
Correspondence and Brief Communications

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ADIPOSE COMPARTMENTS OF THE UPPER EYELID: ANATOMY APPLIED TO BLEPHAROPLASTY

Sir:

In the first sentence of their article entitled "Adipose Compartments of the Upper Eyelid: Anatomy Applied to Blepharoplasty" (*Plast. Reconstr. Surg.* 113: 373, 2004), Persichetti et al. state, "Resection of prominent or herniated adipose fat compartments is a common procedure in upper blepharoplasty." Later in that paragraph they state, "We wish to define the anatomical landmarks of the adipose pockets of the upper lid whose resection may result in a youthful appearance of the upper lid and a better definition of the supratarsal fold." The discussion by Codner (*Plast. Reconstr. Surg.* 113: 379, 2004) praises the results demonstrated and especially the creation of the defined sulcus.

In examining Figures 6 and 7, I see a well-defined sulcus but a sulcus that is seemingly 1.2 to 1.5 cm above the lashes and an empty orbit, giving not a youthful look but, contrarily, a more cachectic look of aging. Furthermore, I see a mild ptosis, which has been unmasked by the removal of fat. In addition, I see some scleral show and an increased distance from the lid to the nasojugal fold, another sign of aging, but this is another story. This patient has had an in-the-box blepharoplasty.

One needs to spend very few minutes thumbing through the popular fashion magazines of today to see photograph after photograph of beautiful, young, vibrant people, and none of them has the empty-orbit look and deep tarsal fold shown in Figures 6 and 7. Instead they have fullness, precious fullness, which we take away with the in-the-box Castanares-like blepharoplasty.

Certainly a thorough knowledge of the anatomy of the eyelid is important, and the work of Persichetti et al. is to be applauded, and in a way, it's good to have this demonstration, along with the editorial regarding the need for out-of-the-box thinking, to bring this point home. In my own experience, incorporating 40 years of blepharoplasty and easily more than 3000 cases, I feel as if I've done the wrong operation. Now, with I hope more out-of-the-box thinking, I'm advocating a different approach, namely, correction of the problem with one of several options, including brow lift, orbital rim reduction, correction of the ptotic lacrimal gland if necessary, modest skin resection, and careful contouring of the fat as described in the excellent anatomical study about which I've been commenting. In some and increasingly more cases, I'm advocating fat injections just below the rim for more fullness, and I try to keep the fold no more than 8 mm above the lashes.

All surgery is in a state of evolution, and this evolution is guided and directed by looking carefully and critically at our own work and then using the same critical eye to examine and appraise our creative goals. Disappointment in our own results is what prompts evolutionary changes (and this too-long letter), but the enthusiasm for better results from this out-of-the-box thinking is what compels me to write and share my thoughts with you and your readers.

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REPLY

Sir:

We appreciate the letter submitted by Dr. Biggs concerning our article¹ and Rohrich and Pomerantz's editorial in the same issue of the *Journal*.²

Dr. Biggs points out that nowadays aesthetic surgery has radically changed its approach. Cutting and lifting are now being replaced by preservation and restoration of volumes. Fullness is synonymous with youthfulness.

Thinking "out of the box" implies the greatest level of self-criticism, and ideally the perfect knowledge of the subject concerned. In the surgical field, a definite, perfect knowledge cannot exist, and every step is the result of individual creative capacity or of multiple experiences made and shared by many individuals.

"In-the-box" Castanares blepharoplasty is a classic chapter in plastic surgery. It is the ground on which the young surgeon builds and a reference for the experienced surgeon in times of uncertainty. Progress requires well-established and consistent grounds to go ahead. Dr. Biggs's comments derive from exceptional experience, and every surgeon should learn from them.

Regarding our article, we never intended to suggest a new technique or to provide newer indications for intraorbital fat resection. We tried to scientifically investigate the orbital

structures that may be involved during blepharoplasty, particularly the adipose tissue.

An "in-the-box" procedure is performing surgery without perfect knowledge of the anatomy that is being operated on. The international literature lacks information about orbital fat, although it is involved in many diseases (e.g., Graves disease and orbital neoplasms) and in many surgical procedures.

It has always been described (*Castanares docet*) that there are two kinds of adipose tissue in the orbit (a deep yellow one and a paler one), but only the rare anatomical or biochemical study has tried to explain the reason for these differences. We tried to review the current information on this matter and to see "with our own eyes" from an anatomical and surgical viewpoint what happens in the orbit and which are the most common anatomical variations.

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GOLD IMPLANTS FOR LAGOPHTHALMOS

Sir:

I read with great interest the article by Bernardo Hontanilla, M.D., entitled "Weight Measurement of Upper Eyelid Gold Implants for Lagophthalmos in Facial Paralysis" (*Plast. Reconstr. Surg.* 108: 1539, 2001). Since the celebrated article of G. D. Smellie (1966), I have long developed and stressed the importance of the fenestrated palpebral gold weight, to avoid placement and extrusion without suturing.¹⁻⁸

I would like to congratulate Dr. Hontanilla for having confirmed the theory of the forces acting over the upper eyelid after the implantation of the weight, as I published in



FIG. 1. The "horse shoe" ("key hole") fenestrated (right) gold prosthesis.

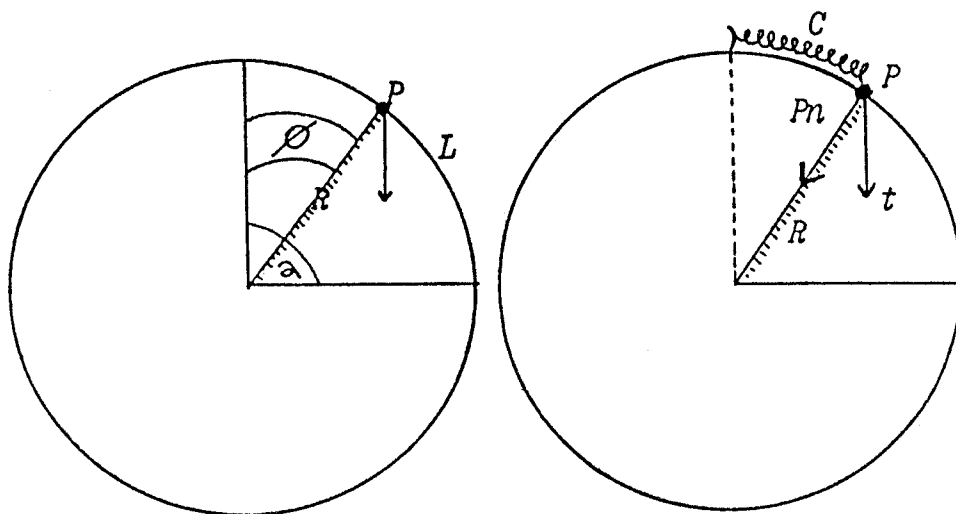


FIG. 2. Diagrams illustrating the mechanical law of functioning gravity on the lid with the inserted weight. (Left) The point P (the prosthesis) with the mass M and weight $P-mG$, in moving on a rigid body with circular section. The θ corresponds to a generic angle. L is the useful length of the arch. The α angle is the useful angle. (Right) The forces are as follows: (1) the weight (t); (2) the constant elastic force (C) produced by the elevator muscle in opposition to the force P ; the force Pt contains the force R opposite and equal; the force Pt reaches a balanced position until the spring is completely tended (when the weight stops on the inferior lid); and (3) the friction (viscous) proportioned to the speed.

1987 with Orlando and Faga in the *Proceedings of the Thirteenth National Congress of the Italian Society of Surgical Research*.⁶

After the weight of the Smellie article, my experience, beginning in 1967, was clearly stressed by Levine and Shapiro in *Facial Plastic Surgery* in 2000.⁹ In the second edition of *The Facial Nerve*, May et al.¹⁰ have kindly quoted my fenestrated gold weight article. The same argument was stressed in my letter to the editor in *Plastic and Reconstructive Surgery* in April of 1975.⁴ More recently, Z. Martini suggested the opportunity to control the "concavity" of the prosthesis (*Riv. Ital. Chir. Plast.* 27: 443, 1995). I would also like to remember the note I published in 1995 demonstrating our actual homemade "horse shoe" palpebral weight with "key hole" (Figs. 1 and 2).⁷ DOI: 10.1097/01.PRS.0000141485.83476.89

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REPLY

Sir:

I thank Dr. Micheli-Pellegrini very much for his comments about my article entitled "Weight Measurement of Upper Eyelid Gold Implants for Lagophthalmos in Facial Paralysis"

(*Plast. Reconstr. Surg.* 108: 1539, 2001). As can be seen in the article, I did not pretend to demonstrate how a gold weight falls when implanted in the upper eyelid using a new mathematical formula. Rather, the intent of my article was to explain a clinical finding, which is the discrepancy in closing the upper eyelid when the implant is over the skin surface of the upper eyelid or over the tarsus. The thesis of the article is to increase the implant weight (0.2 g) from those calculated during the exploration to produce good eye closure. It was a pity not to find Dr. Micheli-Pellegrini's reference from the Congress in Siena in December of 1987 to include in the article. DOI: 10.1097/01.PRS.0000141485.83476.89

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PRESSURE SORE OF THE HELICAL RIM: A NEW PROBLEM, A NOVEL TREATMENT

Sir:

We have recently treated a number of patients in the pediatric intensive care unit with pressure sores of the helical rim of the ear. These patients were ventilated in the prone position to improve respiratory function, which inevitably required them to be lying on one side of their head, directly on the ear. Although prone ventilation has been used for many years to improve lung function, it is only in the last decade that the oscillatory ventilator has been used,¹ which compounds the problem of helical ulceration.

From January to March of 2002, five patients were referred from the intensive care unit at Alder Hey Children's Hospital to the Department of Plastic Surgery with established or incipient pressure sores on their ears. There were three boys and two girls ranging in age from 4 months to 2 years and 8 months.

All the patients were being turned frequently and had been nursed on a silicone pad with intermittent use of a head ring to

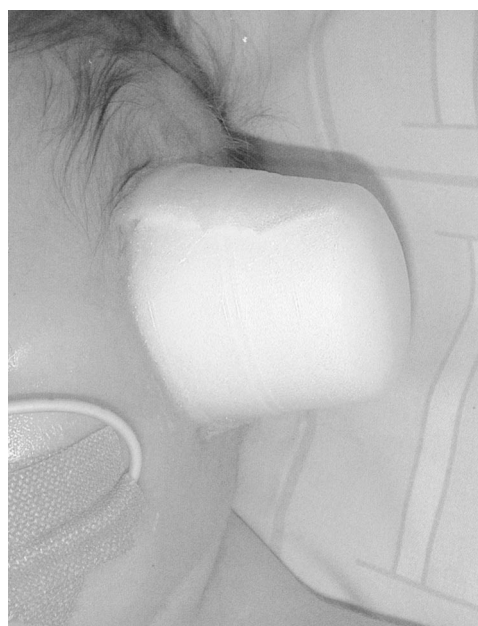


FIG. 1. Ear encased in Cavi-Care dressing.

relieve pressure on the ears. Despite these measures, they were developing pressure areas, either over the helix of the ear from the silicone pad or around the scalp from the head ring. To provide a cushion over the ears for the patients to lie on, we encased their ears in Cavi-Care conforming foam dressings (Smith & Nephew, Cambridge, United Kingdom) (Fig. 1).

The procedure is simple to perform and only takes a few minutes. A piece of cotton wool is inserted into the ear to protect the ear canal, and the helix is covered with paraffin gauze. A mold is prepared using a plastic cup split along the side with the bottom removed. The mold is placed over the ear with the child's head turned such that the ear is the most elevated structure. The Cavi-Care is prepared as per the manufacturer's instructions² and poured into the mold to encase the ear. Once the Cavi-Care is set, the mold can be removed. The dressing can be left in place for up to 7 days, after which time it is simply peeled off to allow inspection of the ear; it can be replaced if necessary. Patients were treated for between 1 and 3 weeks, and all patients showed either no progression of ulceration or im-

provement of ulceration during the treatment period, despite an often-worsening clinical condition (Fig. 2).

Although a head ring is often used to relieve pressure on the ear, if the ear is not placed in the center of the ring, a small area of the helix may be squashed between head and ring, making the development of a pressure ulcer more likely. Furthermore, pressure sores may develop on the scalp around the ear from pressure from the head ring. We have found that by encasing the ear in Cavi-Care conforming foam dressings, not only is the ear cushioned when the patient lies on that side, but if a head ring is used, the ear slots into the center of the head ring, thereby eliminating the risk of compressing a portion of the helix.

We have had good early results using Cavi-Care to prevent the progress of pressure necrosis of the helix.

Acknowledgment. No support of any kind was received from Smith & Nephew.

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FIG. 2. (Above, left) Pretreatment view of a 14-month-old patient with necrosis of right helical rim. (Above, right) One week after treatment with Cavi-Care, the patient shows signs of healing. (Below, left) Pretreatment view of 9-month-old patient with superficial ulceration of the left helical rim. (Below, right) At 2 weeks after treatment, the patient shows a healed ulcer.

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SCHWANNOMA OF THE TIP OF THE TONGUE IN A CHILD

Sir:

We report here a schwannoma with a rare location at the tip of the tongue in a 7-year-old child, an unusual age for this pathology. The schwannoma is a neurogenic benign tumor originating from the Schwann cells that surround motor and sensory nerve axons. The neoplasm possesses a rare malignant counterpart that infiltrates adjacent tissues. Any cranial or spinal nerve, other than the optic and olfactory nerves, may give rise to schwannomas.

Between 25 percent and 45 percent of all schwannomas occur in the head and neck region, but only 1 percent show an intraoral localization. The tongue is the most frequent site of occurrence, with the tip being the least affected part.^{1,2} Schwannoma is most frequently diagnosed in the 25- to 55-year age group, and there is no sex predilection.^{3,4}

A 7-year-old boy was referred to our department for a tongue swelling that had been present for 1 year. Examination of the oral cavity revealed a 1-cm, firm, nontender mass on the tip of the tongue. His medical history was unremarkable. The remainder of the head and neck examination revealed no other abnormalities. With the patient under general anesthesia, the mass was excised. Histologic sections showed a cellular lesion beneath the surface epithelium (Fig. 1), Antoni type A and B areas in the myxomatous stroma (Fig. 2), and palisading of the spindle-shaped Schwann cells (Antoni type A pattern) (Fig. 3). The diagnosis was benign schwannoma. A confirmatory S100 immunoperoxidase stain was positive. The patient has no evidence of recurrence postoperatively.

Schwannoma is a benign, encapsulated neoplasm characterized by two basic tissue types. The tumor shows well-developed cylindrical bands of Schwann cells and delicate connective tissue fibers with a tendency toward palisading of the nuclei about a central mass of cytoplasm (Verocay bodies). This form is known as Antoni type A tissue, whereas Antoni type B tissue lacks the organoid, homogeneous Verocay bodies and consists entirely of fewer cellular and more randomly arranged spindle cells in a loose, myxomatous stroma.⁵

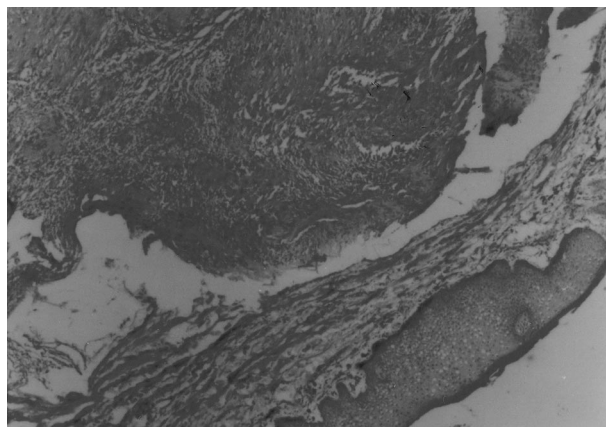


FIG. 1. Cellular tumor mass beneath the intact surface epithelium (hematoxylin and eosin stain; original magnification, $\times 4$).



FIG. 2. Antoni type A and B areas in the myxomatous stroma (hematoxylin and eosin stain; original magnification, $\times 10$).

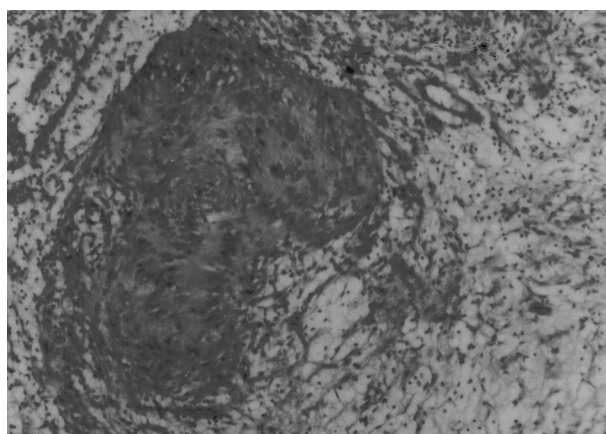


FIG. 3. Areas of palisading of the spindle-shaped Schwann cells (Antoni type A pattern) (hematoxylin and eosin stain; original magnification, $\times 40$).

