

# Aseptic Technique & Sterile Fields In The Operating Theatre

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## Aseptic Technique

The primary goal in operating theatres is prevention of surgical site infection. The surgical team prevents infection by completing patient risk assessments, cleaning the environment, using instruments/equipment that are sterilised, antibiotic prophylaxis and implementing standard precautions. To prevent contaminating the surgical wound, the surgical team uses asepsis which involves isolating the operative wound/site from the non sterile surrounding environment. Implementing asepsis maintains the sterile field and prevents micro- organisms from the surgical site. It is the surgical team's responsibility to understand the principles of asepsis and use them in everyday practice (Osman, 2000).

The teaching/training of these skills for inexperienced/new nurses should be assigned to an experienced nurse who has leadership and mentor skills and provides education in peri operative practice. All new nurses should be educated and orientated on the policies and procedures of peri operative practice (Osman, 2000).

# Surgical Attire and Personal Protective Equipment

Surgical attire must be:

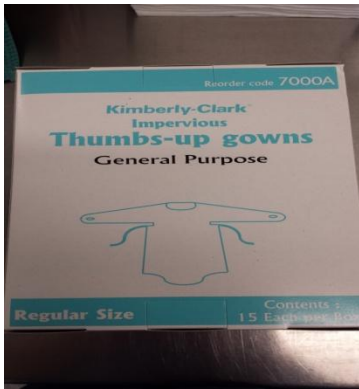
- Clean, laundered freshly and approved by operating theatre policies.
- If attire becomes soiled it must be changed and placed in designated bin.
- Change attire daily.
- Personnel who are not scrubbed should wear jackets to prevent shedding of bacterial from the arm.
- Any under garments must be covered by surgical attire.
- All hair and facial hair must be covered when in the operating room, these areas are restricted or semi restricted.
- In restricted areas masks must be worn at all times and when sterile equipment is being opened.
- Masks must cover nose, mouth and prevent venting (AORN, 2011)

The operating theatre unit must provide all staff with appropriate personal protective equipment (PPE) and surgical attire to ensure protection of staff in restricted and semi restricted areas.

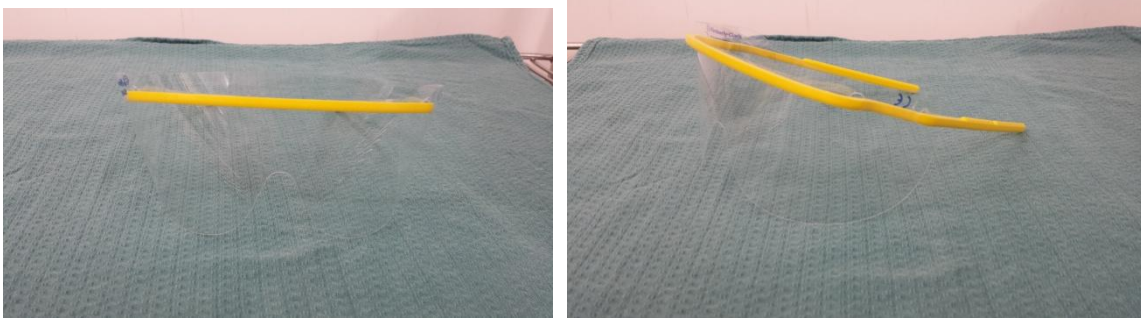
## **PPE includes:**



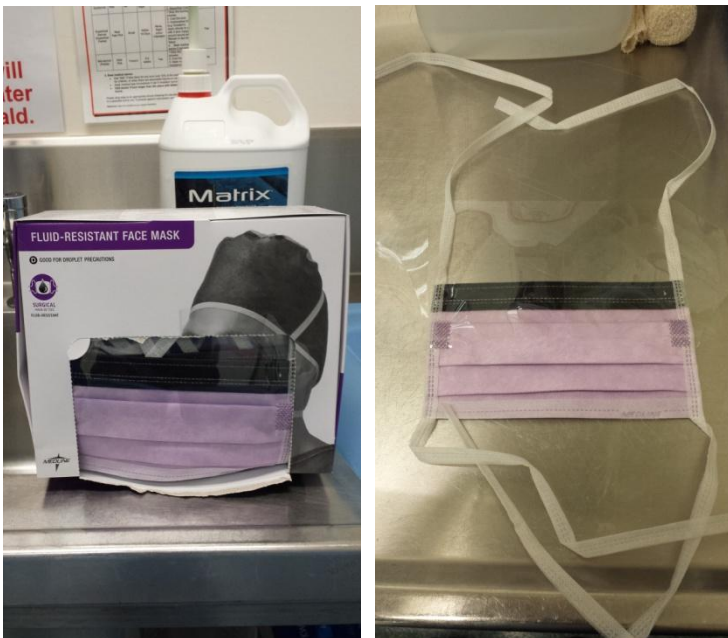
## *Gloves*



*Gowns/aprons must be liquid resistant*



*Goggles or eyewear/shield*



*Mask*

*Shoe covers that are fluid resistant (AORN, 2011)*

## Surgical Scrubbing Technique

To prevent transmission of micro organisms from scrub personnel's hands and clothes, don sterile gown and surgical sterile gloves. Wearing a sterile gown and gloves also protects the scrub personnel from any micro organisms acquired from environment and patients. Hand hygiene must be completed effectively before gowning and gloving to provide an extra level of protection in the incident of gown or gloves integrity being compromised (AORN, 2011).

