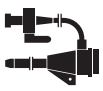
Cordis™

100554720-US.3

Instructions for Use (eIFU)

Cordis **S.M.A.R.T. RADIANZ™** Vascular Stent System

Explanation of symbols on labels and packaging:

	**Lot number**
	**Catalogue number**
	**Do not re-use**
	**Do not resterilize**
	**Use-by date**
	**Keep away from sunlight**
	**Keep dry**
	**Do not use if package is damaged and consult instructions for use**
	**Sterilized using ethylene oxide**
	**Non-Pyrogenic**
	**Caution**
	**Consult instructions for use or consult electronic instructions for use**
	**Manufacturer**
	**Caution: Federal (USA) law restricts this device to sale by or on the order of a physician.**
	**MR Conditional**
	**n units per box**
	**Recommended Sheath Size**
	**Single Sterile Barrier System; sterilized using ethylene oxide**

	Unexpanded Stent Length / millimeters
	**Diameter of the stent**
	**Medical Device**
	**Ok for use**
	**Do not use**

STERILE. The S.M.A.R.T. RADIANZ™ Vascular Stent System is provided STERILE. Sterilized with ethylene oxide gas. Nonpyrogenic. Radiopaque. For single use only. Do not resterilize, do not reuse the device.
Caution: Federal (USA) law restricts this device to sale by or on the order of a physician.
Read all instructions carefully. Failure to properly follow the instructions, warnings and precautions may lead to serious consequences or injury to the patient.

I. DEVICE NAME

The device brand name is the **S.M.A.R.T. RADIANZ™** Vascular Stent System.

II. DESCRIPTION

This section contains the following sub-sections:
1. Description: S.M.A.R.T. RADIANZ Vascular Stent System
2. Available Product Sizes and Catalog Numbers

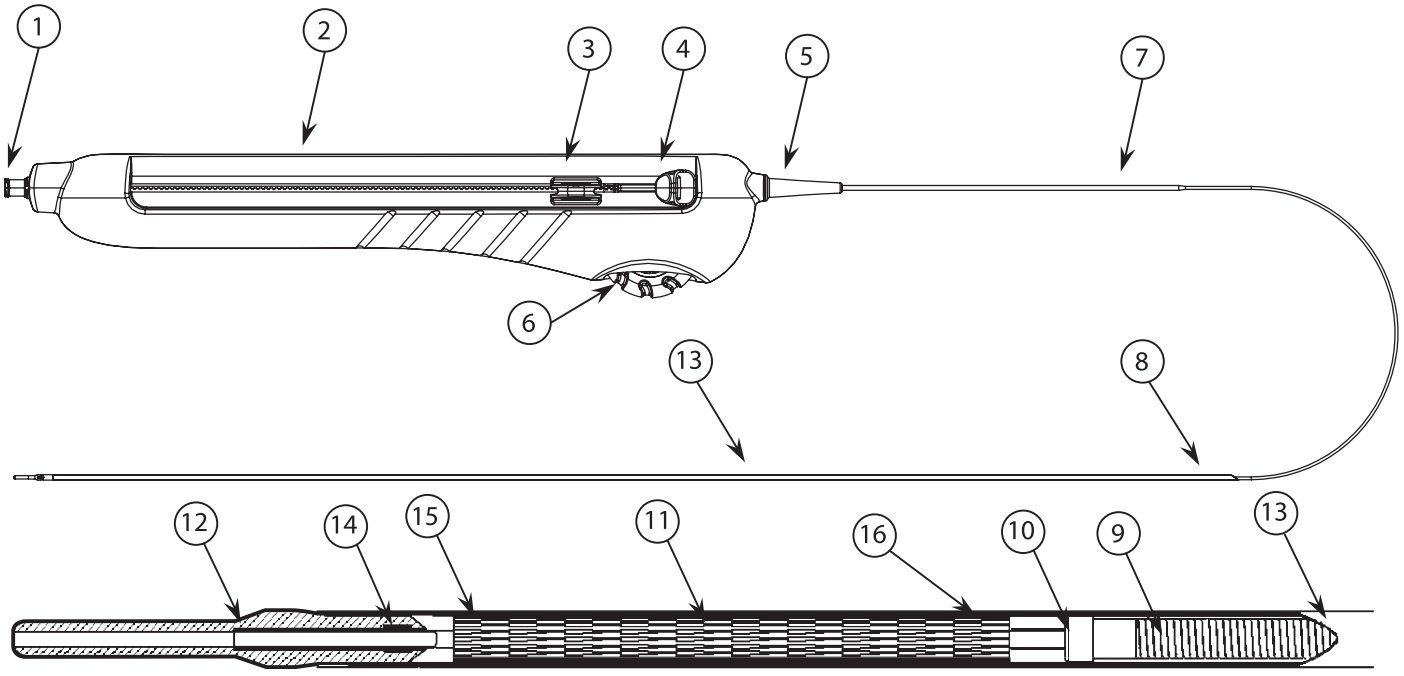
1. Description: S.M.A.R.T. RADIANZ Vascular Stent System

The **S.M.A.R.T. RADIANZ** Vascular Stent System is designed to deliver a S.M.A.R.T.™ Self-Expanding Stent to the iliac arteries, superficial femoral arteries and/or proximal popliteal arteries using a 6F (2.0 mm) sheathed delivery system introduced through the radial artery. The S.MA.R.T. Self-Expanding Stent is composed of a nickel titanium alloy (nitinol). A total of 12 (6 at each end) tantalum radiopaque markers are located on the ends of the stent. The stent is a flexible, fine mesh tubular prosthesis that expands upon deployment to appose the vessel wall. Upon deployment, the stent imparts an outward radial force on the luminal surface of the vessel to establish patency.

Figures 1 – 4 show and describe the **S.M.A.R.T. RADIANZ** Vascular Stent System; the numbers in parentheses in the section below refer to the numbers in **Figure 1**.

The 6F (2.0 mm) outer sheath (13) and proximal outer member (7) connect proximally to the handle (2). The S.MA.R.T. Self-Expanding Stent (11) is constrained within the outer sheath (13). This space is flushed prior to the procedure by injecting fluid via the Luer hub (1). Stent movement during sheath retraction is restricted by a support member stent stop (10) connected to the support member. The outer sheath has a radiopaque marker (14) at its distal end. Stent positioning about the target lesion is achieved prior to deployment utilizing the distal stent markers (15) and the proximal stent markers (16). For stent deployment, the safety lock (3) must be removed. Sheath retraction is achieved by holding the handle (2) in a fixed position. Then, depending upon the orientation of the handle, the thumbwheel (6) is rotated with either the thumb or index finger. Deployment is initiated by rotating the thumbwheel (6) [see **Figure 2**] in a clockwise direction until the distal stent markers (15) and the distal end of the stent visibly appose the vessel wall. With the distal stent markers (15) and the distal end of the stent apposing the vessel wall, stent deployment continues by pulling back on the rapid deployment slide (4) [see **Figure 3**]. Complete deployment of the stent is achieved when the proximal end of the stent and the proximal stent markers (16) visibly appose the vessel wall, and the outer sheath radiopaque marker (14) is proximal to the support member stent stop (10).
An optional two-handed approach is shown in **Figure 4**.

Figure 1. (Pre-deployment position)



1. Luer hub (for flushing)
2. Handle
3. Safety lock
4. Rapid deployment slide
5. Strain Relief
6. Thumbwheel
7. Proximal outer member
8. Guidewire exit port
9. Support member: metallic coil
10. Support member: stent stop
11. **S.M.A.R.T.** Self-Expanding Stent
12. Catheter distal tip
13. Outer sheath
14. Distal radiopaque marker
15. Distal stent markers
16. Proximal stent markers

Figure 2. Stent Deployment Using Thumbwheel

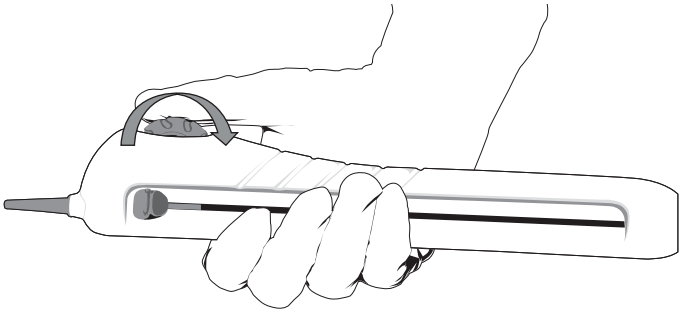


Figure 3. Stent Deployment Using Deployment Slide

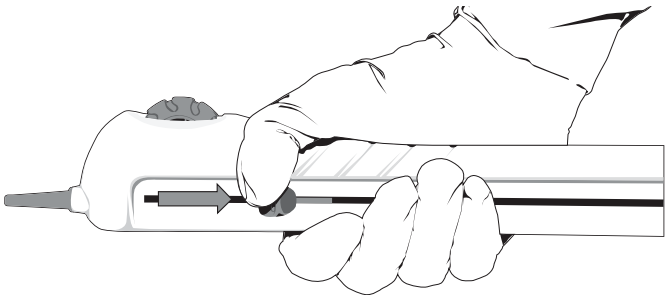
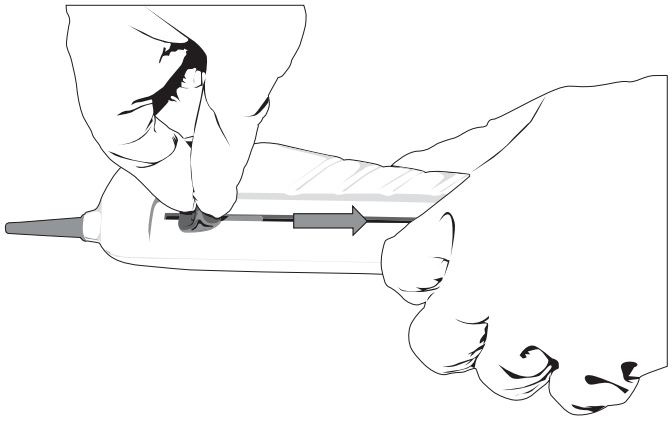


Figure 4. Stent Deployment Using Two Hands



2. Available Product Sizes and Catalog Numbers

Table 1 - Product Catalog Numbers

Delivery System Length	Stent Diameter (mm)	Stent Length (mm)							
		S.M.A.R.T. RADIANZ Vascular Stent System							
		20	30	40	60	80	100	120	150
190 cm	6	SR06020XL	SR06030XL	SR06040XL	SR06060XL	SR06080XL	SR06100XL	SR06120XL†	SR06150XL†
190 cm	7	SR07020XL	SR07030XL	SR07040XL	SR07060XL	SR07080XL	SR07100XL	SR07120XL†	SR07150XL†
190 cm	8	SR08020XL	SR08030XL	SR08040XL	SR08060XL	SR08080XL	SR08100XL	SR08120XL†	SR08150XL†
150 cm		SR08020L	SR08030L	SR08040L	SR08060L	SR08080L	SR08100L	SR08120L†	SR08150L†
150 cm	9	SR09020L*	SR09030L*	SR09040L*	SR09060L*	SR09080L*			
150 cm	10	SR10020L*	SR10030L*	SR10040L*	SR10060L*	SR10080L*			

* Stent sizes for Iliac indication only.
† Stent Sizes for Superficial Femoral Artery (SFA)/Proximal Popliteal indication only.
All other stent sizes are indicated for Iliac, SFA, and Proximal Popliteal indications.