Malignant change in head and neck schwannomas is rare, with the incidence varying between 8 percent and 13.9 percent.^{6,7} Occasionally older lesions show degenerative changes

consisting of hemorrhage, hemosiderin deposition, mild chronic inflammatory cell infiltration, dense fibrosis, and nuclear pleomorphism. This ancient schwannoma is benign but must be differentiated from neurofibrosarcoma and malignant schwannoma. On the other hand, in a long-term follow-up of more than 2000 patients who had undergone irradiation for tonsil and adenoid enlargement, Shore-Freedman et al.⁸ found 29 schwannomas. Therefore, these tumors can be radiation induced.

On presentation, schwannomas are almost always slow-growing, painless masses. The diagnosis is confirmed by microscopic examination. Because these tumors may still be somewhat similar to neurofibromas and other connective tissue masses, immunohistochemical staining may be used as an additional diagnostic tool. For this purpose, a neural crest marker antigen known as S100 protein may be used to help distinguish peripheral nerve sheath tumors from connective tissue masses.⁹

The differential diagnosis of possible malignant tumors (on the basis of data relating to speed of growth and clinical appearance of the neoplasm) and benign epithelial and connective tissue neoforations includes fibrosarcoma, malignant fibrous histiocytoma, leiomyoma, lipoma, neuroma, and adenoma.^{10,11}

Most cases present in the 25- to 55-year age group. Our patient was 7 years old. Tumors of the sympathetic chain make up 7.4 percent of tumors arising in children. De Campora et al.¹² observed 26 cases of head and neck schwannoma in pediatric patients (age range, 8 to 16 years) over a period of 19 years.

These tumors grow longitudinally along the length of the nerve, assuming a fusiform appearance but without compromising the morphological or functional integrity of the nerve. They can therefore be separated surgically from their nerve of origin.¹³ However, only 50 percent of these tumors have a direct relationship with a nerve.¹⁴ Complete excision is curative for schwannomas, as with other benign tongue masses. DOI: 10.1097/01.PRS.0000141485.83476.89

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SURGICAL SMOKE WITHOUT FIRE: THE RISKS TO THE PLASTIC SURGEON

Sir:

Plastic surgeons encounter surgical smoke routinely as a by-product either of electrocautery, laser ablation, or ultrasonic (harmonic) scalpel tissue dissection. Strictly speaking, "smoke" is composed of the products of combustion, while "plume" is a mix of combusted and noncombusted particles, the mix and size of which can vary with the device used. The hazards of smoke plume inhalation are real, proven both scientifically and clinically. They range from the production of chemicals estimated to be as harmful as cigarette smoking to the transmission of biological pathogens carried on the particles released. We describe a simple, cheap, and effective method of removing this surgical smoke plume from the operative field and discuss the advantages of such a system.

A standard piece of silicone suction tubing with an internal diameter of 7 mm was secured to a handheld probe using the string ties normally found binding a set of five "small" sterile gauzes. In this case, the probe was from an ERBE APC 300 laser unit, as shown in Figure 1. The open end of the suction tube was distanced 5 cm from the laser tip with a suction pressure of 30 kPa applied; this provided uptake of virtually all smoke plume in the operative field. No adverse effect on the cutting or coagulation performance of the equipment at any preset program was noted during surgery.



FIG. 1. A standard piece of silicone suction tubing with an internal diameter of 7 mm is secured to a handheld probe (from an ERBE APC 300 laser unit) using string ties. The open end of the tube is 5 cm from the laser tip and has a suction pressure of 30 kPa, to provide uptake of virtually all smoke plume in the operative field.

The risks of smoke plume exposure generated by these electrosurgery devices have been investigated since the 1980s.¹ The device used and the target tissue acted upon determine the particle size and mix. Electrocautery creates particles with the smallest mean size of $0.07\ \mu\text{m}$, laser tissue ablation generates larger particles, with a mean size $0.31\ \mu\text{m}$, and the largest particles generated are from the ultrasonic (harmonic) scalpel, at 0.35 to $6.5\ \mu\text{m}$.²⁻⁴ The smaller the particles, the further they travel. Smaller particles are more chemically based, but as the particulate matter increases in size, it poses more of a biological hazard, acting as a vector for pathogen transmission, with larger particles traveling up to 1 meter from the operative field.⁴

Electrocautery. More than 40 different chemicals have been identified in the smoke generated by electrocautery devices. Hydrocarbons, nitrates, fatty acids, and phenols are present in the greatest quantities, but of concern are the large amounts of acrylonitrile and carbon monoxide produced.⁵ Acrylonitrile can be not only inhaled but also absorbed through the skin, exerting its toxicity by liberating cyanide.⁶ Exposure levels of operating room staff have been estimated to be 1.0 to 1.6 parts per million; the current Occupational Safety and Health Administration has set an upper limit of exposure at 2.0 parts per million.⁷

Carbon monoxide levels may reach up to 10 parts per million in the operating environment, with 11 parts per million being the recommended limit of average exposure during an 8-hour period by the Canadian Federal-Provincial Advisory Committee on Environmental and Occupational Health.⁸ Interestingly, intraperitoneal levels of carbon monoxide may be as high as 1900 parts per million during a laparoscopic cholecystectomy. Carbon monoxide can potentially pass through to the patient's bloodstream and cause systemic effects.

Furthermore, electrocautery smoke, with its release of benzene, formaldehyde, and hydrogen cyanide, although in relatively small quantities, has been estimated to be as mutagenic as cigarette smoke.^{9,10}

Laser. The laser plume is potentially more hazardous than electrocautery smoke. Along with the numerous chemicals generated, the particulate matter has the potential to transfer pathogens. In addition to viruses, *in vitro* experiments have managed to culture bacteria from laser plume.^{11,12} Concern about the transmission of pathogens led to a study that identified human immunodeficiency virus DNA in laser smoke plume, demonstrating its transmission to cultured cells. This

infection lasted 14 days but was not present at 28 days, which suggests that the DNA had been altered in a way that prevented its propagation after infection.¹³ However, there have been case reports of human papillomavirus DNA being isolated from warts developing on unusual sites such as the face, nasopharynx, and larynx of laser operators who often remove plantar and anal warts.^{14,15}

Ultrasonic (harmonic) scalpel. Large quantities of cellular debris ($>1 \times 10^7$ particles/ml) are found in the plume generated by an ultrasonic scalpel. Fatty tissue has been found to generate 17 to 23 times more particulate matter than lean tissue.⁴

The ultrasonic scalpel is said to produce a vapor, not smoke, with the process being described as low-temperature vaporization. This is concerning because cool aerosols in general have a higher chance of carrying viable infectious material than higher-temperature aerosols. There is conflicting evidence about the composition of the aerosol between those who believe the particles are composed of living tissue and those who describe very few morphologically intact cells with little or no viability.¹⁶

The potential dangers of surgical smoke plume have been investigated for more than 20 years. Despite published studies demonstrating the mutagenic and thus potentially carcinogenic risk, as well as the infectious risks, the overall long-term outcome of exposure to surgical smoke plume is still not really known.

Reducing the exposure of surgeons and operating room staff is the most sensible solution. Unfortunately, the surgical mask is not effective in filtering smoke particles, but it can significantly reduce the amount of particulate matter inhaled. Of course, this will be compromised by a poorly fitting mask, and filtering varies among mask manufacturers.¹⁷ Commercial smoke evacuation systems installed in operating rooms are available, but these are relatively expensive, and we believe that removing the majority of smoke plume from its source (i.e., the operative field) is a more sensible approach.¹⁸ Handheld smoke evacuation devices have been described in the past, but as far as we are aware this is the first time such a device has been described for use with the laser with no adverse outcomes.¹⁹ We hope that more surgeons who routinely encounter the surgical smoke plume will adopt this simple, cost-effective evacuation method, bearing in mind the unknown, long-term potential risks of exposure.

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A NOVEL MODEL FOR SKIN GRAFT HARVESTING

Sir:

The acquisition of technical skills is becoming more difficult with ever-decreasing working hours and less operating time. In the United Kingdom, the drive to treat more patients (to reduce waiting lists) without compromising patient care means that trainees must achieve some competence before operating on patients. This has led to the development of artificial simulators to allow trainees to gain confidence before moving on to patients.¹

Harvesting of a split-thickness skin graft is a common plastic surgery procedure with a potentially high morbidity rate; it lends itself well to simulated teaching.² We present a model developed in our unit to train basic surgical trainees at the start of their rotation in the art of skin grafting.

Previously reported models have replaced synthetic materials with porcine skin, an excellent human skin substitute,³ and even with partially cooked lasagna.⁴ However, little consideration has been given to the anatomical correctness or "feel" of the simulation. We aimed to construct a simulator mimicking a human thigh donor site in its consistency, shape, and to provide a more realistic operating room experience (Fig. 1).

Under the supervision of senior surgeons, two junior trainees are assigned to a simulator. The assistant holds the outer layer taut (Fig. 2) to allow the surgeon to become familiar with harvesting split-thickness skin grafts with manual or power-assisted dermatomes under different conditions: knife/skin angle, tautness of skin, and pressure on skin. Figure 3 shows the different graft thicknesses obtained using the simulator. This model has been used successfully in surgical workshops, where it is also used to teach full-thickness skin grafting, subcuticular closure, and graft fixation using tie-over sutures.

We believe this versatile model allows a more realistic experience in the harvesting of split- and full-thickness skin grafts, where the surgical trainee acquires technical skills similar to those learned in the in vivo experience. Once satisfactory technique, competence, and confidence have been acquired, the surgeon may progress to patients.

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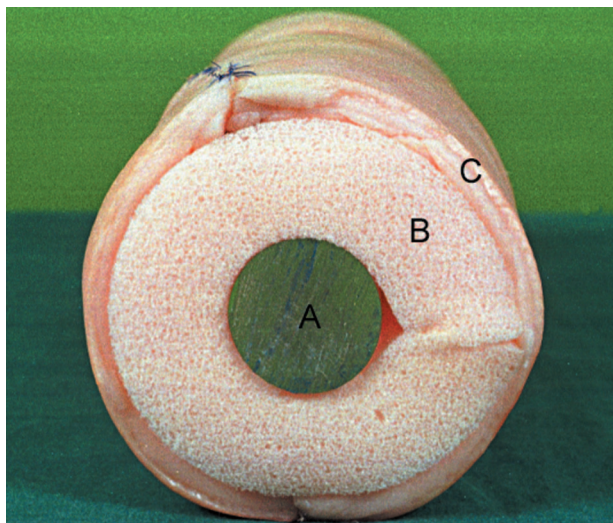


FIG. 1. Cross-section of three-layer simulator: A, inner layer of composite acrylic, representing bone; B, middle layer of composite foam; and C, outer layer of porcine skin stapled to itself to overcome the problem of laxity.



FIG. 2. Simulator in use.



FIG. 3. Different thicknesses of skin grafts obtained using the simulator.

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SALVAGE OF BACLOFEN PUMP POCKET INFECTION WITH MUSCLE FLAP

Sir:

Baclofen is an agonist of the inhibitory neurotransmitter gamma-aminobutyric acid. It inhibits spasticity by blocking excitatory neurotransmitters in the spinal dorsal horn. A programmable pump for continuous infusion of intrathecal baclofen is now widely used with increasing success, and it has shown great efficacy and safety.¹⁻³ This treatment modality is not, however, without complications. Several have been reported. The most common complications leading to explantation of the pumps are skin breakdown and infection at the pump implantation site.¹ Pump pocket infection, as reported in the literature, cannot be effectively treated without pump removal.^{2,3}

A 37-year-old man developed a persistent vegetative state with diffuse spasticity after surgical resection of a third ventricular low-grade astrocytoma. After a successful test with intrathecal baclofen injection (Lioresal; Medtronic, Inc., Minneapolis, Minn.), a programmable baclofen pump (SynchroMed Infusion System; Medtronic) was inserted for continuous intrathecal administration. Three months later a purulent discharge from a draining sinus at the superior border of the pump developed. It did not respond to antibiotic therapy. Since continuation of intrathecal baclofen administration was critical to the patient, and since the high cost of the pump precluded its prompt replacement, it was judged that a salvage attempt was highly indicated. The ipsilateral rectus abdominis muscle was elevated on its inferior dominant vascular pedicle and wrapped around the pump, com-



FIG. 1. (Above, left) A draining sinus at the superior margin of the implant is indicated by the arrow. (Above, right) The baclofen pump is placed directly over the caudal anterior surface of the muscle. The refill site is indicated by the arrow. (Below, left) The cephalad portion of the muscle is folded over the pump to achieve complete coverage. (Below, right) The baclofen pump is refilled.

pletely covering it and covering the exposed portion of the catheter as well. Abdominal skin was then approximated, leaving a small portion of exposed muscle overlying the refill site, which was covered by a split-thickness skin graft. Continuous intrathecal baclofen administration was never discontinued. Three months later the pump's refill site could be easily identified manually for pump refill (Fig. 1). There were no signs of recurrent infection during the 5-month follow-up period.

Wound infection is a dreadful complication in the presence of a foreign implant. Despite aggressive antibiotic treatment and débridement of infected surrounding tissues, the standard management of an infected implanted foreign material includes removal of that material.^{4,5} However, such an approach might not be applicable in situations where the infected implant is vital to the patient or whenever its removal might result in serious complications and extensive morbidity.⁴ The implant may also be too costly to be readily replaced. Careful scrutiny of the wound, débridement, and coverage of the implant with a vascularized muscular flap are appropriate in certain situations.⁶ The ability of the muscle flap to control infection and decrease bacterial colonization has been proven experimentally and demonstrated extensively in the clinical practice.⁷

Baclofen pump pocket infection, although rare, may be devastating. Recently, Kopell et al.¹ suggested a subfascial implantation of the pump in an attempt to prophylactically reduce the risk of infection in children. Subfascial implantation provides greater soft-tissue coverage, but this technique does not allow complete coverage of the pump by the

muscle; therefore, in our opinion, it is not suitable for controlling established infection. Given our previous experience in salvaging infected vascular prosthetic grafts using wrap-around muscle flaps to completely engulf the foreign implant,⁴ the use of an inferiorly based rectus abdominis muscle wrapped around the pump was the most logical alternative in attempting to salvage a precious and costly prosthetic device. Identification of the pump's refill site by palpation for later pump filling was a main concern. However, muscle coverage by a split-thickness skin graft over the refill site, instead of primarily approximating the abdominal skin, proved to be highly practical and extremely convenient.

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MASSIVE WEIGHT LOSS AFTER BARIATRIC SURGERY: FRIEND OR FOE?

Sir:

Bariatric surgery, such as gastric banding, is nowadays considered the accepted standard in the treatment of mor-

bid obesity. Patients have often unsuccessfully attempted several conservative treatment regimens, such as various diets in combination with physical activity. Thus, surgery with the effect of an anatomical burden for food intake is most often the last resort in this patient group. The result is a dramatic weight loss of more than 100 pounds within a few months (Fig. 1) in many cases. The primary goal of reducing weight is then reached, with a successful outcome for the bariatric surgeon. It is obvious, however, that this intermediate stage is highly unsatisfactory for the patient. There is a massive redundancy of skin localized mainly around the lower abdomen, upper arms, and thighs. In addition, there is often a marked ptosis of the breasts. This results in new medical problems, such as sweating and eczema in skin folds. Therefore, most patients request further surgery to remove excess skin and restore an aesthetically acceptable body appearance. To address all of these problems, multiple operations are required, with a high cost burden for the patient and the accompanying risks of additional surgery. Even in countries with a very generous medical welfare system, such as Austria, not all of these operations are covered by the insurance companies. With the rising incidence of morbid obesity and subsequent bariatric interventions, our department is increasingly confronted with this problem. Despite the undisputed beneficial effects of weight loss in this patient group, we believe that thorough information about the sequelae of bariatric surgery is inevitable and that the plastic surgeon should be included at the very beginning of the treatment program. In addition, on the basis of our own experiences, we plead for a slow to moderate rate of weight loss, since then skin laxity is less severe. With an integrated treatment approach (bariatric surgery, plastic surgery, motivation for physical activity, and psychological support), disappointing experiences for the morbidly obese patient can be kept to a minimum and the chances for an optimal treatment result are increased.

