GUIDELINES

Viewpoints, pertaining to issues of general interest, are welcome, even if they are not related to items previously published. Viewpoints may present unique techniques, brief technology updates, technical notes, and so on. Viewpoints will be published on a space-available basis because they are typically less time-sensitive than Letters and other types of articles. Please note the following criteria:

- Text—maximum of 500 words (not including references)
- References—maximum of five
- Authors—no more than five
- Figures/Tables—no more than two figures and/or one table

Authors will be listed in the order in which they appear in the submission. Viewpoints should be submitted electronically via PRS' *e*nkwell, at www.editorialmanager.com/prs/. We strongly encourage authors to submit figures in color.

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Viewpoints

Sentinel Lymph Node Biopsy in the Setting of Conjunctival Melanoma

Sir:

Conjunctival melanoma is a rare subset of malignant melanoma, representing only 1.6 percent of all melanomas.[1] The role of sentinel lymph node biopsy, now widely considered the standard of care for the treatment of cutaneous head and neck melanoma, is beginning to show promise in the setting of conjunctival melanoma. As plastic surgeons, we may be called upon by ophthalmologic surgeons to perform sentinel lymph node biopsies in this patient population. We present our experience in performing a sentinel lymph node biopsy on a 16-year-old female patient with conjunctival melanoma to elucidate nuances involved in performing a procedure of this kind.

The patient presented with a biopsy-proven, 0.84-mm-deep, ulcerated malignant melanoma of her right bulbar conjunctiva. An ophthalmologic surgeon referred the patient to us after she had undergone excision and cryotherapy (Fig. 1). Preoperatively, sentinel lymph node mapping was performed via lymphoscintigraphy, and an ophthalmologic surgeon performed the radiocolloid (Tc-99m) injection. During injection, a drop of the radiocolloid spilled onto the cornea, complicating localization of the sentinel lymph node by draining and scattering into the nasolacrimal duct system (Fig. 2). The proximity of the injection site to the preauricular area and the spillage of the radiocolloid onto the cornea made pinpointing the sentinel lymph node with the gamma probe more difficult secondary to scatter. A preauricular, face lift–type incision was used to access the "hot spot" within the parotid, from which the sentinel lymph node was then dissected. Pathologic analysis revealed no evidence of micrometastasis.

The use of sentinel lymph node biopsy in cutaneous melanoma has proven to be invaluable. There are difficulties, however, when using this technique in periocular and, more specifically, conjunctival melanoma. First, the proximity of the tumor to its draining lymphatic basins and the potential for random scatter of radiocolloid make the use of lymphoscintigraphy more challenging. Amato et al.[2] described the successful use of smaller volumes of Tc-99m sulphur colloid, injecting only 0.2 ml in two to four spots around the lesion. The smaller volumes minimized the random spread of radiocolloid, facilitating the identification of "hot nodes." We recommend the use

Fig. 1. Conjunctiva of a 16-year-old girl who was sent to the senior surgeon for a sentinel lymph node biopsy after she had undergone excision of a conjunctival melanoma performed by an ophthalmologic surgeon.

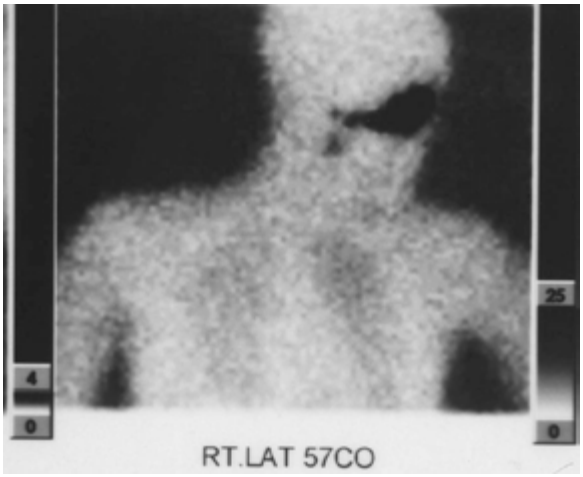

Fig. 2. Lymphoscintigraphy scan demonstrates the inadvertent spillage of radiocolloid onto the patient's cornea and drainage into the nasolacrimal system. The sentinel lymph node can be seen in the region of the parotid gland.

of these reduced volumes and injection under negative pressure to avoid spillage.

Cases of permanent tattooing of periorbital skin with the injection of intradermal Lymphazurin blue dye have been reported.[3] Due to these previous reports and our experience with a patient who underwent a lower eyelid injection that resulted in long-term tattooing (>6 months), we discourage the use of Lymphazurin blue in the conjunctiva.

Nijhawan et al.[4] have conducted the largest study of conjunctival melanoma treated with sentinel lymph node biopsy. They found that the first-order lymph node was within the parotid in four of five patients. The second-order lymph node was a level II cervical lymph node in four of five patients. Our case study supports previous findings that strongly suggest that the sentinel lymph node in patients with conjunctival melanoma will most likely be found in the parotid. This can easily be accessed via a preauricular incision.

With the above recommendations in mind, sentinel lymph node biopsy for the treatment of conjunctival melanoma can be performed safely and efficiently.

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Postauricular Artery Island Flap for Subtotal Ear Reconstruction: Expanding Flap Versatility Based on Zones of Regional Perfusion

Sir:

The postauricular artery flap is a workhorse for conchal reconstruction. Previous reports[1–4] have focused on flaps directly posterior, or cranial, to the conchal defect. Such "short pedicle" designs are precluded in severe trauma or Mohs' excision, where both conchal and postauricular subunits are absent. We present a novel design of the postauricular artery flap for conchal replacement that exploits the rich vascular network of this vessel.

A 68-year-old man with basal cell carcinoma of the right ear underwent Mohs' surgery. The patient exhibited loss of the cymba conchae and the antihelix and partial loss of the helical rim (Fig. 1). In addition, the cranial surface directly behind the ear was absent, negating "revolving door" or direct pull-through of mastoid tissue (Fig. 1). A 3.5 × 3-cm island flap was de-

Fig. 1. A large, through-and-through auricular defect, with extension onto the underlying auriculomastoid skin. A pedicled island flap, based on intraoperative Doppler probe findings, is elevated in an inferior to superior direction (held by Adson forceps), incorporating deep fascia and the perforating branch (*arrow*).

signed using a Doppler probe, incorporating the occipitomastoid branch of the postauricular artery (Fig. 1, *arrow*). A fasciocutaneous composite 5 mm inferior to the mastoid prominence was recruited. Judicious use of Doppler ultrasound enabled dissection of a superiorly based flap (Fig. 1). The flap was transposed 180 degrees without tension. After insetting of the flap and primary closure of the donor site, a 0.0012-inch split-thickness right thigh skin graft was applied to the retroauricular Mohs' defect. Immediate follow-up displayed minimal flap congestion. Long-term follow-up revealed excellent contour and color match of the reconstructed ear (Fig. 2). The patient has had no tumor recurrence, and flap revision via liposuction is pending.

Reconstruction of the ear requires a complete understanding of the intricate arterial supply of this craniofacial appendage. Park et al.[3] identified three divisions of the posterior auricular artery (lower, middle, and upper) and based their island flap on the constant upper branch of the middle division. Two arterial networks have been identified that supply the anterior ear.[4] The triangular fossa-scapha network is supplied by the upper auricular branch of the superficial temporal artery and collateralized by dominant branches (two or three) from the posterior auricular artery. The conchal network contains two to four perforators that emerge from the posterior auricular artery and perforate the conchal floor. Whetzel and Mathes[5] define this vascular territory as a 6 × 11-cm area bordered by the tragus anteriorly, 5 cm from the external auditory canal posteriorly, and 6 cm from the mastoid inferiorly. The current case takes advantage of the entire network, which includes descending cervical, occipitomastoid, inferior, medial, and superior postauricular branches.[3–5] Such arborization divides the retroauricular skin into distinct perfusion zones,[5] allowing one to tailor a skin flap of varying size and location, depending on the defect size and the donor tissue available. Such versatility is essential when the cranial skin behind the ear is deficient or absent.

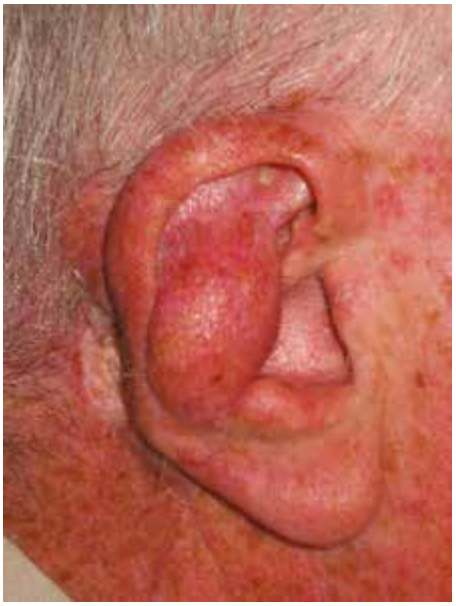

Fig. 2. At 1 year postoperatively, the flap has good color match and contour. Flap bulk will be addressed with minor revision via liposuction in the future.

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DISCLOSURE

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Keloids: When Excision Is the Better Part of Valor

Sir:

Keloid scars continue to present a thorn in the plastic surgeon's side. Until the underlying biological mechanisms are better understood, it seems that no treatment will be able to satisfactorily overcome all problems. We are left with a limited armory of subop-

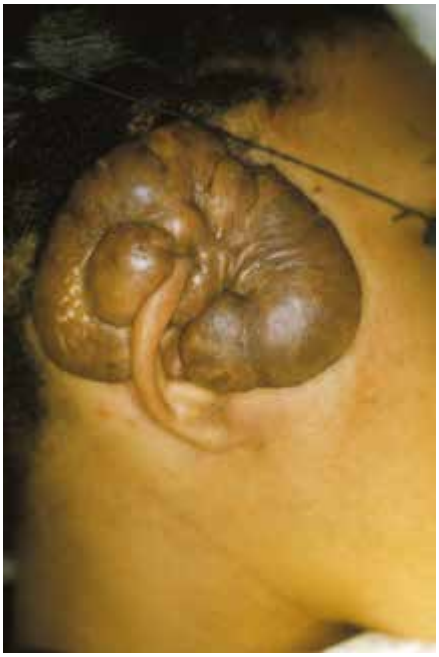

Fig. 1. Preoperative view before intralesional debulking.

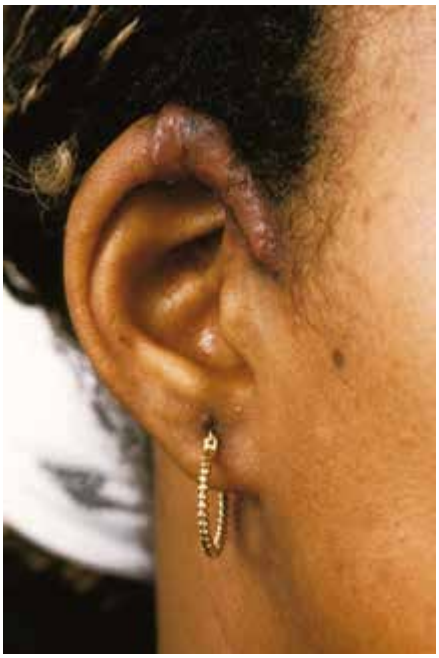

Fig. 2. Postoperative view after intralesional debulking.

timal solutions that include pressure therapy, silicone gel sheets, intralesional steroid injection, excision, carbon dioxide laser ablation, and radiotherapy.[1] These treatments suffice for most patients with a small number of keloids of reasonable size, but there are other patients with a large number of massively overgrown scars for whom permanent control of the problem is not possible. We have therefore adopted an alternative philosophy to deal with selected patients for whom the uphill battle to conquer the keloids can never be won. One patient in particular illustrates this approach.

The patient was a 27-year-old woman of Afro-Caribbean origin who first presented when she was 11 years old with a single keloid scar on her right upper ear after having been scratched by her neighbor's dog. Subsequently she developed multiple keloid scars at a variety of sites, mostly as a result of very minor trauma. Between treatments, the original ear keloid continued to increase in size. Over the 16 years that she has been under our care, she has undergone every treatment available to us, including silicone gel sheeting, intralesional steroid injection, surgical excision (with or without flap reconstruction) and steroid injection into the wound, pressure therapy, carbon dioxide laser treatment, and excision with postoperative radiotherapy. At one recent operation, 168 g of keloid tissue was excised. Furthermore, various experimental therapies have been used, including intraoperative use of collagenase.

Three years ago, having accepted that none of the treatments produced any better results in her than another, we accepted a manner of defeat. We now admit her on an annual basis and perform intralesional scar excisions under general anesthesia. In so doing, we do not recruit any virgin skin into the surgical wound and aim purely to debulk the scars so that she is able to continue with as normal a life as possible. She remains free of massive disfiguring scars for 8 to 9 months before recurrence inevitably sets in. She accepts this approach and finds it preferable to any other she has previously undergone, and these repeated scar-free periods are beneficial to an attractive young girl, allowing her to lead a semblance of a normal life for a period. This technique is demonstrated in Figures 1 and 2.

