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The Medtronic Octopus® System: The Starfish™ Heart Positioner and the Octopus® 3 Tissue Stabilizer

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Market Leading Technologies Help Cardiac Surgeons Practice Beating Heart Bypass Surgery and Achieve Optimal Patient Outcomes

Medical technology leader Medtronic has developed a full line of products and accessories to facilitate the growing practice of Beating Heart bypass surgery. These products include the Octopus® System which features the Starfish Heart Positioner and the Octopus® 3 Tissue Stabilizer.

Beating Heart bypass surgery is a procedure in which bypass surgery is performed without the heart being stopped, thus eliminating the need for a heart-lung machine. Beating Heart surgery accounts for an estimated 20 percent of all bypass surgeries performed in the United States.¹

One of the first tissue stabilizers in the industry, the Octopus® Tissue Stabilizer was pioneered and introduced by Medtronic in 1997 in partnership with a team led by Professor Cornelius Borst at the University of Utrecht in the Netherlands. With the development of technologies such as the Octopus System, Medtronic continues to enhance its leadership in the practice of Beating Heart bypass surgery. During the last four years, Medtronic has introduced three more generations of Octopus tissue stabilizers, as well as a full suite of cardiac surgery accessories to maximize the benefits of Beating Heart bypass surgery. To date, more than 140,000 Beating Heart bypass surgeries have been performed worldwide using Octopus Tissue Stabilizers.

Its latest introduction, the Octopus System, allows physicians to access the most challenging, hard-to-reach coronary arteries and provides a still field where the surgeon can then sew a bypass graft into place, while minimizing the impact that manipulating the heart can have on the natural blood-pumping action of the heart

How the Octopus System Works

The Octopus System is designed to address some of the significant challenges a cardiac surgeon may face while performing Beating Heart bypass surgery. These challenges can include preserving the natural hemodynamic function of the heart as it is positioned for bypass grafting and providing access to hard-to-reach lateral and posterior vessels.

A disposable, retractor-based device that features a silicone multi-appendage suction cup, an articulating arm and a mounting clamp, the Starfish Heart Positioner is used first and conforms to the surface of the heart, enabling the surgeon to position the beating heart in the optimal way to ensure access to any of the coronary arteries that are in need of bypass, including those on the back of the heart. The Starfish's articulating arm provides additional flexibility and further multiplies the number of positioning options available to the surgeon.

Once the heart is positioned with the Starfish, the surgeon can then place the pods of the Octopus3 Tissue Stabilizer parallel to the target artery to reduce motion at the site where the suturing of the bypass graft will take place.

The Octopus3 Tissue Stabilizer incorporates malleable suction pods that can be formed to fit the specific contours of each patient's heart, maximizing flexibility to enhance stabilization. Each Octopus stabilizer has parallel tracks of small vacuum cups that gently grip the outer layer of the heart on either side of the coronary artery to be bypassed, allowing the surgeon to position the heart and stabilize the suturing area. The suction pods lift the suturing site and hold it steady while the heart continues to beat underneath.

Once the heart is stabilized, surgeons must then address the challenges of providing continuous perfusion to the surgical site, as well as creating and maintaining a bloodless field during the procedure. The following Medtronic accessories are designed to assist surgeons in addressing these challenges and support the delicate work performed during Beating Heart surgery:

- **ClearView® Intracoronary Shunts.** The ClearView shunt allows blood to flow to the heart muscle beyond the surgical site while the bypass graft is sewn into place. It incorporates a flexible and tubular design to allow for easy and atraumatic insertion and removal. It is offered in nine sizes, including the industry's first 1 mm shunt, to address both artery size and individual patient anatomy.
- **QuickFlow DPS™ Distal Perfusion System.** The QuickFlow DPS is the first integrated system designed to address cardiac ischemia (or lack of blood flow) during Beating Heart bypass surgery. The system provides a means for blood to be perfused directly from the aorta to multiple coronary arteries during the bypass procedure.
- **ClearView® Blower/Mister System.** The ClearView Blower/Mister is designed to enhance visualization at the surgical site by keeping it clear of blood during the

procedure. Blood is blown off the surgical site, and out of the surgeon's view, by a stream of misted saline.

- **OctoBase™ Sternal Retractor.** The OctoBase Retractor is a key component of Beating Heart CABG procedures with the Octopus System; it can also be used in virtually any type of open heart procedure utilizing a sternotomy (split breastbone) incision. The retractor allows many Octopus and Starfish mounting options.

Medtronic, Inc., headquartered in Minneapolis, is the world's leading medical technology company, providing lifelong solutions for people with chronic disease. Its Internet address is www.medtronic.com.

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References

1 Spice B. Presby first hospital to use robot in 'beating heart' bypass surgery. Pittsburgh Post-Gazette. April 9, 2001.

Medtronic, Inc. 2013