VirtuoSaph® Plus

Endoscopic Vessel Harvesting System

Designed for Safety and Efficiency

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Clinical evidence shows that VirtuoSaph endoscopic saphenous vein harvesting technique preserves the structural and functional viability of SV endothelium.[7]

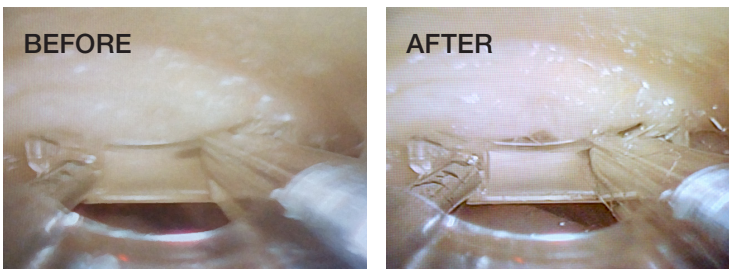
Through extensive research, refinement, and experience, Terumo's VirtuoSaph® Plus Endoscopic Vessel Harvesting System has been designed and optimized for consistent, successful vessel harvesting of both saphenous vein and radial artery for coronary and peripheral artery bypass grafting.

The design of the VirtuoSaph Plus system integrates key design functions that contribute to the highest standards for patient safety and efficiency in the operating room (OR).

Designed for Efficiency

Engineered with a keen understanding of optimal functionality and everyday ease-of-use

- Patented PTFE-sheathed dissector has low coefficient of friction to reduce resistance and ease dissection.
- Unique wiper mechanism quickly clears and cleans the endoscope lens to improve procedural visibility without adding fluid in the cavity.
- Integrated spot cautery with built-in safety switch activates in one simple step to control hemostasis when needed.
- Less cumbersome design reduces the number of components, connections and procedural steps to improve efficiency in the OR.
- Terumo Method is a two-pass dissection and one-pass harvesting technique specifically designed to minimize vessel manipulation and improve ergonomics.



The VirtuoSaph Plus system's unique wiper cleans the endoscope lens of fat or blood for a clear view.

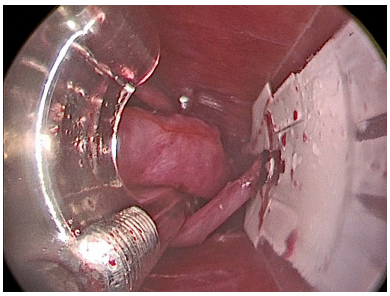
Designed for Patient Safety

Open CO_2 system with distal insufflation reduces risk of CO_2 embolism and intraluminal thrombus

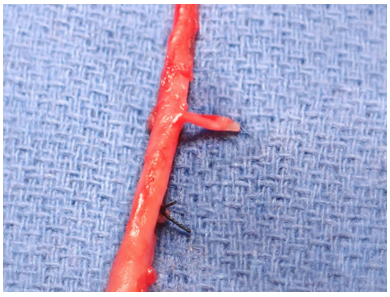
- Use of open CO_2 insufflation can lead to dramatic reductions in retained clots. Research has shown the frequent presence of intraluminal clots in vessels harvested endoscopically using a “closed” EVH system.[1-3] Two studies showed that CO_2 embolisms are noted about 4% to 17% of the time when using closed systems.[4, 5]
- VirtuoSaph Plus EVH consistently delivers CO_2 at the distal end of the dissector and harvester, unlike some closed systems that use the trocar to flood the tunnel with CO_2. Distal insufflation minimizes the amount of CO_2 needed for tunnel maintenance, reduces the risk of CO_2 embolism, and helps deliver a conduit that retains its native moisture.

Bipolar electrosurgical energy targets energy away from the conduit

- Biopolar electrosurgical energy delivers high frequency electrical currents and voltage through an active electrode, causing desiccation and vaporization of target tissue. Because the current only passes through the tissue at the point of contact, damage to sensitive tissues in close proximity to the instrument can be avoided and patient burns are virtually eliminated.[6]
- VirtuoSaph Plus EVH “cutting triad” — tunnel wall grounding, low wattage, and branch tautness — delivers a quick and precise coagulation between the vessel branches and tunnel wall, thereby controlling the direction of energy away from the conduit resulting in less thermal spread.
- The device design gently encapsulates the main conduit and simultaneously seals and cuts the branches near the tunnel wall. This results in an optimal transection location and provides longer branch length.



The V-cutter applies the Bipolar Electrosurgical energy at the most distal part of the branch, both separating tissue and directing energy away from the main conduit.



