AngioSculpt® PTCA

Scoring Balloon Catheter

AngioSculpt® Percutaneous Transluminal Coronary Angioplasty (PTCA) Scoring Balloon Catheter

Rapid Exchange (RX), Easy Exchange (EX), and Over-the-Wire (OTW) Delivery Systems

INSTRUCTIONS FOR USE (IFU)

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Instructions For Use (IFU)

CAUTION: Federal (USA) law restricts this device to sale by or on the order of a physician.

CAREFULLY READ ALL INSTRUCTIONS PRIOR TO USE. FAILURE TO OBSERVE ALL WARNINGS AND PRECAUTIONS MAY RESULT IN COMPLICATIONS.

NOTE: These instructions apply to all balloon diameters and lengths.

STERILE: Sterilized with ethylene oxide gas. Non-pyrogenic. **Do not use if the package is open or damaged.**

CONTENTS: One (1) AngioSculpt® Scoring Balloon Catheter

STORAGE: Store in a dry, dark, cool place.

DEVICE NAME

The device name is the AngioSculpt Scoring Balloon Catheter; the generic name is scoring percutaneous transluminal coronary angioplasty (PTCA) catheter.

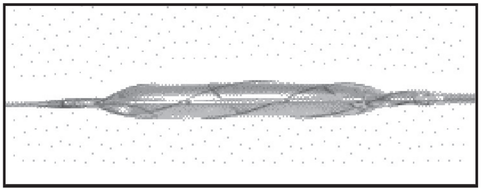
DEVICE DESCRIPTION

The AngioSculpt Scoring Balloon Catheter is a standard PTCA catheter with a scoring balloon near the distal tip. The balloon is designed to expand to a specified diameter and length at a specified pressure. The distal end of the catheter has a conventional nylon-blend balloon and a nitinol scoring element with three spiral struts that wrap around the balloon. The struts create focal concentrations of dilating force, which minimizes balloon slippage and assists in the luminal expansion of stenotic arteries. Conventional radiopaque markers aid in positioning the balloon in the stenosis.

Figure 1 shows the distal section of the catheter with the scoring balloon. The proximal end of the balloon is connected to a balloon inflation channel.

The product is offered on rapid exchange (RX), easy exchange (EX), and over-the-wire (OTW) delivery platforms, and is available in balloon diameters of 2.0 – 3.5 mm in 0.5 mm increments, and in scoring balloon lengths of 10, 15 and 20 mm. The rapid exchange (RX) platform includes an additional balloon length of 6mm in all diameters: 2.0 – 3.5mm in 0.5mm increments. The catheter length is approximately 137-139 cm depending on the platform and is compatible with 0.014-inch guide wires and 6F guide catheters. The catheter is supplied sterile and is intended for a single use.

Figure 1: Distal Section of AngioSculpt Scoring Balloon Catheter



INDICATIONS

The AngioSculpt Scoring Balloon Catheter is indicated for use in the treatment of hemodynamically significant coronary artery stenosis, including in-stent restenosis and complex type C lesions, for the purpose of improving myocardial perfusion.

CONTRAINDICATIONS

The AngioSculpt catheter should not be used for the following:

- Coronary artery lesions unsuitable for treatment by percutaneous revascularization.
- Coronary artery spasm in the absence of a significant stenosis.

WARNINGS

- Administer appropriate antiplatelet, anticoagulant and coronary vasodilator therapy, consistent with institutional practice for coronary stent procedures, during and after the procedure.
- This device is intended for single (one) use only. Do not resterilize and/or reuse, as this can potentially result in compromised device performance and increased risk of inappropriate resterilization and cross contamination.
- For use in *de novo* or in-stent restenosis (ISR) lesions, the inflated diameter size of the balloon should

approximate the vessel diameter size just proximal and distal to the stenosis, in order to reduce potential vessel damage. When used to pre-dilate the lesion prior to pre-planned stenting, the catheter should be one size smaller than the estimated vessel diameter (e.g., a 2.5mm diameter device should be used in a vessel estimated to have a 3.0mm diameter).

- PTCA in patients who are not acceptable candidates for coronary artery bypass graft surgery require careful consideration, including possible hemodynamic support during PTCA, as treatment of this patient population carries special risk.
- When the catheter is exposed to the vascular system, it should be manipulated while under high quality fluoroscopic observation. Do not advance or retract the catheter unless the balloon is fully deflated under vacuum. If resistance is met during manipulation, determine the cause of the resistance before proceeding.
- Do not exceed the rated burst pressure (RBP) during balloon inflation. The RBP is based on results of in-vitro testing. At least 99.9% of the balloons (with 95% confidence) will not burst at or below their RBP. Use of a pressure monitoring device is recommended to prevent over-pressurization.
- PTCA should only be performed at hospitals where emergency coronary artery bypass graft surgery can be quickly performed in the event of a potential cardiovascular injury or life-threatening complication.
- Use only the recommended balloon inflation medium. Never use air or any gaseous medium to inflate the balloon.
- Use the device prior to the expiration date specified on the package.

PRECAUTIONS

- Take extra care when using the AngioSculpt catheter to treat a lesion distal to a freshly deployed stent. This precaution is particularly applicable to a drug-eluting stent so as to minimize the risk of damage to the stent coating.
- Prior to angioplasty, examine the catheter to verify functionality, catheter integrity and to ensure that its size and length are suitable for the specific procedure for which it is to be used.
- Only physicians trained in the performance of percutaneous transluminal coronary angioplasty should use the AngioSculpt catheter.
- Do not rotate the catheter shaft in excess of 180 degrees when the tip is constrained.
- Do not rotate the catheter luer hub in excess of five (5) turns during use.
- Do not advance or retract the AngioSculpt catheter over the floppy portion of the guide wire.
- Catheter manipulation, including advancement and retraction, should be performed by grasping the catheter shaft.
- If unusual resistance is felt when the catheter is being manipulated or if it is suspected that the guide wire has become kinked, carefully remove the entire catheter system (AngioSculpt catheter and steerable guide wire) as a unit.
- If fluoroscopic guidance indicates that the AngioSculpt catheter has advanced beyond the end of the guide wire, withdraw the catheter and reload the wire before advancing again.

