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

Huge Proliferating Trichilemmal Tumors of the Scalp: Report of Six Cases

Sir:

The proliferating trichilemmal tumor, also called proliferative trichilemmal cyst or pilar cyst, is an uncommon, mostly benign neoplasm derived from the outer sheath of the hair follicle.[1] It is usually a solitary lesion but can exhibit multiple lesions. It is located in areas of dense hair follicle concentrations, such as the scalp, in 90 percent of patients, with 10 percent occurring in the back, wrist, vulva, nose, elbow, and chest.[1,2] Usually, it presents as a subcutaneous cystic nodule that has been present for many years, slowly enlarging to a larger nodular mass, often following a history of trauma or chronic inflammation. A small number of malignant proliferating trichilemmal tumors have been reported.[3–5] As part of the management of these lesions, reconstruction of large scalp and/or skull defects often poses difficulties and significant surgical challenges. The purpose of the present study was to present our experience in managing these patients by a multidisciplinary team (plastic surgeon, neurosurgeon, and oncologist) in a dedicated setup.

We retrospectively reviewed data of six patients with cystic giant proliferating trichilemmal tumors (four benign and two malignant) treated over a period of 8 years (January of 1999 to December of 2006). Clinical and pathologic data are summarized in Tables 1 and 2.

Total removal was achieved in all patients (100 percent). Two patients (33 percent) with malignant proliferating trichilemmal tumors underwent adjuvant chemotherapy [CAV protocol (cisplatin, Adriamycin, and vindesine)]. With a mean follow-up of 60 months (range, 24 to 105 months), local recurrence was seen and excised in two patients with malignant proliferating trichilemmal tumor, and among the former patients, one died 9 months later as a result of metastatic disease (case 3) (Tables 1 and 2 and Fig. 1).

Surgical treatment of proliferating trichilemmal tumors may be a demanding task that should be planned from the outset using a multidisciplinary approach (involving at least a neuroradiologist, plastic surgeon, neurosurgeon, pathologist, and neuro-oncologist). Proliferating trichilemmal tumors are known to recur, especially after conservative local excision. These lesions may also exhibit aggressive local invasion, across tissue planes and even intracranially, causing considerable morbidity and mortality. Complete resection of the tumor at first instance followed by precise reconstruction of the remaining defect may give the patient the best chance of being cured. Close clinical follow-up is judicious to detect recurrence or metastases. Reconstruction of the scalp defect after resection of a large tumor always poses a challenge. The options include local rotational, local tissue rearrangement, and vascularized free flaps. Large defects are rarely covered adequately by pedicled rotational flaps alone unless the defects are located eccentrically on the scalp. A strategy of repairing large scalp defects without the need for a free skin flap allows prompt aggressive management, thus avoiding delays in administering adjuvant therapy. Free vascularized cutaneous-muscle flaps have been used extensively for large scalp defects and generally with good success; the latissimus dorsi flap is, for example, widely used and represents when possible our first choice. Bone defects can be managed with either an autograft or an allograft. Split-calvarial bone grafts can be harvested from the same operative field and cover small to medium-sized defects. Metals, calcium ceramics, and polymers such as methylmethacrylate can also be used to cover intracranial contents, restoring the calvarial contour in large defects or when autologous material is not avail-

Table 1. Clinicopathologic Data

Case	Age (yr)	Sex	Size (cm)	Multiple Lesions	History of Trauma	Rapid Growth	Ulceration	Growth Pattern/Depth
1	42	F	10	No	Yes	No	No	Circumscribed/subcutis
2	51	F	16	Yes	Yes	No	No	Infiltrative/brain
3	53	M	20	No	Yes	Yes	Yes	Infiltrative/brain
4	60	F	25	No	No	Yes	Yes	Circumscribed/skull
5	65	M	12	Yes	Yes	No	No	Circumscribed/subcutis
6	39	F	19	No	No	Yes	Yes	Circumscribed/subcutis

F, female; M, male.

Table 2. Clinicopathologic Data, Continued

Case	Intraoperative Histology	Histology	Degree of Resection (%)	Chemotherapy	Local Recurrences	Metastasis	Outcome (mo)
1	Yes	PTT	100	No	No	No	NED, 24
2	Yes	MPTT	100	CAV protocol	Yes (excised)	No	NED, 54
3	Yes	MPTT	100	CAV protocol	Yes (excised)	Yes	Death, 9
4	Yes	PTT	100	No	No	No	NED, 94
5	Yes	PTT	100	No	No	No	NED, 105
6	Yes	PTT	100	No	No	No	NED, 72

PTT, proliferating trichilemmal tumor; MPTT, malignant proliferating trichilemmal tumor; NED, no evidence of disease; CAV, cisplatin, Adriamycin, and vindesine.

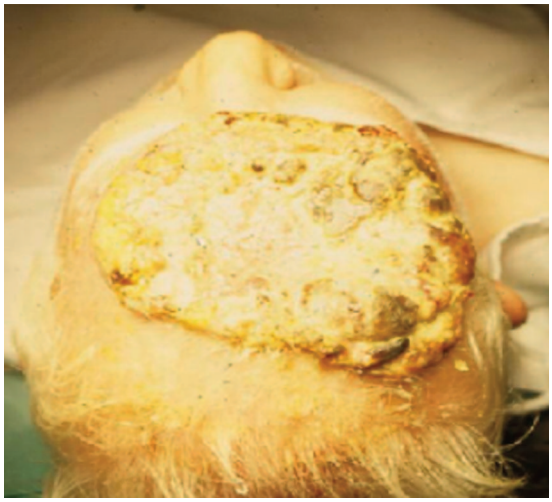

Fig. 1. Superior view of the patient in case 3, a 53-year-old man, showing a giant malignant proliferating trichilemmal tumor in the frontal region with diffuse skin ulcerations that had been slowly growing for 5 years with a rapid progression within 3 months.

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Real versus Perceived Improvements of Helmet Molding Therapy for the Treatment of Plagiocephaly

Sir:

Since the inception of the Back to Sleep campaign in the early 1990s, there has been a well-documented drop in the incidence of sudden infant death

syndrome.[1] There has also been a concomitant, well-documented rise in the number of plagiocephaly cases.[2] Helmet molding therapy with orthosis has become an accepted treatment for deformational plagiocephaly. No studies have compared changes in three-dimensional objective measures in a patient's head shape with subjectively observed outcome. In this study, we investigated the actual versus perceived improvements from helmet molding therapy for deformational plagiocephaly using three-dimensional laser head scans.

During the initial clinic visit, parents of 61 deformational plagiocephaly patients were asked to rate their child's head shape and ear position on a scale of 1 to 10, with 1 being abnormal and 10 representing normal. After their child's helmet molding therapy, parents were again asked to rate their child's head shape and ear position. A matched cohort of 91 children who underwent helmet molding therapy for the treatment of deformational plagiocephaly were also identified. Patients' charts were reviewed and topographic laser head scans were acquired using a STARscanner (Orthomerica, Orlando, Fla.). Laser scans were analyzed for each patient before and after helmet molding therapy. Cranial vault asymmetry index was calculated from the oblique measurements on head scans. The results of this study are presented in Figures 1 and 2.

The STARscanner provides numerous measurements on head shape; however, the cranial vault asymmetry index was selected because it normalizes for head size, allowing for comparison of head shapes independent of changes in head size attributable to age.[3] In this study, helmet molding therapy resulted in a mean change in the cranial vault asymmetry index of 2.4 percent and a post-therapy mean cranial vault asymmetry index of 4.8. Although this degree of change in head shape still corresponded with noticeable asymmetry, parents viewed these results positively. After helmet molding therapy, parents rated their child's head shape as 7.88 on a scale of 1 to 10, with 1 being abnormal and 10 representing normal. Before therapy, the mean parental rating was 2.99. However, the improvements in ear position that parents perceived (7.75 following molding compared with 3.75 before therapy) were similar in magnitude to the changes in head shape despite less impressive changes in actual ear offset. The actual change in ear offset measured on topographic scans was only 0.2 mm.

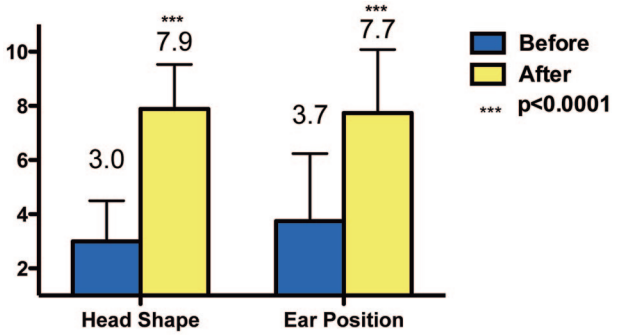

Fig. 2. Parents were asked to rate their child's head shape and ear position before and after helmet molding therapy. Ratings were based on a scale of 1 to 10, with 1 representing abnormal and 10 representing normal.

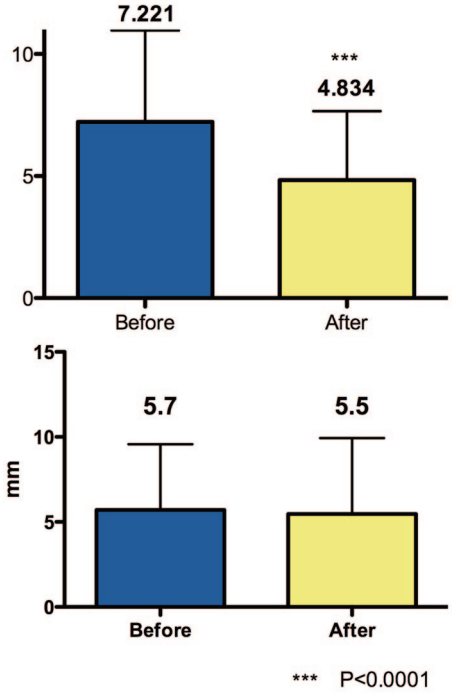

Fig. 1. Mean actual changes in cranial vault asymmetry index and ear offset as measured by topographic laser head scans. A cranial vault asymmetry index below 3.5 is generally indicative of normal symmetry.

Although measurable asymmetry remains following helmet therapy for the correction of posterior positional plagiocephaly, appreciable and statistically significant changes are observed. These changes are viewed as significant by parents, although the objective measurements appear minimal. These data can be used in combination with pre–helmet molding head scans to inform parents of expected changes from helmet orthosis. Future longitudinal prospective studies will need to address the true utility of helmet molding therapy as compared with lack of helmet orthosis in correction of posterior positional plagiocephaly.

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DISCLOSURE

The authors have no financial interests to disclose.

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30-Year Follow-Up of the First Successfully Replanted Ear

Sir:

The senior author (D.G.P.) reported the first successful replantation of a severed human ear by microvascular reanastomosis in 1980.[1] In the nearly 30 years since then, there have been fewer than 30 reported cases worldwide. (We include only microvascular cases where complete amputation had taken place. It is well known that an ear can survive on a very small strip of intact skin. Cases where microsurgery has claimed success in those instances must be treated with skepticism.) We were able to review the original patient described in 1980, some 29 years 7 months after his surgery.

The patient had sustained a complete avulsion injury of his left ear in July of 1979, in a motor vehicle accident. Successful replantation of the ear was completed 9.5 hours after the injury.

The patient, aged 54, still lives in the same mountainous area where winter temperatures frequently fall below 0°C, a factor that would influence cold intolerance. The patient's original history was confirmed; he was questioned about symptoms and examined physically. New photographs were compared with the original photographs taken at the time of the replantation episode (Fig. 1).

Some recovery of sensation was noticed by the patient within months of the injury, but full recovery had taken approximately 3 years. After that, he could not distinguish a difference between the two ears. He had never experienced cold intolerance despite his ear being exposed to near-0°C temperatures.

He felt that hearing in the replanted ear was better than in the uninjured ear. Aural hygiene was slightly affected: it was a little more difficult to clean the canal of that ear.

Results of physical examination are listed in Table 1. Ear dimensions, including thickness, were measured with a standard engineering caliper accurate to 0.01 mm. Two-point sensory discrimination was measured with the same caliper at the upper helix, mid-conchal region, and earlobe. Temperature sensation was tested with a refrigerated drink can and a warmed metal object. Light touch was tested with a thin strip of paper. Both ear canals were inspected with an otoscope. No formal evaluation of hearing was undertaken.

The replanted external meatus is oblique because of lack of cartilage support resulting from cartilage loss at the time of injury (Fig. 2), but there was no cicatricial stenosis. The ear drum and canal appeared normal. The conchal fossa is somewhat distorted, because some cartilage from the concha was lost in the injury and the remaining cartilage of the concha was fractured extensively. The left ear is

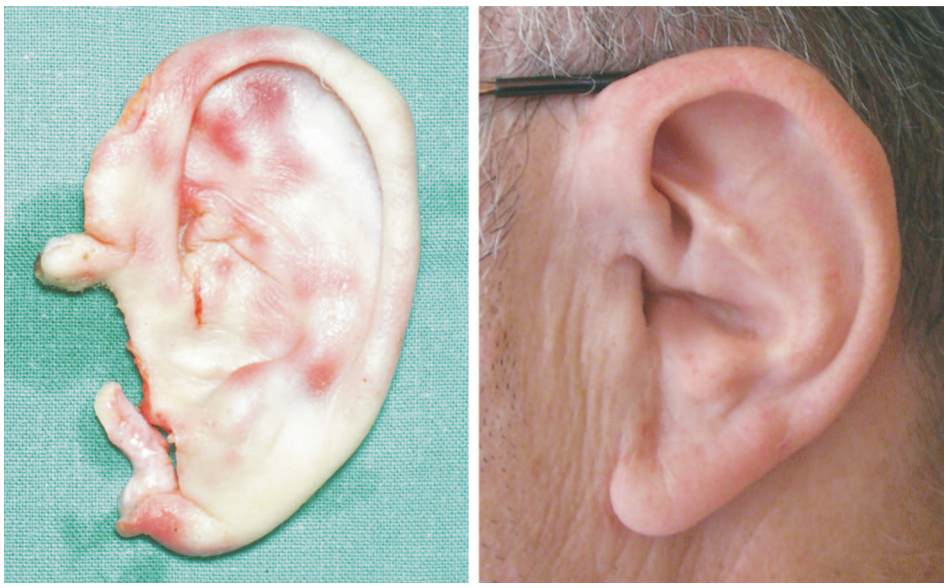

Fig. 1. Results at 30 years after replantation of the patient's avulsed ear.

shorter and wider than the opposite ear because of conchal distortion and perhaps some scar contracture (Fig. 2).

In a 25-year review of ear replantations since our case, Steffen et al.[2] found only 26 genuine microsurgical replantation cases, with an overall success rate of 90 percent. Venous anastomosis improved survival in total ear replants, but not in partial replants. However, when adjuvant treatments such as bleeding and leeches were used instead of venous anastomosis, high transfusion rates and increased morbidity resulted. They concluded that successful replantation was superior to secondary reconstruction, a conclusion with which we agree.

Because of the rarity and technical challenges, use of a clear technical protocol is wise. Our original article stressed the importance of a particular order of procedure as follows:

1. Bench preparation of the amputated ear.
2. Identification and tagging of all potentially anastomosable vessels.
3. Use of vein grafts to allow bench suturing of the auricular artery to the vein graft under high magnification and ideal conditions.
4. Arterial revascularization first to help identify veins.

We stand by that protocol. You only have one good shot at an ear replantation, so it is essential to make the conditions as advantageous as possible.

Table 1. Results of Physical Examination

Parameter	Left Ear	Right Ear
Vertical dimension, mm	62.77	65.93
Horizontal dimension, mm	31.48	27.25
Thickness at mid-helical rim, mm	2.98	2.90
Average two-point discrimination, mm	11.3	11.5
Cold sensation	Present	Present
Heat sensation	Present	Present
Light touch	Present	Present

The use of the superficial temporal vessels as donors for revascularization has been criticized on the grounds that, should replantation fail, this would preclude the use of a vascularized temporalis fascial flap for subsequent ear reconstruction. Our original venous anastomosis was end-to-side with the temporal vein, preserving the continuity of the vein. There is no reason why an arterial input vein graft could not also be end to side, thus preserving the vascularity of the temporal fascia.

Our patient highlights the long-term superior aesthetic quality and durability of microsurgical replantation compared with secondary reconstruction. Sensory recovery is complete within 3 years. Canal stenosis is

Fig. 3. Patient at 30 years after surgery.

