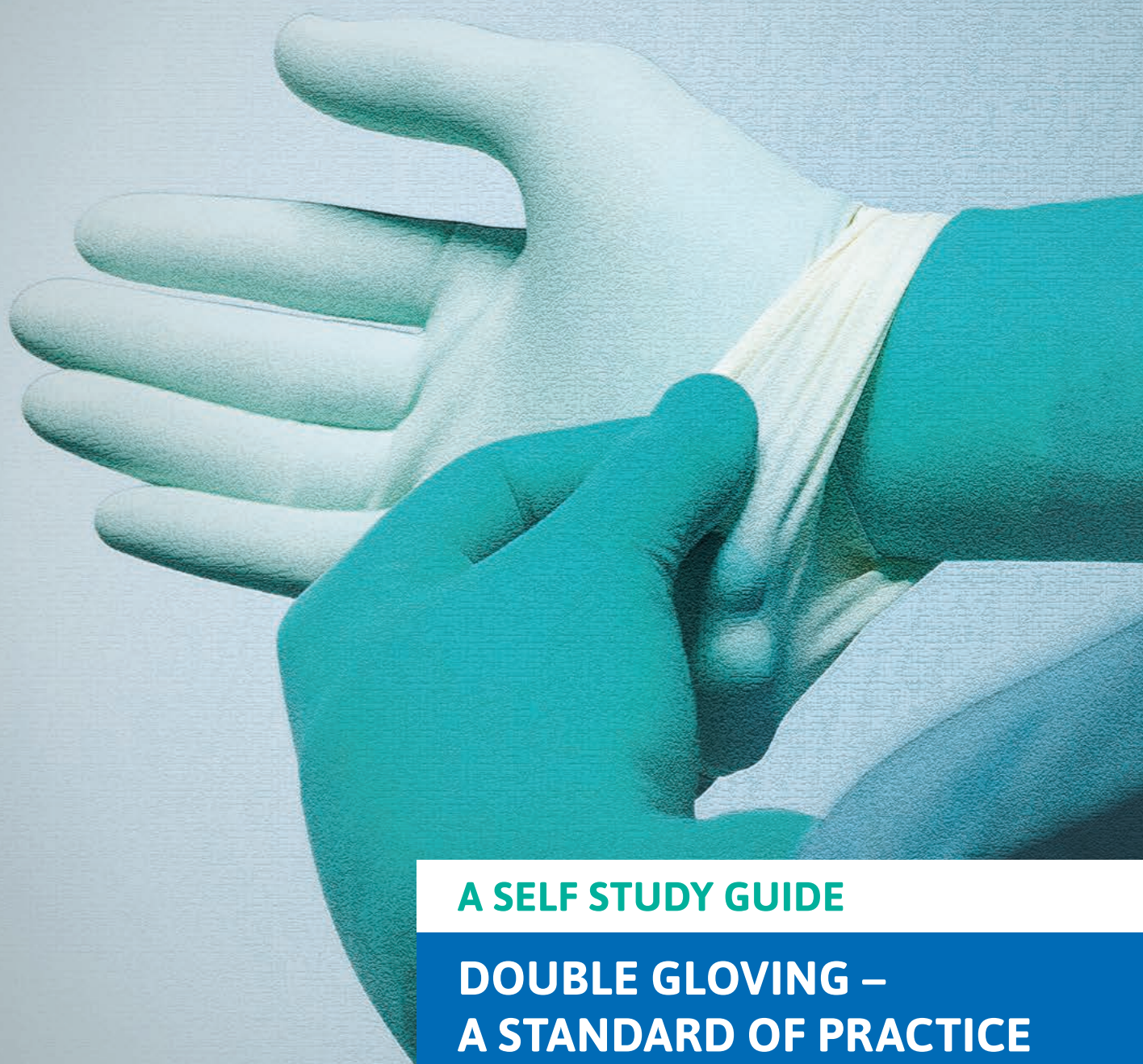


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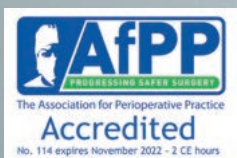
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A SELF STUDY GUIDE

