GUIDELINES

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Letters

The Use of Adson-Brown Forceps to Score the Cartilage in Otoplasty

Sir:

I read with interest the letter entitled "A New Instrument as Cartilage Scorer for Otoplasty and Septoplasty: Adson-Brown Forceps" by Tan et al. in the February 2005 issue of the *Journal* (*Plast. Reconstr. Surg.* 115: 671, 2005) and would like to make some comments regarding the use of Adson-Brown forceps in otoplasty.

In November of 2002 and October of 2003, my coworkers and I presented at the Winter Meeting of the British Association of Plastic Surgeons, in London, England, and at the European-Appointed Sixth Pan-Hellenic Congress of the European Society of Plastic Reconstructive and Aesthetic Surgery, in Athens, Greece, our experience with the combined otoplasty technique in 100 children. Actually, our manuscript, entitled "The Combined Otoplasty Technique in Children: A Review of 100 Consecutive Patients," was submitted to the *Journal* in January of 2005 for consideration for publication. Between August of 1998 and April of 2002, a combination of the closed percutaneous anterior scoring technique and Mustardé-type stitches were used in 100 patients to correct 188 prominent ears. The anterior scoring technique was performed first with the Mitchel trimmer and then with the toothed edge of the Adson-Brown forceps, as the writers of the letter proposed. Finally, 3.0 Vicryl stitches were placed to form the new antihelical fold.

Despite the overall good results and minimal complications, the relapse rate was 7 percent. We concluded that the recurrence rate was due to either insufficient scoring of the cartilage or inadequate support of the Vicryl stitches. Consequently, we are planning to modify our technique by using longer-lasting sutures, such as Maxon or polydioxanone suture, and abandoning the Mitchel trimmer and Adson-Brown forceps for the anterior scoring.

My co-workers and I agree with the authors that manipulation of the Adson-Brown forceps is very easy, but we have reservations regarding its effectiveness in scoring ear cartilage, especially in adults, in whom the cartilage is harder than that in children.

Finally, for historical reasons, it is interesting to see what Stenstrom[1] wrote about the instrument he used for scoring ear cartilage in his original article. He wrote, "For the scratching, the branches of a divided Brown-Adson tissue forceps have proved very effective."

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REFERENCE

1. Stenstrom, S. J. A "natural" technique for correction of congenitally prominent ears. *Plast. Reconstr. Surg.* 32: 509, 1963.

Regarding the Treatment of Dynamic Nasal Tip Ptosis with Botulinum Toxin A

Sir:

We read with interest the letter entitled "Treatment of the Lower Third of the Nose and Dynamic Nasal Tip Ptosis with Botox", by Drs. Dayan and

Kempiners.[1] We are currently completing a study that evaluates the importance of the depressor septi nasi muscle in nasal tip aesthetics and dynamic ptosis by using botulinum toxin type A (Botox; Allergan Inc., Irvine, Calif.) chemodenervation. Not entirely to our surprise, this concept had been previously mentioned, anecdotally, in the literature.[2] The anatomical importance of the depressor septi nasi muscle on nasal tip aesthetics has been underscored by Rohrich et al.[3] Other anatomical studies have confirmed the location of the depressor muscle as arising from orbicularis muscle and/or periosteum above the central and lateral incisors, as well as the region of the anterior nasal spine, with insertion(s) on the membranous septum, and/or medial crura. When this muscle is overactive and/or hypertrophied, it can magnify the amount of nasal tip ptosis and upper lip shortening, thereby creating a transverse philtral crease and/or increasing maxillary gingival show. In these patients, surgical attenuation or transposition[3] of the depressor septi muscle has been recommended during rhinoplasty.

The fundamental problem with previous reports that attribute significance to the depressor septi nasi muscle in nasal tip aesthetics is that the muscle effects have never been evaluated in isolation. Maneuvers during rhinoplasty that can also raise or alter nasal tip dynamics, such as cephalic lower lateral cartilage resection and dynamic tip suturing, add variables that may confound the analysis of depressor septi nasi muscle action proper. While these dynamic effects in rhinoplasty have been firmly established,[4] only by evaluating the action of the depressor septi nasi muscle *in isolation* can its true dynamic effects be known. This fundamental principle has never been reported in the literature.

In contrast to Drs. Dayan and Kempiners, we do not believe, at this time, that Botox can serve as a satisfactory isolated treatment modality, and it certainly cannot *replace* rhinoplasty, until further studies are conducted to establish an optimal treatment protocol. Future treatment indications, however, may include patients who complain of dynamic nasal tip ptosis and/or other sequelae of an overactive depressor septi nasi muscle who do not wish to have rhinoplasty. Perhaps, Botox can also serve as a temporizing procedure in that patient population, until a rhinoplasty can be performed.

With regard to technique, the authors[1] reported injection of 5 U into "each" depressor septi nasi muscle as well as 3 U into each levator labii superioris alaeque nasi muscle. We find it difficult to accept that "each" muscle slip can be identified precisely enough for individual muscle slip injections.[1] We have seen similar nasal tip improvement with only 1 to 2 U total injected into the depressor septi nasi muscle mass. Care must be taken to limit the volume injected in this area, because the orbicularis oris muscle is within 3 cm of the known potential diffusion distance of Botox. Although it may serve as an aesthetic advantage in decreasing "incisor show," excessive upper lip droop may result from as much as 10 U injected into the nasal base. In addition, Figallo[5] has described an often overlooked muscle, called the musculus digastricus septi nasi labialis, which through its pulley-like action can draw the tip down as well as lift the central lip. Concomitant chemodenervation of this synergistic muscle may amplify the decrease in dynamic nasal tip ptosis, and can also lead to an increase in upper lip ptosis and decreased gingival show. The importance of accurate and minimal injection of Botox cannot be understated.

Drs. Dayan and Kempiners inject both the depressor septi nasi and levator alaeque nasi muscles, albeit for treatment rather than evaluation. This precludes accurate analysis of the contribution that each muscle group individually makes to nasal tip and upper lip aesthetics.

Lastly, we have postulated in our current study that Botox administration to the depressor septi muscle mass that results in little to no improvement in nasal tip ptosis may signify the presence of a type II (periosteal attachment) or type III (scant to no muscle) depressor septi nasi muscle.[3]

The role of the depressor septi nasi muscle in nasal tip aesthetics can only be determined by isolating its dynamic action(s) through chemodenervation by Botox. Proper studies that exclude confounding variables, such as concomitant rhinoplasty or chemodenervation of synergistic muscles, are required before Botox injection alone can be recommended as a treatment for dynamic nasal tip ptosis.

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REFERENCES

1. Dayan, S. H., and Kempiners, J. J. Treatment of the lower third of the nose and dynamic nasal tip ptosis with Botox. *Plast. Reconstr. Surg.* 115: 1784, 2005.
2. Carruthers, J., and Carruthers, A. Aesthetic botulinum A toxin in the mid and lower face and neck. *Dermatol. Surg.* 29: 468, 2003.
3. Rohrich, R., Huynh, B., Muzaffar, A. R., Adams, W. P., and Robinson, J. B. Importance of the depressor septi nasi muscle in rhinoplasty: Anatomic study and clinical application. *Plast. Reconstr. Surg.* 105: 376, 2000.
4. Guyuron, B. Dynamics in rhinoplasty. *Plast. Reconstr. Surg.* 105: 2257, 2000.
5. Figallo, E. The nasal tip: A new dynamic structure. *Plast. Reconstr. Surg.* 95: 1178, 1995.

Response to "New-Fill Injections May Induce Late-Onset Foreign Body Granulomatous Reaction"

Sir:

The recent cosmetic case report entitled "New-Fill Injections May Induce Late-Onset Foreign Body Granulomatous Reaction" (*Plast. Reconstr. Surg.* 115: 76e, 2005) described the late onset of foreign body granulomatous reactions in two patients following the injection of poly-L-lactic acid (New-Fill; Biotech Industry S.A., Luxembourg). According to our experience, involving thousands of patients since 1999, poly-L-lactic acid has a very favorable safety profile and such events are very rare, developing more readily when the manufacturer's guidelines are not followed.

With reference to case 1, poly-L-lactic acid was used to augment the upper lip of a 64-year-old woman, which is clearly not an appropriate use of poly-L-lactic acid. As with many devices of this nature, injection into the highly dynamic muscles of the lips is not advised. Frequent muscular contractions can cause the aggregation of the injected material, eliciting nodules and, in rare instances, granulomatous reactions. No mention of the date of injection is made in case 1; this is very important, because amendments to reconstitution and injection protocols have been made that may ameliorate adverse events such as these. Figure 2 in the report suggests that the poly-L-lactic acid had been injected very superficially, which is not appropriate because this device should be injected deep into or beyond the level of the dermis and not be used as an instant dermal filler.

In case 2, a 44-year-old woman presented with a bulky mass in the lower eyelid/zygoma region. The hypermobility of the muscles in this area precludes the injection of semipermanent and permanent devices; however, the zygoma beyond the sphere of influence of the active muscles of the eye can be augmented with poly-L-lactic acid as long as the injections are sufficiently deep—next to the bone/periosteum—with an appropriate small amount of product. It also states in case 2 that the swelling disappeared after excision of the area.

Poly-L-lactic acid has been used in a variety of medical applications for at least 30 years and has been shown to be biocompatible, nontoxic, biodegradable, and nonallergenic. In August of 2004 it received approval from the U.S. Food and Drug Administration for the restoration and/or correction of facial lipoatrophy in patients with human immunodeficiency virus. Injectable poly-L-lactic acid is intended as a means of restoring volume to the face, a facet of facial rejuvenation that is often overlooked; therefore, it should not be used for lip augmentation or correction of superficial lines.

The manifestation of lumps in the patients described in cases 1 and 2 is probably a result of older outdated formulations, choice of indication and injection site, and superficial injections rather than a lack of tolerability to poly-L-lactic acid. Injecting too much material over too short a period of time (overcorrection) can also lead to foreign body tissue reactions. Today, it is known that poly-L-lactic acid should be diluted to a volume of 5 ml, and there should be an interval of at least 4 to 6 weeks between treatment sessions. It is important that injections of poly-L-lactic acid are accompanied by massage of the treatment area, which should be continued by the patient after treatment for at least 5 minutes, once a week. When injectable poly-L-lactic acid was produced by Biotech of Luxembourg, particle size was indeed 10 to 125 μm; however, the formulation available today (Sculptra; Dermik Laboratories, Berwyn, Pa.) has a more uniform particle size of 40 to 63 μm.

Device-related adverse events such as granulomatous reactions are associated with many of the products now on the facial rejuvenation market. Clinical data demonstrate that the incidence of these events associated with the injection of poly-L-lactic acid is low and can be further reduced by adhering to preparation and injection guidelines.

Disclosures. Drs. Bauer and Vleggaar are consultants for Dermik Laboratories.

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Reply

Sir:

The letter by Drs. Bauer and Vleggaar gives us the opportunity to provide an even deeper understanding of how the fast introduction of a new facial filler such as poly-L-lactic acid (New-Fill, nowadays named Sculptra), without being properly tested and investigated, may lead to the abuse of patients and an unacceptably high rate of complications.

Bauer and Vleggaar, both commercially involved as advisors to the Aventis Company, which produces the poly-L-lactic acid Sculptra, are to be congratulated for initiating this discussion. However, their arguments explaining the possible reason why poly-L-lactic acid may induce late-onset granulomatous reaction are just a general summation and reflection of what we mostly already brought up in our case report.

Based on a survey of Dutch plastic surgeons,[1] the incidence of late complications with Sculptra is considered to be at least 5 percent and is thus not very rare, as stated by Bauer and Vleggaar. Furthermore, it is

known that, also as a result of inadequate registration, the incidence is probably far higher.[2] As a result, in the Netherlands, the use of Sculptra has decreased dramatically.

The rather high rate of complications with Sculptra is actually caused by a lack of knowledge of all the ins and outs of this product at the time it was introduced in the European market. In Europe, New-Fill (Biotech Industry S.A., Luxembourg) was introduced on the market after a limited clinical trial, with only a short follow-up not exceeding 6 months, according to an advertisement for Sculptra in the May 2005 issue of *Plastic and Reconstructive Surgery*. The initial "instructions for use" clearly stated nothing about the areas where it should not be used; it was and still is advocated to fill rhytides of the upper lip, a procedure we now know will absolutely result in palpable masses and, in the long term, granuloma formation. Although at this time it is advised not to use Sculptra for augmentation of the lips, the side effect of "hematoma or edema of the lip mucosa" is still mentioned in these instructions.

Much of the advice on the use of Sculptra given by Bauer and Vleggaar has been learned "thanks" to the observed positive and adverse reactions upon the use of poly-L-lactic acid. Actually, one can easily argue that poly-L-lactic acid was put on the market as a kind of phase I study, in which the clients involved did not know of their participation and in which the effects and side effects became known by trial and error.

What especially concerns us is that the appropriate advice given by Bauer and Vleggaar to reduce the complications of poly-L-lactic acid is not found in the manufacturer's guidelines for Sculptra sold in Europe today. For example, the instruction guidelines state the following three points: (1) *reconstitution of poly-L-lactide should be done with 3 ml of sterile water*, but Bauer and Vleggaar advise using 5 ml, with which we fully agree. A solution of 3 ml has an increased risk of causing an accumulation of poly-L-lactic acid particles at the injected site, with increased risk of late granuloma formation. (2) *The patient should be evaluated at no sooner than 2 weeks after treatment to determine whether additional correction is needed.* Bauer and Vleggaar advise waiting at least 4 to 6 weeks between treatment sessions; it is our experience that one should even wait for at least 3 months, because at that time the effect is maximal. (3) *Injection is advocated subcutaneously and intradermally.* The only area where it is mentioned that New-Fill should not be used nowadays is the red area of the lip. We fully agree with not using Sculptra for lip augmentation; at this site, we have seen many patients with palpable and visible papules and granulomatous reactions. This has also been seen at the New-Fill Clinic, in The Hague, The Netherlands, where Vleggaar has treated numerous patients. Furthermore, the use of Sculptra intradermally (even if it is used *deep* intradermally), which is needed to correct wrinkles, has a high risk of the development of papules. In the manufacturer's information accompanying the Sculptra advertisement in the *Plastic and Reconstructive Surgery*, four studies are used in describing the side effects. These studies all have a poor methodological design and can therefore hardly be reliably interpreted. Nevertheless, in two studies the occurrence of palpable subcutaneous papules was 31 percent and 52 percent, with an average onset of 7 months! In contradiction to the instructions for use, these papules mostly do not disappear on term.

Instructions on the use of Sculptra and especially its shortcomings should be clearly outlined in the product instruction leaflet. If not, inadequate use of poly-L-lactic acid and its complications will continue. Furthermore, we would like to make a plea for registration of all injectables and facial fillers as medical implants, so that better regulation upon introduction and use of these products can be established. So far, it seems that the use of Sculptra has come no further than the level of a phase 1 toxicity study describing the possible side effects in time, and even these are methodologically poor. Therefore, all patients treated with Sculptra should ideally be included in a prospective study clearly describing the wanted and unwanted effects of this product. If not, we will never be able to give our patients proper advice concerning the risks of facial rejuvenation by means of poly-L-lactic acid.

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REFERENCES

1. Cromheecke, M. Survey among 68 plastic surgeons in the Netherlands describing the use and side effects of soft tissue fillers. Presented at the spring meeting of the Dutch Society of Plastic Surgery, Apeldoorn, The Netherlands, June 11, 2005.
2. Rapapart, M. Silicone injections revisited. *Dermatol. Surg.* 28: 2002.

Use of Axial Pattern Cervico-Occipital Flaps in Restoration of Beard Defects

Sir:

We read the article entitled "Use of Axial Pattern Cervico-Occipital Flaps in Restoration of Beard Defects" by Dr. Ersin Ülkür et al. and discussed it in our clinics.[1] We would like to thank to Dr. Ülkür et al. for their ingenious report, but we think that the technique has some drawbacks.

The flap described in the article is called an "axial pattern cervico-occipital flap," and its maximum dimensions were 9 × 5 cm, corresponding to a length-to-width ratio of 2:1. As we all know, the scalp and face are richly vascularized regions, and random flaps in these regions can be planned up to a ratio of 5:1.[2] Therefore, any flap planned in hair-bearing scalp should not necessarily be axial if its length-to-width ratio is 2:1.

Moreover, the authors stated that the flap could reach the midline of the face. In our opinion, a 9-cm-long flap from the occipital region can reach the midline of the face only if the head is tilted ipsilateral to the flap donor site, unlike in the article, unless there is undue tension on the flap on adaptation, especially in scalp flaps, because of the inelastic structure of the scalp.

The direction and texture of the scalp hair may not match with those of the beard hair, as discussed by the authors. To overcome this problem, tissue expansion can be performed as a reconstructive procedure. A defect measuring 5 × 4 cm can easily be closed after a short period of tissue expansion without additional donor-site morbidity. This has the advantage of supplying like tissue for coverage of the defects; however, if the defect is located in a place where the expander cannot be placed, then alternative reconstructive procedures should be considered.

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REFERENCES

1. Ülkür, E., Açıkel, C., and Eren, F. Use of axial pattern cervico-occipital flaps in restoration of beard defects. *Plast. Reconstr. Surg.* 115: 1689, 2005.
2. Lamberty, B. G. H., and Healy, C. Flaps: Physiology, principles of design, and pitfalls. In M. Cohen (Ed.), *Mastery of Plastic and Reconstructive Surgery.* Vol. 1, 1st Ed. New York: Little, Brown, 1994. Pp. 56–70.

Reply

Sir:

The dimensions of the flaps presented in the article[1] represent only part of the "cervico-occipital" flap that was used to cover the defect, excluding the proximal stump of the flap between the defect and the flap base. The proximal stump that bridged the flap donor area and the beard defect was transferred back to the flap donor area in the second session. Needless to say, the total length of the flap, including the proximal stump and the distal part of the flap that covered the beard defect, was longer than the dimensions presented in the article. Although we did not specifically depict the total length of the flap in the article, we emphasized that the flap can reach the midline of the face without the need for tilting the patient's head toward the flap donor site, and this issue was very well demonstrated in Figure 2 of our article.

Although it is possible to raise long random pattern scalp flaps, the cervico-occipital" flap is not a random pattern flap. The flap is planned along the ascending branch of the occipital artery, which is traced with the aid of Doppler sonography. Furthermore, arterial pulsation was observed at the undersurface of the flap when the flap was raised. We believe that an axial pattern flap is safer then a random pattern scalp flap, and longer flaps can be raised. However, preoperative planning of the cervico-occipital flap cannot be modified to match the directions of the scalp and beard hair.

As we mentioned in the Discussion section of our article, tissue expansion can be useful for larger beard defects to close the flap donor area primarily. In addition, tissue expansion can reduce the hair density of the scalp flap and provide a better hair match with the beard.

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REFERENCE

1. Ülkür, E., Açıkel, C., Eren, F., and Çeliköz, B. Use of axial pattern "cervico-occipital" flap in restoration of beard defects. *Plast. Reconstr. Surg.* 115: 1689, 2005.

Revisiting the Reconstructive Ladder

Sir:

We are writing in reference to Pallua and von Heimburg's article entitled "Pre-Expanded Ultra-Thin Supraclavicular Flaps for (Full-) Face Reconstruction with Reduced Donor-Site Morbidity and without the Need for Microsurgery" (*Plast. Reconstr. Surg.* 115: 1837, 2005). We congratulate Pallua and von Heimburg on the excellent cosmetic outcome achieved by the use of expanded ultra-thin supraclavicular flaps.

Patients with burns to the head and neck are often left severely psychologically disturbed as a result of their

facial disfigurement. The majority must endure numerous operations and months of intensive physiotherapy before the option of reconstructive surgery is considered. For these reasons, many patients develop an aversion or reluctance to attend for further treatment. It is important, therefore, to select an operation that has a high chance of success, that does not involve a long postoperative or rehabilitation phase, that involves minimal additional procedures, and that is understandable to the patient. A compliant, well-informed patient is the ideal.

Plastic surgery has come a long way since the development of the reconstructive ladder. These days we are so keen to find the perfect free flap for every situation that we sometimes overlook simpler means of closing a defect, presuming it to be inferior to the more sophisticated but complex techniques. As technically challenging as it is, a free flap does not always give a superior outcome. It is time-consuming, costly, and often involves a number of complementary procedures. In relation to head and neck burn reconstruction, a free flap tends to mask facial muscle movement and has the potential to create unnatural contours to the face and neck.

The senior author has been using large full-thickness skin grafts for more than a decade in selected cases to cover burn scar contractures for extensive resurfacing of the head and neck, with excellent functional and aesthetic outcomes. Skin grafts are technically less challenging and time-consuming, and unlike a free flap, they do not mask facial muscle movement or create abnormal facial contours.[1,2] As distinct from a free flap, the pliability of skin grafts and super-thin flaps means that the reconstructive principle of covering whole facial subunits is much more achievable.[3]

Pallua and von Heimburg's case series well illustrates a point we should not forget: starting at the beginning of the reconstructive ladder is still a good place to begin.

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REFERENCES

1. Celikoz, B., Deveci, M., Duman, H., and Nisanci, M. Reconstruction of facial defects and burn scars using large size freehand full-thickness skin graft from lateral thoracic region. *Burns* 27: 174, 2001.
2. Latifoglu, O., Ayhan, S., and Atabay, K. Total face reconstruction: Skin graft versus free flap. *Plast. Reconstr. Surg.* 103: 1076, 1999.
3. Feldman, J. J. Facial resurfacing: The single sheet concept. In Brent B (Ed.), *The Artistry of Reconstructive Surgery*. St. Louis, Mo.: Mosby, 1987.

