



Best Practice Guidelines

Guideline Name:
Surgical Skin Preparation

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Approval Signature:

Date:
 May 2011

Supercedes:

1. **PURPOSE:**

- 1.1. To reduce the resident and transient microbial counts at the surgical site immediately prior to making the surgical incision.
- 1.2. To minimize rebound microbial growth during the intraoperative and postoperative period.
- 1.3. To reduce the risk of post surgical site infection.
- 1.4. To prevent injury to the patient during surgical skin preparation.

2. **GUIDELINES:**

2.1 The surgical skin prep shall be performed using an Infection Prevention and Control Program approved antiseptic agent. (See Appendix A for Mechanism of Action, Contraindications and Precautions of the various skin prepping agents). Whenever possible the recommendation is for use of a Chlorhexidine-Alcohol prepping solution; however the ultimate choice of the agent should be based upon the agent's efficacy, patient's tolerance to the product and the user's acceptance of the agent.

2.2 Antiseptic agents shall:

- have any unused portion of opened bottles, not containing preservative (ie. 4% alcohol) immediately discarded after use;
- have bottles dated if containing preservative (ie. 4% alcohol). Bottles shall be discarded after 30 days or per manufacturer's recommendations;
- not be warmed, as this may alter the chemical properties and equilibrium of the solution causing burns;
- be applied by non-scrubbed personnel;
- be applied in a manner to prevent pooling:
 - in skin creases;
 - under the patient;
 - around a tourniquet;
 - under an electrosurgical dispersive electrode; or
 - near EKG electrodes; and
- not remove surgical site markings when surgical skin prep is performed.

2.3 Before the skin preparation of a patient is initiated the skin should be free of gross contamination (dirt, soil or any other debris). Patients with visibly soiled/unclean skin shall have a scrub and paint prep performed.

2.4 Foley catheter insertion, for procedures that do not require a perineal prep, should be performed prior to the surgical skin prep using a separate set-up.

2.5 Perioperative personnel should be familiar with the flammability characteristics of all antiseptic agents used in the perioperative area.

2.6 When flammable antiseptic agents are used, they should be packaged in small quantities appropriate for single applications or be prepackaged in a unit dose. Use of these agents shall be communicated to all staff participating in the surgical procedure.

2.7 Prior to performing the surgical skin prep:

- ensure that the antiseptic agent is compatible with the site to be prepped (See Appendix A);
- perform a preoperative skin assessment of the area to be prepped including any areas where solution may pool;
- assess patient for allergy or sensitivity to antiseptic agent;
- remove all body jewellery that pierces the skin in the surgical area to be prepped and cleanse the pierced site with alcohol;
- confirm type of incision to be performed;
- perform hair removal:
 - only if necessary;
 - as close as possible to the surgical start time;
 - using clippers (unless contraindicated); and
 - ideally not in OR theatre.

2.8 When performing the surgical skin prep:

- 2.8.1 Use lint free cloths, sponges and applicators.
- 2.8.2 Always prep from “clean to soiled” areas taking care not to transfer microorganisms from the periphery back to the proposed incision site. “Double dipping” into the antiseptic solution with a contaminated sponge may lead to microorganisms being brought back to the proposed incision site.
- 2.8.3 Do not “back track” over an area that has already been prepped with the same prep sponge.
- 2.8.4 Prep delicate areas carefully (i.e. carotid arteries, occluded vessels, tumors, traumatic wounds, distended abdomens, eyes, ears, trachea, and necrotizing fasciitis site).
- 2.8.5 The prepped area should extend to an area large enough to accommodate potential shifting of the drape fenestration, extension of the incision, the potential for additional incisions, and all potential drain sites.
- 2.8.6 **Do not blot or wipe off prepping solution. Allow prepping solution to COMPLETELY DRY PRIOR to draping.**

2.9 Post surgery:

- 2.9.1 Perform a postoperative skin assessment of the prepped area, including any areas where solution may have pooled.
- 2.9.2 Remove antiseptic agents EXCEPT CHLORHEXIDINE from patient unless contraindicated by manufacturer of the antiseptic agent.