ADVERSE EFFECTS

Possible adverse effects include, but are not limited to, the following:

- Death
- Heart Attack (acute myocardial infarction)
- Total occlusion of the treated coronary artery
- Coronary artery dissection, perforation, rupture, or injury
- Pericardial tamponade
- No/slow reflow of treated vessel
- Emergency coronary artery bypass (CABG)
- Emergency percutaneous coronary intervention
- CVA/stroke
- Pseudoaneurysm
- Restenosis of the dilated vessel
- Unstable angina
- Thromboembolism or retained device components
- Irregular heart rhythm (arrhythmias, including life-threatening ventricular arrhythmias)
- Severe low (hypotension)/high (hypertension) blood pressure
- Coronary artery spasm
- Hemorrhage or hematoma
- Need for blood transfusion
- Surgical repair of vascular access site
- Creation of a pathway for blood flow between the artery and the vein in the groin (arteriovenous fistula)
- Drug reactions, allergic reactions to x-ray dye (contrast medium)
- Infection

Observed Adverse Events

A total of 200 patients were enrolled in the AngioSculpt catheter pivotal IDE clinical trial, a prospective, multi-center, non-randomized, single-arm study. The primary objective of the study was to evaluate safety and efficacy of the AngioSculpt catheter in a wide range of coronary artery lesions in both native vessels and following in-stent restenosis (ISR).

Table 1 provides a summary of the Major Adverse Cardiac Events (MACE) observed in the AngioSculpt catheter multi-center IDE study, as determined by the Clinical Events Committee (CEC). MACE was defined as death, Q wave or non-Q wave myocardial infarction (MI) or target lesion revascularization (TLR).

Table 1: Summary of Principal Adverse Event Rates Observed in the IDE Study		
	Aggregate	**95% C.I.**
In-Hospital Complications	**% of patients (number of events)**	
MACE (Death, MI, TLR)	1.5% (3/200)	(0.3%, 4.3%)
Death	0.0% (0/200)	(0.0%, 1.8%)
MI (Q or Non-Q wave)	1.5% (3/200)	(0.3%, 4.3%)
Q wave MI	0.5% (1/200)	(0.0%, 2.8%)
Non-Q wave MI*	1.0% (2/200)	(0.1%, 3.6%)
Target Lesions Revascularization (TLR)	0.0% (0/200)	(0.0%, 1.8%)
TLR PTCA	0.0% (0/200)	(0.0%, 1.8%)
TLR CABG	0.0% (0/200)	(0.0%, 1.8%)
Target Vessel Revascularization(TVR)	0.0% (0/200)	(0.0%, 1.8%)
TVR PTCA	0.0% (0/200)	(0.0%, 1.8%)
TVR CABG	0.0% (0/200)	(0.0%, 1.8%)
Thrombosis	0.5% (1/200)	(0.0%, 2.8%)
Acute Thrombosis	0.5% (1/200)	(0.0%, 2.8%)
Confirmed	0.0% (0/200)	(0.0%, 1.8%)
Presumed	0.5% (1/200)	(0.0%, 2.8%)
Sub-Acute Thrombosis	0.0% (0/200)	(0.0%, 1.8%)
Confirmed	0.0% (0/200)	(0.0%, 1.8%)
Presumed	0.0% (0/200)	(0.0%, 1.8%)
Out-of hospital Complications		
MACE (Death, MI, TLR)	1.0% (2/200)	(0.1%, 3.6%)
Death	0.0% (0/200)	(0.0%, 1.8%)
MI (Q or Non-Q)	1.0% (2/200)	(0.1%, 3.6%)
Q wave MI	1.0% (2/200)	(0.1%, 3.6%)
Non-Q wave MI	0.0% (0/200)	(0.0%, 1.8%)
TLR	1.0% (2/200)	(0.1%, 3.6%)
TLR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TLR CABG	0.5% (1/200)	(0.0%, 2.8%)
Target Vessel Revascularization(TVR)	1.0% (2/200)	(0.1%, 3.6%)
TVR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TVR CABG	0.5% (1/200)	(0.0%, 2.8%)
Sub-Acute Thrombosis	1.0% (2/200)	(0.1%, 3.6%)
Confirmed	1.0% (2/200)	(0.1%, 3.6%)
Presumed	0.0% (0/200)	(0.0%, 1.8%)

Table 1: Summary of Principal Adverse Event Rates Observed in the IDE Study (continued)		
	Aggregate	**95% C.I.**
Cumulative Complications	**% of patients (number of events)**	
MACE (Death, MI, TLR)	2.5% (5/200)	(0.8%, 5.7%)
Death	0.0% (0/200)	(0.0%, 1.8%)
MI (Q or Non-Q)	2.5% (5/200)	(0.8%, 5.7%)
Q wave MI	1.5% (3/200)	(0.3%, 4.3%)
Non-Q wave MI	1.0% (2/200)	(0.1%, 3.6%)
TLR	1.0% (2/200)	(0.1%, 3.6%)
TLR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TLR CABG	0.5% (1/200)	(0.0%, 2.8%)
Target Vessel Revascularization (TVR)	1.0% (2/200)	(0.1%, 3.6%)
TVR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TVR CABG	0.5% (1/200)	(0.0%, 2.8%)
Thrombosis	1.5% (3/200)	(0.3%, 4.3%)
Confirmed	1.0% (2/200)	(0.1%, 3.6%)
Presumed	0.5% (1/200)	(0.0%, 2.8%)

* Non-Q wave MI is defined as elevation of the CPK to >3x the upper limit of normal (associated with an abnormally elevated Troponin-I) without the development of new pathologic Q-waves.