Controversies following the Report on Transplantation of Cephalocervical Skin Flap

Sir:

After reading the recent article entitled "Composite Tissue Allograft Transplantation of Cephalocervical Skin Flap and Two Ears" (*Plast. Reconstr. Surg.* 115: 31, 2005) and the Discussion by Peter Butler, there are still several important issues that we would like to address. The authors present a 72-year-old woman with recurrent cutaneous malignant melanoma on the vertex. The pathological stage, according to the American Joint Committee on Cancer's staging system for cutaneous melanoma, was stage IIIC, with thickness greater than 4 mm and four positive lymph nodes. The expected 5-year survival rate was less than 25 percent. The authors performed wide excision of the tumor, including the scalp, facial/cervical skin, two ears with 5-cm margins, and adjacent lymph node dissection. They stated that there was not enough vascularized autogenous tissue available to reconstruct the created defect. Therefore, composite tissue allograft transplantation of a cephalocervical skin flap including two external ears was performed to reconstruct the defect. Postoperatively, the patient received tacrolimus, mycophenolate mofetil, steroids, and Zenapax as an immunosuppressive regimen. Preoperatively, the major side effects of the immunosuppressants were explained to the patient. The follow-up at 4 months is presented. This case report of composite cephalocervical skin/ear allograft transplantation raises several legal, technical, ethical, and social concerns.

With regard to legal concerns, (1) it is not clear whether the transplant surgeons obtained local institutional/hospital approval to perform allograft transplantation in this high-risk cancer patient. (2) There is no indication of whether the patient signed any type of the consent form before the transplantation. (3) It is not clear which criteria were used to select the patient for transplantation. (4) There is no indication that the patient was evaluated psychologically and psychiatrically. (5) There is no disclosure about the patient's general health status. (6) It is not clear whether the patient had family support. (7) There is no indication that donor consent was a part of this transplantation protocol.

There are technical questions as well. The authors transplanted a facial/scalp flap from a brain-dead young man to a 72-year-old female patient. How was the male facial/scalp skin transplant to cover a female facial/scalp defect justified? In the donor, the composite tissue, including the scalp, facial/cervical skin, and two ears, was harvested but no details are provided about the plane at which the flap was dissected. It was not

indicated which branches of the carotid arteries were included in the flap. In the recipient, as stated, the donor's jugular external arteries were anastomosed to the recipient's left jugular external artery (most probably the authors meant the external carotid artery) and right superior thyroid artery. The estimated cold ischemia time was 6 hours, and the warm ischemia time was 2 minutes (the authors probably meant hours).

Recurrent malignant melanoma was treated by excision with 5-cm margins. The appropriate surgical excision margins for treatment of primary cutaneous malignant melanoma are controversial; however, depending on the thickness of the tumor, in general, 2-cm excision margins are considered to be an efficient surgical treatment. There are no standardized surgical excision margins established for patients with locally recurrent melanomas. Complete excision of the recurrent melanoma within the margins of normal tissue is considered to be adequate.[1,2] The authors did not justified why 5-cm excisional margins were taken, which definitively enlarged the size of defect. The size of the defect was not given, nor was there an explanation as to why the autologous flaps or combination of flaps with skin grafts was not available to cover the defect. If the patient had not been previously reconstructed, what were the limitations to using the autologous flaps or skin grafts?

Ethically, considering the age of the patient (72 years), the pathological stage of the tumor (stage IIIC), and the thickness of the tumor (4 mm), it is doubtful that this patient was the appropriate candidate for a new and an extensive transplantation surgery requiring life-long immunosuppression following transplantation. The estimated 5-year survival rate for this patient was below 25 percent. It should be clear to surgeons that the life expectancy of the patient after transplantation would be further reduced because of the side effects of the immunosuppressive agents.

It was agreed for the protocols of human composite tissue allograft transplants that the patient should be free of cancer for at least 5 years before attempting a transplant procedure.[3] This issue is violated here.

In the Discussion section, the authors underestimated the relationship between the development of malignancies and the usage of immunosuppressive agents.[4,5] In contrast to the well-known data documenting that immunosuppressants promote cancer, the authors quoted new data indicating that some of these substances may actually be used to treat the cancer. References to the few studies quoted by the authors to support their statement are mostly experimental. Although there are reported cases of posttransplant Kaposi's sarcoma regression with change of cyclosporine A to mycophenolate mofetil, there is a higher incidence of Kaposi's sarcoma reported under mycophenolate mofetil therapy, which was reported in one of the references that the authors quoted to support their protocol. For this reason, the immunosuppressive protocol was definitively not justified in this patient with active recurrent cancer.

Despite the great advances in immunosuppressive therapies, currently the life-threatening complications associated with life-long immunosuppression should not be underestimated.

Since the first announcement of the willingness to perform facial transplantation, there has been an ongoing debate about ethical, social, and psychological issues within the medical community worldwide.[6–8] There is an agreement that institutional approval and donor and recipient consent must be achieved for this procedure, and the risk benefits and alternatives must be presented to the patient. It is also clear that a team of experts from different specialties must evaluate the potential candidates for facial allograft transplantation. Composite tissue allograft transplantation is a promising alternative to autologous reconstructions. The most significant obstacle for routine use of composite tissue allograft transplantation is the need for life-long immunosuppressive therapy. There are currently more than 50 composite tissue allograft recipients worldwide, and there are well-documented reports that composite tissue allograft transplantation improves the quality of life of patients with disabilities. This is, however, at the expense of accepting consequences of side effects of immunosuppressive agents. The facial/scalp skin transplant presented by authors is an example of composite tissue allograft transplantation. Although the technical feasibility of facial transplantation has been proven in experimental cadaver studies,[9,10] the clinical application should be considered only for a highly selected group of patients with severe facial disfigurements.

The final question, which is even more difficult to address, is how should we as a medical society react to the controversial reports presented in the scientific journals on procedures that would not be medically and ethically justified by most of the medical communities?

This short article on a case report of the "Composite Tissue Allograft Transplantation of Cephalocervical Skin Flap and Two Ears" has raised many questions. Our major concern was the wrong message that this article may present to residents and the general readership who are not familiar with already established rules for the composite tissue allograft transplantations. Most would agree that this face transplant procedure should never have been performed in this high-risk patient.

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REFERENCES

1. Thompson, J. F., Scolyer, R. A., and Kefford, R. F. Cutaneous melanoma. *Lancet* 365: 687, 2005.
2. Shapiro, R. L. Surgical approaches to malignant melanoma: Practical guidelines. *Dermatol. Clin.* 20: 681, 2002.
3. Strome, M., Stein, J., Esclamado, R., et al. Laryngeal transplantation and 40-month follow-up. *N. Engl. J. Med.* 344; 1676, 2001.
4. Euvrard, S., Kanitakis, J., and Claudy, A. Skin cancer after organ transplantation. *N. Engl. J. Med.* 343: 1681, 2003.
5. Otley, C. C., and Maragh, S. L. Reduction of immunosuppression for transplant-associated skin cancer: Rationale and evidence of efficacy. *Dermatol. Surg.* 31: 163, 2005.
6. Butler, P. E. M., Clarke, A., and Ashcroft, R. E. Face transplantation: When and for whom? *Am. J. Bioethics* 4: 16, 2004.
7. Morris, P. J., Bradley, J. A., Doyal, L., et al. Facial transplantation: A working party report from the Royal College of Surgeons of England. *Transplantation* 77: 330, 2004.
8. Wiggins, O. P., Barker, J. H., Martinez, S., et al. On the ethics of facial transplantation research. *Am. J. Bioethics* 4: 1, 2004.
9. Siemionow, M., Unal, S., Agaoglu, G., et al A cadaver study in preparation for facial allograft transplantation in humans: Part I. What are alternative sources for total facial defect coverage? *Plast. Reconstr. Surg* 117: 864, 2006.
10. Siemionow, S., Agaoglu, G., and Unal, S. A cadaver study in preparation for facial allograft transplantation in humans: Part II. Mock facial transplantation. *Plast. Reconstr. Surg.* 117: 876, 2006.

The Use of the Pedicled Supraclavicular Flap in Noma Reconstructive Surgery

Sir:

As a complementary study to the publication by Heitland and Pallua,[1] we report our preliminary clinical experience with the folded supraclavicular flap in noma reconstructive surgery.[2]

Apart from all positive criticism, we would like to state that in noma surgery nothing is simple, in contrast to what is written. In particular, reconstructing an intraoral lining after release of a restricted mouth opening is a complex and daring challenge. To illustrate this, we present the following three cases of double-folded pedicled supraclavicular flaps for noma reconstructive surgery.

In case 1, a 45-year-old man presented with a left cheek defect with a score of 0-1-1-1-1-2-0 according to the NOITULP classification, which rates defects of the nose (N), outer cheek (O), and inner lining of the cheek (I), the presence of trismus (T), the upper lip (U), and the lower lip (L), and particular problems (P).[3] The original defect was recreated along with a trismus release. Part of the inner lining was reconstructed using a split scar cheek flap.[4] A supraclavicular flap was used to reconstruct part of the inner lining and the complete outer lining. To prevent compression of the pedicle, the flap was not tunnelled. Instead, the neck was opened and the pedicle of the skin flap was inset into this defect. The donor-site defect could be closed primarily after wide undermining. Some distal tip necrosis developed, and a nasolabial flap was used to close the resulting defect. Two months later, the supraclavicular flap was re-advanced to revise the commissure, and a neck scar was released with a Z-plasty.

In case 2, a 14-year-old girl presented with a defect of the left cheek, classified as NOITULP 0-2-2-2-2-1-0 (Fig. 1). After the defect was recreated, a supraclavicular flap was used to reconstruct the outer and inner lining (Fig. 2). The donor-site defect was closed primarily. A necrotectomy was necessary for distal tip necrosis. Later, a persistent orobuccal fistula was closed surgically. The final result was favorable.

In case 3, an 18–year-old man presented with a defect of the right cheek, classified as NOITULP 1-4-4-4-2-1-0. After the defect was recreated and a complete trismus release was performed, the outer and inner linings were reconstructed with a supraclavicular flap in one stage. The donor site was closed primarily. Some tip necrosis developed, followed by dehiscence at the connection with the upper lip. The 1-week postoperative result was an interdental mouth opening distance of 30 mm. Unfortunately, no long-term follow-up of this patient is available.

In the presented cases, all three flaps showed signs of distal tip necrosis. Maybe delaying the flaps could have prevented this phenomenon. Further experience in this matter is needed.

Unlike what is stated by the authors, in our opinion, tunnelling of the supraclavicular flap is counteradvised.

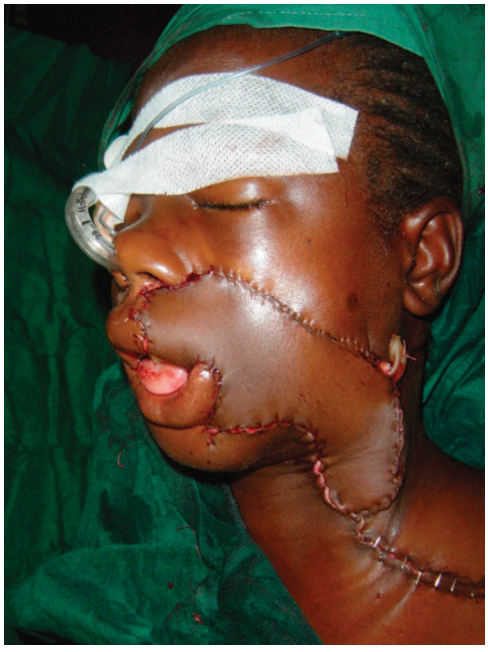

Fig. 1. A 14-year-old girl presented with a defect of the left cheek caused by noma, with a NOITULP classification 0-2-2-2-2-1-0. After the defect was recreated, a complete trismus release was performed and a right-side supraclavicular flap was raised. The flap was designed to reconstruct the outer lining as well as the inner lining in one stage. The inner lining was reconstructed by folding the flap.

Fig. 2. The final result of the folded supraclavicular flap for reconstructing a noma cheek defect was favorable.

Compression of the vascular pedicle in the tunnel might endanger the already compromised flap viability. Instead, the pedicle can be inset into the neck. A second operation to cut the pedicle is then unnecessary. When using this technique, Z-plasties should be used to prevent linear scar contraction.

In conclusion, in noma surgery nothing is ideal and nothing is simple. The adage should be to turn "the face of poverty" into the looks of the healthy and wealthy.

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REFERENCES

1. Heitland, A. S., and Pallua, N. The single and double-folded supraclavicular island flap as a new therapy option in the treatment of large facial defects in noma patients. *Plast. Reconstr. Surg.* 115: 1591, 2005.
2. Hartman, E. H., Van Damme, P. A., and Suominen, S. H. The use of the pedicled supraclavicular flap in noma reconstructive surgery. *Ann. Plast. Surg.* Submitted for publication.
3. Marck, K. W., de Bruijn, H. P., and Schmidt, A. Noma: The Sokoto approach. *Eur. J. Plast. Surg.* 21: 277, 1998.
4. Kuhnel, T. S., Dammer, R., Dunzl, B., Beule, A. G., and Strutz, J. New split scar cheek flap in reconstruction of noma sequelae. *Br. J. Plast. Surg.* 56: 528, 2003.

"Keystone" Approach for Intracranial Nasofrontal Dermoid Sinuses

Sir:

I read the article by Drs. van Aalst, Luerssen, Whitehead, and Havlik (*Plast. Reconstr. Surg.* 116: 13, 2005) with great interest. The authors describe their technique as a new "keystone" approach. Obviously, the authors are not aware that this approach and the related advantages have already been described for many years as the subcranial approach. Having developed this approach in 1978 for the management of combined complex skull base and fronto-orbital/midface injuries and for correction of congenital anomalies/hypertelorism, I would prefer to allude first to the subcranial approach as utilized in tumor cases.

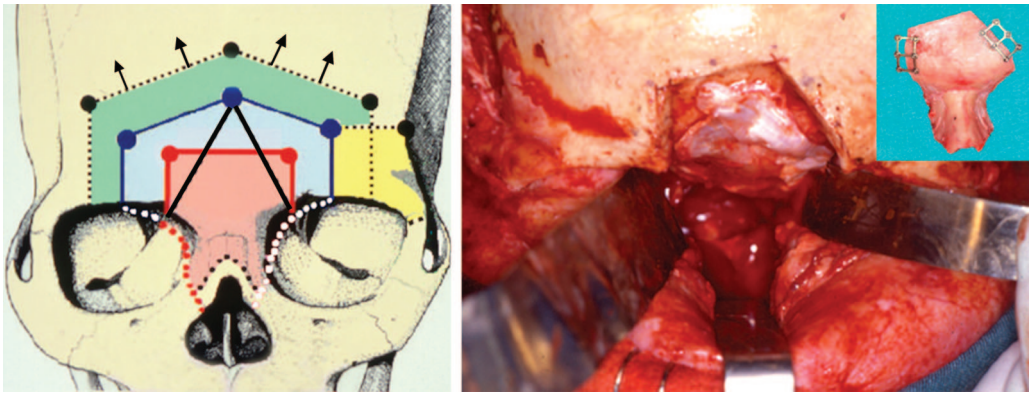

Fig. 1. (*Left*) Schematic illustration of the subcranial approach with different osteotomies. (*Right*) Removal of the frontonasal segment, exposed frontal lobes, and the skull base up to the sphenoid/clivus.

Figures 1 and 2 clearly depict the temporary en bloc removal of the frontonasal segment, while the frontal osteotomies/craniotomy can be deliberately extended or reduced depending on the tumor extensions. This enables simultaneous anterior broad exposure of the intracranial, anterior, and central skull base tumors, as well as the extracranial regions, under direct vision using one and the same approach; frontal lobe retraction or other external approaches and skin incisions are avoided. Thus, radical en bloc tumor removal, avoiding unnecessary damage to the vital structures, and optimal reconstruction represent major advantages. Management of injuries and congenital deformities by the subcranial approach implies different osteotomies, but the concept—based on anterior, intracranial, and extracranial exposure and management of the anterior and center of the skull base—remains the same. In injuries and skull base fractures, including intracranial dislocated fragments, vast dural tears, cerebrospinal fluid leaks, and brain tissue herniation into the disrupted ethmoid/sphenoid, management by the subcranial approach offers major advantages. Avoiding transfrontal access and frontal lobe retraction often implies deferral of definitive management until the brain pressure subsides; early one-stage reconstruction within the first 24 hours and, if indicated, immediate optic nerve decompression represent major advantages of the subcranial concept. Further advantages, as well as the correction of telorbitism, have been described.

According to the guidelines, only a few representative articles are included.[1–8] As the subcranial approach has gained popularity, multiple articles have been published by others confirming the advantages. For those who are interested in additional articles or book chapters, I am at their disposal. In my opinion, there is no justification to declare the "keystone" approach a new technique. Independent of the lesion, the approach is the same as the subcranial approach.

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REFERENCES

1. Raveh, J., Laedrach, K., Speiser, M., et al. The subcranial approach for fronto-orbital and anteroposterior skull-base tumors. *Arch. Otolaryngol. Head Neck Surg.* 119: 385, 1993.
2. Raveh, J., Turk, J., Laedrach, K., et al. The extended anterior subcranial approach for skull base tumors: Long-term results. *J. Neurosurg.* 82: 1002, 1995.
3. Raveh, J., and Vuillemin, T. The subcranial-supraorbital and temporal approach for tumor resection. *J. Craniofac. Surg.* 1: 53, 1990.
4. Laedrach, K., Remonda, L., Lukes, A., Schroth, G., and Raveh, J. Evaluation of the contribution of CAS in combination with the subcranial/subfrontal approach in anterior skull base surgery. *Skull Base* 11: 59, 2001.
5. Raveh, J., and Neiger, M. Restoration in severe craniofacial injuries. *Schweiz. Mschr. Zahnheilk.* 91: 206, 1981.
6. Raveh, J., and Vuillemin, T. The surgical one-stage management of combined cranio-maxillofacial and frontobasal fractures: Advantage of the subcranial approach in 374 cases. *J. Craniomaxillofac. Surg.* 16: 160, 1988.
7. Raveh, J., Laedrach, K., Vuillemin, T., and Zingg, M. Management of combined fronto-naso-orbital/skull base fractures and telecanthus in 355 cases. *Arch. Otolaryngol. Head Neck Surg.* 118: 605, 1992.
8. Vuillemin, T., and Raveh, J. The subcranial approach for the correction of hypertelorism. *J. Craniofac. Surg.* 1: 91, 1990.

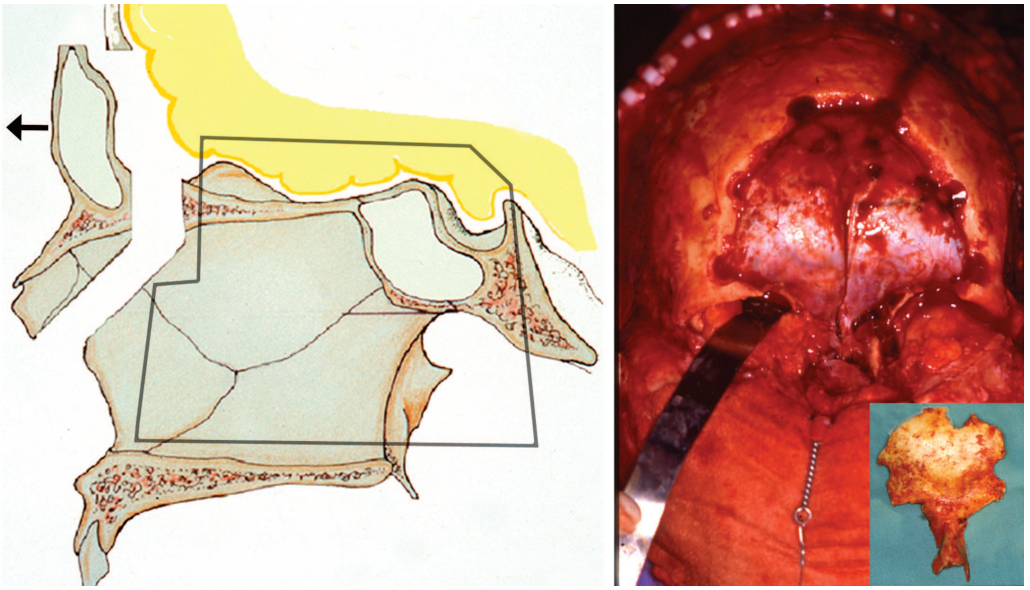

Fig. 2. (*Left*) Schematic sagittal illustration depicting exposure of intracranial and extracranial skull base tumor extensions (*box*). (*Right*) Larger frontonasal segment for extensive tumors.

Involvement of the Basilar Coronal Ring in Unilateral Coronal Synostosis

Sir:

The study by Rogers and Mulliken[1] on the involvement of the basilar coronal ring in unilateral coronal synostosis supports that the fusion starts at the middle portion of the frontoparietal suture (i.e., the coronal suture) and secondarily progresses to the frontosphenoidal suture and the anterior fontanel. In their study, the frontosphenoidal suture was not involved in the first 3 months, and they specified that only the lateral portion of the frontosphenoidal suture was involved between 3 and 5 months, when the fusion was not extended to the medial portion. This finding correlates well with my anatomic study[2] of the morphogenesis of the sphenofrontal suture.[3] My co-workers and I have shown that the sphenofrontal suture is composed of two distinct morphogenesis subunits, the lateral sphenofrontal suture and the orbitosphenofrontal suture, so it is not surprising that their involvement may be different. The lateral sphenofrontal suture is a real cranial suture like the coronal suture, because it is formed between two membranous bones, the great wing of the sphenoid and the frontal bone. Therefore, the orbitosphenofrontal or medial portion of the sphenofrontal suture is quite different, because even if it has a cranial suture structure with five layers, as described by Pritchard et al.,[4] it is formed between a membranous bone (frontal bone) and an endochondral bone (i.e., the lesser wing of the sphenoid). The former bone corresponds with the chondromembranous junction between the dermatocranium and the neurocranium. Endochondral ossification of the ala orbitalis gives the lesser wing of the sphenoid, but some portion of the ala orbitalis, the dorsolateral process, and the sphenoethmoidal cartilage regress without ossifying. The dorsolateral process extends to the sphenoidal fontanel, and the sphenoethmoidal cartilage extends to the orbital roof. In embryo, these two cartilaginous structures take place in the future lateral portion of the sphenofrontal suture and the sphenoidal fontanel, and as suggested Venes and Burdi,[5] the absence of regression of the orbitosphenoid may be the first event in coronal ring synostosis, especially that the regression progress in the out-in way. Thus, the absence of regression and the ossification of the ala orbitalis could lead to a growth defect of the hemicoronal ring that should start outward (calvaria) and progress inward (skull base). My co-workers and I agree that fusion of the basilar coronal ring is responsible for the anterior cranial base deformation seen in unilateral coronal synostosis. The involvement of the anterior cranial base is constant in unilateral coronal synostosis,[6] and the synostosis extension into the basilar coronal hemiring is not associated with increased cranial base angulation, as shown in the study of Rogers and Mulliken,[1] which suggests that the impaired growth of the anterior cranial base is not directly associated with the fusion of the lateral sphenofrontal and coronal sutures. As proposed by Venes and Burdi,[5] I suggest that the defect of the orbitosphenoid regression is the primary event in nonsyndromic unilateral coronal synostosis.