**DOUBLE GLOVING –
A STANDARD OF PRACTICE
IN SURGERY**

HEALTHCARE PRACTITIONERS





DOUBLE GLOVING – A STANDARD OF PRACTICE IN SURGERY

OVERVIEW

The issues around Personal Protective Equipment (PPE) have never been more discussed than they are today. It is no surprise given the recent COVID-19 pandemic and Ebola crisis. The amount of information we hear daily about hospital-associated infections, surgical site infections and antimicrobial resistance continues to increase. As deadly viruses such as COVID-19, Ebola, hepatitis and human immunodeficiency virus become more prevalent in the population, awareness is increasing around the potential infection risk to Healthcare Workers (HCWs) through contaminated blood and other pathogen routes.^{5,20,26,27,50,51}

Focusing on the transmission of infectious blood and body fluids during surgery, surgical gloves provide a protective barrier for the protection of HCWs' hands. However, research has proven that surgical gloves cannot always withstand the rigors of lengthy and strenuous surgeries, and surgical personnel do not always change their gloves frequently enough during lengthy procedures. When there is a breach, or barrier failure to a surgical glove, there is a subsequent potential for the transfer of pathogens to both the patient and the surgical team. From a risk management, infectious disease and occupational health perspective, prevention of barrier failure is key to protecting the surgical team and the patient. For members of the surgical team, the primary method of prevention is the practice of double gloving for surgical procedures.^{2,7,9,14} Some surgeons and nurses have eagerly adopted the practice while others have refused or only partially changed their practice. Objections cited range from poor fit, the change in feel and comfort of wearing two sets of gloves, to losing necessary tactile sensitivity required for intricate surgeries, all the way to administrative budget cuts that prevent the expense for extra gloves. In this education module you will explore two questions: is double gloving worth the effort and what does the evidence say?

LEARNER OBJECTIVES

After completing this continuing education activity, you should be able to:

1. Describe the stringent manufacturing requirements for surgical gloves.
2. Discuss factors that could lead to surgical glove failure.
3. Identify healthcare workers' injury and risks with single gloving.
4. Identify the published advantages of double gloving.
5. Discuss how to implement double gloving best practices.

INTENDED AUDIENCE

The information contained in this self-study guidebook is intended for use by healthcare professionals who are responsible for or involved in the following activities related to this topic:

- Educating healthcare personnel.
- Working in the operating department and other surgical environments.
- Establishing healthcare centre or departmental policies and procedures
- Decision-making responsibilities for safety and infection prevention products.
- Maintaining regulatory compliance.
- Managing employee health and infection prevention services.

INSTRUCTIONS

This course is accredited by the Association for Perioperative Practice and approved for 2 Continuing Education (CE) hours. Obtaining full credit for this course depends on completion of the self-study materials as directed below.

Approval refers to recognition of educational activities only and does not imply endorsement of any product or company displayed in any form during the educational activity.

To receive CE for this module, please go to www.AnsellCARES.com and navigate back to the CE programs page, then to the Online Course Library. Here you will need to Register in order to Login and complete the post-test.

An 85% PASSING SCORE IS REQUIRED FOR SUCCESSFUL COMPLETION. Any learner who does not successfully complete the post-test will be notified and given an opportunity to resubmit for certification. Once completed, a certificate will be sent to the same email provided during registration.

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The Planning Committee Members are employees of Ansell's Professional Education and Clinical Affairs group and therefore have declared an affiliation that could be perceived as posing a potential conflict of interest with development of this self study module. This module will include discussion of commercial products referenced in generic terms only.

TABLE OF CONTENTS

INTRODUCTION	2
HISTORY OF GLOVES	4
MANUFACTURE OF GLOVES	4
FACTORS IMPACTING GLOVE FAILURE	6
GLOVE WEARER ROLE	7
TIME OF WEAR – LENGTH OF CASE	8
DOUBLE GLOVING RESEARCH	8
HEALTHCARE WORKER RISK AND INJURY	9
RESEARCH ON CHANGE	11
DOUBLE GLOVING TECHNIQUE	12
TWO-COLOUR GLOVE SYSTEM	12
ORGANISATIONAL RECOMMENDATIONS	13
BEST GLOVE PRACTICES	13
CONCLUSION	13
REFERENCES	14
BIBLIOGRAPHY	16

