

## Child Abuse Recognition Training using Deliberate Practice for Prehospital Providers

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### Background:

Abused children often have encounters with prehospital providers (PHP) prior to the recognition of abusive injuries. Despite the fact that PHP are mandated reporters, they frequently cite lack of training as a challenge to recognizing and reporting abuse. Identifying abuse among children presenting for acute injury requires the ability to differentiate accidental from abusive injury. Patterns of cutaneous injury (burns and bruises) suggestive of abuse are well described. The method of deliberate practice, a teaching method where a learner is given direct real-time feedback during the practice of a skill, provides educators with the ability to determine a learner's baseline skill and track change over the course of an educational intervention. Given the importance in accurately distinguishing between abusive and accidental injury, an educational module simulating presentations of abusive and accidental injuries is critical.

### Objective:

To develop and evaluate a web-based educational module using deliberate practice methodology to train PHPs to distinguish between abusive and accidental cutaneous injury in children.

### Methods:

This is a pilot study of a web-based educational module using deliberate practice. The educational module includes a case bank of 117 authentic cases of children with burns and bruises who presented to 2 trauma centers with active child abuse evaluation teams. Cases were obtained from hospital trauma and burn registries representing a range of age, race, and ethnicity to matching demographics and physical characteristics of patients in the community. The case bank contains a 60:40 ratio of abusive injury to accidental injury. PHPs were recruited from a state EMS list-serve. Participants reviewed a case, indicated if it was consistent with abusive or accidental injury and after submitting a response, were given immediate text and visual feedback. Learning effectiveness was measured by calculating terminal accuracy, sensitivity and specificity on the last 25 questions answered. We also calculated the odds of interpretation accuracy of burn versus bruise cases. Finally, we assessed the change in self-efficacy for interpreting cutaneous injury and knowing which cases to report to child protective services using a validated pre-post survey asking the question "*As compared to before I participated in this educational module, I am more comfortable...*" for each item. Responses were collected using a 6-point Likert scale (1=strongly disagree to 6=strongly agree).

### Results:

We recruited 61 PHPs that completed the module. The majority of participants were male (63.9%) with median age is 43 years (IQR 35, 53), and median years of practice of 13 years (IQR 5, 25). Approximately 61% reported having prior child abuse training education and 39% report having made a report to child protective services in the past. The mean terminal sensitivity (accurately identifying abuse) for our learners was 87.6% (95% CI 85.5, 89.6). Mean terminal specificity (accurately identifying accidental injury) and learner accuracy (overall proportion correctly answered) was 88.4% (95% CI 83, 91.2) and 87.5 (85.8, 89.1%), respectively. Participants were more likely to be correct in distinguishing between abuse and accidental injury when examining cases of bruising versus burn injuries (OR 1.45 95% CI 1.26, 1.67). The majority participants reported increased comfort in knowing which circumstances require a report to child protective services (80.3% Moderately to Strongly Agree) and interpreting the exam of a bruised and burned child (83.6% and 77.1% Moderately to Strongly Agree, respectively).

### Conclusion:

A web-based educational module using deliberate practice is feasible way to assist prehospital providers in learning to distinguish between accidental and abusive cutaneous injury. To date, the educational module increased self-efficacy in recognizing abusive injury and knowing which circumstances require a report to child protective services among it learners with high terminal sensitivity, specificity, and learner accuracy. Future research is needed to determine the optimum nature of the cases to maximize learner accuracy.

## Supplemental Information

### INSTITUTIONS (ALL):

1. Pediatrics, University of Colorado School of Medicine, Aurora, CO, United States\*.
2. Emergency Medicine, The Hospital for Sick Children, Toronto, ON, Canada.
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\*The Colorado EMS for Children program is housed at the University of Colorado School of Medicine and works under contract with the state EMS office located at the Colorado Department of Public Health and Environment. Author Sean Caffrey is the Colorado EMS for Children program manager.