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1. Rogers, G., and Mulliken, J. Involvement of the basilar coronal ring in unilateral coronal synostosis. *Plast. Reconstr. Surg.* 115: 1887, 2005.
2. Captier, G., Cristol, R., Montoya, P., Prudhomme, M., and Godlewki, G. Prenatal organization and morphogenesis of the sphenofrontal suture in humans. *Cell Tissues Organs* 175: 98, 2003.
3. Federative Committee on Anatomical Terminology. *Terminologia Anatomica: International Anatomical Terminology.* Stuttgart/New York: Thieme, 1998.
4. Pritchard, J., Scott, J., and Girgis, F. The structure and development of cranial and facial sutures. *J. Anat.* 93: 73, 1956.
5. Venes, J., and Burdi, A. Proposed role of the orbitosphenoid in craniofacial dysostosis. *Concepts Pediatr. Neurosurg.* 5: 126, 1985.
6. Captier, G., Leboucq, N., Bigorre, M., et al. Plagiocephaly: Morphometry of the skull base asymmetry. *Surg. Radiol. Anat.* 25: 226, 2003.

Complications after Pi Plate Osteosynthesis

Sir:

We read with interest the article entitled "Complications after Pi Plate Osteosynthesis," by Dr. Sánchez et al.[1] Dr. Sánchez and his colleagues should be praised for their extensive experience with the dorsally placed Pi plate for fractures of the distal radius. However, we have some concerns with their study design. In response to several reports of extensor tendon complications after use of the high-profile dorsal Pi plate,[2–4] the authors examined the rate of complications after use of the Pi plate, specifically extensor tendon rupture, which occurred in 1.3 percent of their patients. While they noted that rupture occurred within the first 8 months after surgery, they also removed 75.5 percent of the plates within the first 6 to 8 months after surgery. Because the majority of their patients had the plate removed after a relatively short amount of time following the index procedure, any conclusions regarding the incidence of hardware-related complications is grossly suspect. It is obvious that the incidence of extensor tendon irritation or rupture would be much higher in this case series had the plates not been removed. Indeed, during hardware removal, tenosynovitis of the extensor compartments was noted in 9.2 percent of patients, although not all of these patients were symptomatic. In the patients who did not have their implants removed, 12 percent noted persistent pain with flexion or extension, but no explanation is given for these symptoms.

We strongly agree with the authors that extensor tendon complications can be minimized by reconstructing the extensor retinaculum over the plate, thereby preventing direct contact between the tendons and the hardware. However, they do not clearly state whether or not this had been performed in their cases with tendon rupture. Despite preserving the extensor retinaculum, we have noted a high incidence of extensor tenosynovitis and tendon rupture in patients treated with the dorsal Pi plate (Fig. 1). A study performed by the senior author (P.K.B.) examined 28 patients in whom either a dorsal Pi plate (high-profile plate) or a low-profile dorsal plate had been used. Nine patients (32 percent) required reoperation for hardware removal or extensor tendon reconstruction, and all nine patients had been treated with a dorsal Pi plate ($p < 0.025$).[5] Although this was a small study, the significant difference in outcomes between the two plating systems studied cannot be dismissed.

Given the long-term, significant difference in the rates of extensor tendon rupture between the Pi plate and low-profile plates, we have stopped using the Pi plate entirely for unstable fractures of the distal radius. Although we agree with the authors that to date there is no perfect implant for use in these challenging cases, we do not believe that the Pi plate remains an acceptable option given its relatively high rate of extensor tendon rupture.

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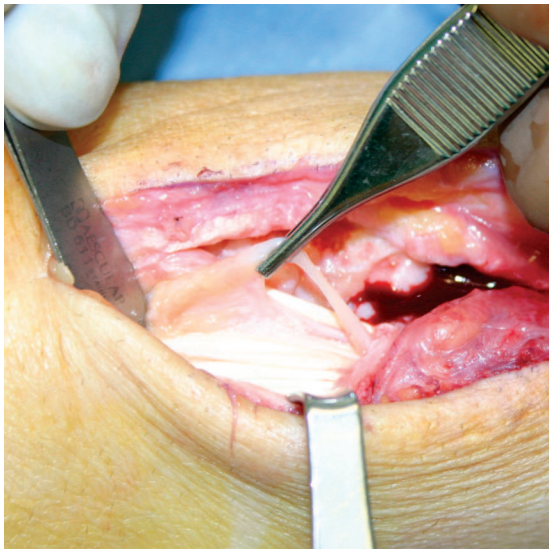

Fig. 1. Tenosynovitis after dorsal Pi plate for fracture of the distal radius.

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1. Sánchez, T., Jakubietz, M., Jakubietz, R., Mayer, J., Beutel, F. K., and Grünert, J. Complications after Pi plate osteosynthesis. *Plast. Reconstr. Surg.* 116: 153, 2005.
2. Kambouroglou, G. K., and Axelrod, T. S. Complications of the AO/ASIF titanium distal radius plate system (pi plate) in internal fixation of the distal radius: A brief report. *J. Hand Surg. (Am.)* 23: 737, 1998.
3. Schnur, D. P., and Chang, B. Extensor tendon rupture after internal fixation of a distal radius fracture using a dorsally placed AO/ASIF titanium pi plate. *Ann. Plast. Surg.* 44: 564, 2000.
4. Lowry, K. J., Gainor, B. J., and Hoskins J. S. Extensor tendon rupture secondary to the AO/ASIF titanium distal radius plate without associated plate failure: A case report. *Am. J. Orthop.* 29: 789, 2000.
5. Rozental, T. D., Beredjiklian, P. K., and Bozentka, D. J. Functional outcome and complications following two types of dorsal plating for unstable fractures of the distal part of the radius. *J. Bone Joint Surg. (Am.)* 85: 1956, 2003.

Complication Rates in Inferior Pedicle Reduction Mammaplasty

Sir:

We read with great interest the article entitled "A Comparison of Complication Rates in Large and Small Inferior Pedicle Reduction Mammaplasty" by O'Grady et al. (*Plast. Reconstr. Surg.* 115: 736, 2005). We commend the authors for dealing with this matter, and also for producing a very valuable report. We would like to present our own experience on the matter, focusing on some of the complications mentioned in the article and their etiologic factors. It is very interesting that the only complication with a statistically significant difference between small and large reductions was wound healing in general (encompassing wound infection, wound dehiscence, and delayed healing, which in our view are all interrelated).

The issue of nipple/areola necrosis (0.4 percent overall incidence in the article) depends more on the length and base width of the pedicle that on any other variable. Although the inframammary fold-to-nipple distance was one of the variables collected in this study, the authors did not comment on the relationship between this distance and nipple survival. Our own experience is that this is the most significant factor in predicting and avoiding this complication and that, irrespective of the predicted resection weight, pedicle length (as predicted by inframammary fold-to-nipple distance) should be measured in all patients and taken

into account in the process of technique selection and pedicle design.

Wound dehiscence, especially at the T junction, depends on various factors, the most important being wound infection and tension of the wound edges. The authors' overall dehiscence rate was 8.6 percent (6.9 percent for small reductions and 16 percent for larger reductions). Our own wound dehiscence rate was 4.6 percent in a series of 371 patients,[1] with a mean resection weight of 790 g per breast. We believe that the difference lies in the appreciation of the role of tension at the T junction. We believe that leaving a small triangle of skin at the inframammary fold helps reduce the tension and thus minimizes the incidence of this complication.

Wound infection was found to be significantly different between the two groups, but we would like to draw attention to a variable that we believe plays a critical role in infection: duration of surgery. Large breasts consist mainly of fatty tissue, and prolonged operative times (often associated with large reductions) result in drying out of fat at the wound edges with resultant higher infection rates. We believe that keeping the flaps and the pedicle moist (i.e., with saline-soaked packs) deals with this problem quite efficiently.

The overall incidence of hematoma in this article was 4.1 percent (3.7 percent in small reductions and 6 percent in large reductions), 10-fold the incidence found in our own series (0.3 percent).[1] Although use of preoperative infiltration with an epinephrine-containing solution is not commented on in this article, we believe that it is most effective in minimizing bleeding and hematoma formation, and we certainly attribute our own low incidence to it.[2]

Fat necrosis is a result of dubious blood supply to areas of fat, and in our view, it results from a combination of infection and bad surgical technique, with smoking obviously playing a role as well. Our own fat necrosis incidence is similar to the incidence observed in the article (0.8 percent versus 1.5 percent).[1,3] The way to minimize the problem is careful patient selection and careful surgical technique, avoiding leaving areas of loose fat during flap and pedicle dissection.

Loss of nipple sensation (5.6 percent overall incidence in the article) depends largely on technique. The nerve supply to the nipple is derived from perforating branches of the third through fifth intercostal nerves, which penetrate the pectoralis major muscle and course along the muscle surface before entering the gland.[4,5] The nerves tend to stay close to the layer of the deep fascia on the anterior surface of the pectoralis major muscle, passing at first through the deepest part of the subcutaneous tissue and then into the base of the breast. They only incline superficially toward the nipple as they approach their destination. In light of these findings, we leave 0.5 to 1 cm of fat and breast tissue on the pectoralis major, starting from the base of the pedicle and extending upward along the whole length of the muscle and laterally until we reach the lateral flaps. We believe this is the main reason for the low incidence of loss of nipple sensation in our own series.[1,6]

Again, we congratulate the authors on their excellent publication, and we hope that our own experience can be of some use to the reader.

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REFERENCES

1. Mandrekas, A. D., Zambacos, G. J., Anastasopoulos, A., and Hapsas, D. A. Reduction mammaplasty with the inferior pedicle technique: Early and late complications in 371 patients. *Br. J. Plast. Surg.* 49: 442, 1996.
2. Mandrekas, A. D., and Zambacos, G. J. Preoperative infiltration with lidocaine and epinephrine for breast reduction. *Plast. Reconstr. Surg.* 103: 2087, 1999.
3. Mandrekas, A. D., Assimakopoulos, G. I., Mastorakos, D. P., and Pantzalis, K. Fat necrosis following breast reduction. *Br. J. Plast. Surg.* 47: 560, 1994.
4. Craig, R. D. P., and Sykes, P. A. Nipple sensitivity following reduction mammaplasty. *Br. J. Plast. Surg.* 23: 165, 1970.
5. Climo, M. S., and Alexander, J. E. Intercostothelial circulation: Nipple survival in reduction mammaplasty in the absence of a dermal pedicle. *Ann. Plast. Surg.* 4: 128, 1980.
6. Zambacos, G. J., and Mandrekas, A. D. Breast-feeding after inferior pedicle reduction mammaplasty. *Plast. Reconstr. Surg.* 107: 294, 2001.

Reply

Sir:

Thank you for the opportunity to reply to Drs. Zambacos and Mandrekas' comments. We thank them for their comments and appreciate their sharing of their considerable experience in this field.

Drs. Zambacos and Mandrekas state that the issue of nipple/areola necrosis depends more on the length and base width of the pedicle. Although in general we agree with this assertion, in our article this complication was rare (one patient developed partial necrosis in one breast and went on to heal uneventfully without another intervention). In the absence of a substantial number of target "end-points" (i.e., nipple necroses), it is difficult to translate this general belief as an evidence-based conclusion.

It is a well-known plastic surgery principle that random flap viability depends on the length-to-width ratio of the pedicle. This varies in some flaps from as little as 2:1 in areas of poor blood supply to as great as 5:1 or 6:1 in areas of robust vascularity, such as the head and neck region. Where the breast lies in this range is

unclear. The pedicle width that was used in all of the reductions in our study measured between 6 and 8 cm. When the pedicle is long, some plastic surgeons recommend other techniques, most notably free nipple grafting. Jackson and colleagues addressed the importance of pedicle length some 5 years ago.[1] They found that although the distance from the suprasternal notch to the nipple was dispersed over a wide range with a trimodal distribution, with peaks at the intervals of 23 to 27 cm, 28 to 33 cm, and 34 to 45 cm, the values of the nipple-to-inframammary fold distance showed a normal distribution pattern, with a peak at 14 cm. On the basis of the constant distance from the inframammary fold to the nipple, these authors concluded that free nipple grafting is never indicated. Our experience supports this statement. The senior author (A.T.) has not used the free nipple graft in more than 20 years of practice, despite having to resect on occasions 2 kg per breast. At these extremes, admittedly, closing the incision without tension can be challenging. It is on these occasions that we have also used a small triangle of skin at the inframammary fold to relieve the tension, as mentioned by Drs. Zambacos and Mandrekas.

In our group, we are not as much concerned with the length of the pedicle as we are concerned with the width and thickness of the parenchymal base. The width and thickness of the parenchymal base are more likely to ensure the "capture" of adequate perforators to maintain the viability of the nipple.

Certainly wound dehiscence at the inverted T junction remains one of the most common problems after reduction mammaplasty. We agree that tension is perhaps the most important factor in determining the degree to which normal healing occurs in this area. We have demonstrated a significant difference in wound dehiscence rates (16.0 percent versus 6.9 percent) between our large and small reductions (average weight, 1310 g versus 534 g). One plausible explanation is the greater tension at the T junction in larger reductions. This may lead to impaired vascularity, as suggested in our article.

The hematoma rate that was reported in our study consisted of all hematomas that required surgical drainage, including aspiration in a clinic setting. It is worth noting that only one of our patients had to return to the operating room for operative intervention. This reduces our rate to 0.4 percent, which is in keeping with rates reported by Drs. Zambacos and Mandrekas. All patients in our study received infiltration with dilute epinephrine solution. We, too, have found this to be invaluable in reducing the blood loss in this procedure and agree with our colleagues that this is an effective technique. We believe that this is now the standard of care.

We could not agree more that careful patient selection and meticulous surgical technique are imperative to a satisfactory outcome for both patient and surgeon. In addition to Drs. Zambacos and Mandrekas' suggestion to keep the breasts moist, we routinely rinse the surgical field with saline solution before closure, to remove any small pieces of fat globules that have divided from their blood supply. We believe that this helps to minimize our rates of infection.

With regard to nipple sensory preservation, we agree totally with Drs. Zambacos and Mandrekas' recommendations of leaving a layer of fat above the pectoralis major. Exposure of the pectoralis muscle during routine reduction mammaplasty is more likely to impair the sensation of the nipple than when one does not encounter the pectoralis at all.

As this was a retrospective study, we cannot comment on the sensitivity of the nipple-areola complexes. We can only state that our patients experienced a subjective difference in only 5.6 percent of reductions overall. The most interesting finding from our study was the salutary effect of extended antibiotic coverage. This needs to be corroborated by other investigators.

Overall, it is clear that the experience of inferior pedicle reduction mammaplasty is similar in many jurisdictions. There is a possibility that the observed variation in complication rates in different reported studies may be due ascertainment bias rather than to variations in surgical technique.

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REFERENCE

1. Jackson, I. T., Bayramicli, M., Gupta, M., and Yavuzer, R. Importance of the pedicle length measurement in reduction mammaplasty. *Plast. Reconstr. Surg.* 105: 2269, 1999.

Deepithelialization of Pedicle in Breast Reduction: The Maze Technique

Sir:

I enjoyed reading the article by Khan and Oudit entitled "Deepithelialization of Breasts with Scissors."[1] Though this has been described previously,[2] I would like to compliment the authors on a concise, well-presented, and well-illustrated point of technique.

In my experience, this technique is very practical and useful, particularly when one is operating with only the scrub nurse as an assistant. The only downside is that each strip that is held in the pair of forceps is difficult to get rid of, because it sticks to the toothed forceps. To get rid of this problem, I suggest that, instead of making

parallel linear cuts at 0.5 cm, staggered cuts be made, with cuts from the medial end stopping 0.5 cm (or preferably less) short of the lateral edge of the pedicle and vice a versa, in the form of a "maze" (Fig. 1). This way, if one skin strip is held, the entire deepithelialization can be performed just by holding that strip and working your way toward the top (Fig. 2). Also, once a sufficient length of strip has been deepithelialized, the traction can be well maintained by wrapping the strip around a gauzed finger. Thus, with no further need for the forceps, there is no need to get rid of one excised strip and to pick the next one. The whole process is quicker and less tiring.

In addition, it makes it easier if, instead of tying the tourniquet and starting deepithelialization from areola to base, the breast is held firmly against the chest wall in an inferosuperior direction, so as to stretch the skin; then the lowest strips can be excised first. This way, the most difficult part of the process is done first, when the upper part of the pedicle is intact and not slippery with blood for the traction. Once the lowest part is done, the tourniquet can be put in place and rest of the deepithelialization can be carried out in continuation.

It can be argued that using a pair of scissors does not seem to be very elegant for such a delicate maneuver, but in practice it is simple, safe, and effective. Moreover, it does save time, particularly when one is operating alone. Those who have reservations about using a pair of scissors may find that using the knife to make the same incisions works just as well. I have found this maze technique to be versatile for all types of pedicles that need deepithelialization, and I highly recommend it to the learned readers.

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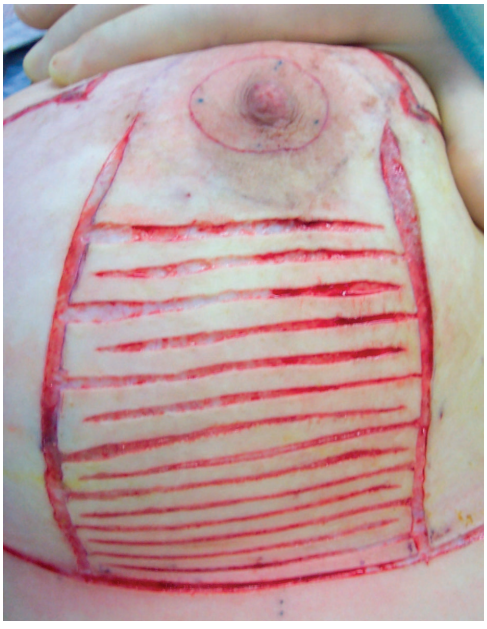

Fig. 1. The "maze" pattern of staggered incisions. It is easier to maneuver scissors around the corners if the incisions stop 2 to 3 mm before the edge.

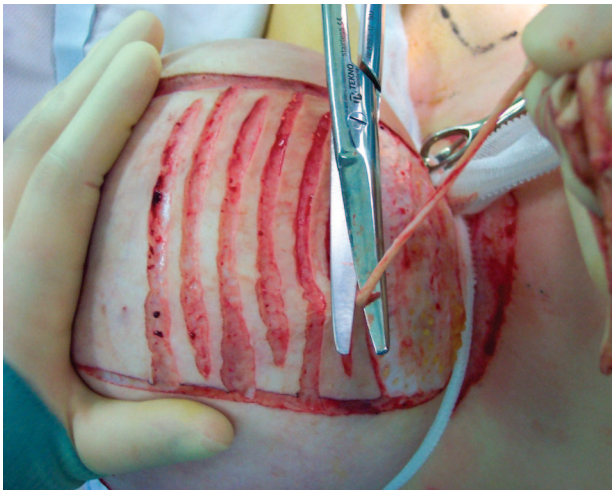

Fig. 2. Tourniquet in place, once the lower part has been deepithelialized. Note the strip of skin being held for traction wrapped on the gauzed finger.

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I adapted this technique from the one described by Benelli,[3] in which he recommends placing concentric periareolar incisions and simple traction for deepithelialization in periareolar mastopexy. I also acknowledge Mr. S. Rayatt for his help in preparing the manuscript and, together with Miss J. Webb, in giving a name to this technique.

REFERENCES

1. Khan, H. A., and Oudit, D. Deepithelialization of breasts with scissors. *Plast. Reconstr. Surg.* 115: 1798, 2005.
2. White, D. J., and Maxwell, G. P. Breast reduction. In B. Guyuron (Ed.), *Plastic Surgery Indications, Operations, and Outcomes.* Vol. 5. Philadelphia: Mosby, 2000. P. 2711.
3. Benelli, L. C. Periareolar Benelli mastopexy and reduction. In S. L. Spear (Ed.), *The Breast: Principles and Art.* Philadelphia: Lippincott-Raven, 1998. P. 689.

Concern about "A Prospective Study of Antibiotic Efficacy in Preventing Infection in Reduction Mammaplasty"

Sir:

We are writing to challenge the conclusions made by Ahmadi et al.[1] that were published in the July 2005 issue of *Plastic and Reconstructive Surgery*. We are concerned that casual readers may be persuaded

to change their clinical practice based on the egregious findings and conclusions presented in this article.

Ahmadi et al.[1] should be congratulated in their attempt to answer a hot topic question: are postoperative antibiotics really necessary in clean surgical cases? Regrettably, their experimental design is fatally flawed. Therefore, their conclusions are equally flawed. The problems we have with their study design are described below.

1. The study was not blinded. Surgeons and residents were made aware of group assignments on the day of the procedure. Investigator bias was not controlled.

2. The sample size was too small. The number of patients enrolled in each of the three different groups was 17 or 16. This sample size for the data presented in their Figure 1 has a *power* of 0.06 to 0.10. In research, investigators hope to have a power of approximately 0.80 (most investigators report data with a power of 0.50). To have an adequate sample size for the data presented in their Figure 1, more than 1500 patients in each group would be necessary (for a power of 0.8) or 190 for a power of 0.5. Data with a low power result in a type II statistical error.[2]

3. It is astounding that the infection rate at the authors' institution (29 percent) in a clean case was 22 times higher than a historical infection rate of 1.3 percent[3] (rate of infection from 20,703 patients reviewed from 1982 through 1986). Even the two remaining groups that received preoperative antibiotics had unbelievably high infection rates of 18 to 25 percent. It is equally disturbing that the authors' rationale for not obtaining cultures of infected breasts was "once a cellulitic incision dehisces and produces purulent drainage, the wound quickly becomes contaminated with skin flora. Culture of the wound would then typically show mixed flora, including the usual inhabitants of skin."[1] This logic would preclude obtaining cultures of any cutaneous abscess, which is a departure from medically sound judgment.