3. **PROCEDURE:**

3.1 **GENERAL STEPS FOR ALL TYPES OF SKIN PREPS:**

- 3.1.1 Perform hand hygiene prior to any contact with the patient.
- 3.1.2 Expose only the area to be prepped (2.8.5) to ensure privacy and warmth of the patient.
- 3.1.3 Ensure surgical site is marked as per WRHA policy 110.220.020 “Correct Site, Correct Procedure and Correct Patient for Surgical Procedures (Identification of)”.
- 3.1.4 Perform scrub (see section 3.4) and/or paint (see section 3.5) as applicable for the type of surgery being performed, using principle of clean to dirty.

3.2 **Contaminated Areas:**

- 3.2.1 Prep the most contaminated area last using separate sponges.
- 3.2.2 Sponges used to prep open wounds, sinuses, ulcers, intestinal stomas, the vagina or anus should be used once and then discarded.
- 3.2.3 Peripheral intact skin is prepared before open wounds and body orifices.
- 3.2.4 Retract foreskin if prep involves the penis; pull foreskin back once prep is completed to prevent compromise to circulation.

- 3.2.5 When performing a surgical skin prep for necrotizing fasciitis:
- if skin is intact perform as usual, however treat intact skin carefully due to loss of structure under the skin; or
 - if skin is broken consider the open area to be contaminated and prep the open area with a separate sponge after prepping the surrounding area.

3.3 Hair removal:

- 3.3.1 Wash hands and don clean disposable gloves.
- 3.3.2 Use a single use clipper or a clipper with a reusable handle and disposable head.
- 3.3.3 Stroke against the direction that the hair is growing using short strokes. Short hair stubble will still be evident after clipping.
- 3.3.4 Remove any stray clipped hair with tape or other adhesive type product (ie adhesive glove designed for picking up hair) to prevent contamination of the surgical site.
- 3.3.5 Discard disposable clipper head into an appropriate sharps container.
- 3.3.6 Clean and disinfect the reusable clipper handle after use following manufacturers' instructions.
- 3.3.7 Razor shaves are not recommended.

3.4 Scrub and Paint Surgical Skin Prep:

- 3.4.1 Perform applicable steps as per section 2: *Guidelines* and section 3.1: *General Steps*.
- 3.4.2 Mix an appropriate amount of antiseptic scrub solution with an appropriate amount of warm sterile water in a basin. This allows for sudsing action of the antiseptic scrub solution.
- 3.4.3 Don sterile gloves.
- 3.4.4 Tuck drip towels under patient as necessary to prevent pooling of solution:
- in skin/anatomical creases;
 - under the patient;
 - around a tourniquet;
 - between the patient and positioning devices;
 - under an electrosurgical dispersive electrode; or
 - near EKG electrodes
- 3.4.5 Mechanically and chemically cleanse the skin in a linear and circular motion as per skin antiseptic manufacturers' instructions.
- 3.4.6 Rinse cleansed area using sterile gauze moistened with sterile water.
- 3.4.7 Blot cleansed area dry with a sterile towel as follows:
- Open a towel fully and place it over the site; and
 - Lift carefully without rubbing or dragging the fabric over the cleaned area.
- 3.4.8 Perform paint as per 3.5.
- 3.4.9 Remove drip towels by grasping the edges in a manner to prevent the towel edges from contaminating the prepped skin.

3.5 Paint Only Surgical Skin Prep:

- 3.5.1 Perform applicable steps as per section 2: *Guidelines* and section 3.1: *General Steps*.
- 3.5.2 Don sterile gloves unless the applicator is of sufficient length to prevent the antiseptic and patient's skin from contact with the nonsterile glove. (AORN:2009)
- 3.5.3 Tuck drip towels under patient as necessary to prevent pooling of solution:
- in skin/anatomical creases;
 - under the patient;
 - around a tourniquet;