In addition to MACE, a total of 23 patients experienced a non-MACE cardiovascular event and 37 patients experienced a non-cardiovascular event, as reported by the clinical sites. Among these events, the principal cardiovascular events were classified as unstable angina (3%), coronary artery injury (1.5%), hypotension (1.5%), and hematoma or excessive blood loss/hemorrhage requiring transfusion (1.5%). The coronary artery injuries consisted of 2 residual post-stenting dissections, 1 non-device related perforation, and 0 ruptures. These events have been associated with the use of other PTCA catheters.

SUMMARY OF CLINICAL STUDIES

European Multi-Center Clinical Investigation

An initial AngioSculpt catheter clinical study was performed at two clinical sites outside the United States. This was a nonrandomized registry which enrolled 45 patients with a wide range of *de novo* lesions and in-stent restenosis (ISR). The primary safety objective was to demonstrate that the incidence and severity of device-related complications (MACE: death, Q wave/non-Q wave myocardial infarction (MI), target lesion revascularization (TLR)) at one month follow-up were acceptably low. The primary performance objective was to demonstrate successful percutaneous revascularization (defined as a reduction in target lesion diameter stenosis to ≤ 50% following completion of all interventions and the absence of in-hospital MACE).

Forty-six lesions were treated with 100% procedural success. All patients completed the final 14-28 day clinical follow-up post procedure and experienced no MACE in-hospital or post discharge related to the study device. Additional six month follow-up beyond that required by the study protocol was performed at one clinical site. Six month angiographic and IVUS evaluations were performed on 11 patients treated with the AngioSculpt catheter for ISR. Only one patient (9%) demonstrated recurrent restenosis.

United States Clinical Investigation (Pivotal Study)

Objective

The primary objective of this study was to determine the safety and effectiveness of the AngioSculpt catheter in patients with single or multiple vessel coronary artery disease, in both *de novo* lesions and in-stent restenosis lesions.

Study Design

This study was conducted as a multi-center, non-randomized, single-arm prospective clinical study in patients with single or multiple vessel coronary artery disease scheduled to undergo percutaneous coronary intervention because of symptoms of stable or unstable angina pectoris. No more than two lesions were to be treated during the index procedure. The investigation was conducted at nine clinical sites and enrolled 200 patients. A subset of patients was evaluated with IVUS. All patients enrolled in this study were followed for 14-21 days post-procedure for any evidence of MACE (death, Q wave or non-Q wave MI, or TLR).

The study hypotheses stated that the procedural success rate and clinical success rate for the AngioSculpt catheter will meet the objective performance criteria for conventional coronary angioplasty balloons based on contemporary published literature. The primary effectiveness endpoint was procedural success, defined as ≤ 50% final diameter stenosis in at least one of the AngioSculpt-attempted lesions following completion of the interventional procedure, including adjunctive stenting when used, without death, Q wave or non-Q wave MI, or emergency CABG surgery during the hospital stay. The primary safety endpoint was clinical success rate, defined as freedom from MACE (death, Q wave or non-Q wave MI, or TLR) at 14-day follow-up.

Demographics

Following informed consent, 200 patients (age 63.5 ± 11.3 years, males 72%) referred for percutaneous coronary intervention underwent treatment with the AngioSculpt catheter. Of these patients, 27% (54/200) had a history of diabetes mellitus. Unstable angina was present in 31.5% (63/200) of patients. Other relevant clinical characteristics are described in Table 2, and are consistent with that of the general population of patients in whom the AngioSculpt catheter is likely to be used.

Table 2. Baseline Patient Demographics and Clinical Characteristics

	Aggregate
Age	63.45 ± 11.32 (200)
Male	71.5% (143/200)
Female	28.5% (57/200)
Stable Angina	53.5% (107/200)
Unstable Angina	31.5% (63/200)
History of Diabetes	27.0% (54/200)
History of MI	26.0% (52/200)
History of Smoking	58.0% (116/200)
History of CHF	6.0% (12/200)
History of Hypertension	78.0% (156/200)
History of Hyperlipidemia	85.0% (170/200)
Patients with only 1 Lesion Treated with ASC	84.5% (169/200)
Patients with 2 Lesions Treated with ASC	15.5% (31/200)

ASC = AngioSculpt

Baseline qualitative and quantitative angiographic characteristics are summarized in Table 3 below. Of the 219 lesions, 184 (84.0%) were *de novo* and 35 (16.0%) were treated for in-stent restenosis. The AngioSculpt catheter was used in combination with stenting in 97.7% of cases.