We now use the philosophy of regular intralesional debulking surgery in such patients with aggressive, almost malignant keloid scars. After all, for the foreseeable future, there is no prospect of beating them, but at least we can lose honorably.

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Midface Distraction Osteogenesis Complication: Intracranial Penetration of a Rigid External Distraction System Pin

Sir:

A 17-year-old boy with bilateral complete cleft lip and palate exhibited severe maxillary hypoplasia. The clinical manifestation was a concave profile anteriorly and a bilateral posterior cross-bite with class III malocclusion and missing maxillary incisors. Orthodontic preparation included fabrication of the maxillary surgical splint and cementation of it 5 days before surgical intervention for adaptation purposes. A Le Fort I osteotomy was performed and the maxilla was separated from the pterygoid plates. A Rigid External Distraction II system was placed to allow anterior traction of the maxilla. Three pins were placed on each side of the skull in the anterolateral portion of the head, torqued only to finger tightness (Fig. 1).

Twenty-four hours postoperatively, the patient experienced severe headaches, fatigue, and dizziness. A postoperative computed tomography scan showed a 0.5-cm penetration of the right middle cranial pin intracranially with a local fracture of the skull (Fig. 2). The halo device and the cranial pins were repositioned accordingly and another postoperative computed tomography scan was performed to confirm the correct positioning of the pins. The patient started broad-spectrum antibiotic therapy. Forty-eight hours later, the general symptoms disappeared and the patient was monitored on a regular basis until discharge from the hospital. The remaining distraction course proceeded as planned.

Distraction osteogenesis of the midface using rigid external distraction offers new possibilities for the treatment of large sagittal discrepancies, but this system is not risk-free. Complications associated with the halo have frequently been reported in the orthopedic literature and include loosening of pins, soft-tissue infection around the pins, severe pain associated with pins, scarring around the pins, dysphagia, neural injury, pin penetration with or without cerebrospinal fluid leak, and cerebral or epidural abscess.[1] Similar complications have been reported lately with the growing use of the rigid external distraction device.[2–5]

Use of the halo in children is especially associated

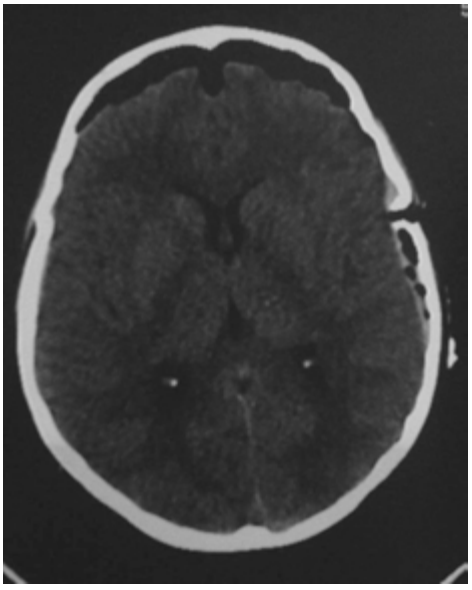

Fig. 2. Postoperative computed tomography scan shows a local fracture of the skull due to intracranial penetration of the right middle cranial pin.

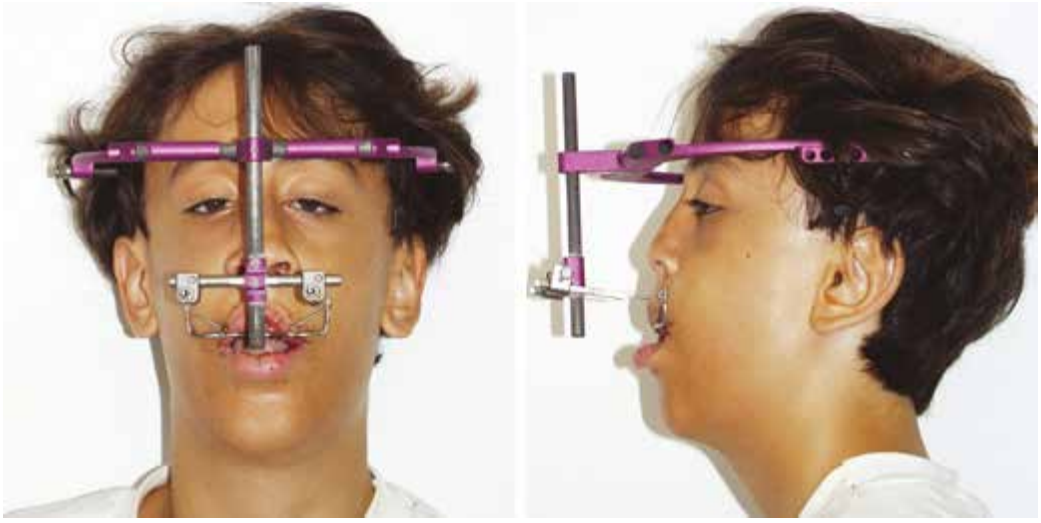

Fig. 1. Frontal (*left*) and profile (*right*) views of postoperative extraoral facial repose with the Rigid External Distraction II system.

with significantly high complication rates. These complications are similar to those reported in an adult population, except for a higher incidence of pin-site infection.[2] The thickness of the safe area for pin placement in children was studied and found to be in the posterolateral and anterolateral sites.[6] The ring should be placed just over the eyebrows and the anterior pins over the lateral one-third of the orbit.[6]

The skull fracture and pin penetration in our case probably happened during device application intraoperatively, although no signs or symptoms were immediately recorded. The patient's complaints began only 24 hours postoperatively. Application of the rigid external distraction device during surgery was performed according to the above-mentioned protocol.

On the basis of this case report, we recommend that a computed tomography scan be performed before halo application because of the variability in skull thickness, even in the safe areas. Pediatric neurosurgical consultation and specific localized pin insertion are recommended in any case when using rigid external distraction. If there is a question as to correct pin placement, a postoperative computed tomography scan should be obtained. Some patients with an extremely thin cortex may not be candidates for external distraction devices that use a halo.

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Craniosynostosis and Rickets

Sir:

In the 1940s, rickets was thought to be the "most common disease of early childhood."[1] After the revelation that rickets was a disease of vitamin or mineral deficiency, it was thought to be "cured" by subsequent supplementation.[1] Since the 1970s, however, the number of reported cases of rickets in children has been steadily increasing in the United States. Conceivably, decreased sun exposure, more breastfeeding, and fewer vitamin prescriptions written for infants have led to its resurgence, or at least to a re-emergence of this condition, once thought to be cured.

Rickets results from a deficiency in calcium, phosphate, vitamin D, alkaline phosphatase, or inhibitors of mineralization, such as aluminum or biphosphonates. Without these minerals, hypomineralization of the bone occurs, and disorganized chondrocyte proliferation occurs at the growth plate.[2] This impairs the strength of these bones and bowing occurs. As a result, affected children often present with parietal and frontal bossing, craniotabes, the "rachitic rosary" (beading along the costochondral junction), and bowing of the distal radius, ulna, femur, or tibia.

Craniosynostosis in conjunction with rickets has rarely been reported in the United States as a result of vitamin D–resistant rickets, X-linked hypophosphataemic rickets, toxic amounts of vitamin D, long-term antacid use in an infant, or presumed genetic factors.

In 2004, a 2-year-old African-American boy with a turribrachycephalic head was brought to the attention of the Duke University Cleft and Craniofacial Program. A head computed tomography scan revealed nonsyn-

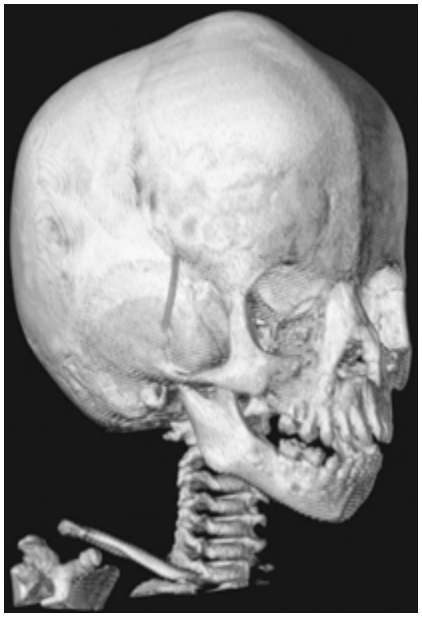

Fig. 1. Preoperative oblique three-dimensional computed tomography scan.

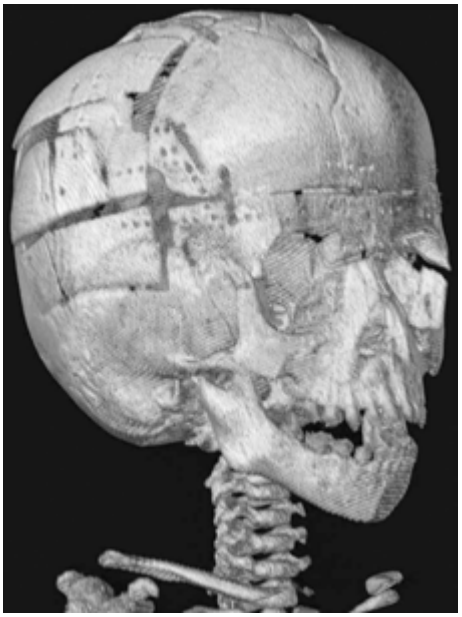

Fig. 2. Postoperative three-dimensional computed tomography scan of the two-thirds cranial vault reconstruction.

dromic bilateral coronal and metopic craniosynostosis with calvarial thumbprinting, suggesting the presence of elevated intracranial pressure (Fig. 1).

To correct the elevated intracranial pressure, the patient underwent reconstruction of the anterior two-thirds of the cranial vault. The procedure was uneventful, and the desired degree of correction was obtained (Fig. 2). Normal craniofacial development was documented over the ensuing 14 months.

Currently, the cause of craniosynostosis is unknown, but rickets is a preventable disease. A recent study reports that out of 166 cases of rickets in children, 83 percent were in African-American children. Furthermore, 96 percent of those patients were breast-fed.[3] Of note, African-American adults require six times more sun exposure than Caucasian adults to generate adequate vitamin D levels, so it only follows that African-American children would require more sunlight as well.[1] Yet another study has found that the incidence of premature infants who developed rickets was increased in mothers who breast-fed (40 percent), as opposed to the incidence of rickets occurring in the children who were bottle-fed (16 percent).[4]

In the United States, craniosynostosis secondary to rickets is rarely reported; however, there is a documented association between the two entities. Craniosynostosis should be included in the differential diagnosis of any rickettic child with increasing head circumference. Moreover, it is important to pay attention to the vitamin D intake of children, especially those with darker skin coloration, those with limited sun exposure, and those who have been breast-fed for an extended period of time without vitamin D supplementation.

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DISCLOSURE

The authors have no financial interest linked to the publication of this communication. The skull images in this report were produced by a helical craniofacial MDCT on a 16-slice scanner (GE Healthcare, Waukesha, Wis.) using the standard pediatric craniofacial protocol: 2.5-mm slice thickness; pitch, 0.875:1; 140 kVp; and 170 mAs. The images were reconstructed from projection data at 1.25-mm increments using a standard reconstruction kernel. Virtual morphometry was performed offline on a Vitrea workstation (Vital Images, Minnetonka, Minn.). Images were interpreted by the neuroradiology department and reviewed with plastic surgeons and neurosurgeons.

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Radial Fasciocutaneous Free Flap "Wrap-Around" Iliac Bone Graft for Hard Palate–Premaxilla–Nasal Septum Reconstruction

Sir:

A 48-year-old healthy man presented with an advanced squamous cell carcinoma at the maxillary labial sulcus, expanding into the premaxilla and palate. There was no neck or distant metastasis.

Surgery was staged over 2 consecutive days. Tracheostomy and extirpation of the tumor were performed first. Excision included the premaxillary alveolus, the hard palate and the adjacent labial sulcus mucosa, the

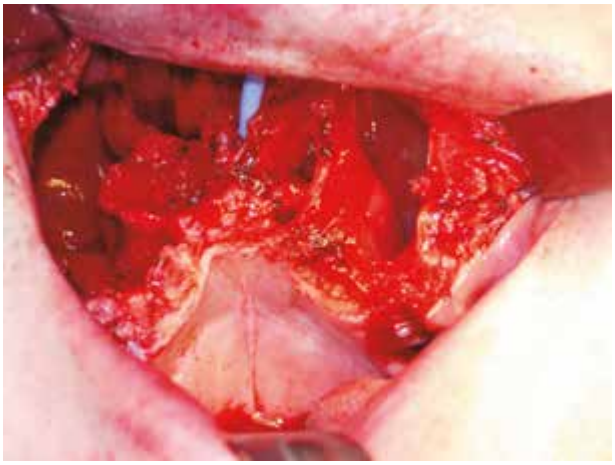

Fig. 1. The defect after bilateral subtotal maxillectomy.

