A novel adhesive retention suture device as an alternative structural support to the "drumhead" graft technique for alar defects

Cara Barber, MD, MPH, Lacey Roybal, DO, John Young, MD, and William Lear, MD

Key words: adhesive retention suture device; deep alar defects; full-thickness skin graft; Mohs surgery; nasal defect; reconstruction.

INTRODUCTION

The anatomical difficulty of performing surgery near the perialar region has been well reported and discussed. There is a natural suspension effect from the overlying skin to the subcutaneous tissue that provides structural support and helps the cartilage maintain patency and shape of the nares and nasal vestibule.[1] Without this crucial skin, there is a risk of possible collapse of the nasal vestibule and, consequently, a visible deformity to the nose. The "drumhead" technique uses a full-thickness skin graft (FTSG) to reconstruct a deep alar defect by maintaining the structure of the nares during the healing process with external reinforcement.[1] This technique purposely slightly undersizes the FTSG to increase outward tension, while also using a strut, fashioned from the inner packaging material of sutures (plastic), with an intranasal bolster.[1] This creates external support and suspension to mimic the action of the lost skin and improve functional and cosmetic outcomes after Mohs surgery.[1] Here, we report the novel use of an adhesive retention suture (ARS) device as an alternative strut for successful structural support during nasal alar defect reconstruction. The ARS device is a suture device designed to help close high-tension wounds by external reinforcement to decrease wound dehiscence. Our case demonstrates an off-label use of the device different from its originally intended purpose.

Abbreviations used:

ARS: adhesive retention suture
FTSG: full-thickness skin graft

CASE REPORT

An 89-year-old woman presented for Mohs surgery for the treatment of a nodular basal cell carcinoma on the right nasal ala (Fig 1, *A*). The lesion was extirpated and left a 1.1 cm × 1.1 cm defect; an FTSG was taken from the right preauricular area, purposely slightly undersized, and sutured in place with 5-0 vicryl rapide. A single ARS device (HEMIGARD ARS device; SUTUREGARD Medical) was then stripped off the retention tape to show only the rigid plastic zone with underlying nonwoven polyester. The adhesive side of the ARS device was affixed to the graft, and a 5-0 vicryl rapide suture was used to secure the ARS device through the epidermal side of the graft into the nasal vestibule and back out through the graft. This was completed without the use of an intranasal bolster, unlike the original method. The intranasal tacking suture uses prefixed ARS device holes to maintain tension and position (Fig 1, *A-D*). Additionally, there is an adhesive on the nonwoven polyester that adds additional security to the position and adherence to the tissue. A standard bandage with petrolatum jelly and occlusive dressing was applied with the goal of 1-week overlying strut removal (Fig 2). Additional follow-up was performed 3 months after the initial surgery, showing preservation of nasal structures and no signs of wound contraction (Fig 3, *A* and *B*)

DISCUSSION

The ARS device is a sterile suture retention device intended for the closure of high-tension wounds to

From the Department of Dermatology, Good Samaritan Regional Medical Center/Silver Falls Dermatology, Salem, Oregon.

Funding source: None.
IRB approval status: Not applicable.

Correspondence to: Cara Barber, MD, MPH, Department of Dermatology, Good Samaritan Regional Medical Center/Silver Falls Dermatology, 1793 13th Street SE, Salem, OR 97302. E-mail: Cara.barber@silverfallsderm.net.

JAAD Case Reports 2022;27:103-5.
2352-5126

https://doi.org/10.1016/j.jdcr.2022.07.001

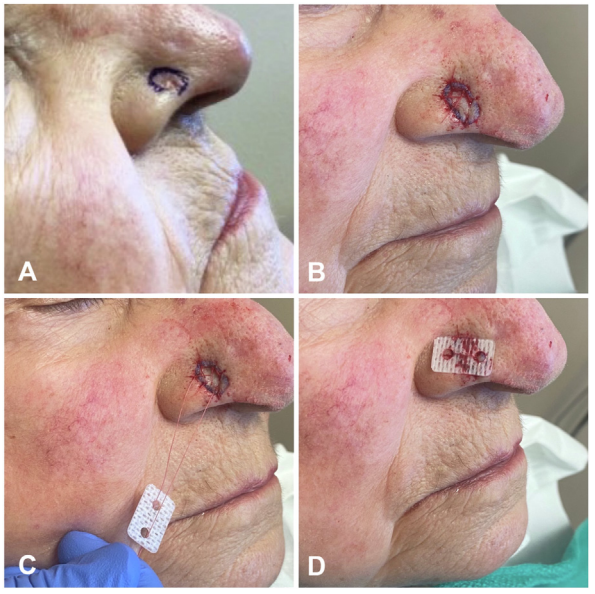

Fig 1. Step-by-step demonstration of the adhesive retention suture device used as a nasal overlying strut. **A,** Step 1: shows the preoperative size and appearance of basal cell carcinoma. **B,** Step 2: shows the full-thickness the skin graft sutured in place of the defect. **C,** Step 3: shows the utilization of the suture through the prefixed holes for alignment on the adhesive retention suture device. **D,** Step 4: shows the postoperative strut achieved with the adhesive retention suture device shown on the day of surgery.

