1.0 indicate higher reliability.

Finally, a Bland-Altman analysis will be conducted to visually assess the extent of agreement. This plot will illustrate the mean difference (bias) between the two methods and calculate the 95% limits of agreement (LoA), providing a clear clinical picture of how much the measurements from the E-Burn app can be expected to differ from the L&B chart. The primary anticipated output is a measurable validation of the E-Burn app's accuracy, quantified against the gold standard L&B chart, with the hypothesis that the digital tool will demonstrate high agreement and minimal clinical bias.

## 3. RESULTS

### 3.1. Descriptive Analysis of TBSA Estimations

Descriptive analysis is conducted to characterize and compare the distribution of TBSA estimates from both the L&B chart and the E-Burn app. Both methods yielded a similar median TBSA estimate of approximately 4.5%. However, the data distributions for both were positively skewed, as evidenced by mean TBSA values that were notably higher than the medians (Figure 3). The mean TBSA for the L&B chart was 8.09% (SD = 11.67), while the mean for the E-Burn app was slightly lower at 7.75% (SD = 11.51). This skewness indicated the presence of high-value outliers in both datasets. The interquartile range (IQR) for the E-Burn app is marginally narrower than that of the L&B chart, suggesting a slightly more concentrated distribution for the central 50% of its estimates. While this initial analysis indicates a similar central tendency, a deeper statistical evaluation is required to determine the precise level of agreement for individual patient assessments (Table 1).

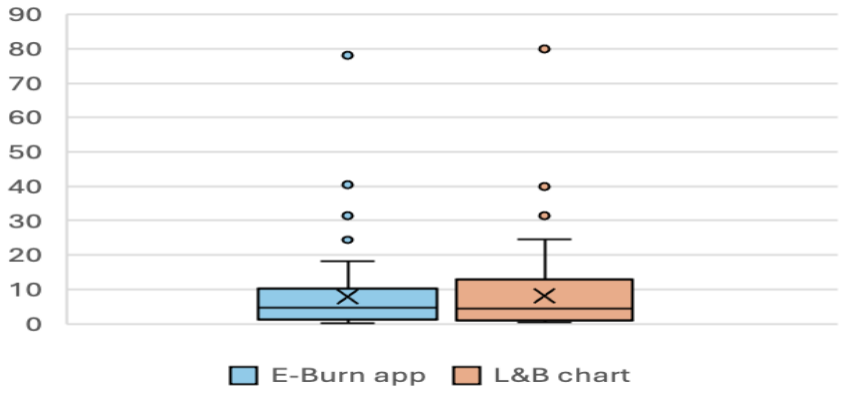


**Figure 3.** Boxplot graph between E-Burn and L&B chart

**Table 1.** Descriptive analysis for E-Burn and L&B chart

| | N | Mean | Standard Deviation |
|---|---|---|---|
| E-Burn app | 101 | 7.7456 | 11.50828 |
| L&B chart | 101 | 8.0926 | 11.67057 |

### 3.2. Analysis of Systematic Difference

Given the right-skewed nature of the data, the non-parametric Wilcoxon Signed-Rank Test is employed to determine if a statistically significant systematic difference existed between the paired TBSA estimations. The null hypothesis stated that the median of the differences between the E-Burn app and L&B chart estimates would equal to zero. The analysis revealed a p-value of 0.001, leading to the rejection of the null hypothesis. This result indicates that the median difference between the two methods is statistically significant, suggesting that one method tends to produce consistently higher or lower TBSA estimates compared to others. However, while this finding confirms a systematic difference, it does not quantify its magnitude or its clinical importance, nor does it address the overall agreement between the methods (Table 2).

**Table 2.** Wilcoxon Signed-Rank Test

| Null Hypothesis | Test | Sig | Decision |
|---|---|---|---|
| The median of differences between E-Burn app and L&B chart equals 0. | Wilcoxon Signed Rank Test | .001 | Reject the null hypothesis |

### 3.3. Reliability and Absolute Agreement

To critically assess the level of absolute agreement and reliability between the E-Burn app and the L&B chart, an Intraclass Correlation Coefficient (ICC) was calculated using a two-way mixed-effects model. The analysis yielded an outstanding level of agreement between the two methods. The average measure ICC value was 0.997 with a 95% confidence interval of 0.994 to 0.998 ($p < 0.001$). This exceptionally high ICC value signifies a compelling level of reliability, demonstrating that the numerical TBSA estimates provided by the E-Burn app were highly consistent and closely aligned with those of the gold standard L&B chart on a case-by-case basis. This finding provides strong evidence for the E-Burn app's capability to reliably reproduce values consistent with the current clinical standard.