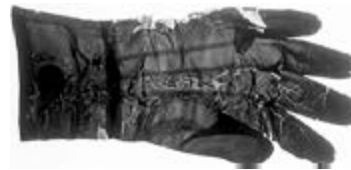


**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

HISTORY OF SURGICAL GLOVES

Gloves were first introduced into the surgical arena during the 1890s when Dr. William Halstad commissioned the Goodyear Rubber Company to make the first pairs to protect the hands of the nurses and surgical assistants from the harsh disinfecting agent, carbolic acid. (See Figure 1.) They were crude and cumbersome at that time, but they did protect the workers' hands from the harsh chemicals. It soon became apparent that wearing the gloves also reduced the rate of post-procedure infections among patients and decreased mortality. By the early 1900s, the use of surgical gloves was routinely used during surgery in both Europe and the United States.³⁶

Figure 1- Goodyear Surgical Glove



The first mention of double gloving in the medical literature came sometime later, during World War II. An orthopaedic surgeon named Dr. Marshal R. Urist, a graduate of the Johns Hopkins University School of Medicine, joined the war effort in 1943. He was Chief of Orthopaedics in the 22nd General Hospital Division in England and the 97th General Hospital Division in Germany. He explained, as they explored wounds for bullet and shell fragments, that they wore two gloves because of the risk of tearing the glove on the sharp fragment of bone.^{13,42}

The first disposable latex medical gloves with thinner fingers and palms were manufactured in 1964. Prior to this, surgical gloves were re-used, and had to be strong enough to withstand repeated washings and steam sterilisations. In 1966, the world's first prepackaged, sterile surgical glove became available.^{13,42}

MANUFACTURE OF GLOVES

The risk of exposure to bloodborne pathogens is a serious concern to healthcare providers, particularly those working in the operating theatre. Given the serious health and cost implications related to the consequences of bloodborne infections, both Operating Theatre staff and their patients need to be protected from the risk of infection during surgical procedures. (See Figure 2.)

Figure 2- Surgical Procedure



SURGICAL GLOVE STANDARDS ARE GOVERNED BY NATIONAL GOVERNMENT STANDARDS

Quality specifications are written into each National Standard for a surgical glove product.^{6, 10, 15, 30} They relate to physical requirements like strength, thickness, measurements, performance, and freedom from holes. Specifics include, elasticity, elongation, protein and powder levels, allergenicity or biocompatibility. These specifications require a statistical sample scheme which, if passed, mathematically ensures a maximum potential number of defined faults per 100 units. This is called an AQL (Acceptable Quality Level).⁶ Batches of product are rejected by the manufacturer if the number of faults exceeds this number. Each Standard Organisation has varying requirements to be met and generally arrange factory inspections before granting a Certificate of Standards Conformity.^{6, 10, 15, 23, 30}

- In Europe, medical gloves are subject to the European Standards EN 455 part 1-2-3, while the enforcement is under the responsibility of each Member State through national standards bodies and healthcare agencies.²⁰ The European EN 455 standard for surgical gloves was approved by CEN (European Committee Standardisation) which the members are the National standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.^{23, 30}
- AfPP (2016) states surgical gloves must conform to the standard BS EN 455-1 (BSI 2000).^{9, 15}
- The US Food and Drug Administration (FDA) does not write standards but it does recognise standards that are written by the American Society of Testing and Materials (ASTM). Surgical gloves sold into the US must meet the ASTM standards.¹⁰

- International Organisation and Standardisation (ISO) is an independent, non-governmental membership organisation and the world's largest developer of voluntary International Standards. Many countries require surgical gloves entering their country to meet the ISO Standards.³⁰

HEALTHCARE PROVIDER SPECIFIC NEEDS

Manufacturers must also produce gloves that meet the customer's specific individual needs for durability, flexibility, tactile sensitivity and resiliency. The gloves need to fit like a "second skin" for the surgeons that are performing delicate microsurgical procedures and be flexible enough to touch the tiny hair-like vessels of a premature infant's heart, in addition to having the durability to withstand the rigor of the chisels and blades during a total joint replacement while providing a barrier between the healthcare worker and the patient. The material must meet stringent manufacturing standards and also stringent tactile requirements at the same time – all of this while still providing acceptable fit, feel and comfort throughout the procedure. This is no small order to fill.