Table 3. Baseline Angiographic Characteristics

	Aggregate
ACC[1] Score A	4.1% (9/219)
ACC Score B1	19.6% (43/219)
ACC Score B2	28.3% (62/219)
ACC Score C	47.9% (105/219)
Lesion Length	17.79 ± 8.94 (219)
Pre-Procedure RVD	2.72 ± 0.39 (219)
Pre-Procedure MLD	0.78 ± 0.31 (219)
Pre-Procedure %DS	71.61 ± 10.16 (219)
Lesion Angulation (degrees)	15.48 ± 17.62 (218)
Eccentric Lesion	26.9% (59/219)
Bifurcation Lesion	28.8% (63/219)
Visible Thrombus	2.7% (6/219)
Lesion Location	
Proximal	35.6% (78/219)
Mid	37.0% (81/219)
Distal	14.6% (32/219)
Ostial	12.8% (28/219)
LAD	37.9% (83/219)
RCA	37.0% (81/219)
LCX	23.3% (51/219)
LM	1.4% (3/219)
SVG	0.5% (1/219)
Lesion Calcification*	35.3% (73/207)
Moderate	29.0% (60/207)
Severe	6.3% (13/207)
TIMI Flow	
TIMI Flow 0	1.4% (3/219)
TIMI Flow 1	0.9% (2/219)
TIMI Flow 2	5.0% (11/219)
TIMI Flow 3	92.7% (203/219)

RVD = reference vessel diameter (mm), MLD = minimal lumen diameter (mm), %DS = percent diameter stenosis (%), LAD = left anterior descending, RCA = right coronary artery, LCX = left circumflex, LM = left main, SVG = saphenous vein graft
*Pre-procedure calcification was not able to be assessed for 12 lesions in 11 patients.

[1]ACC/AHA Lesion Class #: Smith, et al ACC/AHA Percutaneous Coronary Intervention Guidelines. JACC 2001;37:2239i-xvi

Methods

The AngioSculpt catheter was prepped according to standard procedures consistent with those described in the Directions for Use section below. When used to pre-dilate the lesion prior to pre-planned stenting, physicians were instructed to select a catheter that was one size smaller relative to the estimated reference vessel diameter (RVD). For example, for a RVD of 3.0 mm by visual estimation, a 2.5 mm diameter device was used. When used for in-stent restenosis, catheters were selected to closely approximate the RVD (≤ 1.0 x RVD). Additional clinically indicated procedures (e.g., stent placement) were performed at the discretion of the investigator. Anticoagulation and antiplatelet medications were prescribed per institutional protocol for procedures involving stents. Baseline clinical and angiographic data were collected on standardized case report forms. QCA, ECG, and IVUS outcomes were assessed by quantitative analysis at designated core laboratories. All suspected MACE and device failures/ malfunctions were adjudicated by an independent Clinical Events Committee.

Results

Data analysis was performed on an intent-to-treat basis. The study met its primary safety and efficacy endpoints as described and summarized in Table 4.

All patients and all lesions had a final diameter stenosis that was ≤ 50% in at least one AngioSculpt-attempted lesion following completion of the interventional procedure. Three patients experienced an in-hospital MACE (two non-Q wave MI, one Q wave MI) contributing to a procedural success rate of 98.5% (197/200). Additionally, two patients experienced MACE post-hospital discharge (one Q wave MI with TLR-PCI and one Q wave MI with TLR-CABG). This led to a clinical success rate of 97.5% (195/200).

Table 4. Summary of Primary Endpoints

	Aggregate	Lower Bound of 1-Sided 95% C.I.
Procedural Success	98.5% (197/200)	96.2%
Clinical Success	97.5% (195/200)	94.8%

Procedural Success = ≤50% final diameter stenosis in at least one AngioSculpt-attempted lesion following completion of the interventional procedure, including adjunctive stenting when used, without death, Q-wave or non-Q-wave MI, or emergency CABG during the hospital stay.
Clinical Success = freedom from MACE (death, Q wave or non-Q wave MI, or TLR) at 14-day follow-up.

In all 219 lesions (100%) the angiographic component of the primary efficacy endpoint (reduction of the lesion diameter stenosis to ≤ 50% at the completion of the interventional procedure) was successfully achieved. Table 5 summarizes the angiographic results following AngioSculpt treatment and following adjunctive stenting which was reported as performed in 97.7% (211/216) of lesions.

In all treated lesions the AngioSculpt catheter demonstrated stable position during deployment without slippage, as reported by the investigator and independently analyzed by the angiographic core laboratory.

The post-AngioSculpt dissection rate was 13.6% with the majority of these rated as low grade (A-C) utilizing the NHLBI classification.

Table 5. QCA and Lesion Morphology Characteristics (Post-Procedure/In-Hospital)

	Aggregate	Range	95% C.I.
Post ASC In-Lesion MLD	1.55 ± 0.45 (190)	(0.51, 2.74)	(1.48, 1.61)
Post ASC In-Lesion %DS	43.48 ± 14.66 (190)	(13.36, 79.84)	(41.38, 45.58)
Post ASC Dissection	13.6% (26/191)		(9.1%, 19.3%)
Type A	0.5% (1/191)		(0.0%, 2.9%)
Type B	6.3% (12/191)		(3.3%, 10.7%)
Type C	5.8% (11/191)		(2.9%, 10.1%)
Type D	1.0% (2/191)		(0.1%, 3.7%)
Type E	0.0% (0/191)		(0.0%, 1.9%)
Type F	0.0% (0/191)		(0.0%, 1.9%)
Final In-Lesion MLD	2.34 ± 0.42 (219)	(1.31, 3.45)	(2.29, 2.40)
Final In-Lesion %DS	17.73 ± 7.18 (219)	(3.65, 39.84)	(16.78, 18.69)
Final Thrombus	0.5% (1/219)		(0.0%, 2.5%)
Final Dissection	0.5% (1/218)		(0.0%, 2.5%)
Type A	0.0% (0/218)		(0.0%, 1.7%)
Type B	0.5% (1/218)		(0.0%, 2.5%)
Type C	0.0% (0/218)		(0.0%, 1.7%)
Type D	0.0% (0/218)		(0.0%, 1.7%)
Type E	0.0% (0/218)		(0.0%, 1.7%)
Type F	0.0% (0/218)		(0.0%, 1.7%)
Post ASC Acute Gain	0.77 ± 0.43 (190)	(-0.28, 1.93)	(0.71, 0.83)
Final In-Lesion Acute Gain	1.57 ± 0.41 (219)	(0.18, 2.73)	(1.51, 1.62)
Slippage	0.0% (0/206)		(0.0%, 1.8%)
Slippage - slight	0.0% (0/206)		(0.0%, 1.8%)
Slippage - moderate	0.0% (0/206)		(0.0%, 1.8%)
Slippage - severe	0.0% (0/206)		(0.0%, 1.8%)
Balloon to Artery Ratio	0.99 ± 0.14 (201)	(0.67, 1.43)	(0.97, 1.00)

