

When does a bruise on an infant or young child signal abuse?

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Bruising caused by physical abuse is the most common injury to be overlooked or misdiagnosed as non-abusive before an abuse-related fatality or near-fatality in a young child. A refined and validated bruising

clinical decision rule (BCDR), called TEN-4-FACESp, which specifies body regions on which bruising is likely due to abuse for infants and young children, may improve earlier recognition of cases that should be further evaluated for child abuse. Findings were published in the journal *JAMA Network Open*.

"Bruising on a [young child](#) is often dismissed as a minor injury, but depending on where the bruise appears, it can be an early sign of [child abuse](#)," said lead author Mary Clyde Pierce, MD, a pediatric emergency medicine physician and the Research Director for the Division of Child Abuse Pediatrics at Ann & Robert H. Lurie Children's Hospital of Chicago, and Professor of Pediatrics and Preventive Medicine at Northwestern University Feinberg School of Medicine. "We need to look at bruising in terms of risk. Our new screening tool helps clinicians identify high-risk cases that warrant evaluation for [child abuse](#). This is critical, since abuse tends to escalate and earlier recognition can save children's lives."

According to the study findings, the bruising screening tool TEN-4-FACESp reliably signals high risk for abuse when bruising appears on any of the following regions. "TEN" stands for torso, ear, and neck. "FACES" specifies [facial features](#)—frenulum (skin between upper lip and the gum, lower lip and the gum, and under the tongue), angle of jaw, cheeks (fleshy), eyelids, and subconjunctivae (red bruise on white part of the eye). The "p" is for patterned bruising, when, for example, bite marks or the shape of the hand is visible on the child's skin. The "4" represents any bruising anywhere to an infant 4.99 months of age or younger. Importantly, the rule only applies to children with bruising who are younger than 4 years of age. This screening tool is a refined version of TEN-4, previously developed by Dr. Pierce.

This multi-center study was made possible through a grant from the Eunice Kennedy Shriver National Institute of Child Health and Human

Development (NICHD). In the study, Dr. Pierce and colleagues screened for bruising in over 21,000 children younger than 4 years of age at five pediatric emergency departments. They enrolled 2,161 patients with bruising. Researchers found that the TEN-4-FACESp screening tool had a sensitivity of 95 percent and specificity of 87 percent, which means that it distinguished potential abuse from non-abuse with high level of accuracy.

"It was very important to us to make sure that the screening tool captures potential abuse without over-capturing innocent cases of children with bruising caused by accidental or incidental injury," said Dr. Pierce. "We are excited that it proved to be highly reliable, and it is simple enough to be applied during any clinical encounter. A skin exam in infants and young children is essential."

The evidence behind the TEN-4-FACESp BCDR will soon be available as an app developed by Dr. Pierce and co-author Kim Kaczor, expected to launch by October 2021. The app will present a rotatable 3D image of a [child](#)'s body. When a clinician clicks on an area of a patient's bruise, a summary of study results will appear that allows comparison of the clinician's patient with the actual data from this large scale study with the goal of helping the user decide whether the bruise is a red flag for abuse. The app is in no way meant to supplant judgment but to provide evidence-based guidance to inform decision making.

Dr. Pierce cautions that TEN-4-FACESp is not negative for abuse in children without bruising. It is simply not relevant in those circumstances and other methods of identifying abuse would be needed.

More information: *JAMA Network Open* (2021). [DOI: 10.1001/jamanetworkopen.2021.5832](https://doi.org/10.1001/jamanetworkopen.2021.5832)

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