- between the patient and positioning devices;
 - under an electrosurgical dispersive electrode; or
 - near EKG electrodes.
 - 3.5.4 Begin at the incision site; paint the skin from incision to periphery or according to manufacturer's recommendations.
 - 3.5.5 Paint area once or as per manufacturer's recommendations.
 - 3.5.6 **Do not blot or wipe off prepping solution. Allow prepping solution to air dry PRIOR to draping.**
 - 3.5.7 Remove drip towels by grasping the edges in a manner to prevent the towel edges from contaminating the prepped skin.
- 3.6 **Packaged Single Unit Applicator** (alcohol combination antiseptic agents)
- 3.6.1 Perform applicable steps as per section 2: *Guidelines* and section 3.1: *General Steps*.
 - 3.6.2 Don sterile gloves unless the applicator is of sufficient length to prevent the antiseptic and patient's skin from contact with the nonsterile glove. (AORN:2009)
 - 3.6.3 Tuck drip towels under patient as necessary to prevent pooling of solution:
 - in skin/anatomical creases;
 - under the patient;
 - around a tourniquet;
 - between the patient and positioning devices;
 - under an electrosurgical dispersive electrode; or
 - near EKG electrodes.
 - 3.6.4 Perform scrub as per 3.4 if applicable.
 - 3.6.5 Follow manufacturers' instructions for use of prep applicator.
 - 3.6.6 **Do not blot or wipe off prepping solution. Allow prepping solution to air dry PRIOR to draping.**
 - 3.6.7 Remove drip towels by grasping the edges in a manner to prevent the towel edges from contaminating the prepped skin.

Head and Neck Preps:

- 3.7 **Scalp Prep:**
- 3.7.1 Perform applicable steps as per section 2: *Guidelines* and section 3.1: *General Steps*.
 - 3.7.2 Management of hair:
 - hair removal may or may not occur;
 - long hair may be parted along the incision line and hair secured away from the incision with elastic bands; or
 - short hair may have a thin strip of hair clipped along the incision line.
 - 3.7.3 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
 - 3.7.4 Ensure prep solution penetrates through the hair to the scalp and covers all the hair and scalp in the area to be prepped.
 - 3.7.5 Area to be prepped will vary dependent on incision site.
- 3.8 **Eye Prep:**
- 3.8.1 Do not use Chlorhexidine or alcohol solutions. (See Appendix A).
 - 3.8.2 Perform applicable steps as per section 2: *Guidelines* and section 3.1: *General Steps*.
 - 3.8.3 Ensure a cap or towel is over the patient's head to keep hair tucked away. The hairline is considered a contaminated area.
 - 3.8.4 Don sterile gloves.
 - 3.8.5 Tuck sterile drip towels under patient as necessary to prevent pooling of solution.

- 3.8.6 Using just one stroke over eyelashes, clean eyelashes of operative eye with cotton-tipped applicator dipped in 10% povidone iodine prep solution. Do not scrub lashes. Do not touch cornea.
- 3.8.7 Going from medial to lateral canthus, paint operative eye, cheek, forehead and nose on correct side, using ½ circle motions above and below eye
- 3.8.8 Instill a 5% povidone solution into the eye. (Note: solution of equal parts of BSS and 10% povidone iodine solution make a 5% solution)
- 3.8.9 Cover the eye with a 4x4 gauze and massage eye gently especially the fornices.
- 3.8.10 **Repeat** going from medial to lateral canthus, paint operative eye, cheek, forehead and nose on correct side, using ½ circle motions above and below eye.
- 3.8.11 Do not blot solution off of the skin. Allow to air dry.
- 3.8.12 For patients allergic to iodine, use chlorhexidine, however DO NOT touch the mucosa or the cornea. Instill BSS into the eye.

3.9 **Face Prep:**

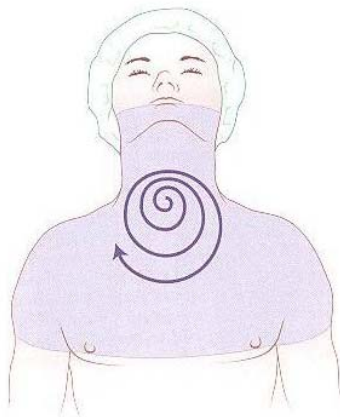
- 3.9.1 Do not use chlorhexidine on eyes, ears or mucous membranes. (See Appendix A).
- 3.9.2 Ensure a cap or towel is over the patient's hair, and use waterproof tape if necessary to ensure hair is tucked away. The hairline is considered a contaminated area.
- 3.9.3 Perform paint as per 3.5.
- 3.9.4 Begin prep at incision site and extend to the periphery of hairline and neck.
- 3.9.5 Prep the external ear if necessary as per 3.10.
- 3.9.6 Do not remove eyebrows.