ASC = AngioSculpt, MLD = Minimal lumen diameter (mm),
%DS = percent diameter stenosis (%)
In a small number of cases, post-AngioSculpt angiograms were not performed and only the final angiograms were available.
All data were determined by Core Lab QCA evaluation.

A summary of CEC adjudicated MACE is provided in Table 6. The cumulative MACE rate was calculated by including only one event per patient. Two patients experienced more than one MACE (Q wave MI with TLR-PTCA and Q wave MI with TLR-CABG). Thus, there were a total of seven MACE among five patients. The events included two (1%) non-Q wave MI, three (1.5%) Q wave MI, one (0.5%) TLR-PTCA and one (0.5%) TLR-CABG.

MACE was defined as 'major adverse cardiac event' (i.e., major complication) and includes: death, Q wave or non-Q wave MI, or target lesion revascularization (TLR).

Non-Q wave myocardial infarction (MI) was defined as elevation of the CPK to >3x the upper limit of normal (associated with an abnormally elevated Troponin-I) without the development of new pathologic Q-waves.

Q wave myocardial infarction (MI) was defined as the development of new pathologic Q-waves in two or more contiguous leads associated with an elevation of the CPK to >3x the upper limit of normal (associated with an abnormally elevated Troponin-I).

TLR was defined as target lesion revascularization including CABG or re-intervention to the treated target area.

"Confirmed" thrombosis was defined as angiographically documented thrombus or subacute closure within or adjacent to a previously successfully treated lesion at the time of clinically-driven (due to chest pain and/or ECG changes) angiographic restudy for ischemia. Thrombosis is "presumed" in the absence of angiography.

Table 6. Cumulative MACE Rates (Through 14 Days Follow-Up)

	Aggregate	95% C.I.
Cumulative Complications		
MACE (Death, MI, TLR)	2.5% (5/200)	(0.8%, 5.7%)
Death	0.0% (0/200)	(0.0%, 1.8%)
MI (Q or Non-Q)	2.5% (5/200)	(0.8%, 5.7%)
Q wave MI	1.5% (3/200)	(0.3%, 4.3%)
Non-Q wave MI	1.0% (2/200)	(0.1%, 3.6%)
TLR	1.0% (2/200)	(0.1%, 3.6%)
TLR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TLR CABG	0.5% (1/200)	(0.0%, 2.8%)
Target Vessel Revascularization(TVR)	1.0% (2/200)	(0.1%, 3.6%)
TVR PTCA	0.5% (1/200)	(0.0%, 2.8%)
TVR CABG	0.5% (1/200)	(0.0%, 2.8%)
Thrombosis	1.5% (3/200)	(0.3%, 4.3%)
Confirmed	1.0% (2/200)	(0.1%, 3.6%)
Presumed	0.5% (1/200)	(0.0%, 2.8%)

Further analysis of the data for the 35 ISR lesions treated compared to the *de novo* lesions demonstrated no significant difference in primary efficacy and safety endpoints or in any of the MACE components between the two groups. The results are summarized in Table 7.

Table 7. Comparison of Outcomes in Patients with ISR vs. *de novo* Lesions

Efficacy Measures	ISR	*de novo*	Aggregate	p-value
Procedural Success	100.0% (33/33)	98.2% (164/167)	98.5% (197/200)	1.0000
Clinical Success	100.0% (33/33)	97.0% (162/167)	97.5% (195/200)	0.5932
In-Hospital MACE Free	100.0% (33/33)	98.2% (164/167)	98.5% (197/200)	1.0000
Out-of-Hospital MACE Free	100.0% (33/33)	98.8% (165/167)	99.0% (198/200)	1.0000
Death Free	100.0% (33/33)	100.0% (167/167)	100.0% (200/200)	N/A
MI Free	100.0% (33/33)	97.0% (162/167)	97.5% (195/200)	0.5932
Q-Wave MI Free	100.0% (33/33)	98.2% (164/167)	98.5% (197/200)	1.0000
Non Q-Wave MI Free	100.0% (33/33)	98.8% (165/167)	99.0% (198/200)	1.0000
TLR Free	100.0% (33/33)	98.8% (165/167)	99.0% (198/200)	1.0000
TLR CABG Free	100.0% (33/33)	99.4% (166/167)	99.5% (199/200)	1.0000
TLR PTCA Free	100.0% (33/33)	99.4% (166/167)	99.5% (199/200)	1.0000

IVUS Sub-study

IVUS was performed in a subset of 80 patients pre- and post-treatment with the AngioSculpt catheter to evaluate the morphologic effects of the device on the plaque and to further confirm device safety. Of these, 72 IVUS images were evaluable post-treatment, and showed an increase in minimal lumen area from 2.42 ± 0.98 mm^2 at baseline to 3.05 ± 1.04 mm^2 post-AngioSculpt treatment. There were no adventitial dissections or intramural hematomas, and there was no thrombus formation or any other evidence of unanticipated vessel injury following AngioSculpt treatment at the lesion site or in the adjacent reference vessel segments.