In conclusion, let us summarize the American College of Surgeons recommendation on antibiotic prophylaxis for clean cases.[4] Antibiotic prophylaxis is not indicated in clean cases if the patient has no host risk factors or if the operation does not involve placement of prosthetic materials. Host and surgical factors that mandate antibiotic prophylaxis include having any two of these criteria: a patient with three concomitant diagnoses, an operation that is expected to last longer than 2 hours, and an abdominal operation. To be effective, the full antibiotic dose needs to be administered before skin incision. A single dose is usually effective, unless the operation is longer than 3 hours. In this case, a second dose should be given. The real hot topic question is, should postoperative antibiotics be given to patients who are expected to have surgical drains?

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REFERENCES

1. Ahmadi, A. H., Cohen, B. E., and Shayani, P. A prospective study of antibiotic efficacy in preventing infection in reduction mammaplasty. *Plast. Reconstr. Surg.* 116: 126, 2005.
2. Lochner, H. V., Bhandari, M., and Tornetta, P., III. Type-II error rates (beta errors) of randomized trials in orthopedic trauma. *J. Bone Joint Surg. (Am.)* 83: 1650, 2001.
3. Olson, M. M., and Lee, J. T., Jr. Continuous, 10-year wound infection surveillance: Results, advantages, and unanswered questions. *Arch. Surg.* 125: 794, 1990.
4. Meakins J. L., and Masterson, B. J. Prevention of postoperative infection. In *ACS Surgery: Principles and Practices.* WebMD, Inc., 2005.

The Ballooning Maneuver in Breast Augmentation

Sir:

I read Dr. Keramidas et al.'s letter about their new procedure, "the ballooning maneuver in breast augmentation."[1] I have been using this technique, though without external markings, for more than a quarter century. It was described in the *Journal* by Hoehn and Elliott in 1979.[2]

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REFERENCES

1. Keramidas, E., and Rodopoulos, S. The ballooning maneuver in breast augmentation. *Plast. Reconstr. Surg.* 115: 1795, 2005.
2. Hoehn, J. G., and Elliott, R. A., Jr. Use of an air pocket for estimation during augmentation mammaplasty. *Plast. Reconstr. Surg.* 63: 273, 1979.

Reply

Sir:

I thank Dr. Strasser for his letter informing us about the publication of this technique 25 years ago.[1] However, the words "new" and "procedure" are not mentioned in our original letter.[2] We described a simple technique which we considered quite useful during breast augmentation to visualize the progress of the pocket. We are pleased that Dr. Strasser confirms the usefulness of the technique, as he has been using it for a quarter of a century.

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REFERENCES

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2. Keramidas, E., Rodopoulou, S., and Khan, U. The ballooning maneuver in breast augmentation. *Plast. Reconstr. Surg.* 115: 1795, 2005.

The Thoracoacromial Vessels as Recipient Vessels in Microsurgery and Supermicrosurgery: An Anatomical and Sonographic Study

Sir:

We read with great interest the recent article by Kompatscher et al., entitled "The Thoracoacromial Vessels as Recipient Vessels in Microsurgery and Supermicrosurgery: An Anatomical and Sonographic Study" (*Plast. Reconstr. Surg.* 115: 77, 2005).

They concluded from the cadaver dissection and the sonographic evaluation of these vessels that the pectoral branch of the thoracoacromial vessels is consistently present and therefore these vessels are reliable as recipient vessels in reconstruction of the breast mound or other microsurgical procedures concerning the breast region. We fully agree with the authors that the thoracoacromial vessels or even subclavian vessels are always very good candidates for recipient vessels of microsurgical reconstruction of these regions, because these vessels are rarely affected by operations, infections, or irradiation. They also state that there has been no major interest in these vessels and that they have only been anecdotally mentioned as possible recipient vessels for free flap transfer.

We have used these vessels as recipient vessels for secondary reconstruction of the cervical esophagus after bilateral neck dissection and heavy irradiation as far back as 1979.[1] Since then, we have also used these vessels for breast or chest wall reconstruction after radical mastectomy and radiation therapy.[2] In some of our cases, not only thoracoacromial vessels but also subclavian vessels themselves were used as recipient vessels using end-to-side anastomosis. In some of our early cases, the clavicle was partially excised or divided temporarily for better access to these vessels, a technique that has been discontinued.

In 1996, we published an article about the selection of appropriate recipient vessels in difficult head and neck reconstructions and presented cases in which thoracoacromial vessels were used in difficult head and neck reconstructions when no other appropriate recipient vessels were available.[3] We also proposed the A-V loop formation using the thoracoacromial artery and cephalic vein for the purpose of accepting the free flap.

None of these articles was included in the reference list of Kompatscher et al.'s article. We believe at least one of the above-mentioned articles could have been cited in this article.

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REFERENCES

1. Harashina, T., Kakegawa, T., Imai, T., and Suguro, Y. Secondary reconstruction of oesophagus with free revascularized ileal transfer. *Br. J. Plast. Surg.* 34: 17, 1981.
2. Harashina, T., Inoue, T., Sasaki, K., Tanaka, I., and Kiyoizumi, T. Reconstruction of breast after super-radical mastectomy with a pedicled latissimus dorsi flap and a free TRAM flap. *Br. J. Plast. Surg.* 41: 361, 1988.
3. Takamatsu, A., Harashina, T., and Inoue, T. Selection of appropriate recipient vessels in difficult, microsurgical head and neck reconstruction. *J. Reconstr. Microsurg.* 12: 499, 1996.

"Flag" Drain Fixation: A Secure Method

Sir:

We read with interest the description of a secure method of drain fixation using a Steri-Strip "flag" and figure-of-eight fixation knot.[1] This technique undoubtedly simplifies drain fixation to some degree and is a useful addition to the surgeon's armamentarium. However, it is unclear why an elaborate figure-of-eight knot is necessary when a single suture through the flag would suffice.

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REFERENCE

1. Belloni, M., delli Santi, G., and Loreti, A. "Flag" drain fixation: A secure method. *Plast. Reconstr. Surg.* 115: 1805, 2005.

Arterial Supply to Type II Muscle after Fasciocutaneous Free Flap Transfer

Sir:

I read with interest the correspondence by Alkureishi and Ross entitled "Arterial Supply to Type II Muscle after Fasciocutaneous Free Flap Transfer"[1] that appeared in the March 2005 issue of the *Journal*. The question of how much an in situ muscle can be stripped of its blood supply before its vascularity is compromised is one I have often considered. Frequently, when raising a perforator flap, parts of the muscle being dissected become dusky, but these segments turn pink again after 15 to 30 minutes. I have presumed that this represents the physiological redistribution of blood flow to the muscle segment after the dominant supply to that part has been disrupted. However, our understanding of the changes that occur to the blood supply of a type II muscle following division of its dominant pedicle is poor.

The authors state that "Mathes and Nahai's classification suggests that the minor pedicle cannot sustain the vastus muscle alone, and so it may be reasonable to expect a degree of muscle necrosis and resultant postoperative donor-site problems." I take issue with this statement and do not think that this expectation is "reasonable," as they misquote Mathes and Nahai's classification. The classification relates to muscle viability after transposition as a flap, as Alkureishi and Ross initially state, and not to muscle viability in situ, as they then later refer to it in the case of an anterolateral thigh flap harvest. Therefore, the usefulness of the Mathes and Nahai classification is in informing us that a type II muscle transferred on its minor pedicle(s) alone is unlikely to survive in its entirety, as they mention in their original article.[2]

I do not recall ever having seen obvious clinical evidence of muscle necrosis following anterolateral thigh flap harvest. As the authors say, donor-site morbidity with anterolateral thigh harvest is extremely good. The vastus lateralis seems to be adequately perfused in situ, provided excessive stripping is not performed. Dissection of any perforator flap will demonstrate, in addition to any named minor pedicles, the presence of numerous muscular branches, particularly of small caliber, coming from a variety of directions and therefore different source arteries. These have no useful role for muscle transfer but do contribute to its vascularity in situ.

Although the authors are correct in raising the question of muscle perfusion after perforator flap harvest, provided the dissection is performed with care, the blood supply appears to take care of itself. Whether this is solely via the minor pedicle(s) or by, as they say, recruitment of additional supply is not known. However, with dissection of a perforator flap, denervation rather than devascularization is probably a far greater cause of postoperative morbidity. No functional advantage is gained in the use of perforator flaps over standard myocutaneous flaps if the muscle that is left behind is denervated. Perforator flaps should therefore be considered as "nerve-sparing," and every attempt should be made to preserve the innervation of the muscle, including microsurgical repair of nerves that have, of necessity, been divided.

I look forward to reading further studies by Alkureishi and Ross on this matter.

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REFERENCES

1. Alkureishi, L. W. T., and Ross, G. L. Arterial supply to type II muscle after fasciocutaneous free flap transfer. *Plast. Reconstr. Surg.* 115: 953, 2005.
2. Mathes, S. J., and Nahai, F. Classification of the vascular anatomy of muscles: Experimental and clinical correlation. *Plast. Reconstr. Surg.* 67: 177, 1981.

Three-Dimensional Anatomical Vascular Distribution in the Pectoralis Major Myocutaneous Flap

Sir:

It was a pleasure to read the article entitled "Three-Dimensional Anatomic Vascular Distribution in the Pectoralis Major Myocutaneous Flap" by Rikimaru et al. (*Plast. Reconstr. Surg.* 115: 1342, 2005) and the accompanying Discussion by Ariyan (*Plast. Reconstr. Surg.* 115: 1353, 2005).

The authors of the article are to be congratulated for their thorough study aiming to overcome the bad reputation of the pedicled pectoralis major myocutaneous flap as a flap with an unstable blood circulation often associated with partial necrosis of the skin island. With their exact localization of perforating vessels to the skin and their clear explanation of how to design the skin island accordingly, the authors made an important contribution to an enhanced safety of this popular flap in head and neck surgery.

In commenting on the study, Ariyan pointed out that the partial or complete necrosis of the skin island was more the result of inappropriate harvesting or insufficient application of the flap rather than variability in the vascular distribution. In the same breath, Ariyan points to the axial blood supply of the pectoralis muscle along a line drawn from the shoulder tip to the xiphoid and recommends that the skin paddle preferentially should be taken along this axial course of the thoracoacromial vessels.

Yet, there is evidence that the course of the pectoral branch of the thoracoacromial vessels does not always follow that line drawn from the shoulder tip to the xiphoid. In commenting on the vascular axis, Cormack and Lamberty[1] pointed out that some of the vessels run

in the expected caudal-medial direction from the acromion to the xiphoid, but more commonly they pursue a course in a caudal-lateral direction until they approach the lateral border of the pectoralis major muscle. We made a similar observation in a recent study on 36 cadaveric hemithoraces, in which we examined the pectoral branches of the thoracoacromial vessels on the underside of the pectoralis major muscle as recipients in microsurgery[2] and assessed their position in relation to the sternal notch and in relation to the horizontal distance from the midsternal line. After the biggest branch (the pectoral branch divided frequently and early into lesser branches), the further distal we measured, the bigger the distance became from the midsternal line ($r = 0.9$, $p = 0.0$), significantly confirming a caudal-lateral direction of the vessels. To confirm these findings once more, we surveyed a sample of presently available cadavers at our institute ($n = 29$ hemithoraces, Fig. 1) and found a caudal-medial course of the pectoralis branches in only one-quarter of cases. In accordance, in most of the figures in the article by Rikimaru et al., the pectoral branch does not take a caudal-medial course either.

These findings indicate that there is noticeable variability in the vascular distribution and in the course of the axial blood supply to the pectoralis major muscle. This fact should be taken into account when aiming to design skin paddles along the pectoral branches of the thoracoacromial vessels.

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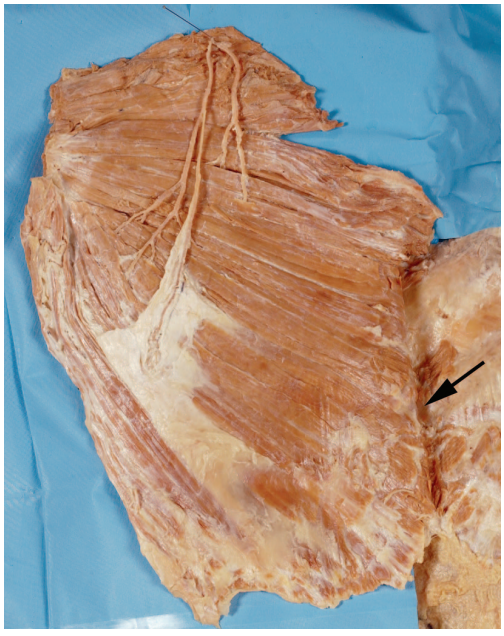

Fig. 1. The course of the pectoral branches of the thoracoacromial vessels on the undersurface of a left pectoralis major muscle fixed with "Frewein"[3] solution. The vessels run in a lateral-caudal direction. The *arrow* marks the sternal border.

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REFERENCES

1. Cormack, G. C., and Lamberty, B. G. *The Arterial Anatomy of Skin Flaps.* Edinburgh: Churchill Livingstone, 1986. Pp. 410–412.
2. Kompatscher, P., Manestar M., Schuster, A., Lang, A., Seifert, B., and Beer, G. M. The thoracoacromial vessels as recipient vessels in microsurgery and supermicrosurgery: A sonographic and anatomic study. *Plast. Reconstr. Surg.* 115: 77, 2005.
3. Frewein, J., Steinmann, W., and Muller, U. [Experiences with reduced formalin fixation of specimens and formalin-free preservation of anatomic samples]. *Anat. Histol. Embryol.* 16: 250, 1987.

Reply

Sir:

We have solved the problem of the unstable blood circulation in the skin paddle by devising the making method of the pectoralis major myocutaneous flap.[1–3] Our article[4] is proof of our current clinical approach based on microangiography that uses fresh cadavers. We are now safely performing the operation with the pectoralis major myocutaneous flap with a high success rate, similar to that of other free flaps.

We think that our results concerning the course of the main pectoral branch of the thoracoacromial artery corresponds to the observation Beer et al. According to our investigation of the microangiography of the pectoralis major muscle, the main pectoral branch runs vertically in a caudal-lateral direction on the back of the muscle body, in which this part of the pectoral branch around to the level of the third costal cartilage can be easily recognized by sight during the operation. The pectoral branches are then anastomosed (true anastomosis) to the muscular branches of the first, second, and third intercostal perforating branches of the internal thoracic artery that traverses the muscle body. In particular, the muscular branch of the third intercostal perforating branch was closely anastomosed with the periphery of the main pectoral branch. So when the pectoralis major myocutaneous flap is prepared, it is very important to take the entire pectoralis major muscle below the level of the third costal cartilage to preserve the blood supply from the pectoral branch in order to stabilize the blood circulation of the muscle

below the level of the fourth costal cartilage. We consider that this course of the main pectoral branch anastomosed with the muscular branch of the third intercostal perforating branch is similar to the axial blood supply described by Aryan[5] as a line draw from the shoulder tip to the xiphoid.

We have reported[4] that the pectoralis major muscle has two anatomical vascular territories that are divided into cranial and caudal portions at the level of the fourth costal cartilage, and that these two territories are connected with each other through the choke vessels at the level of fourth costal cartilage. When a pectoralis major myocutaneous flap is elevated, the blood supply from the pectoral branch passes through these choke vessels and then flows into the vascular network made of perforating branches in the fourth, fifth, and sixth intercostal spaces. Among these perforating branches, the ones in the fourth intercostal space are the largest in diameter, and blood supply from the pectoral blanch flows at first into those through the choke vessels and then into the others. Therefore, it is very important to include some perforators in the fourth intercostal space in the skin paddle. In particular, the one (we named it perforator IV-A)[1] located about 2 cm medial from the nipple is significantly large, and clinically it should be included in the skin paddle to stabilize the blood circulation in the skin paddle. In contrast, by including it in the skin paddle, we can design the skin paddle comparatively freely on the limited area we have reported.[4]

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REFERENCES

1. Kiyokawa, K., Tai, Y., Inoue, Y., et al. A method that preserves circulation during preparation of the pectoralis major myocutaneous flap in head and neck reconstruction. *Plast. Reconstr. Surg.* 102: 2336, 1998.
2. Kiyokawa, K., Tai, Y., Inoue, Y., et al. Reliable, minimally invasive oromandibular reconstruction using metal plate rolled with pectoralis major myocutaneous flap. *J. Craniofac. Surg.* 12: 326, 2001.
3. Kiyokawa, K., Tai, Y., Inoue, Y., et al. Minimally invasive functional reconstruction after extended oropharyngeal resection including soft palate and base of tongue using a pectoralis major myocutaneous flap. *Scand. J. Plast. Reconstr. Surg. Hand Surg.* 36: 71, 2002.
4. Rikimaru, H., Kiyokawa, K., Inoue, Y., et al. Three-dimensional anatomical vascular distribution in the pectoralis major myocutaneous flap. *Plast. Reconstr. Surg.* 115: 1342, 2005.
5. Ariyan, S. Further experiences with the pectoralis major myocutaneous flap for immediate repair of defects from excisions of head and neck cancers. *Plast. Reconstr. Surg.* 64: 605, 1979.

Experiences in Harvesting Type II Distally Based Anterolateral Thigh Flaps

Sir:

We read with great interest the recent article by Pan et al. entitled "Distally Based Anterolateral Thigh Flap: An Anatomic and Clinical Study" (*Plast. Reconstr. Surg.* 114: 1768, 2004). We congratulate the authors on their excellent work and their ideas.

We used a type II flap to reconstruct an exposed fibula head and common peroneal nerve after a tibiofibular fracture. Because the authors only present three type I clinical cases without any examples of type II cases, we would like to share our experience.

First, as we know, in the origin of the lateral circumflex femoral vessels, vascular branches and nerves were intermingled (Fig. 1). When we wanted to harvest a type II or IV distally based anterolateral thigh flap[1] by tracing from the transverse branch to the descending branch, we had to skeletonize all of the arteries, venae comitantes, and nerves. At the same time, the collateral branches between the venae comitantes were divided. As a result, when we elevated the flap, venous drainage[2] was blocked by valves of the descending branch of venae comitantes (Fig. 2, *left*). The authors suggest shifting from a distally based flap to a free style flap in this situation. However, it was usually necessary to use vein grafts to elongate the short pedicle of the transverse branch if we want to avoid using the recipient vessels near the trauma zone. In this situation, we had to use at least two long vein grafts to restore the cir-

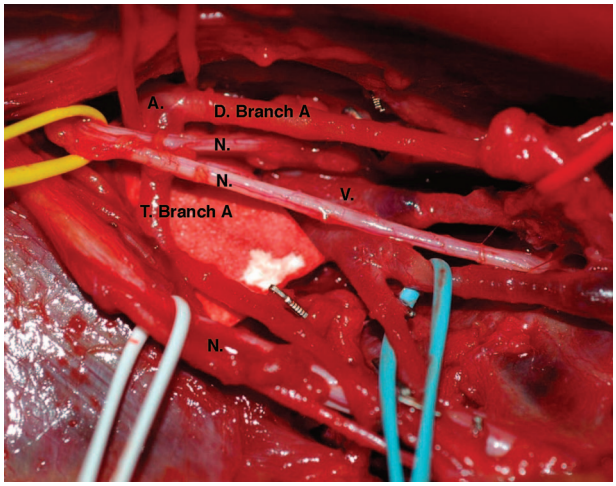

Fig. 1. The intermingled transverse (*T. branch A*) and descending branches (*D. branch A*) of the lateral circumflex femoral artery (*A.*), venae comitantes (*V.*), and accompanying motor nerves (*N.*) were skeletonized. The communicating branches between venae comitantes were divided after the procedure.

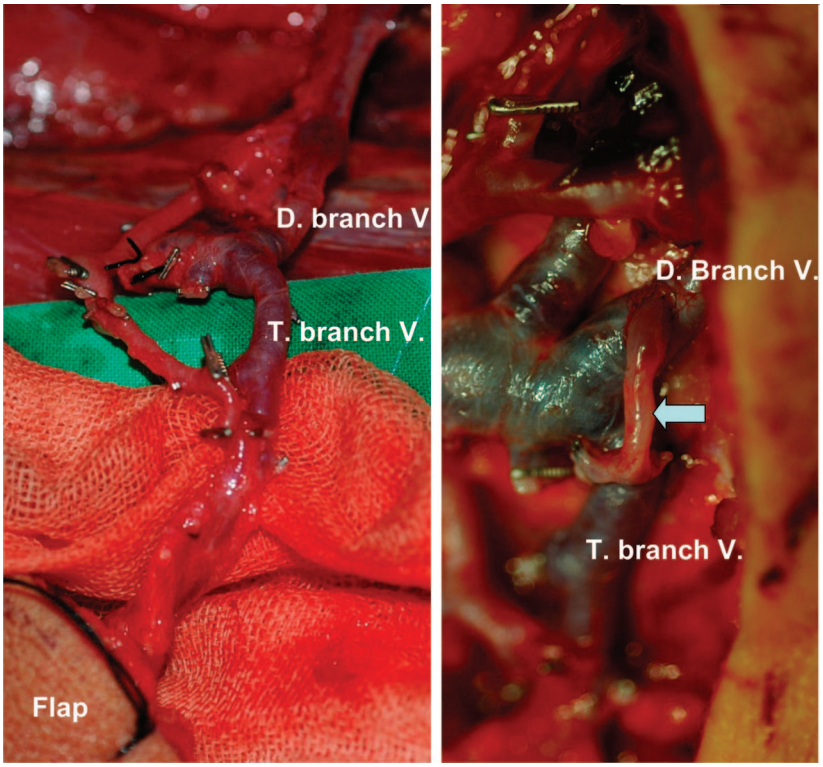

Fig. 2. (*Left*) After the type II distally based anterolateral thigh flap (*Flap*) was elevated by freeing the lateral circumflex femoral vessels, the venous drainage was blocked by valves of the descending branch of the venae comitantes (*D. branch V*). (*Right*) A short vein graft (*arrow*) was used as a conduit to bypass the obstructing valve between the descending (*D. branch V.*) and transverse (*T. branch V.*) branches of the venae comitantes.

culation of the flap. We propose another resolution here. A short vein graft that was harvested from the dorsal foot was used as a conduit to bypass the obstructing valve (Fig. 2, *right*). The venous congestion in the flap improved thereafter (Fig. 3).

