



POWERPICC<sup>®</sup>  
PROVENA<sup>™</sup>  
CATHETER

**Nursing  
Polyurethane  
Catheter**

**with Microintroducer**

Revised date: **January 2018**

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**BARDD**

ACCESS SYSTEMS

## Product Description

A family of peripherally inserted central catheters made from specially-formulated and processed medical grade materials. PowerPICC® Provena™ Catheters have a kink resistant, reverse tapered design. All lumens of the 3F Single Lumen and 4F Dual Lumen catheters are appropriate for use with Central Venous Pressure (CVP) monitoring. Catheters are packaged in a kit with accessories for reliable long (greater than 30 days) or short (less than 30 days) term vascular access, as clinically indicated.

**Sterilized by ethylene oxide. Do not re-sterilize.**

## Indications

The PowerPICC® Provena™ Catheter is indicated for short or long term peripheral access to the central venous system for intravenous therapy, blood sampling, power injection of contrast media, and allows for central venous pressure monitoring. For central venous pressure monitoring, it is recommended that a catheter lumen of 20 gauge or larger be used.

Catheter Size	Maximum Flow Rate
3 F Single Lumen	3 mL / sec
4 F Dual Lumen	5 mL / sec

## Contraindications

The device is contraindicated whenever:

- The presence of device-related infection, bacteremia, or septicemia is known or suspected.
- The patient's body size is insufficient to accommodate the size of the implanted device.
- The patient is known or is suspected to be allergic to materials contained in the device.
- Past irradiation of prospective insertion site.
- Previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
- Local tissue factors will prevent proper device stabilization and/or access.

## Warnings

### General Warnings

- When using alcohol or alcohol-containing antiseptics with polyurethane PICCs, care should be taken to avoid prolonged or excessive contact. Solutions should be allowed to completely dry before applying an occlusive dressing. Chlorhexidine gluconate and/or povidone iodine are the suggested antiseptics to use.
- Alcohol should not be used to lock, soak or de clot polyurethane PICCs because alcohol is known to degrade polyurethane catheters over time with repeated and prolonged exposure.
- Do not use the catheter if there is any evidence of mechanical damage or leaking. Damage to the catheter may lead to rupture, fragmentation, possible embolism and surgical removal.
- If signs of extravasation exist, discontinue injections. Begin appropriate medical intervention immediately.
- Do not wipe the catheter with acetone-based solutions, tincture of iodine or polyethylene glycol-containing ointments. These can damage the polyurethane material if used over time.
- Intended for single use. DO NOT REUSE. Reuse and/or repackaging may create a risk of patient or user infection, compromise the structural integrity and/or essential material and design characteristics of the device, which may lead to device failure, and/or lead to injury, illness or death of the patient.
- The fluid level in the catheter will drop if the catheter connector is held above the level of the patient's heart and opened to air. To help prevent a drop in the fluid level (allowing air entry) while changing injection caps, hold the connector below the level of the patient's heart before removing the injection cap.
- Central Venous Pressure (CVP) monitoring should always be used in conjunction with other patient assessment metrics when evaluating cardiac function.

### Placement Warnings

- If the artery is entered, withdraw the needle and apply manual pressure for several minutes.
- Place a finger over the orifice of the sheath to minimize blood loss and risk of air aspiration. The risk of air embolism is reduced by performing this part of the procedure with the patient performing the Valsalva maneuver until the catheter is inserted into the sheath.
- This is not a right atrium catheter. Avoid positioning the catheter tip in the right atrium. Placement or migration of the catheter tip into the right atrium may cause cardiac arrhythmia, myocardial erosion or cardiac tamponade. The risk of these complications may be more likely in neonatal patients.
- Ensure that the stylet tip does not extend beyond the trimmed end of the catheter. Extension of the stylet tip beyond the catheter end may result in vessel damage, stylet damage, difficult removal, stylet tip separation, potential embolism and/or risk of patient injury.

### Power Injection Warnings

- Exceeding the maximum power injection flow rate or setting the power injector pressure limit above 300 psi may result in catheter failure and/or catheter tip displacement.
- Failure to ensure patency of the catheter prior to power injection studies may result in catheter failure.
- Failure to warm contrast media to body temperature prior to power injection may result in catheter failure.
- Use of lumens not marked "Power Injectable" for power injection of contrast media may cause failure of the catheter.

- Power injector machine pressure limiting feature may not prevent over-pressurization of an occluded catheter, which may cause catheter failure.
- PowerPICC® Provena™ Catheter indication for power injection of contrast media implies the catheter's ability to withstand the procedure, but does not imply appropriateness of the procedure for a particular patient. A suitably trained clinician is responsible for evaluating the health status of a patient as it pertains to a power injection procedure.