Fig. 3. View of the patient 3 weeks postoperatively, before radiotherapy.

nasal septum, and the lateral nasal walls, leaving a skeletal and soft-tissue defect measuring 5 × 5 × 3 cm (Fig. 1). The next day, the patient underwent bilateral supraomohyoid neck dissections and reconstruction of the defect.

An en bloc segment of the iliac crest and the adjacent gluteal surface of the ilium were harvested as a nonvascularized bone graft. The ilium was burred down to a thin sheet of cortical bone to replace the bony hard palate. The iliac crest component was to become the alveolar process. A separate bone fragment, also from the crest, was fashioned to imitate the vomer component of the septum. This new "septum" was stabilized to the new "hard palate" using metal wires.

This iliac bone graft was wrapped in a radial forearm fasciocutaneous free flap and oriented so the fascia of the flap would become the nasal lining and the skin paddle would replace the oral mucosa of the palate. This composite flap-graft was inset using wires (Fig. 2). The radial artery and cephalic vein were anastomosed with the facial artery and vein using 9-0 nylon.

Postoperative recovery was uncomplicated (Fig. 3). The final staging was a T4N1M0 premaxillary squamous cell carcinoma. Six months postoperatively, the patient developed a recurrence and is presently undergoing palliative chemotherapy.

Palatal reconstruction is challenging. Traditionally, obturators are the mainstay of reconstruction. Autologous tissues are preferred and result in better cosmetic and functional outcomes. Local flaps and regional flaps are frequently inadequate and multistaged, and leave poor secondary defects.[1] Hatoko et al. first described the use of the radial forearm free flap for palatal reconstruction.[2] Other free flaps are available, but all are too bulky.[3–5]

We found no example of simultaneous palatal and nasal septum reconstruction in the literature. Our technique is a good option for a large premaxilla, hard palate, and nasal septum defect. The forearm skin is a reasonable oral lining. The fascia is thin, provides re-

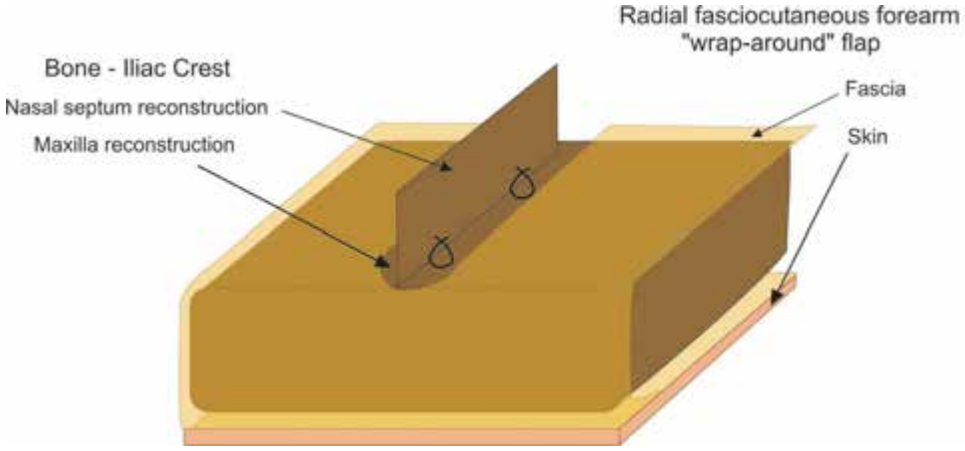

Fig. 2. Design of the radial fasciocutaneous free flap wrapped around the reconstructed hard palate and nasal septum.

vascularization of the bone graft, and becomes mucosalized. The "wrap-around" technique improves the bone graft's take. Septum reconstruction is important to prevent nasal deformity. The iliac crest has sufficient bulk to support dental prostheses or implants. The relative ease of molding and shaping of this technique provides flexibility in design. Good oral function was achieved with no early fistulas; speech was intelligible and aesthetically excellent. The disadvantages are long operative time and high personnel demand.

In summary, we were able to reconstruct the premaxilla, hard palate, and nasal septum simultaneously using a radial forearm fasciocutaneous free flap wrapped around a composite nonvascularized iliac bone. We believe that this is a good option to meet the structural, functional, and aesthetic needs of this complex defect.

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Shortcut Vascular Augmented Long Rectus Abdominis Musculocutaneous Flap Transfer Using the Intercostal Perforator for Complex Oropharyngocutaneous Defects

Sir:

We present a new concept: a shortcut technique involving vascular augmented free long rectus abdominis musculocutaneous flap transfer anastomosing the intercostal perforator with the lateral branch of the deep inferior epigastric vessels of the flap itself.

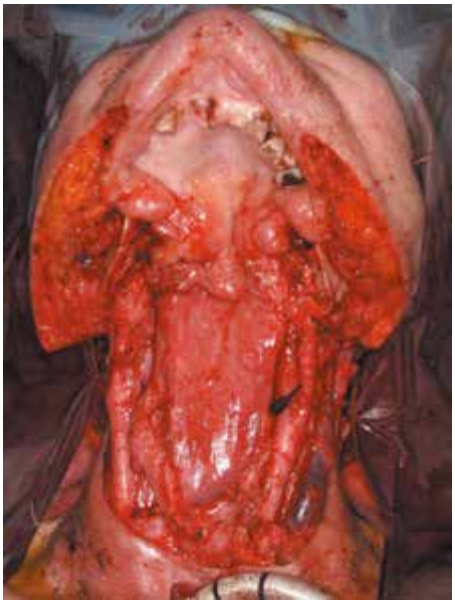

Fig. 1. The defect after the extensive cancer ablation. The defects involved the oral floor, middle and hypopharynx, cervical esophagus, lower lip, and cervical skin. The scar formation was spread all over the neck region, and branches of external carotid or subclavian arteries were unavailable for the recipient artery.

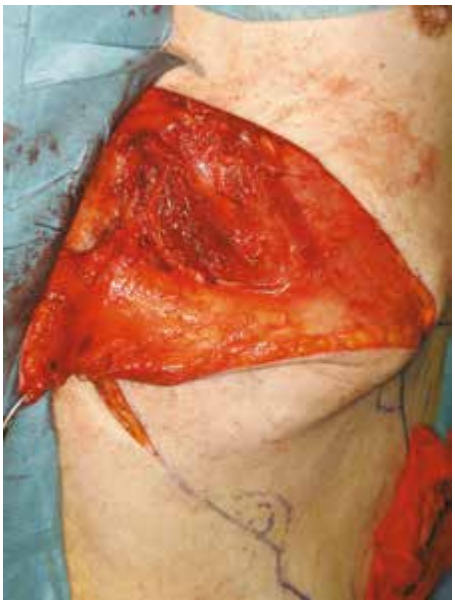

Fig. 2. The distal part of the rectus abdominis musculocutaneous flap. The eighth anterior intercostal neurovascular bundles pierce the serratus muscle and give branches medially and laterally that nourish the distal part of the flap.

Using this method, a patient with a complex oropharyngocutaneous defect was reconstructed.

A 77-year-old man presented with a recurrent cancer of the tongue base, with orocutaneous fistula accompanied by a "frozen neck." Extensive resection was performed (Fig. 1). A long, gourd-shaped rectus abdominis musculocutaneous flap was elevated based on the

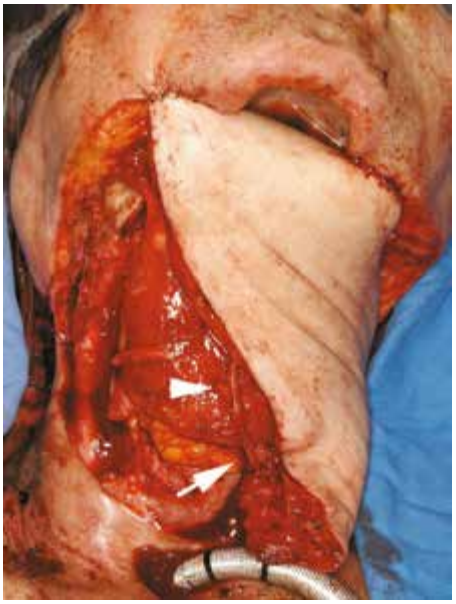

Fig. 3. Finding just after the additional vascular anastomosis between the lateral branch of the deep inferior epigastric vessels (*arrowhead*) and the intercostal perforator (*arrow*).

deep inferior epigastric vessels, including the eighth intercostal perforator in the distal part of the flap (Fig. 2). The oropharyngeal space was reconstructed with the proximal part of the flap, and the neck skin was reconstructed with the distal part. After the flap artery and vein were anastomosed to the left external carotid artery and internal jugular vein, respectively, in an end-to-side fashion, the eighth intercostal perforator (vein and artery) was then anastomosed to the lateral branch of the deep inferior epigastric vessels of the flap itself (Fig. 3). The flap survived perfectly without leakage or abscess formation.

Offman et al.[1] reported that the principal source vessels of the lateral flank region contributed a mean of 33 perforators per hemitrunk. The total area of skin supplied directly by these perforators was a mean 1200 cm^2, equal to an average of 37 cm^2 (1200/33) per perforator. As a single perforator is estimated to supply much more than 37 cm^2 on average, an additional lateral branch of the deep inferior epigastric vessels–intercostal perforator anastomosis may be effective for the vascular augmentation of the distal part of the rectus abdominis musculocutaneous flap. The "frozen neck" is one of the challenging problems in the secondary reconstruction.[2,3] Our shortcut vascular augmentation method using intercostal perforator–lateral branch of the deep inferior epigastric vessel anastomosis is advantageous in that the extremely long oblique rectus abdominis musculocutaneous flap can be transferred based on a single recipient artery and vein, and can therefore even be applied in cases of frozen neck. The deep inferior epigastric perforator flap can be similarly transferred using this concept. The shortcoming of this method is that it can only be used when the distal part of the flap is near the proximal region. The probable indication of this method, therefore, is in the reconstruction of full-thickness (oro-)pharyngocutaneous defects or circumferential defects of the extremities, and so on. Oki et al.[4] reported use of the intercostal perforator for vascular augmentation of the pedicled large and thin flap. Ohjimi et al.[5] reported a free transverse rectus abdominis musculocutaneous flap with "in-flap vascular augmentation methods" using deep inferior epigastric perforator–contralateral deep inferior epigastric perforator anastomosis. However, our shortcut vascular augmentation method using the lateral branch of the deep inferior epigastric vessels–intercostal perforator anastomosis, to our knowledge, has not previously been presented in the literature.

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Efficacy of Epicut Deepithelization Blade in Bilateral Breast Reduction Surgery: A Pilot Study

Sir:

Deepithelization is a key component of breast reduction and other plastic surgical procedures.[1–5] It is commonly performed with a scalpel or scissors. Although other deepithelization techniques are reported, these methods may require special equipment.

Choice of technique depends on the surgeon and is most often a matter of preference and training. A new tool was recently introduced to facilitate deepithelization, the Epicut (MicroAire Surgical Instruments, Charlottesville, Va.). This handheld, knife-like device contains a single blade, shaped like a "V," that is designed to deepithelize in a single, cutting/shearing motion (Figs. 1 and 2). The manufacturer promises a short learning curve and reduced operating time.

We set out to evaluate this device in practice to assess its ability to reduce operative time and complications associated with its use. Institutional review board approval was sought and granted. A side-by-side, controlled trial was carried out simultaneously by two surgeons on healthy subjects scheduled to undergo elective bilateral breast reduction surgery. Twenty consecutive subjects scheduled to undergo bilateral breast reduction were enrolled. Patients not willing to participate were excluded. Each procedure was performed by two surgeons. Surgeon A performed 10 reductions on the right using the Epicut. In those 10 cases, surgeon B performed the deepithelization on the left breast using a knife blade for five cases and a pair of scissors for five cases. For the remaining 10 cases, the surgeons switched roles. Data collected during the operation included deepithelization time (cm^2), specimen weight (g), and complications. Data were compared and analyzed with standard statistical methods utilizing the t test.

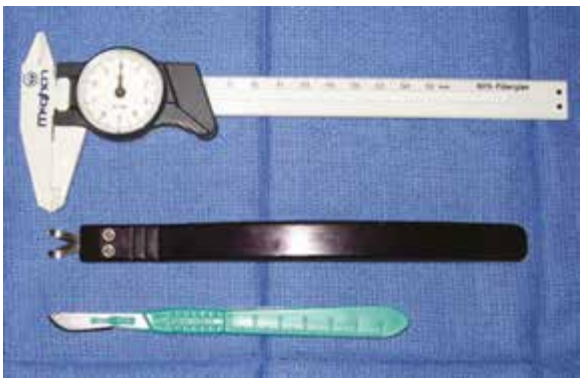

Fig. 1. Epicut handheld tool and a standard no. 10 scalpel blade for comparison.