VirtuoSaph Plus effectively seals and separates tissue simultaneously, providing for longer branches without charring.

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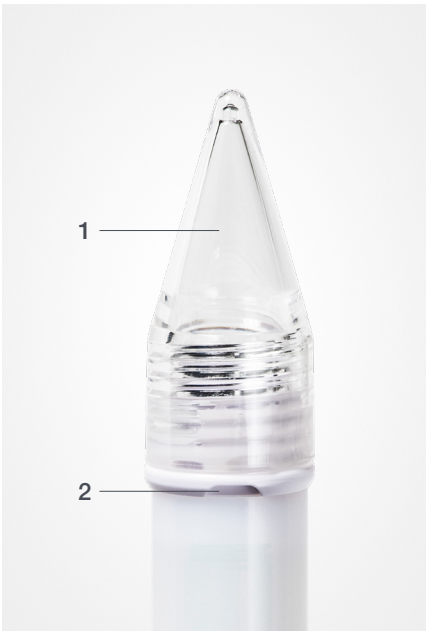
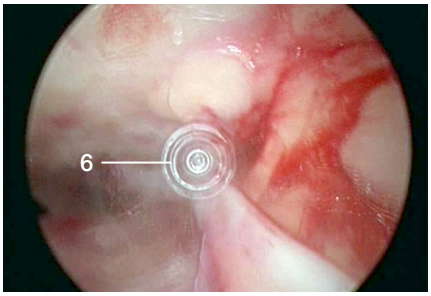
Dissector

To dissect the saphenous vein, radial artery and surrounding branches.

1. The **atraumatic conical tip** of the dissector rod offers consistent and uniform dissection.
2. **CO_2 delivered at the tip**, consistently provides space in the tunnel for increased visibility.
3. The **extended working length** of the dissector rod allows dissection of longer vessel lengths.
4. **PTFE-sheathed dissector** reduces friction in tight muscular anatomy.
5. The **ergonomic dissector handle** design reduces potential for hand strain.
6. **Centering rings** in the dissector cone tip aid in visualization.





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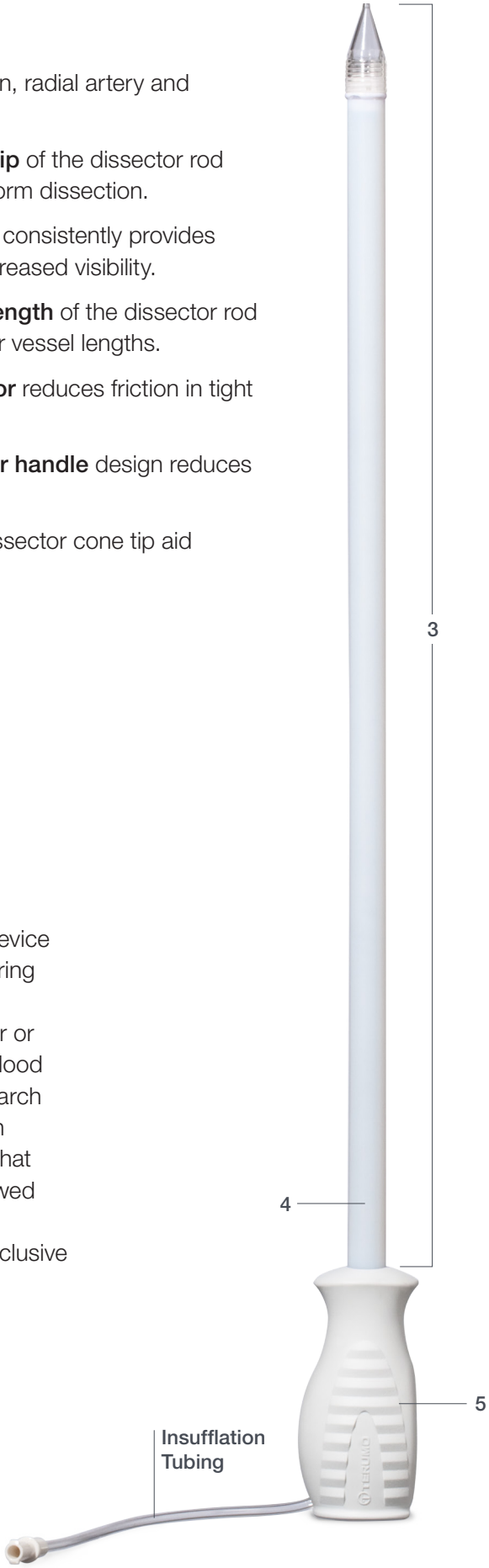