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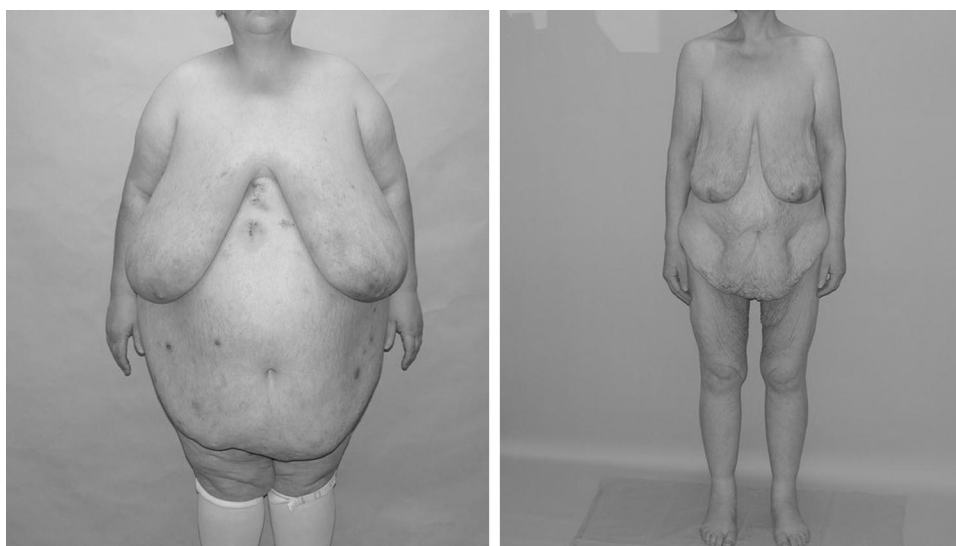


FIG. 1. (Left) Morbidly obese patient immediately after implantation of gastric banding. (Right) Appearance of the same patient after 15 months and a weight loss of 140 pounds. Note the massive redundancy of skin around the lower abdomen and thighs and the marked laxity of the breasts.

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THE TREATMENT OF BURN DISEASE IN THE HIPPOCRATIC ERA

Sir:

Western medicine sprang from the archipelago that surrounds Greece, in the Aegean Sea. Hippocrates, the son of Heraclides (460 to 377 B.C.), is considered the most prominent representative of ancient Greek medicine.¹ A series of medical treatises, written by Hippocrates and his well-trained pupils, together with the famous "Aphorisms"² and the monumental "Oath,"³ was compiled under the general title "Corpus Hippocraticum" (Hippocratic Collection) in a single body during the Alexandrian era (third century A.D.) for the Library of Alexandria. Hippocrates based his medical system on the theory of the three elements (Fig. 1). According to this doctrine, the physician is part of a tripartite relationship⁴ formed by the patient, who is a psychosomatic entity, the disease, which is governed by natural rules, and the physician, who is thought to be nature's helper and servant of the medical art. Hippocrates wrote a whole chapter on burns, which today are in the field of plastic surgery, in his book "Peri Elkeon"⁵ ("About Ulcers"). Burns were systematically described as "kavma" or "pyrikafston." Despite the severity and high mortality rate at that time, he describes precisely and in detail minor burns and their local therapy. Hippocrates teaches the necessity of knowing the nature of diseases and whether they can overcome the natural defense mechanisms of the body. The physician should therefore take precautions

for all patients to predict "those who will eventually die and those who will survive."⁶

It is of interest that although he refers to the symptoms,⁷ he does not consider them to be a consequence of the disease and suggests therapeutic measures only for the burn wound. However, describing the progress of the disease, Hippocrates realized the significance of loss of fluids from the burn surface by pointing out in his book "Peri Himon"⁸ ("About Humors") that "fluids (exudates) coming out of the vessels are forming blisters, as in burn wounds, and should be emptied" and advised as treatment "lots of fluids and diluted honey by mouth for the patient." In his fourth book, "Kat' Itrion"⁹ ("In the Medical Office"), which is similar to the operating theater of today's medicine, he clarified local treatment of wounds under aseptic conditions. He demonstrated that wound management and dressing changes should be "as quick as possible, painless, comfortable, and presentable, while the bandage should be soft, light, and clean." He urged his colleagues to work under as aseptic conditions as possible and to wear clean and properly tailored garments.⁹

He advocated lavage with lukewarm water to prevent pain and promote healing, since "all superficial uncovered burns become irritated." He used sodium chloride in the form of seawater to prevent wound infection. He also used wine, preferably red, for any wound because it combined alcohol and styptic substances. He described numerous extracts containing wine and roots of various plants, such as oak, pumpkin plant, and so on. He also used nonirritating ointments made of fat, wax, and olive oil spread on clean sheets of cloth, resembling tulle gauzes, as used for the first time in the 1940s.

Hippocrates also described the occurring septicemia as the condition where "the dried veins are trying to pull in liquids and thus acute fever, increased pulse rate and trembling of the jaws (rigor) occurred. . . . In major burns, spasm and tetanus are poor prognostic signs . . . finally, rigor with delirium leads to death."¹⁰

Finally, according to the Hippocratic Aphorisms, surgery remained the ultimate solution for treatment (Fig. 2), since "what drugs do not cure, iron may cure; what iron doesn't cure fire may cure; and all other diseases which cannot be treated by fire should be classified as incurable."¹¹

In conclusion, all these astonishing abilities of Hippocrates to describe and cure diseases derive from the fact

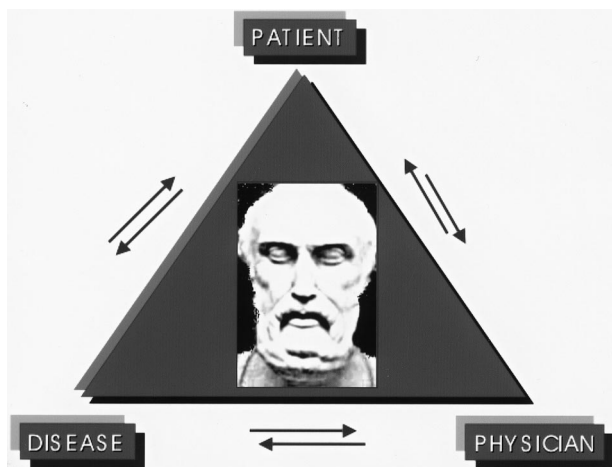


FIG. 1. Hippocrates based his medical system on the theory of the three elements: patient, disease, and physician.

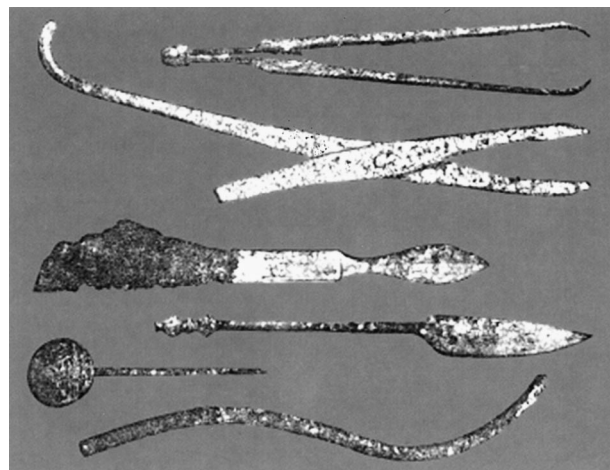


FIG. 2. Surgical instruments—forceps, scissors, osseotome, scalpel, drill, and elevator—used in wound management in the Hippocratic era.

that he defined medicine as a science away from any of the religious views that dominated during his time. "Some of the arts are hard to learn and beneficial for those who use them, a fountain of well being for the common people but of bitterness and sorrow for the professionals Of these arts there is one the Greeks call 'Iatriki' (medicine)."¹²

Note. This letter is based in part on an historical lecture presented by John D. Ioannovich at the 13th Annual Meeting of the European Association of Plastic Surgeons, in Crete, Greece, May 30, 2002. Prof. Ioannovich died on October 6, 2003.

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NYLON TAPE AS A GANGLION LASSO

Sir:

Ganglia are the most common tumor in the musculoskeletal system.^{1,2} They are cystic lesions thought to arise in myxoid degeneration of the connective tissue of joints and tendons.^{2,3} Invariably there is contact with joint capsules or tendons. The main cyst is associated with numerous adjacent microcysts that are either cystic offshoots of the main

cyst or millet-size satellite microcysts in the adjacent joint capsule or tendon sheath. Excision of the main cyst with preservation of the surrounding microcysts accounts for the high recurrence rate of up to 20 percent following ganglion surgery. Secondary ganglia form from the retained microcysts.¹ Radical ganglionectomy, with excision of the main cyst and a large circular collar of normal joint capsule or tendon sheath around the base of the ganglion, is thus recommended to incorporate the pseudopods and satellite ganglia so as to avoid recurrence.¹⁻⁴

Clear visualization and dissection of the base are imperative in ganglion surgery. Surgical dissection of ganglia often leads to rupture, as ganglia are fragile because they are tense with fluid and lined with a thin capsule. We utilize a length of nylon tape to facilitate atraumatic dissection. The nylon tape acts as a atraumatic lasso, allowing progressive concentric dissection to the base via lateral mobilization of the ganglion from side to side, and increasing depth of dissection until the base is clearly dissected (Fig. 1). There is no need to grasp the ganglion lining with hooks or clamps, so the risk of ganglion rupture is avoided. Clear visualization of the ganglion base allows for its excision together with a cuff of tissue.

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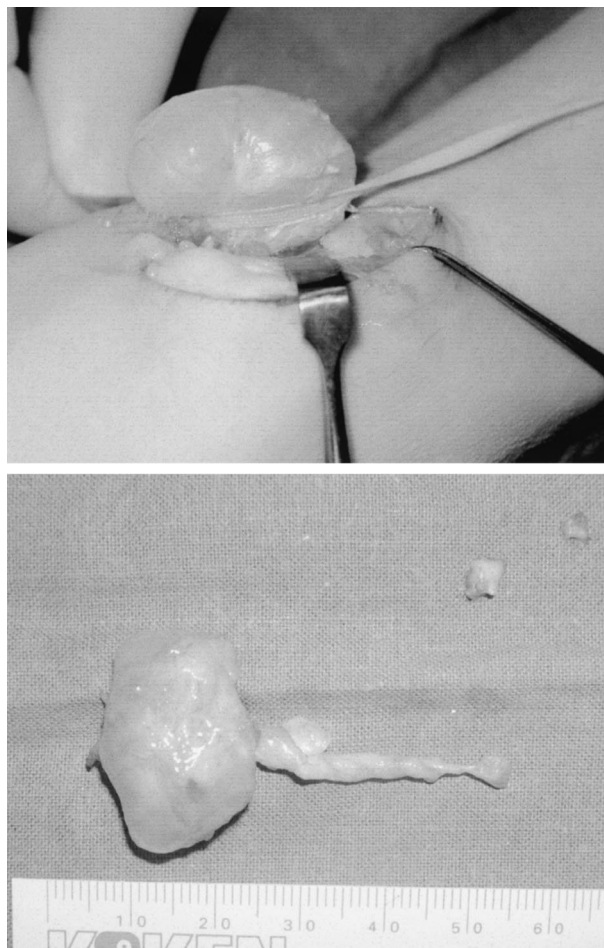


FIG. 1. (Above) Nylon tape is used as a lasso to allow atraumatic traction of the ganglion cyst. (Below) Complete excision of the ganglion with its base without rupture. A cuff of tissue is also taken from around the base.

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REDUCING SURGICAL HAZARD ASSOCIATED WITH THE KLEINERT'S "CAT'S PAW" RETRACTOR

Sir:

The double-ended claw or Kleinert's "cat's paw" retractor is a simple but widely used instrument that provides versatile soft-tissue retraction. While one retractor claw is buried in the wound, however, the opposite claw remains exposed within the operating field. This poses unnecessary but significant risks of sharp injury and infection to surgeons, particularly assistants, who are handling the instrument. The cost of replacing this commonly used retractor in all surgical sets, however, would be prohibitive.

We have found that the use of surgical tape temporarily wrapped around the exposed claw at the time of surgery reduces the risk of such injury (Fig. 1). This precaution not only provides safer practice but also allows surgeons to optimize use of the instrument without being distracted by attempting to avoid injury from the exposed claws.

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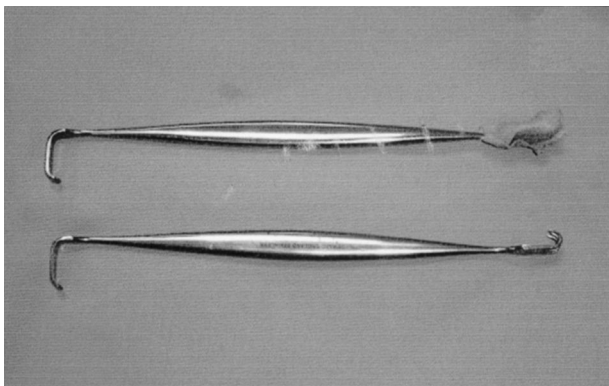


FIG. 1. Kleinert's "cat's paw" retractor protected with surgical tape (above) and an unprotected retractor (below).

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HANDMADE SUCTION DEVICE WITH SMALL PIECES OF MICROSPONGE TO KEEP THE DIFFICULT ANASTOMOTIC SITE CLEAR IN MICROVASCULAR SURGERY

Sir:

Performing microvascular anastomoses in very deep locations is often difficult, particularly when the microsurgical site is flooded by blood or when profuse heparinized saline is used during intravascular washing. When a conventional suction drain or catheter is used during microvascular anastomosis, there is a danger of trapping and suctioning vessels and surrounding tissues inside. A few reports have been published to overcome this problem, but their ideas have not resolved these problems perfectly.^{1,2} Therefore, we propose a simple handmade microsurgical suction drainage device for microvascular surgeons to use to minimize or overcome such problems.

We constructed a handmade catheter, stuffing the tip and side holes with small pieces of microsp sponge (M.Q.A., Inami Co., Japan). The catheter used was 10 French in diameter (Fig. 1). By placing this catheter beside the vascular anastomotic site, the vessels and surrounding tissue were not sucked or trapped inside the suction catheter, and abundant blood and saline were sucked gently and with ease. The working area was kept clean and microsurgical work could be performed smoothly (Figs. 2 and 3).

This handmade catheter is very useful and practical in microsurgical anastomoses, particularly with internal thoracic vessels for breast reconstruction and superior thyroid vessels or superficial cervical vessels in head and neck reconstruction without neck dissection.

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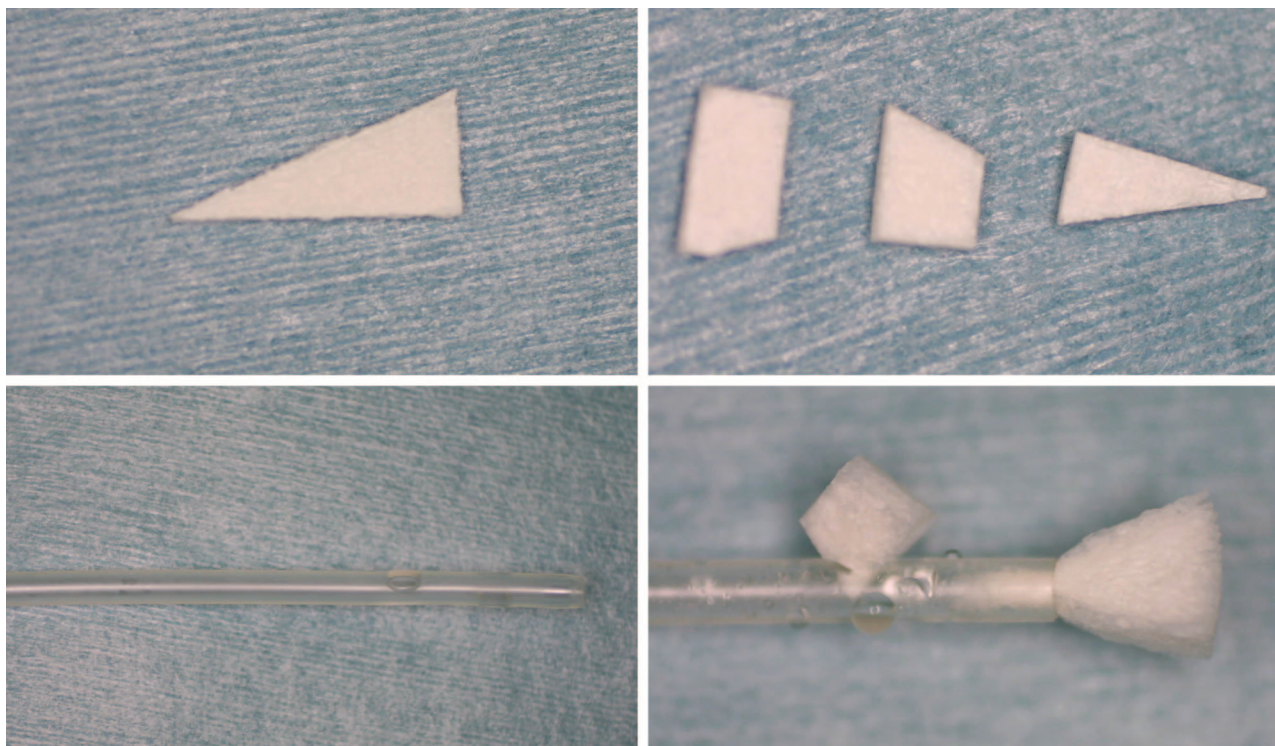


FIG. 1. How to assemble a suction device with small pieces of microsp sponge: (*above, left*) microsp sponge; (*above, right*) microsp sponge cut into small pieces; (*below, left*) suction catheter (10-French diameter) with small holes at the tip and at the side; (*below, right*) completed suction device. Small pieces of microsp sponge fit well into the small holes of the catheter, because the microsp sponge expands after water is dripped into it.