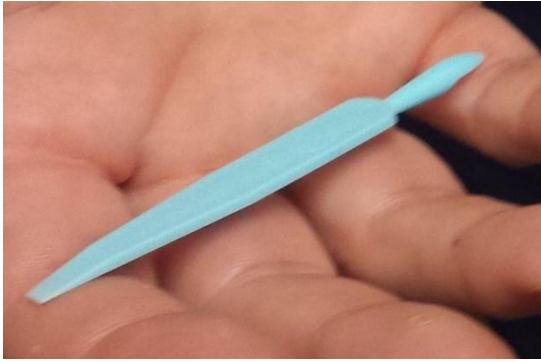
### Surgical scrub procedure

1. No jewellery should be worn such as rings
2. Apply surgical mask, ensure it is securely in a comfortable position
3. Wash hands and forearms before starting the surgical scrub to remove visible dirt using soap and water
4. According to manufacturer's directions dispense approved anti-microbial scrub agent
5. Clean under each nail with disposable nail cleaner under running water
6. Ensure anti-microbial agent is applied to hands and forearms with a sponge which is soft and non abrasive
7. According to manufacturer's directions scrub all areas of the hand and forearms for a total time of 3 – 5 minutes
8. Keep hands elevated and scrub each area of the fingers, hands and arms thoroughly
9. Prevent wetting surgical attire
10. Dispose of sponge in appropriate bin
11. In one direction, under running water rinse hands and arms, from fingertips to elbow as much as needed

12. Always hold arms and elbows away from surgical attire and hands higher than elbows

13. Before donning a sterile gown in the procedure room, use a sterile towel to dry hands and arms (AORN, 2011)

Below are images of the numbered steps as listed above.



5.



6.



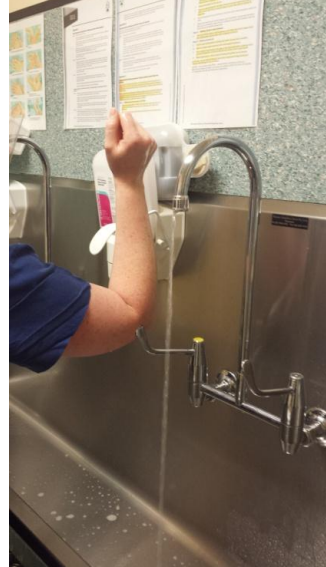
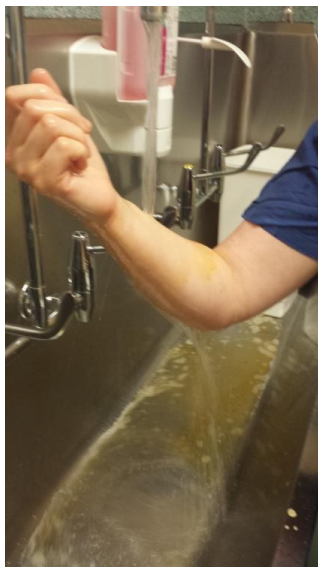
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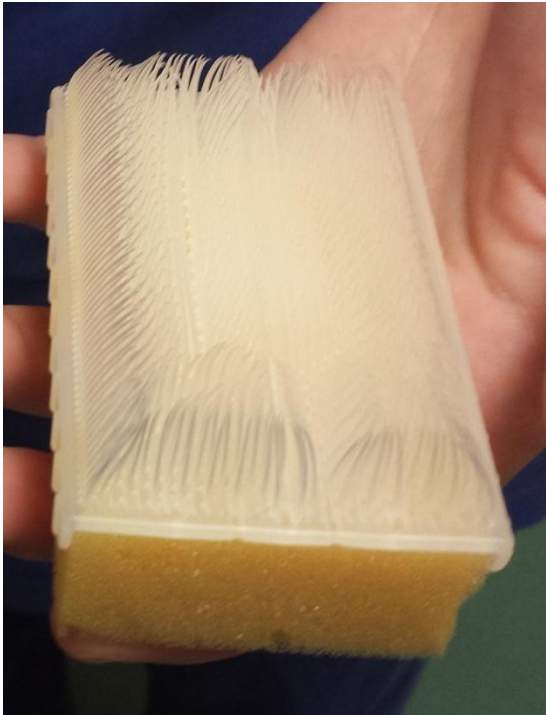
7.



11.



The use of a brush can cause skin damage and increase skin cell shedding and bacterial load. The use of a soft sponge will decrease skin damage. Studies prove that scrubbing for 3 minutes is just as effective as scrubbing for 5 minutes (AORN, 2011). Surgical masks must be changed when it becomes soiled, wet, or continuously worn for over 4 hours (AORN, 2013).