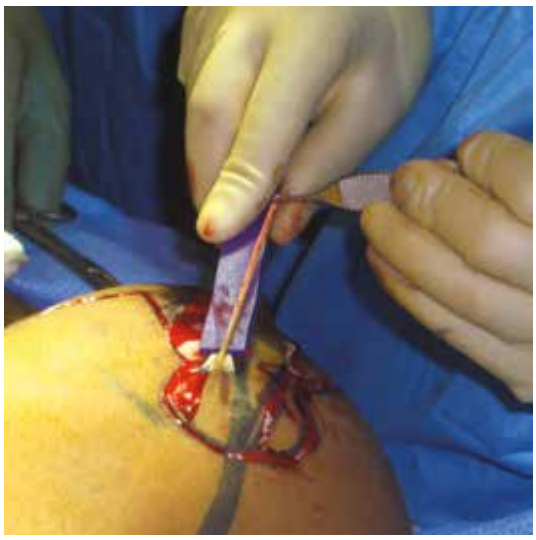

Fig. 2. Epicut in practice.

The average age of the 20 subjects was 39.8 years (range, 21 to 63 years). Traditional Wise pattern reduction was used in all cases (eight superior pedicles and 12 inferior pedicles). The mean specimen weight was 967.5 g (range, 205 to 2549 g). In this pilot study, statistical significance was not achieved. Deepithelization time was calculated as a function of area deepithelized (seconds per square centimeter of breast skin treated, or seconds/cm^2). In comparing the Epicut with other methods (scissors and scalpel), the deepithelization time was 5.0 versus 5.3 seconds/cm^2 (SD 1.7 seconds/cm^2). In comparing the Epicut with the scalpel alone, the deepithelization time was 5.0 versus 5.5 seconds/cm^2 (SD 1.96 seconds/cm^2), and in comparing the Epicut with scissors alone, the deepithelization time was 5.1 versus 5.0 seconds/cm^2 (SD 1.58 seconds/cm^2) (Table 1). No intraoperative or postoperative complications were noted in either the study group or the control group. The learning curve of the Epicut was also examined. Deepithelization time using the Epicut for the first five subjects compared with that for the last five subjects was 5.5 versus 5.0 (SD 1.98 seconds/cm^2), reflecting an improvement in deepithelization time of 0.5 seconds/cm^2.

In this pilot study, the Epicut deepithelized breast reduction pedicles as fast as, or faster than, traditional methods. It was fastest when compared with using the scalpel and demonstrated no real difference versus the

Table 1. Deepithelization Times by Method (seconds/cm^2) (p = NS)

Subject	Epicut	Scalpel
01	9.5	7.5
02	4.9	3.5
03	4.6	4.6
04	3.3	3.0
05	5.1	3.3
06	4.0	5.9
07	7.0	7.2
08	5.6	5.4
09	1.9	7.7
10	3.8	6.8
Average	(5.0)	(5.5)
	Epicut	**Scissors**
11	8.0	7.8
12	4.3	5.2
13	4.3	3.2
14	5.3	4.5
15	3.6	3.3
16	3.6	5.7
17	6.9	6.0
18	3.4	3.3
19	5.3	7.1
20	6.0	4.2
Average	(5.1)	(5.0)
Total	(5.0)	(5.3)

scissors. Further studies may demonstrate a significant difference. However, as with the scissors and scalpel, the Epicut will most likely prove most beneficial as a matter of surgeon preference and training.
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The Implantable Venous Doppler for Perforator Flap Monitoring: Report of a False-Negative Signal

Sir:

Most of the controversy surrounding the utility of the implantable venous Doppler probe for free flap monitoring stems from false-positive losses of signal that prompt unnecessary flap re-explorations. However, there is a common conception among microsurgeons that a false-negative signal, meaning the presence of an audible venous Doppler tone despite a loss of perfusion, is impossible. Indeed, we could not find one report of a false-negative signal among all the reports that describe its accuracy.[1–3] We report a case in which a deep inferior epigastric perforator (DIEP) flap developed significant hypoperfusion despite a normal implantable venous Doppler tone.

We raised a DIEP flap based on two contiguous perforating vessels to reconstruct a mastectomy defect in a 42-year-old woman. The distal of the two perforators had an arterial Doppler tone that was audible through the skin paddle before flap harvest. After dividing the deep inferior epigatric artery and vein, we performed our anastomosis to the right internal mammary artery and vein using 9-0 nylon interrupted suture on the artery and a 2.5-mm venous coupler device. The distal perforator was audible through the skin after the anastomosis was completed.

After the flap was inset, it became pale and the arterial tone on the skin paddle faded. On exploration, the arterial anastomosis appeared to be in spasm. We applied the Cook-Swartz Doppler probe (catalog no. G31631; Cook Vascular, Vandergrift, Pa.) proximal to the venous anastomosis and heard a satisfactory venous tone. We therefore applied papavarine to the anastomosis and closed the skin, satisfied that the flap had adequate perfusion and confident that the arterial tone and color would return after the spasm resolved.

Two hours postoperatively, the flap continued to be pale and had no arterial Doppler tone. The venous Doppler tone, however, was still audible and demonstrated appropriate augmentation and respiratory variation. Despite this, we returned the patient to the operating room based on the clinical appearance of the flap. The anastomosis appeared patent. On further

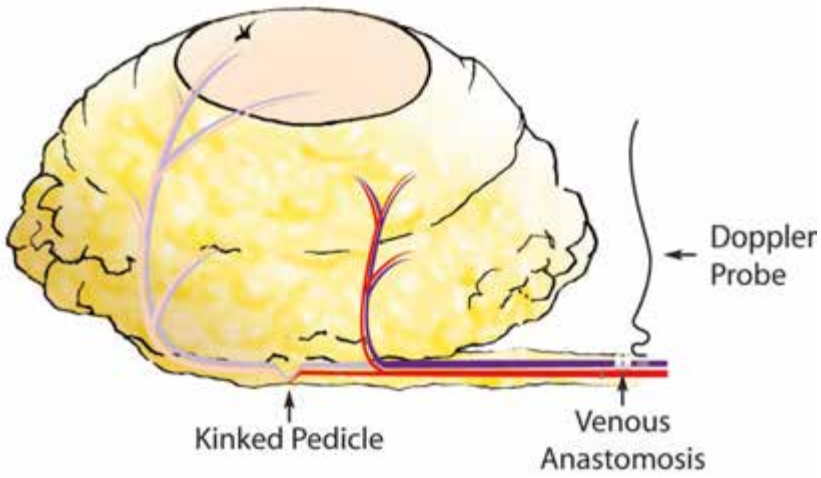

Fig. 1. DIEP flap based on two perforators. A venous tone was heard despite flap ischemia caused by a suture kinking the larger of two perforating vessels.

examination, a tacking stitch was noted to be kinking the pedicle between the two perforators (Fig. 1). Removal of this stitch resulted in prompt return of the arterial tone on the skin paddle. The venous tone became somewhat louder as well. The incision was closed and the patient had an uneventful subsequent recovery, with total flap survival.

This case illustrates two important points. It reminds us that the presence of a venous tone does not necessarily imply adequate flap perfusion; it only implies microanastomotic patency. In our case, the distal perforator supplying the skin paddle became kinked. The proximal perforator supplied enough blood flow to create a venous Doppler tone, but it probably would have been insufficient to ensure flap survival. This case also underscores the notion that the implantable venous Doppler probe is but one tool in the flap monitoring armamentarium that must be interpreted in the context of the overall clinical picture.

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A Simple Way to Reduce Neurovascular Complications in Open Carpal Tunnel Decompression

Sir:

This brief communication details a simple way of avoiding the ulnar neurovascular bundle when performing an elective routine open carpal tunnel decompression. The consequences of damaging this structure are paralysis of the small muscles of the hand, ulnar paraesthesia, and possible digital ischemia. The incision used by the senior author is a modification of the standard incision [from the ulnar border of the palmaris longus toward the midpoint of the ring finger (a more ulnar position)], the purpose of which is to reduce the likelihood of damaging the superficial palmar branch of the median nerve, which can cause palmar paraesthesia and a painful scar. This study was stimulated by the observation of the senior author that, using this incision, the ulnar artery is more commonly encountered in patients with small hands. If this is a true observation, then the risk of damaging the ulnar neurovascular bundle structures can be ameliorated by moving the modified incision radially in smaller hands, thereby reducing the procedure's overall complication rate.

Over 6 months, all patients undergoing carpal tunnel decompression under the care of the senior author had preoperative measurements taken of hand volume (measured by water displacement) and length and wrist circumference (Fig. 1). The same described incision was used in all cases. The ulnar artery was not specifically identified by dissection intraoperatively, but if it was encountered in the process of dividing the subcutaneous fat and palmar ligament, then this fact was recorded.

Thirty patients (39 hands) took part. In 29 hands, the ulnar artery was not encountered and in 10 hands it was. The hands in which the ulnar artery were encountered were found to have, on average, wrist circumference/hand length ratios above 0.95; those hands in which it was not encountered had ratios, on average,

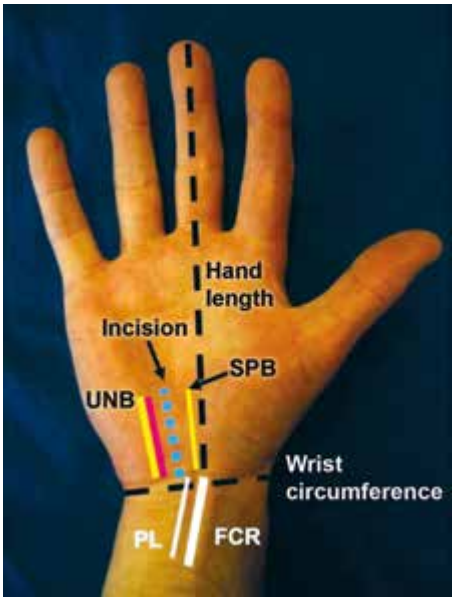

Fig. 1. Hand length and wrist circumference were measured, as was the position of the incision relative to anatomical structures (*UNB*, ulnar neurovascular bundle; *PL*, palmaris longus; *FCR*, flexor carpi radialis).

below 0.95. This association achieved statistical significance ($p < 0.0003$).

In conclusion, the likelihood of encountering the ulnar neurovascular bundle in routine carpal tunnel decompression using the described incision can be determined by simply measuring the wrist circumference and hand length and calculating their ratio. Therefore, for trainees new to this procedure, we recommend using the described incision to avoid damaging the superficial palmar branch of the median nerve, except in instances where the patient has a wrist circumference/hand length ratio above 0.95. In these cases, the incision should be moved about 3 to 5 mm radially to reduce the risk of damage to the ulnar neurovascular bundle.

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DISCLOSURE

The authors declare no financial or other conflicts of interest.

A New Flap for the Treatment of Postburn Contractures of the Hand

Sir:

Postburn contractures are still a challenging problem. Various local and distant flaps have been used to reconstruct hand contractures. However, distant flaps are more complicated and are mostly not suitable for the thin skin of the hand. We have used dorsolateral proximally pedicled ulnar skin flaps to cover a patient's flexion contracture defects.

A 7-year-old boy sustained a burn on the right hand that caused severe flexion scar contractures on the metacarpophalangeal joints of fingers 3, 4, and 5. First, the contractures were released and scar tissues were excised to obtain complete extension of the metacarpophalangeal joints. The flexor tendons were exposed after release of the contractures. Dorsolateral proximally pedicled local flaps were raised from the ulnar sides of fingers 3, 4, and 5 (Fig. 1). The flaps were rotated to cover the flexion defects. The donor sites were closed primarily. The hand was splinted for 2 weeks. Passive motion was started after 1 week. After 3 weeks, physical therapy was started to move the metacarpophalangeal joints.

In postburn contractures of the hand, surgical treatment is often necessary when splinting has failed to improve the functional or aesthetic outcome. In our experience, there are several major types of postburn contracture involving the volar and dorsal sides of the hand: flexion contracture of the metacarpophalangeal joint, flexion contracture of the proximal interphalangeal joint, adduction contracture of the thumb, and extension dorsal contracture.[1]

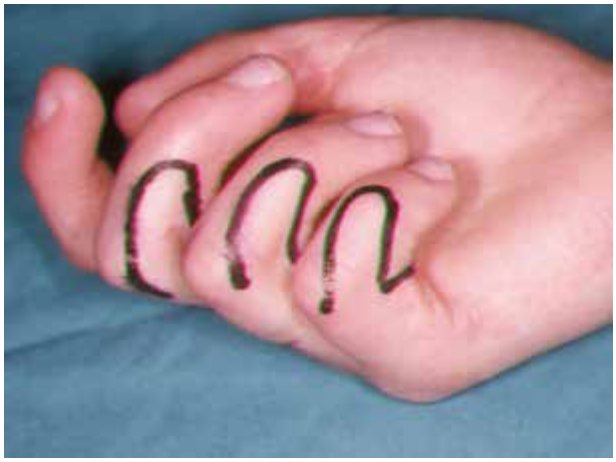

Fig. 1. Preoperative view of the patient's hand. Dorsolateral flaps were planned on the ulnar sides of fingers 3, 4, and 5.

