ORBITAL EXENTERATION — SIMPLIFIED

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THE PURPOSE OF THIS PRESENTATION IS TO DEMONSTRATE THE USE OF FULL THICKness skin of the lids and the skin surrounding the orbital rim following orbital exenteration. Case reports with complications and results are discussed.

TECHNIQUE OF OPERATIVE PROCEDURE

Two traction sutures are placed posterior to the margins of the closed lids. The initial incision is through full thickness skin behind the lash bearing margins of the lids, carried 360°, and includes the skin at the outer and inner canthus areas (Fig 1). The full thickness skin is separated from all other lid tissues and subcutaneous dissection is carried several millimeters beyond the bony orbital rim (Fig 2). The skin is retracted and an incision is carried through all tissue, including the periosteum, around the rim of the orbit (Fig 3). Periosteal elevators are used to free the periosteum from the orbital walls (Fig 4). The entire contents of the orbit are removed en bloc. Mattress sutures of 4-0 chromic gut are used to close the skin edges horizontally (Fig 5). This technique allows more approximation of raw surfaces in healing than end-to-end suturing.

Nothing is placed in the orbit and no pressure dressing is applied (Fig 6). A drain is not essential; however, a small rubber band drain may be used and is removed after 48 hours. The orbital space contains only air at the conclusion of the procedure. No pressure dressing is applied because of the possibility of compromising initial union of the skin flaps. After several weeks the skin flaps begin to become firmly attached to the peripheral areas of the bony orbit. Within two months the skin is usually lying flat against the bony orbital walls, and firmly attached thereto (Fig 7). If not, moderate pressure dressing may be used after firm union of the skin flap incision.

The technique just described is applicable to cases with uninvolved lids. Depending on the circumstances, entire excision of both lids may be necessary. In these instances the skin beyond the orbital rim is under-

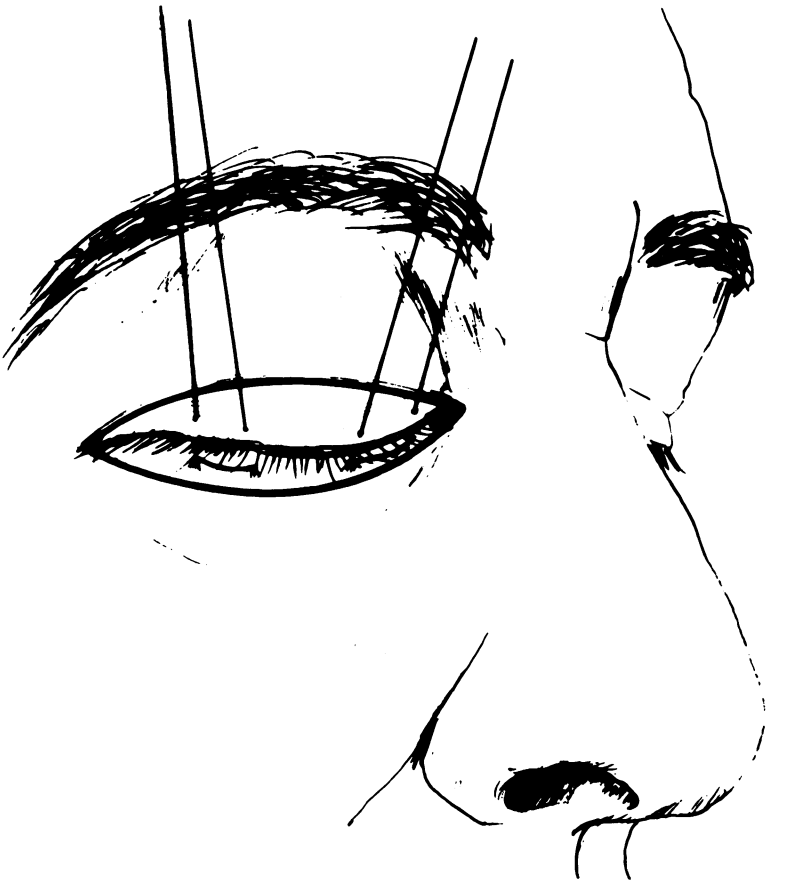

FIGURE 1
Initial incision through full thickness skin behind lash bearing margins of the lid includes skin at the inner and outer canthus.

mined above, below, and temporally until closure of the skin flaps can be accomplished. In patients with loose skin such as is usually found in older age groups, sufficient undermining can be accomplished to bring the flaps together. Naturally in children sufficient undermining could not be done if all lids had to be sacrificed, and skin grafting would be appropriate.