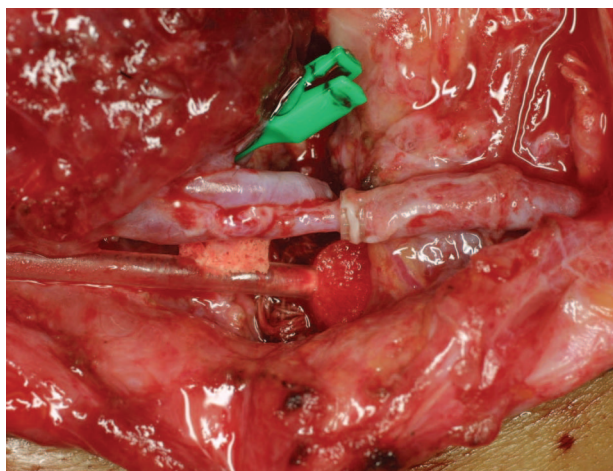


FIG. 2. The suction device is placed beside the anastomosed vessels. The device functions well because vessels are not trapped inside.

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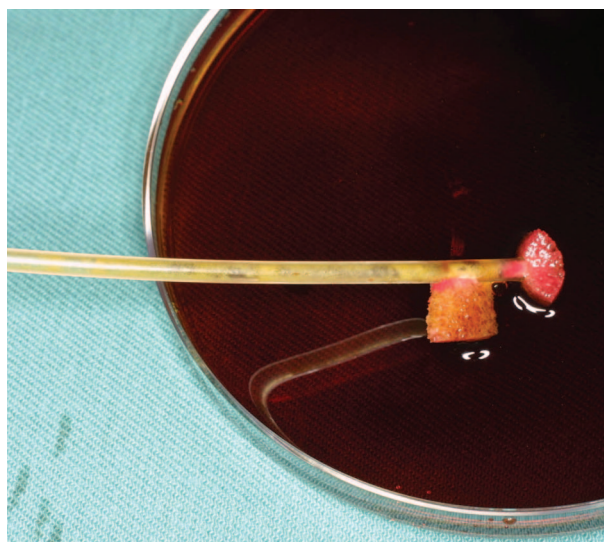


FIG. 3. The catheter is able to suck fluid (colored by iodine) after the microsurgery procedure shown in Figure 2.

A SPONGE MODEL FOR FLAP SURGERY

Sir:

Flap surgery is routinely used to cover tissue defects and is one of the main tools of plastic surgery. However, a nonliving model does not exist for thorough understanding of skin biomechanics and for studying the basic prin-

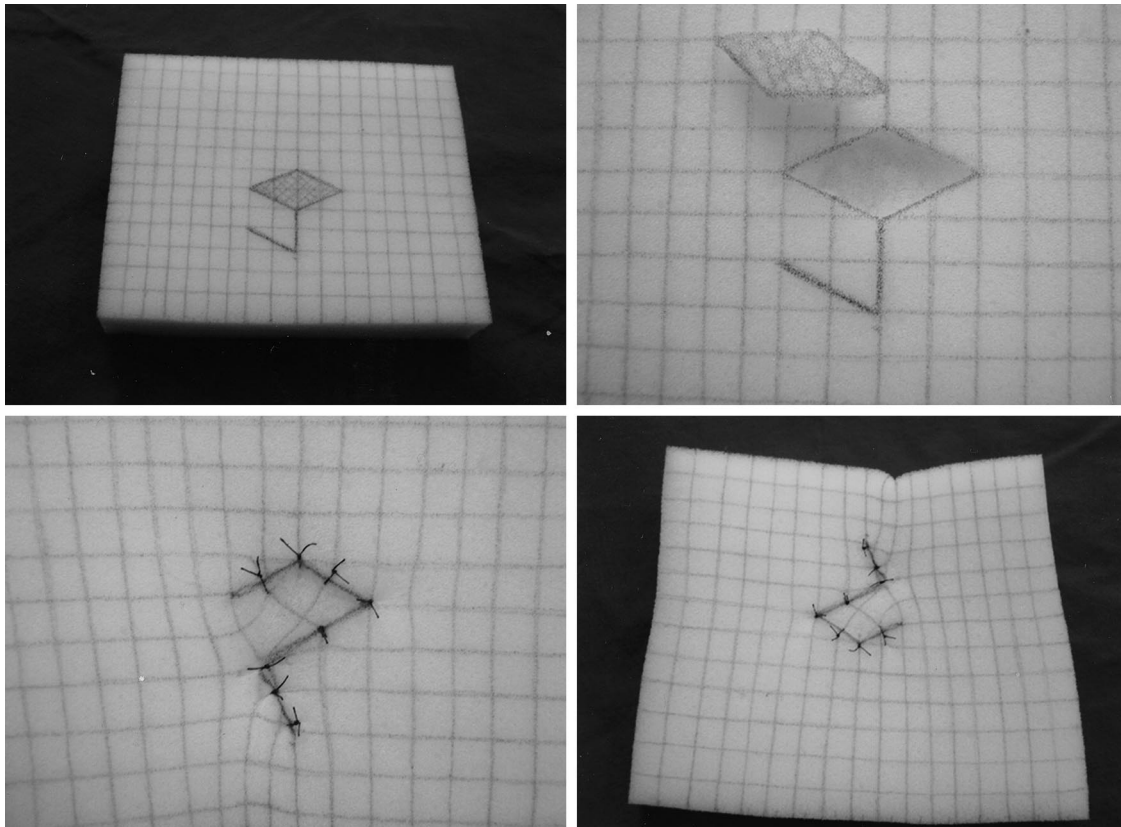


FIG. 1. (Above, left) Appearance of simple sponge block on which representative relaxed skin tension lines are drawn and a Limberg flap is designed. (Above, right) Close-up view of the excised sponge model. (Below, left) Completed Limberg repair and close-up view of the sponge model. (Below, right) Gross appearance of completed flap repair on which deformations and line irregularities are clearly seen.

ciples of flap techniques, such as rotation, advancement, and transposition. The loss of skin elasticity in cadaver models and the complete difference in animal models make these models unsatisfactory.^{1,2} The best model should undoubtedly closely resemble human skin and subcutaneous tissue.^{2,3} These ideal models would be constructed using bioengineering and stem cell technologies, but these are far from being cheap and practical. Nevertheless, a true understanding of the biomechanical structure of flaps and testing of flap dynamics are only possible in living cases, which is also impractical. Materials used in surgical training should be three-dimensional and easily accessible. Simple sponge materials meet these criteria and can be used for surgical skill improvement. They can be used as perfect models, especially by residents whose aim is to understand basic local flap principles such as skin flap mechanics, creeping, and relaxed skin tension lines.^{2,4} With these simple models, new flaps can be designed and the interaction of biomechanical features with relaxed skin tension lines can be easily foreseen (Fig. 1). Various flaps, such as mucoperiosteal flaps in cleft palate surgery and classic flaps in cleft lip surgery, can be mimicked and practiced on simple sponges for resident education. We use simple sponge blocks in our clinic, and after creating defects on them, we test new flap opportunities. We thus have a clear indication of how new designs will work on the human body.

We recommend three-dimensional sponges for all trainees and flap discoverers for their availability and handiness for working on.

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DOG BITES IN OAKLAND, CALIFORNIA

Sir:

In their editorials, Goldwyn¹ and Rohrich² remind us of the devastating consequences that can occur when dogs bite children. Several severe canine mauling cases in the senior author's practice prompted us to review the demographics of dog bites in Oakland, California (population 399,000), and Alameda County (population 1.4 million). All dog bites reported in 1999 (the most recent 1-year period for which complete data were available) were examined. Dog bites treated by physicians are reported to Alameda County's vector control division and were the basis of this study.

The incidence of dog bites in Oakland and Alameda County were 0.87 per thousand per year and 0.80 per thousand per year, respectively. The peak months for dog bites were May, June, and July, with an average victim age of 30 years. Forty percent of the bites occurred in children, and the most commonly bitten area was the head and face; the majority of adult bites occurred on the hand and wrist. These statistics are similar to those in other reported series, such as Borud and Friedman's findings for dog bites in New York City in 1998.³

The most alarming finding was the breed of dog responsible for the bites: pit bulls accounted for 20 percent of the 1122 total bites, German shepherds for 15 percent, Rottweilers for 12 percent, Labrador retrievers for 11 percent, and Chow dogs for 8 percent. These five breeds accounted for 66 percent of all reported dog bites in Oakland and Alameda County in 1999. It is impossible to tell what proportion of dogs in these areas are pit bulls because canine registration data are not computerized. However, it is clear that these breeds account for a disproportionate number of severe dog bites in children.

On the basis of these data, we recommend separation of large-breed, aggressive dogs from families with small children. DOI: 10.1097/01.PRS.0000141485.83476.89

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STRESS-RELATED GASTRIC BLEEDING AFTER RHINOPLASTY

Sir:

Stress-related gastric bleeding is a severe complication seen especially after major operations in critically ill patients, with mortality rates reaching 25 to 88 percent.^{1,2} Although occult bleeding is very common in this population, clinically important bleeding, as defined by the need for blood transfusion or a significant alteration in the vital signs, occurs in only 0.6 to 6 percent of patients.^{3,4} This incidence is highly associated with the severity of the patient's illness, and gastric bleeding is rarely seen after aesthetic procedures, which are essentially performed on healthy patients. Thus, the use of prophylactic drugs for stress-related gastric bleeding is unnecessary and not cost-effective unless a history of gastric ulcer is present.

Recently, we performed a septorhinoplasty under general anesthesia on a 38-year-old healthy woman with no history of previous gastric symptoms. She was discharged with oral diclofenac sodium (100 mg/day) the day after surgery, and nasal packing was removed on postoperative day 3. She was readmitted with nasal bleeding 2 days later and was hospitalized with a hemoglobin level of 9.3 g/dl, compared with a preoperative level of 13 g/dl. Nasal repacking was performed, but the oozing did not stop in 24 hours and the hemoglobin level decreased to 7.2 g/dl, with hematemesis, melena, and symptoms of gastric irritation. A nasal endoscopic examination did not clarify the source of the bleeding, but an upper gastrointestinal endoscopy revealed active erosive gastritis and an antral gastric ulcer with coagulum. The patient was treated conservatively and the bleeding did not recur. After 1 week in the hospital and a 5-unit transfusion of erythrocyte suspension, the patient remembered her previous gastric symptoms that she had forgotten to tell us about during the initial visit.

We would like to emphasize the importance of a detailed preoperative history for every patient. A few simple measures, such as prophylaxis with a proton-pump inhibitor and avoidance of anti-inflammatory drugs, would have prevented this catastrophe if the risk to the patient had been realized preoperatively. Nevertheless, nausea, hematemesis, and melena might all ensue after nasal or gastric bleeding, and we must keep in mind (and perhaps rule out) the possibility of the latter before accepting the former as the source. DOI: 10.1097/01.PRS.0000141485.83476.89

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PHARYNGEAL FLAP SURGERY: LONG-TERM OUTCOMES AT THE UNIVERSITY OF IOWA

Sir:

The authors of "Pharyngeal Flap Surgery: Long-Term Outcomes at the University of Iowa" (*Plast. Reconstr. Surg.* 113: 475, 2004) are to be congratulated for the arduous task they undertook in reviewing patient folders accumulated over 31 years (from January of 1970 to December of 2000). Their selection criteria requiring evidence of periodic speech evaluations limited their subject pool to 172 patients from an unreported total number of cleft palate patients. That is, they identified cleft palate patients whose folders contained records of speech evaluations administered 2 to 5 months after pharyngeal flap surgery, an operative procedure traditionally regarded as appropriate to help with speech resonance distortions. The criteria of time and test limit the consideration of surgical outcomes in that the reader does not know how to think about the proportion of identified subjects in the total diagnostic caseload. Their reference to a 1976 publication identifies the range as 25 to 43 percent of functional failures in cleft palate closure. Unfortunately, poor functional outcomes from palatoplasty (15 to 70 percent) were reported in 1999 by Davani et al.,¹ although there is information that differs markedly (0.13 percent over 20 years).²

In addition, later speech evaluations for these selected patients are grouped according to the time that elapsed since the velopharyngeal flap surgery. Caseload attrition is a universal problem in following patients through their maturing years. However, in view of the reduced number of subjects over time and the lack of individuation of specific patients, one must question whether the statistical outcomes represent the efficacy of the surgical treatment over time. Also, although the authors indicate that there were no significant differences over time, there was a significant *t*-value for reduced hyponasality among the children between the 2- to 5-year evaluation and the 5- to 8-year evaluation ($p = 0.045$).

Yet other queries arise in that the delineation between two speech resonance problems, hypernasality and hyponasality, are assessed on a scale of 1 to 6 and velopharyngeal incompetence is assessed on a scale of 1 to 3. The tabular presentation of the data is a bit misleading, as one cannot read down the columns with equanimity. The numbers of "count" present a series of numbers that do not follow those provided in the text. There is yet another complication in the dual use of the terms "incompetence" and "insufficiency" and in the

overlap in meaning among the terms "hypernasality," "hyponasality," and "velopharyngeal incompetence."

Lastly, as reported by Scheuerle et al.,³ there is significant evidence of underlying neural and neuromuscular differences among patients with congenital cleft palate. It would be of great interest to know whether the patients whose folders served as the source for the information in the Iowa study had speech therapy during the time that lapsed since the velopharyngeal flap surgery, and if so, what kind and how much. It might also have proved helpful to know what other types of behavioral intervention had been provided (e.g., audiological assessment and treatment for hearing loss).
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REPLY

Sir:

In our article, "Pharyngeal Flap Surgery: Long-Term Outcomes at the University of Iowa," we attempted to avoid the trap of trying to summarize every aspect of our patient population and focus on the single question of the functional durability of the pharyngeal flap in the long term. Dr. Habal et al.'s first concern regards our lack of a broad discussion of our group over the last three decades and the percentages of overall cleft children who ultimately required intervention for velopharyngeal incompetence. We believe this question has been answered elsewhere in the literature and was beyond the scope of our inquiry, but it is one that would be an excellent future topic for another discussion. Dr. Habal et al.'s second concern involves caseload attrition over time. Although we agree on the universality of this problem, we argue strongly with the indictment that the statistical outcomes do not represent the efficacy of the surgical treatment. This may be due to an issue of clarity on our part.

First, outcomes from each time period were reported as a total group. For instance, all of the patients in the 2- to 5-year

group were summarized and all of the patients in the 5- to 8-year group were summarized. The 2- to 5-year group was clearly larger than the 5- to 8-year group, but these groups were not directly compared using all patients.

Instead, each time period was compared against the other using only patients with data in each category. For instance, when the 2- to 5-year group was compared with the 5- to 8-year group, only those patients with examinations in both time groups were used. In practical terms, any patient who did not come back for a 5- to 8-year follow-up was excluded from the direct comparison between groups. In this way, we directly compared outcomes with the individuation cited by Dr. Habal et al. We believe these findings clearly establish long-term pharyngeal flap durability. This clarification also likely explains the confusion mentioned regarding "counts" that "do not follow" those provided in the text. This confusion is likely a result of trying to look at both analyses at once.

Dr. Habal et al. mention a number of concerns regarding terms used in cleft speech evaluation and the integer systems used in their grading. We would agree that overlap does exist between some of the terms, such as "hyponasality," "hypernasality," and "velopharyngeal competence." We also agree that using slightly different scales for one of these resonance measures can be confusing, but we would argue that it is certainly not misleading as is suggested. These terms are now well established by our speech pathology colleagues. The scales themselves were initially chosen as a practical matter, and validations of these criteria are established and are available in our cited literature.

Finally, Dr. Habal et al. express interest in postsurgical treatments. The extent of these treatments is beyond the scope of both the article under discussion and this reply, but each patient underwent evaluation and treatment by speech therapists, pediatric otolaryngologists, and audiologists before it was decided that surgery was required. The percentage of patients with velopharyngeal incompetence who go on to fail initial speech therapy and require surgery is an interesting question unto itself and is currently undergoing evaluation at our institution. The same supportive groups offered virtually all patients services postoperatively, varying by patient need as well as parental involvement and follow-up. We concur that these issues are all important and continue to highlight the complexity of caring for this patient population. Each deserves its own individual question to be asked within the research community.

Cleft palate speech remains an area of great importance and challenge. We appreciate the interest of our colleagues and hope that this communication serves to clarify our original presentation and explain the focus of the work as it was offered.