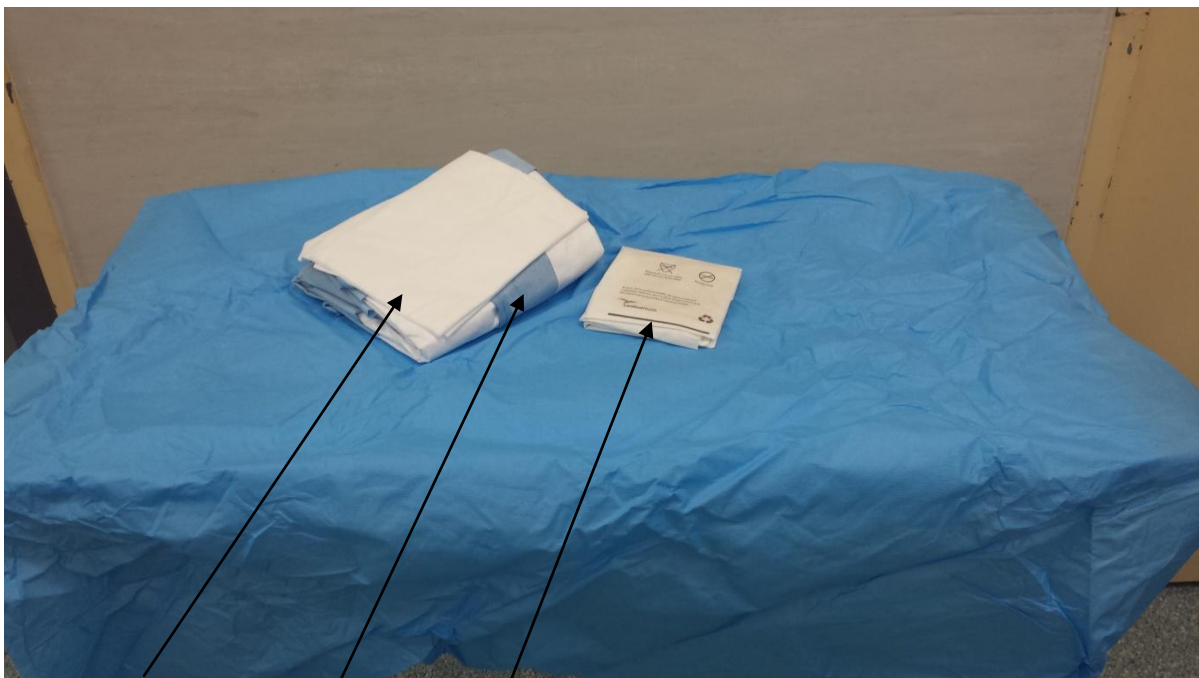
*Abrasive Brush*



## Drying Hands and Arms

1. Hands and arms must be dry to prevent micro organisms from contaminating the gown
2. Avoid dripping water over the sterile field, carefully pick up the sterile towel with one hand from the corner
3. Use the other hand to grasp the opposite corner of the sterile towel and fully open the towel to its full length
4. Use a circumferential motion from the hand to the upper arm, ensuring all portions are dry
5. Use circumferential technique on both hands/arms using opposite sides of the sterile towel on different hands/arms
6. Dispose towel with current hand it is in without contaminating sterile gown (AORN, 2011)

Below are images of the numbered steps as listed above.



*Disposable towel, gown and gloves*



2.



3.



4.



5.



## Gowning Technique

1. The gown will be folded so the scrub personnel does not need to unfold it
2. Pick up the gown from the neckband and directly lift it upwards away from the sterile package
3. Step back into an open area
4. Hold the inside of the gown at the neckband
5. Do not touch the exterior of the gown, let the gown unfold itself with the interior of the gown still facing scrub personnel's body
6. Hold the gown at shoulder height and insert arms into the gown sleeves until nearest edge of the cuff meets the hand
7. Non sterile personnel assists by tying up the ties at the back of the gown and adjusting the gown only by touching the back ties at the neck and waist
8. After the completion of donning their gloves the scrub personnel presents the non sterile personnel with a tab which is attached to the front tie. The non sterile personnel may hold the tab while the scrubbed personnel turns thereby the tie is wrapped around the back. The scrub retrieves the tie carefully by pulling it from the tab and ties it to the short end waist tie which secures the gown (AORN, 2011)

Below are images of the numbered steps as listed above.



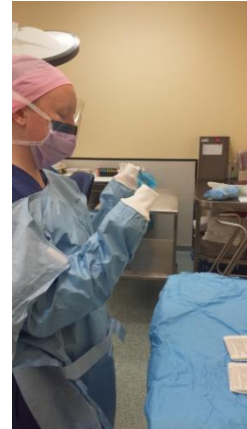
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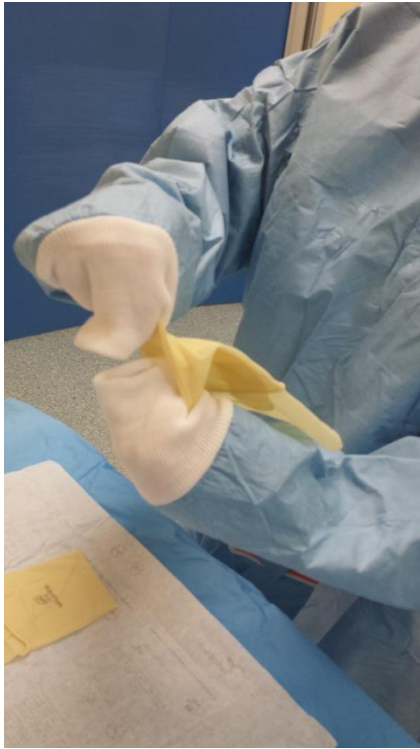
7.

## Closed Gloving Technique

- Hands must not extend beyond the cuff edges and hands must remain within the gown (AORN, 2011)
- To allow access glove packet should be open
- With the opposite hand pick up folded edge of one glove
- Place glove on gown with fingers of glove facing towards the elbow and glove palm resting on palm of enclosed hand
- The hand inside the sleeve should grip the edge of the glove and the other hand grip the upper edge of the cuff
- Use a flipping motion; pull the upper edge of the glove over the sleeve of the gown. This allows the hand within the gown to enter the glove without exposing it outside the gown
- With the gloved hand, don the second glove the same way
- When both gloves are on, don glove the second pair of gloves
- Gloves may be adjusted once both gloves are on (Pirie, 2010)

Below are images of the numbered steps as listed above.





5.



6.



7.



8.

Double gloving decreases the risk of perforation of the gloves and infection of the surgical site for the patient. To protect scrub personnel

from exposure to pathogens via blood. Decrease the blood exposure amount from injuries via needlestick. Wearing double gloves can help identify any faults in the gloves to begin with (AORN, 2013).