Observed Device Failures/Malfunctions

In total, there were 16 reported failures to cross the lesion with the AngioSculpt catheter. Fifteen of these failures were adjudicated as device-related. There was one failure to cross the lesion which was adjudicated by the Clinical Events Committee as procedure-related but unrelated to the study device. All sixteen lesions were subsequently successfully pre-dilated with a commercially available balloon followed by stent placement.

There were two reported cases of device malfunction due to loss of balloon pressure below the rated burst pressure. These device malfunctions were unassociated with any adverse event.

AGILITY Coronary Bifurcation Study

The AngioSculpt Scoring Balloon Catheter was also studied in the *AGILITY* Study, which was designed to evaluate patients with significant (> 50% diameter stenosis) disease involving both the main branch vessel and ostium of the side branch vessel in a native coronary artery bifurcation [Medina class (x, x, 1)].

Study Design

The *AGILITY* Study was a U.S. based multi-center, non-randomized, single-arm prospective clinical investigation designed to evaluate the acute procedural success, device performance and long term safety of the AngioSculpt catheter in patients who were scheduled to undergo percutaneous coronary intervention of their bifurcation lesion because of symptoms of stable or unstable angina pectoris or silent myocardial ischemia.

Following informed consent, a total of 93 patients were enrolled at 9 clinical sites and evaluated through their index hospitalization. All patients were followed at 30 days and 9 months post-procedure by office visit or telephone interview. All study data were analyzed according to the intention-to-treat principle.

Demographics

93 patients (age 61.5 ± 11.6 years, males 72%) participated in the *AGILITY* study. Of these patients, 24.7% (23/93) had a history of diabetes mellitus. Unstable angina was present in 40.9% (38/93) of patients. Other relevant clinical characteristics are described in Table 8, and are consistent with that of the general population of patients in whom the AngioSculpt catheter is likely to be used.

Table 8. Baseline Patient Demographics and Clinical Characteristics

Patient Characteristic	Aggregate
Age	
Mean ± SD(n)	61.54 ± 11.60 (93)
Gender	
Male	72.0% (67/93)
Female	28.0% (26/93)
History of diabetes	24.7% (23/93)
History of PTCA	52.7% (49/93)
History of CABG	7.5% (7/93)
History of CVA/TIA	5.4% (5/93)
History of MI	36.6% (34/93)
History of Smoking	57.0% (53/93)
History of Congestive Heart Failure	6.7% (6/90)
History of hypertension requiring medication	81.7% (76/93)
History of hyperlipidemia requiring medication	79.6% (74/93)
History of Peripheral Vascular Disease	14.8% (13/88)
History of Renal Insufficiency	4.4% (4/91)
Family history of CAD	60.9% (53/87)
Angina	67.7% (63/93)
CCS III	29.0% (27/93)
CCS IV	9.7% (9/93)
Patients with 1 Lesion Treated with ASC - MB	72.0% (67/93)
Patients with 1 Lesion Treated with ASC - SB	98.9% (92/93)
Patients with 2 Lesions Treated with ASC - MB	0.0% (0/93)
Patients with 2 Lesions Treated with ASC - SB	0.0% (0/93)
Medina Classification	
1,0,0	1.1% (1/93)
1,1,0	4.3% (4/93)
1,1,1*	73.1% (68/93)
0,1,1*	17.2% (16/93)
0,1,0	2.2% (2/93)
0,0,1*	1.1% (1/93)
1,0,1*	1.1% (1/93)

* Denotes Medina class (x, x, 1)   ASC = AngioSculpt
SB= Side Branch MB= Main Branch

Table 9. Pre-Procedure Quantitative Measurements

	Main Branch, n = 93		Side Branch, n = 93	
	Mean ± SD	**Range (min,max)**	**Mean ± SD**	**Range (min,max)**
Pre-Procedure Percent Diameter Stenosis (%DS)	67.32 ± 11.69	(16.59,88.89)	61.29 ± 17.73	(4.02,95.71)

Results

The *AGILITY* Study primary effectiveness endpoint and main secondary endpoint results are summarized in Table 10. Procedural success was defined as ≤ 30% diameter stenosis of the main branch vessel and ≤ 70% diameter stenosis of the side branch vessel with TIMI-3 flow at the conclusion of the procedure (including adjunctive stenting) in the absence of in-hospital MACE.

Table 10. Summary of Primary and Secondary Endpoint Results

	Aggregate	95% Confidence Interval
Procedural Success	91.4% (85/93)	[83.8%, 96.2%]
Side-Branch “Bailout” Stenting	10.9% (10/92)	[5.3%,19.1%]
Final Kissing Balloon	16.3% (15/92)	[9.4%,25.5%]

The angiographic success rate was 93.5% (87/93).

The Clinical Events Committee (CEC) adjudicated MACE and major complications are listed in Table 11.

Table 11: CEC Adjudicated Cumulative MACE, Stent Thrombosis and Other Complications