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AVOIDING AREOLAR DISTORTION IN DRAPE PATTERN REDUCTION MAMMAPLASTY

Sir:

The evolution of reduction mammoplasty has been marked by a series of revolutionary techniques. After each of these emerging trends, waves of modifications and rethinking of details have helped to optimize our surgical results. Most recently, we have assimilated the vertical pattern reduction mammoplasty and utilized it in many cases. However, we still rely on the inferior pedicle techniques for larger (>1000 g) procedures. To eliminate the vertical scar and limit complications of "T-junction" breakdown, we frequently utilize a drape or "apron" pattern similar to that described by Yousif et al.¹ Upon review of our results with this technique, distortion of the shape of the nipple-areola complex was noted to be a common occurrence (Fig. 1). We report here the modification that we have adopted to help prevent this suboptimal result.

At the beginning of the procedure, the native areola is marked with a washer that is 38 to 42 mm in diameter. The remainder of the inferior pedicle, including the excess areola, is deepithelialized before resection of fat and glandular tissue. The inferior pedicle is then placed under the superior breast flap, which is brought down like an apron to meet the new inframammary crease.¹ The patient is then placed in the seated position, and the proposed site for the new nipple-areola complex is confirmed and marked with the same circular washer (Fig. 2).

Once these markings are in place, an ellipse with a width of approximately one half the diameter of the circle is drawn within the circle (~2 cm); the long axis of the ellipse parallels the ipsilateral clavicle (Fig. 2). The ellipse is then used as the cut-out pattern instead of the original circle. Due to the inferolateral pull of the pedicle and remaining breast, the



FIG. 1. Typical areolar distortion seen in drape pattern reduction mammoplasty.

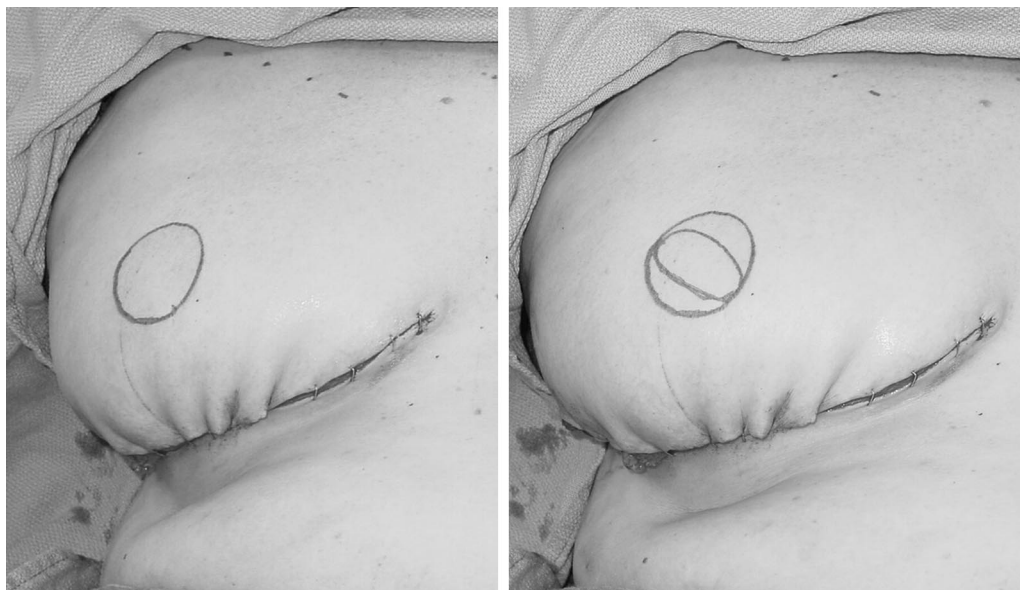


FIG. 2. Intraoperative design for modified nipple-areola complex inset.



FIG. 3. Immediate shape achieved using elliptical cut-out (*left*) and final long-term result (*right*).

ellipse opens into a circle, which allows for a more natural appearance upon inset of the new areola. Cutting on the original circular mark would result in an oblong opening that would translate into a distorted final areolar shape (Fig. 3).

In a drape pattern reduction mammoplasty, there is a natural tendency for oblong areolar distortion to develop. By utilizing an elliptical cut-out for inseting the new nipple-areola complex that parallels the ipsilateral clavicle, a circular opening is created. The foreshortened design compensates for the perpendicular gravitational pull and therefore results in both an immediately acceptable and long-lasting areolar shape (Fig. 3).

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REPLY

Sir:

Thank you for the opportunity to respond to Dr. Naffziger and Dr. Zook's letter on avoiding areolar distortion in the drape pattern reduction mammoplasty. I think it is a very nice letter.

I do feel that, in general, the vertical tension created by the closure of this technique or even the inverted-T technique creates the potential for vertical elongation of the final opening of the nipple-areola complex. This letter addresses that very nicely. Certainly the results shown by Dr. Zook and Dr. Naffziger attest to that.

My current technique of reduction mammoplasty always utilizes some type of vertical tension reduction to attempt to create a final circular incision and scar. My technique at the present time is to mark out the space of the proposed nipple-areola complex. I make a horizontal incision in the middle of that space that goes all the way through the soft tissue of the underlying flap. With that, there is a significant reduction in the vertical tension, and the horizontal incision opens up, eliminating the vertical pull on the closure on that site. I then re-mark a circle overlying that horizontal incision, which has now become more of an elliptical opening where the circle was marked, and once incised has limited vertical stretching, creating a circle as its final opening. I certainly think, however, that an elliptical incision as described by Drs. Zook and Naffziger is a very nice way of creating a circular scar, and as long as the vertical tension is removed somehow, I believe that either way is appropriate.

I congratulate Drs. Zook and Naffziger for their innovation and precision.

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SIMPLIFYING THE VERTICAL
REDUCTION MAMMAPLASTY

Sir:

I read with particular interest the article presented by Dr. Isik's group entitled "Simplifying the Vertical Reduction Mammoplasty" in the January 2004 issue of the *Journal (Plast. Reconstr. Surg.* 113: 162, 2004). As reduction mammoplasty has evolved over the decades, there have been many variations on "scar reduction" techniques. They all share the same shortfalls—they are gimmicky, do not work very well, are difficult for the inexperienced surgeon to master, and often result in less than acceptable outcomes in terms of symmetry and contour. With the exception of the Binelli technique, all are focused on more or less the same goal—eliminating the inframammary crease incision/scar. The irony of this situation is that it is not the inframammary scar that the vast

majority of patients find most objectionable. It is the vertical/oblique scar that connects the inframammary crease to the circumareolar scar. Also, the average reduction mammoplasty patient seeks foremost to gain relief of her physical symptoms and secondarily a pleasing shape and symmetry with correction of the preoperative ptosis. The inframammary scar is rarely an issue, unless the patient is predisposed to hypertrophic scarring or the surgeon allows the incision to track unnecessarily far into the axillary or presternal areas.

In critiquing the results obtained by Dr. Isik and his colleagues, I am sure I am not alone in finding their results to be wanting in a number of areas. Yes, there is no inframammary scar. There is also markedly inadequate reduction in cases 1 and 3, poor contour in case 1, gross postoperative pseudoptosis in cases 1 and 2, and frank ptosis in case 3. In addition, cases 1 and 2 demonstrate a degree of scarring in the vertical and circumareolar incisions that would certainly take one's mind off of an inframammary scar if one were present. If this is the best outcome that this technique offers, then how, exactly, is it superior in any way to a classic inferior pedicle approach using a Wise pattern with an inframammary scar? Certainly, control over the degree of reduction is superior with a "standard" approach, as are, in my opinion, postoperative symmetry and contour as well as correction of the preoperative ptosis.

This is in no way intended as a criticism of Dr. Isik et al. Certainly we need to continue to try new techniques; how else will progress occur? However, we also need to recognize and abandon those techniques that offer no real advantage. I fear vertical mammoplasty falls into that category.

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DIGITAL ANESTHESIA VIA A SINGLE
SUBCUTANEOUS INJECTION

Sir:

Regional anesthesia of digits is one of the most common procedures carried out by junior plastic surgeons. It is most frequently achieved by using a conventional ring block.¹ This method necessitates at least two injections and can be complicated by damage to the neurovascular bundles.² Single intrathecal injection³ has been advocated as an alternative method of digital anesthesia, but it has not gained pervasive use due to fear of flexor sheath infections and patient discomfort. The digital nerves are the most superficial structures on the volar aspect of the fingers, and this anatomical fact can be exploited to achieve regional anesthesia via a single volar subcutaneous injection.⁴ The method involves compression of the proximal phalanx between the surgeon's nondominant index finger and thumb, as depicted in Figure 1. A 25-gauge needle is introduced perpendicular to the skin at the base of the digit and advanced until just through the dermis. A 1.5- to 2.5-ml dose of 2% lidocaine (lignocaine) is then administered, after which a tourniquet is applied to the base of the finger.



FIG. 1. Anteroposterior view of a patient's right hand. The "X" depicts the point of local anesthetic injection.

We have been using this technique exclusively for digital anesthesia in elective and emergency cases, with no significant difference in terms of onset, degree, or duration of anesthesia when compared with traditional ring blocks. However, the single volar subcutaneous technique appears to be much less painful and is particularly valuable in multiple finger injuries. The only drawback with this technique is that it does not anesthetize the dorsal skin proximal to the proximal interphalangeal joint, but the nature of most digital injuries means that additional injections are rarely required.

We believe that this method is underutilized by junior trainees. Using a telephone questionnaire, we carried out a survey of plastic surgery residents (in 17 units in the United Kingdom) to ascertain their routine method of digital anesthesia. All 44 trainees contacted agreed to participate in the survey. Only 16 percent of trainees were aware that the technique existed. The finding of this survey confirms that the single volar subcutaneous technique has not yet gained widespread use. We believe that this method is superior to traditional ring blocks because it avoids multiple injections and potential damage to neurovascular structures, but there is a need to disseminate this information to junior surgeons.

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CHRONIC FINGER CONSTRICTION BY COMPLETELY EMBEDDED RINGS: ONE RING MAY HIDE ANOTHER

Sir:

Chronic ring injuries are rare. They consist of a chronic constriction syndrome of the finger and a progressive embedding of the ring. To our knowledge, 16 cases have already been reported in the literature.¹⁻¹⁶ We report another surprising case of multiple embedded rings.

A 63-year-old mentally disabled woman was brought to our emergency department for a suspected tenosynovitis of her left ring finger. The patient was unable to give any information concerning her injury.

On physical examination, the left ring finger was swollen with some serous discharge at the base of the digit. Two partially embedded rings could be seen (Fig. 1). There were no signs of vascular compromise. There was a moderate hypesthesia of the pulp and no active mobility beyond the metacarpophalangeal joint. On the plain radiograph of the digit (Fig. 2), three large embedded rings were identified, with bony erosion of the proximal phalanx. With the patient under general anesthesia, the two visible rings and one completely embedded ring were cut and removed.

The postoperative radiograph showed a persistent completely embedded fourth ring. The removal of this last ring with minimal soft-tissue trauma required the use of an



FIG. 1. Appearance of the finger on admission. Two partially embedded rings can be seen.



FIG. 2. Three rings are identified on the radiograph.

image intensifier. A biopsy of the tumefied tissues was undertaken, and the wounds were left open. Histologic examination showed an intense, nonspecific, chronic inflammatory reaction with overlying hyperkeratosis and orthokeratosis.

At 3-month follow-up, the wounds had healed and chronic lymphedema had decreased remarkably (Fig. 3). The pulp had recovered normal sensation. No active motion had been recovered, but passive motion was unlimited.

Magnetic resonance imaging of the affected digit showed a thick fibrotic reaction. Tendons were extremely thinned



FIG. 3. Appearance of the finger at 3 months.

and hardly discernible within dense fibrotic tissue (Fig. 4). At present, the patient is not disturbed by the reduced mobility of her finger and no other operative procedure has been proposed.

Chronic ring injuries are rare, and this entity remains unheard of for many surgeons. The injury is caused by a tight ring that gradually erodes the underlying soft tissues. A triggering event—traumatic or infectious—is seldom recalled. Authors have reported the embedding of a ring into the growing finger of a child^{2,9,13,14} and following a rapid weight gain.¹⁵ Patient neglect due to mental disability allows the injury to progress for months or years before medical care is sought. Nevertheless, some cases have been reported in the absence of mental illness,^{10,12} and another case of chronic ring injury treated in our department was that of a 50-year-old female laboratory assistant with no signs of mental illness.

As constriction evolves, chronic edema and soft-tissue dystrophy distal to the ring develop. Later on, skin heals over the ring, and the ring becomes partially or totally embedded. The ring is usually well tolerated and frank infection is rare.^{9,15} Bony erosion is sometimes severe, but spontaneous bony reconstitution is the rule after the removal of the ring.⁹ Neurovascular compromise is rare.⁵ In fact, slow embedding of the ring allows the neurovascular bundles to stretch and adapt until very late stages.

Tendons may be injured in advanced cases. Extensor tendons are injured more frequently as they are badly protected by thin dorsal soft tissues.

Recommended treatment is limited to the removal of the rings and local care. Delicate manipulation reduces the risks of iatrogenic injuries and fracture of the eroded phalanx. Antibiotics are recommended only in the presence of frank infection. A more ambitious treatment has been proposed with excision of granulation tissue, tenolysis, and arthrolysis.¹² This kind of treatment requires long-term postoperative care and reeducation. It is certainly the best treatment for young, motivated, and cooperative patients, which is rarely the case. Furthermore, definitive treatment may be delayed after initial removal of the ring. In fact, as shown in the case above, waiting a few months before definitive treatment allows local conditions to be more appropriate for delicate tendon surgery, reduces the risk

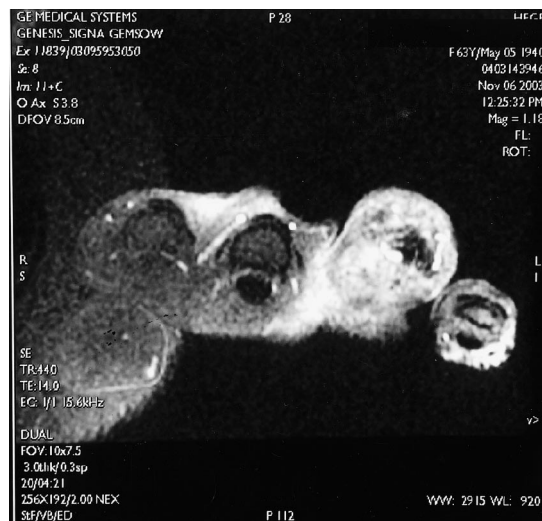


FIG. 4. Magnetic resonance imaging scan at 3 months.

of postoperative infection, and precludes the need for excision of granulation tissue.

Control radiographic analysis is mandatory, as with removal of all other foreign bodies. In fact, large rings may hide others. In case of completely embedded rings, the use of an image intensifier reduces soft-tissue dissection and ensures that no other foreign bodies are left behind.

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COUNTERING THE "ACCORDION EFFECT" IN FLEXOR TENDON REPAIR

Sir:

Flexor tendon injury is a common presentation in the hand surgery department. Zone 2 injuries are particularly difficult to treat. Technically, the sutures are difficult to apply because of the limited space. Similarly, there is less room for tendon gliding after the repair if the repair site is untidy and bulky.

We present a technique of applying sutures to flexor tendons further away from the wound surface, where there is more room, and then "guiding" them together to finally tie the knots. This has a dual effect of quick suture placement and reducing the effect of bunching by the core Kessler suture.

In the first instance, both ends of the profundus tendon are retrieved into the wound to their maximum length and anchored with 20-gauge needles to prevent their retraction into the flexor sheath. Each end of the tendon is taken in turn and an epitendinous suture (5-0 nonabsorbable monofilament) is placed initially in the posterior wall of the tendon in a continuous manner, as described by Silfverskiöld and Andersson.¹ Both ends of the suture are left free before their continuation onto the anterior wall later. No attempt is made to approximate the two ends at this time. The tendons lie apart from each other with multiple loops of epitendinous suture connecting them (Fig. 1). The core

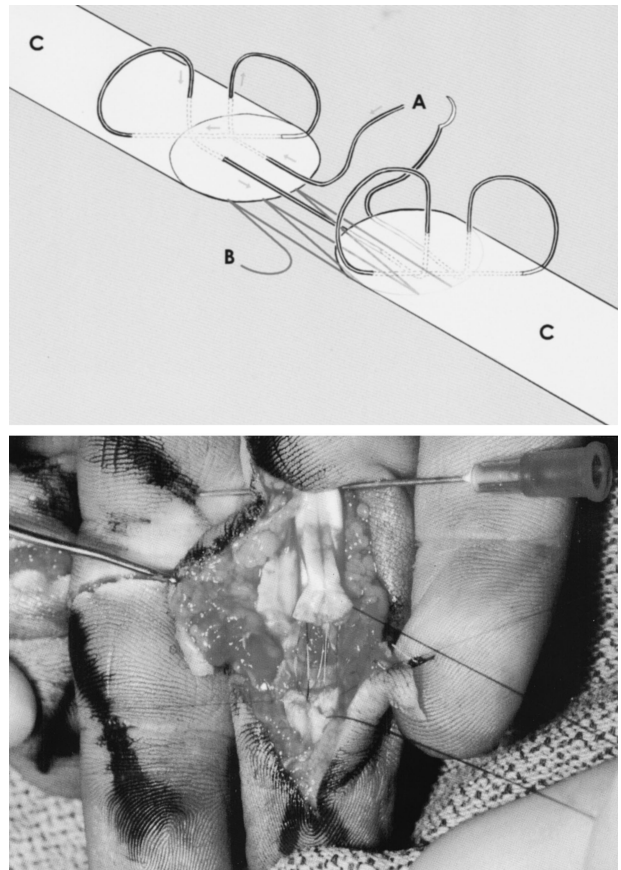


FIG. 1. A, Core Kessler suture 3-0; B, epitendinous Silfverskiöld 5-0 Ethilon; C, tendon.