Manufacturers have made great strides and improvements in gloves and have produced a large variety of quality products for HCWs to choose from including, standard, orthopaedic, sensitive, radiation attenuation, and so on. (See Figure 3.) Even with all the high technology in manufacturing, there are several factors that increase the likelihood of glove failure during use, including mechanical stress, type of surgery, number of instruments used in the surgical case, length of surgical procedure and the wearer's role in the surgical case.³²

Figure 3- Glove Manufacturing





**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

FACTORS IMPACTING GLOVE FAILURE

Approximately 100,000 sharps injuries occur in UK hospitals each year.² It has been estimated that 4% of HCWs sustain 1 to 6 sharps injuries each year.⁹ A small, but significant number of HCWs in the UK, including nurses, have developed potentially life-threatening diseases because of a sharps injury. Since the late 1990s, at least 20 HCWs have contracted hepatitis C and there have been 5 documented cases of HIV transmission.²⁶ The Association of periOperative Registered Nurses (AORN) 2016 states 'Fingernails must be short and free from polish or artificial nails (including acrylic and gel). Fingernails should be no longer than 2mm, as the risk of harbouring bacteria, puncturing gloves and injuring patients increases with longer nails.'⁸

The Operating Theatre is a unique environment in many respects; many healthcare professionals work in close proximity, often over long periods, and often under emergency conditions.

Failure of surgical gloves from sutures, sharp instruments, bone fragments and natural "wear and tear" is a common source of contamination of the hands of surgical personnel with blood and body fluids.^{9,31,49}

Padhye et al (2011) states 'Double gloving technique as demonstrated in Figure 4, using sterile gloves can be used as an effective means of infection control for all major and minor surgical procedures, especially high-risk procedures involving patients who may be suffering from or carriers of bloodborne infections.' and further clarify from the study 'As perforations were noted in both major and minor oral surgical procedures both involving and not involving wiring, donning of double gloves is recommended for all surgical procedures.'⁴⁵

Figure 4- Donning Two Gloves



Kobayashi et al (2020) cites 'In recent years, the risk of glove perforation in orthopedic surgery is not only glove wear time, but also more detailed surgical procedures (e.g., the volume of a trimmed local bone) and surgical instrument handling (e.g., cleaning drill bit flutes, passing a cannulated drill bit, rotating drill shaft) have been reported.³⁵

According to the Centers for Disease Control (CDC), 27% of all percutaneous injuries are sustained in the Operating Theatre. Of these, 43% were due to suture needles^{11,17} with scalpel injuries contributing the majority of the remainder (18% according to Vose et al 2009).⁶¹ Data on the number of percutaneous injuries sustained by HCWs as a result of scalpels are scarce as under reporting is a major problem; some estimates are that only 1 in 10 sharps injuries are reported.⁴⁴

It has been estimated that cuts or needlestick injuries occurring as many as 15% of operations.^{2,61} The higher risks are associated with longer, more invasive and high blood loss operations. The majority are self-inflicted but as many as one quarter are caused by other members of the team.^{2,61}

Kerr (2009) reported a study across three UK district general hospitals in which 73.2% of surveyed surgeons who responded had received a sharps injury in the previous year; 52% had not reported any of the injuries as required under trust policy.³³ In another study, (Thomas 2009), 44% had a sharps injury over the previous 6 months; one surgeon admitted to more than 10.⁵⁷

Figure 5- Double Gloving Barrier Protection



GLOVE WEARER ROLE

Researchers have found significant differences in the glove defect rate depending on the wearer's role in the surgical procedure. Laine's study (2001) found that assistants had perforation rates of 7.7% and surgeons had perforation rates of 23.6% out of 284 surgeries.³⁹ Other studies describe scrub nurses as being at the highest risk for glove failure, citing a glove perforation rate as high as 40%.²⁹ The disturbing thing about all of these statistics is that many of these study participants did not notice the glove defect until the end of the surgical procedure when the gloves were removed, and blood was seen on the hands. Berguer (2004) says that most, if not all, surgeons have encountered blood on their hands or fingers at the conclusion of a procedure without awareness of suffering an injury or the occurrence of a breach of the glove barrier by any other method.^{35, 38}

The closed method of gloving is the preferred option for donning sterile gloves to avoid contamination of the outer surface of the glove.⁹ Health Protection Scotland (2016) recommended that double gloving, using an indicator glove, should be considered for Exposure Prone Procedures (EPPs) in the operating theatre setting, for example orthopaedic or gynaecological surgical procedures, and if appropriate, be adopted by all members of the scrub team, as it provides significantly increased barrier protection when compared to single gloving and allows for glove perforations to be more frequently and easily identified.^{22, 28, 29} (See Figure 5.)