### 3.4. Clinical Agreement and Bias Analysis

To visualize the agreement and quantify the magnitude of the difference between the two methods in a clinically meaningful way, a Bland-Altman analysis was performed. The analysis revealed a small, systematic bias, with a mean difference of -0.35%. This indicates that, on average, the E-Burn app tended to yield TBSA measurements that were just 0.35% lower than the L&B chart (Table 3).

**Table 3.** Bland-Altman analysis findings.

| | |
|---|---|
| Mean Difference Bias | -0.347059 |
| Standard Deviation (SD) | 0.8151956 |
| Upper LoA | 1.3220686 |
| Lower LoA | -2.016186 |

More critically, the 95% limits of agreement (LoA) were impressively narrow, ranging from -2.02% to +1.32%. This interval suggests that for 95% of future clinical cases, the TBSA value obtained from the E-Br-urn app is expected to be no more than 2.02% below or 1.32% above the value derived from the L&B chart. The visual plot showed a random scatter of data points around the mean difference, with no evidence of proportional bias, meaning the magnitude of disagreement did not systematically change with the size of the burn. The narrowness of these limits indicates minimal random variation and a high degree of consistency between the two methods across the range of burn sizes assessed (Figure 4).

The comparative analysis robustly validates the E-Burn application against the L&B chart gold standard. Although a minor but statistically median difference was detected, the clinical implications of this were found to be negligible. This was confirmed by an exceptionally high ICC of 0.997, indicating outstanding reliability, and a Bland-Altman analysis that quantified the mean bias as a clinically inconsequential -0.35%. Crucially, the impressively narrow 97% limits of agreement (+1.32% to -2.02%) demonstrate that the E-Burn app is a precise and highly consistent tool for TBSA estimation. In the high-stakes environment of acute burn care, a median difference of 0.35% is clinically negligible and falls well within safe operational margins.

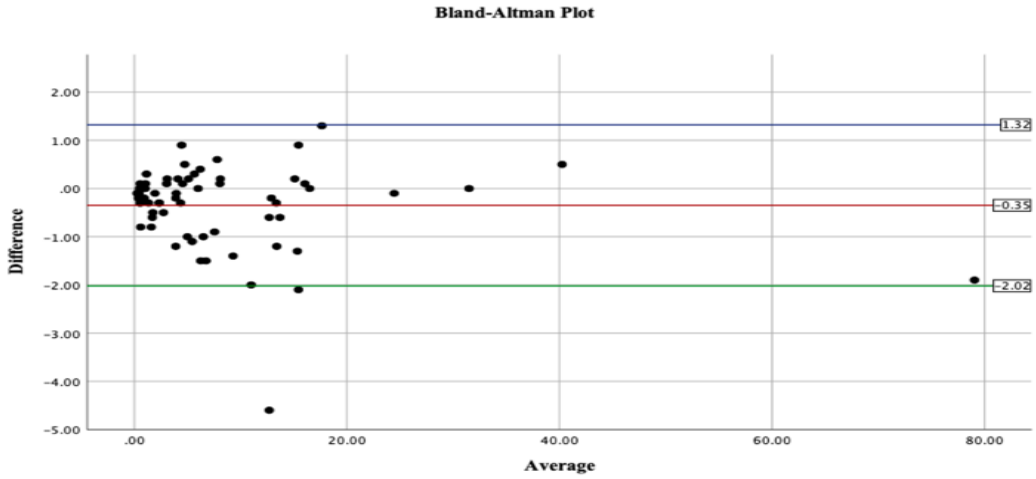


**Figure 4.** Bland-Altman plot graph

## 4. DISCUSSION

This study demonstrates that the E-Burn application possesses a remarkably high degree of concordance with the L&B chart, evidenced by an ICC of 0.997 and a clinically negligible median difference of 0.35%. An ICC this high signifies a near-perfect harmony between the digital tool and the manual chart. For the HCPs, this translates to confidence. It means that whether they are using the familiar, time-honoured L&B chart or the new digital interface, they are arriving at essentially the same crucial number.

