

**TITLE:** DETERMINATION OF BARRIER FUNCTION OF LATEX PROCEDURE GLOVES AFTER NEEDLE PUNCTURE

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**ABSTRACT:**

In the health field, the execution of invasive procedures uses different types of puncture instruments that when manipulated can cause occupational accidents. The objective of this study was to quantify *in vitro* the dye infusion for the inside of gloves through an original protocol developed aiming to simulate the accidental puncture by needle. A receptacle containing crystal violet (CV) at 1% was covered with a gel plate at 8%, in order to simulate a venous puncture and provide a resource as close as possible to human skin and the consistence of subcutaneous tissue. On flat-bottom 96-well polystyrene microplates, all wells were filled with 300µL of gel at 4%, given that each plate line corresponded to a brand of latex procedure glove (n=36). For the negative and positive controls, there was no perforation and there was perforation without using glove, respectively. The microplate was covered with one of the different gloves and then pierced by a needle with lumen and 0.80x30mm caliber coupled to a 20mL syringe containing, at least, 5mL of CV at 1%. The gel on microplates wells was solubilized at 60°C, homogenized next and 100µL of each well transferred to a new microplate. The absorbance and CV dispersion readings were performed through spectrophotometer at the wavelength of 570nm. The obtained data were submitted to normality tests Kolmogorov–Smirnov, Shapiro–Wilk and Mann–Whitney *U* test with  $\alpha=5\%$  significance level. The median values of absorbances of all brands of perforated gloves were lower than the median value of absorbance of gloveless perforation, confirming a retention of CV through all glove brands ( $p<0.001$ ). The glove of brand E presented the highest percentage of retention of CV within all brands (77.2%), followed by brand B (65.6%). Conversely, the glove of brand D indicated the lowest percentage of retention of CV (14.6%). In conclusion, in *in vitro* conditions, the latex procedure gloves even after perforated partially blocked the load of inoculated material.

**Keywords:** biosafety, personal protective equipment, latex, protective gloves, risk management

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