During surgery, gloves are exposed to a range of chemical and physical stressors such as twisting; pulling; stretching; and exposure to fluids, fat, or chemical substances that influence the integrity gloves and increase the rate of perforation.³⁷

According to Kaplan et al 2007, different conditions and peculiarities such as instrumentation, surgical equipment, and techniques have the potential to create glove tears.³² Ayoub et al (2018) in their study, found different results in the 3 different departments: urology surgery (61.7%), maxillofacial surgery (17%), and general and digestive surgery (21.3%).¹²



**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

TIME OF WEAR – LENGTH OF CASE

The rate of glove perforation appears to be related to the length of surgical time. The longer the surgical case, the greater the chance for a tear in the glove due to a bone fragment or sharp instrument.⁴⁸ In a study by Tlilli et al (2017) it was reported that significantly higher perforation rates occurred when the gloves were worn for over 90 min.⁵⁸

In a study Al-Maiyah et al (2005) reported 'The perforation rate was significantly lower in staff that changed gloves at 20-min intervals.⁴ Kim et al (2019) reported in a systematic review of orthopedic surgery that glove change every 20–90 minutes is good practice.³⁴ Perforations are significantly higher for emergency cases than they are for regularly scheduled cases as well. Partecke et al (2009) found a positive correlation between the duration of wear and the incidence of microperforations and recommended a change of gloves for surgeons, first assistants, and surgical nurses after 90 minutes of surgery.⁴⁸

During surgical procedures, microperforations have been shown to increase over time and remain mostly unnoticed. It is therefore advisable to implement glove changing standards according to risk evaluation with respect to different surgical interventions. In general, glove changing after at least 90 minutes is recommended.³

DOUBLE GLOVING RESEARCH

During surgery, intact gloves act as a protective barrier against bloodborne pathogens such as human immunodeficiency virus (HIV), hepatitis B, and hepatitis C. However, as discussed in the section above, glove perforation is frequent and often unrecognised by the surgeon or nurse.

The most recent 2014 Cochrane Review reported that "in 12 studies, two pairs of gloves reduced the number of perforations in gloves by 71% compared to the use of one pair of gloves. In three studies, wearing two pairs of gloves was shown to reduce blood stains on the skin of HCWs by 65%."⁴³ The Cochrane Review (2014) also reported further reductions in perforations when three pairs of gloves are worn compared to either wearing a double or single pair of gloves. Additionally, the use of indicator gloves, which enable a colored spot to show when the user's outer glove is perforated, reduced the number of glove perforation in two of the reviewed studies.^{43, 51} Overall, the Cochrane Review authors concluded that surgeons and surgical staff wearing two pairs of gloves, rather than one, reduce their risk of being exposed to and contracting a serious viral infection occupationally.⁴³

Figure 6- Two Layers of Protection



Hamilton et al (2014) state 'Caesarean section is the most commonly performed major abdominal surgery in the United States and almost one third of births in the US are cesarean deliveries. While cesarean delivery is usually an uncomplicated procedure, up to 20% of patients can experience a complication following cesarean delivery with infectious complications being the most common.'²⁵

Carter et al (2017) suggest 'Several studies have tested new interventions that attempt to decrease these infectious complications including pre-operative bathing, appropriate use of pre-operative antibiotics, type of pre-operative scrub utilised, hair clipping, vaginal cleansing, maintaining intra-operative normothermia, closure of subcuticular skin and type of skin closure.'¹⁶

According to Scrafford et al (2018) 'Intraoperative glove changing prior to abdominal closure during cesarean section decreased occurrence of composite wound complications.'⁵³

Royal College of Obstetricians and Gynaecologists (2016) advise 'More than one in five women in the UK currently give birth by caesarean section. About half of these are as a planned operation and the other half are as an emergency. Many women have more than one caesarean section.'⁵²

According to Palmer and Rickett (1992), a surgeon is at risk of more than one hepatitis infection per lifetime, and more than 1 in 1500 surgeons is likely to be infected by HIV during the next 35 years because of damaged gloves.⁴⁶

HEALTHCARE WORKER RISK AND INJURY

SO IF THE RESEARCH IS SO IMPRESSIVE, WHY ISN'T EVERYONE DOUBLE GLOVING?