III. INDICATIONS FOR USE

The **S.M.A.R.T. RADIANZ** Vascular Stent System is indicated for use to improve luminal diameter in the treatment of patients with de novo or restenotic native lesion(s) of the superficial femoral artery and/or proximal popliteal artery with total lesion length up to 150 mm and a reference vessel diameter ranging from 4 mm to 7 mm, or of the Iliac artery with total lesion length up to 100 mm and a reference vessel diameter ranging from 4 mm to 9 mm.

As shown in Table 1, stent sizes with a * are for Iliac indication only. Stent sizes with a † are for SFA/Proximal Popliteal indication only. All other stent sizes are indicated for Iliac, SFA and Proximal Popliteal indications.

IV. CONTRAINDICATIONS

- Patients with a known hypersensitivity to nickel titanium (Nitinol.)
- Patients who cannot receive antiplatelet or anticoagulation therapy.
- Patients with highly calcified lesions resistant to percutaneous transluminal angioplasty (PTA.)
- Patients with uncorrected bleeding disorders.
- Patients with a large amount of acute or subacute thrombus adjacent to the target lesion.
- Stenting of intra-cranial arteries.
- Patients who are judged to have a lesion that prevents complete inflation of an angioplasty balloon or proper placement of the stent or stent delivery system.
- Patients with known severe upper extremity vascular disease, extreme tortuosity, anomalous radial artery take off, severe subclavian stenosis or severe atherosclerosis.
- Patients with known Buerger's disease or Raynaud's phenomenon.
- Presence of an arterio-venous fistula in the arm being accessed.
- Patients with known severe anatomical abnormalities of the upper extremity / aorta.
- Patients with a known dissecting thoracoabdominal aortic aneurysm.
- Perforated vessel.

V. WARNINGS

- The black dotted pattern on the grey temperature exposure indicator, found on the pouch, must be clearly visible. Do not use if the entire temperature exposure indicator is completely black as the unconstrained stent diameter may have been compromised.
- This product is designed and intended for single use. It is not designed to undergo reprocessing and resterilization after initial use. Reuse of this product, including after reprocessing and/or resterilization, may cause a loss of structural integrity which could lead to a failure of the device to perform as intended

and present a potential risk to patient safety. Reprocessing and resterilization may also lead to a loss of critical labeling/use information which also presents a potential risk to patient safety.
- Do not use if the pouch/package is opened or damaged.
- Use the stent system prior to the "Use By" date specified on the package.
- Do not use with Ethiodol™ or Lipiodol™ contrast media.
- Do not expose the delivery system to organic solvents (e.g. alcohol).
- The stent is not designed for dragging or repositioning.
- Once the stent is partially deployed, it cannot be recaptured using the stent delivery system.
- Avoid stent placement that may obstruct access to a vital side branch.
- As with any type of vascular implant, infection, secondary to contamination of the stent, may lead to thrombosis or pseudoaneurysm or rupture into a neighboring organ or the retroperitoneum.
- The stent may cause a thrombus, distal embolization or may migrate from the site of the implant down the arterial lumen.
- Overstretching of the artery may result in rupture and life- threatening bleeding.
- Persons with allergic reactions to nickel titanium (nitinol) may suffer an allergic response to this implant.
- It is important to use the correct stent size, as recommended in the Stent Size Selection Guide (**Table 2** provided in Section XI - Directions for Use), otherwise, the stent may cause a thrombus or distal embolization, or it may migrate from the site of an implant down the arterial lumen.
- Insufficient clinical data exists to support use of the **S.M.A.R.T. RADIANZ** Vascular Stent System in renal arteries. Caution should be taken when stenting patients with poor renal function who, in the physician's opinion, may be at risk for a reaction to contrast medium or may experience further deterioration of renal function.
- If it is suspected that the sterility or performance of the device has been compromised, the device should not be used.

VI. PRECAUTIONS

- Store in a cool, dark, dry place.
- When catheters are in the body, they should be manipulated using high quality radiographic equipment.
- Radiographic equipment that provides high quality imaging is needed.
- This delivery system is not designed for use with power injection systems.
- Failure to pre-dilate the lesion may impair the ability to remove the stent system after stent deployment.
- Recrossing a partially or fully deployed stent with adjunct devices must be performed with caution.
- Prior to stent deployment remove all slack from the catheter delivery system (see "Stent Deployment/ Procedure")
- In the event of thrombosis of the expanded stent, thrombolysis and PTA should be attempted.
- The device should only be used by physicians who are trained in such interventional techniques as percutaneous transluminal angioplasty and placement of intravascular stents.
- The long-term outcome following repeat dilatation of endothelialized stents is unknown at present.
- To avoid the possibility of dissimilar metal corrosion, do not implant stents of different metals in tandem where overlap or contact is possible, with an exception of stents made of 316L stainless steel which are compatible with stents made of nickel titanium alloy.
- Before insertion of the primary dilatation catheter, the appropriate antiplatelet and anticoagulant therapy should be administered.
- **As safety and effectiveness has not been demonstrated it is not recommended to use the stent in:**
  - Patients with poor renal function, who in the physician's opinion, may be at risk for a reaction to contrast medium.
  - Pregnant patients.
  - Patients who have aneurysmal dilation immediately proximal or distal to the lesion.
  - Pediatric patients.

Stent Handling

- Do not use if the stent is partially deployed upon removal from the package, or before starting the deployment procedure.
- Avoid contaminating the stent. As with any type of vascular implant, infection, secondary to contamination of the stent, may lead to thrombosis or pseudoaneurysm.

Stent Placement

- If resistance is encountered at any time during the insertion procedure, do not force passage. Resistance may cause damage to stent or vessel. Carefully withdraw the stent system without deploying the stent.
- If resistance is felt when beginning deployment, do not force deployment. Carefully withdraw the stent system without deploying the stent.
- When treating multiple lesions, the most distal lesion should be stented first followed by the stenting of proximal lesions. Stenting in this order eliminates the need to cross and reduces the chance of dislodging stents which have already been placed. Overlap of sequential stents is necessary but the amount of overlap should be kept to a minimum.
- The stent is not designed to be lengthened or shortened past its nominal length. Excessive stent lengthening or shortening may increase the risk of stent fracture.
  Caution: Fractures of this stent may occur. Fractures may also occur with the use of multiple overlapping stents. Fractures of the S.M.A.R.T.® Stent, have been reported most often in clinical uses for which the safety and effectiveness have not been established. The causes and clinical implications of stent fractures are not well characterized. Care should also be taken when deploying the stent as excessive force could, in rare instances, lead to stent deformation and/or fracture.

Stent / System Removal

- In the event of complications such as infections, pseudoaneurysm or fistulization, surgical removal of the stent may be required. Standard surgical procedure is appropriate.

Post-implant

- Re-crossing a stent with adjunct devices must be performed with caution to avoid stent damage or migration.
- In patients requiring the use of antacids and/or H2-antagonists before or immediately after stent placement, oral absorption of antiplatelet agents (e.g. aspirin) may be adversely affected.

VII. POTENTIAL COMPLICATIONS

The following complications may be associated with intravascular stent implantation:

- Abrupt closure
- Access failure
- Access site complications
- Allergic / anaphylactoid reaction to anticoagulant and/or antithrombotic therapy or contrast medium

[1]* Ethiodol and Lipiodol are trademarks of Guerbet S.A.

- Allergic reaction to nitinol
- Allergic reaction
- Amputation
- Anemia / blood loss
- Aneurysm
- Angina / coronary ischemia / myocardial infarction
- Arrhythmia
- Arterial restenosis
- Arterial stenosis, or dissection
- Arteriosclerosis
- Arteriovenous fistula
- Blue toe syndrome
- Bradycardia
- Worsened claudication or rest pain
- Death
- Disseminated intravascular coagulation
- Edema, peripheral
- Embolism
- Emergent repeat hospital intervention or surgery
- Encephalopathy (new or worse)
- Fever
- Fistulization
- Gangrene
- Gastrointestinal bleed from anticoagulation/antiplatelet medication
- Hematoma
- Hemorrhage
- Hypotension / hypertension
- Iliac artery spasm
- Infection
- Infection and/or sepsis
- Intimal tear/dissection
- Ischemia
- Multi-organ failure
- Muscle hemorrhage
- Necrosis
- Pain
- Pneumothorax
- Pseudoaneurysm
- Renal failure
- Respiratory arrest
- Restonosis of the stented segment.
- Sepsis
- Stent embolization
- Stent migration
- Stent occlusion
- Stroke
- Tissue necrosis
- Transient Ischemic Attack (TIA)
- Trauma to adjacent structures
- Vascular injury, including perforation, rupture and dissection
- Vasospasm
- Vessel occlusion/thrombosis, puncture site (restenosis or recurrent stricture)
- Worsened claudication or rest pain

VIII. INFORMATION FOR THE PATIENT

- A Stent Implant Card that includes both patient and S.M.A.R.T. Stent-specific information is provided for distribution to all patients in whom the S.M.A.R.T. Stent is implanted. All patients are expected to keep this card in their possession for procedure /stent identification at all times.