## **Maintaining a Sterile Field**

It is the responsibility of all staff of the surgical team to monitor the sterile field. The surgical team can never guarantee the sterility of the sterile field but every effort should be made to reduce contamination and avoid breaches in sterility. If the sterile field is contaminated, the surgical team must take the appropriate/immediate action to avoid further contamination but if doubtful of equipment or field sterility, consider it unsterile. Monitor the sterile field closely and monitor the time length of exposure to environment that the sterile items have had. A sterile field left unattended is at risk of contamination due to airborne contaminants, insects, personnel or liquids (Osman, 2000), (AORN, 2013).

### **Sterile drapes**

Sterile drapes must be used to cover non sterile areas of the environment, only exposing surgical site. Only personnel that are scrubbed may touch the sterile drape. After sterile drapes are placed they should not be repositioned, this may contaminate the sterile field. Only the top of the drape is considered sterile (Osman, 2000).

### **Positioning and movement within the sterile field**

Scrubbed personnel must follow certain guidelines to avoid contamination. Scrubbed personnel must ensure hands are kept above waist level and at all times remain in sight. Unsterile areas of the gown include under the armpits and back of the gown, therefore hands should not be folded under armpits or placed behind back. Sterile areas of the gown include 2 inches below the neck, the gowns front from the sterile field level and 2 inches above the elbow on the sleeves (AORN, 2011).





*Back of gown is unsterile*

*Standing pose when sterile*

Personnel who are scrubbed should only move within the sterile field and not wander around the room. Movement within the sterile field should be by turning back to back or face to face, this decreases risk of contamination. Maintain appropriate safe distances between non sterile personnel and remain within the sterile field. Remain in the same position for duration of surgery for example; surgery started seated must remain seated for the whole surgery. Non sterile personnel must never walk in between sterile fields and when supplying a sterile item to the scrub remain in the margin of safety (12 inches) and never lean over or have contact with any portion of the sterile field (Osman, 2000). Increased movement during a procedure increases bacterial shedding therefore individual's movement should be kept to a minimum. Particles may be picked up by air current and distributed onto the sterile field (AORN, 2005).

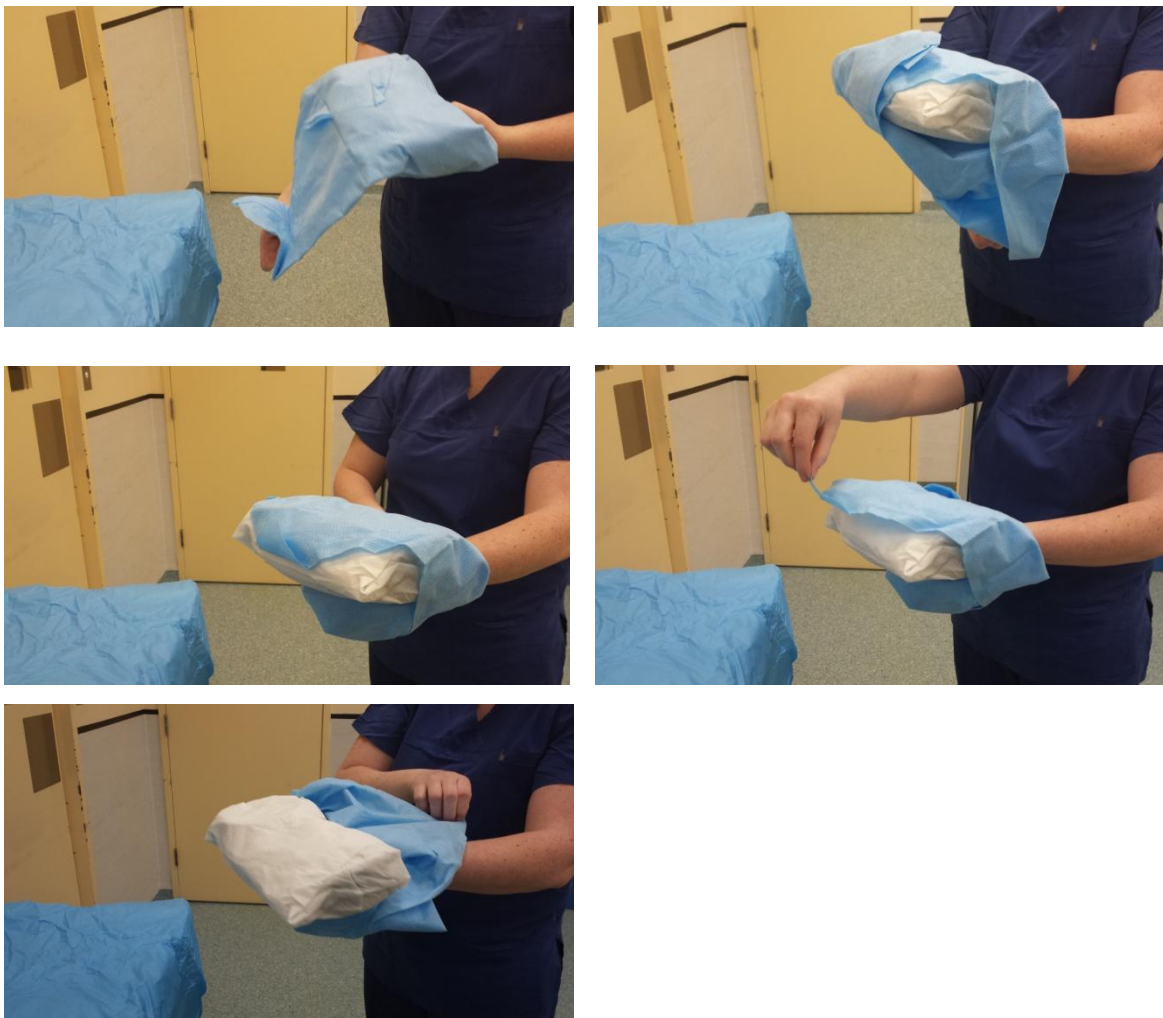
### **Introducing sterile items/solutions into the sterile field**

When dispensing sterile instruments onto the sterile field, the circulating nurse must have excellent judgement and skill to be able to present sterile item to scrub nurse directly or placed securely on sterile field.