#### **Sherlock™ Tip Location System (TLS) Warnings** (Applicable to kits with Sherlock™ TLS Stylet)

- Ensure that the stylet tip does not extend beyond the trimmed end of the catheter. Extension of the stylet tip beyond the catheter end, combined with kinking and excessive forces may result in vessel damage, stylet damage, difficult removal, stylet tip separation, potential embolism and risk of patient injury.

## **Precautions**

### **General Precautions**

- Sterilized by ethylene oxide. Do not re-sterilize.
- Carefully read and follow all instructions prior to use.
- **Caution:** Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.
- **Caution:** After use, this product may be a potential biohazard. Handle and dispose of in accordance with accepted medical practice and applicable local, state and federal laws and regulations.
- Only qualified health care practitioners should insert, manipulate and remove these devices.
- Follow Universal Precautions when inserting and maintaining the catheter.
- Follow all contraindications, warnings, cautions, precautions and instructions for all infusates, including contrast media, as specified by their manufacturer.
- Precautions are intended to help avoid catheter damage and/or patient injury.
- Use aseptic techniques whenever the catheter lumen is opened or connected to other devices.
- Examine the package carefully before opening to confirm its integrity and that the expiration date has not passed. The device is supplied in a sterile package and is non-pyrogenic. Do not use if package is damaged, opened or the expiration date has passed.
- Inspect kit for inclusion of all components.
- Accessories and components used in conjunction with this device should incorporate luer lock connections.
- **DO NOT USE A SYRINGE SMALLER THAN 10 mL TO FLUSH AND CONFIRM PATENCY.** Patency should be assessed with a 10 mL syringe or larger filled with preservative-free 0.9% sodium chloride (sterile saline). Upon confirmation of patency, administration of medication should be given in a syringe appropriately sized for the dose. Do not infuse against resistance.
- Prolonged infusion pressure greater than 25 psi may damage blood vessels or viscus.
- Some patients may be hypersensitive to heparin or suffer from heparin induced thrombocytopenia (HIT) and these patients must not have their catheter locked with heparin flush solution.
- As reported in literature, anaphylactic or anaphylactic-like reactions occur in a small percentage of the population during placement<sup>1</sup>, positioning<sup>1</sup>, flushing<sup>2</sup> of central venous catheters or cleaning of catheter exit site<sup>3</sup>. These reactions are reported in association with insertion, rapid flushing, or manipulation of the catheter and/or use of chlorhexidine gluconate (CHG) in some patients. Be aware of the potential symptoms or signs of these reactions and take precautionary steps as dictated by institution protocol for their prevention or treatment.
- If CHG allergy is suspected, confirmatory testing is recommended<sup>4,5</sup>.
- Secure additional extension sets per hospital protocol. Refrain from having unsupported extension sets that could put stress on the catheter extension leg(s).

### **Precautions Related to Device Placement Procedure**

- The PowerPICC® Provena™ Catheter features a reverse-taper catheter design. Placement of larger catheters at or below antecubital fossa may result in an increased incidence of phlebitis. Placement of the PowerPICC® Provena™ Catheter above antecubital fossa is recommended.
- Avoid placement or securing of the catheter where kinking may occur, to minimize stress on the catheter, patency problems or patient discomfort.
- Flush each lumen of the catheter with sterile saline prior to use. Catheter stylet must be wetted prior to stylet repositioning or withdrawal.
- Do not advance the guidewire past the axilla without fluoroscopic guidance or other tip locating methods.
- If the guidewire must be withdrawn while the needle is inserted, remove both the needle and wire as a unit to prevent the needle from damaging or shearing the guidewire.
- Never use force to remove the stylet. Resistance can damage the catheter. If resistance or bunching of the catheter is observed, stop stylet withdrawal and allow the catheter to return to normal shape. Withdraw both the catheter and stylet together approximately 2 cm and reattempt stylet removal. Repeat this procedure until the stylet is easily removed. Once the stylet is out, advance the catheter into the desired position.
- Avoid accidental device contact with sharp instruments and mechanical damage to the catheter material. Use only smooth-edged atraumatic clamps or forceps.
- Avoid perforating, tearing or fracturing the catheter when using a guidewire.
- Avoid sharp or acute angles during implantation which could compromise the patency of the catheter lumen.
- Do not use scissors to remove dressing to minimize the risk of cutting catheter.
- Do not suture through or around any part of the catheter's tubing (shaft or extension legs). If using sutures to secure catheter **USE THE SUTURE WINGS** and make sure they do not occlude, puncture, or cut the catheter.
- The catheter must be secured in place to minimize risk of catheter breakage and embolization.
- To reduce potential for blood backflow into the catheter tip, always remove needles or syringes slowly while injecting the last 0.5 mL of flush solution.