IX. HOW SUPPLIED

The **S.M.A.R.T. RADIANZ** Vascular Stent System is supplied sterile inside a pouch. The device is sterilized via Ethylene Oxide. The device is non-pyrogenic. The packaged device should be stored in a dry, dark, cool place. **CAUTION:** Do not use if the package is damaged.

X. SELECTION OF STENT SIZE

The available stent diameters range from 6 mm to 10 mm with stent lengths ranging from 20 mm to 150 mm. See **Table 2** for guidance on stent diameter selection.

XI. DIRECTIONS FOR USE

Pre-Procedure

1. The patient may be started on 81-325 mg of enteric-coated or non-enteric-coated aspirin one or two days prior to the procedure and 300-375 mg of Clopidogrel bisulfate or 250 mg of Ticlopidine within 24 hours of the procedure, if deemed appropriate by the physician.
2. The percutaneous placement of the stent in a stenotic or obstructed artery should be done in an angiography procedure room. Angiography should be performed to map out the extent of the lesion(s) and the collateral flow. If thrombus is present or suspected, thrombolysis should precede stent deployment using standard acceptable practice. Access vessels must be sufficiently patent, or sufficiently recanalized, to proceed with further intervention. Patient preparation and sterile precautions should be the same as for any angioplasty procedure.

3. Ensure patient is appropriate for radial access by assessing the radial artery is the dominant artery for hand perfusion.

Procedure

1. Initial Angioplasty

a. Use appropriate selection criteria for radial access (i.e. Allen test or Barbeau test)
b. After local anesthesia is administered, the radial artery is entered under ultrasound guidance with a puncture needle in either a single or double wall technique. A guidewire is introduced into the radial artery through the needle.
c. The needle is then exchanged for a dedicated radial sheath with a tapered dilator and hydrophilic coating
d. The sheath is then flushed with an antispasmodic cocktail.
e. A guide wire and catheter are then advanced into the abdominal aorta
f. The catheter and sheath are then exchanged for a long dedicated radial sheath to the level of the aorta
g. After removing the inner dilator, the sheath is flushed
h. Advance a selective catheter into the vessel of choice
i. An injection of contrast media through the catheter should be done in order to confirm the intraluminal position.
j. The catheter should then be exchanged for a catheter sheath introducer (CSI) with a check valve and a side-arm adapter.
k. An angioplasty balloon catheter should be selected to correspond to the diameter of the superficial femoral artery proximal to the lesion. The side arm of the introducer should be connected to a pressure transducer to record the arterial pressure distal to the obstruction. An initial dilation of the lesion should be made with an appropriately sized balloon catheter. Whenever there is doubt about the dispensability of the lesion, the smallest appropriate balloon catheter should be used for the initial dilatation.
Note: Stent placement is not indicated if the primary angioplasty is not technically successful. A technically successful angioplasty is one in which the guidewire and dilation catheter are passed through the lesion and dilatation of the lesion produces a lumen adequate to accommodate introduction of the stent delivery system.
l. Following dilatation of the lesion, an arteriographic image should be recorded in order to determine the adequacy of the primary procedure.

2. Select Stent Size

a. Measure the length of the target lesion to determine the length of stent required. Size the stent length to extend slightly proximal and distal to the lesion.
b. The appropriate stent length(s) should be selected to cover the entire length of the lesion. Consult **Table 1** for available device sizes.
Note: Should more than one stent be required, placement of the stent most distal from the puncture site should be completed first, followed by placement of the proximal stent in tandem
c. Determine the diameter of the vessel (by visual estimation using angiography or as determined by intravascular ultrasound) and consult **Table 2** to select the appropriate stent diameter.
Note: Because of the behavior of Nitinol, which imparts an outward radial force, the stents are indicated for placement into vessels that are 1-2 mm smaller than the unconstrained diameter of the stent.

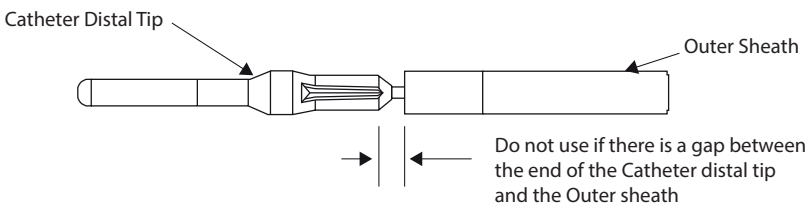
Table 2 - Stent Size Selection Guide

Vessel Lumen Diameter	Unconstrained Stent Diameter
4.0 – 5.0 mm	6 mm
5.0 – 6.0 mm	7 mm
6.0 – 7.0 mm	8 mm
7.0 – 8.0 mm	9 mm
8.0 – 9.0 mm	10 mm
Note: Refer to product labeling for stent length information	

3. Preparation of Stent Delivery System

a. Open the outer box to reveal the pouch containing the stent and delivery system.
b. Check the temperature exposure indicator on the pouch to confirm that the black dotted pattern with a grey background is clearly visible. See ***Warnings*** in **Section V.**
c. After careful inspection of the pouch to look for damage to the sterile barrier, carefully peel open the pouch and extract the stent delivery system from the tray. Examine the device for any damage. If it is suspected that the sterility or performance of the device has been compromised, the device should not be used.
d. Flush the delivery system with heparinized saline to expel air:
   - Attach a 3 cc syringe filled with a heparinized saline to the Luer Hub. Apply positive pressure to the syringe until fluid weeps from the guidewire exit port. While covering the guidewire exit port with thumb and forefinger, apply positive pressure until saline weeps from the catheter tip and the space between the tip and the outer sheath.
e. Evaluate the distal end of the catheter to ensure that the stent is contained within the outer sheath. Do not use if the stent is partially deployed.
f. Inspect the Catheter distal tip of the device to ensure it is within the distal end of the Outer sheath. Do not use if there is a gap between the end of the Catheter distal tip and the Outer sheath. Reference **Figure 5.**

Figure 5. Catheter Distal Tip Outside of the Outer Sheath



4. Insertion of Guiding Sheath or Guide Catheter and Guidewire

a. Access the treatment site utilizing the appropriate accessory equipment compatible with the 6F (2.0 mm) delivery system.
b. Place a 6F guiding sheath of an appropriate length (110cm for a 150cm long device and a 135cm for a 190cm long device) with an internal diameter of at least 2.2 mm
c. A BRITE TIP RADIANZ™ Guiding Sheath is highly recommended.
d. Place an .018" (0.46 mm) guidewire of sufficient length across the lesion to be stented via the guiding sheath or guide catheter.

5. **Dilation of Lesion**
   a. If appropriate, pre-dilate the lesion using standard PTA balloon catheter techniques.
   b. Remove the PTA balloon catheter from the patient while maintaining lesion access with the guidewire.

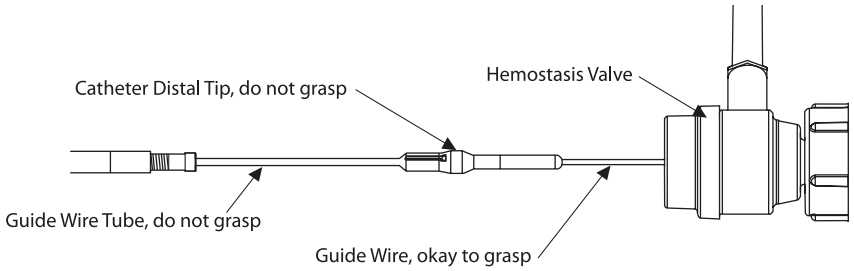
6. **Introduction of Stent Delivery System**
   a. Ensure the safety lock is still in place.
   b. Advance the device over the guidewire through the hemostatic valve and guiding sheath to the lesion site.
      Note: If resistance is met during delivery system introduction, the system should be withdrawn, and another system should be used. The handle should not be rotated during insertion or removal.
      Caution: Always use a guiding sheath or guide catheter for the implant procedure to protect puncture site. A guiding sheath of a 6F (2.0 mm) or larger size is recommended.

7. **Slack Removal**
   a. Advance the stent delivery system past the lesion site.
   b. Pull back the stent delivery system until the radiopaque stent markers (leading and trailing ends) move in position so that they are proximal and distal to the target lesion site.
   c. Ensure the device outside the patient remains flat and straight.
      Caution: Slack in the catheter shaft, either outside or inside the patient, may result in deploying the stent beyond the target lesion site.

8. **Stent Deployment**
   a. Verify that the delivery system's radiopaque stent markers (leading and trailing ends) are proximal and distal to the target lesion.
   b. Ensure that the guiding sheath or guiding catheter does not move during deployment.
   c. Remove safety lock from handle.
      Note: Do not rotate the thumbwheel prior to removing the safety lock from handle.
   d. Initiate stent deployment by rotating the thumbwheel in a clockwise direction (direction of arrow in **Figure 2**) while holding the handle in a fixed position.
      Note: Failure to maintain a fixed handle position or constraining the catheter shaft during deployment may result in stent compression (shortening) or elongation.
   e. While using fluoroscopy, maintain position of the radiopaque stent markers relative to the target lesion site. Watch for the distal radiopaque markers to begin separating. Separation of the distal stent markers signals that the stent is deploying. Continue turning the tuning dial to cause further separation of the distal radiopaque markers until the distal end of the stent obtains full wall apposition.
   f. With the distal end of the stent apposing the vessel wall while maintaining a fixed handle position, pull back the deployment slide to deploy the remainder of the stent (**Figure 3**).
   g. Deployment is complete when the proximal markers oppose the vessel wall and the outer sheath radiopaque marker is proximal to the support member stent stop.
      Note: When more than one stent is required to treat the lesion, the more distal stent should be placed first. Overlap of sequential stents is necessary but the amount of overlap should be kept to a minimum.

9. **Post-deployment Stent Dilatation**
   a. While using fluoroscopy, withdraw the entire delivery system as one unit, over the guidewire, into the guiding sheath and out of the body. Remove the delivery device from the guidewire. Do not rotate the handle during withdrawal.
      Note: The guide wire lumen will be exposed upon removal of the device from the sheath. Be sure that distal tip is visible outside of the hemostasis valve before attempting to grasp the guide wire. **See Figure 6**

Figure 6. Device Removal from Guiding Sheath



   b. Using fluoroscopy, visualize the stent to verify full deployment. If incomplete expansion exists within the stent at any point along the lesion, post deployment balloon dilatation (standard PTA technique) can be performed.
      Note: Only areas within the stent length should receive post-deployment balloon dilatation.
   c. Select an appropriate size PTA balloon catheter and dilate the lesion with conventional technique. The inflation diameter of the PTA balloon used for post-dilatation should approximate the diameter of the reference vessel. Remove the PTA balloon from the patient.

