Defense Health Agency (DHA) Clinical Communities Speaker Series

2026 NOV CCSS: Healthcare Innovations: Catalyzing the Future of Patient Care Delivery

2026 NOV CCSS S01: Beyond the Naked Eye: Advancing Bruise Detection and Documentation Across All Skin Tones

Resource List

Improving Bruise Detection with Alternate Light (2022) discusses federal translational research initiatives supported by the National Institute of Justice to overcome systemic diagnostic disparities in forensic injury documentation across diverse skin complexions. It examines how conventional white examination lighting frequently fails to detect soft tissue contusions on victims of domestic abuse and sexual violence with darker pigmentation, contributing to inequities in both clinical treatment and legal proceedings. It also emphasizes the necessity for standardized clinical protocols, interdisciplinary collaboration, and hands-on examiner training to successfully integrate optical visualization tools into clinical health facilities and military treatment facilities.

Evaluation Framework for Bruise Detection: Systematic ALS/White-Light Training and Skin-Tone Balancing with Deep Learning (2026) evaluates an automated computational framework integrating narrowband alternate light source and ambient white-light imagery to advance equity in forensic bruise detection across diverse skin tones. The authors investigate multi-annotator deep-learning models trained across varying lighting compositions and demographic subgroups, demonstrating that models trained predominantly on ALS data achieve superior detection accuracy compared to standard white-light models. This study provides an operationalized, deployment-ready methodology for AI-enabled clinical documentation tools, emphasizing injury-level validation and standardized optical integration to mitigate diagnostic disparities.

Alternate Light Source Findings of Common Topical Cosmetics and Three Removal Methods (2021) evaluates the forensic assessment of 14 facial cosmetics applied to 100 adult volunteers of diverse skin complexions across 19 alternate light wavelength and barrier filter combinations, while testing the clinical efficacy of three removal techniques. The researchers confirm that foundation, powder, and bronzer products create significant light absorption that can confound cutaneous trauma documentation under visible and ultraviolet alternate light. Blinding forensic nurse examiners to cleansing methods, the study demonstrates that standardized cleansing with micellar water or hospital-grade wipes effectively eliminates cosmetic absorption artifacts, therefore restoring reliable visualization of the underlying skin.

Bruise Detection and Visibility Under Alternate Light During the First Three Days Post-Trauma (2020) evaluates the temporal sensitivity of 14 ultraviolet and narrowband visible ALS wavelength and filter pairings compared to conventional clinical examination lighting over the acute 72-hour window following mechanical injury. Through serial assessments of contusions induced on diverse skin complexions, the study revealed that 34% of bruises undetected under standard ambient room lighting were clearly visible under ALS. Multilevel statistical modeling showed that shorter wavelengths, notably 365 nm and 450 nm paired with appropriate barrier filters, provided the greatest diagnostic advantage for uncovering subtle or occult soft tissue trauma early in the post-injury interval. The authors emphasize that incorporating ALS into acute medical-forensic assessments broadens the clinical window of detection when surface discoloration is masked by skin pigmentation or delayed inflammatory response.

References

Aminfar, K., Scafide, K., Wojtusiak, J., & Lattanzi, D. (2026). Evaluation Framework for Bruise Detection: Systematic ALS/White-Light Training and Skin-Tone Balancing with Deep Learning. *Sensors (Basel, Switzerland)*, *26*(10), 3215. https://doi.org/10.3390/s26103215

Anderson, J. C., Pollitt, E. N., Schildbach, C., MacDonald, R., Rose, L., & Sheridan, D. J. (2021). Alternate Light Source Findings of Common Topical Cosmetics and Three Removal Methods. *Journal of forensic nursing*, *17*(1), 14–23. https://doi.org/10.1097/JFN.0000000000000300

McLeod-Henning, D. (2022). *Improving bruise detection with alternate light* (NCJ Report No. 303692). National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. https://nij.ojp.gov/topics/articles/improving-bruise-detection-alternate-light

Scafide, K. N., Sharma, S., Tripp, N. E., & Hayat, M. J. (2020). Bruise detection and visibility under alternate light during the first three days post-trauma. *Journal of forensic and legal medicine*, *69*, 101893. https://doi.org/10.1016/j.jflm.2019.101893