- Do not withdraw dilator from microintroducer sheath until sheath is within vessel to minimize the risk of damage to sheath tip.
- Do not pull apart the portion of the sheath that remains in the vessel. To avoid vessel damage, pull back the sheath as far as possible and tear the sheath only a few centimeters at a time.
- Do not cut guidewire to alter length.
- Do not insert stiff end of guidewire into vessel as this may result in vessel damage.
- Keep sufficient guidewire length exposed at hub to allow for proper handling. A non-controlled guidewire can lead to wire embolism.
- Do not use excessive force when introducing guidewire or microintroducer as this can lead to vessel perforation and bleeding.
- Never leave stylet or stiffening wire in place after catheter insertion; injury may occur. Remove stylet or stiffening wire and T-lock (as applicable) after insertion.
- The stylet or stiffening wire needs to be well behind the point the catheter is to be cut. NEVER cut the stylet or stiffening wire.
- Do not reinsert needle into IV catheter to minimize the risk of the needle damaging or shearing the IV catheter.
- Do not clamp extension leg when stylet or stiffening wire is in catheter to minimize the risk of component or catheter damage.

#### **Sherlock™ Tip Location System Precautions** (Applicable to kits with Sherlock™ TLS Stylet)

- Temporary disruption of the cardiac rhythm device may occur if the Sherlock™ TLS stylet passes within 1 cm of the cardiac rhythm device. Use care if placing the Sherlock™ TLS stylet on the same side as the cardiac rhythm device.
- The stylet or stiffening wire needs to be well behind the point the catheter is to be cut. NEVER cut the stylet.
- The detector identifies the position of the stylet tip. Ensure that the stylet tip remains inside and within 1 cm from the end of the catheter tip. Failure to do so could result in catheter malposition.
- Never use excessive force to remove the stylet as it may damage the device.

### **Possible Complications**

The potential exists for serious complications including the following:

- |                                     |  |  |
|-------------------------------------|--|--|
| • Air Embolism                      | • Extravasation  | • Myocardial Erosion   |
| • Bleeding                          | • Fibrin Sheath Formation  | • Perforation of Vessels or Viscus   |
| • Brachial Plexus Injury            | • Hematoma   | • Phlebitis  |
| • Cardiac Arrhythmia                | • Heparin Induced Thrombocytopenia   | • Spontaneous Catheter Tip Malposition or Retraction   |
| • Cardiac Tamponade                 | • Hypersensitivity, anaphylactic or anaphylactic-like reaction during placement <sup>1</sup> , positioning <sup>1</sup> , flushing <sup>2</sup> of catheter or cleaning of catheter exit site <sup>3</sup> | • Thromboembolism  |
| • Catheter Erosion Through the Skin | • Intolerance Reaction to Implanted Device   | • Venous Thrombosis  |
| • Catheter Embolism                 | • Laceration of Vessels or Viscus  | • Vessel Erosion   |
| • Catheter Occlusion                |  | • Risks Normally Associated with Local or General Anesthesia, Surgery, and Post-Operative Recovery |
| • Catheter Related Sepsis           |  |  |
| • Endocarditis                      |  |  |
| • Exit Site Infection               |  |  |
| • Exit Site Necrosis                |  |  |

### **Insertion Instructions**

#### **1. Identify the Vein and Insertion Site**

- Apply a tourniquet above the anticipated insertion site.
- Select and mark the vein based on patient assessment. Recommended veins are basilic, cephalic and median cubital veins.

**Caution:** The PowerPICC® Provena™ Catheter features a reverse-taper catheter design. Placement of larger catheters at or below antecubital fossa may result in an increased incidence of phlebitis. Placement of the PowerPICC® Provena™ Catheter above antecubital fossa is recommended.

**Caution:** Avoid placement or securing of the catheter where kinking may occur, to minimize stress on the catheter, patency problems or patient discomfort.

- Release tourniquet.

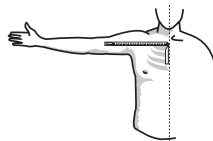
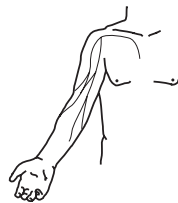
#### **2. Patient Position / Catheter Measurement**

- Position the arm at a 90° angle.
- For central placement, the recommended target tip location is in the lower 1/3 of the Superior Vena Cava (SVC). Measure from the planned insertion site to the right clavicular head, then down to the third intercostal space.

**Note:** The external measurement can never exactly duplicate the internal venous anatomy.

#### **3. Skin Preparation**

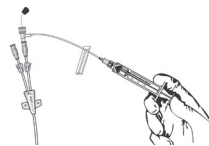
- Don prep gloves.
- Apply underdrape.
- Prepare the site with the ChloroPrep® Solution One-Step Applicator or according to institutional policy and/or applicable ChloroPrep® IFU using sterile technique.
- When alcohol is used as a skin prep, it must be allowed to completely air dry before proceeding with insertion.



- E. Remove and discard gloves.