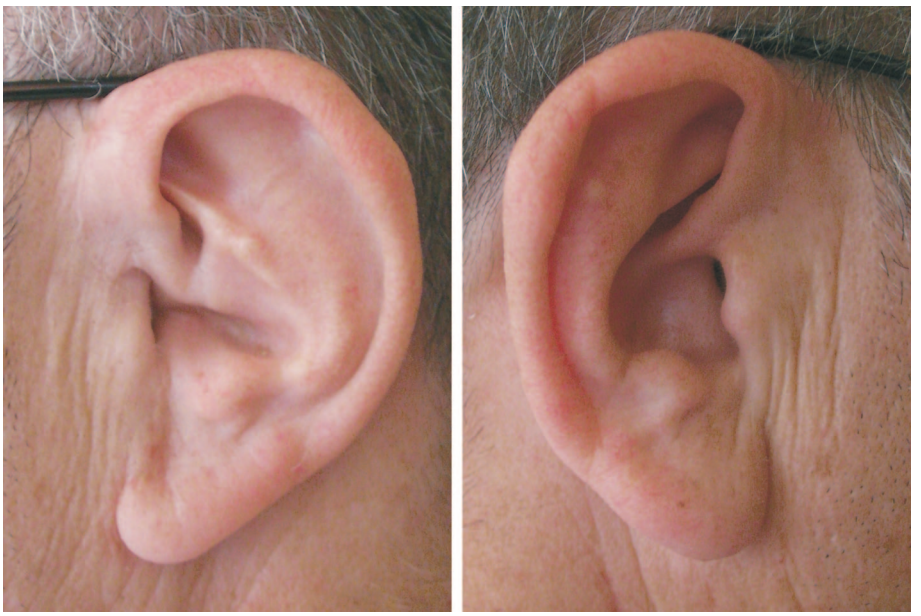

Fig. 2. Comparison of right (uninjured) and left (replanted) ears.

preventable using a silicone stent for 3 months. Cartilage atrophy does not occur, as demonstrated by thickness measurements. The stability is not affected if there is not excessive cartilage loss. Minor aesthetic changes in shape are to be expected, depending on the extent of original injury, and are proportional to the amount of tissue loss.

Since 1979, patient retrieval facilities, operating microscopes, instrumentation, and sutures have improved, as has public awareness of these procedures. If anything, the likelihood of success with replantation should be considerably greater than 30 years ago. Our patient demonstrates that the effort is worthwhile (Fig. 3).

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PATIENT CONSENT

The patient provided written consent for the use of his images.

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Earlobe Reconstruction with a Modified Bilobed Flap

Sir:

Defective earlobes can be reconstructed by following various local procedures intended to reproduce them accurately.[1–5] In this work, we developed a single, easily obtained local flap carved entirely in the same donor area. It can be easily moved and shaped, and features safe vascularization. The proposed technique involves designing and carving a modified bilobed flap that uses redundant skin at the lower ear pole.

The flap consists of fat skin tissue and has two wings identical in size, designated A and B (Fig. 1). This provides two branches, a and b, which, once sutured, constitute the curved earlobe free edge.

The length of branch a should match that of the defect at the lower ear edge, whereas that of branch b should be equal to or smaller. The flap pedicle should fall proximal at wing B and be at least 1 cm wide.

Wing A is lifted and sutured to the anterior cooled ear lower rim. Wing B is transposed posteriorly by rotating it 90 degrees upward and 180 degrees forward. The donor site is closed directly (Fig. 2).

The outcome of the proposed procedure was a sandwich-like skin fat redundancy that resulted in a very natural ear appearance. The sole visible scar runs in the caudal direction.

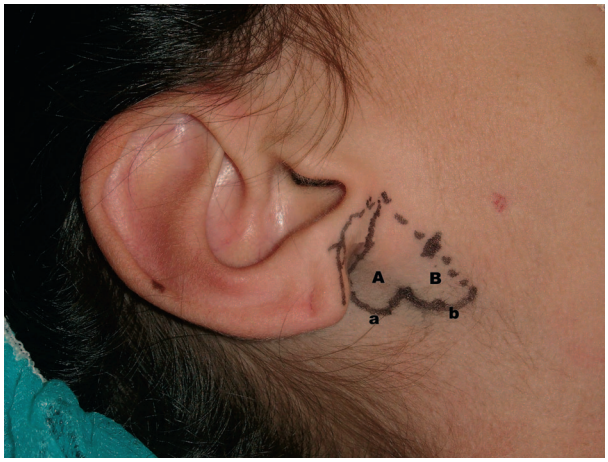

Fig. 1. Congenital defect of the lobe. Design of the flap in the surgical field.

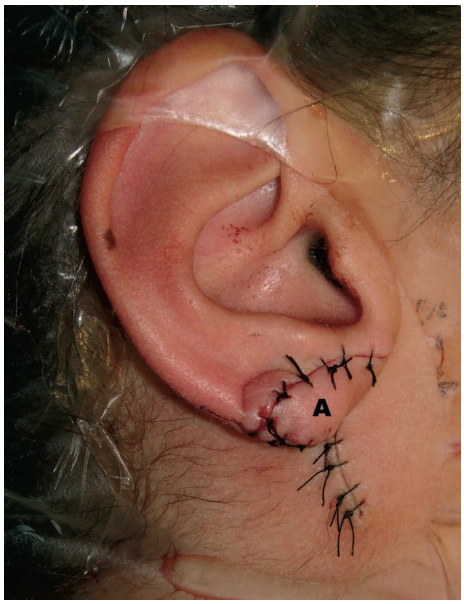

Fig. 2. View of the sutured flap.

The flap retains its texture and volume in the medium to long term. It should be noted that the curved shape of the flap wings is used to provide filling and cushioning to the reconstructed lobe.

Such a small structure as an earlobe lends itself readily to reconstruction with a variety of techniques. The ideal technique should be simple, expeditious, and easily implemented, and should leave insubstantial sequelae if any. Our modified bilobed flap has the following advantages: (a) it is a one-stage design and is easily fitted in the receptor zone; (b) it features excellent vascularization and original-like skin characteristics; and (c) it preserves the earlobe shape and volume to a great extent. It also has some disadvantages: (a) it is preferably used with small and mid-sized lobes (wing B

should not exceed 2 cm), and (b) the procedure is only applicable to an intact donor area.

Earlobe reconstruction procedures often meet with the difficulty of obtaining a natural appearing and durable outcome for such a small but aesthetically crucial structure as the earlobe. We developed one that affords reconstruction of moderately sized lobes in a simple, easy manner; leaves few aesthetic or functional sequelae; and preserves ear shape and volume in the long term.

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Report of Unilateral Cleft Lip Repaired with the Skin-Vermilion Flap Method

Sir:

Between January and December of 2008, this technique has been used in 96 consecutive unilateral cleft lip repairs. Forty-nine were of male and 47 of female patients, and 50 were incomplete unilateral cleft

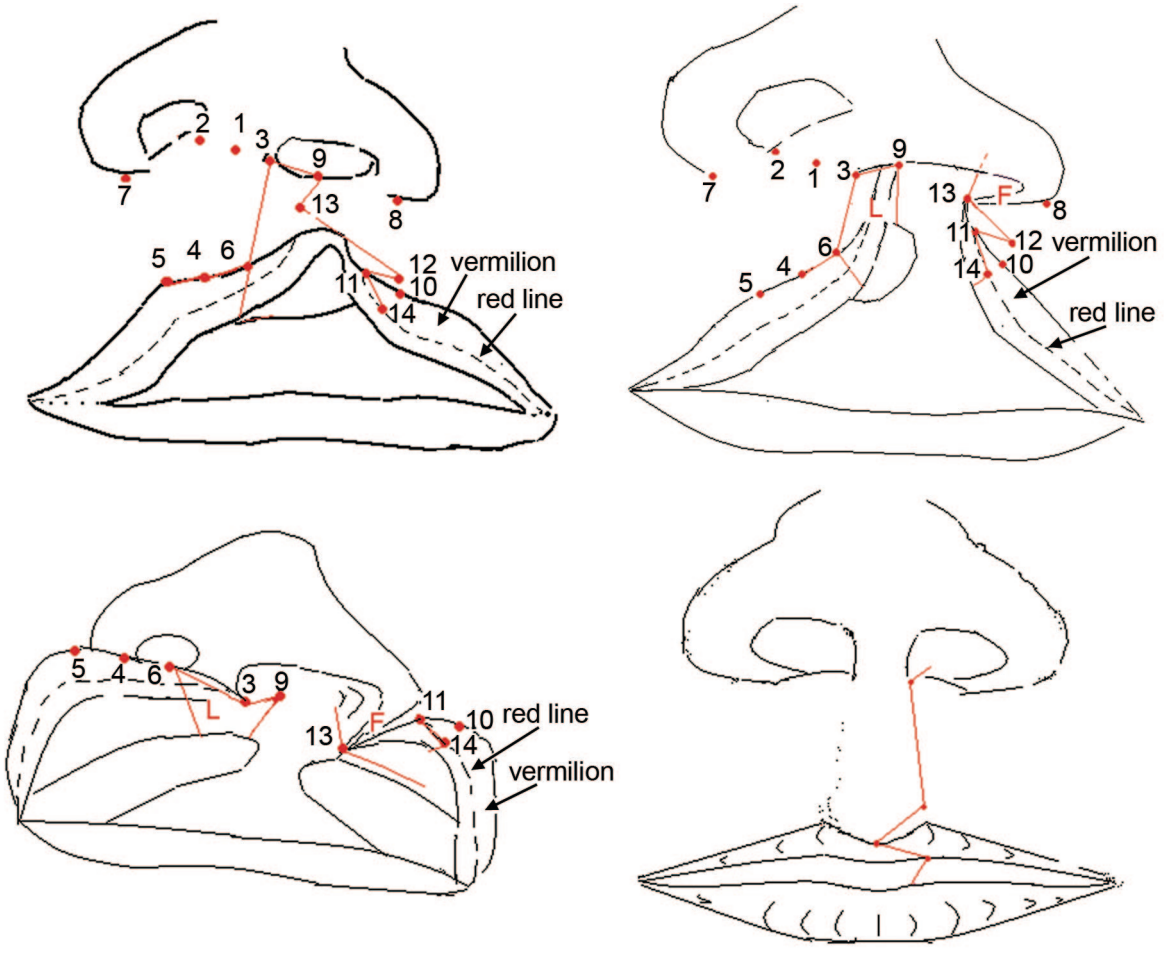

Fig. 1. (*Above*, *left*) Preoperative sketch of unilateral incomplete cleft lip showing marking points and incision design. (*Above*, *right*, and *below*, *left*) Preoperative sketch of unilateral complete cleft lip showing marking points and incision design. (*Below*, *right*) Postoperative sketch of unilateral cleft lip repaired with the skin-vermilion method.

lip and 46 were complete unilateral cleft lip repairs. The patients' ages ranged between 3 months and 15 years, with a mean of 6.5 months.

The operative markings are shown in Figure 1. The problem deserving of our attention is the marking of point 12; point 12 is marked just above the cutaneous roll, and then line 12-11 and line 4-6 are of equal length and will meet, line 13-12 and line 3-6 are of equal length and will meet too, and the line 13-12 plus line 12-10 is equal to that of the non–cleft-side philtral column (line 2-5).

All lines in Figure 1 are operative incisions. A skin-vermilion triangle flap is designed on the affected side of the lateral lip and inserted into the medial lip (line 6-4) to reconstruct a vermilion tubercle and lengthen the vertical height of the affected lip. The affected orbicularis is freed from its upturned insertion in the region of the columellar base, alveolar cleft margin, and alar base, and then the normal anatomical structure of the upper lip is reconstructed by resetting and fixing orbicularis, nasal columella, and nasal alae, and constructing the nasal base (Fig. 1).

All of the patients presented good contour of the vermilion tubercle and chubby nasal base. The vertical height of their upper lip, nasal alae, and vermilion were symmetrical between affected and unaffected lateral lips. The technique can be applied to all degrees of unilateral cleft lip (Fig. 2).

In patients with cleft lip, surgeons are constantly striving for the ultimate goal of achieving a lip and nose of normal form and function by operative repair. Even though we cannot achieve the ultimate goal at present, some achievements have been gained.[1–3]

For obtaining a normal upper lip and nose, we consider that we must solve two problems. The first is to recover the normal anatomical structure and tissue tension of the upper lip and nose with cleft lip, and the second is to provide an operative design with a minimal scar in the upper lip and a minimal impact on growing maxillae after cleft lip repair. This formed the basis of the described repair. The strengths of this described technique, then, are (1) effective completion of the problem about the affected medial lip deficient in vertical height without an increased incision in the nasal base; (2) ap-

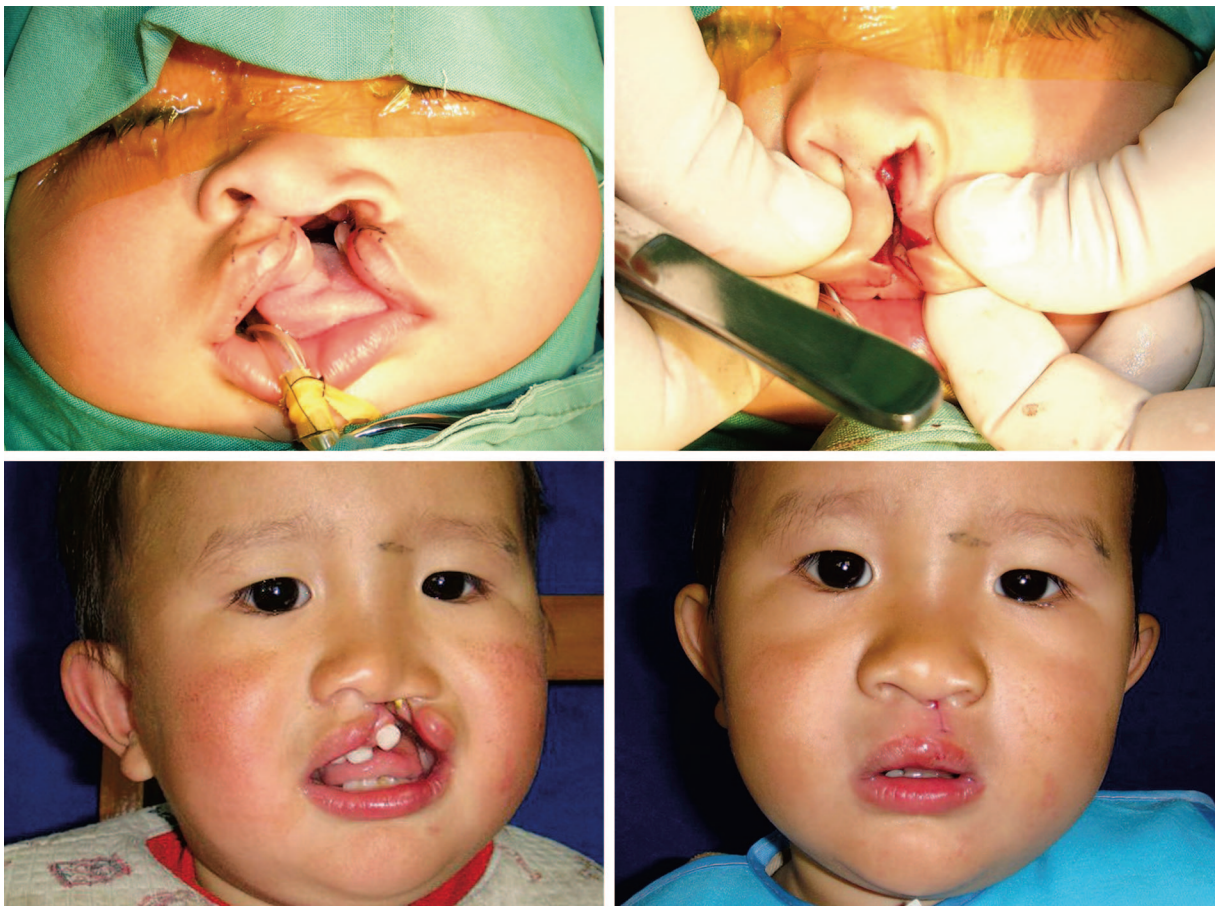

Fig. 2. (*Above*, *left*) Preoperative markings of unilateral complete cleft lip. (*Above*, *right*) The operating incisions have been completed; a skin-vermilion triangle flap with skin, vermilion, and orbicularis has been formed on the affected side of the lateral lip and will be inserted into the medial lip to reconstruct a vermilion tubercle and lengthen the vertical height of the affected lip. Patient is shown preoperatively (*below*, *left*) and 7 days postoperatively (*below*, *right*).

plication of lateral lip tissue in reconstructing the nasal agger and filling the nasal base; (3) maximum reservation of vermilion tissue, effective prevention of "whistle deformity," and formation of a fluent red line; (4) minimal scar; and (5) an obvious vermilion tubercle and minimal tension of the upper lip for scarcely abandoning any tissue.

The short-term effect of a cleft lip repair with the described technique is very satisfactory, but the long-term result after surgery should be observed by longer term follow-up of more cases.

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Constant Infusion of Saline to Maintain an Optical Cavity for Endoscopic "Pure" Neck Lift

Sir:

A recurrent request in plastic surgery is, "Doctor, please operate on my neck, but I do not want a face lift." We are communicating a new, endoscopic, water-assisted, "pure" neck lift that can be used when necks need restoration of an acute cervicomental angle, or correction of a soft-tissue bulge such as fat, ptotic platysma bands (lateral and medial), or glands, without face-lift scars. Through a prospective cohort study, we reviewed the charts of nine patients operated on with this procedure from March of 2007 to April of 2008.

