

Application of VersaWrap in Intercostal Nerve Transfer in Breast Reconstruction

Type of injury

Breast reconstruction with abdominal-based free flap and transfer of intercostal sensory nerves into abdominal cutaneous nerve branches

Surgical Rationale

Breast reconstruction improves a woman's self-image and restores a sense of normality following mastectomy. When conducted with tissues from the abdomen, nerves from the chest wall can be transferred into nerves in the abdomen to restore some sensation in the breast. Typically, long nerve grafts are required for this procedure. Outcomes have previously been hampered by these long grafts. Using VersaWrap Tendon Protector as a guide during flap inset allows for use of shorter nerve grafts, protects the repair site, and may help prevent tethering of the nerve coaptation during flap movement.

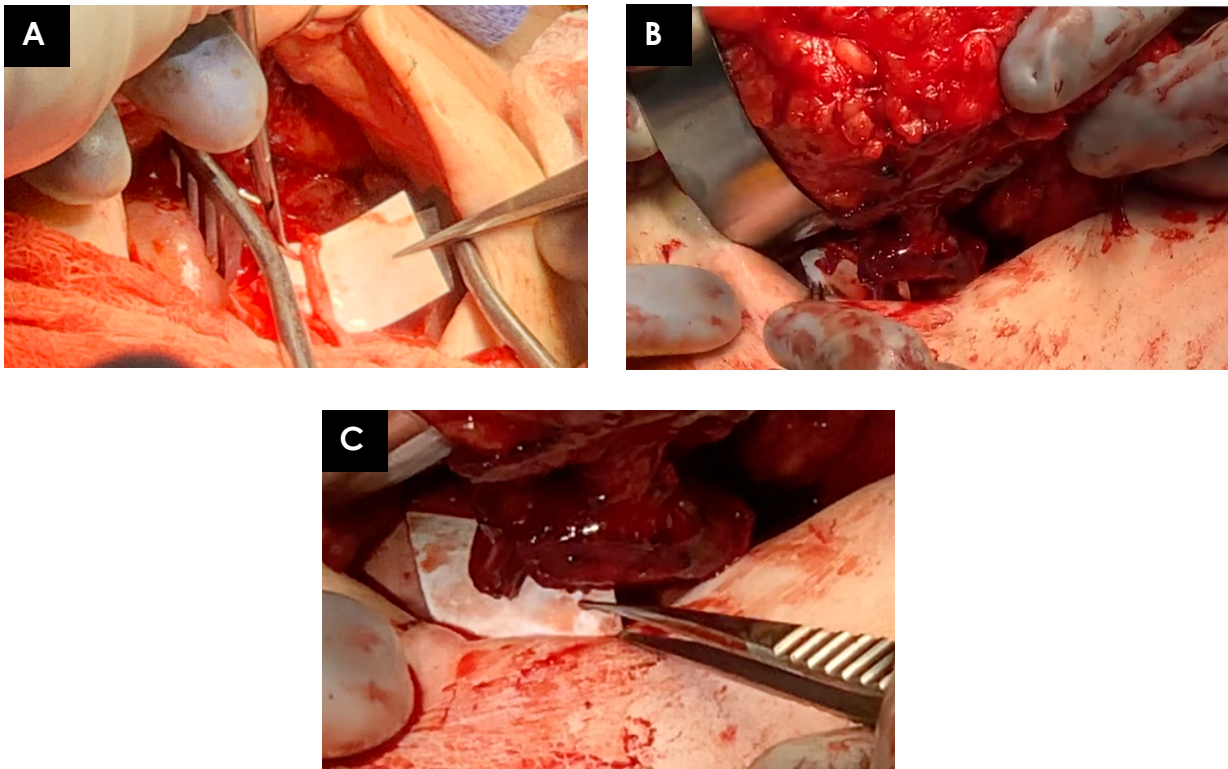


Figure: A) VersaWrap Funnel being prepared for around nerve graft from intercostal nerve; B) Flap being lowered into breast cavity with VersaWrap guiding abdominal cutaneous nerve to nerve graft; C) Nerve coaptation supported by VersaWrap. The paper used to support VersaWrap funnel is removed leaving only the VersWrap sheet around the nerve coaption.

Patient 1

The patient is a 60-year-old woman with bilateral ductal carcinoma in situ who underwent bilateral skin sparing mastectomies. Her medical history is significant only for Hashimoto's thyroid disease. She had bilateral deep inferior epigastric perforator (DIEP breast reconstruction) with transfer of one intercostal nerve into one abdominal cutaneous nerve on each side. One (1) 2 x 2 in VersaWrap Tendon Protector was cut in half into two (2) 1 x 2 in pieces. The VersaWrap pieces were shaped into a funnel using the accompanying paper backing. The VersaWrap funnels allowed the abdominal cutaneous nerves to be coapted to a 3cm graft during flap inset, on each side. Once the nerves were together, the VersaWrap paper backing was removed and the VersaWrap sheet adhered to the nerve coaptions, supporting the repair. Without VersaWrap, the graft would have been 6-7cm for proper visualization.

Result

Patient 1 was discharged from the hospital on postoperative Day 4 in good condition. Incisions are healed and she is very happy with the appearance of her breasts two (2) months after surgery. She has returned to gardening and walking daily at two months. Sensation has not returned to her flap tissues yet but is not expected before 3-6 months.