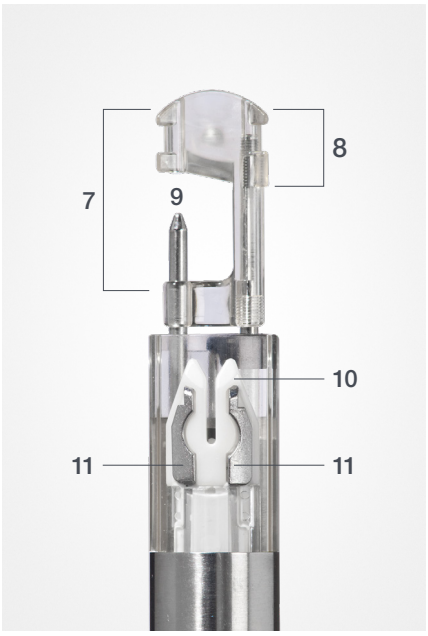
Trocar

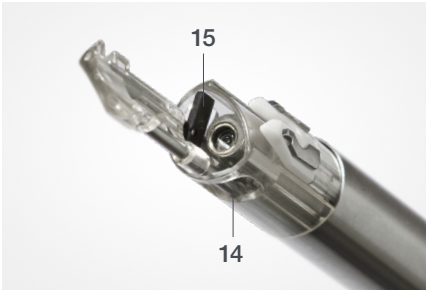
The optional non-occlusive device aids in entering the tunnel during harvesting and allows steady advancement of the harvester or dissector without impeding blood flow at the incision site. Research has shown that clot formation can result if stagnant blood, that is not anti-coagulated, is allowed to remain within a collapsed saphenous vein.[1] The non-occlusive trocar minimizes pressure on the vessel at the incision site.

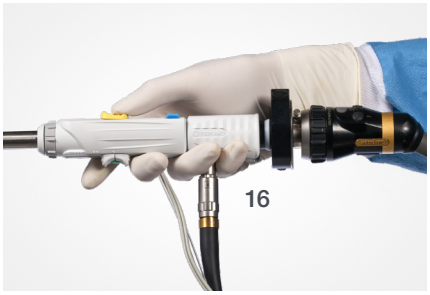
Harvester

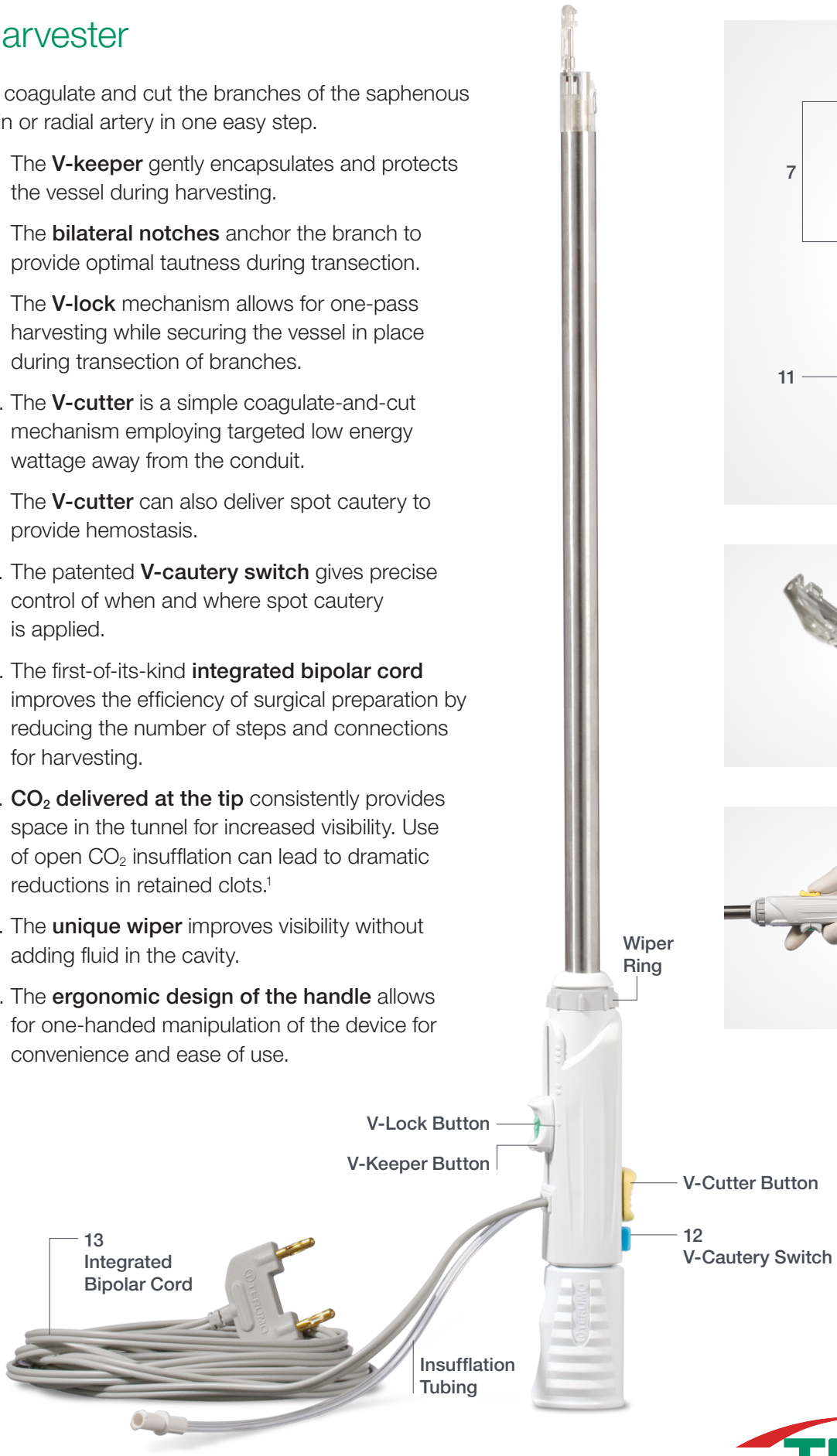
To coagulate and cut the branches of the saphenous vein or radial artery in one easy step.