Complications	In-Hospital		30 Day		9 month	
	Aggregate	95% Confidence Interval	Aggregate	95% Confidence Interval	Aggregate	95% Confidence Interval
MACE (Cardiac Death, MI, Clinically Driven TLR)	3.2% (3/93)	[0.7%, 9.1%]	4.3% (4)	(0.2%, 8.4%)	5.4% (5)	(0.8%, 10.0%)
Cardiac Death	0.0% (0/93)	[0.0%, 3.9%]	1.1% (1)	(0.0%, 3.2%)	1.1% (1)	(0.0%, 3.2%)
Myocardial infarction	2.2% (2/93)	[0.3%, 7.6%]	2.2% (2)	(0.0%, 5.1%)	2.2% (2)	(0.0%, 5.1%)
Q-Wave MI	0.0% (0/93)	[0.0%, 3.9%]	0.0% (0)		0.0% (0)	
Non Q-Wave MI	2.2% (2/93)	[0.3%, 7.6%]	2.2% (2)	(0.0%, 5.1%)	2.2% (2)	(0.0%, 5.1%)
Clinically Driven Target Lesion Revascularization (TLR)	2.2% (2/93)	[0.3%, 7.6%]	2.2% (2)	(0.0%, 5.1%)	3.3% (3)	(0.0%, 6.9%)
PTCA	1.1% (1/93)	[0.0%, 5.9%]	1.1% (1)	(0.0%, 3.2%)	2.2% (2)	(0.0%, 5.2%)
CABG	1.1% (1/93)	[0.0%, 5.9%]	1.1% (1)	(0.0%, 3.2%)	1.1% (1)	(0.0%, 3.2%)
Clinically Driven Target Vessel Revascularization (TVR)	2.2% (2/93)	[0.3%, 7.6%]	3.2% (3)	(0.0%, 6.9%)	4.4% (4)	(0.2%, 8.5%)
PTCA	1.1% (1/93)	[0.0%, 5.9%]	2.2% (2)	(0.0%, 5.2%)	3.3% (3)	(0.0%, 6.9%)
CABG	1.1% (1/93)	[0.0%, 5.9%]	1.1% (1)	(0.0%, 3.2%)	1.1% (1)	(0.0%, 3.2%)
Any Stent Thrombosis	1.1% (1/93)	[0.0%, 5.9%]	2.2% (2)	(0.0%, 5.1%)	2.2% (2)	(0.0%, 5.1%)
Definite	1.1% (1/93)	[0.0%, 5.9%]	1.1% (1)	(0.0%, 3.2%)	1.1% (1)	(0.0%, 3.2%)
Probable	0.0% (0/93)	[0.0%, 3.9%]	1.1% (1)	(0.0%, 3.2%)	1.1% (1)	(0.0%, 3.2%)
Possible	0.0% (0/93)	[0.0%, 3.9%]	0.0% (0)		0.0% (0)	
Definite/Probable	1.1% (1/93)	[0.0%, 5.9%]	2.2% (2)	(0.0%, 5.1%)	2.2% (2)	(0.0%, 5.1%)

The primary and main secondary endpoints and MACE events in the patients with true bifurcations were similar to the entire study population, as shown in Table 12. The patients who were classified as Medina (x, x, 0) did not require side-branch stenting or a kissing balloon procedure (by definition they had no significant side-branch vessel disease).

Table 12: Clinical Outcomes by Medina Classification Cohort

	Procedural success	Rate of SBS	Rate of FKB without SBS	MACE in-hospital	Cumulative MACE 30-days	Cumulative MACE 9-months
All AGILITY patients, n=93	91.4% (85/93)	10.9% (10/92)	16.3% (15/92)	3.2% (3/93)	4.3% (4/93)	5.4% (5/93)
AGILITY cohort (X,X,1), "true bifurcations," n=86	90.69% (78/86)	11.62% (10/86)	17.4% (15/86)	3.48% (3/86)	3.48% (3/86)	4.65% (4/86)
AGILITY cohort (x,x,0), n=7	100% (7/7)	0% (0/7)	0% (0/7)	0% (0/7)	14.28% (1/7)	14.28% (1/7)

The protocol definition of peri-procedural MI was CPK > 3x ULN. Using a more rigorous definition for peri-procedural MI (CPK >2x ULN) resulted in the inclusion of only one additional patient, as shown in Table 13. The cumulative rates of MACE for the protocol definition of MI and for the more rigorous definition are shown in the table below.

Table 13: Cumulative MACE Rates Associated with MI Definitions

Post-Procedure CPK	MACE in-hospital	MACE 30 days	MACE 9 months
CPK > 3x normal	3.2% (3/93)	4.3% (4/93)	5.4% (5)
CPK > 2x normal	4.3% (4/93)	5.4% (5/93)	6.5% (6)

Observed Device Failures/Malfunctions

During the *AGILITY* trial, there were only two patients (2.2%) with reported failure-to-cross the target lesion with the AngioSculpt Catheter. Pre-dilatation with POBA (conventional balloons) was required in 9.1% (6/66) of main branch lesions and 9.9% (9/91) of side branch lesions and resulted in subsequent successful delivery of the AngioSculpt Catheter.

MATERIALS REQUIRED FOR USE WITH THE ANGIOSCULPT CATHETER

WARNING - Use single use items only. Do not resterilize or reuse.

- Femoral, brachial or radial guiding catheter (≥ 6F)
- Hemostatic valve
- Contrast medium diluted 1:1 with normal saline
- Sterile heparinized normal saline
- 10cc and 20cc syringes for flushing and balloon prep
- Inflation device (indeflator)
- 0.014” coronary guide wire (300cm for OTW)
- Guide wire introducer
- Guide wire torque device
- Radiographic contrast
- Manifold (for pressure monitoring and contrast injection), extension pressure tubing

DIRECTIONS FOR USE

Prior to use of the AngioSculpt catheter, examine carefully for damage and catheter integrity. Do not use if the catheter has bends, kinks, missing components or other damage. Do not use if inner package is open or damaged.