CASE REPORTS

The following 11 case reports relate to my own patients and those of colleagues whom I assisted or for whom I acted as consultant.

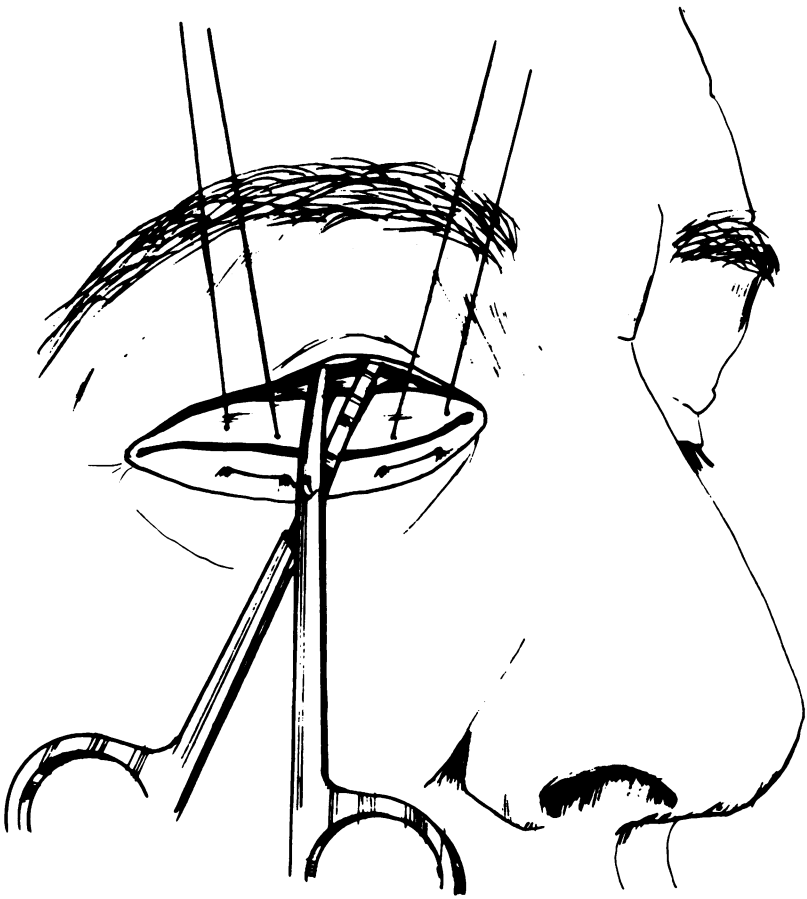

FIGURE 2
Subcutaneous dissection is carried beyond bony orbital rim.

CASE 1

A 58-year-old woman had a malignant melanoma of choroid with orbital extension. She had an exenteration in 1952. Orbital recurrence with generalized metastases occurred in 1958 leading to her death. The added simplicity of this technique subsequently led me and several of my colleagues to employ this procedure in other cases.

CASE 2

A 76-year-old woman had a malignant melanoma of lids, conjunctiva and orbit. Exenteration in 1958, with complete excision of both lids with skin undermining, no complications (Fig 8 A & B).