Tumescent infiltration of the anterior neck consisted of a 1:100,000 solution of epinephrine delivered through three incisions: one submental and two below both ear lobules. An arthroscopic 30-degree short endoscope was introduced through the submental incision to develop an optical cavity with a constant infusion of saline through a bidirectional arthroscopic pump (ConMed Linvatec). The input of the system is developed through a 30-degree, 3-mm, double-lumen endoscope that carries a camera (3CCD Digital Camera; ConMed Linvatec) and a xenon light source (LIS 8430; ConMed Linvatec). The right earlobe incision was used to introduce a 3-mm ultrasonically activated scalpel (Harmonic Scalpel, hook type; Johnson & Johnson, Cincinnati, Ohio) to dissect adhesions and trabecula, and for hemostasis (works under water). A "pistol" forceps was introduced to manipulate a 3-mm curved needle carrying a 5-0 Prolene suture. The right earlobe incision was used

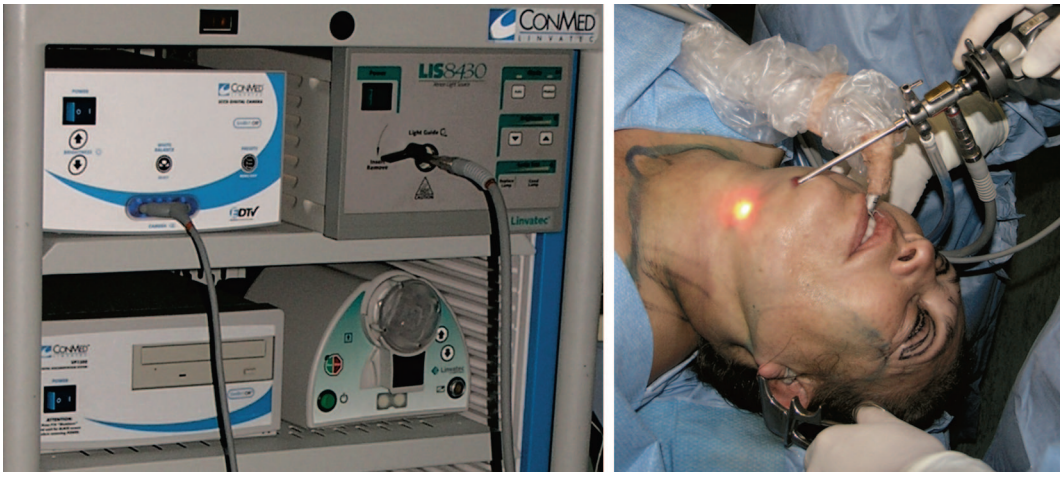

Fig. 1. (*Left*) The ConMed Linvatec 3CCD digital camera is shown *above, left*; the xenon light source (ConMed Linvatec LIS 8430) is shown *above, right*; *below*, *left* is the video recorder; and *below*, *right* is the arthroscopic pump. (*Right*) A 30-degree short endoscope introduced through a submental incision. The optical cavity (working space) is developed with a constant infusion of saline with an arthroscopic pump. "Pistol" forceps are introduced through the right earlobe incision to manipulate a 3-mm curved needle carrying a 5-0 Prolene suture, and the right earlobe incision is used to assist the suturing process with a 3-mm endoscopic forceps.

to assist the suturing process with a 3-mm endoscopic forceps (Johnson & Johnson) (Fig. 1).

We identified both platysma muscles just over the cricoid cartilage. A fisherman's knot was performed at that point (no ties), and the muscles were sutured in the midline (Feldman's corset fashion).[1] The posterolateral superficial musculoaponeurotic system/platysma flap fixation was performed using the same principle to refine the jaw line and contour the anterolateral neck. Another Prolene suture was used to fixate the lateral platysma rotation flap to the mastoid area. We never used drains and the dressing was performed with Reston foam (3M, St. Paul, Minn.) along with a pressure garment used for 3 weeks.

Functional and aesthetic results were evaluated by two surgeons unfamiliar with the patients, using preoperative and postoperative photographs and by direct examination of the cases. Results were graded on a four-point scale—"Visual Criteria for Success in Restoring the Youthful Neck"—described by Ellenbogen.[2] All of the patients demonstrated a smooth and perpendicular neck contour with well-concealed scars in the submental and both posterior ear lobule areas, eliminating the stigma of face-lift surgery (Fig. 2).

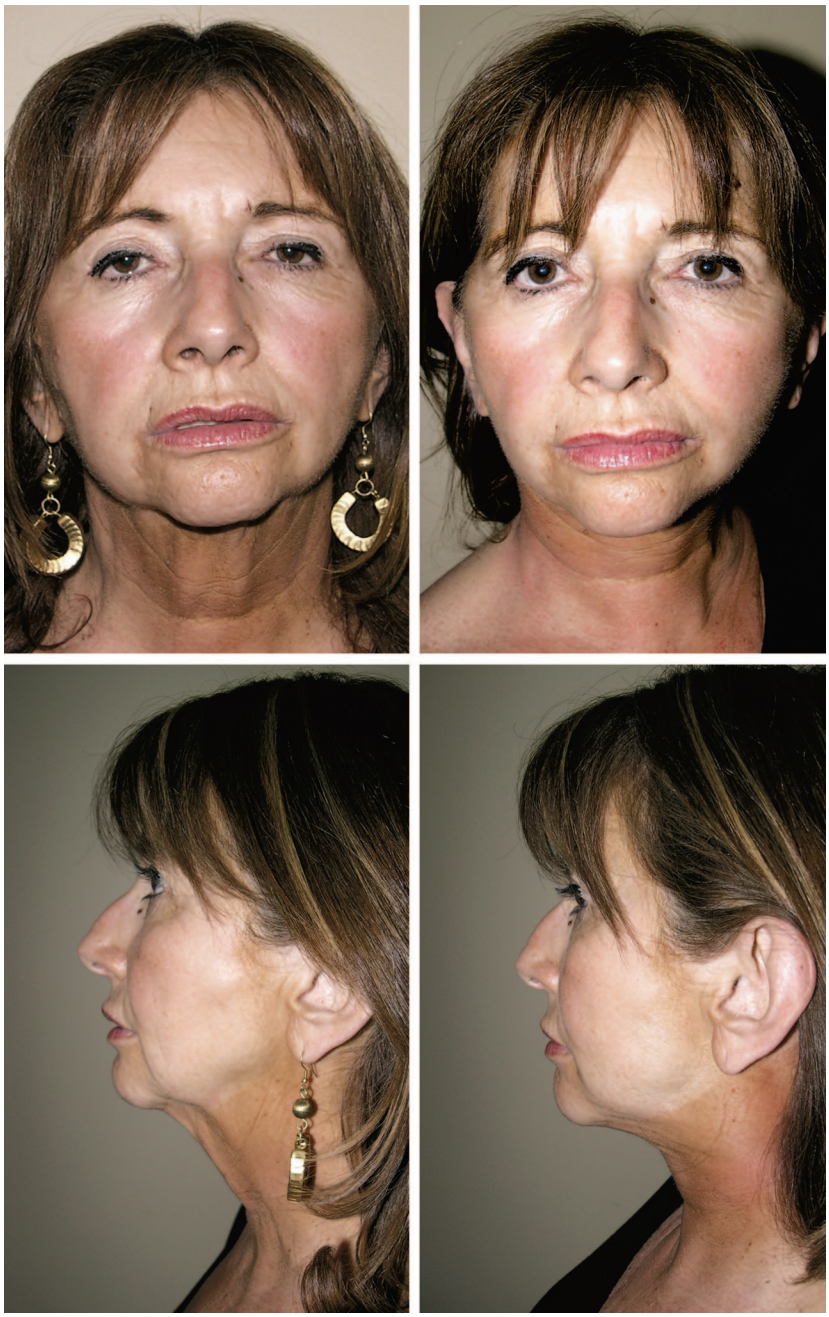

Fig. 2. A 48-year-old woman, with an Ellenbogen result graded as good.

The endoscope in aesthetic surgery of the face and neck has not gained wide acceptance because of the expertise required, longer operation time, and the extra cost of specialized instruments.[3] We describe a gasless, water-assisted, single-surgeon videoendoscopic neck-lift operation, using reduced incisions to reposition the ptotic elements of the aging neck. Enlarged or ptotic submandibular glands should be addressed preoperatively. It is our opinion that leaving fat over the platysma to camouflage the glands is not a good solution. We still prefer an extensive liposuction[4] and additional endoscopic suturing to create a strong and flat muscle to correct the submandibular gland bulging.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

PATIENT CONSENT

The patient provided written consent for the use of her images.

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A Simple Approach of Tubularizing the Supraclavicular Flap for Circumferential Pharyngoesophageal Defects

Sir:

Both regional and free flaps have been used in the successful reconstruction of circumferential pharyngoesophageal defects secondary to pharyngeal tumors treated with total laryngopharyngectomy and/or chemoradiation. The ultimate goals in these types of reconstructions are to restore swallowing and speech and to minimize the recovery period. One specific local fasciocutaneous flap that has found recent use in defects of this nature is the supraclavicular artery island flap, as shown in Figure 1. This flap, first used in facial reconstruction by Lamberty in 1979 and thought to be the evolutionary product of the cervicohumeral flap, allows for restoration of the pharyngeal lining through its highly vascular, thin, and pliable nature.[1]

With the exception of jejunal tissue transfers, both free and regional flaps harvested for circumferential pharyngeal defects must be sutured into a tubular form (i.e., tubularization) before anastomosis, with the remaining pharynx proximally and esophagus distally. In our use of the supraclavicular artery island flap, we have discovered a quick and simple method to aid in the process of tubularization. It entails wrapping the epithelialized portion of the flap circum-

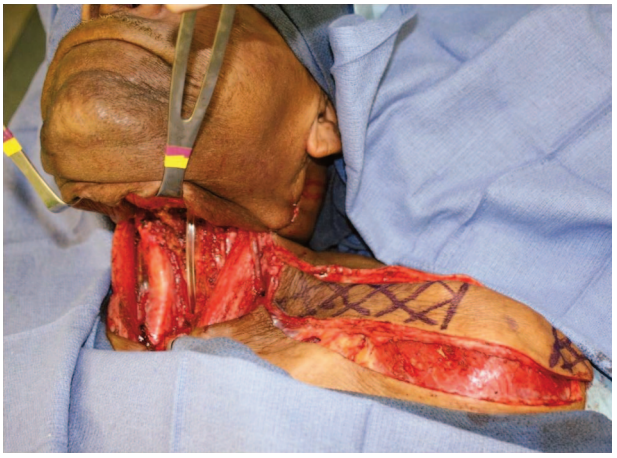

Fig. 1. Circumferential pharyngeal defect with adjacent raised supraclavicular artery island flap.

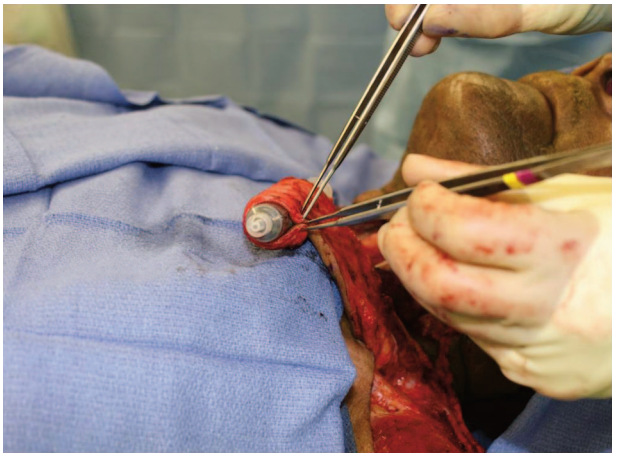

Fig. 2. Creation of the tubular supraclavicular artery island flap around the 10-cc syringe.

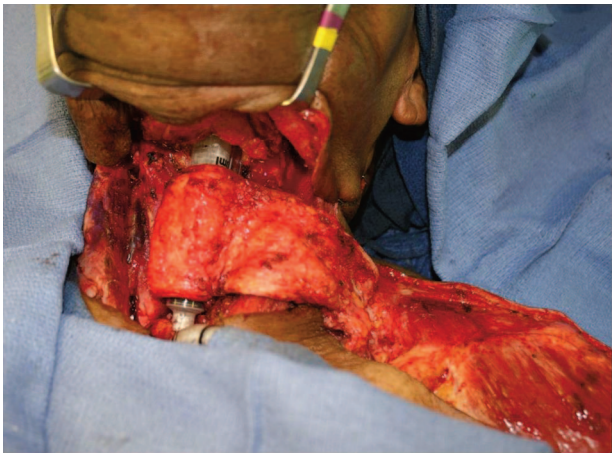

Fig. 3. Inset of the tubularized supraclavicular artery island flap into the pharyngeal defect.

ferentially around the barrel of a 10-cc syringe, as shown in Figure 2. The diameter of a 10-cc syringe (including wall thickness) is equal to 16.23 mm, approximates the size of a 49-French bougie, and adheres to the current recommendations for esophageal dilatation from the American Society for Gastrointestinal Endoscopy, which has stated that a luminal diameter of at least 13 to 15 mm is needed to avoid dysphagia.[2] This technique offers internal structural support and adequate tissue tension for placement of sutures. In addition, it lends a uniform tubular dimension and an ideal functional circumference to the structure, as shown in Figure 3. In conclusion, using a cylindrical object such as a 10-cc syringe for the tubularization phase of pharyngeal reconstruction is time-effective, cost-effective, and an idea that can be further expanded on for defects of variable sizes and shapes.

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Alleviation of Venous Congestion in Muscle-Sparing Free TRAM Flaps with a Temporary Angiocatheter

Sir:

Venous congestion is a concerning complication that can lead to fat necrosis and loss of muscle-sparing free transverse rectus abdominis myocutaneous (TRAM) and deep inferior epigastric perforator (DIEP) flaps in postmastectomy breast reconstruction. The incidence is 1.4 to 2.1 percent,[1] and management varies from leech therapy to operative intervention.[2] Caplin et al.[3] previously reported on venous decompression of pedicled TRAM flaps with an angiocatheter, leading to salvage in two cases. We present here our experience with venous congested muscle-sparing free TRAM flaps alleviated by temporary angiocatheter cannulation after failure of common salvage techniques.

An important anatomical characteristic of TRAM and DIEP flaps is the presence of separate but interconnected superficial and deep venous systems, described in previous studies.[4] Invariably, this fragile network of vessels is disrupted with flap elevation, and superficial venous outflow becomes dependent solely on the deep inferior epigastric system, which can be problematic in superficially dominant flaps until collateral oscillating vessels between the two systems mature. Management of venous congestion after flap elevation thus includes delay of the procedure with staged elevation after development of the choke vessels, or supercharging the flap using the superficial inferior epigastric vein.[2,5]

We present two patients who underwent unilateral muscle-sparing free TRAM flap breast reconstruction, using recipient mammary vessels, with early evidence of venous congestion. In case 1, an engorged superficial inferior epigastric vein was noted intraoperatively and thus a saphenous vein interposition graft was used to

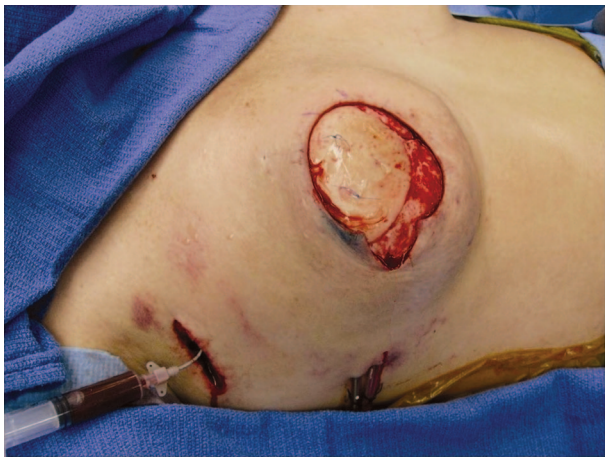

Fig. 1. Case 1. Reoperation for postoperative venous congestion showing the temporary angiocatheter in the superficial inferior epigastric vein, brought out through the axilla, and being aspirated with ease.