10. **Post Stent Placement**
    a. Remove the guidewire and sheath from the body.
    b. Close entry wound as appropriate.
    c. After use, all components used, and packaging materials may be a potential biohazard. Handle and dispose of in accordance with the accepted medical practice and with applicable local, state and federal laws and regulations.
       Note: Physician experience and discretion will determine the appropriate post-procedure drug regimen for each patient.

XII. Magnetic Resonance Imaging (MRI) Safety Information 

A patient with the S.M.A.R.T. Stent may be safely scanned under the following conditions.
Failure to follow these conditions may result in injury to the patient.

Name/identification of device	Cordis S.M.A.R.T. Stents
Nominal values of static magnetic field (T)	1.5 T and 3.0 T
Maximum spatial field gradient (T/m) and (Gauss/cm)	30 T/m (3000 Gauss/cm)
RF excitation	Circularly polarized (CP)
RF transmit coil type	Whole body transmit coil Head RF transmit-receive coil
RF receive coil type	Any receive only coil may be used
Maximum whole body SAR (W/kg)	2.0 W/kg
Limits on scan duration	15 minutes of continuous RF (a sequence or back to back series/scan without breaks) followed by a wait time of 10 minutes if this limit is reached
MR image artifact	The presence of this implant produced an image artifact of approximately 9 mm when imaged with a spin echo pulse sequence and a 3.0 T MRI system
Non-clinical testing has demonstrated that the S.M.A.R.T. Stent is MR Conditional in single and overlapped configuration up to a maximum of 290 mm as defined in ASTM F2503-13.	
If information about a specific parameter is not included, there are no conditions associated with that parameter	

XIII. Clinical Preamble

The following two sections contain clinical trials performed for the S.M.A.R.T. CONTROL™ and S.M.A.R.T. Vascular Stent System. Although this IFU is specific to the S.M.A.R.T. RADIANZ Vascular Stent System, the stent delivered and its indications for use are identical to the S.M.A.R.T. CONTROL and S.M.A.R.T. Vascular Stent Systems. Both the S.M.A.R.T. CONTROL and S.M.A.R.T. Vascular Stent Systems are femoral artery access devices. The S.M.A.R.T. RADIANZ Vascular Stent System is a radial artery access device. The results of the STROLL and CRISP trials are based on clinical data using the femoral access route and are not based on data specifically related to transradial access.

XIV. SUMMARY OF CLINICAL STUDY FOR SFA/PROXIMAL POPLITEAL INDICATION

Cordis performed a clinical study on S.M.A.R.T. Stents to establish a reasonable assurance of the safety and effectiveness of the S.M.A.R.T. CONTROL and S.M.A.R.T. Vascular Stent Systems for improving luminal diameter in the treatment of de novo or restenotic lesion(s) up to 150mm in length in the native superficial femoral artery and/or proximal popliteal arteries with reference vessel diameters ranging from 4 to 7mm, in the U.S. under IDE G060033. Data from this clinical study were the basis for the S.M.A.R.T. and S.M.A.R.T. CONTROL Vascular Stent System PMA approval decision. A summary of the clinical study is presented below

Summary of Clinical Investigation for the Superficial Femoral Artery and Proximal Popliteal Artery Indications

The **S.M.A.R.T.** Nitinol **S**elf-Expandable Stent in the **TR**eatment of **O**bstructive Superficia**L** Femora**L** Artery Disease (**STROLL**) Study, was a prospective, multi-center, non-randomized, unblinded, single arm study comparing primary stenting with the **S.M.A.R.T.** Vascular Stent System to performance goals of PTA alone in the treatment of atherosclerotic lesions of the native superficial femoral artery (SFA) and/or the proximal popliteal arteries. The safety and performance goals were based on an aggregate of published trial data as described by VIVA physicians Inc. (VPI). A total of 250 subjects were enrolled between August 14, 2008 and March 15, 2010 at 39 U.S. investigational sites. Eligible subjects either had stenotic, restenotic (non-stented) or occluded lesions. The reference vessel diameter of the treated subjects was to be 4.0 – 6.0 mm and the lesion length as 4-15 cm. Subjects with Rutherford/Becker Clinical Categories of 2-4 were included in the study. Subject follow-up occurred at 30 days, 6 months, 12 months, 24 months and 36 months post-procedure.

The STROLL Post-Approval study aimed to demonstrate that the **S.M.A.R.T.** Vascular Stent System in the treatment of patients with obstructive SFA disease met the long term safety performance criteria set for SFA stenting based on the incidence of a clinical safety endpoint (defined as a composite of death, index limb amputation, and clinically driven TLR) of 57%. This outcome was assessed in patients enrolled into the STROLL study and followed 3 years.

Safety and Effectiveness Endpoints:

The primary study endpoints were as follows:

- The primary safety endpoint was freedom from all causes of death, index limb amputation and clinically driven target lesion revascularization (TLR) through 30 days post-procedure.
- The primary effectiveness endpoint was primary patency, defined as no significant reduction of flow detectable by Duplex ultrasound (DUS) through the index lesion at 12 months follow-up, and no further clinically driven target vessel revascularization (TVR) performed in the interim. Significant reduction of flow was defined as binary restenosis defined as the diameter stenosis >50% with a peak systolic velocity ratio (PSVR) > 2.0, as measured by Duplex ultrasound.

For the 30-day safety endpoint, the Agresti-Coull method was used to compare the observed 30-day safety rate against the VIVA performance goal of 88%, using a one-sided significance level of 0.025. For the primary effectiveness endpoint, the Agresti-Coull method was used to compare the observed primary effectiveness against the VIVA performance goal of 66%, using a one-sided significance level of 0.025. The results were evaluated using the Modified Intent-to-Treat (ITT) population. The Modified ITT population was designed to include all screened patients who met eligibility criteria, had the guidewire positioned across the target lesion(s) and located intraluminally within the distal vessel (regardless of whether the patient received the **S.M.A.R.T.** Stent or not).

The primary endpoints for the Post-Approval study were as follows:

- The incidence of a clinical safety endpoint, defined as a composite of death, index limb amputation, and clinically driven target lesion revascularization (TLR), at 3 years.

Secondary clinical/safety endpoints included:

- 30-day death.
- 30-day index limb amputation.
- 30-day clinically driven TVR,

- 12-month clinically driven TVR.
- 12-month index limb amputation.
- 12 months composite (death).
- Major adverse event (MAE) defined as death, limb ischemia/amputation of target limb, TLR; significant embolic events, defined as causing end-organ damage, (e.g. lower extremity ulceration or gangrene) at 6 months and 1, 2, and 3-year follow-up.
- Clinically driven TLR and TVR at 30 days, 6 months, and 1, 2, and 3 year follow-up.

Secondary effectiveness endpoints included:
- Technical (lesion) success defined as the attainment of <50% residual stenosis by Quantitative Angiography (QA) using any percutaneous method.
- Procedure success defined as achievement of a final diameter stenosis of <50% (by QA) using any percutaneous method, without the occurrence of death, index limb amputation or repeat revascularization of the target lesion during the hospital stay.
- Device success, defined as achievement of a final residual diameter stenosis of <50% (by QA), using the assigned treatment only.

Secondary endpoints based on core laboratory assessment or office visit
- Index limb ischemia by Rutherford/Becker Classification at 6 months and 1, 2, and 3-year follow-up.
- Ankle-Brachial Index (ABI) at 1 month, 6 months and 1, 2, and 3-year follow-up.
- Patency of the target vessel defined as no significant reduction of flow detectable by Duplex ultrasound, and no further clinically driven target vessel revascularization performed in the interim. Significant reduction of flow was determined as binary restenosis, defined as the diameter stenosis > 50% with a peak systolic velocity ratio > 2.0 as measured by DUS at 6 months and 2- and 3-year follow-up.
- Stent fracture rate as assessed by x-ray evaluation at 6 months and 1, 2, and 3-year follow-up.
- Rutherford classification change at 12 months.

With regard to success/failure criteria, the STROLL study was designed to compare the primary clinical endpoints to a pre-established performance goal of 88% for safety and 66% for effectiveness.

Study Population Demographics and Baseline Parameters:
Baseline demographics and clinical characteristics for all patients enrolled in the STROLL study are summarized in **Table 3. Table 4** presents baseline lesion characteristics (assessed by the angiographic core laboratory, except as otherwise noted), including lesion location, length, and pre-procedure vessel diameter. The demographics, and baseline clinical and lesion characteristics are considered to be typical of interventional peripheral vascular studies conducted in the United States.

Table 3 - Demographics and Baseline Clinical Characteristics

Patient Characteristics	S.M.A.R.T. (N=250 Patients N=250 Lesions)
Age (Years), Mean +/- SD (N)	67.71±10.32 (N=250)
Gender (Male)	61.6% (154/250)
Race	
Asian	0.4% (1/250)
Black or African American	12.4% (31/250)
White or Caucasian	85.6% (214/250)
Middle Eastern	0.4% (1/250)
Hispanic	1.2% (3/250)
BMI	29.48 ± 5.81 (250)
Risk Factors	
Diabetes	47.2% (118/250)
Hypercholesterolemia	87.4% (216/247)
Hypertension	88.8% (222/250)
History of Smoking	84.8% (212/250)
Clinical Characteristics	
Target Limb ABI[1], Mean +/- SD (N); Range (min, max)	0.66 ± 0.15 (247) (0.24, 1.32)
<0.4	6.1% (15/247)
0.4-0.8	84.6% (209/247)
>0.8	9.3% (23/247)
Rutherford/Becker Scale[2]	
2 = Moderate claudication	45.8% (114/249)
3 = Severe claudication	51.4% (128/249)
4 = Ischemic rest pain	2.8% (7/249)

Note: Numbers are % (counts/sample size) or Mean ± SD (sample size).
[1] Baseline target limb ABI was not available for three (3) patients - ABI was not recorded for one patient, not done for the second patient and was recorded as "0.00" for the third patient.
[2] Baseline Rutherford/Becker assessment was not performed for one patient.

