Surgical and Procedural Areas

Sterile Technique

Content Applies To

Mayo Clinic

Scope

The intended scope of the Standardized Surgical Procedures is to provide a consistent baseline within the surgical and procedural environments reporting to Surgical Leadership. Each individual site may include a more restrictive addition; these guidelines shall be the minimum. This content should be followed by the Mayo Clinic Surgical and Procedural Areas that report to Surgical Leadership.

Purpose

To provide guidance for establishing and maintaining a sterile field by following the principles and implementing the processes of sterile technique.

Procedure

All items introduced to a sterile field are opened, dispensed, and transferred by methods that maintain sterility and integrity.

Principles of Sterile Technique

1. Surgical and procedural personnel should implement practices that reduce the spread of transmissible infections when preparing or working in the operating room or invasive procedure room and when performing or assisting with operative or other invasive procedures.
   a. Surgical and procedural personnel entering the operating room or invasive procedure room for any reason (eg, stocking supplies, bringing procedural supplies and equipment into clean rooms) should wear clean:
      i. Scrub attire, including a freshly laundered or single-use, long sleeved jacket snapped closed with the cuffs down to the wrists, and (see Dress Code - Surgical Attire Policy).
      ii. Surgical head covers or hoods that cover all hair and scalp skin, including facial hair, sideburns, and the hair at the nape of the neck.
   b. Surgical and procedural personnel should perform hand hygiene before entering the operating room or invasive procedure room and areas where sterile supplies have been opened.
c. Surgical and procedural personnel should a wear clean surgical mask that covers the mouth and nose and is secured in a manner to prevent venting when open sterile supplies are present and when preparing, performing, or assisting with surgery and other invasive procedures, including:
   iii. Central venous catheter (CVC) insertion, peripherally inserted central catheters (PICCs), and guidewire exchange.
   iv. Regional anesthesia procedures, or
   v. High-risk spinal canal procedures (eg, myelogram, lumbar puncture, spinal anesthesia.)

2. Surgical gowns, gloves, and drape products for use in the surgical and procedural setting should be evaluated and selected for safety, efficacy, and cost before purchase or use.
   a. Surgical gowns, gloves, and drape products should be evaluated and selected for use in the surgical and procedural setting.
   b. Surgical and procedural personnel should select surgical gowns, gloves, and drape products for the procedure according to the barrier performance class of the product as stated on the label and the anticipated degree of exposure to blood, body fluids, and other potentially infectious materials.
   c. Surgical and procedural personnel should select surgical gowns of appropriate size and sleeve length.

3. Surgical and procedural personnel should use sterile technique when donning and wearing sterile gowns and gloves.
   a. Surgical and procedural team members should perform a surgical hand scrub before donning sterile gowns and gloves (see Infection Prevention and Control Hand Hygiene / Fingernails - Policy and Procedure).
   b. Scrubbed team members should don sterile gowns and gloves in a sterile area away from the main instrument table and in a manner to prevent contamination of surgical attire.
   c. The front of a sterile gown should be considered sterile from the chest to the level of the sterile field.
      i. The neckline, shoulders, and axillary regions of the surgical gown should be considered contaminated.
      ii. The surgical gown back should be considered unsterile.
   d. Gown sleeves should be considered sterile from two inches above the elbow to the cuff, circumferentially.
      iii. Sleeve cuffs of the surgical gown should be considered contaminated when the scrubbed team member’s hands pass through and beyond the cuff.
      iv. Sleeve cuffs should be completely covered by sterile gloves and should not be exposed.
   e. The closed assisted gloving method should be used to glove team members during initial gowning and gloving for operative or other invasive procedures.
f. Scrubbed team members should wear two pairs of surgical gloves, one over the other, during surgical and other invasive procedures with the potential for exposure to blood, body fluids, or other potentially infectious materials.

g. Scrubbed team members should inspect gloves for integrity after donning, before contact with the sterile field, and throughout use.

h. Surgical gloves worn during invasive surgical procedures should be changed when a visible defect or perforation is noted or as needed.

i. Surgical and procedural team members who must change their sterile gloves during operative or other invasive procedures should use the assisted gloving method.