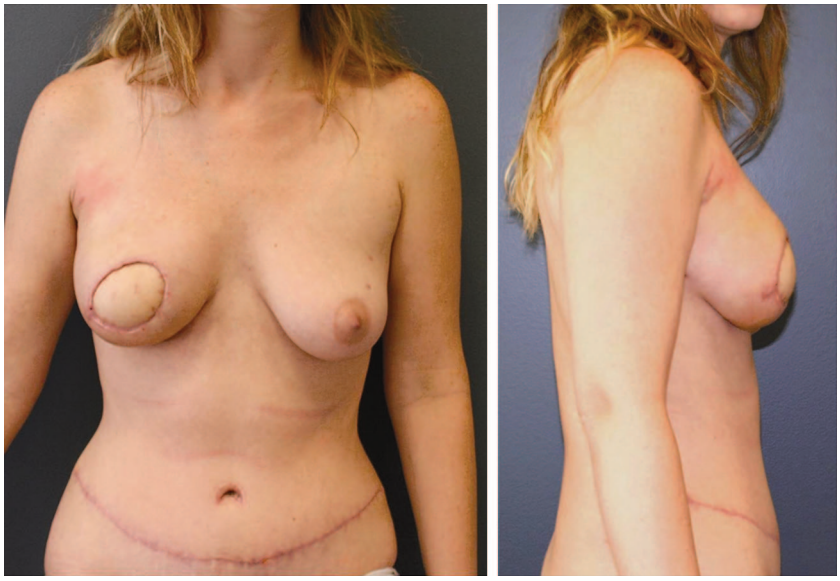

Fig. 2. Case 1. Postoperative views showing unilateral breast reconstruction with a viable muscle-sparing free TRAM flap following resolution of venous congestion.

supercharge the flap. This graft later thrombosed and led to reaccumulation of venous congestion. In case 2, delayed venous congestion was noted on postoperative day 1. Reexploration demonstrated an intact deep system and anastomosis, with no injury, clots, or kinks. However, with release of the superficial inferior epigastric vein on the operating table, venous congestion improved temporarily.

In both cases, because temporarily decompressing the dominant superficial inferior epigastric vein relieved clinically apparent venous congestion, the vessel was cannulated with an angiocatheter and externalized through the axilla (Fig. 1). Postoperatively, venous blood (approximately 20 to 60 ml at a time) was aspirated through the angiocatheter every 3 to 6 hours as needed based on clinical examination to relieve congestion in the flap. With improvement, fewer aspirations of smaller volumes were required. One patient exhibited complete resolution of venous congestion by postoperative day 4 and the other by postoperative day 6, with no further complications in either case. Both patients' catheters were removed uneventfully at the first postoperative office visit (Fig. 2).

When the muscle-sparing free TRAM flap is elevated, superficial venous outflow becomes dependent on the superficial inferior epigastric vein and collaterals between the deep and superficial venous systems. In superficially dominant flaps, management can be difficult because salvage options are limited. By temporarily alleviating venous congestion, collateral flow through the deep venous system is given more time to develop while preventing fat necrosis and maintaining flap viability. This novel method of angiocatheter cannulation for salvage of venous congested muscle-sparing free TRAM flaps is safe and technically straightforward, and can result in a decreased incidence of fat necrosis and flap loss in patients undergoing microsurgical breast reconstruction.

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DISCLOSURE

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A New Flexible Curved Ruler to Shorten the Learning Curve Markings in the Hall-Findlay Mammaplasty

Sir:

Vertical scar mammaplasty has now been accepted worldwide, and many plastic surgeons use it as a preferred technique for breast reduction and mastopexy in their current practice. Among these, the Lejour and the Hall-Findlay techniques[1,2] are the most common mammaplasties performed, with the advantages of less scarring, better projection, and faster recovery for the patient.

However, because of the difficulties in marking and resection, many plastic surgeons are still reluctant to use the vertical approach. The most difficult aspect of vertical mammaplasty is the lack of a simple pattern to follow, especially when marking the nipple-areola opening.

The authors introduce a new, novel, simple, and effective tool (Fig. 1) to facilitate marking on breast reduction more accurately, but we mainly use it in the Hall-Findlay procedure, as this is the preferred technique in our practice.

Such a device is an ellipsometer used for geometric drawings, and is easy to find in any stationary store. The authors marked a ruler on it to take measurements at the same time of the markings.

In the Hall-Findlay technique, the preoperative markings are made using a freehand design, whereas the authors had been using the flexible curved ruler. The malleable ruler is positioned on the breast meridian 2 cm below the inframammary fold and is shaped as a semicircle with its circumference measuring no more than 16 to 18 cm to match an areola diameter of 4.5 to 5 cm (Fig. 2).

The medial and lateral vertical limbs are marked by rotating the breast on each side using the ruler to mark them 5 to 7 cm. These lines are joined in a U shape, staying 2 to 6 cm above the inframammary fold.

Vertical scar breast reduction as described by Lassus[3] and popularized by Lejour[1] has now gained popularity over the past decade. However, many surgeons still view it as a technique with certain limitations.

Many modifications have been suggested, claiming improved results and fewer complications.[4–7] One such technique is described by E. Hall-Findlay[2] in which a superomedial pedicle is used with no pectoralis fascial suspension sutures, no or minimal liposuction, and no skin undermining. The most difficult aspect of the Hall-Findlay technique is the lack of a simple pattern to follow, especially for the markings of the nipple-areola opening.

Few methods have been described to simplify the markings and shorten the learning curve.[8,9] Our method using the malleable ruler has simplified the preoperative markings and shortened the learning curve, especially at the beginning of our experience with the Hall-Findlay technique. Its pliability and adaptability allowed us to use it in breasts of different sizes and shapes, and the possibility of varying the area of the semicircle gave us the chance to remove more breast tissue from the upper pole, especially in large breast reduction. Furthermore, we found it useful not only for those who began their experience with the vertical mammaplasty, but also as a teaching device, because we noticed that the upper part of the

Fig. 1. Flexible curved ruler.

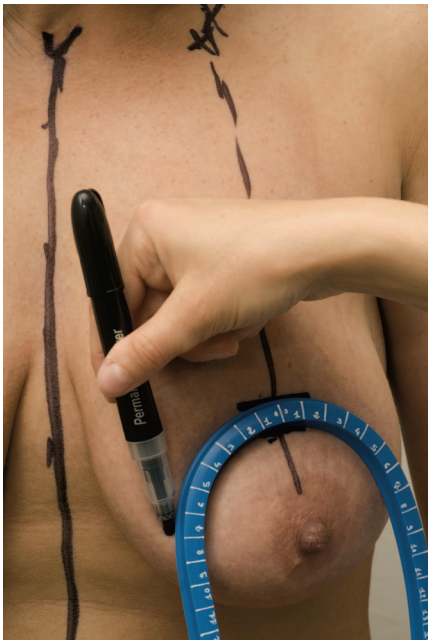

Fig. 2. Marking the areola opening.

marking was somewhat difficult to make clear when explaining the technique.

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DISCLOSURE

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Application of Closed Irrigation-Suction for Postoperative Infection Control in Plastic Surgery

Sir:

Closed irrigation-suction systems have been used successfully in the management of osteomyelitis of the long bones,[1] joint infections,[2] open joint injuries,[3] and pancreatic necrosis.[4]

Plastic operations often create adequate pockets for the placement of autogenous graft or prosthesis through a small incision, such as breast augmentation, augmentation rhinoplasty, tissue expansion, and others. Once infections occur, thorough drainage is difficult to obtain, thus prolonging healing time. Traditional incision and drainage will leave unpleasant scars and need a long healing time.

A total of 31 patients with infections after plastic surgical procedures were treated by closed irrigation-suction from July of 2000 to June of 2008. Eight patients who underwent expander implantation had partial incision rupture, exposure of expander, and turbid effusion. Nine patients presented with high temperature and red, tender skin superficial to the expander during the inflating period. Two patients had tenderness and brown drainage discharged from the incision 7 days after autogenous dermis-fat implantation for facial depression. Two patients developed swelling breast skin, painful mass, and white pus obtained by aspiration 7 to 10 days after breast augmentation with autofat injection. Two patients presented with redness, tenderness, swelling breast skin, and yellow turbid drainage that leaked from the incision after breast prosthetic mammary augmentation through an areola margin incision. Three patients developed tenderness of the wound with pus drainage after treatment of axillary osmidrosis by a small-incision subcision of the apocrine gland. Five patients presented with erythematous and swelling skin and pus drainage gained by aspiration after silicone prosthetic augmentation rhinoplasty.

The rupture incision was enlarged a little along the primary incision. The skin margins of the wound were then excised conservatively. In breast abscesses, an incision that was most superficial to the abscess cavity was used. The nose implant was removed. The tissue expanders were removed and sterilized or replaced with new sterile implants. The pocket was irrigated with povidone-iodine solution. Two transfusion systems or infusion needle tubes were used for both inflow and outflow drainage. Then, the sterilized implant was replaced in the cavity and the wound was closed in layers.

Irrigation with normal saline containing 160 mg of gentamicin per liter was initiated when the patient was brought to the nursing unit. Intravenous broad-spectrum antibiotic therapy were administered for 6 to 8 days.

All cases healed within 6 to 8 days. The expanders and silicone breast implants were salvaged successfully.

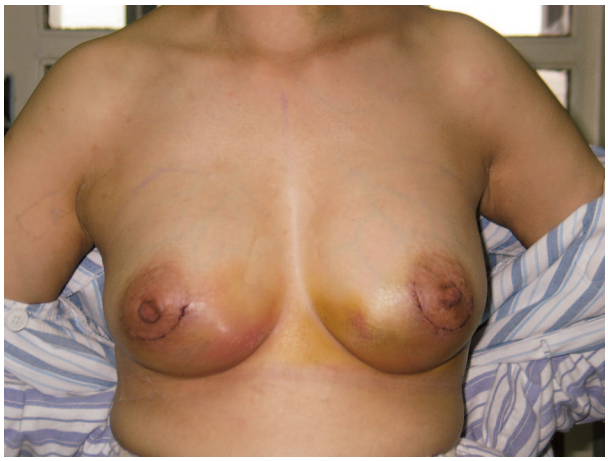

Fig. 1. Patient presented with redness, tenderness, and swelling breast skin after breast prosthetic mammary augmentation.

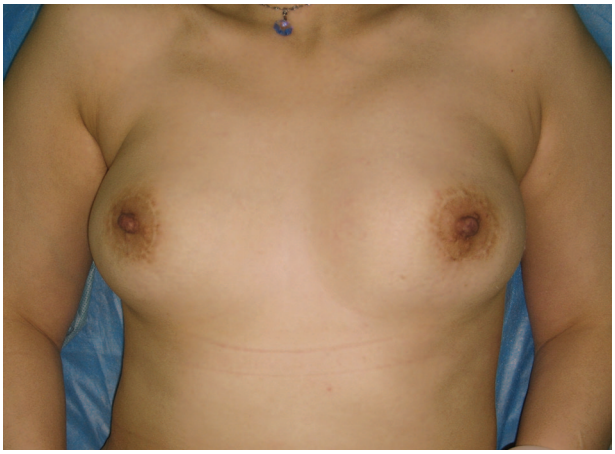

Fig. 2. Patient's appearance 5 years after surgery.

Augmentation rhinoplasty was performed 1 to 2 months after wound healing. The appearance and softness of the breast were satisfactory, and there were no capsule contractures at 5-year follow-up. There was no recurrent infection in the other cases during the 6- to 12-month follow-up period. No additional, visible scar was left. Continuous closed irrigation-suction was particularly suitable for postoperative infections in plastic surgery (Figs. 1 and 2).

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Fluorescent Intraoperative Tissue Angiography with Indocyanine Green: Evaluation of Nipple-Areola Vascularity during Breast Reduction Surgery

Sir:

Intraoperative evaluation of the nipple-areola complex during breast reduction surgery can be difficult. Nipple-areola complexes that preoperatively are very pale or very dark may present the greatest challenge in this clinical evaluation, either during dissection of the pedicle or after inset of the nipple-areola complex. However, fluorescent intraoperative tissue angiography with indocyanine green assists the surgeon in evaluating nipple vascularity.

All women who were to undergo breast reduction surgery were candidates for this study. Women with an allergy to iodinated contrast dye were excluded.

All breasts underwent reduction using a superior, superomedial, or inferior pedicle. Immediately after dissection of the pedicle, 4 ml (2.5 mg/ml) of indocyanine green (Akorn, Inc., Buffalo Grove, Ill.) was infused through a peripheral intravenous catheter by the anesthesia personnel, followed by a 10-ml saline flush. Eight seconds after infusion, real-time fluorescent videoangiography of the nipple-areola complex was captured for 1 minute using the Novadaq Spy SP2001 imaging laser (Mississauga, Ontario, Canada). Arterial phase imaging was initially completed, before inset of the nipple-areola complex. If nipple-areola complex perfusion proved acceptable, the nipple-areola complex was then inset. After being inset, the nipple-areola complex was once again imaged in arterial phase using the same technique (Fig. 1). If perfusion once again appeared acceptable, the nipple-areola complex was imaged 10 minutes later without indocyanine green injection, to examine venous outflow (Fig. 2). If nipple-areola complex outflow was compromised, as seen with a persistently bright fluorescence, the pedicle or skin flaps would be revised or the nipple-areola complex would be grafted.

In 12 women, we completed 22 reduction mammaplasties. The average notch-to-nipple distance was 33 cm and the average resection weight was a 635 g. Preoperatively, three nipples were very pale, eight nipples were cream colored, seven were tan, two were light brown, and two were dark brown. All nipple-areola complexes exhibited healthy arterial and venous phases after inset. All breasts healed without complication and with acceptable cosmetic appearance. Although intraoperative surgical decisions were not altered based on these images, they nonetheless supported the surgeon's operative evaluation.

Fluorescent tissue imaging has been widely used for many years, especially with fluorescein.[1] However, fluorescein can only be injected once during an operation because of its long half-life, typically fading over 24 hours after injection. However, as indocyanine green is hepatically metabolized, its half-life is 2.5 to 3 minutes. Indocyanine green may be injected multiple times dur-

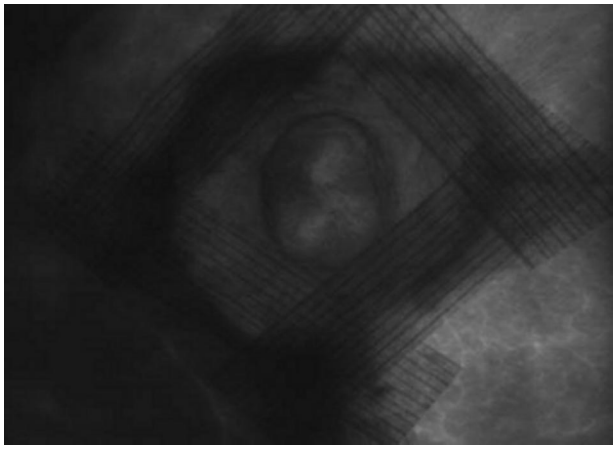

Fig. 1. Fluorescence of the nipple-areola complex after inset, 1 minute after indocyanine green infusion, showing excellent arterial perfusion.

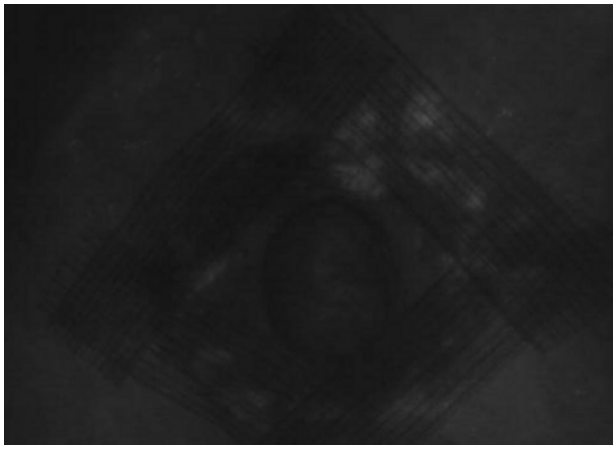

Fig. 2. Indocyanine green fluorescence of the same nipple-areola complex 10 minutes after indocyanine green infusion, representative of the venous phase. Note the minimal fluorescence of the nipple-areola complex, consistent with excellent venous outflow.

ing an operation to evaluate potentially ischemic or congested tissues.[2] In addition, indocyanine green binds to albumin, allowing it to remain intravascular. As indocyanine green remains in congested tissues, it will remain highly luminescent. Indocyanine green has proven helpful to evaluate perfusion of soft tissue in many clinical settings, to include open heart surgery, burn surgery, free tissue transfer, mastectomy, and breast reconstruction.[3–5]

Intraoperative fluorescence of the nipple-areola complex with indocyanine green during reduction mammaplasty helps to evaluate the nipple-areola complex for vascular compromise. Indocyanine green videofluorography may be used repeatedly during the same operation and helps to evaluate both the arterial microcirculatory inflow and venous outflow.

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The Use of Acellular Dermal Matrix in the Correction of Visible Parasternal Deformities after Breast Reconstruction

Sir:

Thin women undergoing mastectomy usually lack sufficient tissue for autologous transfer and must undergo implant reconstruction.[1,2] Complications of implant reconstruction include symmastia, infection, leaking, rupture, extrusion, and implant malposition. Results are further jeopardized in thin women by increased incidences of asymmetry, implant palpability, rippling, "step-off" deformity, and prominent ribs.[1–4] Schulman et al. attempted to correct a step-off deformity with prominent ribs in a thin implant reconstruction patient with cadaveric acellular dermis (AlloDerm; LifeCell Corp., Branchburg, N.J.), later using injectable poly-L-lactic acid (Sculptra; Dermik Laboratories, Berwyn, Pa.) with improved results.[1] Because AlloDerm can add 2 to 3 mm of soft-tissue thickness for up to 30 months, it has been used to correct capsular deformities and may become increasingly important in correcting complications of implant reconstruction.[5] We describe

the case of a thin breast reconstruction patient who desired correction of prominent ribs.