Patient 2

This patient is a 41-year-old woman with invasive ductal carcinoma of the right breast who has had bilateral mastectomies. Her past medical history is significant for cardiac arrhythmia and appendicitis with accompanying cellulitis of her abdominal tissues a few months prior to abdominal tissue transfer. She had bilateral deep inferior epigastric perforator (DIEP breast reconstruction) with transfer of one intercostal nerve into one abdominal cutaneous nerve on each side. One (1) 2 x 2 in VersaWrap Tendon Protector was cut half into two (2) 1 x 2 in pieces. VersaWrap pieces were applied to each side in the same manner as the previous case, allowing coaptation of the intercostal nerve to the abdominal cutaneous nerve through a 3cm (right), and 6 cm (left) nerve graft. The left nerve graft was longer due to scarring of the abdominal tissues and the inability to harvest a long pedicle on the abdominal cutaneous nerve.

Result

Patient 2 was discharged home on postoperative Day 4 in good condition. Incisions are healed and she is very happy with the appearance of her breasts two (2) months after surgery. She has returned to playing basketball with her children and to doing yoga. Sensation has not returned to her flap tissues yet but is not expected before 3-6 months.

Patient 3

This patient is a 69-year-old female with a history of numerous previous breast surgeries, right breast cancer treated 20 years prior with lumpectomy, implant placement, and radiation. She now has a capsular contracture and breast asymmetry. She is otherwise healthy. She had a complete capsulectomy with implant removal, replaced with a free superficial inferior epigastric perforator flap

(SIEA) from the left lower abdomen. At the time of flap surgery, one intercostal nerve was transferred into two abdominal perforator nerves through a 5cm graft. One (1) 2 x 2 in VersaWrap Tendon Protector was cut half into two (2) 1 x 2 in pieces. A single VersaWrap piece was applied to the right breast in the same manner as the previous cases, allowing coaptation of the intercostal nerve to the abdominal perforator nerves.

Result

Patient 3 developed a hematoma on postoperative Day 3 and was taken back to the OR for hematoma evacuation. The nerve repair was visualized and noted to be intact. The applied VersaWrap was visualized, remaining wrapped around the nerve where implanted. VersaWrap isolated the nerve repair, preventing the repair from adhering to the underlying pectoralis major muscle. The patient was discharged home on postoperative Day 5 in good condition. She had a superficial surgical site infection in the right breast on postoperative Day 7 that resolved with a 5-day course of doxycycline. She is doing well and happy with the appearance of her breast 1.5 months after surgery. Sensation has not returned to her flap tissues yet but is not expected before 3-6 months.

Patient 4

This patient is a 34-year-old woman with a BRCA-1 gene mutation at high risk for breast cancer who underwent bilateral nipple sparing mastectomies. She had bilateral deep inferior epigastric perforator (DIEP breast reconstruction) with transfer of one intercostal nerve into one abdominal cutaneous nerve on each side. One (1) 2 x 2 in VersaWrap Tendon Protector was cut half into two (2) 1 x 2 in pieces. VersaWrap pieces were applied to each side in the same manner as the previous cases, allowing coaptation of the intercostal nerve to the abdominal cutaneous nerve through a 4cm (right), and 3 cm (left) nerve graft.

Result

The patient was discharged home on postoperative Day 3 in good condition. She is back to most of her normal activities one (1) month after surgery and is happy with the appearance of her breasts. Sensation has not returned to her flap tissues yet but is not expected before 3-6 months.

Discussion

In these four cases, the VersaWrap Tendon Protector allowed for use of shorter nerve grafts, which is expected to improve the recovery of sensation within the abdominal tissue flaps. Each patient is doing well after surgery with no known complications or side effects associated with the use of VersaWrap for nerve coaptation. Case 3 demonstrates that the VersaWrap remains present around the nerve three (3) days postoperative and was observed to prevent adhesion of the nerve coaptation to surrounding tissues. Sensory recovery is not expected for several more months in any of these patients.

Surgeon Profile

Louis H. Poppler, M.D., MSCI

Dr. Louis H. Poppler is a Plastic and Reconstructive Surgery Specialist in Meridian, Idaho. He specializes in minimally invasive reconstructive surgery for patients with cancer, trauma, or birth differences. He has specific training to care for both adults and children. In addition to plastic surgery training, Dr. Poppler completed fellowships in orthopedic hand surgery and microsurgical reconstructive surgery at the Mayo Clinic, and surgery for peripheral nerve injury and pain with surgical pioneer Dr. Susan Mackinnon at Washington University. Dr. Poppler attended medical school at the University of Washington as part of the highly competitive Idaho WWAMI program. He has a master's degree in clinical research from Washington University and continues cutting-edge research in the field of nerve injury reconstruction. Dr. Poppler started St. Luke's reconstructive microsurgery program. He recently received a prestigious award from the American Society for Surgery of the Hand to travel to China to learn from talented microsurgeons taking care of adults and children with complex injuries of the nerves, hand, and body.

VersaWrap Order Information

Catalog Number	Size / Volume	Quantity
VTP-2201	2 in x 2 in Sheet, 0.03 oz Solution (50 mm x 50 mm, 1 mL)	1 unit/ box
VTP-1201	1 in x 2 in Sheet, 0.03 oz Solution (25 mm x 50 mm, 1 mL)	1 unit/ box

Always refer to the appropriate instructions for use for complete clinical instructions.

Warning: Applicable laws restrict these products to sale by or on the order of a physician.

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info@alafairbiosciences.com

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