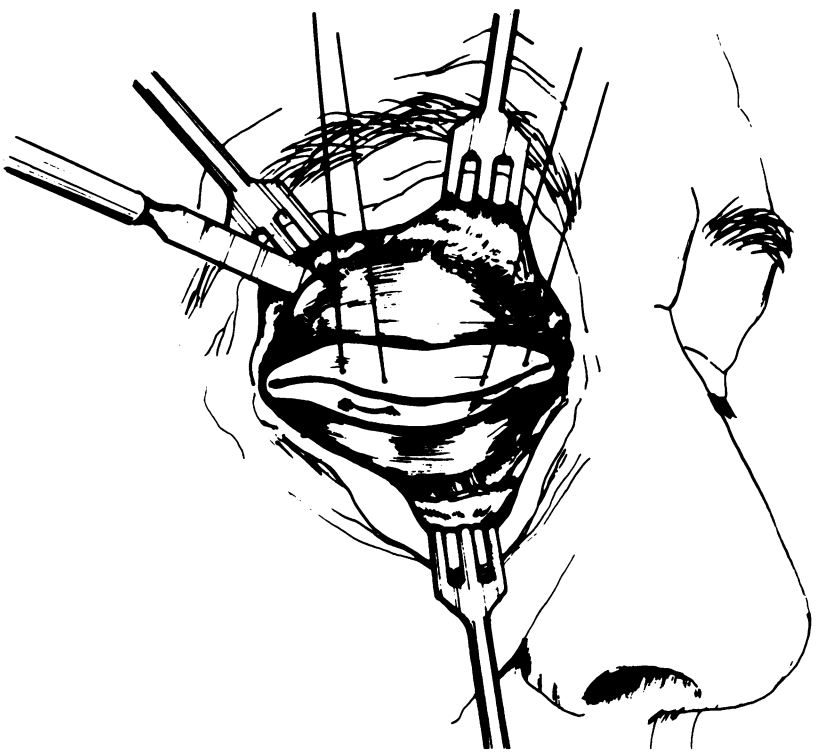

FIGURE 3
With skin retracted incision is carried through all tissue including periosteum around the rim of the orbit.

CASE 3

A 38-year-old man had a squamous cell carcinoma of conjunctiva and orbit. Exenteration in 1976 (Fig 9).

CASE 4

A 56-year-old man had a squamous cell carcinoma of lower lid and extension to the orbit. Exenteration on Sept. 28, 1979 (Fig 10 A & B).

CASE 5

A 56-year-old man had a malignant melanoma of choroid with orbital extension. Exenteration in 1979. Satisfactory postoperative healing occurred (Fig 1A). An inclusion cyst from a remnant of conjunctiva developed nine months later (Fig 11B). After removal of the cyst a combination yeast and Staphylococcus infection

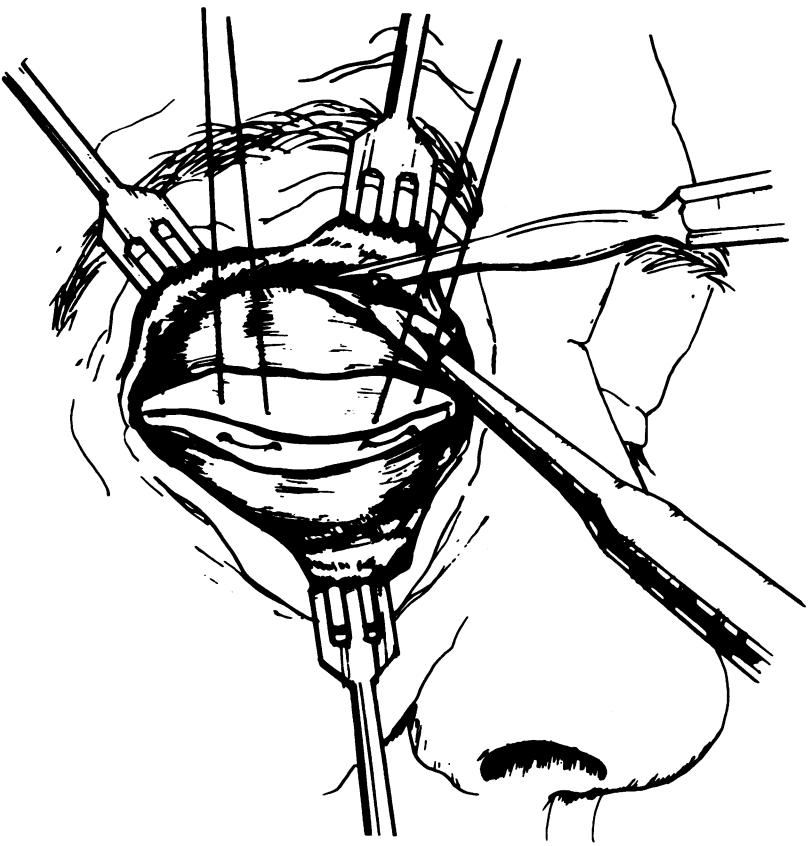

FIGURE 4
Periostial elevators are used to free the periosteum from the orbital bones.