A 38-year-old woman with right breast carcinoma underwent bilateral skin-sparing mastectomies with immediate breast reconstruction using two Mentor (Mentor Corp., Santa Barbara, Calif.) medium-height, 350-ml tissue expanders in December of 2007, followed by adjuvant chemotherapy without irradiation. Her expanders were filled to approximately 430 cc before replacement with Mentor 400-cc smooth, round, high-profile gel breast implants. Her parasternal region had prominent ribs and visible intercostal spaces, which were corrected with two 8 × 16-cm pieces of extra thick AlloDerm placed over the parasternal regions. At approximately 6-month follow-up, she is doing well and is very pleased with the results (Fig. 1).

An 8 × 16-cm piece of thick AlloDerm was reconstituted and cut into the appropriate geometry to fit the defect. Electrocautery was used to dissect a subcutaneous flap to the level of the clavicle, within 1 cm of the parasternal border. Then, 5-0 Prolene sutures (Ethicon, Inc., Somerville, N.J.) were placed percutaneously from superficial to deep, mattressing the AlloDerm, and then passing from deep to superficial into five positions along the defect area (Fig. 2). The AlloDerm was then parachuted into the appropriate position. The Prolene was tied over rolled Xeroform to secure the AlloDerm in place. The same process was used for the contralateral defect.

Our patient was concerned about prominent ribs and intercostal spaces that kept her from exposing her décolleté, and caused her significant psychological distress. Her deformity was addressed with a technique using extrathick AlloDerm. Thin breast reconstruction patients face significant problems related to lack of soft-tissue bulk, and implants can cause complications as outlined above. Correcting these

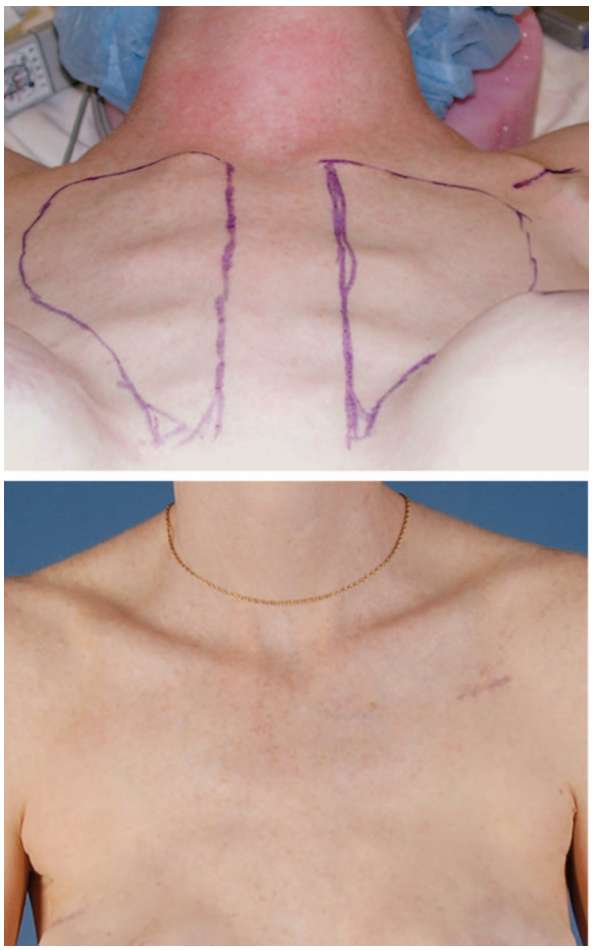

Fig. 1. Preoperative view of the patient (*above*) showing her exposed ribs and intercostal spaces. The postoperative view (*below*) was taken after 6 months. The patient was very pleased with the results.

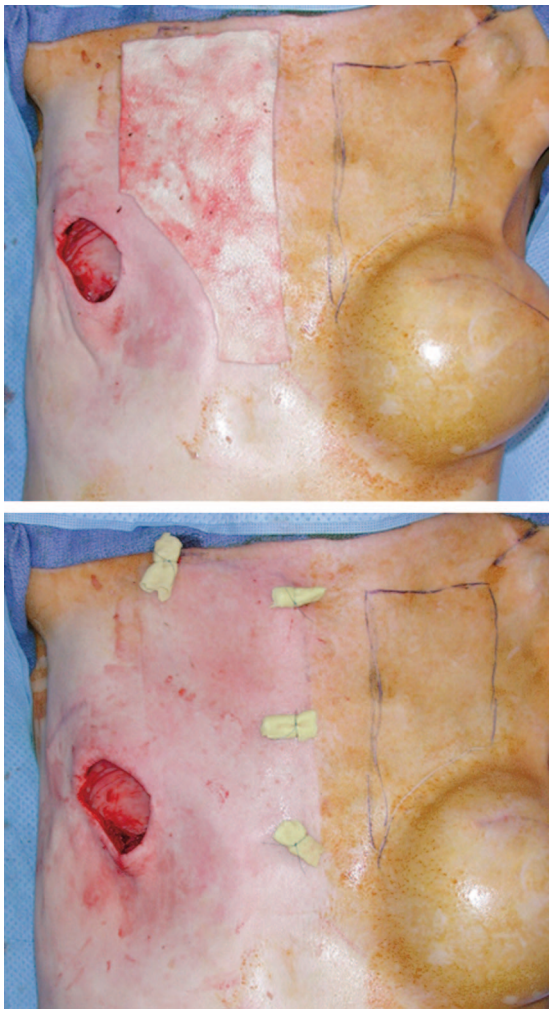

Fig. 2. Intraoperative view after removal of the right-sided tissue expander. The allograft is shown at the intended position for insertion (*above*). The original incision made during tissue expander placement was used for placement of the graft. (*Below*) The allograft is shown after being parachuted and secured in place by Prolene.

problems creates significant challenges to the plastic surgeon.

Autologous fat injection has been used with success in the correction of deformities of the breast.[2] However, fat injection was not an option in our case, as our patient did not possess sufficient fat for injection. Schulman et al. described the successful use of Sculptra to correct a similar deformity. Correction was achieved after four monthly treatments using two 367.5-mg vials of Sculptra diluted in 4 ml of sterile water mixed with 1.5 ml of 1% lidocaine.[1] The advantages of Sculptra include lack of donor-site morbidity, noninvasive application, and semipermanent improvement of dermal thickness approaching 2 years after implantation.[1] Although Sculptra may require multiple treatments and risk complications related to injection technique, like subcutaneous nodule formation and micronodular and macronodular cystic reactions, AlloDerm can correct large areas uniformly, integrating with the patient's own tissues after a single application.[1]

The rising incidence of breast cancer will mean more implant reconstructions. It is reasonable to expect that in thin women, significant contour deformities such as visible ribs will be increasingly faced by plastic surgeons. We have presented a case of a thin implant reconstruction patient who requested correction of her skeletonized ribs. We successfully corrected this deformity with AlloDerm. It is our hope that other centers and surgeons report on the incidence of these deformities and provide options for correcting them.

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Return of Sensitivity and Outcome Evaluation of Breast Reconstruction with the DIEP Free Flap

Sir:

We analyzed the results achieved in 20 patients selected randomly among 130 unilateral mammary reconstructions with noninnervated deep inferior epigastric perforator flaps performed 1 to 2 years previously. Our analysis consisted of four steps:

1. Patients were interviewed with a self-evaluating questionnaire regarding the reasons why they had chosen autologous reconstruction, the degree of satisfaction, and the self-estimated sensitivity recovery (Table 1). Only one patient reported a complete absence of sensitivity, whereas all the others reported a sensitivity recovery comparable to the objective evaluated results. The average recovery time was 9 to 12 months.
2. Breast outcome, scar quality, and donor site were evaluated by the same examiner. All of the reconstructions were satisfactory in terms of naturalness, symmetry, and softness. The only patient with poor symmetry reported an important weight loss. The surgeon was not completely satisfied with the breast shape in eight patients, even if the patients were completely satisfied. The scar quality was considered unsatisfactory in four cases: one was in a patient of African race and produced multiple keloids; three cases presented scar disorders in the median part of the abdomen.
3. Thermal sensitivity was evaluated with tubes containing water at 4°C and 25°C; pain sensitivity was tested with 30-gauge needle punctures. Thermal and pain sensitivity presented similar recovery in all cases, with a better restoration of pain. On the reconstructed breasts (Fig. 1), recovery was better in the extremities and inferior part of the flap. The areola and the upper pole of the flap had poor recovery. On the donor site (Fig. 2), there was complete recovery in the extremities and poor recovery in the central part above the wound and in the umbilical area. In one patient, we observed complete recovery of thermal and pain sensitivity on the breast; and in one patient, we observed complete recovery on both the breast and the donor site.

Table 1. Reconstruction with the Deep Inferior Epigastric Perforator Flap: Self-Evaluating Questionnaire on Overall Patient Satisfaction*

Questionnaire
1) Why did you choose autologous tissue reconstruction? (Choose one or more answers) a. Fear about prostheses as a foreign body (10) b. Possible need to replace the prosthesis after years (15) c. Need for two surgical procedures (mammary expander insertion, prosthesis insertion) (1) d. Need for a period of tissue expansion (3) e. Naturalness of the reconstruction with autologous tissue (8) f. Symmetry of the reconstruction with weight modifications (3) g. Improvement of abdominal contour (2) h. Others: . . .(0)
2) In your experience, do you consider the DIEP flap a good choice for mammary reconstruction? Would you advise it? a. Yes (20) b. No (0)
3) Please define your level of satisfaction with the overall outcome of your operation: a. Very satisfied (15) b. Satisfied (5) c. Dissatisfied (0) d. Disappointed (0) e. Very disappointed (0)
4) Please define your level of satisfaction regarding your breast: a. Very satisfied (15) b. Satisfied (5) c. Dissatisfied (0) d. Disappointed (0) e. Very disappointed (0)
5) Please define the level of symmetry of your breasts: a. Very good (8) b. Good (9) c. Moderate (2) d. Poor (1) e. Very poor (0)
6) Please define your level of satisfaction with your breast shape: a. Very satisfied (12) b. Satisfied (8) c. Dissatisfied (0) d. Disappointed (0) e. Very disappointed (0)
7) Please define your level of satisfaction with your breast naturalness: a. Very satisfied (18) b. Satisfied (2) c. Dissatisfied (0) d. Disappointed (0) e. Very disappointed (0)
8) Please define your level of satisfaction with your scars: a. Very satisfied (12) b. Satisfied (6) c. Dissatisfied (2) d. Disappointed (0) e. Very disappointed (0)
9) Please define your level of satisfaction with your abdomen: a. Very satisfied (4) b. Satisfied (12) c. Dissatisfied (3) d. Disappointed (1) e. Very disappointed (0)
10) Please define your level of sensitivity in the reconstructed breast and in the abdominal region: a. Very good (1) b. Good (6) c. Moderate (11) d. Poor (1) e. Very poor (1)
11) Did you recover any tactile sensitivity? a. Yes (19) b. No (1)
12) If the answer to 11 is yes, How long after surgery did you recover tactile sensitivity? a. <3 mo (1) b. 3–6 mo (1) c. 6–9 mo (5) d. 9–12 mo (10) e. >12 mo (2)
13) Did you recover any thermal sensitivity? a. Yes (18) b. No (2)
14) If the answer to 13 is yes, How long after surgery did you recover thermal sensitivity? a. <3 mo (1) b. 3–6 mo (0) c. 6–9 mo (4) d. 9–12 mo (11) e. >12 mo (2)
15) Did you recover any pain sensitivity? a. Yes (19) b. No (1)
16) If the answer to 15 is yes, How long after surgery did you recover pain sensitivity? a. <3 mo (1) b. 3–6 mo (2) c. 6–9 mo (3) d. 9–12 mo (12) e. >12 months (1)

DIEP, deep inferior epigastric perforator.
*Results are indicated by numbers in parentheses.

4. Pressure sensitivity was evaluated with the Semmes-Weinstein test. In the breast (Fig. 1), we observed a good recovery of pressure sensitivity in the medial and lower quadrants in nine cases. One patient presented good recovery of overall sensitivity in the reconstructed breast, and another patient presented complete absence of pressure sensitivity. On the donor site (Fig. 2), the best recovery of pressure sensitivity was in the extremities. In three cases, we found good recovery of pressure sensitivity on the entire abdomen. We observed a minor recovery in the umbilical area and in the area on the median part of the wound.

We can conclude that most of the 20 examined patients had some sensitivity recovery attributable to reinnervation. Similar results were reported on patients who underwent reconstruction with transverse rectus abdominis musculocutaneous flaps.[1–5]

Patient satisfaction regarding the reconstruction was very high in most of the cases. The strong motivation to restore body image without any foreign body makes them appreciate the results more than what the surgeon would sometimes expect.

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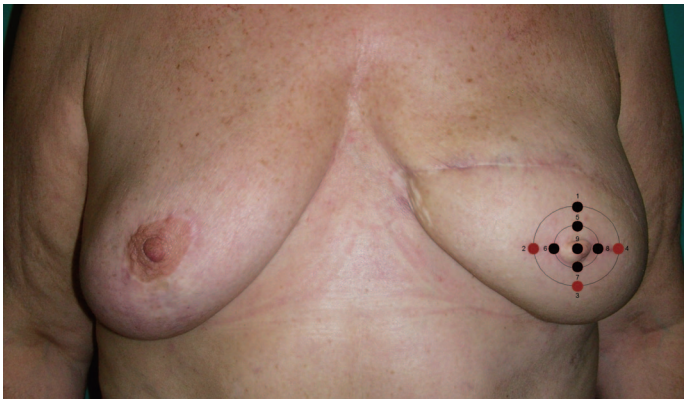

Fig. 1. Points examined on the reconstructed breast: the best recovery is on the points in *red* (*2*, *3*, and *4*).

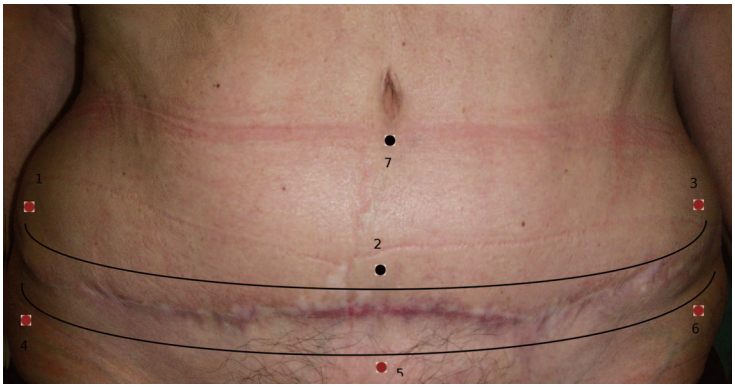

Fig. 2. Points examined on the abdomen: the best recovery is on the points in *red* (*1*, *3*, *4*, *5*, and *6*).

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Chronic Fistulas after Breast Augmentation Secondary to *Mycobacterium abscessus*

Sir:

There has been an increase in the incidence of nontuberculous mycobacterial infections after breast augmentation and other procedures over the past several years.[1–5] We present a case of bilateral mycobacterial infection after transareolar subpectoral breast augmentation with occurrence of chronic draining fistulas at the incision sites after implant removal so as to alert surgeons to this unexpected complication.

An otherwise healthy 44-year-old woman underwent transareolar subpectoral breast augmentation with

500-cc saline implants. Four weeks later, she developed slight swelling of her right breast, with no fever, erythema, pain, or tenderness. The patient was placed on oral linezolid (600 mg twice daily). Ten days later, an area of erythema developed on the inferomedial aspect of the right breast, prompting implant removal through an inframammary crease incision. Approximately 200 ml of turbid fluid was drained, the Gram stain of which showed a white blood cell count of 4+ and no bacteria. Results of routine cultures were negative. Although closed tube drainage was used, the patient developed serous drainage through the inframammary incision site. The amount of drainage diminished slowly and the fistula closed spontaneously within 3 months.

Two weeks after removal of the right implant, the patient became febrile and developed pain and erythema over the inferolateral aspect of the left breast. These symptoms prompted immediate removal of the left breast implant, again through an inframammary crease incision. Approximately 100 ml of turbid material was removed and submitted for Gram stain and cultures. As it was noted during this—and the previous, right-sided—explantation that the tissues surrounding the implant appeared normal without detectable capsule formation, no attempt was made to excise any granulation tissue or perform capsulectomy. Closed tube drainage was again performed. Gram stain showed a white blood cell count of 2+ with no organisms. The final bacteriology report indicated *Mycobacterium abscessus*. The patient showed improvement of her signs and symptoms within 2 to 3 days after explantation. A new antibiotic regimen was initiated by the infectious disease consultant that was continued for 6 months. Approximately 1 week after implant removal, the patient developed a fistula tract similar to the one on the right breast involving the left inframammary crease incision. This fistula closed spontaneously within 3 weeks.