One reason could be that HCWs do not fully understand the consequences of blood and body fluid contamination in the form of post-exposure seroconversion. It is essential for wearers to understand their true risk of exposure and the probability of post-exposure seroconversion. The risk for bloodborne exposure and infection is highest in the Operating Theatre.

National Institute for Health and Care Excellence (NICE) (2006) "Double gloving should be practised during procedures that have a high risk of glove perforation."⁵⁶ (See Figures 6 and 7.)

Fry (2010) states 'It has been claimed that 'double gloving' may compromise dexterity, sensitivity and 2-point discrimination of the surgeon, therefore reducing the ability and quality of the surgeon's performance. Another problem may be that a decrease of manual dexterity may increase the rate of needle stick injuries. Additionally there is poor acceptance among surgeons to double glove including a regular habit of single gloving, comfort, and low risk of transmission. Furthermore, some choose not to double glove because they feel there is a lack of evidence supporting its protection.'^{24,54,56}

Figure 7- Wearing Double Gloves during Surgery



**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

Although double gloving increases the glove budget for a hospital, the reduction of bloodborne pathogen exposure and possible seroconversion of HCWs represents significant savings to the hospital. “Occupationally acquired HBV infection is common among surgeons; it has been identified as having occurred in 25-30% of operating surgeons who have been in practice of surgery for more than 10 years.”¹⁴ Double gloving as shown in Figure 8 reduces risk of exposure to patient blood by as much as 87% when the outer glove is punctured.⁶⁰

Volume of blood on a solid suture needle is reduced as much as 95% when passing through two glove layers, thereby reducing viral load in the event of a contaminated percutaneous injury.⁶⁰

Figure 8- Glove Perforation



Because of the occult nature of intraoperative glove failures, double gloving may prevent occult hand contact with patient blood. Using electronic detection of glove barrier failure, one study estimates that surgeons wearing a single pair of gloves would have contact with patient blood for 42 hours for every 100 hours of operating time.⁶⁰ Costs of post exposure treatment of an occupationally acquired bloodborne pathogen such as HIV are significant to a hospital. Direct costs include initial evaluation of the healthcare worker, counseling, and evaluation of the source patient, post exposure prophylactics, baseline and follow up pathology tests, clinical monitoring and follow up. In addition, there are indirect costs, which include filing workers' compensation and Occupational Health and Safety reports and other administrative paperwork, potential increase in liability premiums and legal fees. How do you put a cost to these statistics, and the cost of these infections to the future of healthcare? These statistics can be changed with double gloving.

Whether glove perforation rate is low or high, glove failure can influence both patients and surgical team members and expose them to serious risks. Bacteria can pass through microperforations from patient to surgeon and vice versa and transmit viral diseases, including hepatitis B, hepatitis C, and HIV, which can endanger serious health problems.⁴⁰

RESEARCH ON CHANGE

Some HCWs and particularly surgeons and operating theatre staff are disinclined to wear more than one pair of gloves. They claim that their dexterity and ability to safely handle and use instruments is compromised or in some way diminished with the addition of an outer pair of gloves.²⁴ Multiple studies investigating tactility and sensation both objectively and subjectively have concluded that there is no negative impact on tactility associated with use of double gloves.^{24, 29}

Studies by (Quebbeman, 1992) and similar studies (Webb and Pentlow, 1993) came to the conclusion that double gloving has minimal effect on tactile sensitivity, the ability to perform tasks such as tying surgical knots and completing the Dellon's moving two point discrimination test.^{51, 62}

Surgeons who always or usually double glove report that a period of 1 to 120 days (2 days in most cases) is required to fully adapt to its use and surgeons who routinely double glove report decreased hand sensation much less frequently than those who do not. It appears that a period of adaptation and retraining is required for physicians and surgeons to be comfortable with the double gloving technique.⁶² Most HCWs need to try several combinations of gloves before they find the right "fit" for their double gloving technique. The consensus in the aforementioned study was that wearing the larger glove on the outside was more comfortable than wearing the larger glove on the inside.⁶² A 2010 study by Fry disputes any negative impact of double-gloving on a surgeon's manual dexterity and tactile sensation. In interviews with 56 surgeons Fry found no difference in dexterity or sensation when no gloves, one pair or two pairs were worn.²⁴