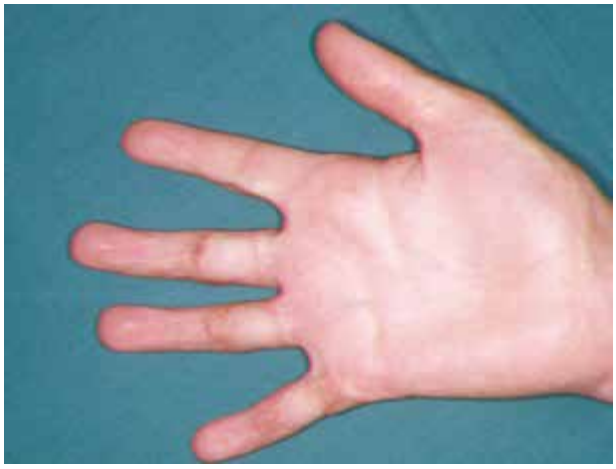

Fig. 2. At 1 year postoperatively, the fingers have full extension and no recurrence is seen.

Postburn contractures of the hand require appropriate surgical treatment whenever conservative approaches have failed. Kalliainen and Schubert[1] stated that multiple reconstructive options exist for the web space contracture: skin grafts, local flaps, and distant flaps have all been used to release the contracture and resurface the resultant defect. Local flaps, however, are frequently more suited to web contractures between the fingers.[1] Katsaros used free flaps in selected cases and stated that it is a modern reminder that there are many ways to treat defects of the upper limb and that the responsibility of the surgeon is to be both imaginative and wise in securing the best

possible result for the patient.[2] However, microsurgery is a more complex and expensive method, so free flaps may be indicated in selected cases. Innocenti and Felli reported some distant flaps for reconstruction of the first interdigital commissure,[3] but distant flaps require multiple sessions, so they are not superior to local flaps. Furnas used Z-plasties to treat hand contractures.[4] Z-plasties are especially useful in treating the web contractures, but they may be insufficient to cover large flexion defects. Our new flap has a secure blood supply that is very suitable for the palmar defect because it is thin. Cross-finger flaps have been used to cover palmar defects, but donor-site morbidity is one of the major drawbacks of this method.[5] Our flap is prepared from the ulnar sides of the finger, which are not involved in opposition, so donor-site morbidity is minimal (Fig. 2).

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The Deltopectomyomammary Flap: A New Flap for Use in Coverage of Large Anterior Chest Wall Defects

Sir:

After Bakamjian's description of the deltopectoral fasciocutaneous flap in 1965,[1] it was used extensively for head and neck reconstruction. In 1976, Robinson described the use of the deltopectoral flap for chest wall reconstruction.[2] In 1978, Arnold and Pairolero described the pectoralis major muscle flap for use in coverage of anterior chest wall defects.[3] Utilization of the breast to cover chest wall defects was first advocated by Schepelmann in 1924.[4] Since then, several articles in the literature have advocated the use of breast skin flaps and myocutaneous breast flaps to cover anterior thoracic defects, as outlined by Hallock[5] and Hughes et al.[6] We describe a modification of the Bakamjian flap that includes elements of the pectoralis major muscle flap and the cutaneous breast flap. This deltopectomyomammary flap was used to successfully cover a 30×40-cm^2, left-sided anterior thoracic wall defect.

The patient had a history of left breast cancer, underwent radical mastectomy, and years later developed an anterior chest wall recurrence that was treated with radiation therapy. She developed a chronic chest wound that was reconstructed with a left pedicled latissimus dorsi flap and, later, a right pedicled rectus abdominis flap, each of which failed secondary to underlying untreated chest wall osteomyelitis. All of her previous treatment was at outside institutions. She presented with chronic mucopurulent drainage from the left side of her chest wall wound that required debridement and reconstruction. Previous use of the left latissimus dorsi and right rectus abdominis muscles narrowed the list of reconstructive options. Free flap closure was also impossible, given the limited availability of local donor vessels secondary to this destructive chest wall process. Preoperatively, we designed a modification of the Bakamjian flap, which included carrying the right breast (skin and breast tissue) and pectoralis major muscle with the flap, thus creating a deltopectoral myocutaneous breast flap for reconstruction. A suspicious mass discovered within the right breast tissue during preoperative mammography necessitated right mastectomy at the time of left chest wall reconstruction. To maintain the integrity of our flap design, a skin-sparing mastectomy was to be utilized to preserve the overlying breast skin, which was intended to be included in our flap.

Debridement of her wound left a chest wall defect of soft tissue and bone measuring 30×40 cm^2. A right subcutaneous mastectomy was performed through an inframammary fold incision, preserving the medial perforators from the right internal mammary artery to the overlying breast skin. The pectoralis major was then elevated off of its inferior chest wall, humeral, and lateral clavicular attachments, including ligation of the right thoracoacromial trunk, leaving the muscle attached to the chest wall by only its superomedial clavicular and sternal attachments. What remained was a huge breast skin flap attached to the pectoralis major muscle superomedially and supplied only by the first few right internal mammary artery perforators (Fig. 1). The flap was then rotated over on its pedicle, tailored to fit the defect, and inset into the wound (Fig. 2).

We have presented a patient with a significant anterior chest wall defect and limited reconstructive options. She successfully underwent reconstruction of this defect with a modification of the Bakamjian deltopectoral flap, which included a pectoralis major and breast skin myocutaneous component. We describe and illus-

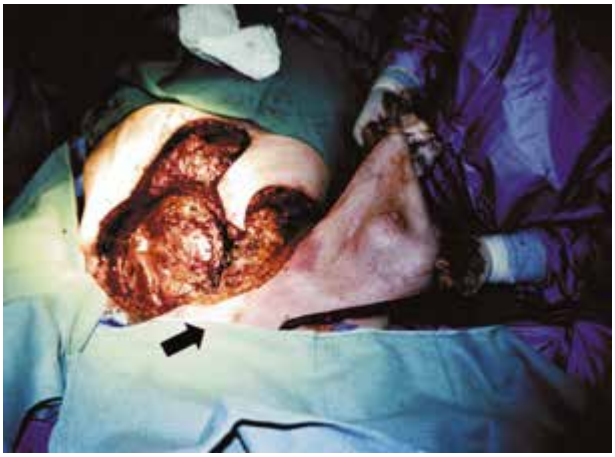

Fig. 1. Chest wall defect after debridement. Flap elevation and rotation: the pedicle is marked with an *arrow*.

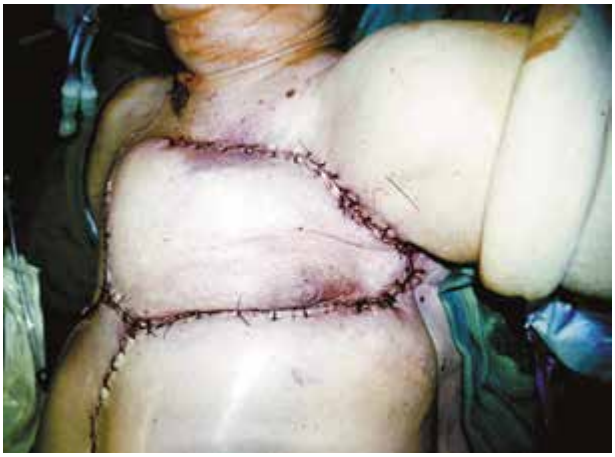

Fig. 2. Inset flap.

trate the elevation and rotation of this deltopectomyomammary flap as another potential pedicled, myocutaneous composite flap for reconstruction of large anterior chest wall defects.

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A New Method for Reducing Postoperative Complications and Scar Length in Abdominoplasty

Sir:

During the last decades, multiple studies have been published presenting surgical refinements in abdominoplasty. Several objectives need to be considered, but achievement of a short, hidden scar is a major objective that has rarely been addressed in the literature. We developed a new technique for skin closure in abdominoplasty that addresses two major concerns of this procedure: excessive postoperative scar length and rate of delayed wound healing.

Since the midline in particular displays an alarmingly low rate of perfusion,[1] which will result in delayed wound healing or even skin necrosis when subject to tension upon closure, it is evident that a tension-free closure, especially in the midline, is essential for surgical success. Having learned from Lejour,[2] we applied principles derived from her experience in vertical mammaplasty and thus were able to easily achieve a tension-free skin closure as well as a short scar postoperatively.

The procedure is routinely performed under general anesthesia. After infiltration of the surgical field with a tumescent anesthetic solution (1 to 2 liters) for reduction of intraoperative blood loss as well as postoperative pain, a modified Regnault incision is made, but it never extends beyond the anterior superior iliac spines laterally. Subsequently, suprafascial dissection is performed up to the xiphoid. A wide anterior abdominal plication is performed whenever indicated.

Tuxedo flaps created during dissection are resected after an inferomedial pull that results not only in a stretch of the anterior abdominal skin vertically but also in considerable lifting of the flanks. However, it will result in dog-ears along the lateral margins provoked by bulging subcutaneous tissue rather than abundant skin. Therefore, cutaneous resection of these dog-ears with resultant rounded skin edges should be extremely conservative, with removal of any residual subcutaneous adipose tissue underneath the lateral dog-ears (Fig. 1). Thus, a full-thickness dog-ear is converted into a small dermoepidermal structure that is subject to significant shrinking.

After reinsertion of the neoumbilicus, the skin is closed in a single running subcuticular layer using 2-0 polypropylene; this is the only way to achieve a continuous "plissé" with the desired distribution of tension (high laterally, low medially). It is essential to avoid beginning at the most lateral point of the incision. Moreover, needle entrance is defined individually after medial pull of lateral tissues. This maneuver allows a more medial needle entrance and results in a considerably shorter scar. Furthermore, needle bites vary while the skin is gathered from lateral to medial. When suturing the lateral third, much bigger needle bites should be taken from the lower wound margin (Fig. 2). This results in some tension along the lateral (well-perfused) flap margin. In addition, by this means, flank contour can be defined very precisely. Moving medially, the incongruent needle bites are reversed.

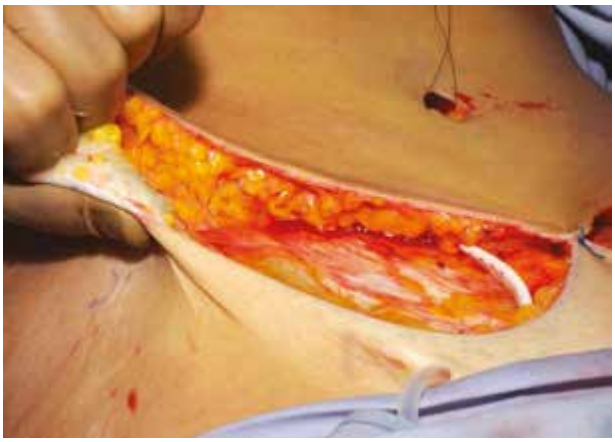

Fig. 1. Removal of any residual subcutaneous adipose tissue underneath the lateral dog-ears is essential or else the skin will not be subject to shrinkage. Note the extent of subcutaneous fat removal.

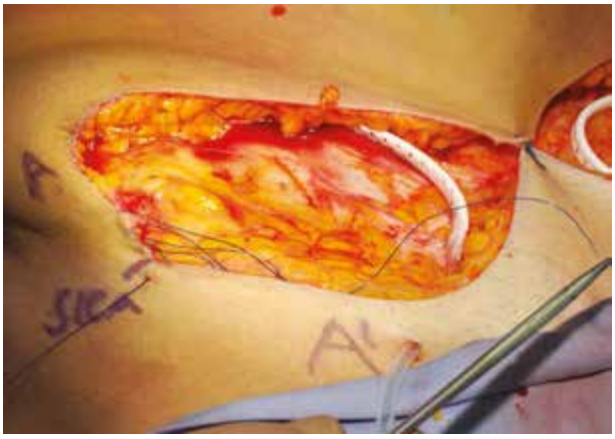

Fig. 2. When suturing the lateral third, much bigger needle bites should be taken from the lower wound margin. Moving medially, the incongruent needle bites are reversed, with resulting bigger bites from the cranial wound margin.

Performed adequately, this technique will result in a short scar postoperatively as well as allow an absolute tension-free closure in the critical midline, thus reducing the occurrence of delayed wound healing.

