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A Novel, Simple, and Reliable Technique to Monitor Free Gracilis Flap

Madhu Periasamy[1] Vamseedharan Muthukumar[1] Hari Venkatramani[1] S. Raja Sabapathy[1]

[1] Division of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, Coimbatore, Tamil Nadu, India

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Address for correspondence S. Raja Sabapathy, MS (Gen), MCh (Plastic), DNB (Plastic), FRCS, FAMS, Division of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, 313 Mettupalayam Road, Coimbatore 641043, Tamil Nadu, India (e-mail: rajahand@gmail.com).

Free flap transfer is extensively used to reconstruct complex tissue defects in various situations. The patency of the microvascular anastomosis is critical for the survival of free flaps. Early detection of vascular compromise and timely intervention is key to salvaging failing free flaps. Various monitoring techniques have been described, ranging from clinical examination to advanced technologies.[1,2] The clinical examination is generally acknowledged as the gold standard; however, it has limitations, including the possibility of poor interobserver agreement because of inconsistent flap appearances, especially in muscle flaps.[3,4]

In our diabetic foot clinical practice, when we use the gracilis muscle as a free flap, the constant skin perforator from the muscle entering the skin in the upper thigh is usually dissected, clipped, and divided during the flap harvest (►**Figs. 1**, **2**; ►**Video 1**). We include the clipped perforator in the muscle. After anastomosis, the pulsation of the clipped perforator is used to monitor the flap (►**Fig. 3**; ►**Video 2**) in addition to the standard clinical examination

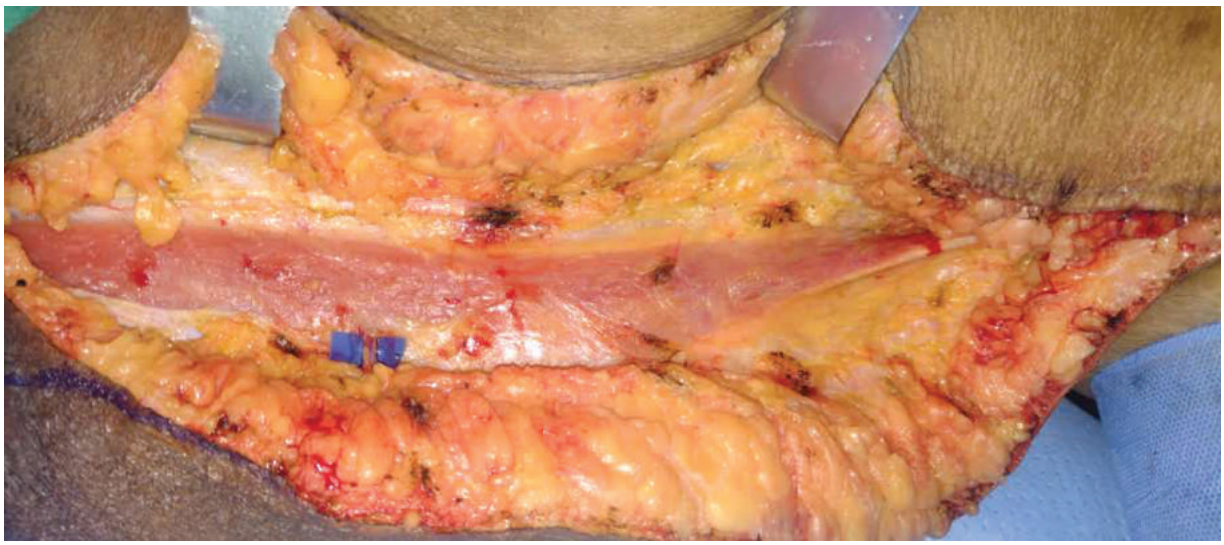

Fig. 1 Intraoperative photograph during the free flap harvest showing the gracilis muscle and the clipped perforator highlighted by the *blue background*.