#### 4. Sterile Field Preparation

- A. Apply the tourniquet above the intended insertion site to distend the vessel.
- B. Don sterile gloves.
- C. Apply drapes and complete sterile field preparation.



#### 5. Preflush the Catheter

- A. Attach prefilled syringe to the luer attachment on the T-Lock extension set and flush each lumen of catheter with sterile saline.
- B. The syringe may be left attached during procedure.

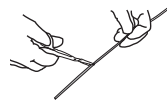
**Caution:** Do not clamp extension leg when stylet or stiffening wire is in catheter to minimize the risk of component or catheter damage.

#### 6. Modification of Catheter Length

**Note:** Catheters can be cut to length if a different length is desired due to patient size and desired point of insertion according to hospital protocol. Catheter depth markings are in centimeters.

**Note:** For catheters with Sherlock™ TLS stylets, please see section “Catheters with Sherlock™ Tip Location System Stylet.”

- A. Measure the distance from the insertion site (zero mark) to the desired tip location.
- B. Disconnect the T-Lock from the luer hub.
- C. Withdraw the entire T-Lock connector/stylet assembly, as one unit.
- D. Retract the stylet to well behind the point the catheter is to be cut.
- E. Using a sterile trimming device (e.g. scalpel, scissors, etc.), carefully cut the catheter according to institutional policy if necessary.



**Caution:** The stylet or stiffening wire needs to be well behind the point the catheter is to be cut. NEVER cut the stylet or stiffening wire.

- F. Inspect cut surface to assure there is no loose material.
- G. Re-advance the T-lock connector/stylet assembly locking the connector to the luer hub. Assure stylet tip is intact.
- H. Gently retract the stylet through the locked T-lock connector until the stylet tip is contained inside the catheter.
- I. Assure proper alignment of the stylet to the distal end of the trimmed catheter.

#### 7. Perform Venipuncture

- A. Anesthetize with local anesthesia as required.
- B. Remove the needle guard.
- C. Insert the safety introducer needle into the desired vein and observe for flashback.

**Alternate Technique:** A safety IV catheter may be used as an alternate to the safety introducer needle. Remove the needle from the catheter after the vein is accessed.

**WARNING:** If the artery is entered, withdraw the needle or safety IV catheter and apply manual pressure for several minutes.

**Caution:** Do not reinsert needle into IV catheter to minimize the risk of the needle damaging or shearing the IV catheter.

- D. Release tourniquet.
- E. Remove the guidewire tip protector from the guidewire hoop and insert the flexible end of the guidewire into the introducer needle or catheter and into the vein. Advance the guidewire to the desired depth.

**Caution:** Do not advance the guidewire past the axilla without fluoroscopic guidance or other tip locating methods.

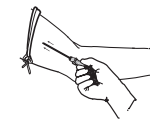
**Caution:** Do not use excessive force when introducing guidewire or microintroducer as this can lead to vessel perforation and bleeding.

- F. Gently withdraw and remove the safety introducer needle or catheter, while holding the guidewire in position.  
**Caution:** If the guidewire must be withdrawn while the needle is inserted, remove both the needle and wire as a unit to prevent the needle from damaging or shearing the guidewire.
- G. Advance the microintroducer assembly over the guidewire. Using a twisting motion, advance the assembly into the vessel. If necessary, a small incision may be made adjacent to the guidewire to facilitate insertion of the sheath and dilator. Verify institutional guidelines concerning the use of a safety scalpel prior to making incision.
- H. Withdraw the dilator and guidewire, leaving the small sheath in place.

**WARNING:** Place a finger over the orifice of the sheath to minimize blood loss and risk of air aspiration. The risk of air embolism is reduced by performing this part of the procedure with the patient performing the Valsalva maneuver until the catheter is inserted into the sheath.

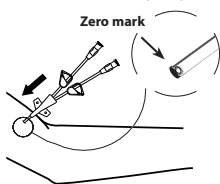
#### 8. Insert and Advance the Catheter

- A. Position the arm at a 90° angle, maintaining sterility.
- B. Insert the catheter into the introducer sheath.
- C. Advance the catheter slowly.



## 9. Complete Catheter Insertion

- A. Continue to advance the catheter. For central placement, when the tip has advanced to the shoulder, have the patient turn head (chin on shoulder) toward the insertion side to prevent possible insertion into the jugular vein.  
**Note:** The PowerPICC® Provena™ Catheter features a reverse-taper catheter design. Resistance may be felt approximately 4 cm distal of catheter hub when introducing the catheter into the sheath due to an increase in outer diameter (O.D.) The introducer may be partially split, but not removed to facilitate insertion of the catheter past this point if necessary.
- B. Complete catheter advancement into the desired position.  
**Note:** Maximum recommended insertion is to the zero mark on the catheter shaft.  
**Note:** PICCs should be positioned with the catheter tip in the lower 1/3 of the Superior Vena Cava (SVC). Verify correct catheter tip position using radiography or other appropriate technology.  
**WARNING:** This is not a right atrium catheter. Avoid positioning the catheter tip in the right atrium. Placement or migration of the catheter tip into the right atrium may cause cardiac arrhythmia, myocardial erosion or cardiac tamponade. The risk of these complications may be more likely in neonatal patients.