ensued involving the nasal portion of the skin flap with erosion of one/third of the closure nasally (Fig 11C). After bringing the infection under control the skin flaps reunited spontaneously as seen in Figure 11D after which he was able to wear a prosthesis (Fig 12).

CASE 6

A 67-year-old man, a diabetic, dentist, had placed himself on cortisone for a nasal obstruction and nasal discharge and became critically ill. He was hospitalized with severe orbital cellulitis, a blind right eye, complete destruction of the nasal orbital wall, and pansinusitis. The offending organism was Mucor. At the time of the

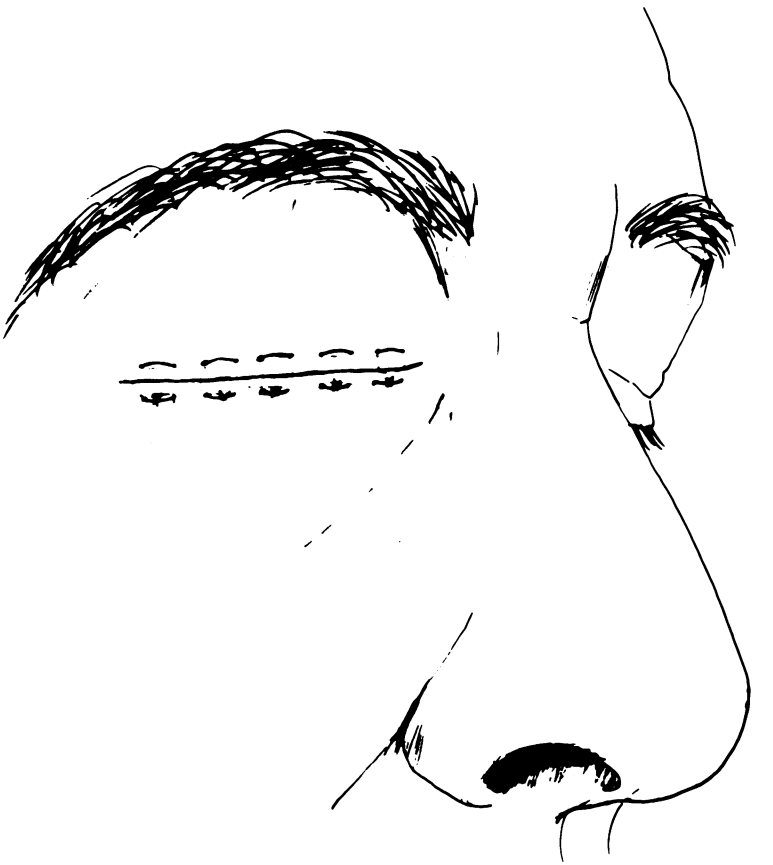

FIGURE 5
Skin edges united with mattress sutures.

exenteration in January of 1980, it was noted that the nasal wall of the orbit did not exist, and Mucor organisms were found in the orbit. Amphotericin and cephalexin (Keflex) were administered. Post-operative healing was without complication. The skin flaps healed without incident and lie flat against the orbital walls and completely cover the nasal-orbital defect. Figure 13 A & B demonstrates the prosthesis.

CASE 7

A 39-year-old woman with malignant melanoma of conjunctiva had an orbital extension. She had an exenteration in 1972, and died one year later of generalized metastases, with no orbital recurrence.