Kessler suture is then placed (using a 3-0 nonabsorbable monofilament). The ends of the suture are again left free and not tied. The epitendinous suture is now pulled taut from both ends and held by the assistant. This has the effect of guiding the separated tendons into accurate approximation. The tension of the approximation is thus taken by the epitendinous suture in the posterior wall of the tendon (Fig. 2). The Kessler suture is then tied without tension, thus reducing the bunching effect of the tendon. The anterior layer of epitendinous suture is completed up to the starting point of the suture and the knot is tied to complete the repair (Fig. 3).

It has been acknowledged in studies that the modified Kessler suture technique and an associated epitendinous suture greatly improve the strength of the flexor tendon repairs.^{1,2} Sanders³ suggested an epitendinous first suture to reduce the tension on the Kessler core suture.³ Papandrea et al.² showed an increased strength of the overall repair by 22 percent in an animal model using these techniques. There is, however, a tendency for the tendon to bunch up like an "accordion" at the repair site if the knot is pulled too securely.²

We propose that our technique makes the placement of both the Kessler and epitendinous sutures for repair easy and quick. It maintains the principle of two sutures to give more strength to the repair. It also reduces the chances of bulkiness caused by the "accordion effect" at the repair site.

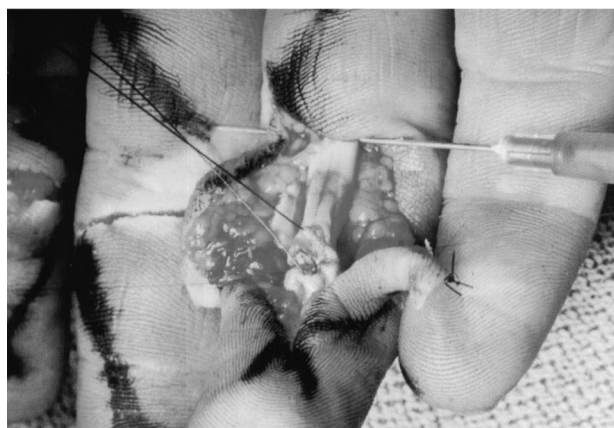
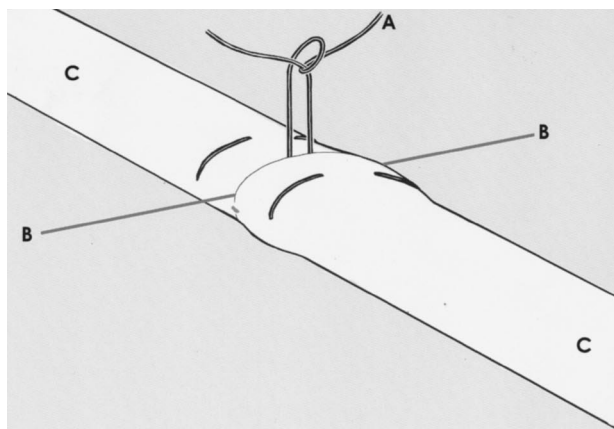


FIG. 2. The tension is taken by the epitendinous suture, and the Kessler suture is tied.

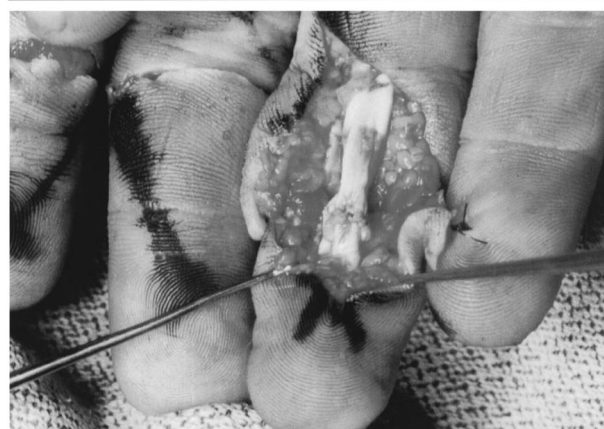
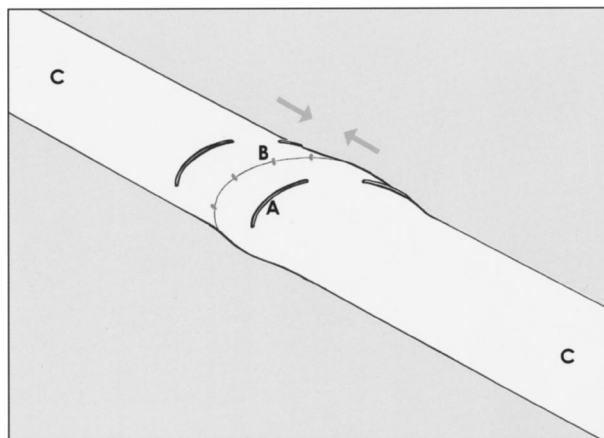


FIG. 3. Final closure with continuation of the anterior layer. There is minimal bunching of the anastomosis.

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IS NAIL GERMINAL MATRIX ABLATION ALWAYS NECESSARY IN A DORSAL REVERSE ADIPOFASCIAL FLAP PROCEDURE FOR FINGERTIP RECONSTRUCTION?

Sir:

We read with interest the article by Laoulakos et al. entitled "The Dorsal Reverse Adipofascial Flap for Fingertip Reconstruction" (*Plast. Reconstr. Surg.* 112: 121, 2003) and the well-written discussion by Netscher (*Plast. Reconstr. Surg.* 112: 126, 2003) that followed. First, we want to congratulate the authors on their article. However, we would like to add a small datum to the literature in this matter. Our letter also includes a correction concerning Netscher's discussion of this article.

It is known that crush injury to the nail bed or amputations at nail level can result in a deformed, unsightly nail, and when the injury is located proximal to the lunula, the residual germinal matrix must be removed to prevent bad shaping of the growing nail. To avoid this, ablation of the germinal matrix may be attempted at the time of injury or at a later stage as problems occur.¹ The authors pointed out the necessity of germinal matrix ablation in the Surgical Technique section of their article. This is an accurate application in their indication.

As a different indication, we observed that preserving the nail bed without matrixectomy could lead to successful results in amputations located at the lunula level and distal to it. As a result of this application, growing nail perforates the flap and comes out roughly 2 months later. In addition, with the help of soft-tissue support to the distal part of the finger, the nail grows almost normally. No infection or pain is observed during this process. Once the nail reaches acceptable limits, minor surgical revisions may be necessary to obtain the best cosmetic appearance. There are some reasons that make us prefer this method: (1) As the germinal matrix is not visible to the naked eye, incomplete excision may occur, resulting in the growth of a nail spicule, which may be uncomfortable, inconvenient, and cosmetically unappealing. (2) We think that the nail gives important functional support to the finger, even if it is deformed to a degree, so it must be protected as much as possible. (3) Most patients declare that they want to have a nail at the end of the operation. (4) If it is observed that the grown nail is severely deformed and completely useless, it can be simply excised by a local operation, as also indicated by Netscher.

Netscher, in his discussion, puts forward ideas in accordance with ours, but we do not agree with him in his opinion that "the turnover flap obligatorily must destroy the remaining nail" and that "it should probably not be used in treating significant distal crush injuries." In our opinion, the dorsal adipofascial flap can be used without matrixectomy in amputations at the level of lunula or distal to it. We agree, however, that matrixectomy is needed in amputations proximal to lunula. If matrixectomy is inevitable, chemical matrixectomy, which has a high success rate, must be preferred to decrease recurrences.

In conclusion, the chance of the patient having a nail must be preserved as much as possible.

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REPLY

Sir:

I am happy to add to the comments of Dr. Hoşnuter and colleagues from Turkey. In my discussion of the original article, I was simply restating the authors' methods where they said that special attention should be paid not to leave behind nail remnants to avoid problems from nail spicules growing back. Thus, it was my understanding from the technique of Dr. Laoulakos et al. in Greece that they always ablated the germinal matrix when performing a turnover adipofascial flap. The obligatory ablation of the germinal matrix was simply a statement of mine taken from their technique and perceived as a potential disadvantage of the turnover flap. I did state in my review that if there was a significant portion of this germinal matrix remaining with adequate nail bed support, then one would like as far as possible to preserve nail growth and that other, albeit potentially more complex, reconstructions might be required.

I am curious about the observation of our colleagues from Turkey that the nail plate will grow out through the flap without problems. This is an interesting observation. I assume that the nail plate is adherent to the original nail bed, which implies that sufficient sterile matrix must remain to provide adequate length of residual adherent nail to be functionally and cosmetically relevant. Presumably no adherent nail plate will actually grow out over the skin-grafted adipofascial flap. A skin-grafted surface does not generally provide a good adherent surface for the nail plate.^{1,2}

Dr. Hoşnuter et al. might comment on how little of the sterile matrix should remain behind before they would consider ablating the germinal matrix. I believe the intent of the authors of the original article was to perform this type of adipofascial flap reconstruction only when there was a small remnant of nail bed remaining, in which case they would ablate the nail to avoid a dysfunctional residual nail spike. I also wonder whether Dr. Hoşnuter et al. might address the appearance and adherence of the eponychial fold. Is this a new pseudo-eponychial fold or the original structure poking through? Supporting clinical photographs of the original injury with postoperative views would certainly be helpful to the reader.

I thank the authors, both from Greece and from Turkey, for providing us with practical clinical information.

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REPLY

Sir:

We thank Drs. Hoşnüter, Kargi, and Babuccu for their interest in our article, "The Dorsal Reverse Adipofascial Flap for Fingertip Reconstruction" (*Plast. Reconstr. Surg.* 112: 121, 2003). We appreciate the opportunity to respond to their correspondence, and we will try to clarify a few minor points.

As we state in our article, the dorsal reverse adipofascial flap we present "is used in transverse or dorsal oblique amputations at the level of the nail fold that leave intact only the germinal matrix of the nail." In light of previous work reporting that a functionally stable nail requires at least 5 mm of healthy nail bed distal to the lunula,¹ we propose ablation of the nail matrix remnants when facing amputations such as the indications mentioned above. Dr. Hoşnüter et al. state, "This is an accurate application in their indication. As a different indication . . ." When dealing with different indications, we use different flaps for reconstruction in an attempt to preserve as much of the nail bed as possible.

Hoşnüter et al. also state that with "the help of soft-tissue support to the distal part of the finger, the nail grows almost normally." We would appreciate it if they would share with us their experience with parrot beak deformity when bone support is missing and how they avoid this problem. Apparently, they are speaking about other types of amputations.

Hoşnüter et al., however, give us a new perspective on fingertip reconstruction. The growth of the nail through the flap, apart from some minor technical considerations (the germinal matrix is unroofed to ease the passage of the flap, or the skin over the germinal matrix is deepithelialized?), is intriguing and deserves more attention if a more acceptable appearance is to be gained. We are interested in their results and await the next report from Dr. Hoşnüter and his colleagues.

In conclusion, the nail must be preserved as much as possible.
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METASTATIC BRONCHOGENIC CARCINOMA OF THE HAND

Sir:

Although skeletal metastasis from bronchogenic carcinoma is common, the spread of cancer below the elbow is quite rare.¹ It represents less than 0.1 percent of all described cases of metastasis to bone.² The incidence of bony metastasis is 66 percent in breast cancer. Even though bony metastasis occurs in about 33 percent of lung cancer cases, this is limited to hematopoietically active bones. The collective literature presents 25, 13, 13, 11, 9, and 9 percent rates of bony metastasis in kidney, pancreas, rectum, stomach, colon, and ovary cancer cases, respectively.³

We present a case that is the first manifestation of bronchogenic carcinoma, mimicking inflammatory disorders, with metastases to the left index finger.

A 72-year-old man presented with a 2-month history of swelling and pain in the finger. He had smoked for 30 years. Local examination showed redness, induration, and mild tenderness in the middle and proximal phalanges of the left index finger (Fig. 1). Laboratory tests revealed a white blood cell count of 8800 and an erythrocyte sedimentation rate of 20 mm/hour. Levels of glucose, alkaline phosphatase, acid phosphates, urea, uric acid, and liver enzymes were all normal. Roentgenographic examination of the finger showed cortical erosion of the middle and proximal phalanges and a large amount of soft-tissue swelling. He was thought to have an infection, for which a broad-spectrum antibiotic was used for 14 days. Local management was continued for the same time without clinical improvement. Repeated roentgenographic examination showed progression of the cortical destruction of the phalanges. An incisional biopsy was performed, and the specimen was examined with immunohistochemical stains. The specimen was cytokeratin-positive diffusely, desmin-negative, S-100-negative, and MIC-2-negative, and was thought to have a primary focus as bronchogenic carcinoma. A chest roentgenogram showed a density in the left inferior lobe. Three-phase skeletal scintigraphy was performed, but other skeletal metastases were not found. The chest and whole abdomen were examined by computed tomography. A solid mass was found in the liver in the left inferior lobe posterior segment and a hypodense mass was found in the lung in the left lobe, medial segment (Fig. 1). The patient underwent ray amputation of the finger, which resulted in complete relief of pain. Histopathological analysis of this tissue revealed metastatic bronchogenic carcinoma (Fig. 1).

The earliest report of a metastasis to the bones of the hand was made by Handly in 1906.³ The collective literature presents 25, 13, 13, 11, 9, and 9 percent rates of bony metastasis in kidney, pancreas, rectum, stomach, colon, and ovary cancer cases, respectively.³

Bone is the third most common metastatic site for carcinomas. The majority of metastatic lesions involve the axial skeleton, with the femur as the most common long-bone site. Upper extremity lesions account for only 20 percent of metastatic lesions. Metastatic disease below the elbow is quite uncommon, and when present in the hand it often mimics infection.⁴

Clinical findings include typical signs of inflammation, pain, and erythema, which may lead to an initial clinical diagnosis of infection. Misdiagnosis is common and has included osteomyelitis, felon, gout, rheumatoid arthritis, reflex



FIG. 1. (Above, left) Lateral view of the hand. (Above, right) Chest axial computed tomography scan shows metastatic lung tumor (T.M.). (Below, left) Postoperative view of the ray-amputated hand. (Below, right) Hematoxylin and eosin stain shows giant cell (arrow) (magnification $\times 440$).

sympathetic dystrophy, and traumatic fracture.⁵ For the differential diagnosis, a physical examination should be performed initially, followed by laboratory tests, roentgenographic examinations including chest radiographs, bacterial and fungal cultures, local wound management, histopathological examinations, and, if needed bronchoscopy, bronchial washings, and skeletal scintigraphy. Radiographs usually reveal a lytic destructive lesion, although metastatic prostate carcinoma can produce a sclerotic lesion. Histologically, most metastatic lesions are easily distinguished from sarcomas.

Most metastasis reaches the skeleton by neoplastic tumor growth and venous invasion with initial deposition in the bone marrow. Further proliferation of the neoplasm results in a progressive replacement of the marrow spaces with tumor. Destruction of the adjacent trabecular, endosteal, and compact cortical bone usually ensues, with later soft-tissue involvement.⁶

Differentiation of metastatic lesions of the phalanges may be difficult. Signs of inflammation, such as swelling, heat, redness, and pain, are commonly present and lead to an initial impression of infection, rheumatoid arthritis, or gout. The differential diagnoses include gout, rheumatoid arthritis, felon, osteomyelitis, and osteoarthritis. Lytic, destructive lesions in the bones of the hand should be biopsied and cultured without delay in the absence of a known primary malignancy.

Treatment of documented metastasis should be directed at relief of pain and preservation of function. Amputation and ray resection are effective in providing palliation and local control of disease.⁵

This case shows that phalangeal metastasis from carcinoma of the lung can mimic inflammatory disease. Therefore, a differential diagnosis should be established among the in-

flammatory process of the hand from metastatic lesions.

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MANAGEMENT OF ADDUCTION CONTRACTURE OF THE THUMB WITH A PREFABRICATED RADIAL FASCIAL FLAP

Sir:

Adduction contracture of the thumb is quite common after burn and hand trauma involving the first web space. The usual method of treatment is release of contracture by making an incision at the maximum contracture site, releasing the adductor pollicis muscle, and, at times, performing a capsulotomy of the carpometacarpal joint. Resurfacing of the flap is needed in all cases.

Different flaps have been described for resurfacing, ranging from local to distant flaps. The first metacarpal artery flap,¹ the longitudinally split reverse radial forearm flap,² the dorsal transposition flap,³ tissue expansion of the dorsal skin of the hand,⁴ the posterior interosseous artery flap,⁵ and lateral arm free flaps⁶ are a few of the flaps that have been described.