Sterile equipment that is thrown onto the sterile field may roll off the

table, displace other equipment or penetrate the drape which can lead to contamination.

Non sterile nurse when opening sterile items, the wrap should be opened away from them, starting from the top, then sides and the last wrap flap opened towards non sterile nurse. This ensures non sterile nurses are not reaching over sterile item inside. Ensure all edges of wrap are secured and prevented from flipping back onto sterile equipment which contaminates the item and makes it unsterile. The margin of safety between sterile and non sterile is 1 inch of the outer edge of the wrap. Example of practice is pictured below.



When opening steripeel, roll the package over and let the scrub take the inner package. Example of opening steripeel is pictured below.



When solutions are poured from a container lift the cap up straight and pour contents into a sterile bowl. Pour slowly to avoid contamination from splashback (Osman, 2000).

Never mix sterile and non sterile equipment, due to contamination of the sterile field. To ensure all items have been sterilised, items must be checked for the following:

- Integrity of packaging
- Indicator tape colour has changed
- Expire date of item such as linen wrapped trays
- Sterilisation tracking ticket, which includes the date of sterilisation, number of steriliser load and which steriliser was used

## **Common Breaks in Sterile Techniques**

Sterile techniques can be easily contaminated and difficulties may be encountered, such as sterilisation, sterile field set up, gowning and gloving, draping, positioning and prepping of a patient, operating theatre environment and surgical techniques (Hopper, Moss, 2010).

There are many issues which may occur during the sterilisation process of instruments and equipment such as water spots from the steam that can leak through the wrap and contaminate the item. The sterility of items may not be checked correctly by peri-operative personnel. Checking the sterility of an item includes:

- Ensuring the indicator tape is changed, the tape changes colour to inform everyone it has been through a process

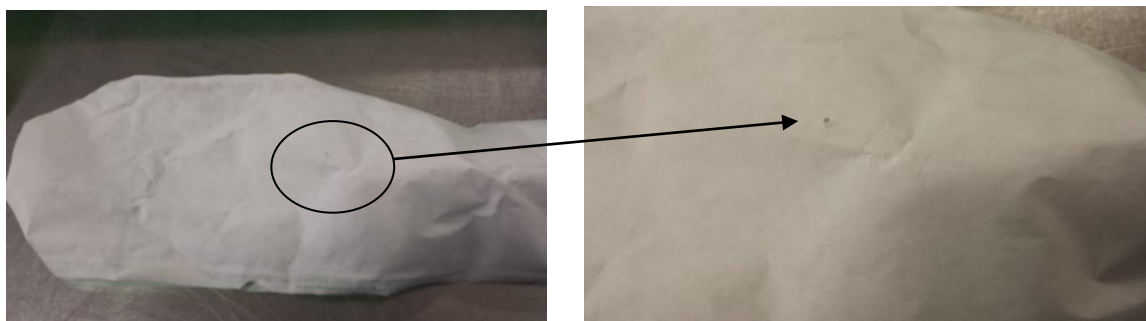


*Unsterile autoclaved tray*



*Sterile autoclaved tray*

- The integrity of the packaging, ensuring there is no holes in linen or wrap, no tears or rips/holes in steripeel



*Hole in steripeel from being dropped instrument has pierced through package*

- The seal is intact in steripeel items and indicators have changed

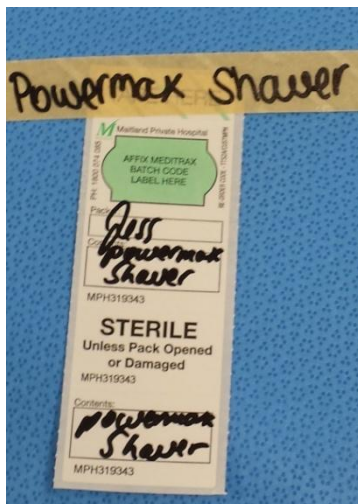


*Unsterile steripeel item*

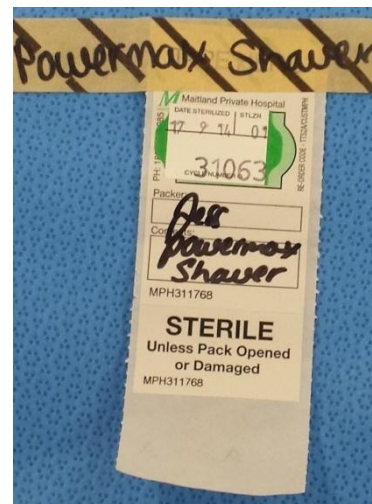


*Sterile steripeel item*

- Correct packaging
- Correct sterilisation indicators (Hopper, Moss, 2010)
- Expire date of item such as linen wrapped trays
- Sterilisation tracking ticket, which includes the date of sterilisation, number of steriliser load and which steriliser was used (Osman, 2000)



*Unsterile tracking ticket*



*Sterile tracking ticket*

After checking that all instruments are properly sterilised, the peri-operative team proceeds to open a sterile field, this should never be rushed due to many opportunities of contamination. Items that are being opened and used within a sterile field must be handed off in a way that maintains sterility, integrity of item and safety of all people (Hopper, Moss, 2010).

Inside every packed tray/ item there should be an indicator which has changed colour to provide evidence of sterilisation of instruments. Ensure all scrub personnel know the changes of colour (Hopper, Moss, 2010).