Second, when we wanted to transpose the skin paddle of a type II or IV distally based anterolateral thigh flap, we had to divide the motor nerves that intermingled with the vessels. To preserve muscle function, nerve repairs were recommended. This may be why the authors did not recommend harvesting the type II or IV distally based anterolateral thigh flap.

In conclusion, when we want to elevate type II or IV distally based anterolateral thigh flaps, we have to face the problems of venous congestion and muscle denervation. We can solve them by using a bypass vein graft

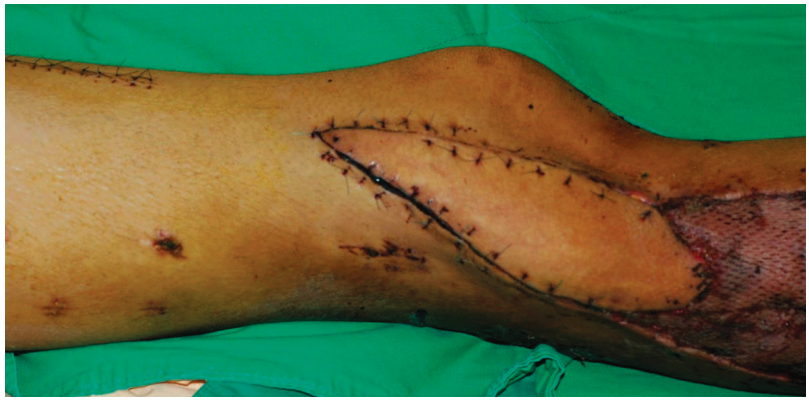

Fig. 3. The type II distally based anterolateral thigh flap was inset to cover the exposed common peroneal nerve and fibular head.

and neurotomy followed by nerve repairs, or change to a free flap procedure.

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REFERENCES

1. Shieh, S. J., Chiu, H. Y., Yu, J. C., et al. Free anterolateral thigh flap for reconstruction of head and neck defects following cancer ablation. *Plast. Reconstr. Surg.* 105: 2349, 2000.
2. Lin, S. D., Lai, C. S., and Chiu, C. C. Venous drainage in the reverse forearm flap. *Plast. Reconstr. Surg.* 74: 508, 1984.

Reply

Sir:

We thank Drs. Lin and Chien for the attention they gave to our article, "Distally Based Anterolateral Thigh Flap: An Anatomic and Clinical Study" (*Plast. Reconstr. Surg.* 114: 1768, 2004). We read with great interest their thoughtful comments about their experience with this flap.

Drs. Lin and Chien skeletonized all the arteries, venae comitantes, and nerves and also divided collateral branches between the venae comitantes while harvesting the type II distally based anterolateral thigh flap. It is not surprising that there was trouble with venous drainage. To preclude the problem of venous drainage, we dissected the vascular pedicle (the artery with its venae comitantes) as a group, preserving the communicating and collateral branches of the venae comitantes as much as possible, and isolated the motor nerve to the vastus lateralis muscle (Fig. 1). Lin et al.[1] demonstrated significant evidence of reverse-flow drainage via the "crossover pattern" of the communicating branches between the two venae comitantes and the "bypass flow" of the collateral branches of each vein. Ballmer and Masquelet[2] also described a reliable reverse-flow mediodistal fasciocutaneous island thigh flap, which they used to safely cover the defect around the knee. Thus, theoretically, the venous drainage of a distally based anterolateral thigh flap is ensured if communicating and collateral branches of the venae comitantes are well preserved. Furthermore, although there are two veins at the origin of the descending branch, usually only one vein accompanies the perforator.[3] Therefore, we think that a short vein graft as a conduit to bypass the obstructing valve is not always needed, because it unnecessarily prolongs the operation and increases the potential risk of venous thrombosis during microvascular anastomosis of the vein graft. We have recommended that a type II or type IV distally based anterolateral thigh flap can also be raised after ligation of the lateral circumflex femoral vessel proximal to the bifurcation of the transverse branch and descending branch, or the procedure can be changed to a free flap procedure to reconstruct the defect over the knee and upper leg.[4] However, we did not have any clinical cases of type II distally based anterolateral thigh flap at that time. Recently, Dr. Shieh, using a type II distally based anterolateral thigh flap without any superdrainage or turbodrainage procedure, successfully reconstructed a patient with a soft-tissue defect around the knee and an exposed Huckstep nail (Figs. 2 and 3). Though there were problems of redundant pedicle intraoperatively and transient venous congestion with flap swelling for a couple of days

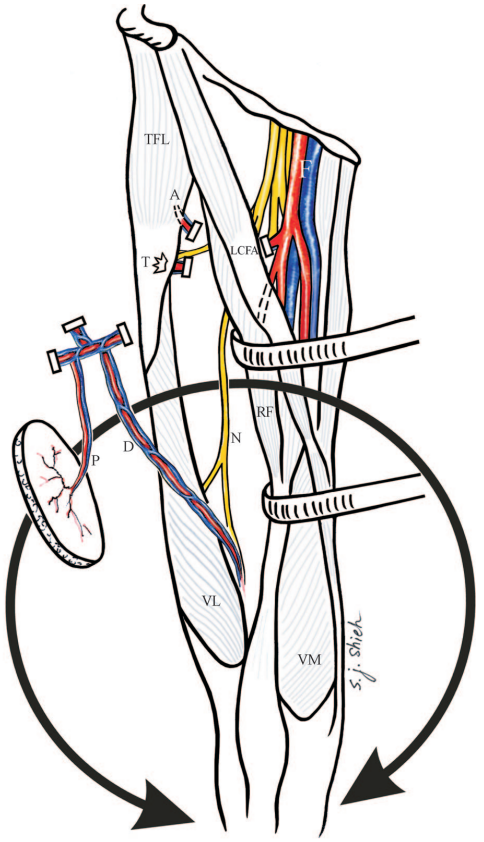

Fig. 1. The anterolateral thigh flap with type II or type IV perforators can be distally transposed with a wide rotational arc to reconstruct soft-tissue defects of the knee and upper third of the leg. The vascular pedicle is dissected with the artery and its venae comitantes as a group, and the motor nerve is always isolated and preserved to the degree possible. *F*, femoral artery and vein; *LCFA*, lateral circumflex femoral artery; *A*, ascending branch; *T*, transverse branch; *D*, descending branch; *P*, perforator; *N*, nerve to vastus lateralis muscle; *VL*, vastus lateralis muscle; *RF*, rectus femoris muscle; *VM*, vastus medialis muscle; *TFL*, tensor fasciae latae.

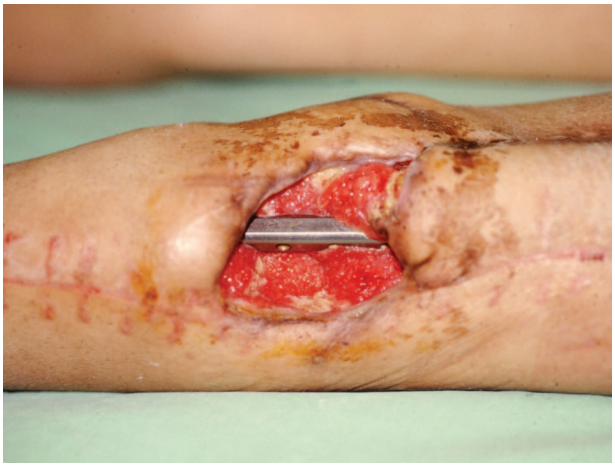

Fig. 2. A patient with a left distal femoral osteogenic sarcoma received wide tumor excision, femoral internal fixation, and knee arthrodesis with a Huckstep nail. It was complicated because of a 9.0 × 8.0-cm soft-tissue defect around the knee with the exposed Huckstep nail.

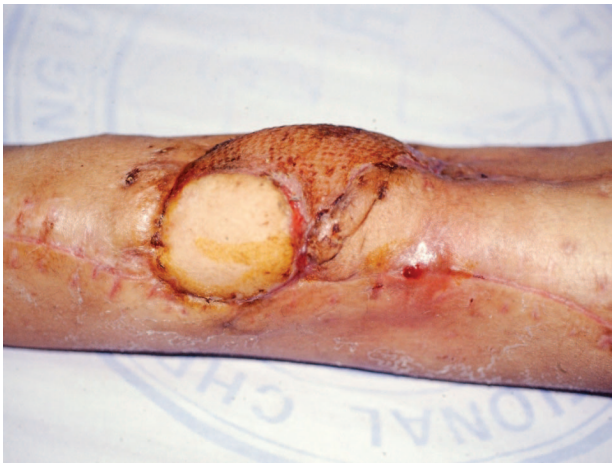

Fig. 4. The raw surface of the muscle cuff, carrying the perforator, was covered with a split-thickness skin graft. The wound was completely healed 1 month after surgery.

postoperatively, as occurs in other reverse-flow flaps,[1] the flap survived without any marginal necrosis (Fig. 4).

Dr. Lin and Chien were also concerned about the short pedicle of the transverse branch of lateral circumflex femoral vessel, because we wanted to avoid using the recipient vessels near the trauma zone. Dr. Shieh et al. reported[5] that the pedicle lengths of type II and type IV anterolateral thigh flaps are 11.10 ± 2.01 and 12.75 ± 1.06 cm, respectively. We believe that they are long enough for the recipient vessel while shifting the procedure to a microsurgical free flap transfer.

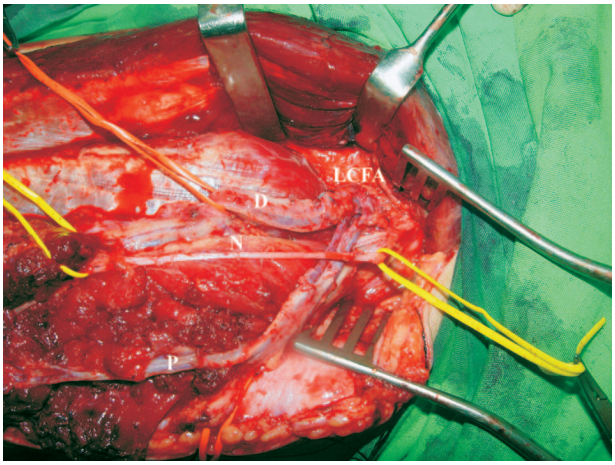

Fig. 3. A distally based anterolateral thigh flap with a type II musculocutaneous perforator was harvested to cover the defect. The descending branch of the lateral circumflex femoral vessel and perforator were dissected with their arteries and venae comitantes as a group, and the motor nerve to the vastus lateralis muscle was preserved. The flap was elevated, passed underneath the nerve, and transposed to cover the defect around the knee. *LCFA*, lateral circumflex femoral artery; *D*, descending branch; *P*, perforator; *N*, nerve to vastus lateralis muscle.

Although the vascular branches and nerves of the lateral circumflex femoral system are intermingled at the origin or bifurcation site, we always try to preserve the motor nerves as much as possible during flap harvesting to minimize dysfunction of the muscles.[5,6] In some complex cases, however, we have to divide the nerve to easily harvest the flap. We then immediately repair the nerve. We do not suggest a routine neurotomy or neurectomy for anterolateral thigh flap harvesting. For the above-mentioned case of type II distally based anterolateral thigh flap, we raised the flap after ligating the lateral circumflex femoral vessel proximal to the bifurcation of the transverse and descending branch, delivered the flap underneath the accompanying motor nerve without a neurotomy or neurectomy, and transposed it to cover the knee defect (Figs. 2 through 4).

Since the first successful case of anterolateral thigh flap at our medical center, performed by Dr. Shieh in January of 1997,[5] we have performed 352 anterolateral thigh free flap procedures for a versatile clinical application for reconstructive surgery.[4,5,7] It has become the first choice and main workhorse for microvascular free flap reconstruction at the National Cheng Kung University Medical Center in Taiwan, and has been applied not only in the head and neck region but also in the trunk and extremities.

Again, we thank Drs. Lin and Chien for their comments, and would like to share our experiences regarding the anterolateral thigh flap.

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REFERENCES

1. Lin, S. D., Lai, C. S., and Chiu, C. C. Venous drainage in the reverse forearm flap. *Plast. Reconstr. Surg.* 74: 508, 1984.
2. Ballmer, F. T., and Masquelet, A. C. The reversed-flow medio-distal fasciocutaneous island thigh flap: Anatomic basis and clinical applications. *Surg. Radiol. Anat.* 20: 311, 1998.
3. Kimata, Y., Uchiyama, K., Ebihara, S., Nakatsuka, T., and Harii, K. Anatomic variations and technical problems of the anterolateral thigh flap: A report of 74 cases. *Plast. Reconstr. Surg.* 102: 1517, 1998.
4. Pan, S. C., Yu, J. C., Shieh, S. J., et al. Distally based anterolateral thigh flap: An anatomic and clinical study. *Plast. Reconstr. Surg.* 114: 1768, 2004.
5. Shieh, S. J., Chiu, H. Y., Yu, J. C., et al. Free anterolateral thigh flap for reconstruction of head and neck defects following cancer ablation. *Plast. Reconstr. Surg.* 105: 2349, 2000.
6. Kimata, Y., Uchiyama, K., Ebihara, S., et al. Anterolateral thigh flap donor-site complications and morbidity. *Plast. Reconstr. Surg.* 106: 584, 2000.
7. Lee, J. W., Yu, J. C., Shieh, S. J., Liu, C., and Pai, J. J. Reconstruction of the Achilles tendon and overlying soft tissue using anterolateral thigh free flap. *Br. J. Plast. Surg.* 53: 574, 2000.

Bone Exposure in the Leg: Is a Free Muscle Flap Necessary?

Sir:

We read the article by Verhelle et al. entitled "Bone Exposure in the Leg: Is a Free Muscle Flap Mandatory?" (*Plast. Reconstr. Surg.* 116: 170, 2005) with interest. The authors compared 22 medial adipose-fascial flaps with a retrospective series of 22 free gracilis flaps selected out of 150 muscular free flaps for lower leg reconstruction. All patients had defects that were smaller than 40 cm^2. The overall surgical results were comparable, but more medical complications, a longer operative time, and a longer hospital stay were seen in the free muscle group. The authors proposed that muscle coverage was not mandatory to cover bone in the lower leg and that the medial adipose-fascial flap could provide a good alternative for free flap coverage.

In our experience with adipofascial flaps, they are pliable throughout the body and are good alternatives, especially because they involve one-stage procedures that are easy to perform.[1] The most important point in the surgical technique for adipofascial flaps is to determine the thickness of the flap.[2] Although it is indicated for diverse regions of the body, the thicker the skin over the flap that is dissected, the thinner the flap will be, and that would jeopardize the flap's vascularity. The thinner the skin over the planned adipofascial flap that is dissected, the worse the donor site will be. In addition, regardless of whether the flap is based on preoperatively determined perforators, the width-to-length ratio of the flap can still only be 1 to 3. One potential complication of adipofascial flaps is venous congestion. The postoperative position of the flap and the patient has an enormous effect on venous outflow, suggesting that the adipofascial flap is usually lacking a rich venous network.

Coverage of the lower leg with exposed bone was proposed to necessitate a highly vascularized flap. As the authors mentioned, the muscle flaps were not the solution for "curing" an established infection. Aggressive débridement was the key factor.[3] In our opinion, the topic that must not be forgotten is that despite aggressive débridement, the infection can persist. In these situations, a flap with rich vascularity can easily support not only the defect but also the delivery of antibiotics. The vascular network of a muscle is still not dogma when compared with the vascular pattern of an adipofascial or a fasciocutaneous flap.[4,5]

We wonder about the authors' experience with defects larger than 40 cm^2. Would they again prefer to use adipofascial flaps with these larger defects? Why did they prefer to use the adipofascial flap only in small defects?

We thank the authors for their good, retrospective study with their excellent results using adipofascial flaps.

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REFERENCES

1. Uysal, A. C., Alagoz, M. S., Unlu, R. E., and Sensoz, O. Re: Perforator-based forearm and hand adipofascial flaps for the coverage of difficult dorsal hand wounds. *Ann. Plast. Surg.* 50: 103, 2003.
2. Heymans, O., Verhelle, N., and Peters, S. The medial adiposofascial flap of the leg: Anatomical basis and clinical applications. *Plast. Reconstr. Surg.* 115: 793, 2005.
3. Weinzweig, N., and Davies, B. W. Foot and ankle reconstruction using the radial forearm flap: A review of 25 cases. *Plast. Reconstr. Surg.* 102: 1999, 1998.

4. Chang, N., and Mathes, S. J. Comparison of the effect of bacterial inoculation in musculocutaneous and random-pattern flaps. *Plast. Reconstr. Surg.* 70: 1, 1982.
5. Byrd, H. S., Spicer, T. E., and Cierny, G., III. Management of open tibial fractures. *Plast. Reconstr. Surg.* 76: 719, 1985.

Reply

Sir:

Thank you for allowing us opportunity to respond to Dr. Uysal et al.'s letter regarding the article, "Bone Exposure in the Leg: Is a Free Muscle Flap Mandatory?" (*Plast. Reconstr. Surg.* 116: 170, 2005).

Determination of the flap thickness is an important point in the surgical technique.[1,2] However, in our hands, it seemed to be more important for the final result of the donor site than for the flap itself. Because of the vascularization of this flap, which is located mainly at the fascial layer (the prefascial and subfascial plexuses), the flap can be thinned aggressively without jeopardizing its vascularity. The adipose tissue above the fascial layer can be tailored to the demands of the defect and is vascularized by the subcutaneous plexus through the above-mentioned plexuses. Second, this flap is not an "at random" flap, so the ratio of the flap can easily be more than 1 to 3 without postoperative flap loss. During harvesting, we island this flap completely on one perforator and wait for about 10 minutes. The angiosome of the nourishing vessel will become clear and areas of questionable flap vascularity can be resected. Regarding the problem of venous congestion, we encountered this only once, due to tunneling of the flap. Hence, we do not perform this technique any more and open any skin bridge between the donor and recipient site.

With regard to the "infection issue," despite the importance of an aggressive débridement, little has been written on this subject. Clearly, in some cases, residual microorganisms can persist, but it is a wrong to think that a well-vascularized flap will deal with this residual infection by, for example, its antibiotic delivery. Although many authors think that the advantages of muscle are related to its good vascularity,[3] Schemitsch et al.[4] observed that not the blood supply but the tissue itself is of great importance. Lorenzetti et al.[5] even documented that the weight-related intake of blood was higher in fasciocutaneous free flaps than in muscular free flaps. Advocates of muscle flaps could argue that tissue oxygenation is far superior in muscle flaps, and although this might be true for certain muscle flaps compared with (fascio-)cutaneous flaps before flap transfer,[6] this is no longer the case after transfer. Driemel et al.[7] recently documented a significantly lower tissue oxygenation in pedicled flaps compared with free revascularized flaps, but in the free revascularized flaps, the tissue oxygenation values measured did not vary significantly. So indeed, local/pedicled flaps have a lower tissue oxygenation, but their oxygenation values are often sufficient to cover lower leg defects. However, when the decision is made to perform a free flap due to better tissue oxygenation (compared with pedicled flaps), it is wrong to state that muscle flaps are superior to an adipofascial or a fasciocutaneous flap. This has been confirmed by recent clinical studies demonstrating excellent results with flaps other than muscle flaps, even in infected areas.[8–12]

It was never our intention to discard the efficacy of muscle flaps. Muscle flaps remain the workhorse flaps worldwide in reconstructive procedures. However, new donor sites and new surgical techniques have been described, and reduction of donor-site morbidity has become a hot topic in reconstructive procedures. Hence, we compared and tried to value the use of flaps other than muscle flaps. If the bulkiness of a muscle is not mandatory for a defect larger than 40 cm^2, we discuss, often together with the patient, the different coverage options and the final functional and aesthetic results. Large, nonmuscular flaps (anterolateral thigh fascial flap, deep inferior epigastric perforator flap, TAP flaps, and so on) can be harvested, resulting in less donor-site morbidity than, for example, that seen after harvest of a latissimus dorsi flap. Moreover, even if some dead space has to be filled out, we would rather harvest a chimeric flap (anterolateral thigh + vastus lateralis, or TAP + latissimus dorsi, and so on), which results in a nicer contour of the leg after reconstruction. However, all types of reconstructions have to be discussed individually to result in the best reconstruction for that particular patient.

We preferred to use the adipofascial flap only in small defects, because the available soft tissue on the inner medial aspect of the leg does not allow us to harvest large flaps. Moreover, we included in our planning perioperative trimming of the flap after islanding it on its pedicle. With the experience we have now, we could expand the indications of the use of this flap, but this would only increase morbidity rates (e.g., partial necrosis). We advocate using this flap only in selected cases as we have documented, because we think that for other indications, other flaps result in better reconstructions. The medial adipofascial flap should be considered an additional option in the reconstructive armamentarium of the reconstructive surgeon.