We used a prefabricated radial fascial flap to resurface the defect in one patient (Fig. 1), with good results. The radial fascial flap was prefabricated in the first stage (Fig. 2). An incision was made in the forearm to expose the fascia. Skin flaps were reflected on either side, and fascia was exposed widely, over which a skin graft was applied and the skin was closed.

After 2 weeks, adduction contractures were released, and the prefabricated radial fascial flap was raised based on the radial artery and reversed to resurface the defect of the first web space that resulted after release of the contracture (Fig. 3). Postoperative recovery was uneventful (Fig. 4).

The advantages of this flap are as follows:

- The flap is thin and nonbulky in comparison to the standard radial artery forearm flap, the posterior interosseous artery flap, and other flaps.



FIG. 1. Preoperative view of a patient with severe adduction contracture.



FIG. 2. The radial fascial flap is prefabricated.



FIG. 3. Adduction contracture is released and resurfacing is performed using the reverse radial fascial prefabricated flap.

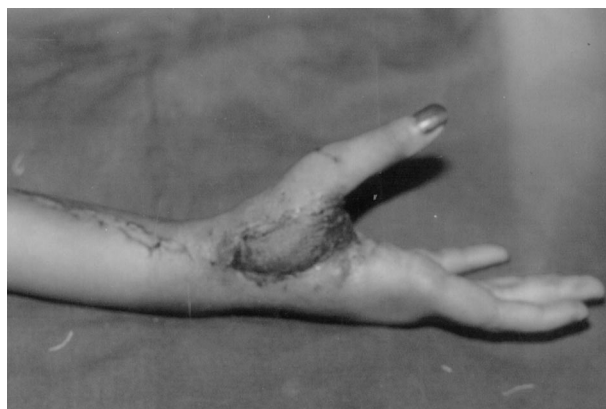


FIG. 4. Postoperative view of the well-settled flap.

- There is no skin-grafted donor site as in first dorsal metacarpal flaps, local flaps, standard radial forearm flaps, and posterior interosseous flaps.
- The flap is well vascularized because it is based on the radial artery.
- No microsurgical expertise is required, as with free flaps.
- No expensive material is required as in tissue expansion,

but the flap has the disadvantage of requiring a two-stage method.

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NAIL BED SECURED WITH A SYRINGE SPLINT

Sir:

Fingertip injuries are commonly seen in emergency departments. The nail plates are frequently avulsed and the nail beds are exposed. It is important to repair the nail bed and secure it during the nail regeneration to prevent painful deformities and promote patient comfort during subsequent dressing changes. If the nail plate is not replaced, the proximal skin fold is obliterated within a few days.

When the avulsed nail plate cannot be returned to its anatomical position or when it is absent, we use a synthetic material to splint the nail bed. Temporary metal foil stents and acrylic nails have been used for this purpose.^{1,2} In our emergency department, we use nail bed splints prepared from hypodermic syringe cylinders. We shape splints into the appropriate sizes for use as fingernail plates. We place them in the proximal skin fold and suture splints to the fold proximally and to the pulp distally. Our splints, cut from the syringe cylinder, are as hard and convex as acrylic and metal stents and similar to anatomical nail plates (Fig. 1). Splints are kept in place for at least 3 weeks, with acceptable results.

In summary, it is easy to prepare a nail bed splint from a hypodermic syringe cylinder, and it is a cheap and effective method for securing the nail bed after injury.

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FIG. 1. (Left) A nail bed splint prepared from a hypodermic syringe cylinder approximates the anatomical nail bed. (Right) Nail bed secured with a syringe splint.

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FUNCTIONAL RECONSTRUCTION OF THE THUMB AFTER RESECTION OF A SLOWLY GROWING CHONDROSARCOMA

Sir:

Chondrosarcomas are the most common primary malignant bone tumors of the hand. Unfortunately, the slowly growing character, low metastatic potential, and ambiguous histologic appearance complicate the differential diagnosis from their benign counterparts, the enchondromas.¹

The clinical importance of this differentiation lies in the more prompt and radical treatment required when dealing with chondrosarcomas.² Indeed, the traditionally advised treatment consists of ray resection or digital amputation. However, a conservative approach for phalangeal chondrosarcomas has also been proposed by Bovee et al.³ in view of the low metastatic potential.

A 71-year-old man was admitted to our clinic complaining of a swelling of 30 years' duration on his left thumb (Fig. 1). The patient had an active life working as a waiter and had no complaints of pain or inability to use his thumb. A plain radiograph revealed that the tumor was located in the first metacarpal bone and manifested features of malignancy, such as cortical penetration, soft-tissue extension, and poor margination (Fig. 2). Interestingly, although the metacarpal bone was totally destroyed, the tumor circumferentially wrapped the bone and provided a somewhat stable structure, thus allowing for the functional use of the thumb. An incisional biopsy revealed grade II chondrosarcoma. The preoperative work-up did not reveal any distant metastases. The frequent recurrences reported in the literature led to the decision to perform first ray resection, but the patient refused to lose his thumb for a disease that gave him neither pain nor any functional deficit. After the risk of recurrence was explained to the patient and consent was obtained, a more limited treatment strategy was planned.

The surgery was conducted with the patient under general anesthesia. The tumor was totally excised with the destroyed metacarpal bone, part of the thenar muscles,



FIG. 1. Preoperative view of the lesion.



FIG. 2. Preoperative radiograph of the lesion.

and the involved skin; the distal and proximal phalanges were left intact. The metacarpal bone was reconstructed using a segment of iliac bone graft, which was folded over itself on its cortical side to obtain sufficient strength. The graft was inserted in the defect, and the proximal and distal ends were placed inside the pockets created in the carpal bones and the proximal phalanx, respectively. The skin was closed primarily over suction drains. The postoperative course was uneventful, and the patient was discharged the next day. A splint was used for 6 weeks, after which phys-

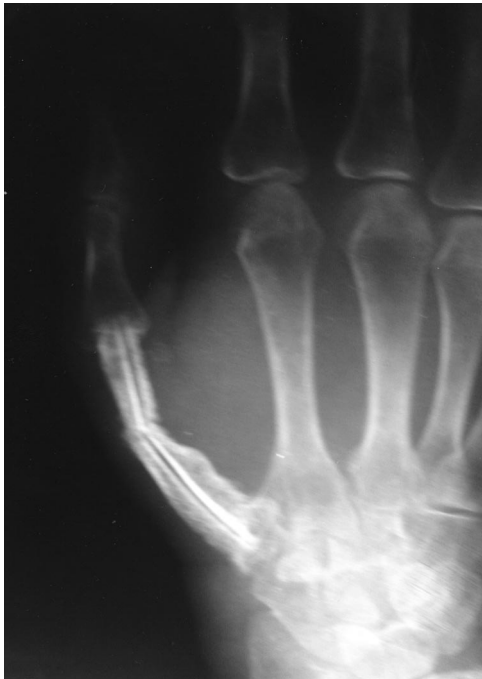


FIG. 3. Postoperative radiograph at 1-year follow-up. Note the healthy appearance of the bone graft. A clinically asymptomatic fracture site with callus formation is observed in the midsegment.



FIG. 4. The thumb is functionally active at 1 year post-operatively.

iotherapy was started. Histologic analysis confirmed the initial diagnosis and adjuvant radiotherapy was performed. At 1-year follow up, no recurrence was observed and the patient was satisfied with his functionally active thumb (Figs. 3 and 4).

Chondrosarcomas of the hand behave differently from those seen in other sites of the body. However, although they are locally aggressive tumors and should be treated radically, limited resection with immediate reconstruction can be an option in exceptional circumstances, such as in old and frail patients or patients who refuse amputation.

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ELECTROTHERMAL RING BURN

Sir:

A 36-year-old male farmer was referred to the plastic surgery trauma clinic with a week-old circumferential electrothermal burn of his left ring finger. The injury was sustained when a tractor battery short-circuited. Although such injuries may initially appear insignificant, they can have serious sequelae.

The patient had attempted to manually change the voltage of a tractor battery using a metal spanner. His wedding band touched the tractor gear stick while he was holding the spanner, creating a short circuit. The patient experienced a burning sensation in his finger, but no electrical shock. He immediately removed the wedding band and immersed his finger in cool water, applied a dressing, and continued working. The patient later noted blistering and discoloration at the base of his finger. When the wound showed no improvement after a week, he visited his general practitioner, who referred him to the hospital.

At presentation, a 3-mm-wide, circumferential, partial-thickness burn was noted on the patient's left ring finger. An area of erythema was confined to the wound edges. The digit was not swollen, had no evidence of vascular compromise, and had normal sensation and full range of motion. The burn was treated conservatively and healed 3 weeks after injury. At the 2-month follow-up, he had an area of hyperpigmentation



FIG. 1. (Left) A 3-mm-wide, circumferential, partial-thickness burn on the patient's left ring finger, with erythema of the wound edges. (Right) Two months after injury, following conservative treatment, the patient had hyperpigmentation at the base of the finger but no loss of hair follicles or sweating.

at the base of his finger, with no loss of hair follicles or sweating (Fig. 1).

Low-voltage sources such as car or tractor batteries are capable of producing large currents. Any metal object that comes into contact with a live terminal and a grounding will short-circuit the battery, resulting in rapid heating of the metal object and an electrothermal burn. The current may ground through the patient, as perspiration under jewelry serves as an excellent conductor, or, as in this case, through the tractor frame.

The depth of the burn sustained depends on the duration of contact and temperature. Previous authors have demonstrated that connecting a gold ring to a 24-V battery for 1 to 2 seconds can raise the temperature of the ring above 1000°C (melting point, 1064°C).¹ The result of such rapid heating invariably leads to at least a partial-thickness burn when the contact source is the patient's jewelry.

Of the 10 cases reported in the literature, eight involved male patients.²⁻⁵ Four of them were automechanics and four were amateur mechanics. Rings (six) and watches (four) were the two items of jewelry causing burns. Of the 10 patients, seven sustained deep partial-thickness burns, which were treated conservatively. Three patients required débridement and skin grafting for full-thickness burns, and one patient had a lateral escharotomy of his ring finger due to neurovascular compromise.⁵

The primary management of electrothermal injuries is to remove the source of heat and cool the affected area. When examining an injured finger, gross swelling, anesthesia of the digital nerves, or delayed capillary refill indicates that the burn is acting as a tourniquet and an escharotomy is indicated. The majority of reported cases healed with conservative treatment without any serious sequelae, but patients should be aware of the possibility of scarring, loss of hair follicles and sweat glands, and permanent skin pigmentation.⁴

Mechanics and electricians typically have strict codes of practice prohibiting the wearing of watches or rings during work. It is the amateur mechanic or worker, however, who features prominently in the literature regarding these injuries. Greater awareness of the risks of electrothermal injuries from jewelry in all working environments would prevent such burns.

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THIRD-DEGREE BURN AFTER PLASTER OF PARIS BRACE

Sir:

Cast bracing is a frequently used immobilization method in extremity injuries. Calcium sulfate powder reacts with water and becomes the hard cast after an exothermic reaction. The amount of heat that is released to the environment depends on the type of the cast, the thickness of the brace, the temperature of the dipping water, and the use of covering materials. Despite the presence of several experimental studies on the risk of serious burns after brace application,¹⁻³ only one case report of third-degree burn could be found in the literature.⁴ We present a case of third-degree burn after a long-leg cast brace application to emphasize the necessity of correct technique. We also discuss the possible factors resulting in burn.

An 86-year-old woman was admitted to the emergency room of another center after a fall. She had a left supracondylar femur fracture and was transferred to the orthopedics ward after application of a long-leg plaster of Paris brace. Although the patient complained of feeling burning and pain, the brace was kept in place for 2 days. After the cast was removed, wide areas of burn were detected on the posteriors of the leg and calf. External fixation was applied for the fracture on the same day, and the burn wound was followed with daily dressing changes. At the second postoperative week, the patient was referred to our center for the burn injury.

The patient's general status was poor and she had acute renal and cardiac failure. On local examination, third-degree burns with 10 percent total burn surface area were noted (Fig. 1). Débridement of the necrotic tissue and skin grafting were

planned, but the patient died the day after because of cardiopulmonary arrest.

The degree of heat and the exposure time are important in the severity of thermal wounds. Moritz and Henriques⁵ calculated that 44°C heat requires 6 hours of contact to cause a third-degree burn. However, 50°C heat may result in second- or third-degree burns after 5 to 10 minutes of contact.⁶ The heat emerging during cast application varies widely between 32.2°C and 82.2°C.⁴ Thus application technique has a vital role in burn complication.

Studies have shown that cast thickness directly affects the amount of heat released.^{3,4} When a 30-layer brace is dipped into 42°C water for a short time and applied, 47.7°C heat is produced on the skin, and this may result in a burn.^{3,4}

The hardening reaction of the cast starts from the outer layers and moves inward, trapping the heat inside.⁴ Additional barriers to radiation of the heat increase contact temperature and time, which in turn facilitates thermal injury. External support materials prevent heat dissipation.²⁻⁴ As room temperature and humidity increase, the evaporation of the water content of the brace decreases and the heat increases.² Although otherwise had been believed, the thickness of the cotton pad has been shown to have a minimal effect in preventing thermal injuries.²

Another factor is the temperature of the dipping water. A temperature of less than 40°C is recommended.⁴ Kaplan⁴ states that if the person applying the cast does not feel discomfort with the heat while dipping the brace in water, then the water temperature can be considered safe. As the cast is dipped into a bucket, some chemical accelerators remain in the water. Using the same water each time the brace is applied may thus increase the formed heat.²⁻⁴

The condition of the braced extremity, such as edema, vascular problems, tourniquet use, or local anesthesia, also decreases the skin's tolerance to heat.⁴ Conditions such as acute renal and cardiac failure, as reported here, may have contributed to the formation of third-degree burns.

As in our case, the immediate sensation of burn after contact with the cast demonstrates that the temperature of the dipping water is high.

To prevent such serious complications, (1) braces should be kept to a minimum thickness to provide satisfactory strength, (2) the temperature of the dipping water should be less than 40 degrees, and (3) heat insulators, such as pillows and blankets, should be avoided during the setting of the cast, especially for elderly patients who are in poor general condition.

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FIG. 1. Third-degree wide burn wounds on the posterior of the left lower extremity.

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BREAST REDUCTION INSURANCE DENIALS

Sir:

The following letter was written by the father of a patient in our office whose experience with his daughter wanting breast reduction might be of help to our readers.

Our daughter is 16 years old. She has had pain in her back since she started to develop at 14. It is hereditary. She is built like her grandmother and aunts. She could not tolerate wearing a regular bra and has had to wear a sports bra. After wearing a regular bra for several hours, the straps would dig into her shoulders, leaving deep, red, indented marks. In certain situations, she even has had to wear two sports bras at a time.

Last spring, we applied to Blue Cross/Blue Shield of New Jersey for permission to have breast reduction surgery. They refused. The Medical Directors at Blue Cross/Blue Shield stated that we wanted the surgery performed for cosmetic reasons. *This implies that our daughter and women in general do not experience any pain due to their breast size.*

Prior to paying for the operation, Blue Cross/Blue Shield wanted our daughter to go through a number of conservative treatments. Listed below are quotes from the letter Blue Cross/Blue Shield sent us in their rejection of our claim:

1. When the patient's weight is greater than 120 percent of ideal body weight, weight reduction for at least a 6-month period must be attempted and documented. Evidence must be submitted that dietary referral and consultation have been made.
2. Copies of medical records demonstrating that problems related to macromastia have been ongoing and significant, requiring medical attention.
3. Evidence/documentation that the pain is not responding to a course of conservative therapy under medical supervision (e.g., support bra, exercise, heat/cold treatments, appropriate nonsteroidal anti-inflammatory agents/muscle relaxants).
4. Medical documentation of chronic skin breakdown or dermatitis in intertriginous areas not responding to medical management.
5. Detailed clinical records of previous and/or ongoing therapeutic intervention for the problems associated with the size and shape of the breast.
6. Consultation reports from at least two providers of different specialties that the pain is directly related to the size

and weight of the breast and not another diagnosis (e.g., arthritis).

Prior to paying for the surgery, we were expected to meet all of the above criteria (and then some).

Curiously, Blue Cross/Blue Shield would pay for the conservative treatments, but not the cause of the problem.

Our family then went to a second-step appeals committee made up of both Blue Cross and non-Blue Cross personnel. This involved my family explaining to a group of approximately 20 people why our daughter had to have breast reduction. Imagine a 16-year-old teenager discussing her breast size before a panel of adults. It was pretty embarrassing to say the least. We told them, "as parents, we felt tortured watching our daughter in daily pain." Surprisingly enough, they agreed with the medical director's decision.

Not wanting our daughter to go through any more pain, we went ahead with the operation this past August. We paid out of pocket. Even after notifying Blue Cross/Blue Shield that the doctor had removed 620 g from the right side and 710 g from the left side, they still refused to pay.