Because of the recent rise in outbreaks of mycobacterial infections[1–5] and because clinical diagnosis of mycobacterial infection after breast augmentation may be delayed,[5] we strongly recommend laboratory staining for acid-fast bacilli in addition to routine Gram stain and culture studies in all patients who undergo implant removal. A standard Gram stain frequently fails to identify acid-fast bacilli. Furthermore, we bring attention to the occurrence of a chronic fistula as a potential complication of atypical mycobacterial breast implant infection. The treatment goal should involve controlling the infection medically, without necessarily removing the periprosthetic granulation tissue or the capsule at the time of explantation or when a fistula has formed.
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Primary T-Cell Lymphoma Associated with Breast Implant Capsule

Sir:

A 44-year-old woman was referred to our clinic for evaluation of an enlarged right breast 6 years after bilateral augmentation with subpectoral textured saline implants (Fig. 1). She sustained a minor trauma, and her chest swelling was treated with antibiotics, aspiration, and implant exchange. Asymmetry persisted for 2 years before her visit to our clinic. A capsulectomy with implant exchange was performed. The implant was not ruptured; however, there was a 10-cm mass

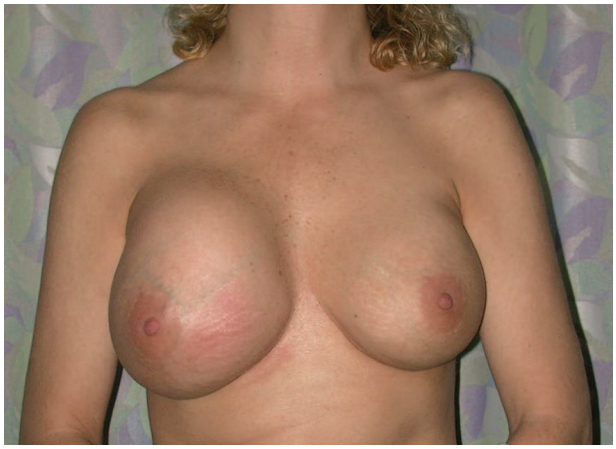

Fig. 1. Preoperative view showing gross enlargement of the right breast 6 years after subpectoral saline implant placement.

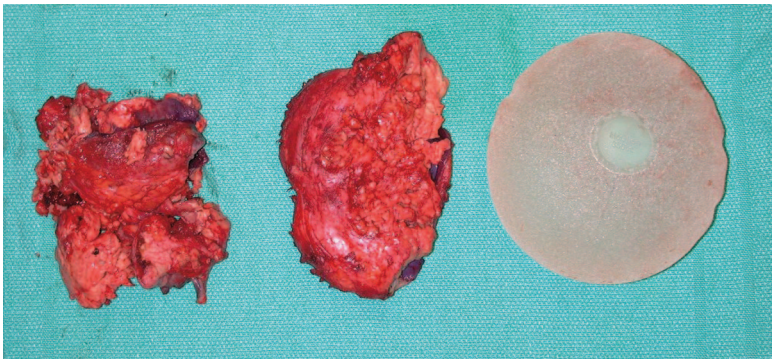

Fig. 2. Intraoperative views of the complex mass measuring 12 × 10 × 4.5 cm (*left*), the capsulectomy specimen (*center*), and the intact saline implant (*right*).

associated with the capsule consistent with T-cell lymphoma of anaplastic large cell lymphoma morphology (Fig. 2). The patient underwent multimodality treatment, including irradiation, with no evidence of recurrent disease. She returned to our clinic for reconstruction. Given her recent chest wall irradiation and refusal of transverse rectus abdominis musculocutaneous flap surgery, she underwent latissimus dorsi flap surgery over a tissue expander to provide symmetry with the contralateral augmented breast. Expansion was performed without difficulty and the expander was exchanged with a saline implant.

It is estimated that over 300,000 cosmetic breast augmentation procedures are performed annually in the United States. This figure continues to rise despite debate regarding the safety of saline and silicone implants. Epidemiologic studies have found no causative relationship between implants and malignancies or connective tissue diseases[1,2]; however, there have been reports of a rare subtype of non-Hodgkin lymphoma of the breast observed in patients with breast implants.[3,4] Primary breast lymphoma is an unusual subset of cancer that constitutes less than 0.5 percent of malignant neoplasms of the breast.

Registry-linked studies of patients with cosmetic breast implants have shown no increase in malignancy compared with the general population. A recent review from The Netherlands showed an 18-fold increase in the odds of developing anaplastic large cell lymphoma in the setting of silicone implants[5]; however, it is imperative to note that the absolute risk remains exceedingly low because of the low prevalence of breast lymphomas. A literature search revealed few cases of breast lymphoma in the setting of breast implants, with the large majority being anaplastic large cell lymphoma. All cases of primary breast lymphoma arising in proximity to implants have a common presentation of swelling or asymmetry around the implant, generally outside the perioperative period, and diagnosis was made by means of cytology or histology.[4]

Although the retrospective data reject a causal link between breast implants and malignancy, the cases reviewed discuss an unusual morphology of primary breast lymphoma, including this case, presenting as asymmetry after augmentation. Asymmetric enlargement after augmentation may be attributable to many causes, including hematoma, seroma or infection, capsular contracture, or implant failure, and can often be diagnosed by physical examination or imaging. Alternatively, there are rare reports of autoinflation or tumor coincident with augmentation. Although the relationship is speculative, further study is warranted. Our experience and literature review indicate the benefit of imaging, aspiration with cytology and culture, and histologic analysis of the capsulectomy specimen. In particular, it is important to be aware of potential malignancy in those patients who experience breast enlargement outside of the immediate perioperative period. Reconstruction is possible after aggressive, multimodality treatment of primary breast lymphoma.

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Spontaneous Hematoma of the Breast 30 Years after Augmentation

Sir:

Delayed hematoma formation following augmentation mammaplasty is a rare complication.[1–5] We encountered the largest hematoma ever reported, and the furthest from initial surgery, when a 56-year-old African American woman presented with a 3-month history of left breast swelling. The patient had subglandular silicone breast implants placed in the late 1970s and denied any recent trauma. On examination, the patient had extensive asymmetry, with a very large, firm left breast distended to approximately the size of a basketball (Fig. 1). Mammography and ultrasound showed evidence of implant rupture and a large fluid collection surrounding the implant. Computed tomography identified a well-defined fat plane between the fluid and the pectoralis major muscle (Fig. 2).

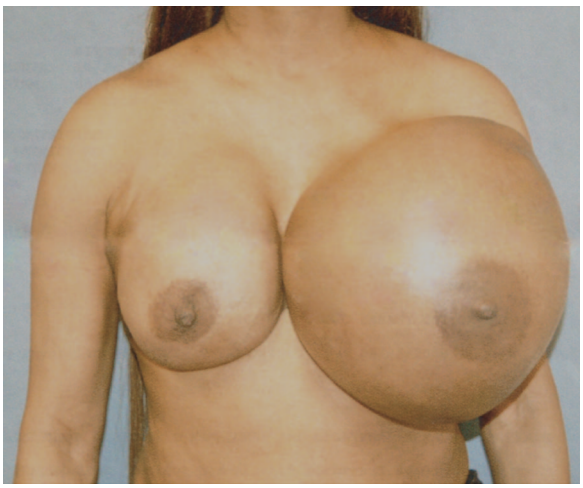

Fig. 1. The patient presented with a 3-month history of a slowly enlarging left breast.

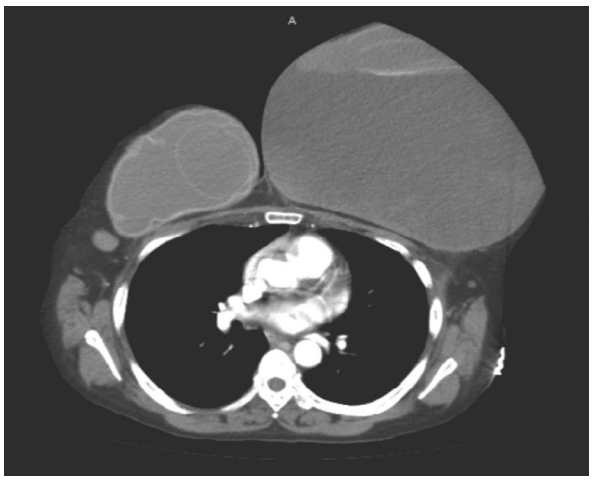

Fig. 2. Computed tomographic scan of the chest reveals a large heterogeneous fluid collection within the left breast, a well-demarcated plane between this collection and the pectoralis major muscle, and bilateral implant rupture.

During surgical exploration, the implant was found to be ruptured with silicone mixed within the hematoma fluid. In total, 4.5 liters of material was removed from the breast. Open periprosthetic capsulectomy was performed, and biopsy specimens were obtained from thickened areas of the capsule. Results of cultures were negative and pathologic evaluation revealed a ruptured silicone implant, with benign fibroadipose tissue and chronic inflammation. Within the specimen, silicone granulomas with multinucleated giant cell reaction and hemosiderin-laden macrophages were identified. The postoperative course was uneventful, and staged reconstruction is planned.

In 1979, Georgiade et al. first reported a hematoma developing in a 25-year-old patient 2.5 years after breast augmentation using saline prostheses containing triamcinolone acetonide.[1] During exploration, an eroded capsular artery was found to be actively bleeding, and this was ascribed to the steroid infusion. Follow-up reports attribute late hematoma formation to the erosion of vessels arising from the breast capsule, and various inciting factors have been described, including inflammation, microfracture of the capsule, friction of the implant against the capsule, and trauma.[2–5] Our pathologic findings are consistent with inflammation contributing to the development of the hematoma, likely as a reaction to the ruptured silicone implant.

Previous case reports describe chronic expanding hematomas developing around various types of implants after a period ranging from 5 months to 22 years; thus, this hematoma is the furthest from time of onset, developing 30 years after augmentation.[4] Before this study, the largest hematoma evacuated was 500 ml, whereas in this case, 4.5 liters of fluid was removed, making this the largest collection to date.[5]

Described treatment of hematomas ranges from close observation to surgical management.[2–5] In the

setting of hematoma development many years after augmentation without an inciting event, other pathologic findings such as infection, inflammation, and malignancy should be considered. The hematoma requires drainage, and the capsule must be examined for any evidence of persistent bleeding. In addition, the breast and capsule must be inspected for any evidence of malignancy, especially in the setting of reconstruction and prior malignancy.

In summary, hematoma formation is a rare complication of breast implantation. Patients presenting with sudden swelling of the breast should be evaluated for infection, malignancy, and late hematoma formation. Imaging studies are useful adjuncts to better characterize breast abnormality, but ultimately surgical exploration is the standard treatment.

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Prevention of Wound Infection after Release of Apert Acrosyndactyly

Sir:

A succession of Apert syndrome patients with infection and graft loss after acrosyndactyly correction with the trilobed flap technique and at our medical center prompted a modification of the conventional surgical prophylactic protocol used by the senior author (J.H.C.).

Conventionally, patients undergoing syndactyly release would receive one intravenous dose of antibiotics (amoxicillin/clavulanate) at induction with, apart from a sterile nonadherent paraffin gauze dressing (Unitulle; Roussel B.V., Hoevelaken, The Netherlands), no added measures for the graft recipient site.

The modified or extended protocol involved 7 days of oral antibiotics (amoxicillin/clavulanate) in additional to the conventional single intravenous antibiotic dose given at induction and treatment of the graft recipient sites with Unitulle dressings impregnated with an antibiotic 0.2% nitrofurazone solution (Furacine; Norgine, Heverlee, Belgium).

A preliminary retrospective study was performed to study the effectiveness of the new protocol compared with the conventional protocol for reducing the postoperative infection and revision rate, to evaluate whether an objective justification exists for empirically prescribing the prolonged use of antibiotics. The group of procedures (27 webs in nine patients with Apert syndrome) performed by the senior author between January of 2004 and December of 2005 could be divided into two cohorts (Table 1): (1) 15 web corrections in nine patients under the conventional antibiotic prophylaxis, and (2) 12 webs in six patients under extended prophylaxis. It should be noted that all patients represented in the second cohort were also represented in the first. All cases were corrected with the dorsal trilobed flap technique, and all had secondary defects that required coverage with full-thickness skin grafts taken from the groin.

Although we found a lower incidence of postoperative infections and reoperations in the extended compared with the conventional group (25 percent versus 46 percent and 8 percent versus 13 percent, respectively), the difference was not statistically significant ($p = 0.35$ and $p = 0.69$, respectively). Similar techniques for syndactyly release and web reconstruction using local transposition flaps and full-thickness skin grafts in patients with Apert syndrome have been reported in the literature, with infection rates ranging between 6 and 8 percent and revision rates ranging between 13 and 18 percent.[1–3]

Skin grafts are associated with poor surgical outcome,[4] but their use is often unavoidable in complex abnormalities, such as those presented here. Different techniques, such as tissue expansion, defatting, and novel commissural flap designs, that omit the use of large skin grafts, may reduce the need for reoperation. These techniques, however, have not yet been

Table 1. Demographics of Patients with Apert Syndrome Operated on for Primary Syndactyly of the Hand

Characteristics	Conventional Protocol	Extended Protocol
Patients/webs	9/15	6/12
Male-to-female ratio	8:7	5:7
Age at surgery, years		
Mean	3.7	2.8
Range	0.8–8.3	0.3–9.4
Operative time, min		
Mean	112	104
Range	60–130	30–180
Simple/complex	4/11	4/8
Apert type I/type II/type III	3/8/4	2/5/5
Webspace involvement		
First	0	2
Second	4	4
Third	5	4
Fourth	6	2
Follow-up, mo		
Mean	15.4	10.3
Range	1–25	2–19

widely accepted, and their place in the treatment algorithms remains to be determined.

We acknowledge that this study has major limitations, including those inherent in the retrospective design, and the preliminary data do not provide enough evidence to recommend a prolonged course of antibiotics. Also, although meticulous surgical technique, adequate postoperative dressings, and splinting are crucial for a successful outcome, we do feel that the described prophylactic protocol could be a useful adjuvant in complex cases such as those presented here. We therefore suggest a prospective, randomized trial with a larger cohort of patients be performed to validate our findings.

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Index Reconstruction by Means of a Fasciocutaneous Thenar Flap

Sir:

The palmar aspect of the hand is not a well-known donor site for hand reconstruction, although several fasciocutaneous flaps from this area have been described previously.[1–3] However, the palmar skin bears unique mechanical and thickness characteristics, and would therefore represent an ideal replacement option for itself.

A right-handed, 39-year-old carpenter presented at our emergency department after a circular saw mangled the radial part of his left index finger along with the collateral pedicle and part of the distal interphalangeal joint. The trauma spared the distal pulp but left far too large a defect for any local or cross-finger flap to assume coverage. Joint exposure and the few remaining subcutaneous tissues made this manual worker a poor candidate for a skin graft or secondary healing.

After distal interphalangeal joint stabilization with a Kirschner wire, a retrograde fasciocutaneous thenar flap pedicled on the radial collateral artery was designed and elevated with a pivot point at the base of the finger. Part of the abductor pollicis brevis muscle was sectioned to include the underlying radiopalmar artery, taking care not to harm the median nerve motor branch to the thenar muscles. The superficial palmar arch and the origin of the thumb palmar collateral arteries had to be divided, but not the first dorsal interosseous artery. No nerve suture was performed (Fig. 1).

The flap healed quickly, and at 6 months, static two-point discrimination was 6 mm, with no cold intoler-

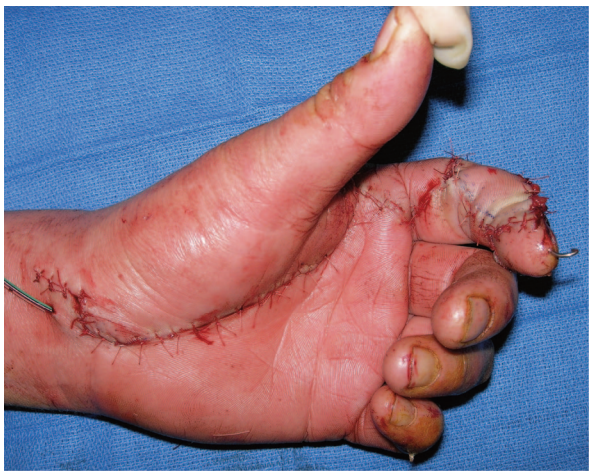

Fig. 1. Postoperative view with the donor site closed, immediately after release of the tourniquet.

ance. The patient returned rapidly to his previous occupation without impairment, and declared himself very satisfied.