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REFERENCES

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2. Verhelle, N., Vranckx, J. J., Van den hof, B., and Heymans, O. Bone coverage: Is muscular coverage really necessary or can fasciocutaneous coverage do the job. *Plast. Reconstr. Surg.* 116: 170, 2005.
3. Heymans, O., Verhelle, N., Peters, S., Nélissen, X., and Oelbrandt, B. Use of the medial adiposofascial flap of the leg for coverage of full thickness burns exposing the tibial crest. *Burns* 28: 674, 2002.
4. Schemitsch, E. H., Weinberg, J. A., McKee, M. D., and Richards, R. R. The relative importance of intramedullary, intracortical, and extraosseous soft tissue blood flow to the repair of devascularized canine tibial cortex. *Ann. Plast. Surg.* 38: 623, 1997.
5. Lorenzetti, F., Suominen, S., Tukiainen, E., et al. Evaluation of blood flow in free microvascular flaps. *J. Reconstr. Microsurg.* 17: 163, 2001.
6. Wolff, K. D., Kolberg, A., and Mansmann, U. Cutaneous hemoglobin oxygenation of different free flap donor sites. *Plast. Reconstr. Surg.* 102: 1537, 1998.
7. Driemel, O., Oberfahrenhorst, I., Hakim, S. G., Kosmehl, H., and Pistner, H. Intra- and postoperative monitoring of transplanted flaps: Measurement of the partial pressure of oxygen in tissue. *Mund. Kiefer. Gesichtschir.* 8: 361, 2004.
8. Arnold, P. G., Yugueros, P., and Hanssen, A. D. Muscle flaps in osteomyelitis of the lower extremity: A 20-year account. *Plast. Reconstr. Surg.* 104: 107, 1999.
9. Blume, P. A., Paragas, L. K., Sumpio, B. E., and Attinger, C. E. Single-stage surgical treatment of noninfected diabetic foot ulcers. *Plast. Reconstr. Surg.* 109: 601, 2002.
10. Musharafieh, R., Atiyeh, B., Macari, G., and Haider, R. Radial forearm fasciocutaneous free tissue transfer in ankle and foot reconstruction: Review of 17 cases. *J. Reconstr. Microsurg.* 17: 147, 2001.
11. Van Landuyt, K., Blondeel, P., Hamdi, M., Tonnard, P., Verpaele, P., and Monstrey, S. The versatile DIEP flap: Its use in lower extremity reconstruction. *Br. J. Plast. Surg.* 58: 2, 2005.
12. Chen, S. L., Chen, T. M., and Wang, H. J. Free thoracodorsal artery perforator flap in extremity reconstruction: 12 cases. *Br. J. Plast. Surg.* 57: 525, 2004.

Defining Vascular Supply and Territory of Thinned Perforator Flaps: Part I. Anterolateral Thigh Perforator Flap

Sir:

We read the article by Nojima et al. entitled "Defining Vascular Supply and Territory of Thinned Perforator Flaps: Part I. Anterolateral Thigh Perforator Flap" (*Plast. Reconstr. Surg.* 116: 182, 2005) with interest. The authors performed an anatomical study of the vascular territories in the anterolateral thigh perforator flap, to determine pedicle number, location, and diameter; accompanying veins; vascular territory; and where surgical incisions could be made safely during thinning. Thirteen anterolateral perforator flaps were harvested and the perforators were cannulated. A series of dyes were injected: red dye for skin followed by Omnipaque for the whole flap before thinning, and blue dye for skin and lead oxide for the whole flap after thinning. Pedicle locations were determined by ratios of anatomical landmarks.

The determination of vascular pedicle diameters in the anatomical studies indicated some drawbacks, as the authors mentioned in their Discussion. In our anatomical studies,[1,2] the vascular diameter measurements revealed differences depending on the method. Obtaining measurements without any injected material or with various kinds of injected materials cannot culminate in same results.[3,4] The authors' method of diameter calculation through the radiographs with the Omnipaque or lead oxide injections could not propose standard objective diameters of the pedicles. In particular, the two-dimensional radiography could propose some values that are not relevant to the three-dimensional nature of the pedicles. The two-dimensional measurements probably could be larger than the actual three-dimensional diameters. We wonder if the authors could explain the method of the conversion of the actual three-dimensional diameters to two dimensions.

In the literature there are still no satisfying studies about the maximum vascular territory that a perforator can nourish. We conducted trials and studies to determine the vascular territory of one deep epigastric artery perforator, using dye injections, radiography, and barium latex emulsifications. The main point in determining the vascular territory of one perforator is to have the constant pressure continuously the same, as in vivo studies, so that the capillaries can be visualized. This is scientifically impossible with today's technology. In any kind of imaging study, depending on the injected material, as the authors have mentioned, any leakage after flap harvest can culminate in false results. Regardless of the other perforators, the capillaries were ligated or coagulated; the injected material would preferably fill the larger-diameter vessels. In addition, repeated injections and uncontrolled pressure during every injection could obviously change the results. Besides, the dye studies could propose various results depending on the preserved position of the harvested flap and depending on the time delay between the application and measurement, due to extravasations and other uncontrollable factors.

Despite these drawbacks, depending on today's facilities, these kinds of studies could reveal the safest and the minimum area that a perforator can nourish, but they are still unable to indicate the maximum vascular territory of a perforator.[5] The authors' marvelous study would encourage working on the anatomical studies and their clinical interpretation. We thank and appreciate the authors for their study, with its illuminating results and controlled methods and evaluation.

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REFERENCES

1. Uysal, A. C., Alagoz, M. S., Tuccar, E., Sensoz, O., and Tekdemir, I. The vascular anatomy of the abductor digiti minimi and the flexor digiti minimi brevis muscles *J. Hand Surg. (Am.)* 30: 172, 2005.
2. Uysal, A. C., Alagoz, M. S., Tuccar, E., and Sensoz, O. Vascular anatomy of the metacarpal bones and the interosseous muscles. *Ann. Plast. Surg.* 51: 63, 2003.
3. Ogawa, R., Hyakusoku, H., Murakami, M., and Gao, J. H. Clinical and basic research on occipito-cervico-dorsal flaps: Including a study of the anatomical territories of dorsal trunk vessels. *Plast. Reconstr. Surg.* 113: 1923, 2004.
4. Ogawa, R., Hyakusoku, H., Murakami, M., Aoki, R., Tanuma, K., and Pennington, D. G. An anatomical and clinical study of the dorsal intercostal cutaneous perforators, and application to free microvascular augmented subdermal vascular network (ma-SVN) flaps. *Br. J. Plast. Surg.* 55: 396, 2002. Erratum in *Br. J. Plast. Surg.* 55: 710, 2002.
5. Whetzel, T. P., and Mathes, S. J. The arterial supply of the face lift flap. *Plast. Reconstr. Surg.* 100: 480; discussion 487, 1997.

Viewpoints

Rhinoplasty and PubMed

Sir:

Undoubtedly, rhinoplasty is one of the more complex operations in plastic surgery. Maybe that is why it is the object of so many articles published in the international literature. In searching for the word "rhinoplasty" in PubMed, a service of the National Library of Medicine (which includes more than 15 million citations for biomedical articles dating back to the 1950s, ranging from MEDLINE and additional life science journals), we found a total of 4698 articles. In comparing the only surgery in our specialty, we found more articles published on breast reduction (7287 articles). Following in the rankings were breast reconstruction, liposuction, face lift, breast augmentation, and abdominoplasty (Table 1). With so many articles available, why do most of us know so little about this surgery? The answer must be because of the infinite variables that can be found in a case previously thought to be "simple" giving a hard time even for the experts. Why do snake charmers risk their lives just to mislead an exotic snake into rising out of a basket? The answer may be found in the unexplained pleasure and fascination of controlling the mysterious and unforeseeable reptile. In the same manner, nose surgery will keep fascinating us because we will never completely overcome it.

Table 1. Number of Articles Listed in PubMed

Ranking	Type of Surgery	Articles in PubMed
	Plastic surgery	22390
1	Breast reduction	7287
2	Rhinoplasty	4698
3	Breast reconstruction	4478
4	Liposuction	1821
5	Face lift	1614
6	Breast augmentation	1276
7	Abdominoplasty	419

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Nose Elongation

Sir:

An aesthetically short nose is defined as a developmental deformity in which the nose appears foreshortened. It is characterized by a decreased distance from the nasofrontal angle to the tip-defining points and an increased nasolabial angle with increased nostril shown.[1]

The quest for nasal symmetry and balance with the face often mandates the need for implantable grafts to sculpt and rebuild the nasal skeleton and the overlying tissues.[2] The extended columellar strut/tip graft as a unit combines the attributes of the columellar strut and those of the tip graft.[3]

Many postoperative sequelae of rhinoplasty can be prevented by minimizing resection of the supporting tissues of the nose and by using structural grafting to increase tip support. Stabilizing the nasal base is a critical step in providing a good long-term outcome with preservation of nasal tip projection. The surgeon must also anticipate the effects of scar contracture, which can aid in creating a favorable tip contour over time and avoid complications.[4]

We describe a method for lengthening the aesthetically short nose by bringing down the nasal tip in an inferior direction. The concept is based on the technique previously described by Aiach[5] and Toriumi[4] for the correction of the severely deviated nose. It consists of removing a piece of cartilage from the septum that is of the fashion and size adequate for the carving of two spreader grafts. Then the remaining septum is removed

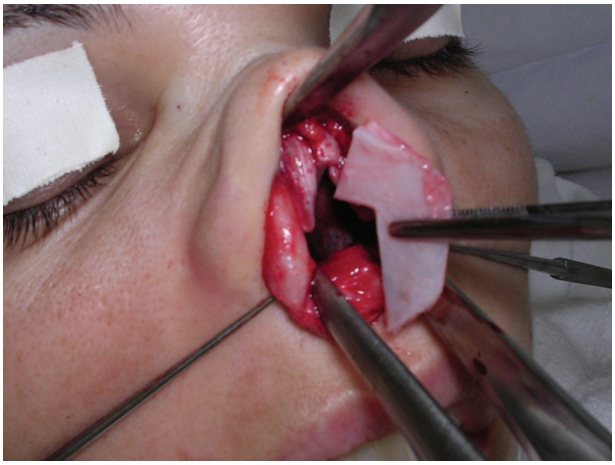

Fig. 1. The L-shaped cartilage is removed from its attachments from the nasal spine.

in an "L" shape from its attachments from the nasal spine (Fig. 1). At this point, the "keystone area" is the only attachment retaining the septum. This is the secret of the advancement. A piece of cartilage from the septum must be left affixed to the keystone area for posterior fixation of the spreader grafts. The spreaders are then sutured at the dorsum of the removed septum (Fig. 2). These framework grafts are then reintroduced, and the spreaders are fixed in the cartilage left attached to the keystone area. The previous septum is fixed in the nasal spine with an unabsorbable suture (Fig. 3). The dorsum can then be shaved if it is too high. To support the tip, the medial crura are sutured onto the caudal septum. In this manner, the septum works as a strut (Fig. 4).

This septum advancement has the advantage of requiring only two pieces of grafts to elongate the nose as long as needed, and there is no need for additional cartilage for strut harvesting because the septum can work as a strut.

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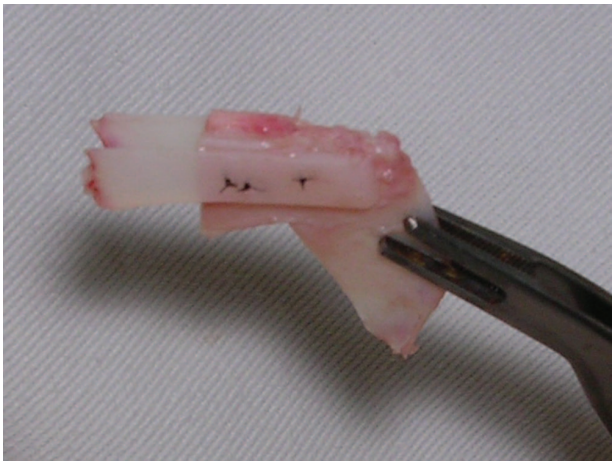

Fig. 2. The spreaders are sutured in the removed septum.

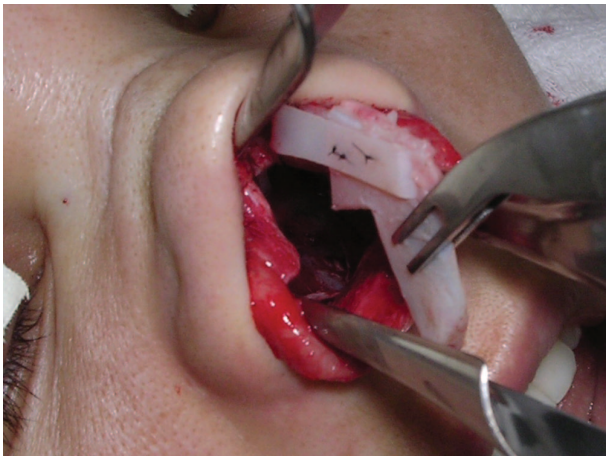

Fig. 3. Fixation of the spreader to the "keystone area."

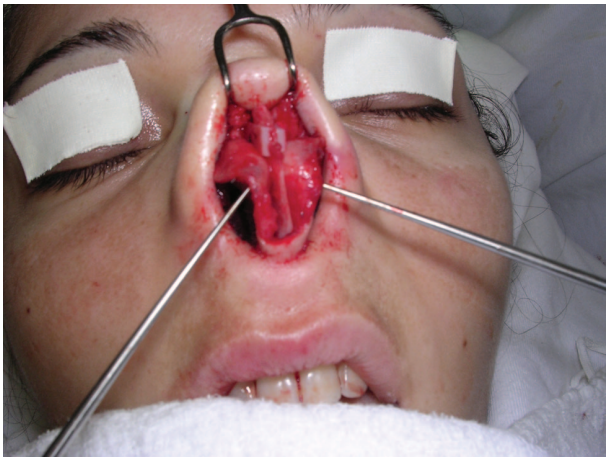

Fig. 4. To support the tip, the medial crura are sutured onto the caudal septum, with the septum being used as a strut.

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REFERENCES

1. Gunter, J. P., and Rohrich, R. J. Lengthening the aesthetically short nose. *Plast. Reconstr. Surg.* 83: 793, 1989.
2. Lovice, D. B., Mingrone, M. D., and Toriumi, D. M. Grafts and implants in rhinoplasty and nasal reconstruction. *Otolaryngol. Clin. North Am.* 32: 113, 1999.
3. Pastorek, N. J., Bustillo, A., Murphy, M. R., and Becker, D. G. The extended columellar strut-tip graft. *Arch. Facial Plast. Surg.* 7: 176, 2005.
4. Toriumi, D. M. Structure approach in rhinoplasty. *Facial Plast. Surg. Clin. North Am.* 10: 1, 2002.
5. Aiach, G. *Atlas de Rhinoplastie et de la Voie d'Abord Externe.* Paris: Masson, 1996. Pp. 76–80.

Three-Dimensional Surgical Videos: A New Medium for Supporting Patient Education before Aesthetic Surgery

Sir:

The rigorous implementation of clear preoperative information is mandatory for the patient's understanding, acceptance, and written informed consent to all diagnostic and surgical procedures. We evaluated whether new media are suitable for conveying basic information to patients and setting the tone for the doctor-patient relationship. We have taken advice to VirtualScientific, S.L. to create virtual surgical videos for the aesthetic patient, to inform them clearly and easily about the four most frequently performed surgical procedures.

Four three-dimensional animation videos were used to illustrate the basic aesthetic procedures: breast augmentation, liposuction, blepharoplasty, and rhinoplasty. In these videos, the principles of the surgery were explained by visualizing the surgical procedure using three-dimensional high-quality imaging; accurate explanations of the preoperative and postoperative aspects were also included.

The breast augmentation video discussed the selection criteria used for breast implants; preoperative management; surgical techniques, such as subglandular or retropectoral implantation, using three-dimensional anatomical images (Fig. 1); aesthetic placement of the incisions; type of anesthesia; what to expect after surgery; and, finally, dressings and postoperative results. The liposuction video included a preliminary description of the metabolical function of the fat cell; an explanation of the long-term results; details of preoperative management; a description of cannulas and the liposuction device; a discussion of anesthesia selection; a description of the surgical technique, using three-dimensional images showing the management of the subcutaneous and fat layers (Fig. 2); and a demonstration of dressings and postoperative results. The blepharoplasty video included a preoperative exploration; an anatomical explanation (Fig. 3); surgical techniques; placement of the incisions; and postoperative expectations. The rhinoplasty video included an explanation of nasal function (Fig. 4); placement of the incisions; management of the dorsum, tip, columella, cartilages, and nasal bones; a description of the osteotomy; postoperative dressings; what to expect after surgery; and the long-term results.

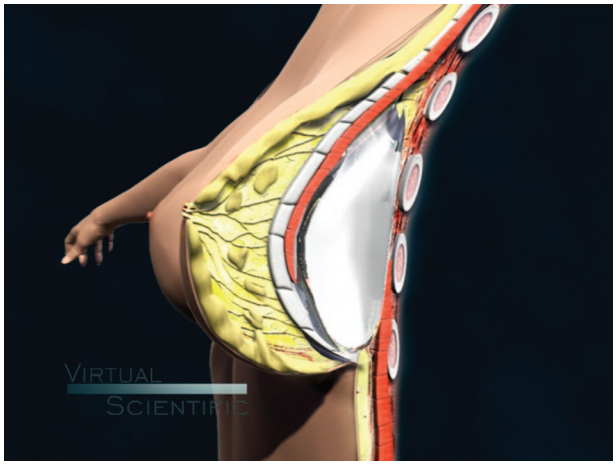

Fig. 1. Retropectoral location of breast implants.

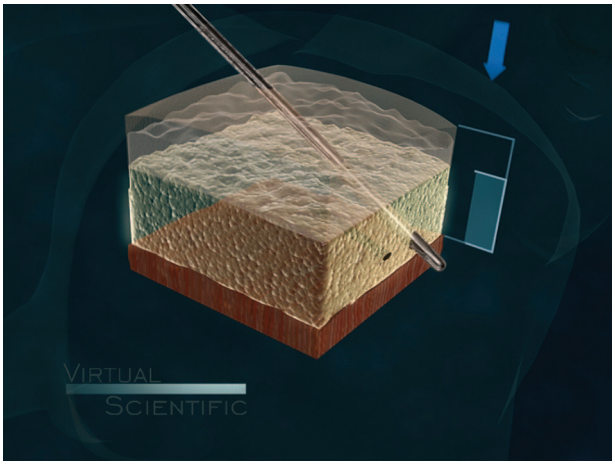

Fig. 2. Management of the subcutaneous and fat layers during liposuction.

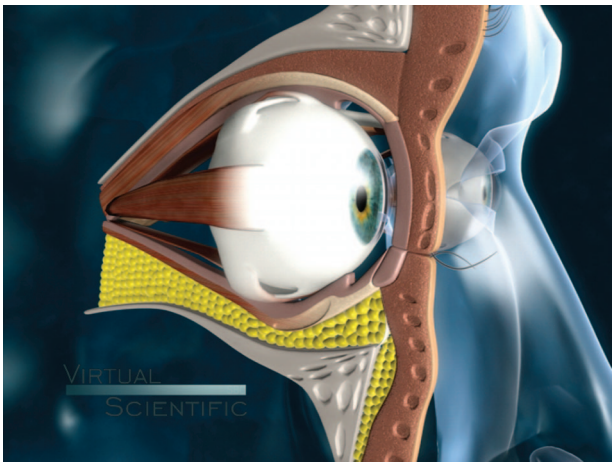

Fig. 3. Anatomical explanation of eyelid fat pads.

Patients' understanding of and subjective knowledge about the surgical procedure and its possible complications, degree of trust in professional treatment, reduction in anxiety, and readiness for the operation were significantly better after they watched the computer animation than after they read the text. We have observed that the interest in the preoperative information was high.

In conclusion, with regard to these procedures for patient education, preoperative and postoperative surgical information can be optimized by presenting the operative procedure via computer animation. We believe that modern patient-based information systems are necessary, but they can no longer be the sole re-

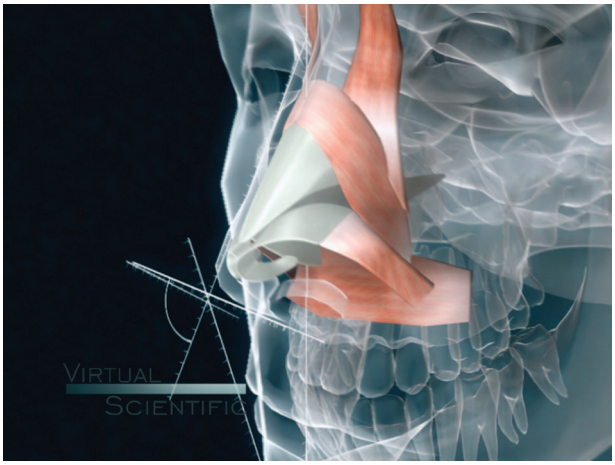

Fig. 4. Explanation of nasal function: muscular components of the nose.

sponsibility of the medical profession; they must be on the agenda of hospital management and medical care systems as well.

ACKNOWLEDGMENT

We especially thank VirtualScientific, S.L. (three-dimensional projects enterprise), for the illustrations.

Readers may refer to the online version of the article at the *Journal*'s Web site (www.PRSJournal.com) for additional materials.

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Total Nipple-Areola Complex Necrosis in Inferior Pedicle Breast Reduction

Sir:

Total nipple-areola necrosis is a rare and undesirable condition. There are multiple causes of this complication, including compression of the vascular pedicle secondary to a very tight cutaneous envelope, infection (such as necrotizing fasciitis), an involuntarily severed vascular pedicle, a vascular pedicle that is too thin, suture of the nipple-areola complex that is too tight and under tension secondary to a huge hematoma, important trauma during or immediately after the surgery, and full-thickness skin resection around the nipple-areola complex during reduction mammaplasty instead of the Schwartzman maneuver.[1–5]

We performed more than 600 reduction mammaplasties using the inferior pedicle over a 20-year period in the Military Hospital and Hospital del Trabajador in Santiago de Chile. Last year, we performed a reduction mammaplasty with 850 and 900 g of breast tissue resected per side. Four days after the surgical procedure, the patient presented with total necrosis of the nipple-areola complex, probably secondary to a very tight cutaneous envelope that had compressed the vascular pedicle (Fig. 1).

Knowing that the epidermis in this specialized area is very thick, we hypothesized that the deep basal epidermic cells would allow future epidermization when the necrotic layers were reduced. We started by applying Mupirocin ointment 2% twice a day to avoid infection. We observed the slow reduction of the superficial layers of necrosis over a period of 2 months, with total recovery of the skin of the nipple-areola complex (Figs. 2 and 3). In those months, showering over the area was avoided.

We believe this treatment saved the nipple-areola complex (Fig. 4). As a result, we strongly recommend conservative treatment and do not recommend resection of the necrotic area, because repairing this defect would be very difficult and achieve disappointing results.