4. **Sterile drapes should be used to establish a sterile field.**
   a. Surgical and procedural team members should place sterile drapes on the patient, furniture, and equipment in the sterile field and should handle them in a manner that prevents contamination.
      i. Unsterile equipment (eg, Mayo stands) should be covered on the top, bottom, and sides with sterile barrier materials before being introduced to or brought over a sterile field. Sterile barrier material also should be applied to the portion of the equipment that will be positioned immediately adjacent to the sterile field.
      ii. Sterile drapes should be handled as little as possible.
      iii. Draping materials should be held in a controlled manner that prevents the sterile drape from coming into contact with unsterile surfaces.
      iv. During draping, gloved hands should be shielded by cuffing the drape material over the gloved hands.
      v. Surgical drapes should be placed in a manner that does not require scrubbed team members to lean across an unsterile area and prevents the front of the surgical gown from contacting an unsterile surface.
      vi. Sterile drapes should be placed from the surgical site to peripheral areas.
      vii. The portion of the surgical drape that establishes the sterile field should not be moved after it has been positioned.
      viii. Only the top surface of a sterile, draped area should be considered sterile. Items that fall below the sterile area should be considered contaminated.
   b. Surgical equipment (eg, tubing, cables) should be secured to the sterile drapes with nonperforating devices.
   c. The upper portion of the C-arm drape should be considered contaminated.

5. **A sterile field should be prepared for patients undergoing surgical or other invasive procedures.**
   a. The sterile field should be prepared in the location where it will be used and should not be moved.
b. The sterile field should be prepared as close as possible to the time of use.
c. Sterile supplies should be opened for only one patient at a time in the operating room or procedure room.
d. Sterile supplies should be visually inspected immediately before transfer to the sterile field and should not be used if the expiration date has passed or if there is any indication that the sterile item has been compromised.
e. One patient at a time should occupy the operating room or procedure room.
f. Surgical and procedural personnel should perform a surgical hand scrub and don a sterile gown and gloves before setting up sterile supplies.
g. Only sterile items should come in contact with the sterile field.
h. Sterile fields and instrumentation used during procedures that involve both the abdominal and perineal areas should be kept separate and should not be used interchangeably.
i. Isolation technique should be used during bowel surgery.
j. Isolation technique should be used during procedures involving resection of metastatic tumors.

6. **Items introduced to the sterile field should be opened, dispensed, and transferred by methods that maintain the sterility and integrity of the item and the sterile field.**
   a. Surgical and procedural team members should inspect sterile items for proper processing, packaging, and package integrity immediately before presentation to the sterile field.
   b. Items should be delivered to the sterile field in a manner that prevents unsterile objects or unscrubbed team members from leaning or reaching over the sterile field.
   c. Sterile items should be presented directly to the scrubbed team member or placed securely on the sterile field.
      i. Heavy items or items that are sharp and may penetrate the sterile barrier should be presented directly to the scrubbed team member or opened on a separate clean, dry surface.
   d. Peel pouches should be presented to the scrubbed team member or opened onto the sterile field by pulling back the flaps without touching the inside of the package or allowing the contents to slide over the unsterile edges of the package.
   e. Rigid sterilization containers should be inspected and opened on a clean, flat, and dry surface.
      i. Surgical and procedural team members should verify that external locks, latch filters, valves, and tamper-evident devices are intact before opening rigid sterilization containers.
      ii. Surgical and procedural team members should verify that the external chemical indicator has changed as appropriate before opening rigid sterilization containers.
iii. The rigid sterilization container should be opened according to the manufacturer’s written instructions for use. The lid should be lifted up and toward the person opening the container and away from the container.
   1. The lid should be inspected for the integrity of the filter or valve and the integrity of the filter or valve and the gasket.
   2. The container contents should be considered contaminated if the filter is damp, dislodged, has holes, tears, or punctures.

iv. The scrubbed team member should avoid contacting the unsterile surfaces of the table or container while lifting the inner basket(s) out and above the container. Before the instruments are placed on the sterile field, the internal chemical indicator should be examined for the appropriate color change and the inside surface of the container inspected for debris, contamination, or damage.