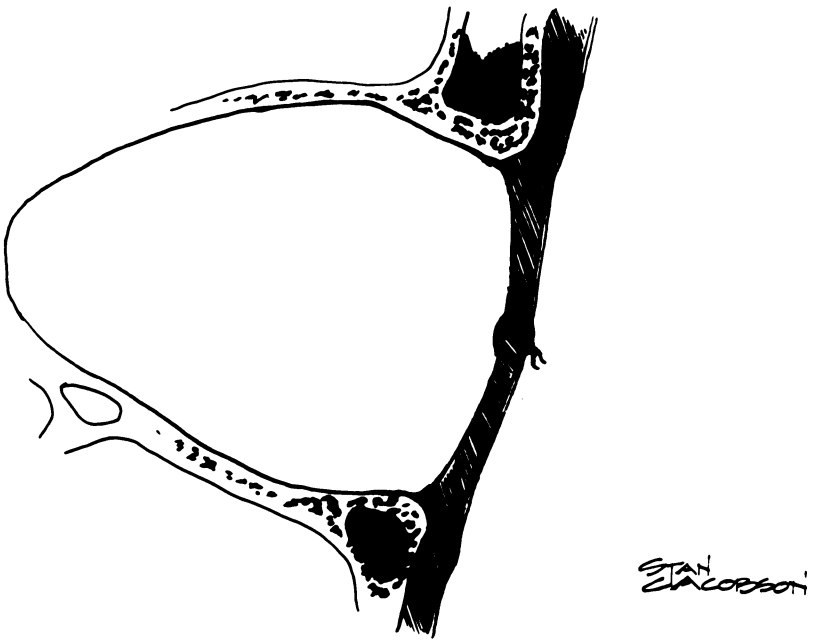

FIGURE 6
No orbital packing and no pressure dressing applied.

CASE 8

A 47-year-old woman had Wegener's midline granuloma involving nasopharynx, ethmoids, maxillary sinuses and right orbit. The right eye was painful, blind and proptotic. At the time of exenteration, Nov 2, 1979, complete absence of the nasal wall of the orbit was noted. The skin flaps were closed successfully, followed by a breakdown nasally due to a Staphylococcal infection. A combination of antibiotics and cyclophosphamide (Cytoxan) resulted in elimination of lid infection and arrested the granulomatous process. The remaining skin of the lids now lines the orbit up to the huge nasal wall opening (Fig 14A). The patient is wearing a prosthesis successfully (Fig 14B).

CASE 9

A 78-year-old man had an exenteration Dec 16, 1980, for a basal cell carcinoma of lid extended over the orbital rim temporally with orbital invasion. Involved portions of lids excised, and 4 cm^2 of skin excised temporally to the orbital margin. Primary closure of skin flaps was obtained, but due to tension, separation of skin flaps occurred temporally. In spite of this, reunion occurred spontaneously and

