

# Best Practice Trends for Surgical Gloving

William Halstead, M.D., the great surgical innovator, introduced sterilized surgical gloves in the late 19th century, saving countless lives over many generations. Gloving material and techniques have advanced considerably since then, especially in recent years as knowledge of how to maximize safety for patients and healthcare professionals has advanced.

This article summarizes recent surgical glove innovations, relevant research and current best practices for surgical gloving. It further discusses trade-offs and concerns common in operating rooms transitioning from older gloving practices to newer, safer ones.

## Best Practice Trend #1: Synthetic gloves

Synthetic surgical gloves are recommended by most health safety authorities as a preventive measure to latex allergy, including the Occupational Health Department, UK<sup>1</sup>, Irish Health Ministry<sup>2</sup> Spanish Society of Allergology and Clinical immunology<sup>3</sup> and the Pediatric anesthesia.<sup>4</sup>

The first cases of Latex allergy through type I hypersensitivity were described in 1927 in Germany. In the 1980s, the number of cases reported considerably increased especially due to the widespread use of Latex gloves.<sup>3</sup>

Allergic reactions to latex are triggered by proteins found in natural rubber latex and mediated by the IgE antibody. Touching latex or inhaling particles shed from gloves can cause a reaction. Sensitivity increases over time and with repeated use.<sup>5</sup> This makes healthcare professionals vulnerable. In fact, up to 15 percent<sup>6</sup> of healthcare workers are affected by a latex sensitivity compared to 1 percent<sup>6</sup> of the general population.

In addition to healthcare workers, high-risks group of patients have been identified as Latex sensitized; the pediatric population:

- Up to 70 percent of spina bifida patients
- Up to 36 percent of atopic patients<sup>4</sup>

The most common allergic reactions to Latex are local hives, systemic generalised urticaria, rhinitis, swheezing, asthma... However Latex reactions can range in severity and lead to anaphylactic shock.<sup>2</sup>

Historically, gloves made with natural rubber latex have been popular because of their comfortable fit and feel. Synthetic gloves have improved by technological improvements to make synthetic gloves more closely mimic the fit, feel and comfort of latex. All high-risk or allergic patients should benefit a latex-free environment.<sup>4</sup>



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**15%**<sup>6</sup>

of healthcare workers are affected by a latex sensitivity compared to under **1%** of the general population.<sup>6</sup>

No treatment exists for an allergy to natural rubber latex, thus, latex avoidance is recommended.

The interior glove reduces exposure to patient blood by as much as

**85%**

when the outer glove is punctured.<sup>9</sup>

Contrasting-colored undergloves increase awareness of perforations to synthetic outer gloves from 21 percent to 86 percent<sup>10</sup> and reduce time to awareness from 67 seconds to 42 seconds.<sup>16</sup>

## Best Practice Trend #2: Double-gloving

Double-gloving is recommended for invasive surgeries by the Centers for Disease Control and Prevention (CDC)<sup>7</sup> as well as Association of periOperative Registered Nurses (AORN)<sup>8</sup> and The British Journal of surgery.<sup>9</sup> In fact, wearing two surgical gloves significantly reduces infection risk to operating room personnel.<sup>11</sup> The second glove protects against bloodborne pathogens when the outer glove is punctured.<sup>12</sup>

Operating rooms are the hospital environment with the greatest concentration of sharp objects. By their final year of training, 99 percent of surgical residents across 17 medical centers reported having suffered a needle-stick injury.<sup>13</sup> A separate study found glove perforations occurred in up to 43 percent of gynaecologic procedures, 54 percent in general surgeries, 21.4 percent in plastic surgeries and 26 percent in thoracic surgeries.<sup>12</sup> Up to 16 percent of injuries from sharp instruments occur in hand-to-hand transfers.<sup>15</sup>

Double-gloving helps provide a high level of protection. The interior glove reduces exposure to patient blood by as much as 85 percent when the outer glove is punctured.<sup>9</sup>

Surgeons report varying adjustment periods are needed to optimize protection, tactility and dexterity when starting to double glove.<sup>14</sup> To address tactile and comfort, specialized designs now differentiate undergloves and outer gloves. Undergloves are an average of 14 percent thinner than outer gloves. Synthetic gloves may include an inner coating to reduce slippage and contain a low-protein formula to make donning and removing gloves easier.