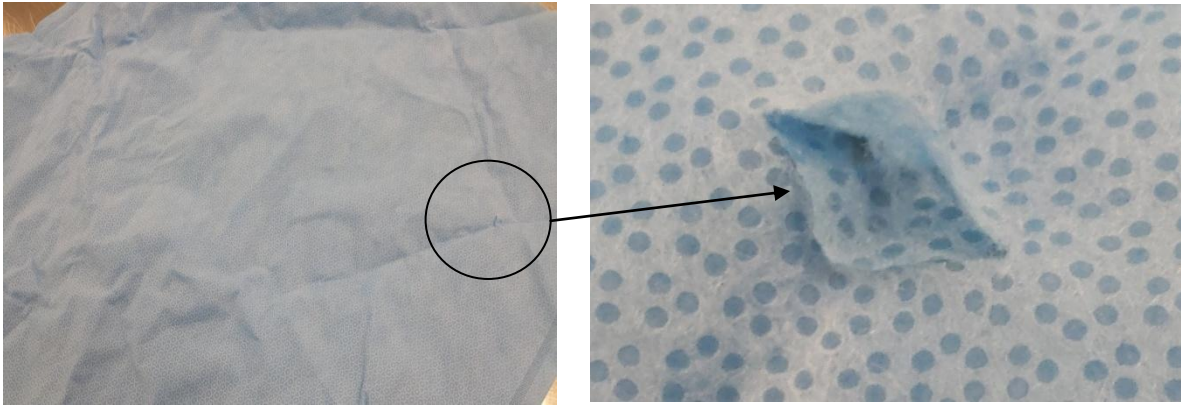
*Unsterile indicator tape and indicator*

*Sterile indicator tape and indicator*



*Unsterile indicators and tape for plasma*    *Sterile indicators and tape for plasma*

Ensure wraps are checked before placing items onto the sterile field in case there are holes in the wrap from staff dragging trays off the shelf or from the metal tray corners (Hopper, Moss, 2010).



### *Tear in wrap*

Check for wet spots underneath trays regardless of the water resistant wrap, condensation can occur when sudden temperature changes occur for example, a tray hot from steriliser, not fully cooled is taken into a cold environment (Hopper, Moss, 2010).

Events that can compromise sterility of an item:

- Fluid spilt on sterile items which promotes micro -organisms to migrate into the sterile item



- Sterile items that are dropped forces the sterile air out of package and contaminated air/particles forced into the package (Osman, 2000)

- Droplets can be spread onto a sterile field contaminating it by conversation therefore minimise conversation in the presence of a sterile field (AORN, 2005)
- Non- sterile personnel should not lean or reach over the sterile field to deliver sterile items as this may contaminate the sterile field (Hopper, Moss, 2010).

Scrub nurses and circulating nurse must work well together as a team to keep the sterile field sterile during handing off instruments and not to contaminate the sterile field (Hopper, Moss, 2010). Occurrence of a break in sterile technique requires immediate action to ensure patient's safety. If the break in sterile technique cannot be corrected immediately due to risk of patient's safety, this need to be recorded on an incident report (AORN, 2005).



## Inspection of Instrumentation

The following are some of the areas of instruments to check where blood and debris may build up and be missed during the sterilisation process. The inspection of instruments is an extremely important step to detect contamination and infection and is crucial for patient safety (Thompson, 2012). Below are some examples of damaged, dirty and tricky areas to watch out for when inspecting instruments.

### **Wolf Hook**



Damaged wolf hook for laparoscopic operations, dry blood and debris is caught under installation. Checking damaged instruments is important to ensure instrument is not contaminated.

### BP Handle #3



Blood gets left on Bp Handle when blade is removed and dries in the groove.

## Gillies forcep



Tissue and blood may be left in the teeth of the instrument and in the grooves.



Blood clots may be stuck in the groove in the bottom of the forcep.