Table 4 - Baseline Target Lesion Characteristics	
Lesion Characteristics	**S.M.A.R.T. (N=250 Patients N=250 Lesions)**
Lesion Location	
Proximal 1/3 of SFA	10.8% (27/250)
Middle 1/3 of SFA	68.0% (170/250)
Distal 1/3 of SFA	20.0% (50/250)
Lesions extending into proximal popliteal	15.6% (39/250)
Lesion length (mm), normal-to-normal, by core lab*	
Mean +/- SD (N)	77.31 ± 35.31 (250)
Range (min, max)	(15.73, 200.10)
Pre-procedural Reference Vessel Diameter, RVD (mm)	
Mean +/- SD (N)	4.87 ± 0.68 (250)
Range (min, max)	(2.71, 8.54)
Pre-procedural Minimum Lumen Diameter, MLD (mm)	
Mean +/- SD (N)	1.17 ± 0.82 (250)
Range (min, max)	(0.00, 3.53)
Pre-procedural Diameter Stenosis (%)	
Mean +/- SD (N)	76.05 ± 16.07 (250)
Range (min, max)	(44.10, 100.00)
Numbers are % (counts/sample size) or Mean ± SD (sample size). * Measured by quantitative angiography (CMS) as the distance (in millimeters) from the proximal to the distal shoulder of the lesion in the projection that demonstrates the stenosis in its most elongated segment	

Patients Studied

Enrollment in the STROLL study was limited to patients who met the following inclusion criteria:

- The subject was 30 years of age or older.
- For women of childbearing potential, a pregnancy test done within 7 days prior to the study procedure and negative test results to be eligible.
- Symptomatic leg ischemia by Rutherford/Becker Classification categories 2-4 (mild to severe claudication) with a resting or exercise ABI < 0.8.
- A single superficial femoral artery lesion with > 50% stenosis or total occlusion.
- Stenotic lesion or occluded length within the same vessel (one long or multiple serial lesions) ranging from 4.0 to15.0 cm by visual estimate. The stenosis had to be treatable with no more than two stents, minimizing the stent overlap, whose combined length was not to exceed 170 mm.
- Reference vessel diameter ranging from 4.0 to 6.0 mm, by visual assessment.
- All lesions located at least three centimeters proximal to the superior edge of the patella.
- There must have been a patent infrapopliteal and popliteal artery, i.e. at least one vessel runoff with at least one of three vessels patent (< 50% stenosis) to the ankle or foot.
- The guidewire must have been across the target lesion(s) and located intraluminally within the distal vessel.
- Poor aortoiliac or common femoral "inflow" (i.e. angiographically defined > 50% stenosis of the iliac or common femoral artery) that would be deemed inadequate to support a femoropopliteal bypass graft was successfully treated prior to treatment of the target lesion. After treatment of the inflow lesion, if the peak-to-peak pressure gradient across the inflow lesion was < 20 mmHg and the peak-to-peak pressure gradient across the SFA target lesion was > 20 mmHg, then the patient could be included in the study.
- A patient with bilateral obstructive SFA disease was eligible for enrollment into the study.
- A patient must have been eligible for standard surgical repair, if necessary.
- A patient who required a coronary intervention should have had it performed at least 7 days prior to the treatment of the target lesion.
- Patient or authorized representative provided written informed consent and written HIPAA authorization prior to initiation of study procedures.
- Patient was willing to comply with the specified follow-up evaluation schedule.

Methods

All eligible study participants underwent a post-procedure DUS on or before their 30-day follow-up visit as well as at 6, 12, 24, and 36 months following the intervention. Eligible participants were known to be alive at the study visit and were available for testing. At these follow-up time points, clinical status, Rutherford–Becker Classification, ABI, and health status were assessed. Flat-plate radiographic images to detect stent fractures were obtained at the 6-, 12-, 24-, and 36-month follow-up assessments. Written informed consent was obtained from all subjects. The study protocol was approved by the institutional review board at each investigational site. The STROLL study was monitored by a Clinical Research Organization (CRO). Independent core laboratories reviewed and analyzed key study variables. An independent Data Safety Monitoring Board (DSMB) was used to review study data on an ongoing basis and identify any potential safety trends. Final adjudication of major adverse events was conducted by an independent Clinical Events Committee (CEC). A total of 250 patients signed the informed consent and were enrolled in the STROLL study. Visit compliance was 242/248 (97.6%) at 30 days, 219/244 (89.8%) at 6-months, 219/234 (93.6%) at 1-year, 203/224 (90.6%) at 2 years and 190/209 (90.9%) at 3-years. At 3-years, 8/250 (3.2%) of patients were lost to follow-up.

Safety Results

The primary analysis of safety in the STROLL IDE study was based on the 248 subjects available for the 30-day evaluation, for which the key outcomes are presented below in **Table 5.**

The primary safety endpoint was freedom from all causes of death, index limb amputation, and clinically driven Target Lesion Revascularization (TLR) through 30 days. Among the subjects for whom 30-day safety data were available, the rate of freedom from death, amputation and TLR was 100% with a lower 95% Agresti-Coull Confidence Interval of 98.2%. This is higher than the performance goal of 88%. Therefore, the primary safety endpoint was met. Per protocol, two (2) subjects who did not have reported adverse events or a reintervention prior to 30 days, and who did not complete the 30-day follow-up visit and were without any further follow-up information were not included in this analysis. The MAE rate at one-year was 14.2% (34/240), 24.0% (56/233) at 2-years, and 31.5% (70/222) at 3-years.

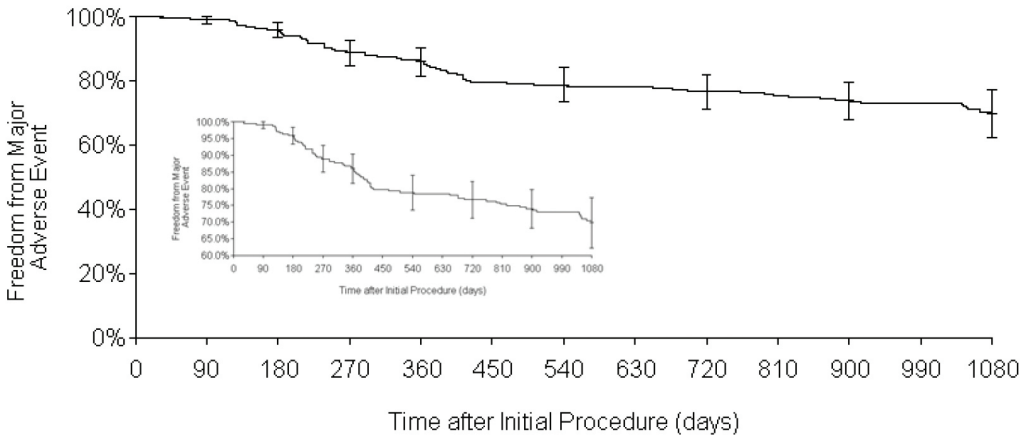
Table 5 – Primary Safety Endpoint				
1-Month (30-Day) Primary Safety Endpoint	**S.M.A.R.T. (N=248 Patients N=248 Lesions)**	**95% Confidence Interval***	**Performance Goal**	**Objective Met**
Absence of 30-Day Major Complications	100.0% (248/248)	[98.5%,100.0%]	88.0%	Yes
For each parameter in the safety measures, the denominator is the number of enrolled patients who had sufficient follow-up (at least 23 days for 1-month visit) plus any patients who had an event prior to the milestone visit. *Agresti-Coull method was used to calculate the 95% CI of the point estimate for the primary safety endpoint.				

Primary Endpoint Results of the Post-Approval Study

The key outcomes of the post-approval study are presented below in **Table 6.** At 3 years, 31.5% (70/222, one-sided upper bound of 97.5% CI: 38.1%) of the subjects experienced death, index limb amputation, or clinically driven TLR. This rate is significantly lower than the pre-specified performance metric of 57% ($p<0.001$). As a secondary analysis of the primary endpoint of the STROLL Post-Approval study, the Kaplan Meier estimate of the composite of death, index limb amputation, and clinically driven TLR was calculated. The estimate for the cumulative composite primary post-approval safety endpoint at 1080 days was 30.3%. These results demonstrate that the **S.M.A.R.T.** Vascular Self-Expandable Stent, in treating subjects with Obstructive Superficial Femoral Artery Disease, meets the pre-specified post-approval safety performance criteria.

Table 6 – 3-Year Composite Endpoint			
	S.M.A.R.T. (N=222 Patients N=222 Lesions)	**95% Confidence Interval***	**K-M Estimated Event Rate**
3-Year Composite Endpoint	31.5% (70/222)	38.1%*	30.3%
3-Year Death	9.9% (22/222)	[6.3%,14.6%]	
3-Year Clinically Driven TLR	22.5% (50/222)	[17.2%,28.6%]	
3-Year Index Limb Amputation	0.9% (2/222)	[0.1%,3.2%]	
*One-sided, upper-bound 97.5% Confidence Interval			

Figure 6. Freedom from Major Adverse Events through 3-Years



Adverse effects that occurred in the PMA clinical study:

There were twenty-two (22) subject deaths reported in this study. All deaths were classified by the Clinical Events Committee (CEC) as unrelated to the **S.M.A.R.T.** Stent.

Tables 7 provide a summary of the adverse events documented in the study. The data are presented as the total number of events as well as the percentage of subjects experiencing an AE at 3 years.