3.10 **Ear Prep:**

- 3.10.1 Do not use chlorhexidine or alcohol solutions in the ear canal. (See Appendix A).
- 3.10.2 Ensure a cap or towel is over the patient's hair, and use waterproof tape if necessary to ensure hair is tucked away. The hairline is considered a contaminated area.
- 3.10.3 Place absorbent cotton into the external ear canal.
- 3.10.4 Perform paint as per 3.5.
- 3.10.5 Cleanse the external ear.
- 3.10.6 Extend the prep to the edge of the hairline, face and jaw.
- 3.10.7 Remove the absorbent cotton from the external ear canal.

3.11 **Neck Prep:**

- 3.11.1 Ensure a cap or towel is over the patient's hair and use waterproof tape if necessary to ensure hair is tucked away. The hairline is considered a contaminated area.
- 3.11.2 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.11.3 The area to be prepped includes the neck laterally to the table line and up to the mandible, tops of the shoulders, and chest almost to the nipple line.



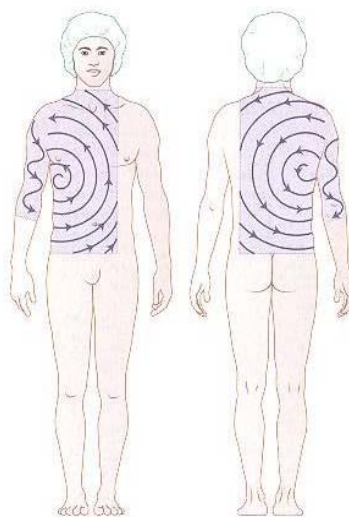
Torso Preps:

3.12 Shoulder Prep:

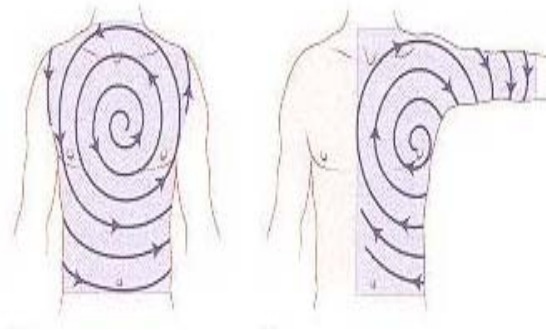
- 3.12.1 Elevate the patient's arm prior to proceeding with prep. Be careful not to pull the patient's shoulder laterally to expose the scapular area to avoid dislocation and further injury to the patient.
- 3.12.2 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.12.3 Area to be prepped includes the chest, neck and shoulder, upper arm, scapula and axilla on the affected side. Prep the axilla last. Hand may be excluded if surgeon wraps in occlusive drape after the prep.

3.13 Chest/Breast Prep:

- 3.13.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.13.2 Area to be prepped includes from the top of the shoulder to below the diaphragm and from the edge of the non-operative breast to the table-level of the operative side, including the upper arm to elbow circumferentially and the axilla of the operative side.
- 3.13.3 Prep the axilla last.
- 3.13.4 Skin prep for thoracic surgery requires an extension bilaterally of the boundaries for radical breast surgery (see diagrams).
- 3.13.5 Prep both sides of the chest for a bilateral procedure.
- 3.13.6 If incision is in axilla, use a separate sponge for the axilla.
- 3.13.7 For a breast biopsy, prep the breast from the incision area, to include an area beyond the drape fenestration.

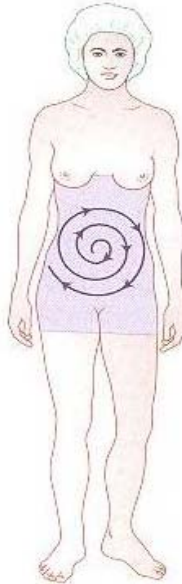


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3.14 Abdominal Prep:

- 3.14.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.14.2 Umbilicus is prepped first using sterile cotton-tipped applicators dipped in antiseptic solution. Discard applicators after use.
- 3.14.3 Area to be prepped will vary depending on surgery to be performed (ie appendectomy, inguinal hernia repair). Area that may be required to be included is from nipple line to upper 1/3 of thighs; table level left to table level right (ie. Laparoscopic cholecystectomy).



3.15 Back Prep:

- 3.15.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.15.2 Back procedure: area to be prepped includes to border of the OR table on both sides.
- 3.15.3 Back procedure if patient is prone: area to be prepped includes from neck to sacrum.