While this was occurring, we appealed to the State of New Jersey Managed Care Office. New Jersey has enacted a law that states all instances of insurance rejection can now be appealed to an independent medical arbitrator.

During this appeals process, you are allowed to submit any information to support your position. The insurance carrier is also allowed to do the same. You do not appear in person. The decision by the arbitrator is binding.

We performed considerable research to prove that the conservative treatments required by Blue Cross/Blue Shield have no effect on alleviating a patient's pain due to the size of her breasts. Certain studies by Doctors E. D. Collins and C. Kerrigan from the Dartmouth Medical School were most helpful.

On October 22, 2003, we received a letter from the arbitrator reversing the Blue Cross decision. In their summary statement, the arbitrator wrote, "nonsurgical methods including weight loss, physical therapy, body mass index, cup size, and resection amounts have no impact on positive outcomes." They further state that "patients who have classic symptomatic macromastia and have a confirmatory basic examination, benefit from reduction surgery." Blue Cross was given 10 business days to respond to us on their intent to comply. We received a letter from Blue Cross stating that they will pay for the costs involved in the surgery.

The decision of Blue Cross/Blue Shield not to initially pay for the breast reduction surgery is not uncommon among insurance companies. It is hoped that antiquated regulations by insurance companies will change. Until that happens, the only way certain insurance companies will pay is if an individual has the time, patience, and fortitude to fight back.
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HUMANITARIAN MISSIONS IN THE THIRD WORLD

Sir:

The editorial by Dr. Dupuis, entitled "Humanitarian Missions in the Third World: A Polite Dissent," is amazingly correct in most of its thoughts, but it was written by someone

from the developed world and misses the point of view of someone who was born and lives in the undeveloped world.

I have been in practice for 10 years and involved with Operation Smile (a humanitarian international organization providing reconstructive surgery to needy patients around the world) for 12 years, since I was a resident at the Lorencita Villegas de Santos Children's Hospital in Bogotá, Colombia. I have also had surgical experience in several countries around the world as part of that organization (Fig. 1).

As I have pointed before,¹ a 20- or 85-year-old patient with an uncorrected cleft lip and palate looking for help in one surgical mission is testimony to how inaccessible this simple plastic surgery procedure is to some of the populations of the world. These patients are testimony to how inefficient the medical care has been in that place. Maybe the professors and most skilled surgeons in the world are there, but they are not doing anything to help these cleft patients.

There are several reasons for the inefficient care system in each place, but the less common reason is the lack of skilled physicians or professionals. The most common reason is the lack of organization. The public health care system in our undeveloped countries spends most of its resources treating life-threatening conditions such as trauma, respiratory infections, and gastrointestinal infections.

Each country is missing different resources. For example, the undeveloped countries cannot afford to have all the high-technology equipment needed to provide real, safe anesthesia. In South America, a great part of our gross domestic product has to be used to pay our external debt; it is a fact almost impossible to change, so we do not have enough in money to help the cleft patients. Colombia has had to make several changes in the health care system to cut the state's health expenses, which has forced the closure of several hospitals. The first one to close was the Lorencita Villegas Children's Hospital, a teaching institution, where I was trained and where we were working on the integral care of craniofacial anomalies and other deformities.

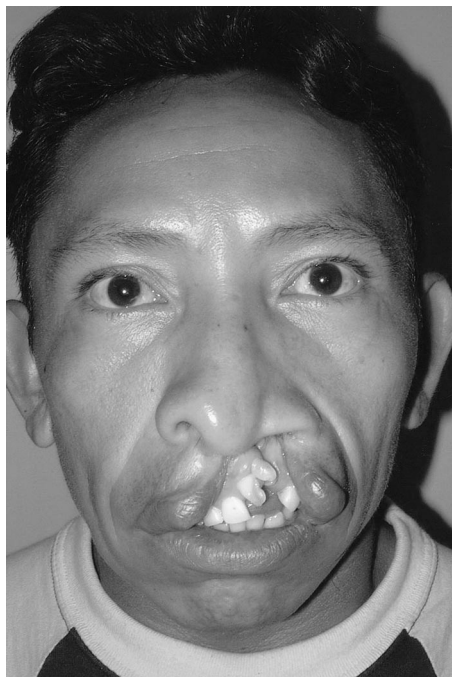


FIG. 1. A 33-year-old man before treatment.

It is not just the matter of providing supplies and other resources, it is not giving the cash to the politicians or physicians in our undeveloped countries and not teaching surgeons how to perform a cleft lip or palate repair. The key is to provide the organizational bases to help the cleft patients. It is getting the needed resources, involving businessmen and companies in the process, administering the resources, and motivating the local medical and nonmedical professionals toward a team approach to help needy cleft patients. Delivering these organizational tools or motivating the professionals is not a miracle; it takes time and is a continuum, at least it was the way our organization was developed in Colombia. Let me explain briefly:

- During the first 5 years (1988 to 1993), we just hosted *international missions* like the ones described by Dr. Dupuis in his article, with one mission per year and 150 patients per mission. They were useful, they corrected the deformities of many patients, and they were willing to teach, but most importantly, they raised concerns about the cleft patients and they planted a seed. A 40-year-old patient does not care about perfect symmetry of his Cupid's bow or nostrils. Yes, it is better to light a candle than to curse the darkness.
- Our next step was the creation of *local missions* (1994). A local team of in-country professionals goes to the countryside on the weekends in their free time to perform operations on their own. The international missions were still running because we did not yet have the organization to help the number of patients in need on our own.
- Then our organization got stronger and we did not need help from foreign physicians performing operations anymore. We needed just the supplies and the equipment, so we created the *internationally supported local missions* (2001). The missions were run by local professionals, but the supplies and equipment were provided by the international organization. Each year, we host two or three international professionals who come to our country for educational purposes on specific topics related to the ideal team care of patients. Sometimes they operate on selected patients for educational purposes.
- Our last step was the creation of the *integral care centers*. There is one in Duitama (1998) and another in Bogotá (2002). There we provide in a precarious way interdisciplinary treatment every day. We are working hard to improve and accomplish our goal of ideal care of many patients. To have the ability to provide that ideal care to all the cleft patients is tough, even in developed countries. Can you imagine how it is for us? We will continue running the local missions and the internationally supported local missions until the conditions change in our underdeveloped and poor country; we will need international support until this happens.

It is not easy to find a well-trained professional who is willing to work for free or almost for free, at home, weekly, and who is committed to an excellent result. As an organization, we understand that the motivations for helping others vary; some are selfish, some are not. But who cares about how ideal the motivations are if you are able to conduct them to a good final outcome? The organization has to know the needs of its people. Those needs are not only economic; they are also social, cultural, religious, political, and so on.

Education is more than teaching a surgical technique or its modification. For people who have not been born in

undeveloped countries, sometimes it is hard to understand what we could learn from you and your organization and how much you could learn from us. I would gladly accept a good foreign resident in my hospital and I would let him or her operate on patients under my supervision. I do it all the time with my residents. But I also would love to send my residents or professionals abroad to visit well-known team care centers or educational centers that I believe know our needs.

If someone wants to keep his or her dignity, he has to be humble first, is my personal thought.

Acknowledgments. I am grateful to all the humanitarian organizations and volunteers working hard to help patients in need in my country and around the world. We, the third world (as we were named during the Cold War), really need help. I encourage them to continue their work, involving more and more local people in their projects and when they are making decisions. I am also really grateful to Dr. Dupuis for expressing his thoughts, because it is really a constructive effort.

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REPLY

Sir:

Dr. Bermudez's letter is a welcome addition to what I wrote. It shows that a competent surgeon, devoted to the welfare of his own people, can, in Bogotá, with the help of a foreign foundation, take the matter of cleft care in his own hands and succeed. He is rightfully grateful to the foundation which helps him. His achievements deserve praise. Dr. Ross I. Zbar¹ developed the same type of philosophy in his program in Nepal. My point, however, was about other aspects of humanitarian aid in Asia.

I would be interested to know how Dr. Bermudez would feel if a foreign team of 30 people came, with media coverage, to operate on cleft lip and palate patients for 1 week in a hospital 80 km away from his center, achieving a total of 48 operations, without him having any input into this foreign mission other than being invited to observe.

This is the situation I witnessed in Southeast Asia at the end of 2003. It is a part of the world where American, Asian, Australian, and European humanitarian teams cross each other continuously, without, to my knowledge, any cooperation or collaboration among the different groups.

Dr. Bermudez's letter stresses the problems of Colombia in a most commendable way. There is, however, a sentence with which I would like to take issue: "A 40-year-old patient does not care about perfect symmetry of his Cupid's bow or nostrils." During my now 235 weeks of volunteer work over 35 years in Asia, patients have repeatedly asked me to correct unsatisfactory lip repairs, many of which have been performed by previous foreign teams. Poor people, wherever

they live in the world, care as much about their appearance as we do.

There cannot be, for volunteer plastic surgeons, two standards of care: one for their cosmetic surgery patients at home and another one, a sort of "good enough is better than nothing" approach, for foreign humanitarian missions because there is little risk of malpractice action. There is only one standard of care, and that is one provided by surgeons qualified in that type of surgery, and it has to be met by all surgeons participating in humanitarian missions.

This being written, Dr. Bermudez is to be thanked for having reminded us that, if there is a dark side to a coin, there is also a bright side, hopefully the most frequently proposed to our admiration.

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LOCAL ANESTHESIA SAVES LIVES OF EXPERIMENTAL RATS AND TIME AND MONEY OF RESEARCHERS IN COMPOSITE TISSUE ALLOTRANSPLANTATION

Sir:

Composite tissue allografts consist of integumentary/musculoskeletal tissue. They have the potential to replace or reconstruct tissues after traumatic loss or extensive tumor ablation or they can be used for the repair of congenital abnormalities. However, allograft rejection requires life-long immunosuppression, which is the main obstacle to composite tissue allotransplantation. The future of composite tissue allotransplantation depends on the modalities that can reduce or eliminate the need for chronic immunosuppression.

Today's transplantation research is primarily focused on understanding the mechanisms of rejection and the requirements of a successful tolerance induction regimen.¹ The majority of research work has been performed in the rat model.² Although the rat hind limb serves as a useful model,²⁻⁴ various composite tissue models have also been utilized, including the vascularized skin flap⁵ without or with vascularized bone (unpublished data) and the vascularized joint,⁶ muscle,⁷ ear (unpublished data), or facial and scalp flap.⁸

During the research, the effectiveness of the applied strategy in modulating or suppressing the recipient's immune response and preventing rejection has to be monitored. Therefore, after the transplantation, periodic tissue and blood sampling is performed as long as the animal (allograft) survives. Sometimes, the follow-up period continues for months before coming to a robust conclusion. The samples are used for histologic rejection grading for each tissue component at different stages of the rejection process⁹ to confirm the diagnosis of graft-versus-host disease,^{10,11} as well as for other immunological analyses.¹² Tissues may be obtained from the skin, muscle, nerve, or other

areas. For blood sampling, usually the femoral vessels are used for venipuncture.

Many of the reports describing the histological or immunological outcomes of their studies have sacrificed the animals at certain intervals to get the required samples.^{7,13,14} In others, samples are generally obtained after general anesthesia is induced by intraperitoneal pentobarbital¹⁵ or a combination of other anesthetic agents through either an intramuscular or intraperitoneal route.¹⁶ At our institute, we have usually followed the same anesthesia protocol. However, despite careful titration of the recommended dose, we have experienced a significant percentage of animal deaths. Various immunosuppressive drugs given to the experimental animals may severely interfere with the biology of the experimental animals or may alter the pharmacokinetics of the anesthetic agents. In addition, a poor general condition and wasting syndrome may contribute this situation. The reports investigating this correlation are sparse. High mortality rates from general anesthesia for sample attainment cause great frustration to researchers because of the waste of time and money. As transplantation research is expensive, this issue should not be underestimated.

Currently in our laboratory, we use local anesthesia for tissue sampling and venipuncture. A 0.1- to 0.2-ml dose of 2% lidocaine (Xylazine) is injected percutaneously to the field of intervention via a 32-gauge needle (Fig. 1). We have used this anesthesia technique for repetitive tissue sampling and venipuncture in various composite tissue models, including hindlimb transplants ($n = 13$), cutaneous flap transplants ($n = 38$), osseocutaneous flap transplants ($n = 9$), and ear transplants ($n = 4$). Depending on the composition of the transplant, more than one kind of tissue can be sampled in one instance. The time of tissue sampling ranges from one to three, with an average of 2.05. Venipuncture is performed occasionally. With the help of this convenient method, we have attained 150 tissue samples and 18 venipuncture samples from 64 animals. Pain-toler-



FIG. 1. Percutaneous injection of local anesthetic to the field of intervention in a vascularized cutaneous allograft.

able venipuncture and biopsies of skin and/or deeper tissues could be performed reliably and easily, with no animal deaths from these procedures. The only disadvantage is the requirement of another individual to restrain the animal. We recommend this method to all researchers working in the field of transplantation.

We suggest a simple and safe local anesthesia technique for periodic tissue sampling and venipunctures from recipient animals of various composite tissue allotransplantations. It saves the lives of experimental animals and the money and time of researchers.

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A METHOD THAT DEALS WITH THE PRESENCE OF HAIR IN ANIMALS USED FOR RESEARCH

Sir:

Training for microsurgery requires long-term education. Rats, rabbits, and pigs are frequently used as experimental animals in microsurgical studies. The care, preparation, and postoperative follow-up of such animals involve a lot of difficulties. In performing a microvascular procedure, technical ability is especially important.

The factors affecting the potency of an anastomosis fall into four broad categories: technical factors, flow factors, coagulation factors, and spasm. Since you have some control over the technical factors, they are of particular interest. The importance of technical perfection cannot be overemphasized.¹

The control of technical factors is dependent on the surgeon; therefore, any factors that may influence anastomosis must be immediately discarded. One of the factors that influences anastomosis is the hair located at the anastomosis area, which has a negative influence on the flow. To avoid such conditions, the animal must be shaved at a remote site far away from the study area before any applications are performed. However, most of the time it is quite difficult to remove hair from the operation area, and hairs remaining on the animal can be transported anywhere by means of equipment, tools, and even the hands of the surgeon. Hairs that soil the operation site can be hard to remove.

In an application carried out in our clinic, the study animal is shaved at a remote location far away from the microsurgery laboratory. Then, to provide sterility, the operative site is soaked with batticon (sterile cleaner solution) and cleaned with serum. The study animal is covered with a semioclusive or transparent dressing material, which can easily be found in all clinics (Steri-Drape, Tegaderm, Omiderm, or stretch film; Fig. 1).^{2,3}

Such covering procedures applied to study animals can avoid hairs coming into contact with tools or with the hands

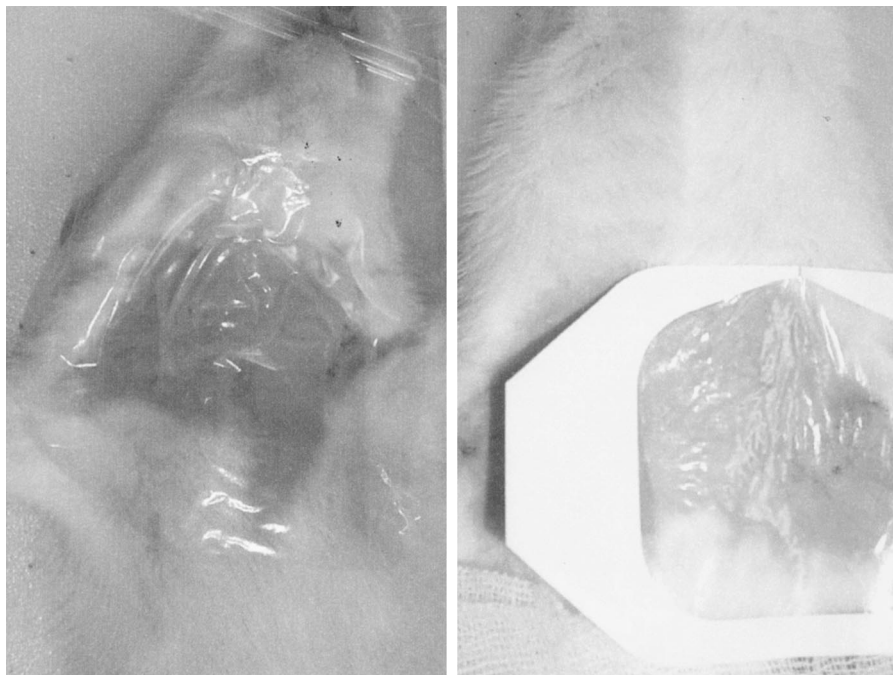


FIG. 1. The operative site covered with Tegaderm, stretch film, and Steri-Drape.

of the surgeon and contaminating the operative site. Therefore, during anastomosis studies performed on study animals, we especially suggest that clinicians use materials such as Steri-Drape, stretch film, Tegaderm, or Omiderm to prevent foreign bodies (hairs) from contaminating the operative site.

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