This level of agreement is the foundational requirement for a new technology seeking to enter the clinical arena. It assures us that in adopting the digital tool burn app, we are not sacrificing accuracy for the sake of innovation, but rather, we are validating a new method that reliably mirrors the results of the established expert standard.

Bland-Altman analysis provides this crucial context, acting as the bridge between statistical output and clinical reality. It revealed that the systematic bias was a mere -0.35%, meaning the E-Burn app, on average, estimated TBSA just a fraction of a percentage point lower than the L&B chart. The narrow Bland-Altman limits of agreement provide the most important clinical takeaway. It indicates that 95% of TBSA calculated by the E-Burn app will fall within approximately two percentage points of the gold standard, position the E-Burn app as a valid and reliable alternative.

In the dynamic and often chaotic environment of an emergency department or burn unit, a difference of 0.35% is clinically inconsequential. It will not alter the calculation for fluid resuscitation, change the decision to transfer a patient to a specialized centre, or affect their prognosis. The statistical significance is merely a reflection of the tool's own consistency. It produced this tiny difference so reliably across the patient sample that it became statistically noticeable. This finding, therefore, should not be seen as a flaw but rather as a testament to the app's precision.

These findings position the digital tool as a valid alternative to the traditional manual method, which remains the clinical gold standard despite it known limitations. Our results align with the growing body of evidence suggesting that digital adjuncts can replicate and potentially stabilize the accuracy assessment [13, 18, 20]. Furthermore, the narrow limits of agreements suggest that the app provides the precision necessary to keep fluid calculations within safe physiologic margins. Hence, by providing a reliable digital tool assessment, it could serve as a critical filter to reduce the 77% of inappropriate transfers reported in some healthcare settings [5,6]. It is crucial to contextualize this against the widespread inaccuracies reported in broader practice [9,15, 24]. By enforcing a standardized calculation algorithm, the E-Burn app mitigates the risk of mathematical errors, thereby reducing the variability that leads to dangerous clinical complications.

The potential impact of this digital tool extends significantly beyond tertiary centres to rural and less-resourced settings where burn expertise may be scarce. Non-specialist providers often struggle with the complexity of the L&B chart, leading to the substantial referral discrepancies noted globally. In these environments, the E-Burn app can "democratize" expertise, allowing junior doctors or general practitioner to achieve a level of assessment precision comparable to burn specialists.

The implications of these findings are clear and immediate. The digital burn app has proven itself to be a valid, reliable, and precise tool for TBSA estimation. This evidence provides the green light for its integration into clinical workflows, where its benefits can extend beyond mere accuracy. The potential to enhance speed, improve the clarity of

digital documentation, and seamlessly integrate with electronic health records makes the digital tool burn app a compelling evolution in burn care.

## 5. Conclusion, Limitations And Future Directions

This study provides definitive and compelling evidence that the digital burn app stands as a robust, reliable, and highly accurate digital tool for the estimation of Total Body Surface Area in burn patients. Therefore, the digital burn app is not merely a technological novelty, but a validated clinical instrument poised to modernize a critical aspect of burn care. Its integration into clinical practice holds the significant potential to enhance objectivity, improve efficiency, and standardize the foundational assessment upon which all subsequent life-saving interventions are built, representing a pivotal step forward for burn care in Malaysia and beyond.

While the findings robustly validated the digital burn app, it is important to acknowledge the limitations inherent in this initial study to contextualize the results. The research was conducted within a single, specialized tertiary burn centre, and the assessments were performed by HCPs with a high level of expertise in burn care. Consequently, the findings may not be immediately generalizable to primary care settings, rural hospitals, or emergency departments where the variability in clinical experience is greater. Furthermore, this cross-sectional design provides a critical snapshot of diagnostic accuracy at a single point in time but does not capture the long-term impact on clinical workflows, user adoption rates over time, or its ultimate effect on tangible patient outcomes such as the accuracy of fluid resuscitation, complication rates, or length of hospital stay.