Table 7 – Summary of Adverse Events		
System Organ Class	**Events ≤ 3 Years[1]**	
	Number of Events	**Number of Patients (N=228 Patients)**
Any AE	188	49.56% (113/228)
Blood and lymphatic system disorders	2	0.88% (2/228)
Anaemia	2	0.88% (2/228)
Cardiac disorders	6	2.63% (6/228)
Acute myocardial infarction	1	0.44% (1/228)
Arrhythmia	1	0.44% (1/228)
Bradycardia	1	0.44% (1/228)
Cardiac failure	1	0.44% (1/228)
Cardio-respiratory arrest	1	0.44% (1/228)
Cardiovascular disorder	1	0.44% (1/228)
Gastrointestinal disorders	1	0.44% (1/228)
Upper gastrointestinal hemorrhage	1	0.44% (1/228)
General disorders and administration site conditions	8	3.07% (7/228)
Death	2	0.88% (2/228)
Multi-organ failure	1	0.44% (1/228)
Edema peripheral	1	0.44% (1/228)
Pain	3	0.88% (2/228)
Pyrexia	1	0.44% (1/228)
Infections and infestations	4	1.75% (4/228)
Gangrene	1	0.44% (1/228)
Sepsis	2	0.88% (2/228)
Septic shock	1	0.44% (1/228)
Injury, poisoning and procedural complications	85	28.51% (65/228)
Arterial restenosis	12	4.39% (10/228)
Catheter site hematoma	5	2.19% (5/228)
Catheter site hemorrhage	4	1.75% (4/228)
Device failure	2	0.88% (2/228)
In-stent arterial restenosis	55	20.18% (46/228)
Procedural hypotension	1	0.44% (1/228)
Stent occlusion	4	1.75% (4/228)
Thrombosis in device	1	0.44% (1/228)
Vessel perforation	1	0.44% (1/228)
Musculoskeletal and connective tissue disorders	14	5.70% (13/228)
Muscle hemorrhage	1	0.44% (1/228)
Pain in extremity	13	5.26% (12/228)
Neoplasms benign, malignant and unspecified (incl. cysts and polyps)	8	3.51% (8/228)
Adenoma benign	1	0.44% (1/228)
Gastric cancer	1	0.44% (1/228)
Glioblastoma	1	0.44% (1/228)
Hepatic neoplasm malignant	1	0.44% (1/228)
Lung neoplasm malignant	2	0.88% (2/228)
Mesothelioma malignant	1	0.44% (1/228)
Urethral cancer metastatic	1	0.44% (1/228)
Nervous system disorders	1	0.44% (1/228)
Hypoaesthesia	1	0.44% (1/228)

Table 7 – Summary of Adverse Events		
System Organ Class	**Events ≤ 3 Years[1]**	
	Number of Events	**Number of Patients (N=228 Patients)**
Renal and urinary disorders	2	0.88% (2/228)
Nephropathy	1	0.44% (1/228)
Renal failure acute	1	0.44% (1/228)
Respiratory, thoracic and mediastinal disorders	2	0.88% (2/228)
Chronic obstructive pulmonary disease	1	0.44% (1/228)
Pneumonia aspiration	1	0.44% (1/228)
Vascular disorders	55	18.42% (42/228)
Arterial thrombosis limb	3	0.88% (2/228)
Arteriosclerosis	1	0.44% (1/228)
Femoral arterial stenosis	3	1.32% (3/228)
Femoral artery dissection	10	4.39% (10/228)
Femoral artery occlusion	3	1.32% (3/228)
Intermittent claudication	30	11.40% (26/228)
Peripheral ischemia	3	1.32% (3/228)
Vascular pseudoaneurysm	2	0.88% (2/228)
[1] Denominator for events at ≤ 3 years includes subjects who died or who had adequate follow-up for 3-year visit (through 1020 days).		

Effectiveness Results:
The analysis of primary effectiveness was based on 215 evaluable patients at the 12-month time point, as shown in **Table 8** below.

The primary effectiveness of the **S.M.A.R.T.** Stent System was compared to the predetermined VIVA Objective Performance Goal (OPG) of 66% primary patency, using a Peak Systolic Velocity (PSV) ratio ≤ 2.0 and no further clinically driven Target Vessel Revascularization (TVR). The mean primary patency rate as a measure of primary effectiveness at 12 months was 66.5%, with a lower two-sided 95% CI of 59.8%. The lower confidence interval was not greater than the performance goal of 66%, so the effectiveness endpoint was not met.

In further consideration of the overall device performance as well as to allow the application of a more modern study design, a secondary analysis of the data was also performed. The secondary analysis applied the modified VIVA criteria which uses a higher PSV ratio and a Target Lesion Revascularization (TLR) in place of TVR. Using these modified criteria of a PSV ratio < 2.5 and no further clinically driven TLR, the mean primary patency rate as a measure of primary effectiveness at 12 months was 71.2% with a lower 95% CI of 64.8%. See **Table 8** below.

Table 8– Primary Effectiveness Endpoint				
	S.M.A.R.T. (N=250 Patients N=250 Lesions)	**95% Confidence Interval[3]**	**Performance Goal**	**Objective Met**
Primary Endpoint				
12-Month Primary Effectiveness[1] (protocol-defined)	66.5% (143/215)	[59.8%,72.8%]	66%	No
Primary DUS Stent Patency[2] (PSV ratio ≤ 2.0)	77.0% (144/187)	[70.3%,82.8%]	n/a	
Absence of Clinically Driven TVR	86.4% (203/235)	[81.3%,90.5%]	n/a	
12-Month Primary Effectiveness[1] (modified VIVA criteria)	71.2% (153/215)	[64.8%,76.8%]	66%	No
Primary DUS Stent Patency[2] (PSV ratio < 2.5)	81.1% (154/190)	[74.7%,86.4%]	n/a	
Absence of Clinically Driven TLR	87.7% (206/235)	[82.8%,91.6%]	n/a	

[1] 12-month primary effectiveness, a composite endpoint, is based on 215 available patients in the modified ITT population.
There were 35 patients who were not included in the analysis of 12-month primary effectiveness:
- 5 patients died
- 30 patients did not complete 12-month follow-up (withdrew consent, no Duplex ultrasound assessment at 12 months)

The number of available patients for this endpoint is the sum of the number of patients who had ultrasound within the 12-month window and the number of patients whose TLR/TVR was evaluable but who had no ultrasound by 12 months (i.e. patients had revascularization within 360 days or had sufficient follow-up for revascularization evaluation by 330 days). There were four (4) patients who overlap and met both criteria.

[2] Primary DUS stent non-patency is binary restenosis defined as diameter stenosis > 50% with a specific peak systolic velocity ratio as measured by Duplex ultrasound.

[3] Agresti-Coull method was used to calculate the 95% CI of the point estimate for the primary effectiveness endpoint; exact (binomial) method was used to calculate the 95% CI of the point estimate for other endpoints.

The primary patency rate was also analyzed using the Kaplan Meier method. The analysis cohort consisted of all enrolled subjects. In analysis conducted using the protocol-defined primary effectiveness endpoint, the freedom from loss of primary patency (PSVR ≤ 2.0 and no clinically driven TVR) at 12 months was 86.7%. Using the modified VIVA criteria for defining 12-month primary patency (PSVR < 2.5 and no clinically driven TLR), the freedom from loss of primary patency at 12 months was 87.9%.

Secondary Effectiveness Endpoints:
Acute success was one of the secondary endpoints for the STROLL study. Acute success is comprised of 3 components, as indicated in **Table 9** below:

Table 9 – Acute Procedural Success Endpoint

	S.M.A.R.T. (N=250 Patients N=250 Lesions)	95% Confidence Interval
Device Success	99.2% (248/250)	[97.1%, 99.9%]
Technical (Lesion) Success	100.0% (250/250)	[98.5%, 100.0%]
Procedural Success	100.0% (250/250)	[98.5%, 100.0%]

Device success is defined as achievement of a final residual diameter stenosis of <50% (by QA), using the assigned treatment only for the intended purpose of treating the target lesion, regardless of whether any non-study stents were used to treat complications or lesions outside the target limb SFA.
Technical (lesion) success is defined as the attainment of <50% residual stenosis by Quantitative Angiography (QA) using any percutaneous method.
Procedural success is defined as achievement of a final diameter stenosis of <50% (by QA) using any percutaneous method, without the occurrence of death, index limb amputation or repeat revascularization of the target lesion during the hospital stay.

When using the protocol-defined criteria of target vessel patency (PSV ratio ≤ 2.0; TVR), the rate at 2 years was 61.0% (125/205). When using the modified VIVA criteria (PSV ratio < 2.5; TLR), the target vessel patency rate at 2 years was 64.7% (132/204). The 24-month patency rate was also analyzed using the Kaplan Meier method. The analysis cohort consisted of all enrolled subjects. In analysis conducted using protocol-defined patency, the freedom from loss of patency (PSVR ≤ 2.0 and no clinically driven TVR) at 24 months was 78.8%. Using the modified VIVA criteria for defining 24-month patency (PSVR < 2.5 and no clinically driven TLR), the freedom from loss of patency at 24 months was 80.5%. When using the protocol-defined criteria of target vessel patency (PSV ratio ≤ 2.0; TVR), the rate at 3 years was 57.2% (107/187). When using the modified VIVA criteria (PSV ratio < 2.5; TLR), the target vessel patency rate at 3 years was 61.1% (113/185). The 36-month patency rate was also analyzed using the Kaplan Meier method. The analysis cohort consisted of all enrolled subjects. In analysis conducted using protocol-defined patency, the freedom from loss of patency (PSVR ≤ 2.0 and no clinically driven TVR) at 36 months was 69.4%. Using the modified VIVA criteria for defining 36-month patency (PSVR < 2.5 and no clinically driven TLR), the freedom from loss of patency at 36 months was 72.7%. ABI results remained fairly constant at 3 years post-procedure with 76.5% (137/179) of the patients having ABI of > 0.8, 22.3% (40/179) having ABI of 0.4 to 0.8 and only 1.1% (2/179) having ABI of < 0.4. At 3 years post-procedure, the majority of patients, 57.8% (104/180), were classified as Rutherford/Becker category 0, 20.0% (36/180) were classified as Rutherford/Becker 1, 11.7% (21/180) were classified as Rutherford/Becker 2, 9.4% (17/180) were classified as Rutherford/Becker 3 and 1.1% (2/180) were classified as Rutherford/Becker 4.

Study Strengths and Limitations: The outcomes of the STROLL Post-Approval Study were assessed in the same patients enrolled into the STROLL study and followed through 3 years. The STROLL study enrolled a total of 250 subjects between August 14, 2008 and March 15, 2010 at 39 U.S. investigational sites. The sample size provided sufficient power to perform the long-term safety analysis of the primary endpoint of the STROLL Post-Approval Study. However, this sample size may be considered relatively small for collecting post-market data. In addition, while the data were collected with high quality, the patient population treated in the real-world setting could be more complex.

