

# Double Gloving in 'Low Risk' Surgical Speciality Cases

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## INTRODUCTION

It is well recognized that in 'high risk' surgery cases (such as joint replacements) double gloving reduces the risk of punctures to the inner glove, which in turn reduces the risk of cross infection. Research has shown that double gloving in both 'high and low risk' specialties does indeed reduce inner glove perforations. At present double gloving is typically done only for 'high risk' specialty procedures in the operating rooms.

The purpose of this article is to demonstrate that double gloving during 'low risk' specialty cases is beneficial in reducing inner glove perforations and should therefore be introduced into practice for all surgical cases.

## LITERATURE REVIEW

Literature reporting on research into double versus single gloving in 'low risk' surgery was reviewed. The definition of 'low risk' surgery for the purpose of this article is surgery that does not involve joint replacement. Six quantitative, prospective, randomised controlled trials were chosen, representing a cross-section of surgical specialties including general, gastrointestinal, vascular, gynaecological, laparoscopic and plastic surgery.

Common themes identified in the research articles were:

- Single versus double gloving and the number of glove perforations
- Duration of surgery
- Dexterity when double gloved for the surgical team
- Cross contamination

All of the above factors are considered to have an effect on the number of perforations found in surgical gloves or have a possible outcome from glove perforations, and will be discussed within this article.

To double glove or not to double glove, that is the question. The American College of Surgeons (1998) states, "Double gloving does help to cut down by a factor of 10 the number of potential exposures." The American Operating Room Nurse's Association

(AORN) recommends, "Wearing two pairs of gloves (i.e., double gloving) may be indicated for some procedures to reduce the potential for contact with blood and body fluids" and emphasizes that intact gloves establish a barrier that minimizes the passage of micro-organisms between non-sterile and sterile areas (2002).

We will begin this review by looking at research conducted by the following groups who compared single gloving with double gloving and noted the difference in the number of perforations found in each method (Berridge, Starky, Jones & Chamberlain, 1998; Jensen, Kristensen & Fabrin, 1997; Kovavisarachi & Jaravechson, 1998; Marin-Bertolin, Gonzalex-Martinez, Vila & Amorrortu-Velayos, 1996; Naver and Gottrup, 2000 and Thomas, Agarwal & Mehta, 2002). The sample sizes varied between all the studies reviewed, with only one study identifying the number of staff participants, as well as the number of gloves tested (Marin-Bertolin et.al, 1996). All studies stated which members of the scrub team participated in the study with only half including nursing staff. Interestingly all 6 studies were carried out by medical staff and the author did not find any research on this topic that had been carried out directly by nurses.

All of the trials involved randomly selected OR staff to wear either single or double surgical gloves for a procedure. All single gloving studies used latex gloves, while five double gloving studies used latex gloves and one study used a double gloving indicator system (Naver & Gottrup, 2000). At the end of the procedure the gloves were collected and then tested for perforations.

The methods used to test the gloves for perforations in all studies were one of two approaches. The first method involved filling the gloves with water and then examining them for leaks and counting the number of perforations. The second method was to fill the gloves with air, under pressure, observe and count the number of perforations. One study used both methods to test the gloves for perforations, but failed to state which method was used for which gloves, or if both methods were used on all gloves (Thomas et. al, 2002). In all studies the control element was established by testing unused gloves in an identical fashion to the used gloves, for pre-existing leaks and perforations. The number of glove perforations found in unused gloves in the control groups

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ranged from 0% to 3.75%. Two of the studies found 0% of perforations. (Jensen et. al 1997; Marin-Bertolin et. al 1996).

Out of the 6 studies reviewed, 5 all agreed that double gloving reduces the number of glove perforations to the inner glove. (See table I for results from all studies.)

Study	Single gloving perforations	Double gloving perforations	Sample size (Pairs of gloves tested)
Berridge et. al	17.7%	41.9%	237 pairs
Jensen et. al	20%	4%	400 pairs
Kovavisarach et. al	6.7%	2.7%	1,316 pairs
Marin-Bertolin et. al	24%	10%	1,038 pairs
Naver et. al	17%	2%	560 pairs
Thomas et. al	42.1%	22.7%	396 pairs

The exception was Berridge, et. al (1998), where an increase in the number of perforations were found when double gloving was used, but with a significantly reduced incidence of skin contamination for the operating surgeon. The study did not state whether skin contamination was also reduced for surgical assistants or scrub nurses. This study postulated that a loss of dexterity may have accounted for the increase in perforations seen by surgeons and scrub nurses. Two of the studies failed to look at dexterity as a possible cause for the increase in perforations (Naver et. al 2000; Thomas et. al 2001) while the remaining three studies discussed dexterity, with both surgeons and nurses reporting a loss of dexterity when double gloved. However, all participants were prepared to take the time to adjust to double gloving because of the improved protection double gloving offers against possible contamination (Jensen et. al 1997; Kovavisarach et. al 1998; Marin-Bertolin et. al 1996).

