Tensile Properties and Integreity of Cleanroom and Low-modulus Nitrile Exam Glove Formulations

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Materials & Methods
Six cleanroom and five low-modulus nitrile exam glove products were evaluated.

Water Leak Test (Glove Integrity)
A modified water-leak test (Figure 1) was used in this study. Stretching in the cuff region was restricted using a 3-inch long coupling between the glove and adjoining water column. This increased the water pressure in the rest of the glove and helped increase leak detection sensitivity.

The water leak test was standardized to detect a small 30-gauge needle hole in various regions of the glove. Adjusted water volumes ranged between 1 to 2 liters. Each glove was closely observed for leaks immediately following the application of water and then again after two minutes.

Results

Conclusions
On average, the leak failure rates were significantly different between the two glove types. The cleanroom gloves were about three times more likely to have leak failures than the low-modulus gloves. However, the correlation and logistic regression analyses indicated that tensile properties are not strongly associated with leak failures. From an infection control standpoint, the low-modulus gloves appear to be a better choice for protection. The observed variability between glove products and brands indicates that glove selection can not rely solely on glove type. Both maximum modulus < 4 MPa and area density < 11 g/cm² were associated with improved glove integrity.

References

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