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The Use of Suction Drains in Abdominal Dermolipectomy: A Randomized Clinical Trial

Sir:

We conducted a randomized trial with 63 abdominal dermolipectomy procedures performed at the Department of Plastic Surgery at Santa Casa Hospital Center–Fundação Faculdade Federal de Ciências Médicas de Porto Alegre between January 1, 2003, and April 20, 2004. After assessment and indication for abdominal dermolipectomy, patients were randomly allocated to two groups. Both groups underwent conventional surgery. Patients in group 1 ($n = 30$) received closed tubular drainage with negative pressure for the time needed to stabilize drainage volumes at 30 to 50 ml/day. Patients in group 2 ($n = 33$) did not receive any kind of drainage and were only made to wear a compressive garment during the postoperative period. Both groups received follow-up after hospital discharge and were examined on a weekly basis in the first 6 weeks after surgery and then fortnightly up to the third postoperative month. From the third to the sixth postoperative months, the patients were examined monthly. Those patients who presented clinical signs suggestive of fluid collections, such as swelling, contour deformities, extensive hematomas, or fluid waves, were treated with needle puncture and the volume of fluid collected was recorded.[1,2] All patients were assessed according to the research protocol. Statistical analysis used the chi-square and Fisher's exact tests, and $p < 0.05$ was considered significant.

Group 1 presented one case of fluid collection (seroma), which was diagnosed and drained around the tenth postoperative day. Group 2 presented three cases of fluid collection (one hematoma and two seromas), which were diagnosed on the seventh (hematoma) and ninth (seromas) postoperative days. There was no statistically significant difference between groups 1 and 2 with regard to fluid collection in the postoperative period.

We believe that because of their late presentation (between the sixth and tenth postoperative days), use of aspiration drains seems to have no effect on seroma prevention. In the case of the hematomas, it is believed that use of drains has an important role in monitoring bleeding in the first 24 hours after surgery. Later hematomas, such as the ones identified in this study, are not prevented by the use of drains, which are removed around the first or second postoperative day (when drainage volumes are less than 50 ml/24 hours). In addition, use of drains for extended periods is not advisable, as they increase discomfort and reduce patient mobility, which contributes to a higher incidence of morbidities such as local infections and thromboembolic accidents.[3,4]

The patient population in this study consisted of young women with early first pregnancy and multiple pregnancies and a history of recent weight loss. It was seen that the formation of fluid collections was not significantly affected by the use of drains.

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Anchoring of Pain Pump Catheters within the Rectus Fascia in Abdominoplasty

Sir:

Infusion devices delivering local anesthetic directly to the operative site have improved postoperative analgesia in a number of plastic surgical procedures, including abdominoplasty.[1] To ensure optimal analgesic effect, correct placement of the infusion catheters is important. In the case of abdominoplasty, this is generally achieved by suturing the catheters to the anterior rectus sheath.

We have used another method without sutures that will also deliver anesthetic directly to the rectus muscles. After excision of excess skin and subcutaneous tissues and plication of any rectus abdominis divarication, the catheters are introduced through the skin with a trocar in the usual fashion. Small holes are made in the anterior rectus sheath bilaterally, and the catheters are fed in and out of a subfascial plane until they reach the superior aspect of the surgical field (Fig. 1).

We have found that this technique provides excellent postoperative analgesia and that the catheters are held securely while the abdominolasty wound is closed as well as during the immediate postoperative period. We have had no difficulty in removing the catheters once they are no longer required.

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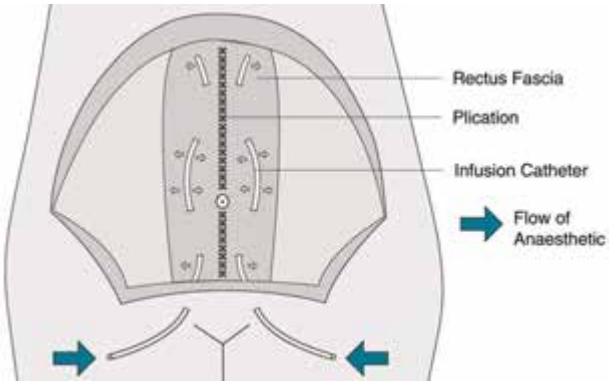

Fig. 1. Anesthetic is delivered within and around the rectus sheath and held securely without suturing.

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Persistence of Human Skin Allograft in a Burn Patient without Exogenous Immunosuppression

Sir:

A 19-year-old man presented to our burn unit with 75 percent total body surface area deep second- and third-degree flame burns resulting from accidental ignition of toy airplane fuel. His medical history was unremarkable except for bipolar disorder. He was intubated and immediately taken to the burn unit for resuscitation and wound care. After 72 hours, the patient underwent multiple operations for sequential excision of the back, chest, and legs and resurfacing of the wounds with widely meshed autografts. On hospital day 8, the abdomen was excised to subcutaneous fat, and on day 10, fascial excision of the upper extremities was performed. Due to a lack of donor sites, the lower abdomen was resurfaced with 1000 cm^2 of allograft and the arms with 1600 cm^2, meshed to a ratio of 1:1.

Four weeks later, these areas showed no signs of rejection (Fig. 1). The skin was hyperemic but without scaling, shrinking, sloughing, or necrosis. HLA typing revealed only the patient's HLA type within an allograft biopsy. Histopathologic analysis showed a moderate dermal perivascular inflammatory infiltrate, fibroplasia, and vascular proliferation consistent with "reparative changes as may be seen in a scar." There was no evidence of epidermal destruction or thrombosis to suggest rejection (Fig. 2). Seven weeks after allograft placement, the graft continued to provide stable wound closure but had the clinical appearance of hypertrophic scar.

The average time to rejection of allograft skin has been reported to be 10 to 14 days.[1] As late as 7 weeks after grafting in the patient presented, we did not find clinical or histological evidence of rejection. HLA typing and histologic analysis suggested that the mechanism of allograft persistence was not survival of donor cells but repopulation of the allograft by recipient cells.

Allograft skin persistence by creeping substitution has previously been described. Phipps and Clarke[2] used meshed parental allografts and widely meshed autografts in children following thermal injury to provide

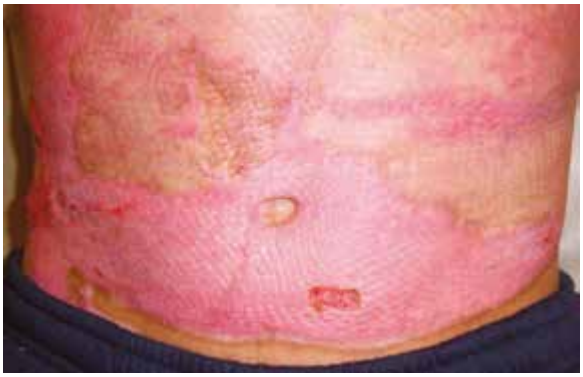

Fig. 1. Allograft skin on lower abdomen at 4 weeks after grafting. A fresh biopsy site is seen.

stable wound closure without acute rejection. Chromosomal analysis demonstrated substitution of male donor cells by female recipient cells. Hypertrophic scar was not seen. Krupp et al.,[3] using unrelated allograft skin intermingled with cultured epidermal autografts and temporary cyclosporine treatment, did not see acute rejection after cyclosporine was stopped; chromosomal analysis suggested creeping substitution of allograft by recipient cells. Hypertrophic scarring was not seen. This may have been due to the temporary use of cyclosporine and the avoidance of excessive inflammation.

In cases of composite tissue allotransplantation, episodes of acute rejection of the skin of abdominal wall, hand, and recent face transplants have been managed with increased doses or topical application of immunosuppressive drugs.[4,5] With the occurrence of the world's first face transplant, it is all the more pressing that we find solutions to the challenge posed by skin antigenicity that avoid the risk of life-long immunosuppression and pre-

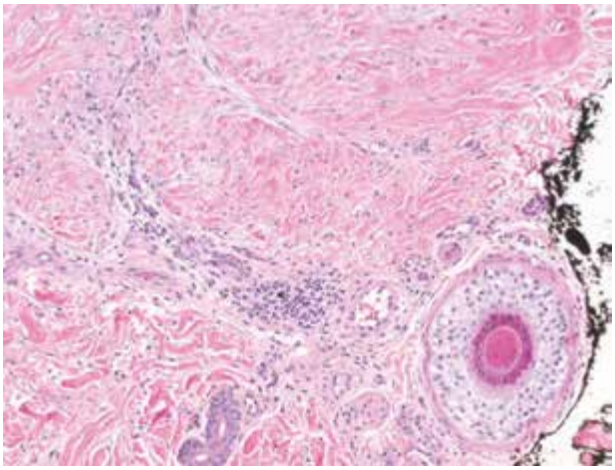

Fig. 2. Skin allograft biopsy specimen taken at 4 weeks (40× magnification) shows moderate to severe dermal inflammatory infiltrates, fibroplasias, and perivascular inflammation. An intact hair follicle next to the inked edge of the specimen and a structurally normal sweat gland are seen in the lower right corner. There is no significant epidermal damage.

serve an aesthetically acceptable result. Methods to promote repopulation of allograft skin would greatly affect the management of burn patients and recipients of skin transplants; however, inflammation must be controlled to prevent excessive scar formation.
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First Clinical Use of an Omental Pedicle Flap for the Surgical Correction of a High Intra-Abdominal Testicle

Sir:

Intra-abdominal testes are five times as likely to undergo malignant degeneration as testicles within the inguinal canal.[1] High intra-abdominal testes are the most difficult to correct, with the results of testicular viability and function frequently being disappointing. The high failure rate (26 percent)[2] is likely due to the fact that testicular blood flow is reduced up to 80 percent with spermatic vessel ligation, leading to insufficient germ cell perfusion.[3] Another procedure used in this situation is microvascular autotransplantation, but this operation requires vessels of adequate size and expertise in microsurgical technique. Therefore, especially when the contralateral testicle is normal, an orchiectomy is preferred due to the high risk of testicular atrophy associated with most of the salvage procedures. However, if the chances of postoperative viability of the testicle could be increased, perhaps more salvage orchiopexies would be performed.

In situations where the testicular vessels are not adequate for microvascular autotransplantation and the collateral circulation from the vas deferens is not sufficient to maintain testicular viability, a different technique is needed. Our solution was to perform an orchiopexy in two stages with the use of an omental pedicle flap.

Our patient had a single left intra-abdominal hypoplastic testicle superior to the left common iliac artery. There was no vas deferens attached to the gonad due to previous operations. His vascular pedicle was too small (0.5 mm in diameter) to permit safe microvascular transfer. Therefore, the testicle was marsupialized in an omental flap to allow external neovascularization of the testicle (Fig. 1, *above*). The patient returned to the operating room 6 months later. The testicular pedicle was divided and the omental flap was lengthened (Fig. 1, *below*). It was transferred down through the midline between the rectus muscles, just above the pubic bone, into the left hemiscrotum. The testicle remains viable and the patient continues to demonstrate normal testosterone levels, maintaining his secondary male sexual characteristics.

There are several indications for use of the omentum in reconstructive surgery,[4] thanks to its plasticity, volume, and ability to neovascularize adjacent tissue

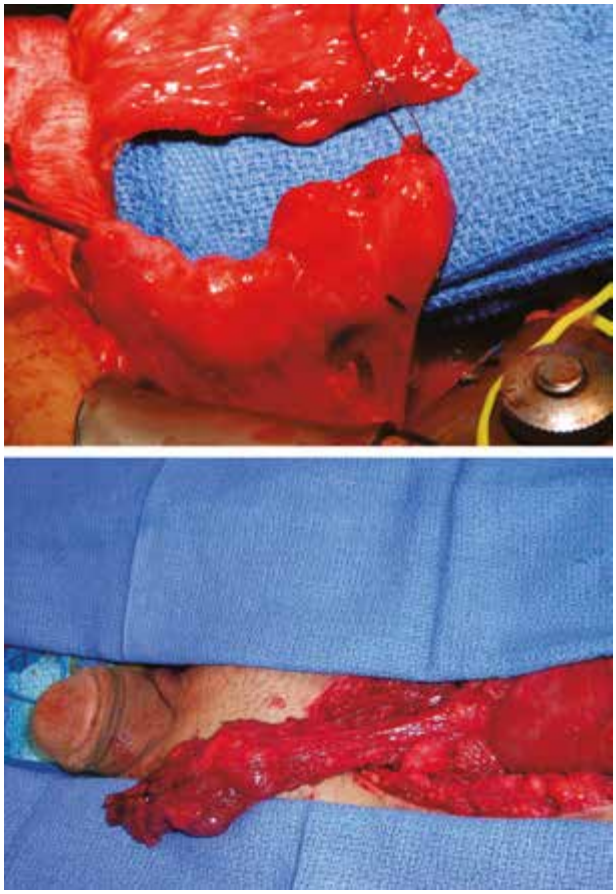

Fig. 1. (*Above*) Left high intra-abdominal hypoplastic testicle and omental flap. (*Below*) Neovascularized testicle within the omental flap, demonstrating adequate length for scrotal placement.

through the induction of angiogenesis.[5] Clinical use of the omentum to perform a two-stage orchiopexy has not previously been described.