The concept of a wide fasciocutaneous pedicled thenar flap was first developed by Omokawa et al.[1] and was refined later by Schoofs et al.[3] as an almond-shaped flap whose medial border merges into the proximal palmar crease. The vascular axis is the radiopalmar artery, with its H-shaped connections to the superficial palmar arch.[4] From there comes an interesting versatility (Fig. 2), which allows a retrograde flap to reach the pulp of the first three long fingers or their dorsal aspect. We would therefore recommend making the first incision at the distal part of the flap, to identify the arterial pattern.

This flap usually offers rewarding results, with excellent reliability and palmar tissue match along with an inconspicuous donor-site scar. Although its sensitivity is not always adequate for pulp reconstruction,[3] progressive nerve ingrowth can yield useful two-point discrimination, as shown in this case.

Immediate closure of the donor site is possible,[3] and in a few weeks, thumb abduction and retropulsion ranges of motion recover completely, without need for physiotherapy, as we witnessed in this patient.

Many local or cross-finger flaps can reach the dorsal or lateral aspect of each long finger. Fewer options are available with regard to the palmar skin,[1–3,5] and the coverage of large lesions of the radial and palmar side of the index finger represents a real challenge. With a size up to 3 × 8 cm, a pedicled fasciocutaneous thenar flap offers an interesting answer.

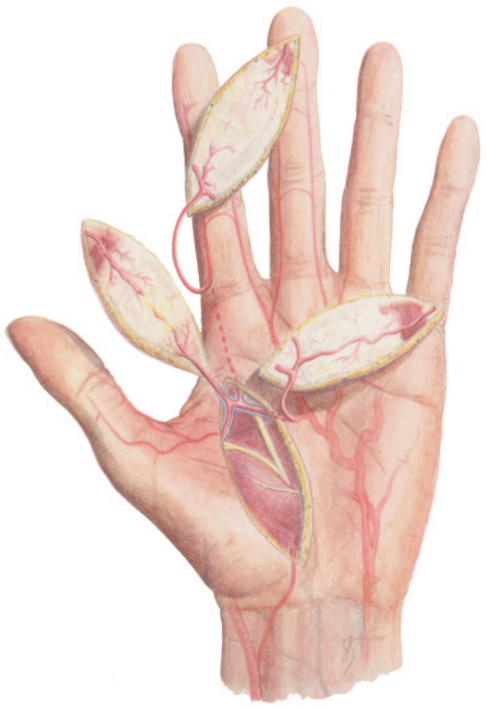

Fig. 2. Three different options for the pedicled fasciocutaneous thenar flap, illustrating its anatomy, range, and versatility. It can also be used as a free flap.

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Synovium Tissue Engineering to Prevent Tendon Sheath Adhesion

Sir:

Synovium facilitates skeletal movement by the maintenance of a fluid-filled space around cartilage or tendon surfaces. In the plastic and hand surgery clinic, the occurrence of tendon sheath adhesions is a common postoperative complication. They result from scar formation caused by extrinsic tendon healing. Creating a barrier between the repair sites and surrounding tissue layers may prevent adhesions.

Numerous substances consisting of either permanent or biodegradable materials have been used in

tendon surgery to create either mechanical or biological barriers between surrounding tissues or the repair site.[1–5] For example, hyaluronic acid is a glycosaminoglycan polymer that has been found to have some beneficial effects on the prevention of adhesions in primary tendon repairs,[6] but the resulting tissue cannot fully reconstruct the structure and function. One study recently fabricated a biomembrane that may provide natural lubrication for tendon gliding and nutrition for tendon tissue, and may act as a barrier to adhesion formation.[7] Synovial cells harvested from the tendon sheath and the knee joint of a rat were cultured for 2 weeks and then impregnated into collagen matrix for another 2 weeks. Alcian blue staining demonstrated the presence of acidic mucopolysaccharide, indicating hyaluronic acid production. This provides indirect evidence of functioning synovial cells on the membrane. Application of this biomembrane to tendon repair sites may help to prevent adhesions after tendon repairs.

Tissue engineering provides the possibility of creating a barrier that is morphologically and functionally similar to the normal synovium between the repair sites and surrounding tissue layers, which may prevent adhesions. However, compared with other types of tissue engineering research such as bone, cartilage, and skin, studies of synovium tissue engineering are fewer at present. Further investigation, especially in animal models, is needed for future clinical use.

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DISCLOSURE

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Mons Rejuvenation in the Massive Weight Loss Patient Using Superficial Fascial System Suspension

Sir:

Significant ptosis and fullness of the mons region often creates an additional skin roll in massive weight loss patients. Traditional abdominoplasty techniques may leave these patients with a ptotic mons and an unsatisfactory aesthetic result. Treating the mons region as a distinct aesthetic unit and incorporating correction into abdominal contouring procedures will lead to greater satisfaction. There are few references that address the mons region. Liposuction and wedge dermolipectomy have been advocated by some authors.[1,2] We describe a technique of mons rejuvenation that involves direct excision of sub-Scarpa fat and suspension of the mons using the superficial fascial system.

Over 400 massive weight loss patients have undergone mons rejuvenation at our center between 2002 and 2009. The severity of the mons deformity was either grade 2 or 3, as based on the Pittsburgh Rating Scale.[3] Two considerations are necessary to adequately rejuvenate the mons region: does the mons need to be resuspended to the abdominal fascia? Does the mons thickness need to be reduced?

After fascial plication and resection, the thickness of the remaining upper abdominal flap is compared with the mons region. If the thickness is comparable, defatting of the mons is not necessary. In patients with a

thicker mons region, we directly excise a wedge resection of the deep, sub-Scarpa adipose tissue down to the level of the anterior abdominal wall overlying the pubic symphysis. Care is taken to uniformly thin the mons and to avoid entering the vaginal vault. To elevate the mons to a rejuvenated position and minimize recurrent ptosis, the deep surface of the mons superficial fascial system is suspended to the abdominal wall fascia with three to five 0 braided nylon sutures. Layered closure of the abdominal incision is then performed.

Over 400 patients have undergone mons rejuvenation using this technique. Average follow-up is 6 months. There was significant improvement in the mons contour, with a smooth transition to the upper abdominal flap. The mons was suspended to a more youthful position (Fig. 1). Complications included self-limited edema and mons fullness secondary to conservative defatting. We had one case of suture granuloma from the permanent suture requiring excision. Temporary change in the angle of urinary stream may be encountered. There were no incidences of dyspareunia. Patient satisfaction with the rejuvenated mons contour was very high.

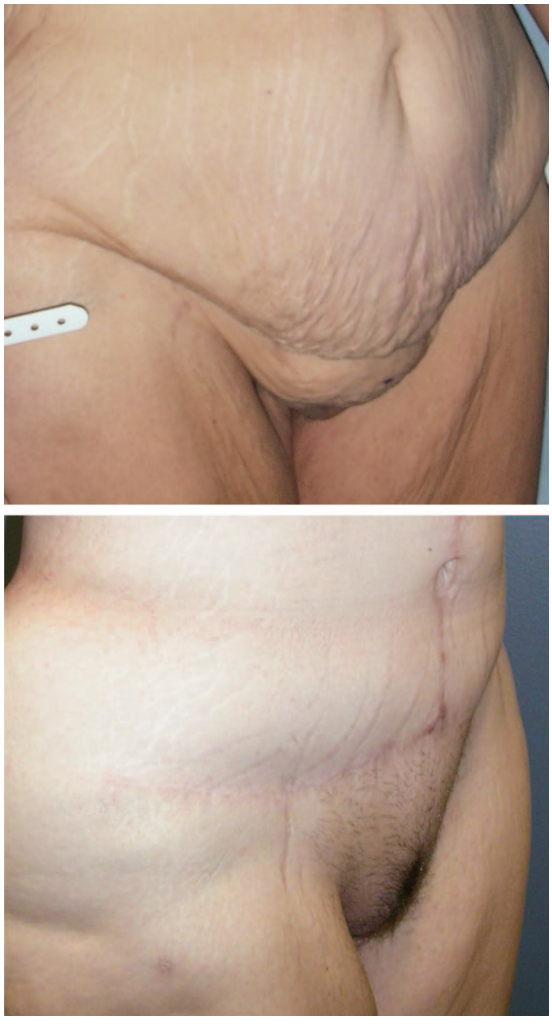

Fig. 1. (*Above*) Preoperative anteroposterior view of a 48-year-old woman after 137-lb weight loss. (*Below*) Postoperative view 1 year after fleur-de-lis abdominoplasty.

Massive weight loss patients often present with severe ptosis and fullness of the mons region. Traditional cosmetic abdominoplasty techniques do not specifically address the mons regions. Failure to address the pubic region in the massive weight loss patient will result in fullness of the pubic area, ptosis, and an appreciable step-off between the mons and the upper abdominal flap. Suspension of the superficial fascial system in the mons region to the abdominal wall fascia minimizes recurrent ptosis, providing a durable result. Mons rejuvenation may be a source of patient embarrassment, but correction leads to high patient satisfaction and is necessary to obtain an acceptable aesthetic result. This technique can easily be incorporated during abdominal recontouring in the massive weight loss patient.

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Measurements and Aesthetics of the Mons Pubis in Normal Weight Females

Sir:

Restoration of the mons pubis during abdominoplasty and belt lipectomy is an important part of aesthetic outcome in body contouring. A challenge is how to redistribute the excess tissue of the abdominal flap when closing the incision. Often, the closure is started laterally to minimize dog-ear deformity, but as a result, excess tissue is bunched up toward the midline, distorting the appearance of the subunit mons pubis.

To our knowledge, the normal dimensions and angles of the mons have not been defined, and only limited data are available describing the mons as a separate subunit and treating it as such during abdominoplasty and belt-lipectomy.[1]

Our goal is to define specific measurements of the mons pubis in normal weight females, respect the mons as a separate aesthetic subunit, and be able to apply these lines and angles during abdominoplasty and belt lipectomy to each individual patient.

Our study design involves evaluating 28 female mons pubis measurements. Healthy female volunteers aged 26 to 53 years (mean, 35 ± 8.4 years) with a body mass index between 18 and 26 (mean, 21 ± 2.4) and no prior altering operations in the mons area were evaluated. In addition, measurements of 13 female cadavers aged 60 to 95 years (mean, 82 ± 9.5 years) were performed. The following lines and angles were measured: 1) umbilicus to pubic hairline/skin fold = top of mons pubis; 2) top of the mons pubis to the end of the labia majora (height of triangle = a = a1 + a2); a1) top of the mons pubis to the cleft; a2) length of the labia majora (cleft to end of labia); 3) lengths of the side segment lines (end of the labia majora along the inguinal crease up to the lateral hairline at the femoral vessels = b); 4) lengths of base of mons triangle = c; 5) inguinal crease/pubic hairline angle = α°; 6) inguinal crease/labia majora angle (tip of mons triangle = β°) (Fig. 1). The mean, median, and SD values were calculated for each measurement.

The average measurements of the 28 female subjects are summarized in Table 1. The measurements

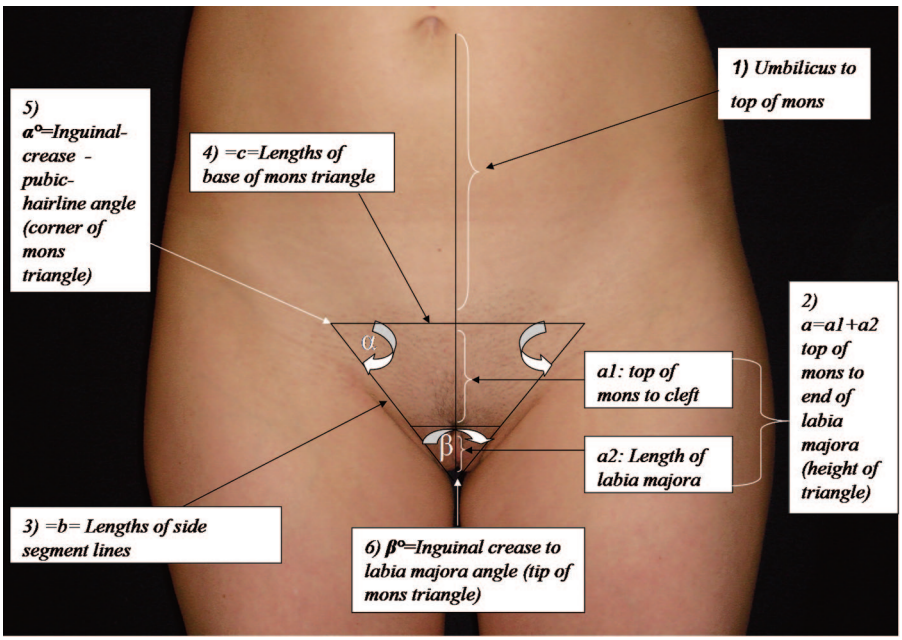

Fig. 1. Healthy normal weight female mons measurements and angles.

Table 1. Results of Mons Measurements

	Female Volunteers (n = 15)			Cadaver Study (n = 13)		
Measurements	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**
1) Umbilicus to pubic hairline/skin fold (cm)	14	13	2.7	14.5	15	1.3
2) Pubic hairline/skin fold to end of labia major (height of triangle) = a = a1 + a2 (cm)	13	12.5	2.3	13	13	1.5
a1) Pubic hairline to cleft (cm)	8	8	1.5	7.9	8	0.95
a2) Length of labia majora (cleft to end of labia) (cm)	5	4	2.2	5.3	5	1.4
3) Lengths of side segment lines = b (end of labia majora along the inguinal crease up to lateral hairline) (cm)	13	13	2.1	14	14	1.7
4) Lengths of base of mons triangle = c (cm)	16	16	2.3	19	18	2.6
5) Inguinal crease/pubic hairline angle (corner of mons triangle = α) (degrees)	55	54	5.3	54	52	4
6) Inguinal crease to labia majora angle (tip of mons triangle = β) (degrees)	75	75	5.5	76	75	3.4

of the mons pubis dimensions are dependent on body size/weight and age. There seems to be a slight enlargement of all mons dimensions, with a slight drop in acuity of the triangle in the significantly older cadaver group. However, the sample size is too small for us to draw any conclusions about significance of subgroup variations.

Defining the normal dimensions and angles of the mons pubis makes it possible to apply those measurements during abdominoplasty and belt lipectomy. Abdominal skin flap closure is often started laterally to minimize dog-ear deformity but thereby bunching excess tissue into the subunit mons. We therefore start the abdominal skin flap closure in the midline, followed by securing the mons corners, creating the mons triangle with the ideal angles, avoiding bunching of redundant skin medially into the aesthetic subunit of the mons pubis. We propose that by applying these dimensions, our patients will have a more pleasing appearance of the mons area and potentially greater satisfaction with the aesthetic outcome of their body contouring procedure.

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Free Flap Reconstruction for the Knee and for Midleg Amputations

Sir:

Over the past three decades, the gastrocnemius transposition flap has become the workhorse for defect reconstruction about the knee and proximal tibia.[1–4] Despite its versatility, size and length are still limiting factors in its use. The muscle is rotated 90 degrees from its original position in the calf to reach the anterior leg. Therefore, the longest wound in the axial direction that can be covered by a single medial gastrocnemius muscle is equal to the width of the muscle, which is approximately 7 cm.[5]

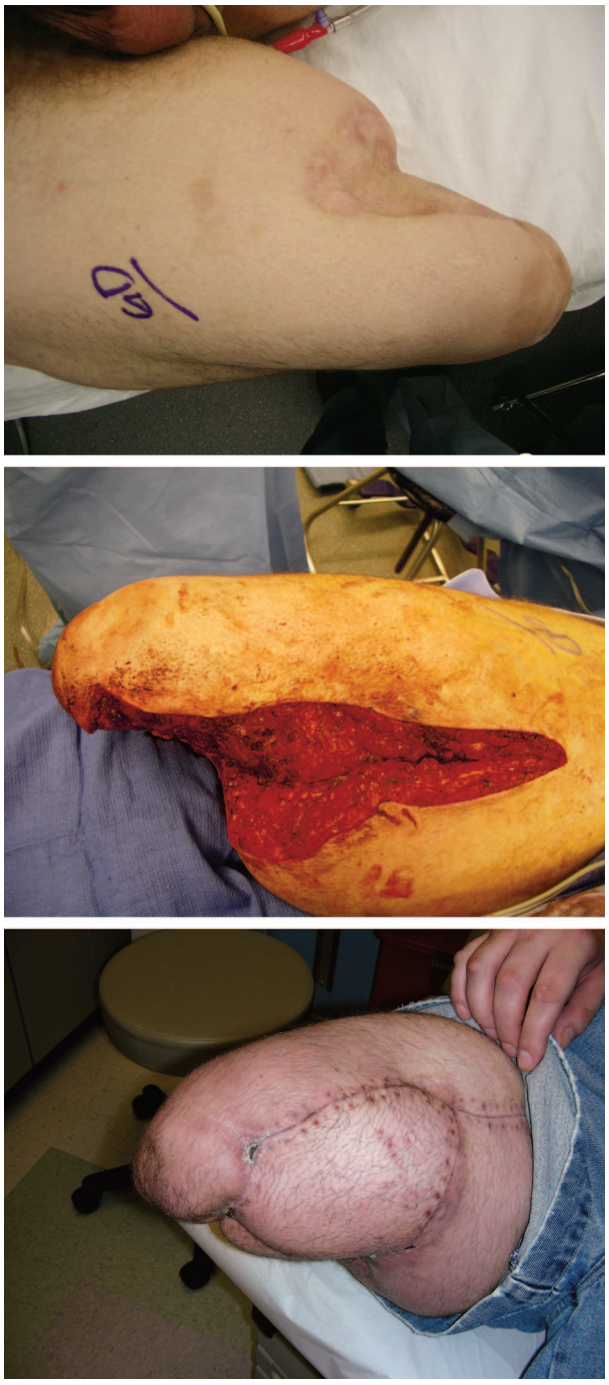

Fig. 1. (*Above*) Preoperative image of right lower extremity stump detailing significant soft-tissue defect resulting in severe pain with prosthetic use. (*Center*) Intraoperative image depicting resultant defect following resection of medial stump scar. (*Below*) Postoperative image detailing well-healed stump reconstruction resulting in adequate soft tissue for prosthesis comfort.