f. Medications and sterile solutions (eg, normal saline) should be transferred to and handled on the sterile field using sterile technique.
   i. Medications and solutions should be visually inspected immediately before transfer to the sterile field and should not be used if the expiration date has passed or if there is any indication that the medication or solution has been compromised (eg, discoloration, particulate formation).
   ii. Sterile transfer devices (eg, sterile vial spike, filter straw, plastic catheter) should be used when transferring medications or solutions to the sterile field.
   iii. When solutions are dispensed to the sterile field, the entire contents of the container should be poured slowly into a solution receptacle that is placed near the sterile table’s edge or is held by a scrubbed team member and labeled immediately.
   iv. The edge of the container should be considered contaminated after the contents have been poured.
   v. The cap should not be replaced on opened medication or solution containers and any remaining fluids should be discarded.
   vi. Medications and solutions should be dispensed to the sterile field as close as possible to the time they will be used.
   vii. Stoppers should not be removed from vials for the purpose of pouring medications unless specifically designed for removal and pouring by the manufacturer.
   viii. Unused, opened irrigation or IV solutions should be discarded at the end of the procedure.

7. Sterile fields should be constantly monitored.
   a. Once created, a sterile field should not be left unattended until the operative or other invasive procedure is completed.
      i. The doors to the operating room or other procedure room should not be taped closed or otherwise secured as an alternative to monitoring the sterile field.
b. When there is an unanticipated delay, or during periods of increased activity, a sterile field that has been prepared and will not immediately be used may be covered with a sterile drape.

   i. When sterile fields are covered, they should be covered in a manner that allows the cover to be removed without bringing the part of the cover that falls below the sterile field above the sterile field. When covering the sterile field, two sterile “cuffed” drapes should be used as follows.

   ii. The first drape should be placed horizontally over the table or other area to be covered with the cuff at or just beyond the halfway point. The second drape should be placed from the opposite side of the table and the cuff positioned so that it completely covers the cuff of the first drape.

   iii. The drapes should be removed by placing hands within the cuff of the top drape and lifting the drape up and away from the table and toward the person removing the drape. The second drape should be removed from the opposite side in a similar manner.

c. Surgical and procedural personnel should observe for, recognize, and immediately correct breaks in sterile technique when preparing, performing, or assisting with operative or other invasive procedures and should implement measures to prevent future occurrences.

   i. When a break in sterile technique occurs, corrective action should be taken immediately unless the patient’s safety is at risk. When a break in sterile technique cannot be corrected immediately, corrective action should be taken as soon as it is safe for the patient.

d. If organic material (e.g., blood, hair, tissue, bone fragments) or other debris (e.g., bone cement, grease, mineral deposits) is found on an instrument or item in a sterile set, the entire set should be considered contaminated and surgical and procedural team members should take corrective actions immediately.

   i. Corrective actions should include, at a minimum, removing the entire set and any other items that may have come in contact with the contaminated item from the sterile field and changing the gloves of any team member who may have touched the contaminated item.

e. If an instrument in a sterile set is found assembled or clamped closed, the entire set should be considered contaminated and surgical and procedural team members should take corrective actions immediately.

8. All personnel moving within or around a sterile field should do so in a manner that prevents contamination of the sterile field.

   a. Scrubbed team members should remain close to the sterile field and touch only sterile areas or items.

      i. Scrubbed team members should not leave the sterile field to retrieve items from the sterilizer.
ii. Scrubbed team members should wear protective devices (eg, lead aprons) that reduce radiological exposure so they are not required to leave the sterile field when x-rays are taken.

b. Scrubbed team members should keep their hands and arms above waist level at all times.

c. Scrubbed team members should avoid changing levels and should be seated only when the entire procedure will be performed at that level.

d. When changing position with each other, scrubbed team members should turn back-to-back or face-to-face while maintaining distance from each other, the sterile field, and unsterile areas.

e. Unscrubbed personnel should face the sterile field on approach, should not walk between sterile fields or scrubbed persons, and should maintain a distance of at least 12 inches from the sterile field and scrubbed persons at all times.

f. Conversations in the presence of a sterile field should be kept to a minimum.

g. The number and movement of individuals involved in an operative or other invasive procedure should be kept to a minimum.

h. Limit operating room traffic and door opening when open sterile supplies are present and when preparing or performing surgery or other invasive procedures.

