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# An Optimized Preparation Platform for the Autologous Saphenous Vein Graft

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## Abstract

*Background*: There is an unmet need to develop a device which can assist the operating surgeon in performing dexterous and proficient saphenous vein graft preparation. *Methods*: The device consists of a platform which bears a proximal port to secure the vein graft cannula, and a distal bulldog clamp which is used to occlude the distal end of the vein graft. In-between is a mobile base which holds a bulldog clamp and has the capacity to slide along a track that extends the entire length of the platform. This mobile bulldog clamp is used to isolate segments of the vein graft progressively starting from the vein inlet, thus keeping the vein graft filled under sufficient fluid tension. *Results*: We have evaluated the application of this device in over 800 patients and have found its use to facilitate proficient saphenous vein graft preparation. There were no incidents of unintentional saphenous vein graft injury or any other complication secondary to use of the device. *Conclusions*: The device was effective in vein graft preparation and maintaining graft orientation while requiring only simple modifications from current practice.

## Keywords

Surgery, Coronary, Saphenous, Vein, Technique, Instruments

## 1. Introduction

Even though arterial grafts offer superior patency rates and improved outcome following coronary artery bypass grafting, the autologous saphenous vein graft (SVG) remains an important and convenient conduit material, and continues to be used universally [1].

Post-harvesting preparation of the SVG involves removal of adventitial adipose tissues, clipping of side branches, and rectification of pseudo-strictures caused by ligature tension or branch traction. Furthermore, it is common practice to distend

the SVG with a heparinized solution or blood under controlled pressure to aid inspection and repair of possible wall-injuries.

The importance of minimizing intra-operative trauma to SVG tissues cannot be overemphasized, as this has been directly linked to early graft failure [2]-[5]. We have developed an optimized preparation platform to assist the operating surgeon in performing dexterous and proficient SVG preparation while minimizing intra-operative trauma to SVG tissues.

## 2. Methods

The described device consists of a rectangular 40 × 7 cm platform which bears three components. At the proximal end of the platform is a fixed base which acts as a stabilizer/port (**Figure 1(A)**). This port consists of an inward-directed male Luer-lock and an outward-directed female Luer-lock, and the port is capable of rotating fully around its own axis. In the middle of the device is a mobile base which holds an atraumatic bulldog clamp (**Figure 1(B)**). This base has the capacity to slide along a straight track that extends the entire length of the platform. The opposite end of the platform holds a fixed base which holds another atraumatic bulldog clamp (**Figure 1(C)**). The entire platform is made of medical-grade chrome, is matte-finished to minimize reflections and avoid glare, and is fully autoclavable.

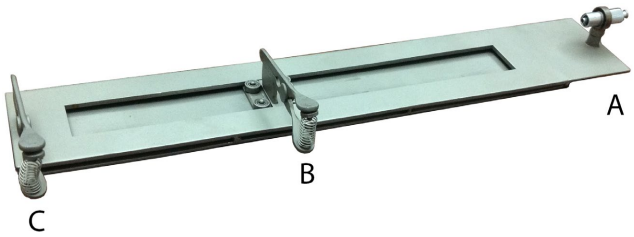


**Figure 1.** The complete preparation platform. (A) a proximal fixed stabilizer/port, (B) a sliding base holding an atraumatic bulldog clamp, and (C) a distal fixed atraumatic bulldog clamp.

**Figure 2.** The preparation platform during SVG preparation.

To prepare an SVG graft, a standard SVG cannula is inserted and secured into the graft inlet, and the cannula is connected and locked into the male Luer-lock on the stabilizer/port. The opposite female Luer-lock is used to connect a pressure-controlling syringe (Vasoshield pressure-controlling syringe, Getinge, Göteborg, Sweden) which serves to distend the SVG with a heparinized isotonic electrolyte solution or blood. As the SVG starts to relax and distend under controlled

intra-luminal pressure (<140 mmHg), the distal atraumatic bulldog clamp is used to secure and occlude the distal end of the SVG which now begins to unfold along the length of the platform, and the rotatability of the stabilizer/port ensures correct orientation of the SVG. The mobile atraumatic bulldog clamp is used to isolate segments of the SVG progressively starting from the vein inlet, thus keeping the SVG filled under sufficient fluid tension, which aids inspection and repair of possible wall-injuries (**Figure 2**). Complete circumferential preparation of the graft is supported by the rotating the stabilizer/port through 360 degrees, so that proficient preparation of the stable SVG can be carried out without the need for skilled assistance.