On occasion, long open wounds around the knee develop that require coverage for limb salvage. Other patients require soft-tissue coverage of the midleg level, and do not have suitable local tissue because of a prior amputation. In these settings, free flap reconstruction is a feasible option. Since 1999, the senior surgeon (G.A.D.) has performed 11 free flap reconstructions for complex soft-tissue defects about the knee. All 11 patients suffered from a common theme: long, narrow defects along the long axis of the leg (Figs. 1 through 4). All defects were of significant dimensions to preclude the use of a rotational gastrocnemius flap, with a mean defect size of 166 ± 105 cm^2 (range, 80 to 450 cm^2) and a mean length of 21 ± 7 cm. The average length of the defects in this series is significantly longer than that reported for gastrocnemius flap reconstruction (range, 1 to 13 cm).[1–4]

The cause of these complex wounds included defects around total knee prostheses (four patients), amputation stump sites (four patients), and tumor excision (three patients). The choice of flap for transfer was variable and based on the size of the defect and the location of the donor vessels. We successfully used seven different free flaps for reconstruction. All flaps had long pedicles, long narrow shapes, and skin paddles, which facilitated the stability of the flap inset and were a necessary aspect for resurfacing of amputation stumps.

There were no donor-site complications or cases of flap failure. One patient required a reoperation for flap

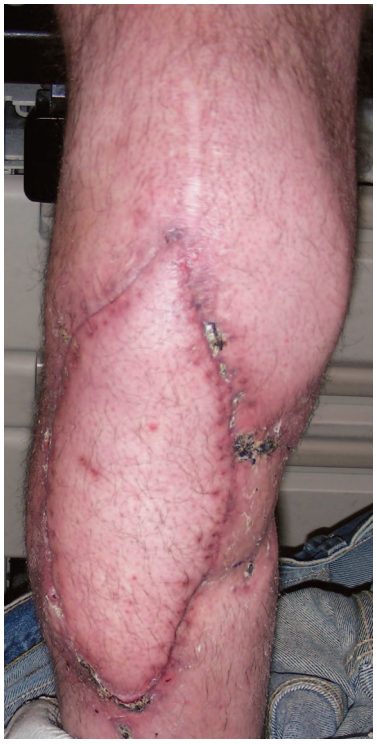

Fig. 4. Postoperative image detailing well-healed flap reconstruction with full joint range of motion.

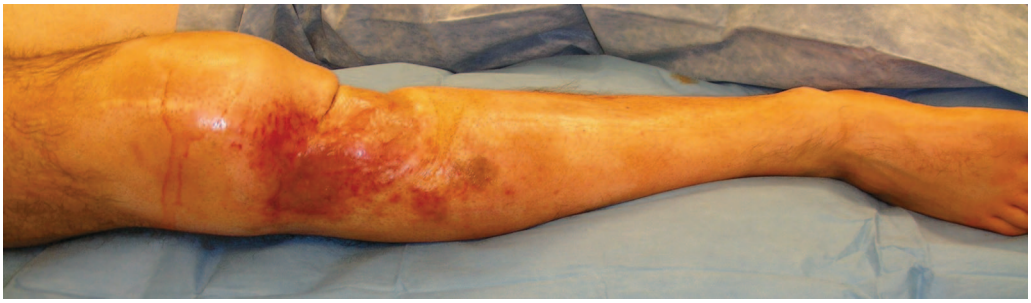

Fig. 2. Preoperative image depicting skin changes associated with infected proximal tibia hardware.

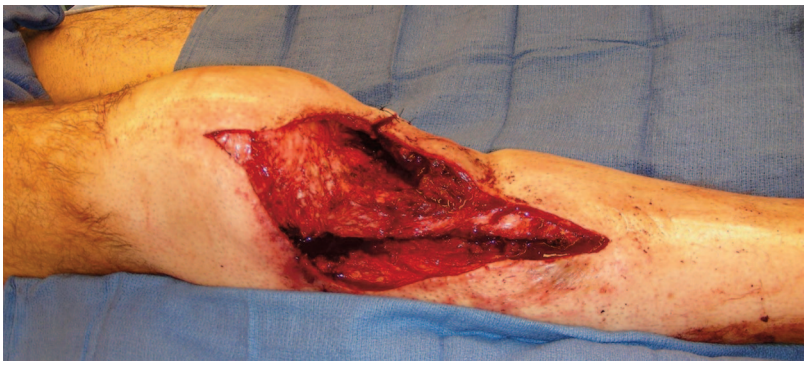

Fig. 3. Intraoperative image depicting long, narrow defect after hardware removal and débridement of infected soft tissues.

salvage as a result of acute arterial thrombosis. All patients regained functional independence of their affected extremity postoperatively.

There is no consensus regarding the optimal target vessels for free flap reconstruction about the knee. The anterior tibial system was used in seven patients in this series. It is our belief that the anterior tibial system offers significant advantages and is our vessel system of choice. It has a more superficial position and can be approached with minimal muscle trauma. In addition, the course of the anterior tibial vein runs deep toward the popliteal vein, and therefore vascular outflow is not compressed with postoperative dressings or splints.

Complex defects about the knee pose many challenges to the reconstructive surgeon. For some defects with long axial dimensions, the gastrocnemius flap provides insufficient tissue for adequate defect closure. We believe the use of long, narrow microvascular flaps and liberal use of the anterior tibial system for inflow to be the procedure of choice in these cases.

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DISCLOSURE

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The Four-Step Subcuticular Suture Technique

Sir:

One of the primary missions of an academic medical center is to train future physicians. However, because of ever-increasing economic pressures, the drive to maximize efficiency in our practices is being emphasized. Unfortunately, this can threaten our role as teachers. As a result, a simple, reproducible method of teaching medical students and junior surgical residents how to perform a basic running subcuticular (or intracuticular) suture was developed.

Although the running subcuticular suture is well described in surgical textbooks,[1] the "four-step method" is unique in that it separates and quantifies each component. With the first step, the skin is gently everted using an Adson forceps to visualize the dermal-epidermal junction (Fig. 1, *above, left*). Step two consists of introducing the needle at a 90-degree angle at the dermal-epidermal junction and pronating the wrist to take a deep horizontal bite parallel to the skin surface (Fig. 1, *above, right*). In step three, the needle is stabilized with the Adson forceps, being mindful of not touching the tip, and advanced through the skin (Fig. 1, *below, left*). In this step, it is important to emphasize to the student that the Adson forceps can be used more effectively by firmly gripping the needle at more of a right angle to it, allowing more contact and thus success with grasping the needle, without dulling the needle by manipulating the tip. Finally, in step four, while continuing to stabilize the needle with the Adson forceps, the needle is replaced in the needle holder in the appropriate position for the next throw (Fig. 1, *below, right*). It should be highlighted that in this step the operator should stabilize the hand holding the needle with the Adson forceps on the patient's body close to the area from the last throw while releasing and reloading with the needle holder, to minimize the difficulty in reloading the needle holder in the correct position for the next throw.

Once the student grasps the concept of each of the four steps, the instructor begins to count aloud as the student performs each of the four steps. Each movement performed by the student is given a number (i.e., 1, 2, 3, 4, 5, and so on), illustrating extraneous movements. The immediate feedback provided by having the instructor count aloud has been critical in helping students at our institution master this skill and improve their efficiency by removing extraneous movements. Once the basic concept is grasped, the four-step method can be modified as necessary for the advancing surgeon.

In conclusion, the four-step method is a quick, simple, and easily reproducible method of teaching medical students and junior residents how to perform a basic running subcuticular suture. We believe that its simplicity will serve as a valuable tool for surgeons to

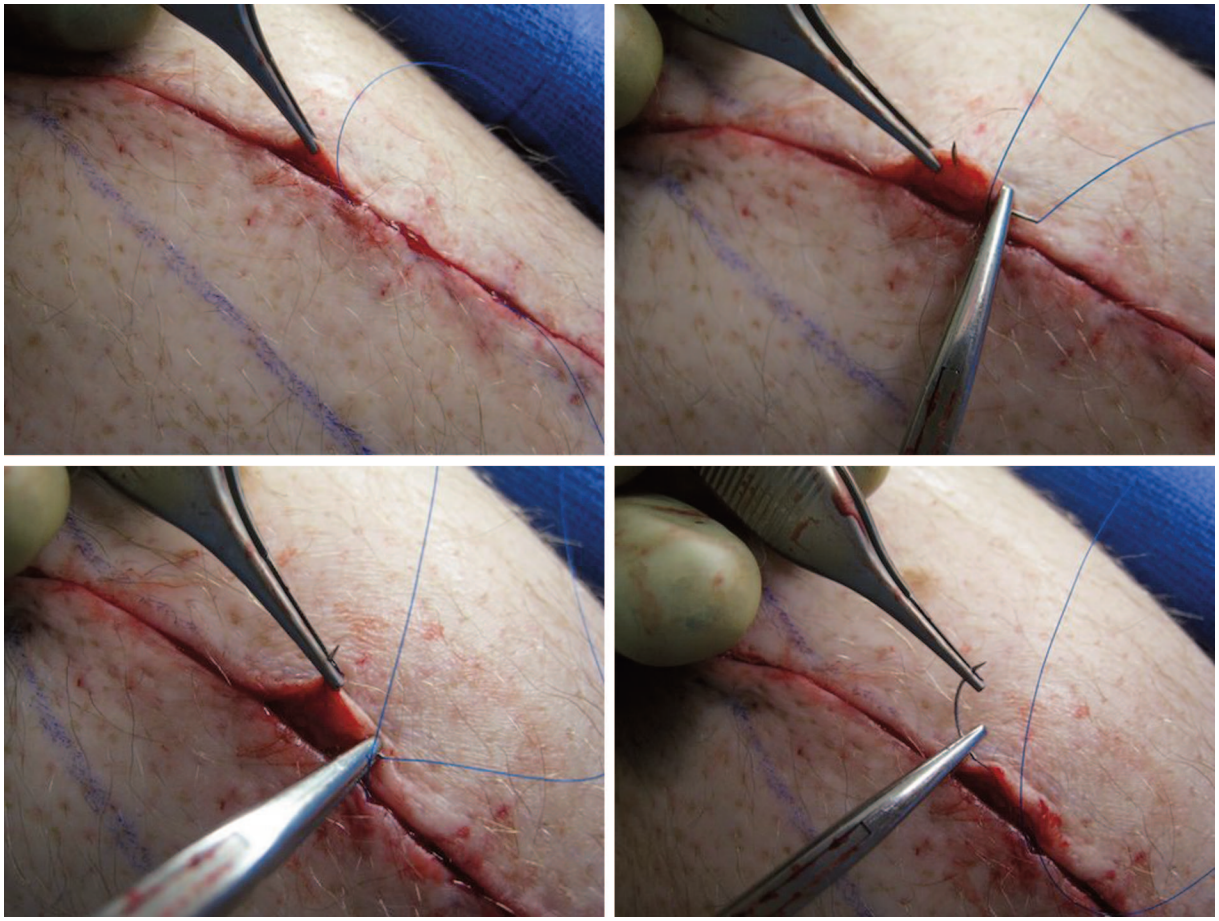

Fig. 1. (*Above, left*) Step 1: Eversion of skin using the Adson forceps, allowing visualization of the dermal-epidermal junction. (*Above, right*) Step 2: Introduction of needle at a 90-degree angle at the dermal-epidermal junction, with pronation of the wrist for a deep horizontal bite. (*Below, left*) Step 3: Stabilization of needle with Adson forceps. Note that the forceps do not touch the needle tip. (*Below, right*) Step 4: Replacement of the needle in the needle holder using Adson forceps, in preparation for the next throw.

maintain their efficiency in the operating room while still fulfilling their role as teachers.

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The Availability and Content Analysis of Melanoma Information on YouTube

Sir:

YouTube, created in 2005, allows users to view and upload video clips covering a diverse spectrum of topics.[1] Sabel et al. showed that 39 percent of patients with melanoma used the Internet to research their disease.[2] The aim of this study was to investigate the availability and content of video clips relating to melanoma on YouTube.

The search term "melanoma" returned 704 video clips on YouTube. We analyzed the 100 most relevant clips, as identified by YouTube. Irrelevant, duplicate, and foreign video clips were excluded, leaving 61 clips

Table 1. Origin of Clip, Nature of Production, and Presence of Specific Content

	Total No. of Clips Uploaded	Presence of Specific Content Areas (%)					
		General	Risk Factors	Diagnosis	Treatment	Prevention	Prognosis
Origin of clip							
Public	20	8 (40.0)	6 (30.0)	3 (15.0)	2 (10.0)	2 (10.0)	2 (10.0)
News or television	12	10 (83.3)	6 (50.0)	3 (25.0)	5 (41.7)	3 (25.0)	2 (16.7)
Medical professionals	21	14 (66.7)	6 (28.6)	8 (38.1)	7 (33.3)	4 (19.0)	4 (19.0)
Advertisement	3	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nonprofit organization	5	5 (100.0)	3 (60.0)	2 (40.0)	1 (20.0)	2 (40.0)	1 (20.0)
Nature of production							
Professional	43	31 (72.1)*	16 (37.2)	14 (32.6)	14 (32.6)*	9 (20.9)	8 (18.6)
Amateur	18	7 (38.9)	5 (27.8)	2 (11.1)	1 (5.6)	2 (11.1)	1 (5.6)
Total	61	38 (62.3)	21 (34.4)	16 (26.2)	15 (24.6)	11 (18.0)	9 (14.8)

*$p < 0.05$.

for our analysis. These 61 clips had been viewed 134,068 times. Content analysis assessed six areas, as follows: general information, risk factors, prevention, diagnosis, treatment, and prognosis. Statistical analysis using chi-square tests was performed to investigate whether topic areas discussed varied significantly between amateur and professionally made clips.

Our study revealed that most clips (62.3 percent) were uploaded by medical professionals, institutions, news broadcasters, government, or nonprofit organizations. The target audience of the majority of videos was the general public (95.1 percent). Most clips (70.5 percent) were professionally produced. Analysis of video clips according to the origin of clip, nature of production, and coverage of the six information areas is illustrated in Table 1. Professionally made clips had a tendency to cover with accuracy a wide range of topics relating to melanoma. The majority of clips (62.3 percent) covered general information relating to melanoma such as the definition, cause, signs, and symptoms. Risk factors for melanoma were also discussed in two-thirds of clips. A quarter of clips covered diagnosis and treatment. Prevention was not as frequently discussed in the clips (18.0 percent). Statistical analysis revealed that professionally made clips were significantly more likely to discuss general and treatment topics when compared with amateur clips.

Advantages of web-based information include better informed patients; improved doctor-patient relationships by sharing responsibility for knowledge and enhancing communication; more efficient use of time, as patients will have gained prior basic knowledge; adjunct to information provided by doctor; and a source of information for doctors to update their knowledge.[3]

However, concerns have been raised regarding an unregulated and uncensored video-sharing web site for dissemination of medical information.[4] A review of melanoma information using Internet search engines revealed a lack of complete information and inaccuracies in 14 percent of web sites reviewed.[5] Our study found two clips showing patients testifying cure of melanoma from alternative therapies with no scientific basis. The quality of information on the Internet remains the primary concern for opponents of this as a source of knowledge.[3] The impact on the doctor-patient relationship may also be affected in a negative way. Patients may present with clinically inappropriate requests or challenge a doctor's treatment plan.[3]

YouTube is a potentially valuable resource for the dissemination of information on the Internet. Our study reveals that available video clips contain information covering almost all aspects of melanoma directed predominately at the general public. With appropriate guidance of patients toward established clips from reputed institutions, understanding and awareness of this condition can be facilitated.

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