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VIEWPOINT

# Paint It Blue: Methylene Blue in Burn Care

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While the gold standard of burn assessment is clinical examination, there is significant discordance between clinically and histologically nonviable tissue.[1] Inadequate debridement is a common source of complications when treating burn patients, leading to reconstructive failures, septic complications, and prolonged hospitalizations. Complicating this reality are the potential anatomic and physiologic insults associated with resecting adjacent viable tissue, especially in patients with limited physiologic reserve, such as children or critically ill patients. Moreover, tangential excision can be associated with a significant blood loss. Moreover, while the use of tourniquets is helpful in treating extremity burns, bleeding tissue is a useful clinical endpoint for adequate debridement.

Therefore, plastic surgeons who treat burns must be familiar with secondary strategies for patients who present with burned tissue of uncertain viability. In such cases, indocyanine green angiography offers one method; however, its use is encumbered by additional intravenous injection timing and proprietary equipment.[2] Use of infrared thermography has also been attempted with good preliminary results, but also requires additional, often unavailable, intraoperative equipment.[3]

In this communication, we propose a technique to identify nonviable tissue, using methylene blue (MB) staining, to diminish inadequate or excessive debridement, as well as limit intraoperative blood loss (Fig. 1). After the surgical preparation has been cleaned off the area of interest, the entire burn is painted with a surgical sponge soaked in MB. The burned tissue is immediately cleaned with saline-soaked laparotomy sponges and then debrided with a surgical scratch pad. Areas of viable tissue will metabolize the MB to the colorless metabolite leucomethylene blue, while nonviable areas will remain stained blue (Fig. 2). Tangential excision then commences, with the goal of removing all stained, nonviable tissue.[4] In our experience, the removal of blue-stained tissue correlates well with the clinical endpoint of bleeding, healthy tissue. When a tourniquet is used, the tissue is stained and then debrided. The tourniquet is briefly released to confirm adequate bleeding tissue, and then reinflated to proceed with grafting.

**Fig. 1.** Intraoperative image depicting a 13-year-old boy with 8% total body surface area flame burns to the anterior chest and left arm, 2 days after presentation. While several areas appear grossly ischemic, representing full thickness burns, other areas are hyperemic, which may represent areas of partial or full thickness injury.

First synthesized in 1891, MB is one of the oldest synthetic drugs manufactured and is widely available. As such, it has benefitted from over a century of experimentation and has extremely broad clinical applications. In addition, its pharmacodynamic properties are well described and it is known to be an exceptionally safe medication. Furthermore, MB appears to have bacteriostatic qualities, and facilitates vasodilation. MB meets the requisite technical requirements for this type of diagnostic tissue staining, and fares well when compared with other dyes.[5] More accurate debridement, fewer resultant complications, and less blood loss can be expected with the aid of MB during burn excision and grafting.

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## DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

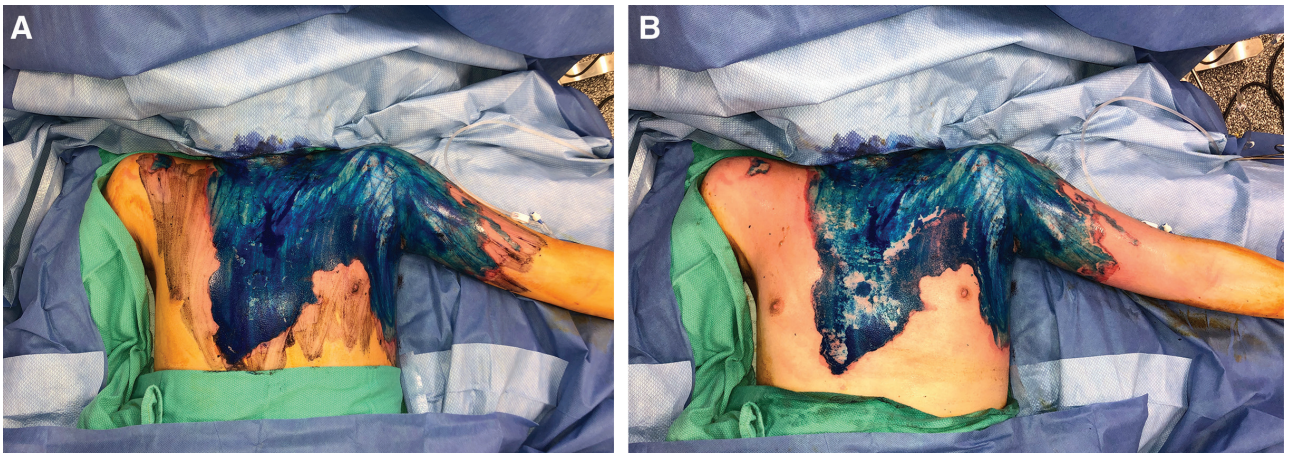


**Fig. 2.** The same patient after painting with methylene blue. A, The dye is liberally applied to the burn and surrounding tissue. B, After removal of the dye with saline and abrasion, the full thickness injured area remains stained blue.

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