## 3. Clinical Experience

The described platform has been in use by our team for over 5 years, and this experience involved over 800 patients. We did not experience a significant learning curve with the device, and we have found its use to facilitate proficient SVG preparation without the need for assistance. There were no incidents of unintentional SVG injury as indicated by macroscopic assessment by the surgeon, nor any other complication secondary to use of the device. A single preparation platform was repeatedly re-sterilized and used for all patients throughout this period.

## 4. Conclusions

There has been substantial emphasis in the medical literature on the significance of minimizing intra-operative trauma to SVG tissues [2]-[5]. While debate continues regarding the merits of endoscopic versus open saphenous vein harvesting, bench-top inspection of the SVG is universally carried out to clip branches, identify wall injuries, and confirm perfect branch-seal. This "free-hand" preparation technique is occasionally made difficult by the lack of stability of the SVG within the operative field, may necessitates the availability of skilled assistance, and could expose SVG tissues to inadvertent trauma.

Recognizing an unmet clinical need, an optimized testing platform has been engineered to assist the operating surgeon in performing atraumatic preparation of the SVG. An early design of a vein test bench was reported by Karthaus in 1974 [6], but no further reports of related devices were found in the literature. In our experience, the new preparation platform has proved to be a very useful addition to the surgical armamentarium, as it stabilizes the SVG securely within the operating field, allows a single operator to perform vein preparation without requiring skilled assistance, and could prevent from potential inadvertent trauma to SVG tissues. The device was effective in SVG preparation and maintaining graft orientation while requiring only simple modifications from current practice. Additionally, we believe that the device holds promise as a parallel training tool outside the operating field, as it can be used to practice end-to-end vascular anastomoses on surplus SVG segments which are held in place by the atraumatic bulldog clamps without requiring assistance, thus helping surgical trainees build confidence and

refine their skills.

## Authors' Contributions

Author 1: Ahmad Walid Izzat. Drafting and revising the manuscript critically, and giving final approval for the version to be published.

Author 2: Albaraa Bara. Drafting the manuscript and revising it critically, and giving final approval for the version to be published.

Author 3: Mohammad Bashar Izzat. Conception and design of device. Performing surgery, revising the manuscript critically, and giving final approval for the version to be published.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

[1] ElBardissi, A.W., Aranki, S.F., Sheng, S., O'Brien, S.M., Greenberg, C.C. and Gammie, J.S. (2012) Trends in Isolated Coronary Artery Bypass Grafting: An Analysis of the Society of Thoracic Surgeons Adult Cardiac Surgery Database. *The Journal of Thoracic and Cardiovascular Surgery*, **143**, 273-281. https://doi.org/10.1016/j.jtcvs.2011.10.029

[2] Antonopoulos, A.S., Odutayo, A., Oikonomou, E.K., Trivella, M., Petrou, M., Collins, G.S., *et al.* (2020) Development of a Risk Score for Early Saphenous Vein Graft Failure: An Individual Patient Data Meta-analysis. *The Journal of Thoracic and Cardiovascular Surgery*, **160**, 116-127.e4. https://doi.org/10.1016/j.jtcvs.2019.07.086

[3] Guida, G.A. and Angelini, G.D. (2022) Pathophysiology and Mechanisms of Saphenous Vein Graft Failure. *Brazilian Journal of Cardiovascular Surgery*, **37**, 32-37. https://doi.org/10.21470/1678-9741-2022-0133

[4] Mehta, D., Izzat, M.B., Bryan, A.J. and Angelini, G.D. (1997) Towards the Prevention of Vein Graft Failure. *International Journal of Cardiology*, **62**, S55-S63. https://doi.org/10.1016/s0167-5273(97)00214-3

[5] Angelini, G.D., Johnson, T., Culliford, L., Murphy, G., Ashton, K., Harris, T., *et al.* (2021) Comparison of Alternate Preparative Techniques on Wall Thickness in Coronary Artery Bypass Grafts: The Harvest Randomized Controlled Trial. *Journal of Cardiac Surgery*, **36**, 1985-1995. https://doi.org/10.1111/jocs.15477.

[6] Karthaus, A.J. (1974) A Vein Test Bench. A New Instrument. *VASA Zeitschrift fur Gefasskrankheiten*, **3**, 200-202.