1. Pre-medicate patients with ASA, Clopidogrel/ Ticlopidine, intravenous anti-coagulants, coronary vasodilators and GP2b/3a blockers according to institutional protocol for percutaneous coronary interventions involving stents.
2. Perform coronary angiogram in at least 2 orthogonal views of the target lesion prior to device deployment with online QCA.
3. Position 0.014” coronary guide wire of choice beyond the target lesion. Use an exchange length 300 cm guide wire for the OTW version. Use an extra support guide wire for the EX version.
4. In the case of pre-planned stenting, select a catheter that is one size smaller relative to the estimated reference vessel diameter (RVD). For example, if the RVD by visual “estimation” during the procedure is 3.0 mm, use a 2.5 mm diameter AngioSculpt catheter. For in-stent restenosis, select a catheter that closely approximates the RVD (≤ 1.0 x RVD).
5. Using sterile technique, remove the appropriately sized AngioSculpt catheter from the sterile package and place on the sterile field.
6. Inspect the catheter to ensure that all components are intact.
7. For the RX and EX version, flush the guide wire lumen with saline by carefully inserting the distal catheter tip into the distal end of a 10 cc syringe and injecting saline until droplets emerge from the proximal guide wire lumen.
   For OTW version, flush guide wire lumen with saline by connecting proximal hub to a 10 cc syringe and injecting saline into proximal guide wire lumen until droplets emerge from the distal end.
8. Attach a stopcock to the catheter’s balloon inflation port.
9. Attach 20 cc syringe filled with 2-3 cc of 1:1 mixture of radiographic contrast and normal saline to the stopcock.
10. Open the stopcock to the syringe, aspirate/remove air from the catheter balloon lumen using the 20 cc syringe filled with 2-3 cc of radiographic contrast and leave on vacuum for 30 seconds.
11. Close the stopcock to the catheter balloon inflation port and remove the syringe.
12. Attach inflation device (indeflator), filled with 1:1 mixture of radiographic contrast and normal saline, to the stopcock by creating a meniscus. Avoid introducing air bubbles into the catheter balloon lumen.
13. Open the stopcock to the inflation device and aspirate using the inflation device, locking in vacuum.
    NOTE: All air must be removed from the balloon and displaced with contrast medium prior to inserting into the body (repeat steps 9-13 if necessary).
14. Advance the AngioSculpt catheter over the coronary guide wire (through a previously placed guiding catheter) and position at the target lesion utilizing standard fluoroscopic technique.
    NOTE: When back loading the catheter onto the guide wire, the catheter should be supported, ensuring that the guide wire does not come in contact with the balloon. Do not advance or retract the AngioSculpt catheter over the floppy

portion of the guide wire. Do not advance or retract the catheter unless the balloon is fully deflated under vacuum. If resistance is met during manipulation, determine the cause of the resistance before proceeding.

Guide wire prolapse may occur as the AngioSculpt EX catheter is withdrawn. If guide wire prolapse occurs, attempt to resolve the prolapse by gently pulling back on the guide wire under fluoroscopic control until the guide wire becomes coaxial with the AngioSculpt EX catheter.

15. Inflate the AngioSculpt balloon per the following recommended protocol:
    - Increase the inflation pressure by 2 atmospheres every 10-15 seconds until full device inflation is achieved
    - Do not exceed the rated burst pressure (RBP) printed on the package label
16. Perform coronary angiogram in at least 2 orthogonal views (same views as step 2) of the target lesion following completion of each device treatment.
17. Apply negative pressure to the inflation device, confirm that the balloon is fully deflated, and remove the AngioSculpt catheter.

    NOTE: Do not rotate the catheter shaft in excess of 180 degrees when the tip is constrained. Do not rotate the catheter luer hub in excess of five (5) turns during use. Catheter manipulation, including advancement and retraction, should be performed by grasping the catheter shaft.
18. Inspect all components to ensure that the catheter is intact. Follow institutional procedures for disposal of biohazards. If device malfunction occurs or any defects are noted on inspection, flush the guide wire lumen and clean the outer surface of the catheter with saline, store the catheter in a sealed biohazard bag, and contact AngioScore, Inc. for further instructions.
19. Complete any additional interventions as clinically indicated (e.g. stent placement).
20. Remove the coronary guide wire and perform coronary angiography in at least 2 orthogonal views (same views as step 2) of the target lesion following completion of all interventions.
21. Remove all catheters and manage the arterial access site according to institutional protocol.
22. Continue treatment with aspirin, Clopidogrel/ Ticlopidine, and GP2b/3a blockers according to institutional protocol for percutaneous coronary interventions involving stents.

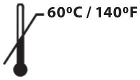
REFERENCES

The physician should consult recent literature on current medical practice regarding balloon dilatation and PTCA procedures.

DISCLAIMER OF WARRANTY AND LIMITATION OF REMEDY

There is no express or implied warranty, including any implied warranty of merchantability or fitness for a particular purpose, on the AngioScore product(s) described in this publication. Under no circumstances shall AngioScore be liable for any direct, incidental or consequential damages other than as expressly provided by specific law. No person has the authority to bind AngioScore to any representation or warranty except as specifically set forth herein.

Labeling Symbol Definitions

REF	**Catalog Number**
LOT	**Lot Number**
Ø	**Balloon Outer Diameter**
	**Balloon Length**
Nominal Pressure (NP)	
Rated Burst Pressure (RBP)	
	**Max. Guidewire Compatibility**
Min. Guide Catheter ID (MGCID)	
	**Caution: Do not exceed rated burst pressure**
	**Use-by Date**
QTY	**Quantity**
Pressure atm (kPa)	
NON-PYROGENIC	**Non-Pyrogenic**
Rx ONLY	**CAUTION: Federal (USA) law restricts this device to sale by or on the order of a physician.**
	**Consult Instructions for Use (IFU)**
	**Upper Limit of Temperature**
	**Keep Dry**

STERILE EO **Sterilized Using Ethylene Oxide**

Do Not Use if Package is Damaged.

Single Use

Distributed by

Manufacturer

Distributed by

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