Despite the clear clinical utility, the integration of digital tools into practice faces substantial barriers. One primary obstacle is the resistance of HCPs to alter established workflows. HCPs accustomed to "eyeballing" burns assessment may perceive digital entry as time-consuming, although studies suggest that while digital tools may take slightly longer initially, they reduce the variance and major error rates found in rapid manual assessments.

Furthermore, technical challenge regarding interoperability remains a hurdle. For widespread adoption, such applications must not exist in silos but should integrate seamlessly with Hospital Information System (HIS) to allow for longitudinal burn assessment documentation. Independent apps often lack the necessary interface for secure data merging, raising concerns about data security and the continuity of the medical record.

These limitations, however, illuminate a clear and exciting path for future research and development. The logical next step is to conduct larger, multi-centre trials to confirm the app's validity and reliability across a diverse range of clinical settings and user groups. Future research must also adopt a longitudinal approach, moving beyond agreement to measure the app's direct impact on patient outcomes and healthcare efficiency, analysing metrics like resuscitation volumes, rates of acute kidney injury, and overall cost-effectiveness. This would evolve the digital burn app from a diagnostic tool into a comprehensive, integrated digital ecosystem for burn care management and innovation.

## Acknowledgement

The authors would like to thank the healthcare professionals in the Department of Plastic and Reconstructive Surgery, Hospital Kuala Lumpur, Malaysia, for their significant input and contribution in this study.

## Conflict of Interest

No conflict of interest is declared by the authors. In addition, no financial support was received.

## Ethics Committee

The study protocol was approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia (NMRR ID-25-00252-AZD).

## Author Contributions

Study Design, MSS; Data Collection, MSS; Statistical Analysis, MSS; Data Interpretation, MSS; Manuscript Preparation, MSS, SMS, RB; Literature Search, MSS. All authors have read and agreed to the published version of the manuscript.

## REFERENCES

1. Jeschke, M. G., van Baar, M. E., Choudhry, M. A., Chung, K. K., Gibran, N. S., & Logsetty, S. (**2020**). Burn injury. *Nature Reviews Disease Primers*, *6*(1). [CrossRef] [PubMed]
2. Lee, N., Bae, Y., Jang, S., Lee, D. W., & Lee, S. W. (**2025**). Global, Regional, and National Burden of Burn Injury by Total Body Surface Area (TBSA) Involvement from 1990 to 2021, with Projections of Prevalence to 2050. *Healthcare (Basel),* 13(16), 2077. [CrossRef] [PubMed]
3. Snell, J. A., Loh, N. H. W., Mahambrey, T., & Shokrollahi, K. (**2013**). Clinical review: The critical care management of the burn patient. *Critical Care*, *17*(5). [CrossRef] [PubMed]
4. Heard, J., Ren, Y., Sen, S., Romanowski, K. S., Palmieri, T. L., & Greenhalgh, D. G. (**2024**). 105 Burn Injury Severity: Proposed Definitions Based on the National