After this experience, we revisited the literature and found no articles describing the treatment of this com-

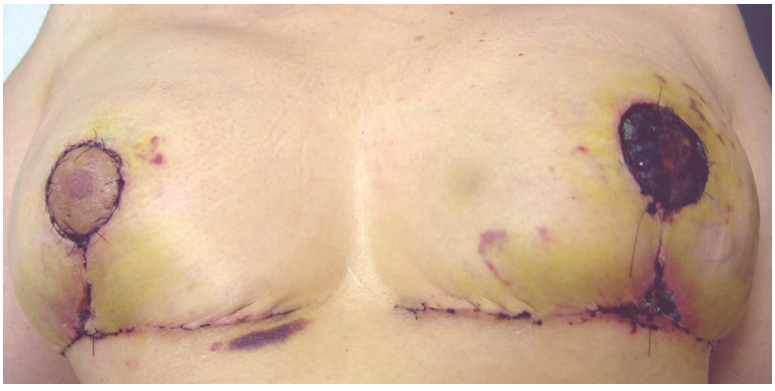

Fig. 1. Left nipple-areola necrosis on the fourth day postoperatively.

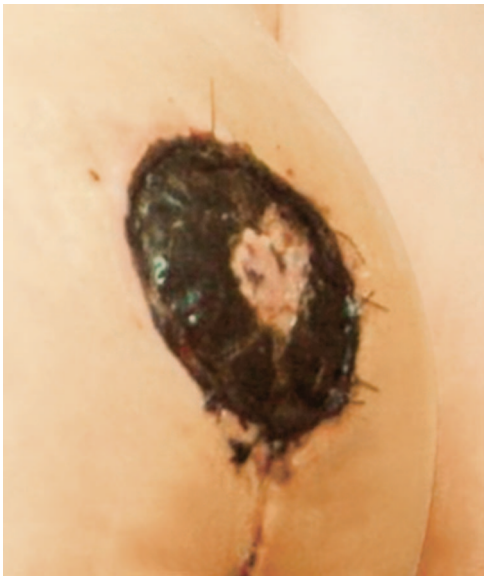

Fig. 2. Vital nipple appeared at the fourth week.

plication with the clinical management we propose. We hope this communication will help resolve this kind of complication for plastic surgeons who perform breast operations, but it would be better that surgeons never have to see this type of necrosis.

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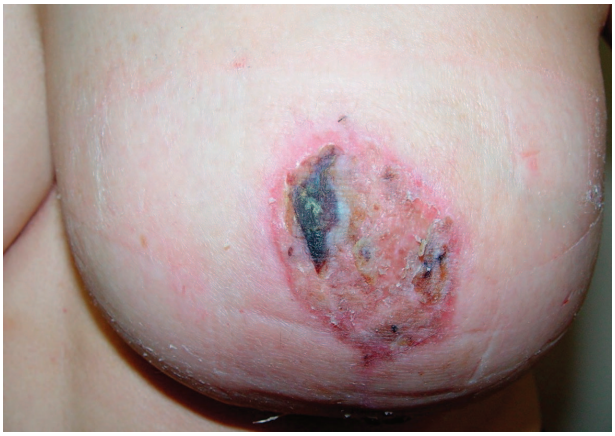

Fig. 3. Almost total recovery of the nipple-areola complex at the eighth week.

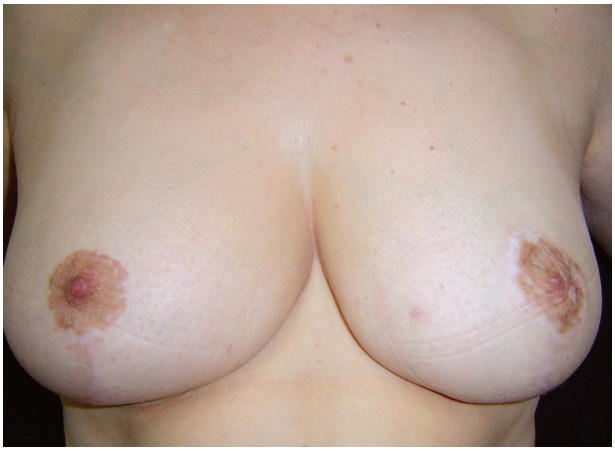

Fig. 4. Total recovery of the left nipple-areola complex after 1 year.

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REFERENCES

1. Roth, A. G., and Thomas, B. A. Total nipple necrosis. *Plast. Reconstr. Surg.* 109: 2171, 2002.
2. O'Grady, K. F., Thoma, A., and Dal Cin, A. A comparison of complication rates in large and small inferior pedicle reduction mammaplasty. *Plast. Reconstr. Surg* 115: 736, 2005.
3. Chen, J. S., Liu, W. C., Yang, K. C., Chen, L. W., Huang, J. S., and Chang, H. T. Reconstruction with bilateral pedicled TRAM flap for paraffinoma breast. *Plast. Reconstr. Surg* 115: 96, 2005.
4. Bentley, M., Ghali, S., and Asplund, O. A. Galactorrhoea causing severe skin breakdown and nipple necrosis following breast reduction. *Br. J. Plast. Surg.* 57: 682, 2004.
5. Uludag, M., Yetkin, G., Kebudi, A., et al. Bilateral nipple necrosis in a breastfeeding woman with Behcet's disease. *Breast* 11: 522, 2002.

Liposuction and Pulmonary Embolism: Can We Trust D-Dimer Values?

Sir:

Pulmonary embolism is a severe complication after surgery and is a significant cause of morbidity and mortality. Objective diagnostic testing is crucial and should not be delayed. Over the past two decades this screening has been made easier, less invasive, and somewhat safer. This has led to the development of diagnostic tools that aim to reduce the number of unnecessary pulmonary angiograms. These tools include clinical probability assessment and fibrin D-dimer.

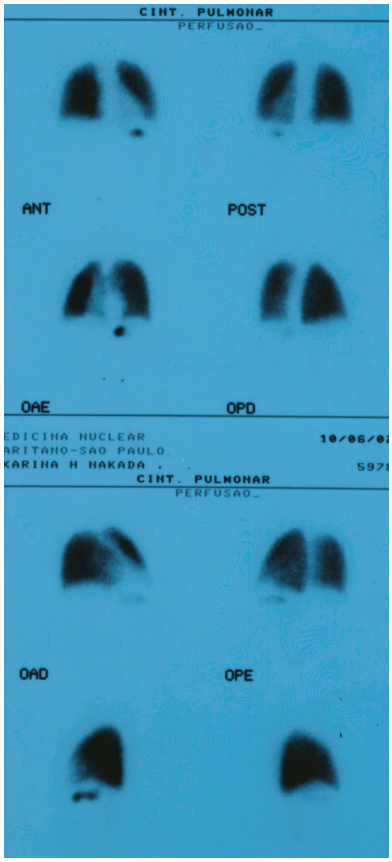

Fig. 1. Perfusion images of the pulmonary scintigraphy.

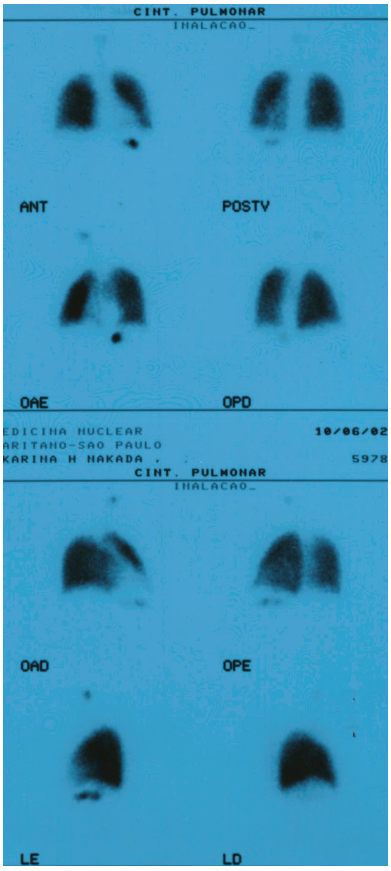

Fig. 2. The inhalation images of the pulmonary scintigraphy.

Levels of D-dimer, a fibrin-specific product, are increased in patients with acute thrombosis. A normal result is useful in excluding pulmonary embolism in patients with a low pretest probability of pulmonary embolism.[1] For a precise diagnosis of pulmonary embolism, a V/Q lung scan is the first-line test.[2,3]

We present a case of acute respiratory distress in a young woman (26 years old) who underwent liposuction (3 liters were aspirated from her trunk and limbs). The surgery was uneventful. Postoperatively, she had moderate pain and normal arterial pressure, and was able to walk without indisposition, so she was discharged.

In the following night, we were informed that the patient was very anxious due to progressive respiratory distress. The family was told to go to an emergency unit to meet the surgeon and a clinician. The patient was slightly pale, with normal arterial pressure and a heartbeat of 110 bpm; her lung and heart noises were normal. No clinical signal of deep venous thrombosis was observed. Analysis revealed the following: blood count, 3.5 million/mm^3; hemoglobin level, 10.8 g/dl; hematocrit level, 33 ml/dl; mean corpuscular hemoglobin level, 33 g/dl; mean corpuscular volume, 93femL; leukocyte count, 10,300/mm^3; neutrophil count, 7632/mm^3; platelet count, 230,000/mm^3; creatinine level, 0.5 mg/d; urea, 11 mg/d; sodium, 138 mEq/liter; potassium level, 4 mEq/liter; activated partial thromboplastin time, 22 seconds; and D-dimer level, close to 500 ng/ml (normal, <250 ng/ml).

The patient's respiratory distress and D-dimer value made pulmonary embolism a certainty. She was confined in the intensive care unit. Examination of the arterial blood gas composition revealed a pH level of 7.44, a partial pressure of oxygen of 92 mmHg, a partial pressure of carbon dioxide of 33 mmHg, a bicarbonate level of 22 mmol/liter, a BE of −0.9, and an oxygen saturation of 97 percent. Her electrocardiogram was normal. Pulmonary scintigraphy was demanded to establish respiratory gated perfusion. The perfusion assay was performed after intravenous administration of the radiopharmaceutical macroaggregated albumin (technetium 99m–macroaggregated albumin at a dose of 5 mCi); Regular distribution of the radiopharmaceutical was observed in all pulmonary fields in the anterior, posterior, lateral, and oblique views (Fig. 1).

The inhalation part of the examination consisted of breathing the radiopharmaceuticals technetium–diethylenetriamine pentaacetic acid (dose, 35 mCi). Results of the image analysis were normal (Fig. 2).

Once the hypothesis of pulmonary embolism was discarded and the patient's symptoms had vanished, the patient was released to the infirmary. No other symptoms arose. Interview of the family revealed that

the patient had a history of psychiatric treatment for panic syndrome with similar but slight symptoms of breathing distress, which is common in these patients.[4]

Was the vessel trauma with the cannulas sufficient to cause acute thrombosis in a small number of vessels and in this way increase the D-dimer levels? We suggest that more thorough research should be performed to determine what levels of D-dimer are normal after plastic surgery, to avoid serious psychological distress for the family and the surgeon when pulmonary embolism is a possibility.

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REFERENCES

1. Ginsberg, J. S., Wells, P. S., Kearon, C., et al. Sensitivity and specificity of a rapid whole-blood assay for D-dimer in the diagnosis of pulmonary embolism. *Ann. Intern. Med.* 129: 1006, 1998.
2. Kovacs, M. J., MacKinnon, K. M., Anderson, D., et al. A comparison of three rapid D-dimer methods for the diagnosis of venous thromboembolism. *Br. J. Haematol.* 115: 140, 2001.
3. Ginsberg, J. S., and Bates, S. M. Management of venous thromboembolism during pregnancy. *J. Thromb. Haemost.* 1: 1435, 2003.
4. Bandelow, B., Amering, M., Benkert, O., et al. Cardio-respiratory and other symptom clusters in panic disorder. *Anxiety* 2: 99, 1996.

Improving the Cosmetic Acceptability of Punch Biopsies: A Simple Method to Reduce Dog-Ear Formation

Sir:

Punch biopsies are commonly performed in dermatology and plastic surgery practices. The procedure is quick, convenient, and easy to learn, but closure of

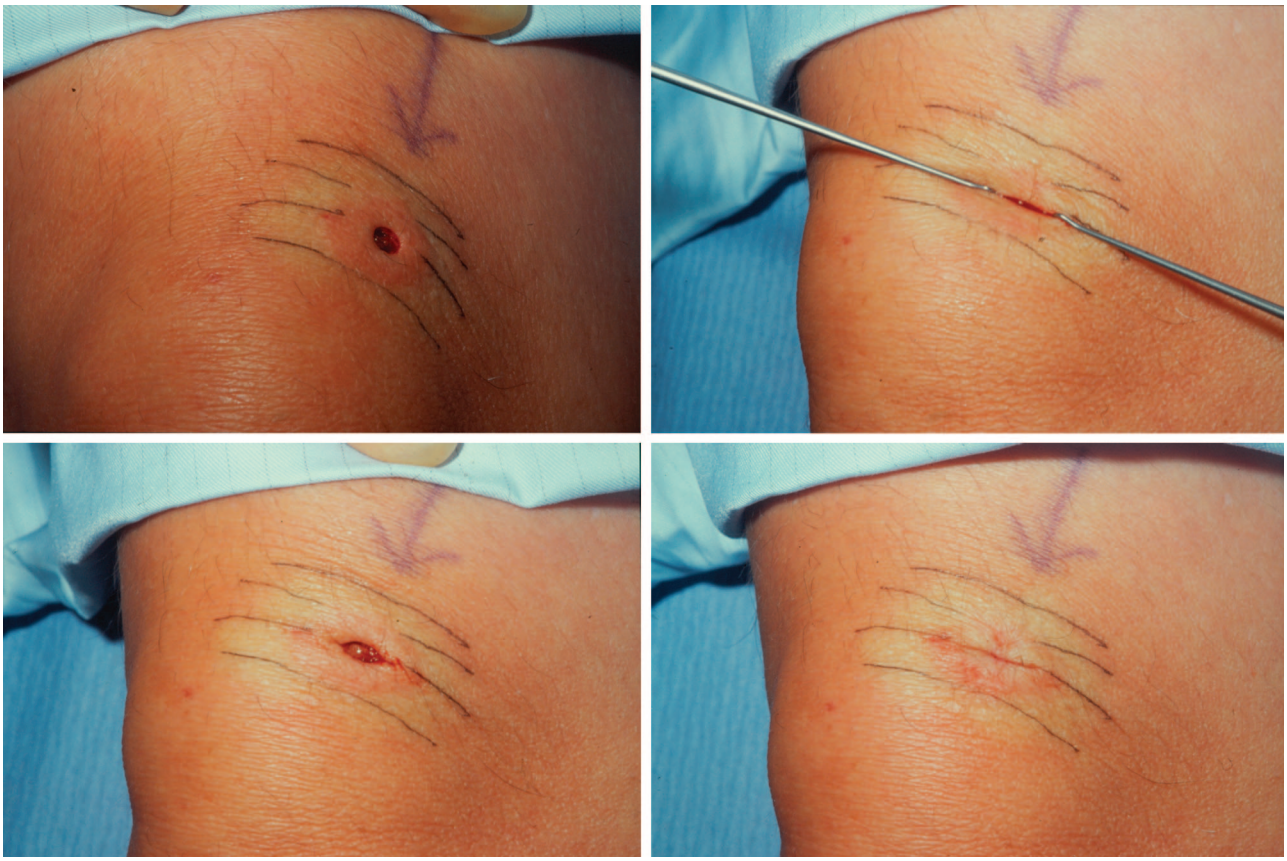

Fig. 1. (*Above, left*) Punch biopsy performed on a skin lesion on the knee. The directions of the relaxed skin tension lines are marked. (*Above, right*) Skin hooks are pulled parallel to the relaxed skin tension lines and held for 1 minute. (*Below, left*) Maintenance of ellipse after removal of the skin hooks. (*Below, right*) A single suture is placed to maintain closure, with minimal dog-ear formation.

the punch site with sutures often results in dog-ears. This is a consequence of the circular defect left by the punch. We describe a method for creating an elliptical defect that allows satisfactory cosmetic closure.

A novel method we have used involves the use of skin hooks to create an ellipse. The hooks are inserted into the dermis and placed parallel to the lines of relaxed skin tension (Fig. 1, *above, left*). The hooks are then pulled apart until the punch circle collapses into a straight line; this position is held for 1 minute (Fig. 1, *above, right*). The resultant defect is an ellipse oriented in the lines of skin tension that holds its shape after the skin hooks have been removed (Fig. 1, *below, left*). A single suture can be placed to maintain shape, and the scar from such a punch biopsy will not leave a dog-ear (Fig. 1, *below, right*). At follow-up, we have found these scars to maintain a flat appearance. It is thought that the exertion of pressure by the skin hooks results in rupture of the collagen fibers oriented perpendicular to the lines of relaxed skin tension. This allows the ellipse to maintain its shape and the scar to remain flat in the long term.

This technique is a simple and quick addition to punch biopsy, and results in a flatter, more cosmetically acceptable scar. This technique would be useful for both dermatologists and plastic surgeons, for whom increasing numbers of skin biopsies are performed in practice.

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An Efficient Method to Increase Specificity of Acoustic Doppler Sonography for Planning a Perforator Flap: Perforator Compression Test

Sir:

Perforator flaps are increasingly being used as a versatile reconstructive option for free tissue transfer. Precise localization and preoperative evaluation of each perforating vessel are essential for elegant flap planning and design.

Acoustic Doppler sonography is a useful tool that can provide the necessary preoperative information about the vascular anatomy.[1–3] Although its value has been underrated, this method is very simple, highly portable, and relatively easy to interpret. In addition, a hand-held Doppler probe can be sterilized. Therefore, the probe can be used intraoperatively to finalize the planning and the surgical procedure.

On the other hand, a hand-held acoustic Doppler probe cannot distinguish between perforating vessels and vessels located more deeply, and it can create a false-positive localization of the perforators. Although there is no sound around the perforator and the longitudinally oriented sound of the proximal vessels can provide valuable information, surgeons still find it difficult to detect real perforators. In addition, contrasting findings are not always obvious, and there is still a great deal of confusion. To overcome the limitation of acoustic Doppler sonography, a new method known as the perforator compression test was devised.

The test was based on the following anatomical characteristics of perforators: (1) perforators are the most superficially located vessels among those capable of producing discernible sounds on Doppler sonography; (2) perforators have a much thinner vessel wall than the more proximal vessels do; and (3) the course of most perforators is approximately perpendicular to the surface of the skin. This anatomy makes true perforators easily compressible, collapsible, and obstructed due to the external force applied perpendicular to the surface of the skin.

Therefore, after an area with a strong sound is found (Fig. 1, *above*), increasing pressure can be applied to the skin surface using a pencil-type Doppler probe. The loudness of the pulsating sound reduces with increasing pressure if the original sound comes from a true perforator (Fig. 1, *below*). This change in sound intensity is quite sensitive to the pressure applied to the perforator vessels, which is not observed in the proximal vessels. The compression pressure decreases continuously when a perforator sound almost stops. This results in increasing sound and finally a return to the peak intensity when contact between the tip of the probe and the surface of the skin occurs. The following sequence is defined as a positive result on the perforator compression test, which is specific to the perforators: the loudest sound on a just touch position, reducing sound with increasing pressure, no sound, increasing sound with decreasing pressure, and the loudest sound on a nonpressure position.

This positive sequence never occurs on the perforator compression test when the original sound originates from other proximal vessels on the initial Doppler examination. In contrast, the initial loudness of the sound detected on the contact position of the probe frequently increases as pressure is applied. Therefore, surgeons can easily distinguish a perforator from other vessels.

A Hadeco ES-1000SPM flowmeter with an 8-MHz probe was used intraoperatively to detect a thoracodorsal artery perforator. The perforator compression test was performed on 40 thoracodorsal artery perforator flaps. One hundred percent specificity in detecting a perforator was achieved. Therefore, various modifications of the flap design, based on the precise location of the perforator, were possible. The perforator compression test was also applied to various perforator flaps and was found to be equally useful. In addition to the comprehensive under-

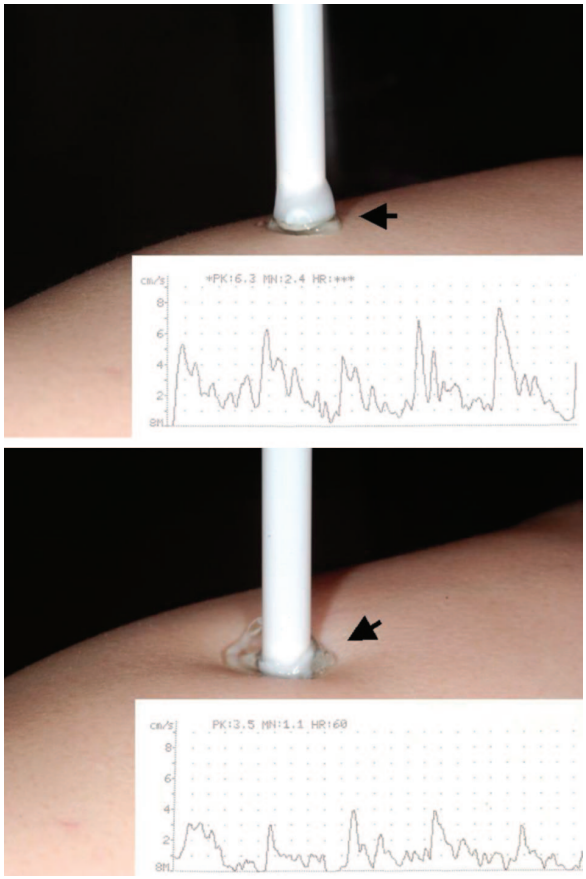

Fig. 1. (*Above*) The loudest pulsating sound was recorded on a nonpressure position. (*Below*) The loudness of the sound decreases with increasing compressive pressure on the surface of the skin; the pattern of the graph changes.

standing of the certain perforator topography and the point localization on a Doppler examination, the perforator compression test can be efficiently incorporated into current acoustic Doppler studies to obtain remarkably improved specificity.