## Metzenbaum Scissor



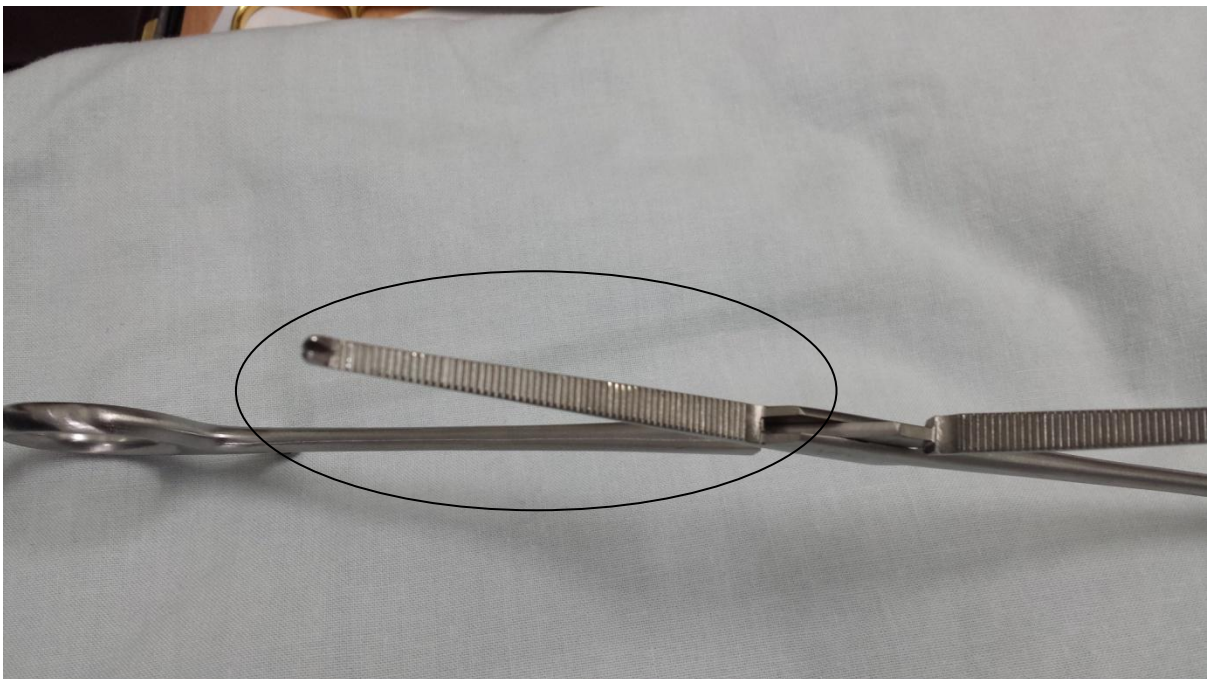
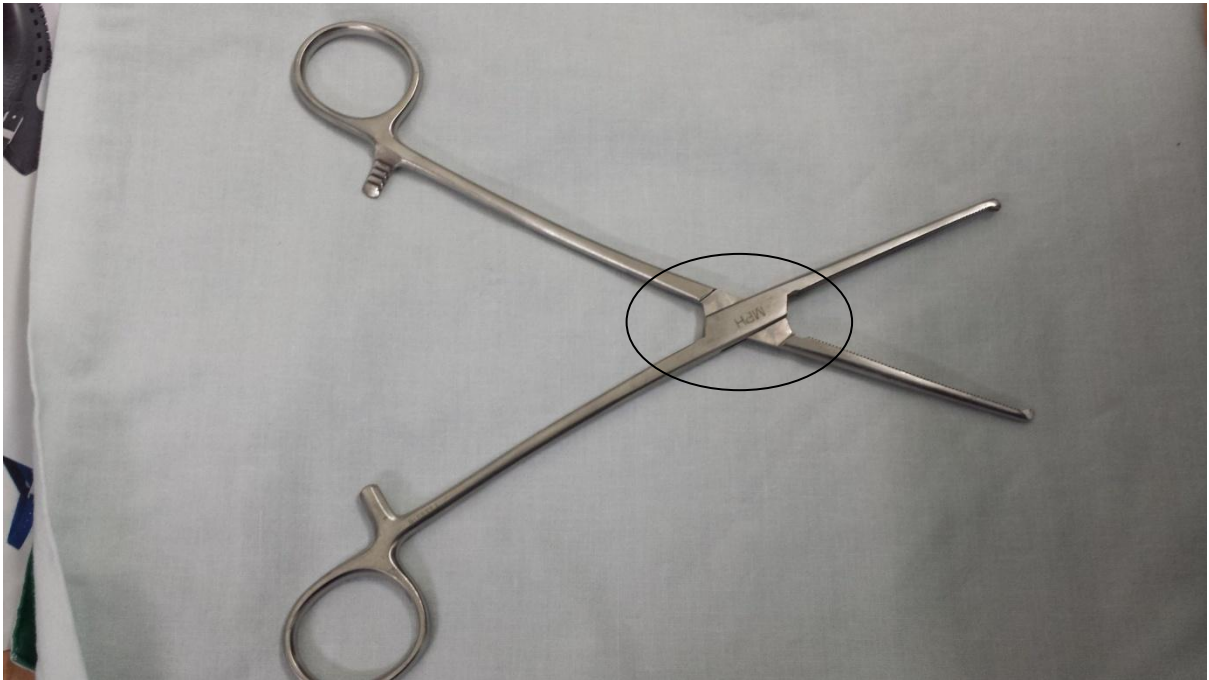
Blood dries when the scissors are closed when put through a decontamination cycle and may be overlooked by sterilisation technician.

## Catpaw Retractors



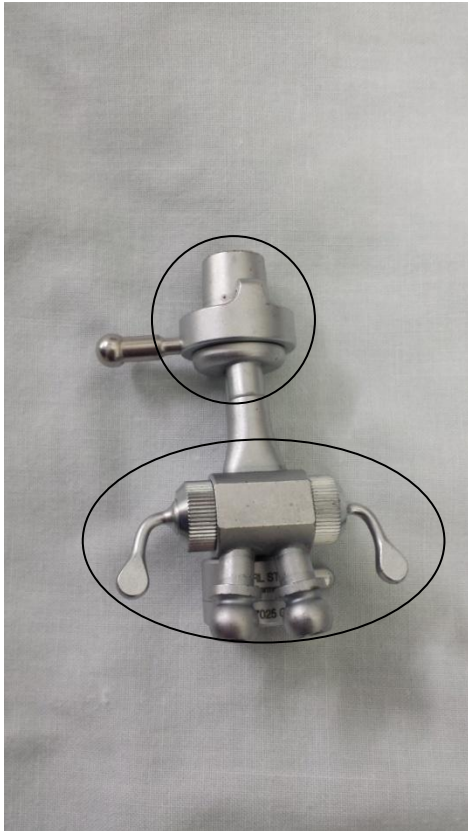
These retractors usually have tissue stuck in between the grooves.

