INTRODUCTION
With the rising incidence of viral diseases such as hepatitis C and human immunodeficiency virus infections, protective barriers to blood-borne infection are essential for medical professionals, especially surgeons and operating room personnel. The reliability and efficacy of surgical gloves are crucial, as gloves are the most important barriers protecting hospital personnel and patients. Unfortunately, glove perforation rates are as high as 78% in high-risk procedures. Double gloving significantly decreases exposure to blood and thus provides better protection but many surgeons continue to use single gloves, with most citing the lack of comfort of double gloves or the loss of fine motor skills and sensation. Surgical gloves must be comfortable and when holes are present, it is imperative they be detected promptly.

This study aimed to evaluate the ability of participants to locate 30-micron laser holes in surgical gloves while performing simulated surgery and to evaluate the Biogel Indicator Glove System, which reveals punctures.

METHODS
- This double-blind, randomized study was carried out at the Department of Surgery, University of Tulane, New Orleans, USA.
- The simulated surgery involved retrieving round metal objects from large pieces of beef in an attempt to replicate deep wound surgery.
- Twenty glove configurations (eight single, twelve double) were tested, half of which had laser-created 30-micron holes at the most common intraoperative perforation sites.
- Four configurations were indicator systems; 16 configurations were non-indicator systems. Latex, polyisoprene, and polychloroprene were the three glove materials tested and all gloves were from commercially available brands.
- Each of the 25 participants tested and evaluated 20 configurations randomly.
- Simulated surgery terminated when a hole was identified by the participant or at the end of two minutes, whichever occurred first.
- Participants also rated their perceptions of each glove’s features on questionnaires, all of which were returned.

RESULTS
- The indicator systems enable the participants to find the laser-created holes more often and faster than in the other single or double-glove configurations.
- With the latex Biogel Indicator Glove System participants found 84% of holes in an average of 22 seconds. This was compared to the worst performing latex configuration of only 8% of holes found in an average of 47 seconds.

KEY POINTS
- This double-blind, randomized study confirms the finding that double gloving with an indicator system provides the best protection and allows the timeliest identification of glove perforations
- The Biogel® Indicator™ Glove System permits rapid, dramatic, and obvious identification of glove perforations and are highly rated for comfort and ease of use
- The authors conclude that there can be no acceptable explanation for not double gloving during surgical procedures and for not doing so with an indicator system
Efficacy of double gloving with an intrinsic indicator system

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- With the synthetic Biogel Indicator Glove System participants found 56% of holes in an average of 42 seconds compared to the worst performing synthetic configuration of only 12% of holes found in an average of 67 seconds.

CONCLUSION

As this and other studies have demonstrated, double gloving is clearly safer than single gloving. This study also confirms the finding that double gloving with an indicator system provides the best protection and allows the timeliest identification of perforations.

The authors conclude that the Biogel Indicator system permits rapid, dramatic, and obvious identification of glove perforations, and, based on their findings, there can be no acceptable explanation for not double gloving during surgical procedures and for not doing so with an indicator system.

References