Conclusion: Overall, the results from non-clinical and clinical evaluations provide reasonable assurance that the **S.M.A.R.T. CONTROL** and **S.M.A.R.T.** Vascular Stent Systems are safe and effective. While the prespecified primary effectiveness endpoint was not met, the study results are similar to the results for other US marketed stents intended for use in patients with SFA and proximal popliteal artery lesions. The benefits of use of the **S.M.A.R.T. CONTROL** and **S.M.A.R.T.** Vascular Stent Systems for the target population outweigh the risk of illness or injury when used as indicated in accordance with the labeling and Instructions for Use (IFU).

XV. Summary of Clinical Investigations for Iliac Indications
A multi-center, randomized, concurrently controlled study was conducted at 20 sites in the US (The CRISP-US Study). The primary objective of this study was to assess the equivalent performance of the S.M.A.R.T. Vascular Stent System and the Schneider WALLSTENT™ Iliac Endoprosthesis. This study was performed on patients with de novo or restenotic lesions in the common and/or external iliac artery, based on a composite of 9-month restenosis rate via duplex ultrasound or angiography, and the presence of any adverse clinical outcomes (defined as peri-procedural (30 day) death or repeat revascularization of the target vessel at the 9-month follow-up visit).

A total of 203 subjects with 226 lesions were treated in the study. 102 patients with 114 lesions were randomized to receive the S.M.A.R.T. Nitinol Stent while 101 patients with 112 lesions were randomized to receive the WALLSTENT Endoprosthesis device. This CRISP-US study, together with preclinical data showing the design equivalence of the S.M.A.R.T. Vascular Stent System and the S.M.A.R.T. CONTROL Vascular Stent System, was used to provide reasonable assurance of the safety and effectiveness of the S.M.A.R.T. CONTROL Vascular Stent System.

Study Endpoints: The primary endpoint was a composite of 9-month restenosis rate, peri-procedural (30 day) death, and target vessel revascularization at the 9-month follow-up visit. Secondary endpoints included adverse events and clinical and hemodynamic status at 1, 6, 9, and 12 months as determined by changes in the Ankle/Brachial Index (ABI), Thigh/Brachial Index (TBI), Rutherford/Becker Scale and Walking Impairment Questionnaire.

An independent clinical events committee adjudicated all of the major adverse events (MAEs) and deaths. All duplex and angiographic measurements were determined by independent central laboratories. Endpoints were analysed on an intent-to-treat basis.

Patients Studied: Eligible patients had either de novo or restenotic lesions in the common and/external iliac artery of up to 145 mm in length with a documented suboptimal PTA result, a reference vessel diameter of 4 to 9 mm, and angiographic evidence of a patent profunda or superficial femoral artery. Baseline characteristics for the patients in the CRISP-US study are presented in **Table 10.**

Table 10. Baseline Demographics and Clinical Characteristics

Patient Characteristic	S.M.A.R.T. (N=102)	WALLSTENT (N=101)	All Randomized (N=203)	Difference [95% C.I.]	P-Value
Age (years)* Mean±SD (N)	65.8 ± 11.00 (102)	66.6 ± 9.67 (101)	66.2 ± 10.34 (203)	0.8% [0.2%, 3.0%]	0.597
Number of men* History of Peripheral Vascular	62.7% (64/102)	61.4% (62/101)	62.1% (126/203)	-1.3% [-15%, 12.1%]	0.817
Disease (PVD)*	89.2% (91/102)	94.1% (95/101)	91.6% (186/203)	4.9%[-2.7%, 12.5%]	0.031
Diabetes mellitus*	21.6% (22/102)	30.7% (31/101)	26.1% (53/203)	9.1%[-2.9%, 21.1%]	0.164
History of smoking*	90.2% (92/102)	92.1% (93/101)	91.1% (185/203)	1.9%[-5.9%, 9.7%]	0.768
Reference vessel diameter (mm)** Mean±SD (N)	7.9 ± 1.71(118)	7.4 ± 2.12(114)	7.7±1.93(232)	-0.5 [-1.0, -0.0]	0.072
Minimal lumen diameter (mm)** Mean±SD (N)	2.9 ± 1.42(118)	2.5 ± 1.50(114)	2.7 ± 1.47(232)	-0.4 [-0.8, -0.0]	0.041
Lesion length (mm)** Mean±SD (N)	24.7 ±15.60 (115)	24.5 ± 19.11(114)	24.6 ± 17.39 (229)	-0.2 [-4.7, 4.3]	0.921
Percent diameter stenosis (mm)** Mean±SD (N)	62.6 ± 17.20 (118)	65.7 ± 15.45 (114)	64.1 ± 16.40 (232)	3.1 [-1.1, 7.3]	0.149

*Variables are counted by patient
**Variables are counted by lesion

Methods: Informed consent, baseline demographics and medical history data were collected prior to treatment. Patients eligible for the study underwent a PTA and were randomized following an angiographically documented suboptimal result defined by the presence of an unfavorable lesion morphology such as: a) a documented inadequate angiographic and/or hemodynamic result as defined by a 30% or greater residual stenosis resultant to PTA, lesion recoil or intimal flaps and/or b) flow limiting dissections post PTA longer than the initial lesion length, and/or c) a 5 mm Hg, or greater mean transtenotic pressure gradient post PTA. Lesions treated could be single, multiple, and/or bilateral. Baseline quantitative angiography was performed pre-procedure, post-PTA, and post-procedure in all patients. Duplex Ultrasound was performed prior to discharge.

Clinical follow-up visits were conducted at 1, 6, 9 and 12 months post-procedure. Patients were to receive aspirin (81 to 325 mg/day) for at least 3 months following hospital discharge. Duplex Ultrasound was utilized in all patients to make an initial determination of restenosis at the 9-month follow-up. If restenosis was observed by Duplex Ultrasound, or if the Duplex Ultrasound was non-diagnostic, a confirmatory angiogram was performed to document the amount of restenosis present. Computer assisted quantitative angiographic analysis (QA) and Duplex Ultrasound were performed at central laboratories.

Results: Visit compliance at 9 months was 88.2% (90/102) vs. 81.2% (82/101) in the S.M.A.R.T. Nitinol Stent vs. WALLSTENT Endoprosthesis groups, respectively; of the returning patients, compliance to duplex/angiographic follow-up was 84.7% (83/98) and 78.8% (78/99) patients, respectively. Based on analysis of a composite of 1) 9-month restenosis rate and 2) death within 30 days of the procedure or repeat revascularization of the target vessel (TVR), there was no difference between outcomes for patients receiving either the S.M.A.R.T. Nitinol Stent vs. the WALLSTENT Endoprosthesis after suboptimal PTA of a lesion in the iliac artery (6.9% vs. 5.9%). Both groups had comparably low rates of restenosis (3.5% vs. 2.7%), death (2.0% vs. 0.0%), and TVR (2.0% vs. 4.0%), respectively. Acute procedural success was achieved in 98.2% of patients receiving the S.M.A.R.T. Nitinol Stent compared to 87.5% in the WALLSTENT Endoprosthesis group, a difference of –11% (95% CI=-17% to -4.1%). Primary patency was maintained in 95% of all patients at 9 months. One patient in the S.M.A.R.T. Nitinol Stent group experienced a major adverse ischemic event in the hospital; at 9 months the occurrence was 4.9% vs.4.0% in the S.M.A.R.T. Nitinol Stent and WALLSTENT Endoprosthesis groups, respectively. The principal effectiveness and safety results are presented in **Table 11.** The freedom from major adverse ischemic events Kaplan-Meier curve is presented in **Figure 7.**

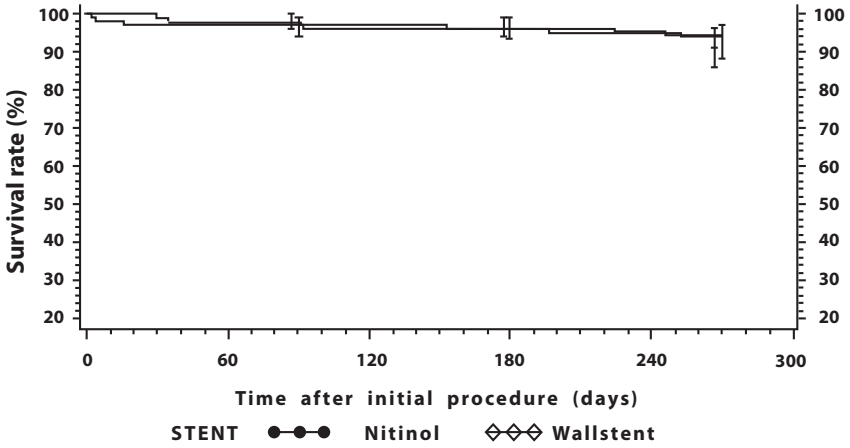
A higher percentage of males (62%) than females (38%) were included in the trial. Evaluation of 9-month restenosis by gender showed no significant difference between groups of either gender, although incidents of restenosis occurred more frequently in males in the WALLSTENT Endoprosthesis group (4 to 0, male to female). Acute procedural success was more likely to occur in males in the S.M.A.R.T. Nitinol Stent group, which had 100% success compared with 81.5% in the WALLSTENT Endoprosthesis group, a significant difference of -19% (95% CI=-28%, -9.1%). There were no significant differences between the females in either treatment group in acute procedural success, or in the early or late clinic success rates for either gender. The occurrence of major adverse events was comparable between treatment groups for both males and females. A larger percentage of females experienced events than did males overall, although the total number of events was too small to make this difference statistically significant.