The AfPP (2016) under their Standard Precautions recommendations state 'The use of appropriate personal protective equipment (PPE) such as gowns, gloves, eye protection, face shields and aprons is important to both minimise the risk of introducing infection into the patient's wound and to protect staff from occupational exposure to potential biohazards.'⁹ A study published in the European Journal of Cardiothoracic Surgery (1999) had this to say about wearing gloves and making a change to double gloving. "Given a comfortable size combination, it is likely that during the accommodation period, cortical retraining will occur. The somato-sensory cortex will undergo cortical remapping when challenged with new sensory stimuli. Therefore, the perception of decreased sensation, experienced by the surgeon when first using double gloves, will likely be minimised and overcome with sensory cortical remapping. The surgeon or surgical nurse who is just beginning to use double gloves should try various combinations; when a comfortable fit is found, perceived hand sensibility will likely improve with increased experience using double gloves."²⁹

When gloves require changing intraoperatively due to a puncture or inadvertent contamination, the glove must be removed in a way that avoids further contamination and hands decontaminated with alcohol hand gel.⁹ (See Figure 9.) A new glove may be donned with assistance from a member of the surgical team Ayoub et al (2018) highlighted an important problem to which members of surgical teams do not give much importance, despite the risks that it can generate and its potentially severe consequences. In light of this study, Ayoub et al 2018 recommend systematic double-gloving and frequent changing of gloves to reduce the perforation rate and its risks. The research also suggests training and informing sessions for surgical team members to draw attention to the gravity of glove perforation, the importance of double-gloving, and to highlight the factors and circumstances that lead to higher perforation rates. Research is recommended to highlight the efficacy of these measures.^{9, 12}



Figure 9- Glove Change Procedure



**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

DOUBLE GLOVING TECHNIQUE

Is there a proper technique for double gloving? Double gloving technique is as personal as the choice of your ice cream flavour. You need to try several different combinations until you find the one that works for you. Some people find that a larger glove inside with a smaller one outside works for them, others use the same size glove for both inside and outside glove. The aforementioned study published in the European Journal of Cardiothoracic Surgery (1999) found almost an equal distribution of glove sizes used by surgeons for double gloving: larger glove inside 31%, smaller glove inside 35% and both gloves the same size 31%.²⁹

TWO-COLOUR GLOVE SYSTEM

Of significant importance is the fact that glove defects are not identified at the time of the incident in the majority of the cases. Often the impaired barrier integrity is not known until the end of the case when the gloves are removed and the blood on the hand is noted. Wearing gloves of two different colours significantly increases the awareness of perforation.⁴³ When the outer glove is perforated the moisture that seeps through and allows the site of perforation to be more easily seen providing an alert for the wearer making them realise that they must immediately change their gloves. According to a recent study by Meakin et al (2016) results state 'Glove perforations occurred during 43% of surgeries with a mean of 2.3 holes/surgery. Inner gloves were intact in 63% of glove pairs where an outer perforation occurred. Intraoperative perforation detection was improved when coloured indicator gloves were worn (83% sensitivity) vs. standard gloves (34% sensitivity; $P < .001$).⁴¹ Investigators have reported that frequency of changing gloves among wearers of double gloves is significantly higher when an indicator system was used.³⁷

Figure 10- Top Glove and Indicator Glove



Should the outer glove perforate, change out both gloves as soon as possible, as the inner glove's integrity may also be lost. Please see Figure 10 showing top glove and coloured indicator glove.

ORGANISATIONAL RECOMMENDATIONS

There are several very prestigious organisations that are involved with healthcare professionals and concerned with the protection and safety of both the healthcare worker and the patient. The following recommendations have come forth from these organisations.