In addition, using colored undergloves that contrast with the other gloves helps to improve occupational safety. Research shows that most punctures are tiny and identified only after surgery, not at the time of the incident.<sup>15</sup> One study found that contrasting-colored undergloves increased awareness of perforations to synthetic outer gloves from 21 percent to 86 percent<sup>10</sup> and reduced time to awareness from 67 seconds to 42 seconds.<sup>16</sup>

Wearing two surgical gloves significantly reduces infection risk to operating room personnel.<sup>10</sup>

Healthcare workers often blame synthetic gloves for the reaction when other factors are the more likely cause of skin irritation.<sup>18</sup>

## Best Practice Trend #3: Allergy awareness

The shift from latex to synthetic has dramatically reduced allergic reactions to surgical gloves.<sup>17</sup> Medical providers still experience allergic reactions on hands and wrists, primarily from irritant contact dermatitis, a non-immunologic response to an irritant or skin damage. Healthcare workers often blame synthetic gloves for the reaction when other factors are the more likely cause of skin irritation.<sup>18</sup> Potential irritants include products related to medical practice (harsh anti-microbial soaps, surgical scrub brushes) and those outside the work environment (detergents, fragrances). Seasonal weather changes, frequent hand-washing and wearing jewelry contribute to susceptibility to non-immunologic dermatitis.<sup>19</sup>

Allergic contact dermatitis (ACD), an immunologic response to a chemical, causes irritation in smaller number of cases. Although not life-threatening, ACD can be a problem for healthcare workers. Rashes, dryness and other symptoms can be acute or chronic and can appear up to 48 hours after exposure to the irritant. The source of hypersensitivity can be elusive because more than 4,000 chemicals are known to have the potential to trigger allergic reactions.<sup>18</sup> Chemical accelerators, used to make synthetic and latex gloves stronger and more elastic, are an allergen that causes a Type IV (delayed) allergic reaction, albeit infrequently. In a Cleveland Clinic study, a patch test found 23 of 626 synthetic glove users with suspected ACD were found to react to an accelerant.<sup>18</sup> For this small group, switching to a glove not made with chemical accelerators may be beneficial.

Treatment for skin irritation must accurately respond to the cause, not a hunch. Focus first on common non-immunologic reactions, such as soaps and vulnerability from damaged skin. Approved moisturizers, rehydrating products and glove liners can help. In actuality, jewelry, fragrances, detergents and other products are more common irritants than synthetic gloves.<sup>20,21</sup> If ACD is suspected, the glove user should have a patch test done to isolate the cause of the immune response. Patch tests exist for all accelerants and are very reliable for diagnosing ACD. Switching to non-accelerant gloves should be done if it is determined that the accelerant causes an immune response. However, “glove shopping” — frequently switching gloves as a response to a dermatitis — is counterproductive because it does not allow time for adjusting to new gloves or provide an understanding of delayed allergic reactions. As in medicine generally, an accurate diagnosis is a prerequisite for the right cure.

## Best Practice Summary

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- 1 Use synthetic gloves.**

Latex can cause potentially severe allergic reactions in healthcare workers and patients.
  - 2 Double-glove using colored undergloves that contrast with the outer glove.**

Using two surgical gloves dramatically reduces the risk of bloodborne infections to health care professionals.<sup>16</sup> Contrasting-colored undergloves help identify punctures to outer gloves.
  - 3 Determine the accurate cause of skin irritation and allergies.**

Focus on common non-immunologic reactions, such as soaps and vulnerability from damaged skin. If Allergic Contact Dermatitis is suspected, the glove user should have a patch test done to isolate the cause of the immune response.

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