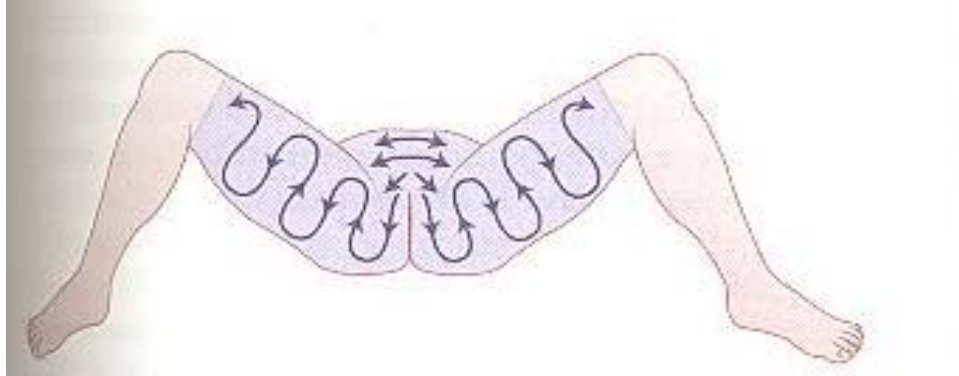
3.16 Flank:

- 3.16.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.16.2 Area to be prepped includes shoulder to iliac crest, back and midabdominal wall. Frontal prep depends on accessibility when patient is in lateral position.

3.17 Vaginal Prep:

- 3.17.1 Do not use Chlorhexidine or alcohol solutions. (See appendix A).
- 3.17.2 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.17.3 Place drip towel or impervious drape under buttocks to prevent prep solution from pooling under the patient's coccyx. Ensure towel or impervious drape is removed following completion of the prep.

- 3.17.4 First: prep pelvis, labia, perineum, and thighs as follows:
- Start prep at the pubis and prep to iliac crest using back and forth strokes.
 - Prep labia majora using downward strokes, including perineum.
 - Use fresh sponge to prep inner thigh of first leg starting at labia majora and moving laterally using back and forth strokes. Discard sponge when periphery reached.
 - Use fresh sponge to prep inner thigh of second leg starting at labia majora and moving laterally using back and forth strokes. Discard sponge when periphery reached.
- 3.17.5 Next: prep vaginal vault using a separate sponge mounted on a forcep.
- 3.17.6 Prep anus last.



3.18 Abdominal/Perineal Prep:

- 3.18.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.18.2 Perineal and abdominal prep shall not be performed simultaneously.
- 3.18.3 First: Prep perineal area including pelvis, labia, perineum, anus and thighs as per 3.17.
- 3.18.4 Next: Using a separate prep set-up, prep the abdomen as per section 3.14.

3.19 Perianal Prep:

- 3.19.1 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.19.2 Prep area surrounding anus first. The anus is prepped last being the most contaminated area.
- 3.19.3 Begin prep outside anal mucosa and extend outward in all directions.
- 3.19.4 Prep the anus last – do not penetrate the anus itself.

Extremity Skin Preps:

3.20 Extremities: (General)

- 3.20.1 Place a drip sheet under the operative arm/leg prior to prep. Ensure drip sheet is removed after completion of surgical skin prep.
- 3.20.2 Elevate limb for prep.
- 3.20.3 A towel tucked around a tourniquet cuff absorbs excess solution.
- 3.20.4 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.

3.21 Upper Extremities: Upper Arm:

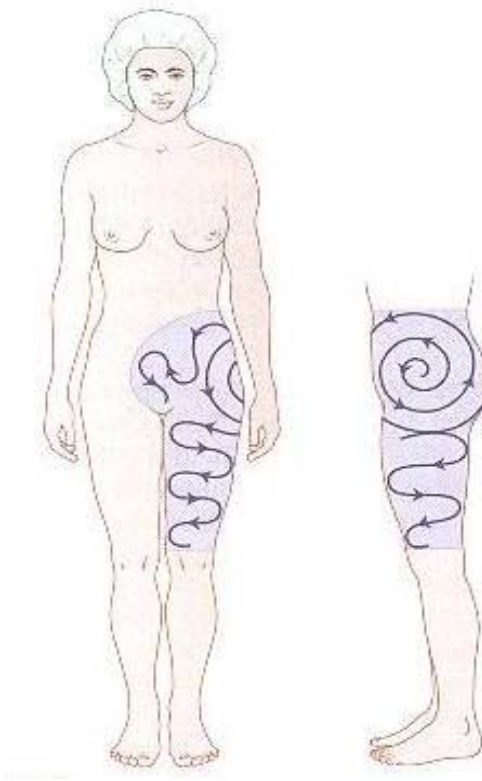
- 3.21.1 Perform Extremity General steps as per 3.20.
- 3.21.2 The area to be prepped includes: entire circumference of the arm to the mid-forearm, over the shoulder, scapula and axilla (prep last).
- 3.21.3 Begin the prep at the incision, prep to the proximal and distal boundaries.
- 3.21.4 An extremity prep may be done in two stages to provide adequate support to joints and to ensure that all areas are prepped.