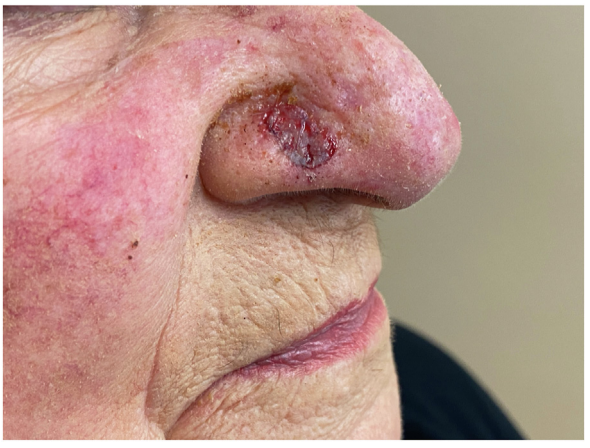

Fig 2. Postoperative photo taken 1 week after surgery at the time of adhesive retention suture device removal.

decrease the risk of dehiscence. The ARS device has been shown to aid in the closure of fragile and high-tension wounds, such as those in the lower leg, by >80%.[2,3] The device, in its designed use, provides additional strength to the skin through external reinforcement, allowing it to sustain higher tension without ripping through the skin.[3] The device costs just over $40 for a pair of sterile strips, which are sold in boxes of 12 pairs. The novel use of this device as

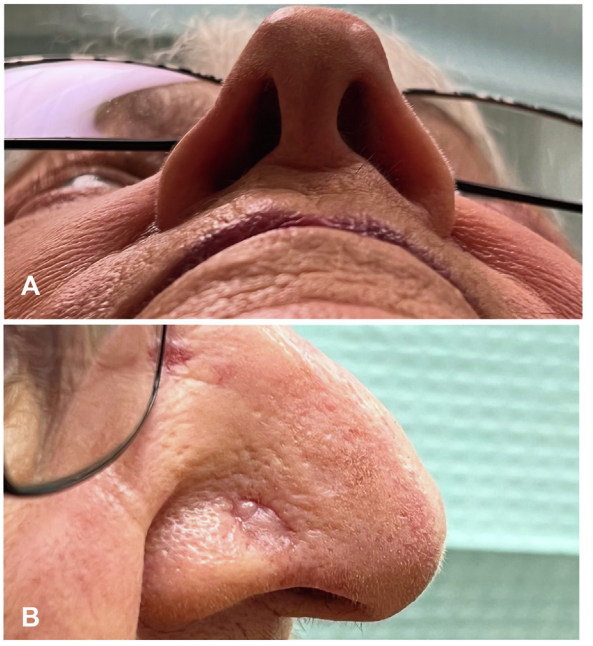

Fig 3. Postoperative photos taken 3 months after surgery. **A** and **B,** Photos demonstrating the preservation of architecture and cosmesis after use of the adhesive retention suture device during graft healing.

an alternative to the traditional "drumhead" technique for deep alar repairs offers many advantages over the traditional inner suture packaging. The ARS device has undergone numerous tests to meet the US Food and Drug Administration guidelines to be considered biocompatible, as is necessary for a medical device, whereas the inner packaging for sutures has not. The plastic found within the suture packaging was never intended for use on the skin and, therefore, could have more unpredictable risks due to contact with the skin. Additionally, the use of the ARS device would be a more time-efficient option in the hands of a surgeon during reconstruction. The prefixed holes and rigid plastic can be easily separated from the original device and would dramatically reduce the amount of work for the surgeon compared with the measurements, cuts, and alterations needed with the inner suture packaging (drumhead method). The ARS device is also advantageous because of the adhesive nonwoven polyester found on the back of the plastic retention piece. The tension created mimics the natural suspension effect, and the adhesion secures and enhances the FTSG contact with the wound bed.[4] The nonwoven polyester also acts to wick moisture from the wound bed to avoid maceration, which offers a more ideal healing environment for proper graft maturation and survival.[4] There were no issues observed with the removal of the ARS device, such as pulling on the FTSG, due to natural weakening of adhesive with

moisture. The limitation to using this device would primarily be the size. Our patient had a defect greater than 1 cm. We are unclear whether this device can be used in smaller lesions because it would compromise the original length and possible integrity of the device.

Conflicts of interest

Dr Lear is the cofounder of and chief technical officer for SUTUREGARD Medical, Inc, the manufacturer of the adhesive retention suture device used in this study. Drs Barber, Roybal, and Young have no conflicts of interest to declare.

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