- AfPP (2016) 'Double gloving provides an extra layer of protection, can significantly reduce the risk of surgical site infections (SSI's). This should be considered gold standard as evidence based practice supports double gloving for all surgery including low risk surgery'⁹
- NICE 2006 Guideline: "Double gloving should be practised during procedures that have a high risk of glove perforation"⁵⁶
- AORN (2014) stated, "Health care practitioners should double glove during invasive procedures."⁷⁷
- The American College of Surgeons (ACS) states, "Double gloving does help to cut down by a factor of 10 the number of potential exposures." The ACS also acknowledges that double gloving will offer increased protection to the patient as well.⁵
- The 2014 CDC Guideline for Prevention of Surgical Site Infection specified, "Wear two pairs of gloves with extended cuffs, wear a two color indicator glove system to assist with identifying rips or tears, double gloving provides an extra layer of safety during direct patient care and during the PPE removal process."¹⁸
- In 2014 the Australian College of Operating Room Nurses (ACORN) released updated Standards which represent the accepted standard of professional practice for Australian OR nurses. Standard 8 section 8.4 deals with glove use and sub-section 8.4.2 directly stipulates that nurses "comply with the recommended practice of double-gloving when scrubbed for surgical invasive procedures".¹
- The European Center for Disease and Control (ECDC) encourages the practice of double gloving to reduce hand contact to bodily fluids.²¹
- The World Health Organization (WHO) recommends double gloving in countries with a high prevalence of HBV, HCV and HIV for long surgical procedures (>30 minutes), for procedures with contact with large amounts of blood or body fluids, for some high-risk orthopaedic procedures, is considered an appropriate practice.⁵⁵

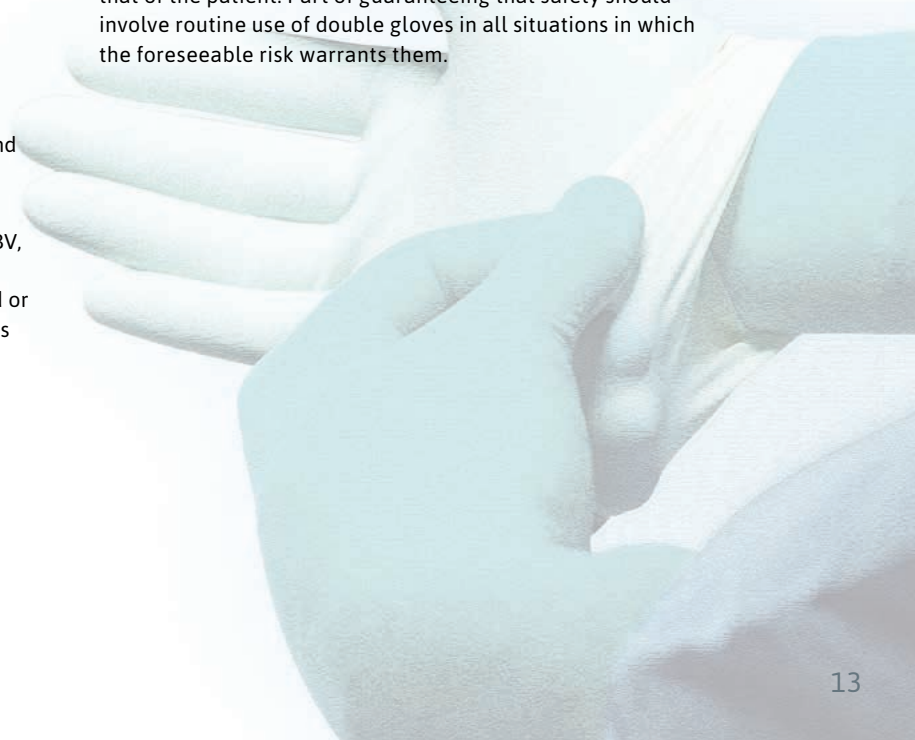
BEST GLOVE PRACTICES

The following points to practice are based on recommendations from Childs (2013). Below are further prompts and recommendations on Infection Prevention and Control best Practice that ensures patient and HCW safety:¹⁹

- HCWs should routinely check their gloves for perforations even if they are not obvious.
- Double gloves should be common practice in all major cases and specifically when contamination or extended duration are expected or encountered.
- If double gloves are worn and the outer glove is perforated it is best to change both layers.
- Both viruses and bacteria have been demonstrated as being capable of passing through perforated outer gloves.
- Finding the most appropriate glove combination may require experimentation.
- Required glove resources include a colour indicator system and a range of glove sizes.
- Audits should be done regularly to monitor personnel compliance with PPE and glove-wearing recommendations.
- Ensure local policies, protocols and procedures are reviewed as evidence and technology evolves.

CONCLUSION

This module raises important questions for infection prevention teams, operating theatre staff and all HCWs to consider in terms of their own occupational health and safety as well as that of the patient. Part of guaranteeing that safety should involve routine use of double gloves in all situations in which the foreseeable risk warrants them.





**DOUBLE GLOVING –
A STANDARD
OF PRACTICE
IN SURGERY**

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