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REFERENCES

1. Hallock, G. G. Doppler sonography and color duplex imaging for planning a perforator flap. *Clin. Plast. Surg.* 30: 347, 2003.
2. Giunta, R. E., Geisweid, A., and Feller, A. M. The value of preoperative Doppler sonography for planning free perforator flaps. *Plast. Reconstr. Surg.* 105: 2381, 2000.
3. Blondeel, P. N., Beyens, G., Verhaeghe, R., et al. Doppler flowmetry in the planning of perforator flaps. *Br. J. Plast. Surg.* 51: 202, 1998.

Improvement of the Bipedicled Fascial Flap with a Cutaneous V and Y Island for Coverage of the Heel

Sir:

The posterior and plantar areas of the heel are frequently affected by pressure ulcers, trauma, and burn wounds. Various techniques have been described for coverage of these portions of the heel, such as skin grafts and cutaneous,[1] fasciocutaneous, neurovascular, muscular, and free flaps. Recently, the anatomical aspects of fasciocutaneous flaps have become better understood, especially in relation to the fascia and its vascularization.[2]

In 1997, Hayashi and Maruyama[3] published a stepladder V-Y advancement flap for repair of posteroplantar feet ulcers (four cases); they pointed out advantages such as diminished scar contracture with the stepped incision technique, increased flap reliability and durability, and minimal donor-site morbidity (with no skin graft requirements for the donor site). In our service,

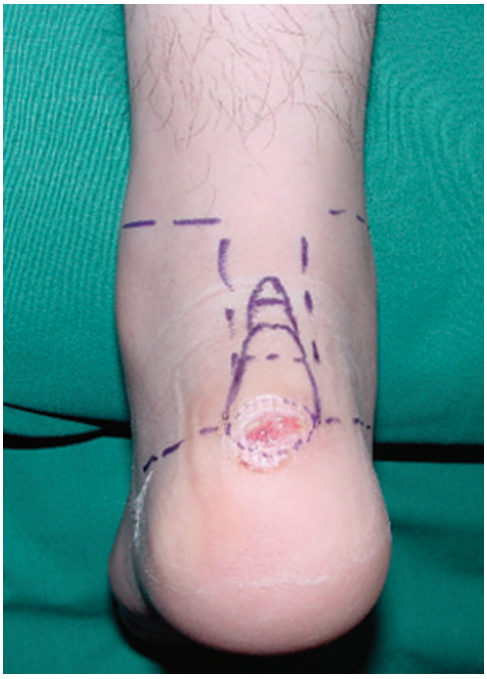

Fig. 1. Patient with a posteroplantar heel pressure ulcer. A view of the adipofascial bipedicled flap with its triangular cutaneous island (without stepladder) design. The *dotted lines* mark the superior and inferior borders of the flap, over which lies the cutaneous island supported by the fascia. The flap advances in a bucket handle form.

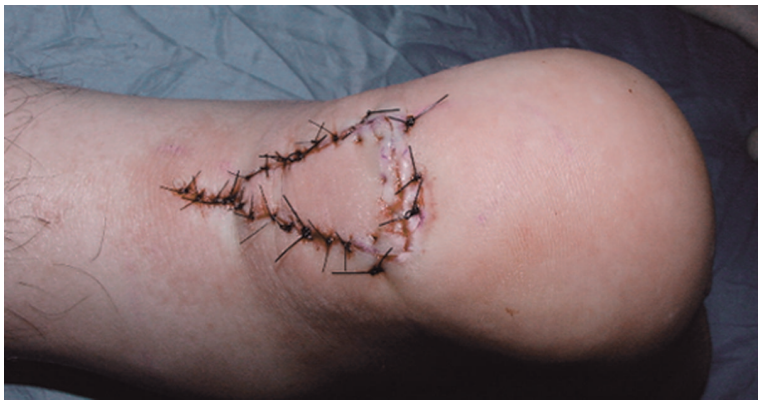

Fig. 2. Immediate postoperative view of the cutaneous island advanced to obtain tension-free defect coverage.

we have reproduced this flap as described by the authors in their original publication: a random fasciocutaneous flap with bilateral adipofascial pedicles using the stepped incision technique in combination with the V-Y advancement principle.

The first time we performed this operation, we applied the original technique proposed by Hayashi and Maruyama. In the next three cases, we modified some details of the technique, which resulted, in our judgment, in the following improvements. First, the stepladder skin design makes the marking and suture slower, because of the zigzag suture line. This disadvantage led us to design a *triangular* cutaneous flap. Second, it appeared adequate to us to completely free the flap in its cephalic portion with a transverse section of the adipofascial layer to obtain a complete bipedicled flap, in a bucket handle flap manner, thus facilitating distal transfer to cover the defect (Figs. 1 and 2). Third, we agree that a V-Y advancement of the cutaneous island is an excellent choice, as demonstrated in the geometric analysis of these flaps by colleagues in our hospital, who exposed the advantages of this technique.[4]

We believe that the stepladder flap described by Hayashi and Maruyama is very useful for resurfacing small to moderate-sized defects of the heel. In applying this technique, we became aware that the above-described improvements were possible. While the results obtained may not differ from the original work, it is important to consider that with our improvements there is less tension on the suture line and therefore the risk of tissue stress is diminished.

It is important to point out that the fascia is a structure that has a rich irrigation system through its epifascial and subfascial plexus and that the fascial or adipofascial flap can be as good a transporter as a muscle with a cutaneous island.[5] This grants various advantages to this technique, including primary closure in one surgical procedure, better aesthetic results, faster recovery and wound healing, and a better functional future with a resistant skin coverage. This kind of V-Y closure optimizes the distribution of the skin's tensional forces and readvancement in case of wound dehiscence.

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REFERENCES

1. Miasels, D. O. Repairs of the heel. *Br. J. Plast. Surg.* 14: 117, 1961.
2. Calderón, W., Arriagada, J., Godoy, M., and Haack, F. Anatomía y clínica de los colgajos fasciocutáneos. *Rev. Cir. Plast. Iberolat.* 13: 293, 1987.
3. Hayashi, A., and Maruyama, Y. Stepladder V-Y advancement flap for repair of postero-plantar heel ulcers. *Br. J. Plast. Surg.* 50: 657, 1997.
4. Andrades, P., Calderon, W., Leniz, P., Bartel, G., Danilla, S., and Benitez, S. Geometric analysis of the V-Y advancement flap and its clinical applications. *Plast. Reconstr. Surg.* 115: 1582, 2005.
5. Calderon, W., Llanos, S., Rodriguez-Peña, A., Searle, S., and Calderon, D. Cutaneous island with V-Y closure over a gastrocnemius muscle flap. *Plast. Reconstr. Surg.* Accepted for publication.

Extramedullary Multiple Myeloma Associated with Amyloidomas of the Lower Limbs

Sir:

A 42-year-old, otherwise healthy woman presented with slow-growing, localized, nontender soft-tissue swelling of both lower legs (Fig. 1). The lesions were

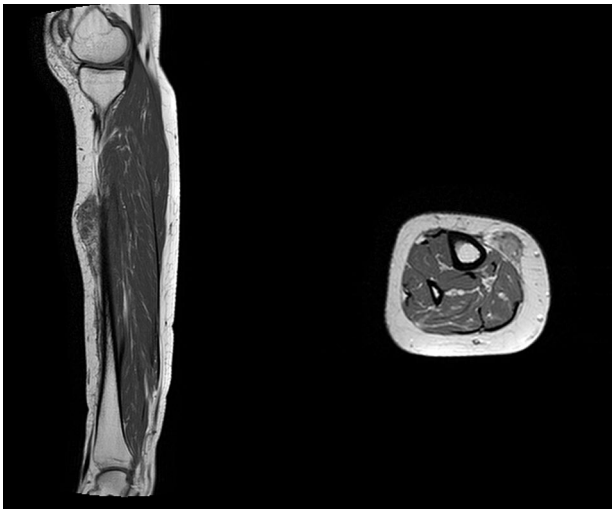

Fig. 1. Magnetic resonance image (T2/TSE 3 mm) of the right lower leg showing the tumor.

excised. Histopathological examination revealed extramedullary plasmacytoma with κ-light chain–derived subcutaneous amyloid presenting as diffusely distributed large globular masses surrounded by $CD68^+$ histiocytic giant cells and $CD20^+$ and $CD138^+$ plasma cells showing restriction for κ-light chain. The amyloid deposits stained weakly with the anti–κ-light chain and amyloid P component antibodies (Fig. 2). Amyloid or tumor cells did not stain with antibodies directed against AA amyloid, apolipoprotein AI, fibrinogen, lysozyme, transthyretin, β2-microglobulin, or λ-light chain (Fig. 2). Western blot analysis with an anti–κ-light chain antibody detected multiple protein bands in the molecular weight range below 20 kDa and a single strongly immunoreactive protein band just above 20 kDa, representing κ-light chain–derived amyloid proteins and intact immunoglobulin light chain.

With normal findings on bone marrow biopsy, radiography, and scintigraphy, regular serum calcium levels, no Bence-Jones proteins detected in the serum or urine, as well as normal renal function tests, our patient met the diagnostic criteria for extramedullary plasmacytoma as proposed by Galieni et al.[1] After resection, the tumor sites were irradiated with 30 Gy. Eighteen months later, the patient had no evidence of recurrent or progressing disease.

Despite the still unclear origin of extramedullary plasmacytoma, which accounts for less than 5 percent of plasma cell neoplasms,[2] it is considered a distinct entity from multiple myeloma and solitary plasmacytoma of the bone. It affects sites with mucosal lymphoid tissue of the head and neck region in 80 percent of cases and is found at almost every other site of the body in 20 percent. Colocalized amyloidosis is present in up to 25 percent of cases in the head and neck region, whereas association of amyloidosis with extramedullary plasmacytoma at other anatomical sites, especially the limbs, has only rarely been reported. Symptoms are unspecific and depend on the site of manifestation and the size of the tumor. B symptoms are usually absent.

Treatment of extramedullary plasmacytoma with amyloid deposits should consist of surgical resection and radiation doses of 30 to 50 Gy.[1] Considering the incidence of regional lymph node involvement of up to 25 percent, elective radiation or dissection should be mentioned.[3,4] Chemotherapy may delay conversion to multiple myeloma but is widely considered ineffective.[5]

No other clinical factor, including amyloidosis, except elevated M proteins, probably indicating active tumor cells, was found to have positive predictive value for disease progression.[2] If treated properly by surgery and radiation, alone or in combination, local and systemic dissemination can be avoided in up to 100 percent of cases.[2,4,5] Follow-up should include bone marrow studies, serum and urine protein evaluations, skeletal radiographic examination, and abdominal ultrasonography every 6 months within the first 3 years and then every year for at least 10 to 15 years, because in most cases, disease progression occurs within the first 2 to 3 years[4,5] but has also been observed after a long disease-free interval of up to 15 years.[5]

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REFERENCES

1. Galieni, P., Cavo, M., Pulsoni, A., et al. Clinical outcome of extramedullary plasmacytoma. *Haematologica* 85: 47, 2000.

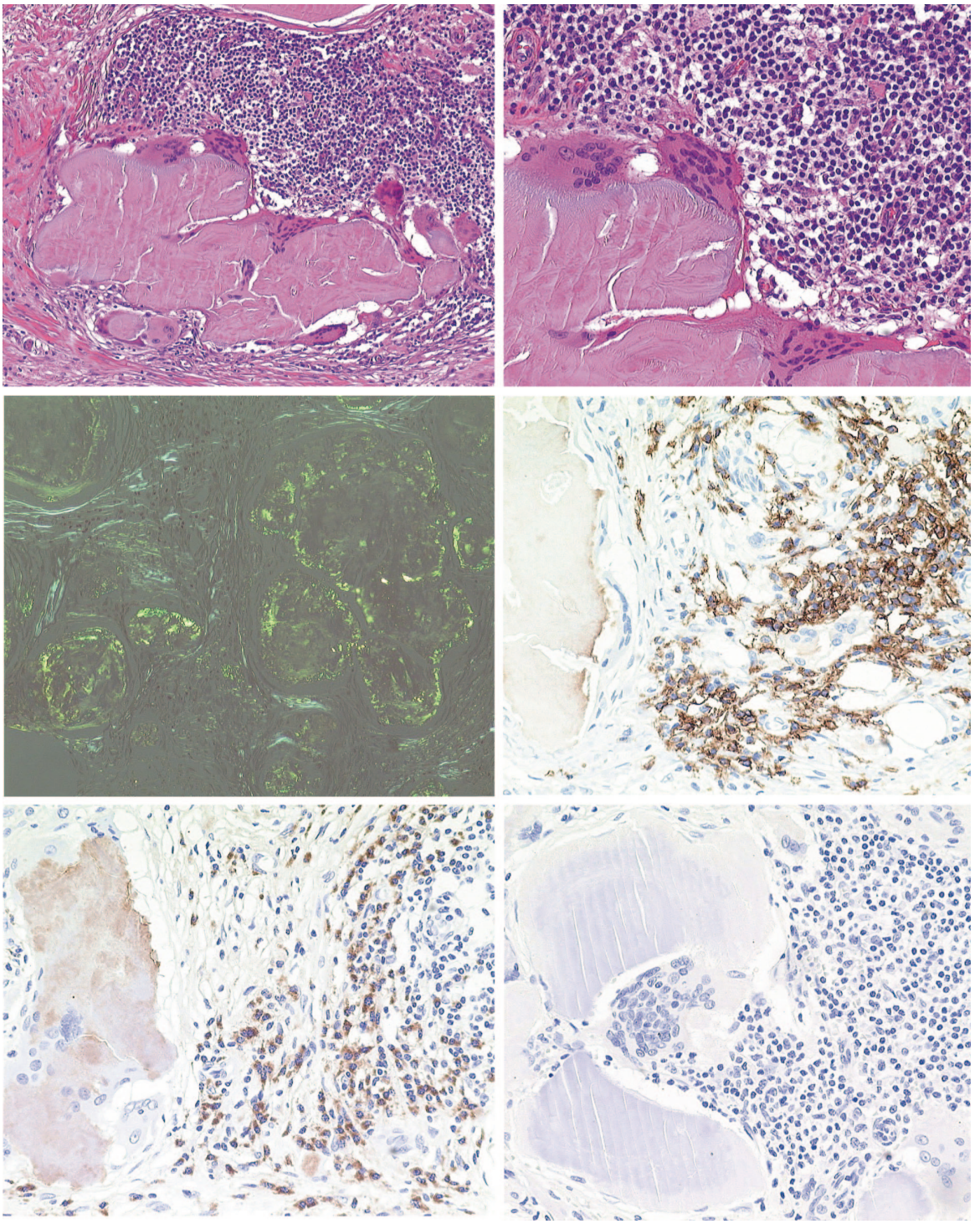

Fig. 2. Sections from the tumor of the left lower limb showed large patchy deposits of homogeneous eosinophilic material surrounded by multinucleated giant cells (*above, left and right*); there was also a characteristic green birefringence in polarized light after Congo red staining (*center, left*). Between the amyloid deposits, infiltrates of plasma cells were noted (*above, left and right*) that were immunoreactive for CD138 (*center, right*) and showed light chain restriction for κ-light chain (*below, left*). Note the scattered immunostaining of the amyloid deposits with anti-κ-light chain antibody. No immunostaining was found in either the plasma cells or the amyloid deposits with an anti–λ-light chain antibody (*below, right*). Hematoxylin and eosin stain (*above, left and right*); Congo red staining in polarized light (*center, left*); anti-CD138 antibody (*center, right*); anti–κ-light chain antibody (*below, left*), and anti–λ-light chain antibody (*below, right*). Original magnifications 40 × (*above, left*, and *center, left*); 100 × (*above, right*); 200 × (*center, right*, and *below, left and right*).

2. Knowling, M. A., Harwood, A. R., and Bergsagel, D. E. Comparison of extramedullary plasmacytomas with solitary and multiple plasma cell tumors of bone. *J. Clin. Oncol.* 1: 255, 1983.
3. Woodruff, R. K., Whittle, J. M., and Malpas, J. S. Solitary plasmacytoma: I. Extramedullary soft tissue plasmacytoma. *Cancer* 43: 2340, 1979.
4. Mayr, N. A., Wen, B. C., Hussey, D. H., et al. The role of radiation therapy in the treatment of solitary plasmacytomas. *Radiother. Oncol.* 17: 293, 1990.
5. Holland, J., Trenkner, D. A., Wasserman, T. H., and Fineberg, B. Plasmacytoma: Treatment results and conversion to myeloma. *Cancer* 69: 1513, 1992.

Cutaneous Island with V-Y Closure over a Gastrocnemius Muscle Flap

Sir:

The gastrocnemius muscular flap is useful for coverage of defects of the knee and the proximal third and part of the medial third of the leg.[1–4] The medial or lateral gastrocnemius flap may be raised for these purposes when releasing the posterior midline raphe.[3] Its vascular type I pedicle, using Mathes and Nahai's classification, allows a good arc of rotation in the leg. Nevertheless, it can also be used as a free flap.[1]

In general, a muscle flap is used to cover defects in the leg, but it requires a split-thickness skin graft to cover it. This kind of dermoepidermal skin graft is a weak cover. Moreover, when the graft is placed as coverage over a muscular flap, there is an increased risk of flap loss, and the aesthetic results are suboptimal.

We report two cases of patients with exposed leg fractures with no osteomyelitis. Patient 1 was a 32-year-old woman with a Winquist IV fracture of the distal third of the leg (Fig. 1). Patient 2 was a 58-year-old man with a IIIB fracture of the middle third of the leg. The defects were covered with a gastrocnemius muscle flap, but instead of using a skin graft, we used a triangular island of skin over the muscle (Fig. 2). In this technique, the gastrocnemius muscle flap acts as a transporter for the island of skin (Fig. 2), both of which are rotated together to cover the defect. The island of skin is irrigated by the musculocutaneous perforators.

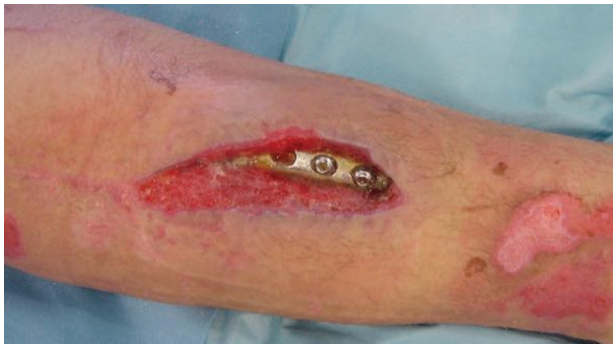

Fig. 1. Exposed fracture of the tibia with osteosynthesis plates.

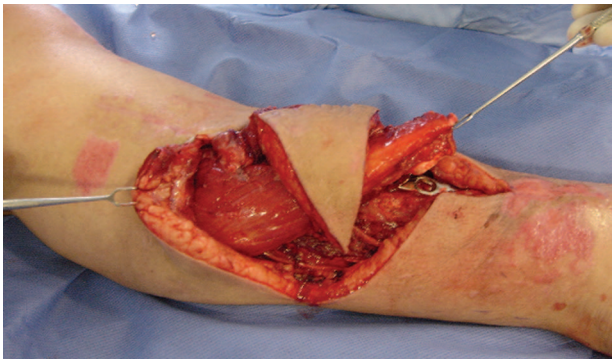

Fig. 2. Triangular cutaneous island over the gastrocnemius muscle transposed to the fracture site. Excellent irrigation of the cutaneous island is visualized.

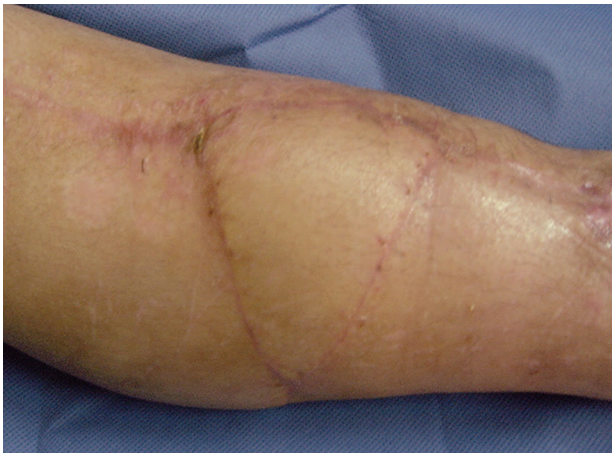

Fig. 3. Long term postoperative result.

The defect to be covered was 9.2 × 4.3 cm in patient 1 (Fig. 1) and 18.4 × 10.6 cm in patient 2. The cutaneous triangular island over the muscle was made with the base toward the fracture and the vertex toward the posteromedial aspect of the leg. The muscle was severed from the Achilles tendon and rotated to the defect with the cutaneous island portion over it. The closure was made in the V-Y fashion.[5] In the second patient, the defect was so large that the flap permitted complete coverage of the exposed fracture, and a turnover flap and skin graft were used to cover the rest of the soft-tissue defect as well as part of the donor site.

The gastrocnemius muscle with a cutaneous island flap is a good alternative to a more complex solution, such as a microsurgical flap. It is to be used mainly in large exposed fractures of the leg. The advantages of this technique are primary closure, faster wound healing, better aesthetic results, lack of a donor site and its eventual complications, faster recovery, and a better functional future (Fig. 3). In case of wound dehiscence, this kind of V-Y closure permits readvancement.

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REFERENCES

1. Mathes, S. J., and Nahai, F. *Clinical Applications for Muscle and Musculocutaneous Flaps.* St. Louis, Mo.: Mosby, 1982.
2. Mathes, S. J., McCraw, J. B., and Vasconez, L. O. Muscle transposition flaps for coverage of lower extremity defects: Anatomical considerations. *Surg. Clin. North Am.* 54: 1337, 1974.
3. Feldman, J. J., Cohen, B. E., and May, J.W., Jr. The medial gastrocnemius myocutaneous flap. *Plast. Reconstr. Surg.* 61: 531, 1978.
4. Kroll, S. S., and Marcadis, A. Aesthetic considerations of the medial gastrocnemius myocutaneous flap. *Plast. Reconstr. Surg.* 79: 67, 1987.
5. Venkataramakrishnan, V., Mohan, D., and Villafane, O. Perforator based V-Y advancement flaps in the leg. *Br. J. Plast. Surg.* 51: 431, 1998.