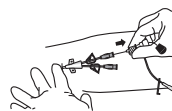


## 10. Retract and Remove the Introducer Sheath

- A. Stabilize the catheter position by applying pressure to the vein distal to the introducer sheath.  
B. Withdraw the introducer sheath from the vein and away from the site.  
C. Split the introducer sheath and peel it away from the catheter.  
**Caution:** Do not pull apart the portion of the sheath that remains in the vessel. To avoid vessel damage, pull back the sheath as far as possible and tear the sheath only a few centimeters at a time.

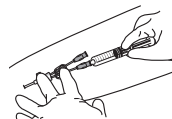
## 11. Remove the Stylet and T-Lock Assembly

- A. Disconnect the T-Lock and stylet from the catheter luer connector.  
B. Stabilize the catheter position by applying light pressure to the vein distal to the insertion site.  
C. Slowly remove the T-Lock and stylet, as a unit. Do not remove stylet through T-Lock.  
**Caution:** Never use force to remove the stylet. Resistance can damage the catheter. If resistance or bunching of the catheter is observed, stop stylet withdrawal and allow the catheter to return to normal shape. Withdraw both the catheter and stylet together approximately 2 cm and reattempt stylet removal. Repeat this procedure until the stylet is easily removed. Once the stylet is out, advance the catheter into the desired position.  
**Caution:** Never leave stylet or stiffening wire in place after catheter insertion; injury may occur. Remove stylet or stiffening wire and T-lock (as applicable) after insertion.



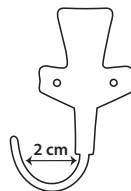
## 12. Aspirate and Flush

- A. Attach primed extension set and/or sterile saline-filled syringe.  
B. Aspirate for adequate blood return and flush each lumen of catheter with 10 mL of sterile saline to ensure patency.  
**Caution:** To reduce potential for blood backflow into the catheter tip, always remove needles or syringes slowly while injecting the last 0.5 mL of flush solution.  
**Caution:** As reported in literature, anaphylactic or anaphylactic-like reactions occur in a small percentage of the population during placement<sup>1</sup>, positioning<sup>1</sup>, flushing<sup>2</sup> of central venous catheters or cleaning of catheter exit site<sup>3</sup>. These reactions are reported in association with insertion, rapid flushing, or manipulation of the catheter and/or use of chlorhexidine gluconate (CHG) in some patients. Be aware of the potential symptoms or signs of these reactions and take precautionary steps as dictated by institution protocol for their prevention or treatment.  
C. Cap catheter.  
**WARNING:** The fluid level in the catheter will drop if the catheter connector is held above the level of the patient's heart and opened to air. To help prevent a drop in the fluid level (allowing air entry) while changing injection caps, hold the connector below the level of the patient's heart before removing the injection cap.



## 13. Dress Catheter

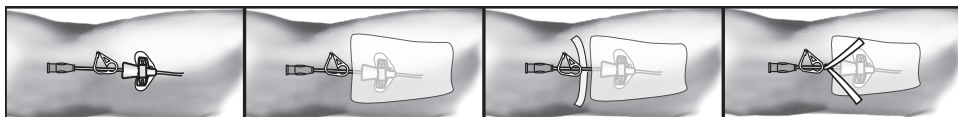
- Note:** When dressing a PICC do not create bends or curves in the catheter shaft that are less than 2 cm in diameter.  
**Caution:** The catheter must be secured in place to minimize risk of catheter breakage and embolization.  
**Caution:** Secure additional extension sets per hospital protocol. Refrain from having unsupported extension sets that could put stress on the catheter extension leg(s).  
**WARNING:** When using alcohol or alcohol-containing antiseptics with polyurethane PICCs, care should be taken to avoid prolonged or excessive contact. Solutions should be allowed to completely dry before applying an occlusive dressing. Chlorhexidine gluconate and/or povidone iodine are the suggested antiseptics to use.  
**WARNING:** Alcohol should not be used to lock, soak or de clot polyurethane PICCs because alcohol is known to degrade polyurethane catheters over time with repeated and prolonged exposure.  
**WARNING:** Do not wipe the catheter with acetone-based solutions, tincture of iodine or polyethylene glycol-containing ointments. These can damage the polyurethane material if used over time.



The StatLock® stabilization device may be included in PowerPICC® Provena™ Catheter kits. Please refer to Statlock® stabilization device Instructions For Use on the proper use and removal. The StatLock® stabilization device should be monitored daily and replaced at least every seven days.