9. **Surgical and procedural team members should receive initial and ongoing education and competency validation on their understanding of the principles of and performance of the processes for sterile technique.**

a. Surgical and procedural team members should receive education and competency validation that addresses specialized knowledge and skills related to the principles and processes of sterile technique.

b. Surgical and procedural personnel should receive education that addresses human factors related to the principles and processes of sterile technique.

**Related Documents**

[Decision Tree](#)

**Definitions**

**Aseptic:** The absence of all pathogenic microorganisms. Synonym: sterile.

**Aseptic practices:** Patterns of behavior and processes that are implemented to prevent microbial contamination.

**Assisted gloving:** Technique used when changing a contaminated glove. One scrubbed team member assists another to don a new sterile glove by touching only the
outside of the new sterile glove when applying the glove to another scrubbed team member’s hand.

**Barrier material**: Material that minimizes or retards the penetration of microorganisms, particulates, and fluids.

**Closed assisted gloving**: Technique for donning sterile gloves during which the gown cuff of the team member being gloved remains at or beyond the fingertips. The glove to be donned is held open by a scrubbed team member, while the team member being gloved inserts his or her hand into the glove with the gown cuff touching only the inside of the glove.

**Closed gloving**: Technique used when donning surgical gloves. The scrubbed team member dons the gloves without assistance by keeping his or her hands inside the gown sleeves.

**Colony forming unit**: A measure of the number of viable bacterial cells in a sample.

**Event-related sterility**: Concept that the sterility of an item does not change with the passing of time but may be affected by particular events (ex., amount of handling), or environmental conditions (ex., temperature, humidity).

**Invasive procedure**: The surgical entry into tissues, cavities, or organs, or the repair of major traumatic injuries.

**Isolation technique**: Instruments and equipment that have contacted the inside of the bowel, or the bowel lumen, are no longer used after the lumen has been closed. Clean instruments are used to close the wound. The contaminated instruments and equipment are either removed from the sterile field or placed in a separate area that will not be touched by members of the sterile team. Synonyms: bowel technique, contamination technique.

**Open assisted gloving**: Technique for donning sterile gloves during which the gown sleeve of the team member being gloved is pulled up so that the gown cuff is at wrist level, leaving the fingers and hand exposed. The glove to be donned is held open by a scrubbed team member, while the team member being gloved inserts his or her hand into the glove without touching the outside of the glove.

**Open gloving**: Technique used to don sterile gloves without assistance. The cuff of each glove is everted to allow the team member to don sterile gloves by touching only the inner side of the glove with ungloved fingers and the outer sterile side of the glove with gloved fingers.

**Perforation indicator system**: A double gloving system comprising a colored pair of surgical gloves worn beneath a standard pair of surgical gloves. When a glove
perforation occurs, moisture from the surgical field seeps through the perforation between the layers of gloves, allowing the site of perforation to be more easily seen.

**Sterile**: The absence of all living microorganisms. Synonym: aseptic.

**Sterile field**: The area surrounding the site of the incision or perforation into tissue, or the site of introduction of an instrument into a body orifice that has been prepared for an invasive procedure. The area includes all working areas, furniture, and equipment covered with sterile drapes and drape accessories, and all personnel in sterile attire.

**Sterile technique**: The use of specific actions and activities to prevent contamination and maintain sterility of identified areas during operative or other invasive procedures.

**Surgical hand scrub**: Antiseptic hand wash or antiseptic hand rub performed preoperatively by surgical and procedural personnel to eliminate transient bacteria and reduce resident hand flora.

**References**

[1] **AORN Standards, Recommended Practices, and Guidelines**

[Surgical Services: Autoclaves Use](#)

**Approved by**

Nursing Surgical Practice Subcommittee

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**Revision History**

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<th>Date</th>
<th>Synopsis of Change</th>
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<td>3/20/17</td>
<td>Annual review. Changed from a Policy to a Procedure.</td>
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