Burn Research Dataset. *Journal of Burn Care & Research*, *45*(Supplement_1), 85–85. [CrossRef] [PubMed]
5. Milner, S. M. (**2023**). Burn Size Estimation: A Critical Component of Burn Care. *Eplasty*, 23:QA13. [PubMed]
6. Cartotto, R., Johnson, L. S., Savetamal, A., Greenhalgh, D., Kubasiak, J. C., Pham, T. N., & Main, E. (**2024**). American Burn Association Clinical Practice Guidelines on Burn Shock Resuscitation. *Journal of Burn Care and Research*, *45*(3), 565–589. [CrossRef] [PubMed]
7. Radzikowska-Büchner, E., Łopuszyńska, I., Flieger, W., Tobiasz, M., Maciejewski, R., & Flieger, J. (**2023**). An Overview of Recent Developments in the Management of Burn Injuries. *International Journal of Molecular Sciences*, *24*(22), 16357. [CrossRef] [PubMed]
8. Surgeon, P. (**2024**). *Care of Burns in Scotland Paediatric guideline* : Fluid resuscitation, (February), 1–19.
9. Corona-Figueroa, A. A., Vélez-Palafox, M., Marquez-Gutierrez, E. A., Barlandas-Quintana, E., & Gutierrez-Barreto, S. E. (**2024**). Burn vs. Referral Physicians' TBSA Estimation Errors: A Cross-Sectional Study at the National Burn Center. *Burns Open*, *8*(4).
10. Parvizi, D., Kamolz, L. P., Giretzlehner, M., Haller, H. L., Trop, M., Selig, H., Lumenta, D. B. (**2014**). The potential impact of wrong TBSA estimations on fluid resuscitation in patients suffering from burns: Things to keep in mind. *Burns*, *40*(2), 241–245. [CrossRef] [PubMed]
11. Carrougher, G. J., & Pham, T. N. (**2024**). Burn size estimation: A remarkable history with clinical practice implications. *Burns Open, 8: 47–52* [CrossRef]
12. Harish, V., Raymond, A. P., Issler, A. C., Lajevardi, S. S., Chang, L. Y., Maitz, P. K. M., & Kennedy, P. (**2015**). Accuracy of burn size estimation in patients transferred to adult Burn Units in Sydney, Australia: An audit of 698 patients. *Burns*, *41*(1), 91–99. [CrossRef] [PubMed]
13. Cocchi, E., Cassalia, F., Palo, S., D'Acunto, C., Belloni Fortina, A., Stella, M., & Melandri, D. (**2024**). Acute phase optimization in burn care: Online tools and comprehensive predictive models for adult and pediatric patients. *Burns Open*, *8*(4), 100370. [CrossRef]
14. Suman, A., & Owen, J. (**2020**). Update on the management of burns in paediatrics. *BJA Education*, *20*(3), 103–110. [CrossRef] [PubMed]
15. Carrougher, G. J., & Pham, T. N. (**2024**). Burn size estimation: A remarkable history with clinical practice implications. *Burns Open*, *8*(2), 47–52. [CrossRef]
16. Waw, S. (**2023**). Estımatıon of total body surface area burned: a comparıson between burn unıt and referrıng facılıtıes. *Annals of Burns and Fire Disasters*.
17. Ray, W. C., Rajab, A., Alexander, H., Chmil, B., Rumpf, R. W., Thakkar, R., Fabia, R. (**2022**). A 1% TBSA Chart Reduces Math Errors While Retaining Acceptable First-Estimate Accuracy. *Journal of Burn Care and Research*, *43*(3), 665–678. [CrossRef] [PubMed]
18. Chong, H. P., Quinn, L., Jeeves, A., Cooksey, R., Lodge, M., Carney, B., & Molony, D. (**2020**). A comparison study of methods for estimation of a burn surface area: Lund and Browder, e-burn and Mersey Burns. *Burns*, *46*(2), 483–489. [CrossRef] [PubMed]
19. Ibrahim, S., Abo-Alez, R., Hamza, F., Nassar, L., Taman, E., & Huta, A. E. M. (**2021**). A Computer System for Classification of Burns and Determination of Fluid and Nutritional Needs for Burn Patients. *International Journal of Medical Arts*, *3*(2), 1329–1341. [CrossRef]
20. Fontaine, M., Ravat, F., & Latarjet, J. (**2018**). The e-burn application A simple mobile tool to assess TBSA of burn wounds. *Burns*, *44*(1), 237–238. [CrossRef] [PubMed]
21. Yeh, C. C., Lin, Y. S., Chen, C. C., & Liu, C. F. (**2023**). Implementing AI Models for Prognostic Predictions in High-Risk Burn Patients. *Diagnostics*, *13*(18), 2984. [CrossRef] [PubMed]
22. Tran, N. K., Sen, S., Palmieri, T. L., Lima, K., Falwell, S., Wajda, J., & Rashidi, H. H. (**2019**). Artificial intelligence and machine learning for predicting acute kidney injury in severely burned patients: A proof of concept. *Burns*, *45*(6), 1350–1358. [CrossRef] [PubMed]
23. Abrams, T. E., Lloyd, A. A., Elzey, L. E., & Hickerson, W. L. (**2019**). The Bridge: A mobile application for burn patients. *Burns*, *45*(3), 699–704. [CrossRef] [PubMed]
24. Holm, S., Engström, O., Petäjä, I., & Huss, F. (**2021**). Does the estimation of burn extent at admission differ from the assessment at discharge? *Scars, Burns & Healing*, *7*, 205951312110194. [CrossRef] [PubMed]