7. The **V-keeper** gently encapsulates and protects the vessel during harvesting.
8. The **bilateral notches** anchor the branch to provide optimal tautness during transection.
9. The **V-lock** mechanism allows for one-pass harvesting while securing the vessel in place during transection of branches.
10. The **V-cutter** is a simple coagulate-and-cut mechanism employing targeted low energy wattage away from the conduit.
11. The **V-cutter** can also deliver spot cautery to provide hemostasis.
12. The patented **V-cautery switch** gives precise control of when and where spot cautery is applied.
13. The first-of-its-kind **integrated bipolar cord** improves the efficiency of surgical preparation by reducing the number of steps and connections for harvesting.
14. **CO_2 delivered at the tip** consistently provides space in the tunnel for increased visibility. Use of open CO_2 insufflation can lead to dramatic reductions in retained clots.[1]
15. The **unique wiper** improves visibility without adding fluid in the cavity.
16. The **ergonomic design of the handle** allows for one-handed manipulation of the device for convenience and ease of use.









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Ordering Information

Catalog #	Description	Unit/Cases
VirtuoSaph® Plus Endoscopic Vessel Harvesting System		
VSP550EX	VirtuoSaph Plus Endoscopic Vessel Harvesting System, sterile (includes dissector rod, harvester rod, and trocar)	5
MCTRC550S	Trocar, sterile (for spare)	10
MCENDO550	5.5 mm Endoscope	1
UES-40	Generator*	1
811497	Endoscope Only Sterilization Tray	1
811496	All Components Sterilization Tray	1

*Manufactured by Olympus Corporation, Tokyo, Japan. Distributed in the U.S. by Terumo Cardiovascular Group, Ann Arbor, MI. Available in the United States only.

FOOTNOTES

1. Brown et al. Strategies to reduce intraluminal clot formation in endoscopically harvested saphenous veins. *J Thorac Cardiovasc Surg* 2007;134:1259-1265.
2. Burris et al. Incidence of residual clot strands in saphenous vein grafts after endoscopic harvest. *Innovations: Technology & Techniques in Cardiothorac & Vasc Surg* 2006;1(6):323-327.
3. Burris et al. Catheter-based infrared light scanner as a tool to assess conduit quality in coronary artery bypass surgery. *J Thorac Cardiovasc Surg* 2007;133:419-42.
4. Chiu et al. Reduction of carbon dioxide embolism for endoscopic saphenous vein harvesting. *Ann Thorac Surg* 2006;81:1697-1699.
5. Lin et al. Carbon dioxide embolism during endoscopic saphenous vein harvesting in coronary artery bypass surgery. *J Thorac Cardiovasc Surg* 2003;126:2011-2015.
6. McCauley, Genard. Understanding Electrosurgery. Bovie Medical Corporation. MC-55-049-011 Rev 2
7. Hussaini BE, Lu HG, Wolf JA, Thatte HS. Evaluation of endoscopic vein extraction on structural and functional viability of saphenous vein endothelium. *J Thorac Cardiovasc Surg* 2011;10(6):82

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