3.22 Upper Extremity: Hand

- 3.22.1 Perform Extremity General steps as per 3.20.
- 3.22.2 Hand and fingernails may require pre-cleaning prior to skin prep.
- 3.22.3 The area to be prepped includes: the hand to mid forearm.
- 3.22.4 Begin prep at the incision site and complete one side of the hand, continue prep on the opposite side of the hand, working in circular motion towards the elbow.
- 3.22.5 During the prep, the nurse wearing sterile gloves may hold the patient's painted fingers to assist in manipulation of hand during the prep.

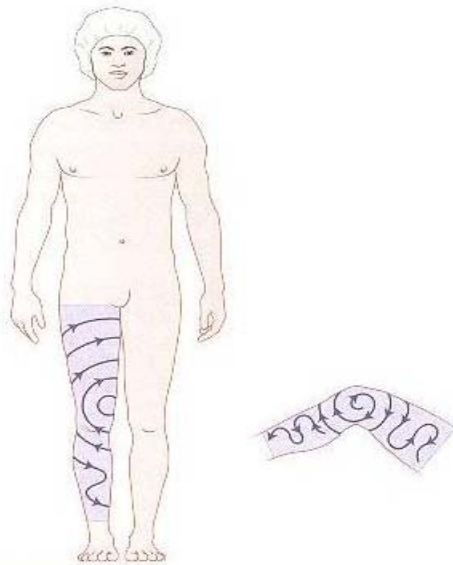
3.23 Lower Extremities: Hip:

- 3.23.1 Perform Extremity General steps as per 3.20
- 3.23.2 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.23.3 Area to be prepped includes: abdomen on the affected side, thigh to below the knee, the buttocks on the affected side, the groin, and the pubis.
- 3.23.4 Begin the prep at the incision site. Proceed to periphery which is abdomen midline, inferior rib cage, below knee. Prep the groin and perineum last.



3.24 Lower Extremities: Leg and Foot

- 3.24.1 Perform Extremity General steps as per 3.20.
- 3.24.2 Perform scrub as per 3.4 and/or paint as per 3.5 as applicable.
- 3.24.3 Elevate limb.
- 3.24.4 Area to be prepared may vary depending on surgery to be performed.
- 3.24.5 Prepping the foot should include a scrub prior to paint in order to reduce the bacterial counts between the toes and under toenails.
- 3.24.6 If top of leg prepped, place a drip towel between the groin and the fold of the upper thigh to prevent pooling in the area.
- 3.24.7 Prepping for knee surgery:
 - foot may be contained within a sterile drape;
 - with one prep sponge, prep circumferentially starting at incision site and proceed with prep to tourniquet.
 - with a new sponge, prep circumferentially starting at incision site and prep to ankle.



Special Preps:

3.25 Stomas:

- 3.25.1 Seal off with a sterile adhesive drape, if not part of the surgical site. Cover the stoma with sterile clear plastic adhesive dressing to prevent fecal material from entering the surgical wound.
- 3.25.2 Prep gently and last if stoma is part of the surgical incision.
- 3.25.3 Place a soaked sponge over the stoma before peripheral tissues are prepped and discard at completion of prep.
- 3.25.4 Should a surgeon request to pack a stoma, ensure that a radiopaque Betadine-soaked sponge is used.