In summary, a two-stage transposition to the scrotum of a high intra-abdominal testicle was performed successfully via an omental pedicle flap. The omental pedicle flap for orchiopexy has several advantages, including the ease of lengthening the flap, so that the testicle can be transferred into the scrotum, and neovascularization of the testicle, decreasing its probability of atrophy. This procedure should be performed in two stages, to allow angiogenesis and neovascularization of the testicle to occur. Due to the high rate of atrophy associated with the standard orchiopexy of intra-abdominal testes, we propose that our procedure be added as a surgical option to increase the likelihood of preserving testicular viability and function. This is especially important in patients who have only a single functional testicle, to prevent their need for life-long treatment with exogenous testosterone.

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Periumbilical Full-Thickness Skin Graft Donor Site for Pretibial Skin Cancer Excisions

Sir:

Skin grafts have long been a mainstay in the reconstruction of skin cancer excision defects. Sun-exposed areas such as the head and neck, as well as the upper and lower extremities, are common sites for skin cancer and, therefore, postexcision reconstruction. In particular, the anterior tibial area can present difficulties in reconstruction given the paucity and inelasticity of skin anterior to the tibia. As a result, full-thickness skin grafts have been a useful tool in reconstructing skin cancer excision defects in the pretibial area. Historically, the groin has served as a common donor site. Although it is still a good option, the donor-site scar can be long and unsightly, given that skin cancer excision defects are frequently circular (especially melanoma) and the donor site is designed elliptically to achieve a linear closure.

We propose the use of a periumbilical donor site for reconstruction of pretibial skin cancer excision defects. The advantages of such a donor site are as follows: (1) the periumbilical donor site supplies skin in a circular pattern ideal for filling the circular pretibial defect; (2) there is a good color match between the pretibial and periumbilical skin; and (3) the resultant periumbilical scar is well hidden.

A doughnut-shaped area around the umbilicus is marked out, leaving a small, superiorly based skin bridge intact (Fig. 1). The skin is excised full thickness and thinned appropriately. The skin is then sutured into the defect with primary closure of the central hole, with very little trimming or tailoring necessary (Fig. 2). The donor site is closed in a purse-string fashion using a permanent suture to avoid widening of the scar, much like a Benelli blocking suture.[1]

The periumbilical donor site has proven to be a useful tool in the full-thickness skin grafting of pretibial skin cancer excision defects (Fig. 2), particularly in patients concerned with cosmesis. The graft allows for easy in-setting into the defect because of its circular nature, it provides a color match similar to that of pretibial skin (Fig. 2), and it leaves the patient with a well-camouflaged donor scar (Fig. 1). It provides yet another weapon in the armamentarium available to plastic surgeons who often deal with full-thickness, circular pretibial defects.

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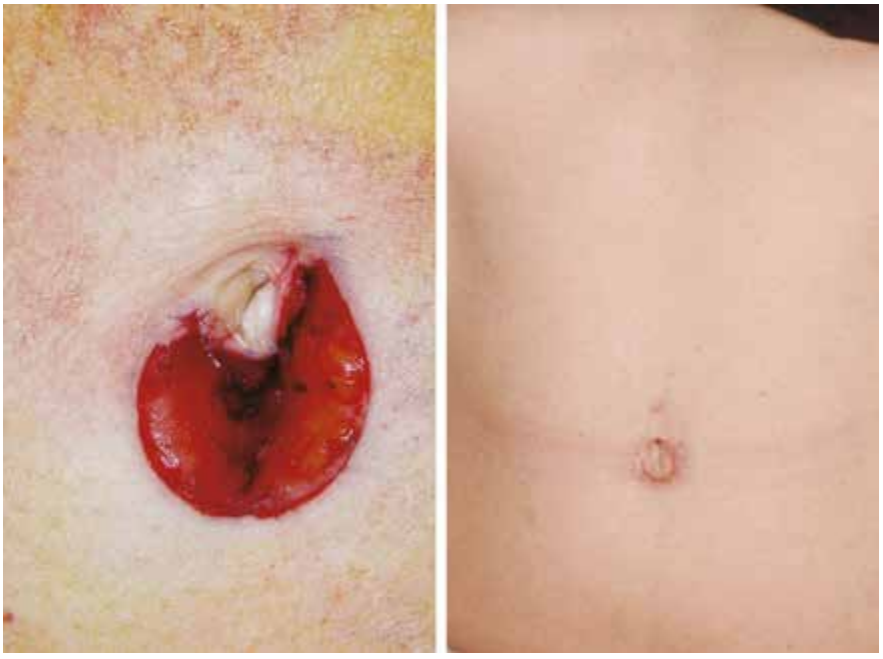

Fig. 1. (*Left*) Umbilicus donor defect after skin graft harvest. (*Right*) Umbilicus healed at 6 months.

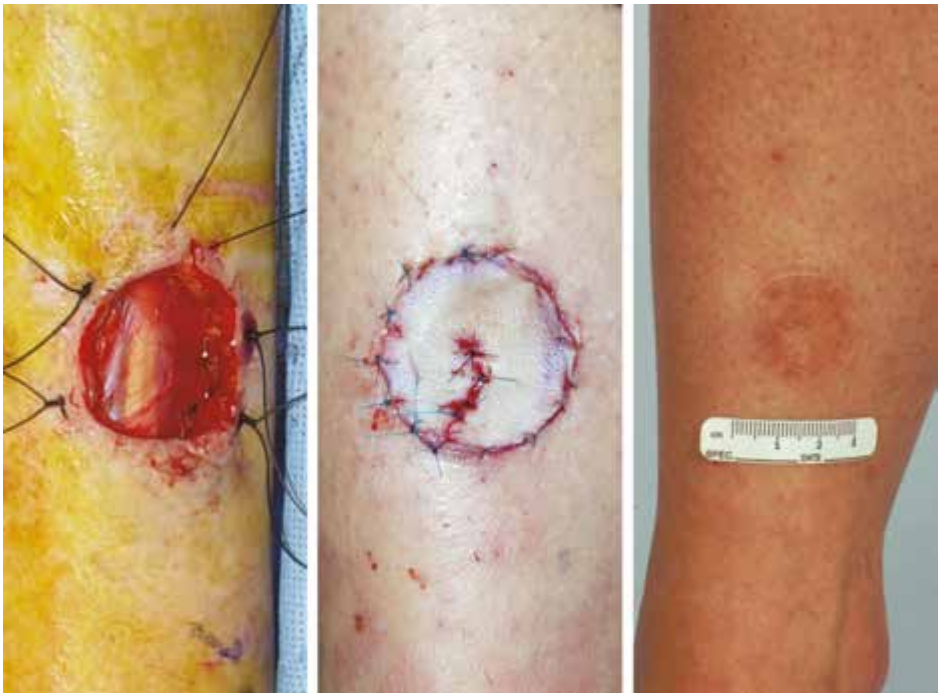

Fig. 2. (*Left*) The tibial defect after excision of melanoma. (*Center*) The tibial defect after skin graft placement. (*Right*) The tibial defect healed at 6 months.

Vacuum-Assisted Closure over an External Fixation Device

Sir:

Since its initial description in 1997,[1,2] the vacuum-assisted closure device (KCI, San Antonio, Texas) has been commonly used to manage complex traumatic wounds of the lower extremities. The device significantly reduces tissue edema, increases local perfusion, and stimulates granulation tissue formation.[2] The negative pressure environment alters the cytoskeleton of cells in the wound bed and causes increased rates of cellular proliferation.[3] In addition, bacterial contamination and colonization can be reduced significantly and rapidly.[2]

Coverage of acute traumatic wounds of the lower extremities with the vacuum-assisted closure device is often necessary to optimize the wound before definitive soft-tissue reconstruction with skin grafting, local flaps, or free tissue transfer. However, we have found the device to be particularly difficult and cumbersome to use in the setting of a circumferential wound and the presence of an external fixation device. With large or circumferential wounds, it is difficult to maintain a seal around the fixation hardware due to poor skin adhesion, pin-site gapping, and tearing of the adhesive drape over the hardware itself once negative pressure is applied.

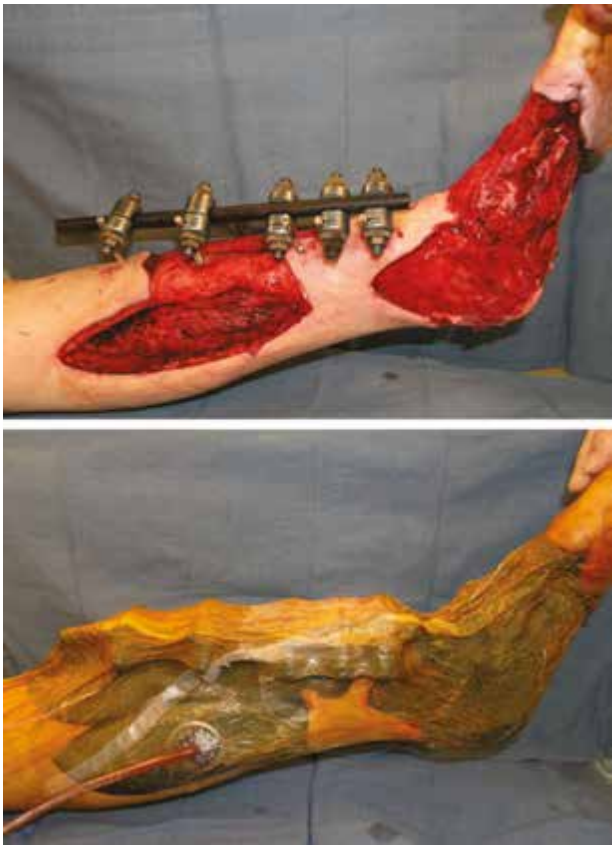

Fig. 1. (*Above*) Traumatic lower extremity wound consisting of a nearly circumferential degloving of the leg and foot and a comminuted fracture of the tibia maintained in reduction with an external fixation device. (*Below*) Black foam over the wounds and covering the entire external fixation device is held in place by loban, and negative pressure is maintained.

We present the case of a 26-year-old woman with an acute traumatic injury to the left lower extremity due to a motorcycle collision. A comminuted fracture of the tibia and fibula was present and associated with a nearly circumferential degloving of the leg and foot. Limb salvage with free tissue transfer was planned but delayed due to other traumatic injuries. An external fixation device was placed to maintain reduction of the tibial fracture, and the vacuum-assisted closure device was utilized to manage the soft-tissue injury until formal reconstruction could be performed.

The soft-tissue component of the injury was substantial and involved the tissue immediately under and surrounding the external fixator hardware (Fig. 1, *above*). The black foam was cut to the dimensions of the wound and a separate piece of foam was then used to cover the prominences of the hardware. An adhesive barrier (Ioban; 3M, St. Paul, Minn.) was wrapped circumferentially without undue tension, and the device's tubing was then attached and connected to the vacuum-assisted closure pump (Fig. 1, *below*). Before completion of the dressing, it is important to assess the dressing for leaks, which are often seen (or heard) in areas of "tenting." Areas of tenting between the Ioban and skin required additional, geometrically cut-out vacuum-assisted closure sponges. In summary, important technical points include (1) adequate padding of all the hardware, particularly prominences of the pins and rods; (2) avoiding areas of dead space (i.e., tenting between the Ioban and underlying skin) to prevent rupture of the adhesive barrier from application of negative pressure; and (3) final assessment of a proper seal ("listen and look"). We have found the above technique to be both efficient and effective in allowing placement of the vacuum-assisted closure dressing onto complex wounds when an external fixation device is present.