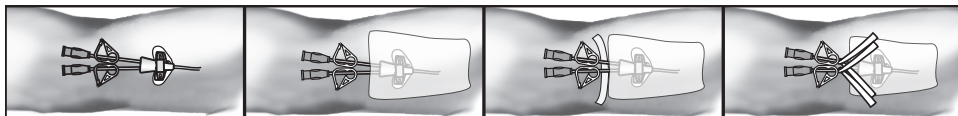
## The StatLock® Stabilization Device Procedure

### Single Lumen



1. Secure catheter with StatLock® stabilization device.
2. Cover site and StatLock® stabilization device with transparent dressing.
3. Place anchor tape sticky side up, under hub. Wedge tape between hub and wings.
4. Chevron anchor tape on top of transparent dressing.

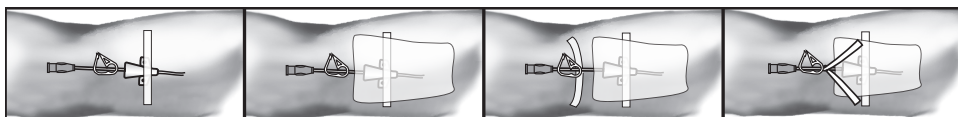
### Dual Lumen



1. Secure catheter with StatLock® stabilization device.
2. Cover site and StatLock® stabilization device with transparent dressing.
3. Place 1st anchor tape sticky side up, under one extension leg. Wedge tape between hub and wings. Chevron anchor tape on top of transparent dressing.
4. Place 2nd anchor tape sticky side up under remaining hub. Wedge tape between hub and wings. Chevron anchor tape on top of transparent dressing.

## Tape Strip Stabilization Procedure

### Single Lumen



1. Place 1st anchor tape over wings.
2. Cover site and 1st anchor tape with transparent dressing up to hub, but not over hub.
3. Place 2nd anchor tape sticky side up, under hub. Wedge tape between hub and wings.
4. Chevron anchor tape on top of transparent dressing.

### Dual Lumen



1. Place 1st anchor tape over wings.
2. Cover site and 1st anchor tape with transparent dressing up to hub, but not over hub.
3. Place 2nd anchor tape sticky side up, under one extension leg. Wedge tape between hub and wings. Chevron anchor tape on top of transparent dressing.
4. Place 3rd anchor tape sticky side up under remaining hub. Wedge tape between hub and wings. Chevron anchor tape on top of transparent dressing.

## 14. Verify Placement

- A. PICCs should be positioned with the catheter tip in the lower 1/3 of the SVC. Verify correct catheter tip position using radiography or other appropriate technology.

## 15. Power Injection Procedure

**WARNING:** PowerPICC® Provena™ Catheter indication for power injection of contrast media implies the catheter's ability to stand the procedure, but does not imply appropriateness of the procedure for a particular patient. A suitably trained clinician is responsible for evaluating the health status of a patient as it pertains to a power injection procedure.

- A. Remove the injection/needleless/end cap from the PowerPICC® Provena™ Catheter.
- B. Attach a 10 mL or larger syringe filled with sterile saline.

- C. Aspirate for adequate blood return and vigorously flush each lumen of the catheter with the full 10 mL of sterile saline. This will ensure the patency of the PowerPICC® Provena™ Catheter and prevent damage to the catheter. Resistance to flushing may indicate partial or complete catheter occlusion. Do not proceed with power injection study until occlusion has been cleared.  
**WARNING:** Failure to ensure patency of the catheter prior to power injection studies may result in catheter failure.
- D. Detach syringe.
- E. Attach the power injection device to the PowerPICC® Provena™ Catheter per manufacturer's recommendations.
- F. Contrast media should be warmed to body temperature prior to power injection.  
**WARNING:** Failure to warm contrast media to body temperature prior to power injection may result in catheter failure.
- G. Use only lumens marked "Power Injectable" for power injection of contrast media.  
**WARNING:** Use of lumens not marked "Power Injectable" for power injection of contrast media may cause failure of the catheter.
- H. Complete power injection study taking care not to exceed the maximum flow rate limits. Do not exceed the power injection flow rate.

Catheter Size	Maximum Flow Rate
3 F Single Lumen	3 mL / sec
4 F Dual Lumen	5 mL / sec

**WARNING:** Exceeding the maximum power injection flow rate or setting the power injector pressure limit above 300 psi may result in catheter failure and/or catheter tip displacement.

**WARNING:** Power injector machine pressure limiting feature may not prevent over-pressurization of an occluded catheter, which may cause catheter failure.

- I. Disconnect the power injection device.
- J. Replace the injection/needleless/end cap on the PowerPICC® Provena™ Catheter.
- K. Flush the PowerPICC® Provena™ Catheter with 10 mL of sterile saline, using a 10 mL or larger syringe.