Table 11 Principal Effectiveness and Safety Results - All Patients Treated (N=203)

Effectiveness Measure	S.M.A.R.T. (N=102)	WALLSTENT (N=101)	Difference [95% C.I.]	P-Value
Composite Endpoint*	6.9% (7/102)	5.9% (6/101)	-1.0% [-7.7%, 5.7%]	1.000
9-month restenosis rate**	3.5% (4/114)	2.7% (3/112)	-0.8% [-5.3%, 3.7%]	1.000
Death within 30 days*	2.0% (2/102)	0.0% (0/101)	-2.0% [-4.7%, 0.7%]	0.498
TV-revascularization at 9 months*	2.0% (2/102)	4.0% (4/101)	2.0%,[-2.7%, 6.7%]	0.445
Effectiveness Measures				
Acute procedural success**	98.2% (112/114)	87.5% (98/112)	-11% [-17%, -4.1%]	0.002
Early clinical success**	81.6% (93/114)	75.9% (85/112)	-5.7% [-16%, 4.9%]	0.331
Late clinical success**	64.9 (74/114)	66.1 (74/112)	1.2% [-11%, 13.6%]	0.889
Primary Patency to 9 months**	94.7% (108/114)	94.6% (106/112)	-0.1% [-6.0,%, 5.8%]	1.000
Revascularization within 9 months**	0.0% (0/114)	2.7% (3/112)	2.7% [-0.3%, 5.7%]	0.120
Bypass within 9 months**	1.8% (2/114)	0.9%(1/112)	-0.9% [-3.9%, 2.1%]	1.000
Safety Measures				
In-hospital MAIEs*	1.0% (1/102)	0.0% (0/101)	-1.0% [-2.9%, 0.9%]	1.000
Out-of-hospital MAIEs to 9 months*	3.9% (4/102)	4.0% (4/101)	-0.04% [-5.4%, 5.3%]	1.000
Cumulative MAIEs to 9 months*	4.9% (5/102)	4.0% (4/101)	-0.9% [-6.6%, 4.8%]	1.000
Stent thrombosis*	1.0% (1/102)	1.0% (1/101)	0.0% [-2.7%, 2.7%]	1.000
Major bleeding complications*	0.0% (0/102)	0.0% (0/101)	0.0% [0.0%, 0.0%]	—
Major vascular complications*	0.0% (0/102)	0.0% (0/101)	0.0% [0.0%, 0.0%]	—
CVA/TIA*	0.0% (0/102)	0.0% (0/101)	0.0% [0.0%, 0.0%]	—

*Variables are counted by patient.
** Variables are counted by lesion.
Numbers are % (counts/sample size) or Mean±SD
Relative risk = Risk of event in WALLSTENT Endoprosthesis group as compared to **S.M.A.R.T.** Stent; SE=sqrt[$(1-p_1)/n_{11}+(1-p_2)/n_{21}$] CI=RR*exp(±1.96SE)
Difference=WALLSTENT Endoprosthesis-**S.M.A.R.T.** Stent; SE=sqrt(p1•q1/n1+p2•q2/n2) CI=Diff±1.96•SE
Primary Endpoint = A composite of 1) nine-month restenosis rate via duplex ultrasound of the CFA and 2) the presence of any adverse clinical outcome defined as a) peri-procedural (30-day) death or b) repeat revascularization of the target vessel at the 9-month follow-up visit.
Acute Procedural Success = Vessels with 30% residual stenosis immediately after stent placement. Mean transtenotic pressure gradient < 5mmHg and no occurrence of a procedure related adverse event within the Lab. This is determined at both clinical site and the core lab.
Early Clinical Success = Vessels with Rutherford/Becker Classification>=1 at the latest follow-up between baseline and 30-day posttreatment follow-up.
Late Clinical Success = Maintenance of achieved improvement in the appropriate segmental limb pressure index (ABI and TBI) which if not normalized (>.90) must have increased by at least 0.10 over the initial preoperative level and not have deteriorated by more than 0.15 from the maximum early post-procedure level.
MAIE = Major adverse ischemic events = Death to 30 days, in-hospital MI, TVR, or amputation.
Primary patency = continuous flow without revascularization, determined as any patient who did not die, and did not have a revascularization, amputation, or bypass within the first 9 months. Presented as proportion of patients with primary patency.
Revascularization = continuous flow assisted by revascularization within the first 9 months, excluding bypass ("Primary assisted patency"). Bypass = reestablishment of flow to distal arteries following bypass of the target vessel ("Secondary patency")
Note: 9-month patency endpoints unavailable for lesions in patients not surviving to 9 months **(S.M.A.R.T.** Stent =4, WALLSTENT=2).

Figure 7. Freedom from Major Adverse Ischemic Events - All Patients Treated (N=203)



S.M.A.R.T. Nitinol Stent

Category	90 Days	180 Days	270 Days
# Entered	102	98	98
# Censored	0	0	96
# At Risk	102	98	50
# Events	4	0	2
# Events / Month	1.333	0	0.6667
% Survived	96.1	96.1	92.2
SE %	1.9	1.9	3.2

WALLSTENT

Category	90 Days	180 Days	270 Days
# Entered	101	99	97
# Censored	0	0	95
# At Risk	101	99	49
# Events	2	2	2
# Events / Month	0.667	0.6667	0.6667
% Survived	98.0	96.0	92.2
SE %	1.4	1.9	3.3

Test of Equality over Strata

Test	Chi-Square	DF	Pr>Chi- Square
Log-rank	0.1065	1	0.7442
Wilcoxen	0.0929	1	0.7605
-2Log(LR)	0.1089	1	0.7414

Observed Adverse Events

A total of 203 patients were enrolled in the CRISP-US study, a multicenter, randomized, concurrently controlled study comparing the **S.M.A.R.T. Vascular Stent System** to the Schneider WALLSTENT Iliac Endoprosthesis. Patients with a suboptimal PTA result during the treatment of a de novo or restenotic lesion in the common and/or external iliac artery were randomized to either the **S.M.A.R.T.** Nitinol Stent (N=102) or the WALLSTENT Endoprosthesis (N=101). This CRISP-US study, together with preclinical data showing the design equivalence of the **S.M.A.R.T. Vascular Stent System** and the **S.M.A.R.T. CONTROL Vascular Stent System**, was used to provide reasonable assurance of the safety and effectiveness of the **S.M.A.R.T. CONTROL Vascular Stent System.**

Table 12 below summarizes major adverse events reported in both treatment groups to 9 months. Two patients in the **S.M.A.R.T.** Nitinol Stent treatment group died within the first 30 days. One patient developed acute renal insufficiency and died in the hospital 4 days after the procedure. A second patient was discharged but returned to the emergency room 2 days after his procedure. The patient's condition deteriorated, and the patient died 3 days after the procedure of unknown causes. Both deaths were believed to be procedure-related. Other major adverse events reported in the **S.M.A.R.T.** Nitinol Stent treatment group include amputation of the target limb (n=1), target vessel revascularization (n= 2), and stent thrombosis (n= 1). Other major adverse events reported in the WALLSTENT Endoprosthesis treatment group include target vessel revascularization (n=4) and stent thrombosis (n=1).

There were seven additional deaths that were not related to the device or the procedure, two in the **S.M.A.R.T.** Nitinol Stent treatment group and five in the WALLSTENT Endoprosthesis treatment group. The two deaths in the **S.M.A.R.T.** Nitinol Stent treatment group were non-cardiac: one patient died at 229 days of complications secondary to congestive heart failure and one patient died at 246 days of a lymphoproliferative disorder. Three of the deaths in the WALLSTENT Endoprosthesis treatment group were cardiac: one patient died at 92 days following an MI, one patient died at 302 days due to cardiac arrest, and one patient died at 465 days due to coronary atherosclerosis. The remaining two deaths in the WALLSTENT Endoprosthesis treatment group were non-cardiac: one patient died at 253 days following surgery for bladder cancer and one patient died at 306 days from lung cancer.

Table 12. Major Adverse Events In-Hospital and Out-of-Hospital (to 9 months)					
Description of Event	**S.M.A.R.T. (N=102)**	**WALLSTENT (N=101)**	**All Randomized (N=203)**	**Relative Risk [95% C.I.]**	**P-Value**
In-Hospital Complications					
MAIE	1.0% (1/102)	0.0% (0/101)	0.5% (1/203)	N/A	1.000
Death	1.0% (1/102)	0.0% (0/101)	0.5% (1/203)	N/A	1.000
MI (in-hospital)	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Amputation of the target limb	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Target vessel revascularization	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Stent thrombosis	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Major bleeding complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Major vascular complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
CVA / TIA	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Out-of-Hospital Complications (to 9 months)					
MAIE	3.9% (4/102)	4.0% (4/101)	3.9% (8/203)	1.0 [0.3, 3.9]	1.000
Death (30 days)	1.0% (1/102)	0.0% (0/101)	0.5% (1/203)	N/A	1.000
Amputation of the target limb	1.0% (1/102)	0.0% (0/101)	0.5% (1/203)	N/A	1.000
Target vessel revascularization	2.0% (2/102)	4.0% (4/101)	3.0% (6/203)	2.0 [0.4, 10.8]	0.445
Stent thrombosis	1.0% (1/102)	1.0% (1/101)	1.0% (2/203)	1.0 [0.1, 15.9]	1.000
Major bleeding complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Major vascular complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
CVA / TIA	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Cumulative Complications (to 9 months)					
MAIE	4.9% (5/102)	4.0% (4/101)	4.4% (9/203)	0.8 [0.2, 3.0]	1.000
Death (30 days)	2.0% (2/102)	0.0% (0/101)	1.0% (2/203)	N/A	0.498
MI (in-hospital)	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Amputation of the target limb	1.0% (1/102)	0.0% (0/101)	0.5% (1/203)	N/A	1.000
Target vessel revascularization	2.0% (2/102)	4.0% (4/101)	3.0% (6/203)	2.0 [0.4, 10.8]	0.445
Stent thrombosis	1.0% (1/102)	1.0% (1/101)	1.0% (2/203)	1.0 [0.1, 15.9]	1.000
Major bleeding complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
Major vascular complications	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—
CVA / TIA	0.0% (0/102)	0.0% (0/101)	0.0% (0/203)	N/A	—

A subject was counted at most once for multiple occurrences of an adverse event. All variables were judged by the Clinical Events Committee (CEC). MAIE (Major Adverse Ischemic Event) was defined as death within 30 days, in-hospital myocardial infarction, amputation of the target limb, or target vessel revascularization. Relative risk = Risk of event in the WALLSTENT group as compared to the **S.M.A.R.T.** Stent; SE= SE=sqrt[(1-p_1)/n_{11}+(1-p_2)/$n2_1$] CI=RR*exp(±1.96SE)

Observed Device Malfunctions

There were no delivery failures or device malfunctions observed with the **S.M.A.R.T. Vascular Stent System.** There were four failures to deploy at the intended location observed with the Schneider WALLSTENT Iliac Endoprosthesis. In two cases, the stent was removed and a non-study stent was placed. In the other two cases, an additional WALLSTENT was placed.

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