## Straight Kocher



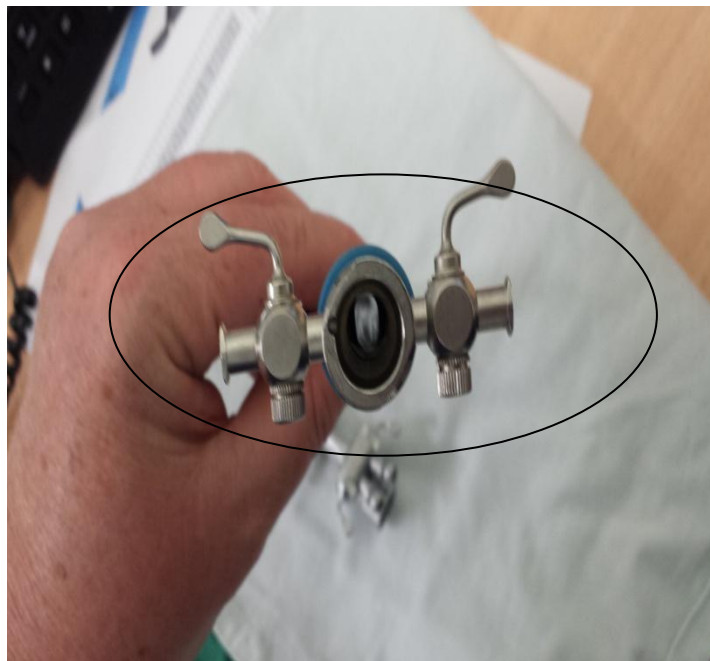
Bone gets trapped in the tooth area and in the serrated grooves.

## Storz Cystoscopy Bridge

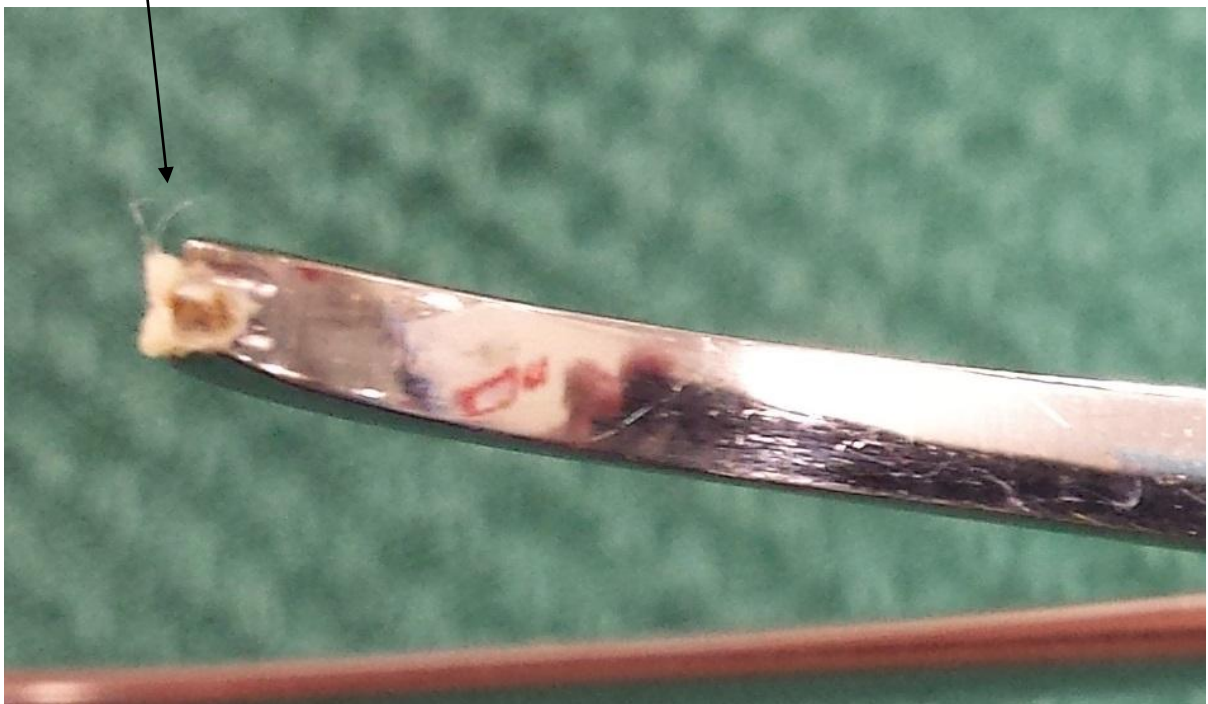


All cannulated instruments must be checked before using them, debris, dry blood clots and tissue may get stuck on the inside and on the walls of the instrument.

## Storz Cystoscopy 2 tap sheath



## Littlewood Forcep



Piece of tissue stuck on the teeth of the instrument, very hard to see at a distance but on closer examination a very large amount of tissue is attached to the instrument.

## Surgical Conscience

Surgical conscience has many definitions; most refer to aseptic technique and infection control measures. The concept is broader than having a good technique; it involves making decisions regarding morals and ethics from which patients' benefit. Knowledge, self-awareness, intelligence and courage to speak up and be a patient advocate, are the attributes that a nurse's surgical conscience should include. Nurses who have an excellent surgical conscience knows wearing earrings outside the surgical hat is putting a patient in danger, the earring may fall out into the patient, a nurse with a surgical conscience does not need to be informed by other staff as they know it can harm a patient (Girard, 2007).



*(Surgical Conscience: A guiding light in the modern OR, 2014)*

By having such awareness, a nurse may protect their patient by taking appropriate actions to do no harm. Teaching and promoting surgical conscience in the peri operative environment to student nurses encourages students/nurses to think, discover and seek further knowledge and skill. Peri -operative nurses are seen as strong advocates for their patients. Reflecting on a nurse's surgical conscience and own



practice helps to improve and provide the highest quality holistic nursing care (Girard, 2007).

## Acknowledgments

I would like to thank Maitland Private Hospital for allowing me to use the facility and the equipment for the development of this learning resource which may contribute towards the education of future nurses in the peri-operative field.

I would also like to thank Bethany Wozniak for demonstrating her nursing practice which will contribute to future nurses' learning and furthering their peri-operative knowledge and skills.

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