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Bipedicle Flap for Wounds following Achilles Tendon Repair

Sir:

Surgical repair of Achilles tendon rupture carries a significant risk of postoperative complications.[1] These can culminate in skin loss with the risk of exposure and subsequent necrosis of the tendon. Such skin defects in the distal leg represent a challenge to reconstruction, as complications of tendon repair can further compromise an already poorly vascularized bed. The search for alternatives to simple local flaps has led to more elaborate reconstruction techniques, which carry significant cost in terms of donor-site morbidity, operative complexity, and cosmesis.[2–4]

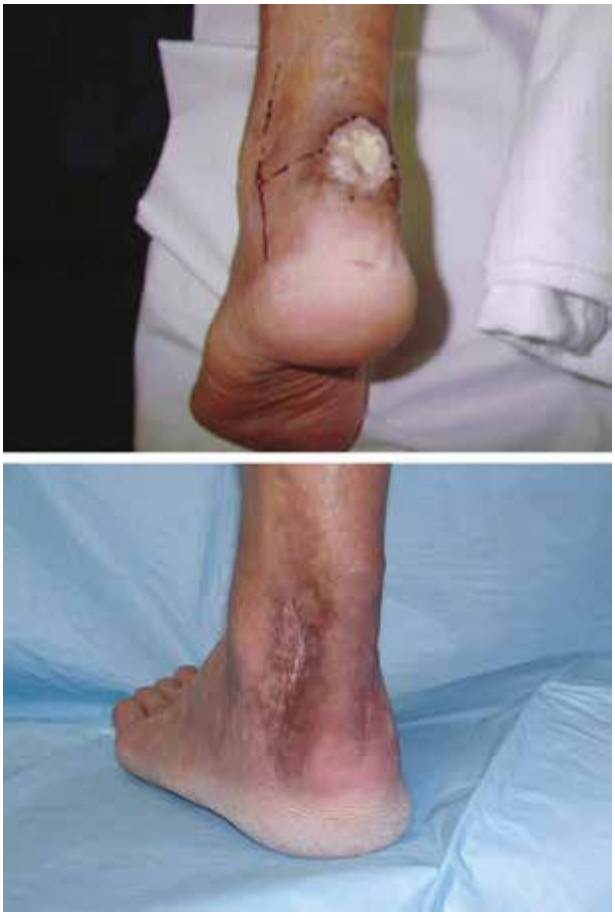

Fig. 1. Before and after pictures of a patient with skin defect following tendon repair that was covered with a bipedicle flap. (*Above*) A frayed Achilles tendon exposed with visible suture material, and the bipedicle flap design. (*Below*) Satisfactory result after superficial tendon debridement, removal of suture material, and closure (4-year follow-up).

We have used a bipedicle fasciocutaneous flap to cover skin defects in three patients, ranging in age from 37 to 52 years old, who experienced wound breakdown following Achilles tendon repair. In all cases, the wound was widely debrided. A longitudinal bipedicle flap was raised lateral to the defect in the subfascial plane, with care taken not to injure the sural nerve. The horizontal width of the flap was designed to be 25 percent greater than the defect itself, and the total vertical length was at least twice the width. The donor site was covered with a partial-thickness skin graft. The ankle was immobilized for 4 weeks in a cast, with a posterior window for wound care. Patients were placed on prophylactic antibiotics for 3 weeks (Fig. 1.)

The bipedicle fasciocutaneous flap has the two major advantages of good vascularity and minimal tension. The longitudinal incision preserves axial cutaneous perforators and parallels the orientation of the most widely used incisions for tendon repair, avoiding additional trauma. Perhaps most importantly, the procedure itself is technically straightforward; with an average operative time of less than 1 hour, it can easily be performed in the outpatient setting. Finally, there is minimal donor-site morbidity, and results are satisfying both functionally and cosmetically.

One potential caveat is that we have as yet made use of this technique in only three patients. It is possible that, in the setting of a severely infected or otherwise compromised bed, the bipedicle flap may not provide sufficient coverage. However, the patients described here are representative of the spectrum of patients presenting to the plastic surgeon. The viability of the flap in all cases is encouraging.

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DISCLOSURE

Neither of the authors has any competing financial interests or commercial associations to declare.

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A New Modification of Z-Plasty

Sir:

It is well known that a scar perpendicular to the relaxed skin tension line tends to become hypertrophic. Z-plasty is an effective technique to prevent this hypertrophic change. By performing Z-plasty, a scar perpendicular to the relaxed skin tension line is realigned parallel to it, becoming less likely to develop hypertrophic change. However, the whole part of the scar produced by the Z-plasty is not parallel to the relaxed skin tension line. The lateral limb remains, forming a steep angle against the line even after Z-plasty is performed. For example, in the most conventional Z-plasty, where a pair of equilateral triangular flaps is used, lateral limbs form a 60-degree angle against the relaxed skin tension line at the completion of the procedure. Since 60 degrees is a steep angle, although not as steep as the right angle, the lateral limbs tend to become hypertrophic postoperatively (Fig. 1, *above*).

To prevent this unfavorable outcome, we developed a new technique by modifying conventional Z-plasty. We design each limb of the Z-flap as a curved line (lazy S) instead of the straight line used in conventional Z-plasty. The shape of the each lazy S curve must be identical for all the limbs produced in one Z-plasty. We adjust the degree of the curvature of the lazy S on a case-by-case basis. After the design is completed, two flaps are raised, rotated, and recombined. The lateral limbs, as well as the central limb, form a lazy S shape. Since a curved scar tends to become less hypertrophic than a straight scar if they form the same inclination against the relaxed skin tension line, we can expect the lateral limbs produced with our new technique to become less hypertrophic than those produced with conventional Z-plasty. Thus, we can prevent the above-mentioned problem of the lateral limbs' hypertrophy.

Figure 2 demonstrates a case of scar revision where we used our modified Z-plasty for a forehead scar on a 15-year-old boy. The lateral limbs are inconspicuous at 1 year after the operation, proving the effectiveness of our technique.

Generally speaking, straight scars are not favored by plastic surgeons. Few plastic surgeons adopt straight scar incisions for rhytidectomy, cranioplasty, removal of tumors—almost all operations in the field of plastic surgery—because it is commonsense for plastic surgeons that straight scars tend to become conspicuous compared with curved scars. However,

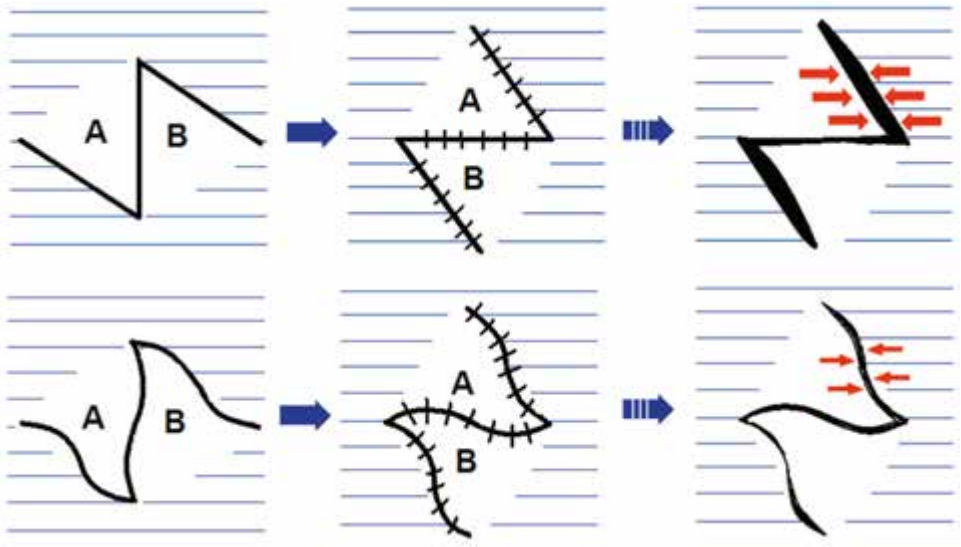

Fig. 1. (*Above*) Conventional Z-plasty and postoperative change of the scar (*above, left* and *center*). In conventional Z-plasty, a scar perpendicular to the relaxed skin tension line (*thin parallel lines*) is realigned parallel to the line. (*Above, right*) Thus, we can expect the central limb to become inconspicuous. However, since the lateral limbs form a steep angle against the relaxed skin tension line, they tend to become hypertrophic over time. (*Below*) In our technique, each limb of the flap forms a lazy S shape, so the lateral limbs are less likely to become hypertrophic postoperatively.

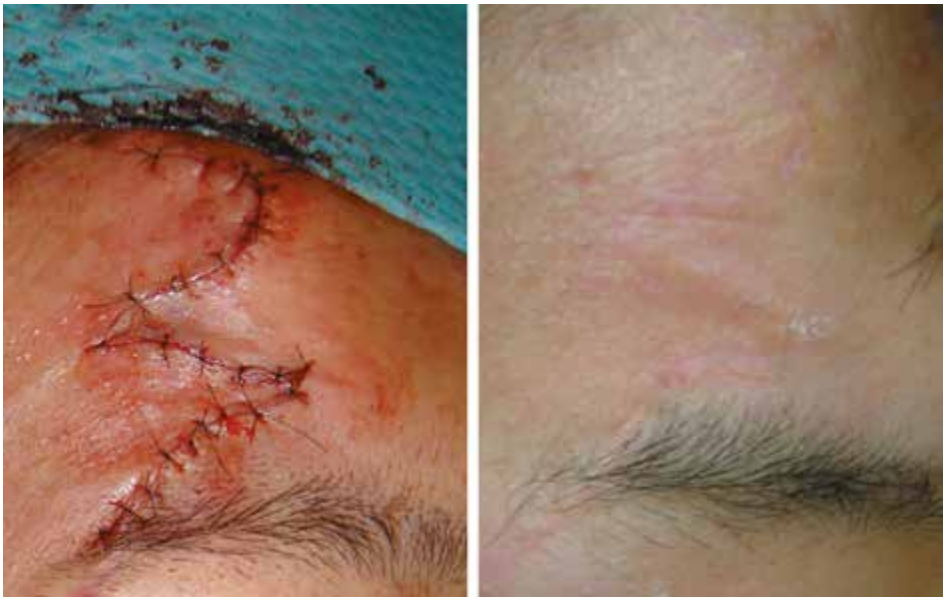

Fig. 2. (*Left*) Our modified technique was applied to the scar on the forehead of a 15-year-old boy. (*Right*) At 1 year after the operation, the lateral limbs, as well as the central limb, have become inconspicuous.

strangely enough, little attention has been paid to the straight line in the conventional Z-plasty, though various modifications of it have been reported in the literature.[1–5] At the recognition of this paradox, we modified the conventional Z-plasty. Lateral limbs, after being transformed from a straight line to a curved line with our technique, are expected to become inconspicuous postoperatively.

Although our technique requires some effort to perform because of its elaborate design and flap-trimming processes, it contributes to patients' satisfaction. We recommend our technique as a useful option for scar revision operations.

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Use of the GlideScope for Airway Management in Patients with Craniofacial Anomalies

Sir:

An estimated 40 to 50 million anesthetics are administered each year in North America alone and as many again worldwide. In up to half of the cases, it is necessary to intubate the patient for airway management. This can be challenging and dangerous in the pediatric population, and even more so in the child with significant craniofacial anomalies. The standard laryngoscope blade, in conjunction with maneuvers performed by the laryngoscopist to improve their view, is not always adequate to visualize the epiglottis and/or vocal cords. In recent years, a number of airway devices have been introduced. Some of these devices offer a

Fig. 1. Monitor, Glidescope videolaryngoscope handpiece, and carrying case.

definite advantage when confronted with a difficult pediatric airway.

The GlideScope videolaryngoscope (Saturn Biomedical Systems, Inc., British Columbia, Canada) is a relatively new device designed by a surgeon for management of the airway and, more specifically, the difficult airway (Fig. 1). It is essentially a lightweight laryngoscope that incorporates micro-video technology. The approximate weight of the handpiece is 0.12 kg. The 60-degree angle on the laryngoscope blade of the GlideScope enables visualization of the endotracheal tube in its trajectory toward the glottic opening. The laryngoscope blade includes an integrated camera with an antifogging mechanism and has been designed and developed to make the insertion of the endotracheal tube safe, reliable, and easy. The view from the camera in the handpiece is transferred to a small display monitor. The image of the airway structures provided is clear and sharp and is a significant improvement when compared with those obtained with direct laryngoscopy.

The Glidescope videolaryngoscope provides an unquestionable advantage in the airway management of children with craniofacial anomalies. Pediatric anesthesiologists can benefit from such a device, especially when they are presented with a challenging airway. In addition, clinicians who teach airway management skills will recognize that this device is an invaluable teaching tool, since both teacher and trainee are able to visualize the complex and variable airway anatomy.

To date at our institution, the GlideScope videolaryngoscope has been used in numerous pediatric craniofacial cases and in even more routine pediatric cases, with excellent results. In our experience, anesthesia residents as well as other trainees to the device quickly acquire the skills necessary for visualizing the larynx and passage of the endotracheal tube with limited assistance from the attending anesthesiologist. While the time needed for intubation is certainly decreased, the possibility of trauma to the airway is also lessened.

Concerns regarding this device might include a reliance on the technology to the point where clinicians lose the ability to perform direct laryngoscopy. Therefore, we recommend its use as a complement to, but not a replacement for, the traditional method of intubation. The laryngoscopist should remain proficient at intubating patients with the standard laryngoscope blade, but also be comfortable using this new technology. In addition, while the cost of the GlideScope videolaryngoscope is greater than that of the traditional laryngoscope, its use may save healthcare dollars when one considers the savings from possible patient morbidity or mortality related to the airway.

Of note, the authors have no financial arrangement with the makers of the GlideScope videolaryngoscope.

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