The duration of the surgery in relationship to the number of perforations was also looked at in two studies (Marin-Bertolin et. al 1996; Thomas et. al 2001). Thomas, et. al (2001) could find no correlation between the length of surgery time and the number of perforations. However, in the Marin-Bertolin et. al (1996) study, perforations were found to increase by 8.22% in surgery that lasted longer than 2 hours.

All six studies compared the surgical team's skin contamination rates between single and double gloving. They all found that double gloving reduced the risk of skin contamination to the surgical team. None of the studies described the method that was used to test for skin contamination in any detail, although all studies gave statistics. (See table II).

**Table II**

Study	Single gloving skin contamination	Double gloving skin contamination
Berridge et. al	17.7%	4.7%
Jensen et. al	20%	4%
Kovavisarach et. al	6.7%	2.7%
Marin-Bertolin et. al	24%	10%
Naver et. al	17%	2%
Thomas et. al	42.1%	22.7%

## CONCLUSION

It would appear that there is strong evidence from these studies to demonstrate that double gloving reduces the number of perforations to the innermost glove during 'low risk' surgery. There is also evidence that double gloving reduces the risk of skin contamination for the surgical team. However, the author feels that this is an area that requires more research as in the studies reviewed, the methodology for gaining these results was either discussed without sufficient details or not discussed at all.

Furthermore, the studies reviewed focused on one specialty each with a varying sample size, and lead the author to suggest that a study needs to be carried out, which covers a wide selection of specialties, to determine if the results would be the same.

Finally none of the studies looked at the cost implications of double gloving. Whilst the cost and consequences of an undetected barrier breach to both the patient and the surgical team could be high, it would be invaluable, in this budget conscious time, to know the financial implications.

Notably, all six studies were carried out by surgeons, with only half of the studies including scrub nurses as participants. The possible consequences of single gloving versus double gloving are just as great to a scrub nurse as to a surgeon and the author feels that this alone indicates a need for nurses to carry out a research study, covering the whole scrub team, on double gloving in 'low risk' surgery specialties.

In both 'high and low' risk specialties it is now considered that 'wearing two pairs of gloves provides an additional barrier between the patient and the surgical team thereby reducing the cross infection risk' (Tanner 2003, p.2).

However, although research has been carried out in 'low risk' specialties the research studies all focus on a single specialty. It could therefore be argued that there is a need for further studies that cover a cross section of 'low risk' specialties in order to demonstrate the relationship between glove perforations and double gloving in all specialties. Previous studies carried out also failed to demonstrate the relationship between double gloving in 'low risk' specialties and cross contamination. Many of the studies carried out did not look at the whole surgical team but focused mainly on the surgeon and surgical assistant.

Therefore, it could be argued that the significance of further research into this area would be to:

- Strengthen the argument for double gloving in all surgical specialties.
- Demonstrate the link between double gloving and reduction in cross contamination.
- Show the risk of glove perforations to all members of the surgical team.

The potential contribution of further research could be the introduction of double gloving for all surgical cases for all the surgical team members. This could potentially reduce the risk of cross infection between the patient and the surgical team. However, a comparison between the cost of double gloving and the potential cost of a patient or staff member developing an infection would also need to be examined in order to justify the increased cost of double gloving for all cases.

If nursing is to be considered as a profession it must continue to develop a distinct body of knowledge to ensure effective, safe, high quality care through research (Bassett & Bassett 2003). The literature search carried out by the author revealed that most of the research into double gloving has been carried out by the medical profession. The author would hope that this article increases interest, within nursing, into double gloving research. Research carried out by Nurses into double gloving has the potential to be published in the nursing community and hopefully stimulate discussion amongst multidisciplinary team members within the O.R. This could have an impact on the education of Nurses on the benefits of double gloving for all specialties. It could also lead to a

change in standards and policies within nursing practice in the Operating room.

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