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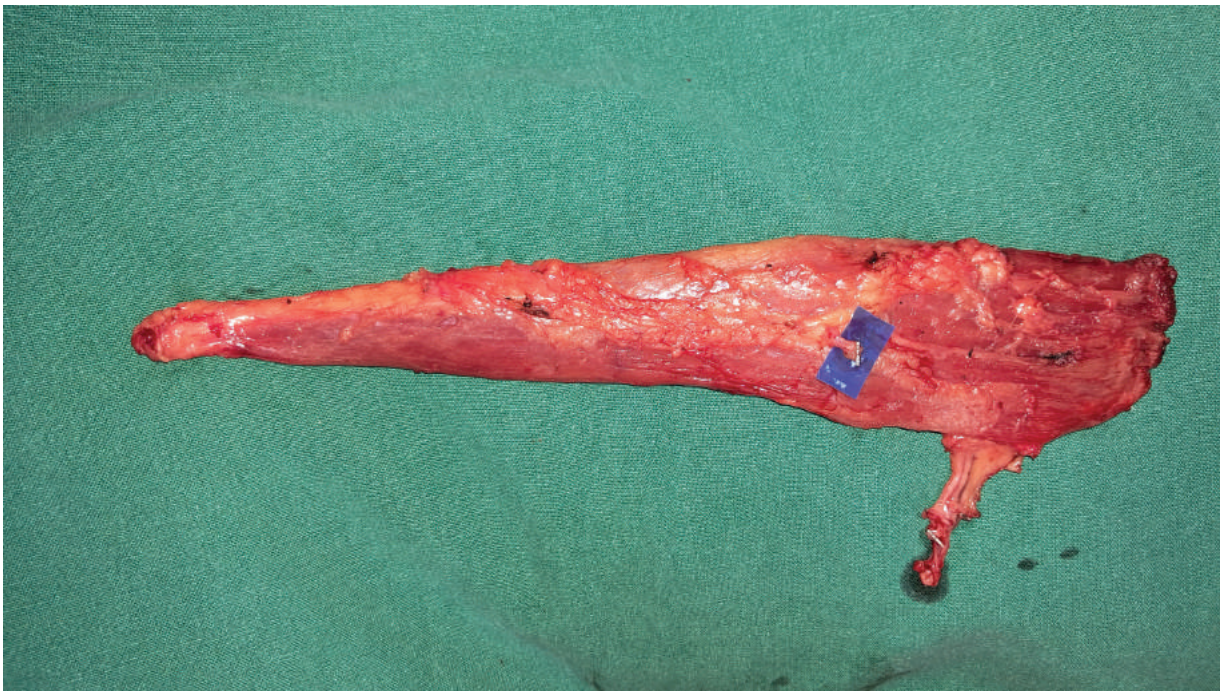

Fig. 2 Harvested gracilis muscle with the clipped perforator highlighted by the *blue background*.

techniques of observing the color and turgor of the flap. Usually, we delay skin grafts in diabetic foot-free flaps, and this clipped perforator helps monitor the arterial status. Even when we resurface the flap with a skin graft in the same setting, we prefer to make a slit in the region of the perforator, exposing the perforator for flap monitoring (►**Fig. 4**).

Fig. 3 Postoperative photograph showing the gracilis muscle after the anastomosis and inset with the clipped perforator highlighted by the *blue background*.

Video 1

Intraoperative video during the free flap harvest showing the gracilis muscle and the pulsating clipped perforator highlighted by the *blue background*. Online content including video sequences viewable at: https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0044-1779659.

Video 2

Postoperative video showing the gracilis muscle after the anastomosis and inset with the pulsating clipped perforator highlighted by the *blue background*. Online content including video sequences viewable at: https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0044-1779659.

Postoperatively, the paramedical staff in the micro-post-operative ward look into the pulsating perforator to monitor the flap's arterial anastomosis. They feel more confident and comfortable as this technique has negligible interobserver variability (►**Video 3**). We have been using this technique off and on for the past 15 years, and to pen

Fig. 4 Postoperative photograph showing the gracilis muscle after inset and resurfacing with skin graft with the clipped perforator highlighted by the *green background*.

this article, we tried it in 20 consecutive free gracilis flaps with reliable results.

Video 3

The same free flap being monitored in the micro-postoperative ward showing the pulsation of the clipped perforator. Online content including video sequences viewable at: https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0044-1779659.

This technique can reliably monitor only the arterial status of the flap. Although the clipped perforator has a vein that can get engorged with venous congestion, we have not encountered such a situation in our clinical practice to back up this idea with clinical evidence. The pulsation of the clipped perforator is good till 72 hours, which is the most critical period; later, the pulsation dampens out. We can extrapolate this technique to any muscle-free flap having a superficial perforator.

We advise using this method to monitor muscle flaps. It is simple to execute, reliable, and nurses find it easy to monitor muscle flaps.

Conflict of Interest
None declared.

References

1 Kohlert S, Quimby AE, Saman M, Ducic Y. Postoperative free-flap monitoring techniques. Semin Plast Surg 2019;33(01):13–16
2 Chao AH, Lamp S. Current approaches to free flap monitoring. Plast Surg Nurs 2014;34(02):52–56, quiz 57–58
3 Schiltz D, Geis S, Kehrer A, Dolderer J, Prantl L, Taeger CD. Video tutorial for clinical flap-monitoring in plastic surgery. Plast Reconstr Surg Glob Open 2017;5(10):e1478
4 Broyles JM, Smith M, Coon D, Bonawitz SC. Assessment of nursing deficiencies in the postoperative care of microsurgical patients. J Reconstr Microsurg 2016;32(08):615–624