- The PowerPICC® Provena™ Catheter testing included 10 power injection cycles.

## 16. Suggested Catheter Maintenance

**Caution:** As reported in literature, anaphylactic or anaphylactic-like reactions occur in a small percentage of the population during placement<sup>1</sup>, flushing<sup>2</sup> of central venous catheters or cleaning of catheter exit site<sup>3</sup>. These reactions are reported in association with insertion, rapid flushing, or manipulation of the catheter and/or use of chlorhexidine gluconate (CHG) in some patients. Be aware of the potential symptoms or signs of these reactions and take precautionary steps as dictated by institution protocol for their prevention or treatment.

**Caution:** If CHG allergy is suspected, confirmatory testing is recommended<sup>4,5</sup>.

### A. Dressing Changes/Exit Site Cleaning

**Caution:** Do not use scissors to remove dressing to minimize the risk of cutting catheter.

**Caution:** Do not suture through or around any part of the catheter's tubing (shaft or extension legs). If using sutures to secure catheter **USE THE SUTURE WINGS** and make sure they do not occlude, puncture, or cut the catheter.

**Caution:** The catheter must be secured in place to minimize risk of catheter breakage and embolization.

1. Assess the dressing in the first 24 hours for accumulation of blood, fluid or moisture beneath the dressing. During all dressing changes, assess the external length of the catheter to determine if migration of the catheter has occurred. Periodically confirm catheter placement, tip location, patency and security of dressing.  
**WARNING:** Do not wipe the catheter with acetone-based solutions, tincture of iodine or polyethylene glycol-containing ointments. These can damage the polyurethane material if used over time  
**WARNING:** When using alcohol or alcohol-containing antiseptics with polyurethane PICCs, care should be taken to avoid prolonged or excessive contact. Solutions should be allowed to completely dry before applying an occlusive dressing. Chlorhexidine gluconate and/or povidone iodine are the suggested antiseptics to use.

### B. Flushing

**Caution:** Some patients may be hypersensitive to heparin or suffer from heparin induced thrombocytopenia (HIT) and these patients must not have their catheter locked with heparin flush solution.

1. Flush each lumen of the catheter with 10 mL of sterile saline every 12 hours or after each use. Use a 10 mL or larger syringe.
2. In addition, lock each lumen of the catheter with heparin flush solution. Usually, 1 mL per lumen is adequate.
3. Disconnect the syringe and attach a sterile end cap to the catheter hub and tighten securely.
4. Prior to blood sampling when infusing TPN, follow routine maintenance procedure except use 20 mL of sterile saline and flush to clear TPN from the catheter.
5. If resistance is met when flushing, no further attempts should be made. Further flushing could result in catheter rupture with possible embolization. Refer to institution protocol for clearing occluded catheters.  
**NOTE:** When injecting or infusing medications that are incompatible, always flush the catheter with a minimum of 10 mL of sterile saline before and after the medication.  
**Caution:** To reduce potential for blood backflow into the catheter tip, always remove needles or syringes slowly while injecting the last 0.5 mL of flush solution.



**Caution:** Use aseptic techniques whenever the catheter lumen is opened or connected to other devices.

**WARNING:** Alcohol should not be used to lock, soak or de clot polyurethane PICCs because alcohol is known to degrade polyurethane catheters over time with repeated and prolonged exposure.

C. **Occluded or Partially Occluded Catheter**

Catheters that present resistance to flushing and aspiration may be partially or completely occluded. Do not flush against resistance. If the lumen will neither flush nor aspirate and it has been determined that the catheter is occluded with blood, a de clotting procedure per institution protocol may be appropriate.

**17. Central Venous Pressure Monitoring (CVP)**

Prior to conducting central venous pressure monitoring:

- A. Ensure proper positioning of the catheter tip.
  - Flush catheter vigorously with sterile saline.
  - Ensure the pressure transducer is at the level of the right atrium.
  - It is recommended that a continuous infusion of sterile saline (3 mL/hr) is maintained through the catheter while measuring CVP to improve accuracy of CVP results.
- B. Use your institution's protocols for central venous pressure monitoring procedures.

**WARNING:** CVP Monitoring should always be used in conjunction with other patient assessment metrics when evaluating cardiac function.

**18. Catheter Removal**

- A. Remove dressing and StatLock® stabilization device or tape securement strips.

**Caution:** Do not use scissors to remove dressing to minimize the risk of cutting catheter.
- B. Grasp catheter near insertion site.
- C. Remove slowly. Do not use excessive force.
- D. If resistance is felt, stop removal. Apply warm compress and wait 20-30 minutes.
- E. Resume removal procedure.
- F. Examine catheter tip to determine that the entire catheter has been removed.