3.26 Traumatic Wounds:

- 3.26.1 Wear appropriate PPE (gloves, mask and eyewear).
- 3.26.2 Use only normal saline to prep burned, denuded or traumatized skin.
- 3.26.3 Position drip towels/drip sheet as appropriate.
- 3.26.4 Irrigate wound as necessary with sterile normal saline. Use drip sheet under the wound.
- 3.26.5 Do not use irritating solutions on denuded areas.
- 3.26.6 May need to cover the wound with sterile gauze while prepping surrounding areas.
- 3.26.7 Prep surrounding intact skin as per guidelines and 3.1.

3.27 Graft Sites

- 3.27.1 Use separate set-ups for recipient and donor sites.
- 3.27.2 Prep donor site first.
- 3.27.3 Use a colorless antiseptic on the donor site so that the graft vascularity may be evaluated post op.

4. **DOCUMENTATION:**

4.1. The following should be documented in the patient's health record:

- condition of the skin at the operative site pre and post operatively;
- method of hair removal, if used;
- name and concentration of antiseptic agent(s) used;
- any skin reaction that occurred; and
- name of person performing the skin preparation.

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Appendix A
Activity and Considerations for Preoperative skin Preparation Antiseptics
(Adopted from 2008 AORN Perioperative Standards and Recommended Practices)

Antiseptic Agent	Mechanism of Action	Gram -	Gram +	Viruses	Rapidity of Action	Persistent/Residual Activity	Contraindications	Precautions
Chlorhexidine Gluconate with Alcohol (Chloraprep™ or Soluprep™)	Disrupts cell membrane and denatures proteins	Excellent	Excellent	Good	Excellent	Excellent	<ul style="list-style-type: none"> • Do not use on eye may cause corneal damage • Do not use on ear as may cause deafness if in contact with inner ear • Do not use on mucous membranes • Contraindicated if known hypersensitivity to drug or any ingredient • Contraindicated for lumbar puncture and use on meninges. 	<ul style="list-style-type: none"> • Flammable • Allow to dry completely prior to draping patient
Chlorhexidine Gluconate (2%, 4%, 0.5% with 70% alcohol, 2% with 70% alcohol)	Disrupts cell membrane	Excellent	Good	Good	Moderate	Excellent	<ul style="list-style-type: none"> • Do not use on eye may cause corneal damage • Do not use on ear as may cause deafness if in contact with inner ear • Use with caution on mucous membranes • Contraindicated if known hypersensitivity to drug or any ingredient • Contraindicated for lumbar puncture and use on meninges. 	<ul style="list-style-type: none"> • Prolonged skin contact may cause irritation in sensitive individuals. • Body lotions may nullify the residual bacteriostatic properties • Not tested in children under 2 months of age. • Prolonged effect inhibited if combined with iodine preparations.

Antiseptic Agent	Mechanism of Action	Gram -	Gram +	Viruses	Rapidity of Action	Persistent/ Residual Activity	Precautions/ Contraindications	Precautions
Iodophor with alcohol (Duraprep™)	Oxidation/ substitution with free iodine and denatures proteins	Excellent	Excellent	Good	Excellent	Moderate	<ul style="list-style-type: none"> Do not use on eye or ear as may cause corneal or nerve damage Do not use on mucous membranes Contraindicated if sensitivity to povidone-iodine (Shellfish or contrast media allergies are not a contraindication) 	<ul style="list-style-type: none"> Flammable Allow to dry completely prior to draping patient
Iodine/ Iodophors (Povidone-Iodine 7.5%, 10%, tincture of iodine 1% available iodine with 50% alcohol)	Oxidation/ substitution with free iodine	Excellent	Good	Good	Moderate	Minimal	<ul style="list-style-type: none"> May be used on eye or ear, however is a moderate ocular irritant May be used on mucous membranes Contraindicated if sensitivity to povidone-iodine (Shellfish or contrast media allergies are not a contraindication) 	<ul style="list-style-type: none"> Prolonged skin contact may cause irritation. May cause iodism in susceptible individuals Avoid use in neonates Inactivated by blood and debris
Alcohol (Isopropyl or Ethyl Alcohol)	Denatures Protein	Excellent	Excellent	Good	Excellent	None	<ul style="list-style-type: none"> Do not use on eye or ear as may cause corneal or nerve damage Do not use on mucous membranes 	<ul style="list-style-type: none"> Flammable Does not penetrate organic material Optimum concentration is 60% - 90% (isopropyl alcohol) or 50% (ethyl alcohol)