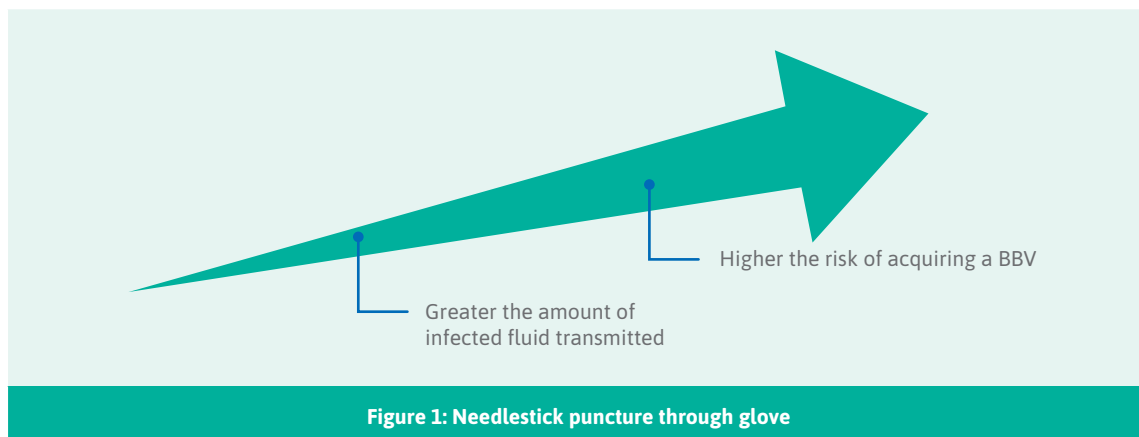


NEEDLESTICK FLUID TRANSMISSION THROUGH SURGICAL GLOVES OF THE SAME THICKNESS

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BACKGROUND

There has been a growing focus on bloodborne pathogen safety and control practices that assist in the reduced risk of transmission of diseases. Healthcare workers (HCWs) are exposed daily to blood and bodily fluids from patients, which puts them at a greater risk of transmission. The transmission from patient to HCW occurs through several routes, including exposure of the eyes, mouth, open skin, and through puncture of intact skin. This remains a serious health threat to HCWs and patients as a bloodborne virus (BBV) can be transmitted through contact with blood or other bodily fluids. As gloves are the first line of defense and are important to protect the HCW from punctures and fluid transmission, their strength and thickness remain important for optimal protection.



OBJECTIVES AND METHODS

This comparative study was the first to compare the volume of fluid transmitted through the same thickness of the same glove material made up of different numbers of layers during simulated needlestick injuries. It also analyzed the relationship between the force required to puncture the glove materials and the volume of fluid inoculated through them.

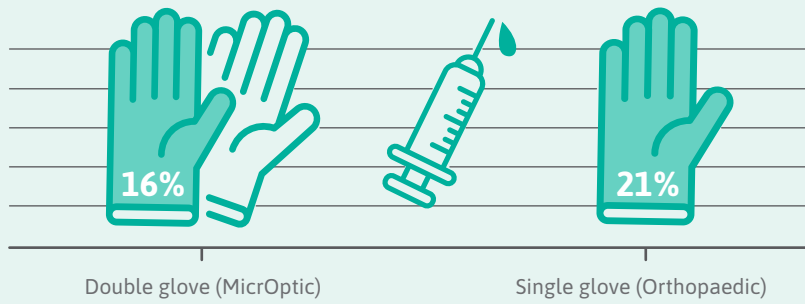


Data was collected from a glove manufacturer which was reviewed and recorded to include Encore MicrOptic; Ansell Healthcare and Encore Orthopaedic; Ansell Healthcare. The gloves were of equal size and made by the same manufacturer.

The glove material was stretched mimicking operator usage. In each experiment, the measure of force was recorded at which puncture occurred and a post hoc analysis was completed. An enzyme was used to quantify the volume transferred in the experiments. The force required and the volume of enzyme transferred for each experiment were recorded.

RESULTS

There was a control group which was comprised of 24 experiments with no glove barrier, and 48 comprised of single-layer (Orthopaedic) and double-layer (MicrOptic) test gloves. Three results were excluded due to technical errors, one from the (Orthopaedic) group and two from the (MicrOptic) group.



Samples results analyzed:
 • 46 double-layer (MircOptic)
 • 46 single glove (Orthopaedic)

Figure 2: Fluid transmission after a needlestick

Fluid Transfer
 The double-layer (MircOptic) showed less fluid transfer compared to the single (Orthopaedic). However, in this study compared to others, fluid transmission was lower.

Force
 More force was required for the double-layer (MircOptic) compared to the single-layer (Orthopaedic). However, no association was demonstrated between the force required and the volume of fluid transferred.

The results on simulated needlestick injuries found that two thin-layered gloves were associated with significantly less fluid transmission than a single-layered glove of equivalent thickness.

The double, thin glove layers transmitted 16% of needle fluid, compared to 21% for the single thicker glove layer. The force required to puncture the glove material was not directly related to the volume of fluid transferred through it. This study supports the proposal that there is an additional interface-wiping effect from using a thinner “double-glove” compared to a single glove layer with a similar thickness.

CONCLUSION

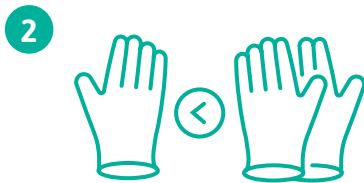
The study indicated that double layers of the glove, or “double-gloving,” required more force and were more resistant to puncture compared to the single thicker layer of glove material. Thus, “double-gloving” decreases the probability of puncture and the associated incidence of percutaneous injuries. There was no association between the force of the puncture and the fluid volume that was transferred.



APPLICATION FOR PRACTICE



Double-gloving is recommended for all procedures for optimal protection



Double gloving with two layers versus a thicker single layer was more resistant to puncture and demonstrated a lower volume of fluid transmission reducing the risk of acquiring a BBV.



Ensure double gloving practice is incorporated into Policies and Procedures and provide frequent staff training to reinforce optimal protection.

Note: This clinical summary is written by clinicians at Ansell Healthcare Products, LLC. Please refer to the actual study for full text information.

Reference:

Din SU, Tidley MG. Needlestick fluid transmission through surgical gloves of the same thickness. *Occup Med (Lond)*. 2014;64(1):39-44.

To read study article: <https://academic.oup.com/occmed/article/64/1/39/1413566>

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