**19. Catheters with Sherlock™ Tip Location System Stylet**

**Indications for Use:** Catheter stylets provide internal reinforcement to aid in catheter placement. The Sherlock™ TLS Stylet contains passive magnets that generate a magnetic field. This field can be detected by the Sherlock™ TLS Detector to provide the placer rapid feedback on catheter tip location.

**Description:** The Sherlock™ TLS stylet is made of specially-formulated materials designed to aid in the placement of central venous catheters. The stylet material provides internal reinforcement to aid in catheter placement. In addition, the Sherlock™ TLS stylet may be used with the detector to provide catheter tip placement information during the insertion procedure.

**Note:** The Sherlock™ TLS stylet may be used with patients who have cardiac rhythm devices (e.g. pacemakers and defibrillators) implanted. When a cardiac rhythm device is present, it is recommended that the Sherlock™ TLS stylet be placed on the contralateral side.

**Modification of Catheter Length when Using PICC with Sherlock™ TLS Stylet**

**Note:** Catheters can be cut to length if a different length is desired due to patient size and desired point of insertion. Catheter depth markings are in centimeters.

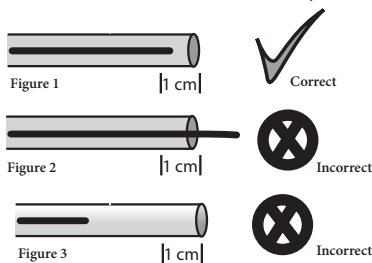
- A. Measure the distance from the insertion site (zero mark) to the desired tip location.
- B. Loosen the T-lock connector/stylet assembly from the luer hub.
- C. Withdraw the entire T-lock connector/stylet assembly as one unit.
- D. Retract the stylet well behind the catheter cut location.
- E. Using a sterile trimming device (e.g. scalpel, scissors, etc.) carefully cut the catheter.

**Caution:** The stylet or stiffening wire needs to be well behind the point the catheter is to be cut. NEVER cut the stylet or stiffening wire.

- F. Inspect cut surface to assure there is no loose material.
- G. Re-advance the T-lock connector/stylet assembly locking the connector to the luer hub. Assure stylet tip is intact.
- H. Gently retract the stylet through the locked T-lock connector until the stylet tip is contained inside the catheter.
- I. Prior to insertion, ensure that the stylet tip is contained inside and within the catheter but not more than 1 cm from the trimmed end of the catheter. [See Figure 1]

**WARNING:** Ensure that the stylet tip does not extend beyond the trimmed end of the catheter. Extension of the stylet tip beyond the catheter end, combined with kinking and excessive forces may result in vessel damage, stylet damage, difficult removal, stylet tip separation, potential embolism and risk of patient injury. [See Figure 2]

**Caution:** The detector identifies the position of the stylet tip. Ensure that the stylet tip remains inside and within 1 cm from the end of the catheter tip. Failure to do so could result in catheter malposition. [See Figure 3]



### Removal of the Stylet and T-Lock Assembly

- A. Disconnect the T-Lock from the catheter luer connector.
- B. Stabilize the catheter position by applying light pressure to the vein distal to the insertion site.
- C. Slowly remove the T-Lock and stylet, as a unit. Do not remove stylet through T-Lock.  
**Caution:** Never use force to remove the stylet. Resistance can damage the catheter. If resistance or bunching of the catheter is observed, stop stylet withdrawal and allow the catheter to return to normal shape. Withdraw both the catheter and stylet together approximately 2 cm and reattempt stylet removal. Repeat this procedure until the stylet is easily removed. Once the stylet is out, advance the catheter into the desired position.  
**Note:** Maximum recommended insertion is to the zero mark on the catheter shaft.  
**Caution:** Never leave stylet or stiffening wire in place after catheter insertion; injury may occur. Remove stylet or stiffening wire and T-lock (as applicable) after insertion.
- D. For additional information, refer to catheter and detector Instructions for Use for the insertion procedure.

### References

1. Halpern M.D., Georges. "Allergic and Toxic Reactions." Adverse Events During Infusion Therapy Symposium, University of California, Davis School of Medicine. (1993)
2. Findlay, Steven R. et al., "Hyperosmolar Triggering of Histamine Release from Human Basophils." Journal of Clinical Investigation. (1981)
3. Benjamin, Richard J. et al., "Skin Disinfection with Single-Step 2% Chlorhexidine Swab is more Effective than a Two-Step Povidone-Iodine Method in Preventing Bacterial Contamination of Apheresis Platelets." Transfusion. (2010)
4. "FDA Public Health Notice: Potential Hypersensitivity to Chlorhexidine-Impregnated Medical Devices." FDA U.S. Food and Drug Administration. <<http://www.fda.gov>>. (accessed March, 1998).
5. Beaudouin, E. et al., "Immediate Hypersensitivity to Chlorhexidine: literature review." European Annals of Allergy and Clinical Immunology. 36, no. 4 (2004)



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