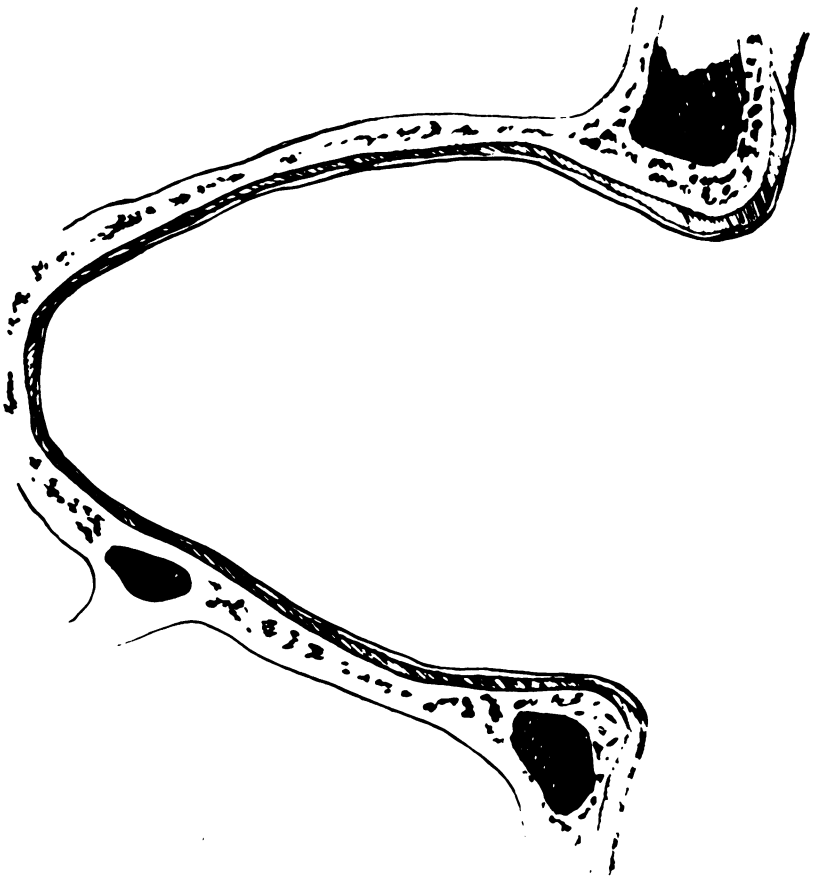

FIGURE 7
Skin is usually flat against bony orbital walls and firmly attached two months after the operation.

full thickness skin covers the orbit and is becoming firmly attached to the orbital wall with no defect (Fig 15).

CASE 10

An 87-year-old woman had an exenteration April 9, 1981, for malignant melanoma of conjunctiva extending into the orbit. There were no post-operative complications (Fig 16).

CASE 11

A 76-year-old woman had an exenteration March 20, 1981, for malignant mela-

FIGURE 8
Case 2 A: Preoperative malignant melanoma of lids, conjunctiva and orbit. B: Postoperative appearance.

FIGURE 9
Postoperative appearance five years following removal of squama cell carcinoma of conjunctiva and orbit.

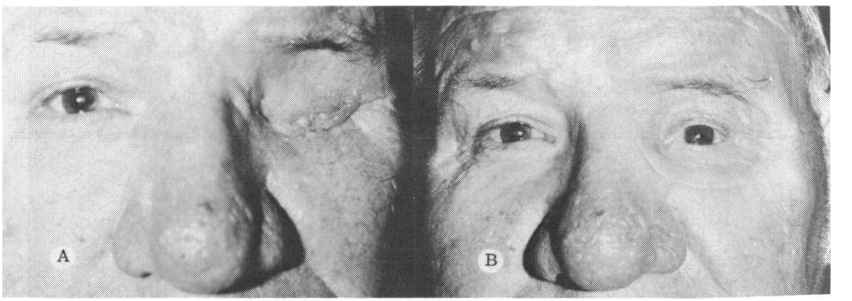

FIGURE 10
Case 4 A: Postoperative appearance following removal of squamous cell carcinoma of the lower lid by exenteration of orbit. B: Appearance with prosthesis.

noma of the choroid with orbital extension. The postoperative course was uneventful (Fig 17).

SUMMARY

In summary, a simplified technique of orbital exenteration has been presented. Results, with complications, in eleven cases have been described. The advantages of the operative method described are: (1) full

FIGURE 11
Case 5 A: Postoperative appearance of malignant melanoma choroid with orbital extension. B: Inclusion cyst from remnant of conjunctiva nine months following surgery. C: Infection followed cyst removal that resulted in erosion of skin closure nasally. D: Skin flaps reunited spontaneously after infection controlled.

FIGURE 12
Case 5: Patient fitted with prosthesis after infection subsided.

thickness skin provides better cushion for self-retaining prosthesis, (2) skin with intact blood supply is much less likely to be rejected, (3) no donor site with added discomfort and care, (4) local recurrence of neoplasm is easily detected, (5) operating time shortened and (6) favorable patient acceptance.

ACKNOWLEDGMENT

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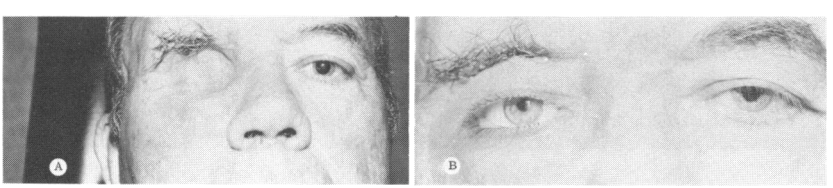

FIGURE 13
Case 6 A: Well healed orbit following exenteration and subsequent infection. B: Demonstrates prosthesis after healing completed.

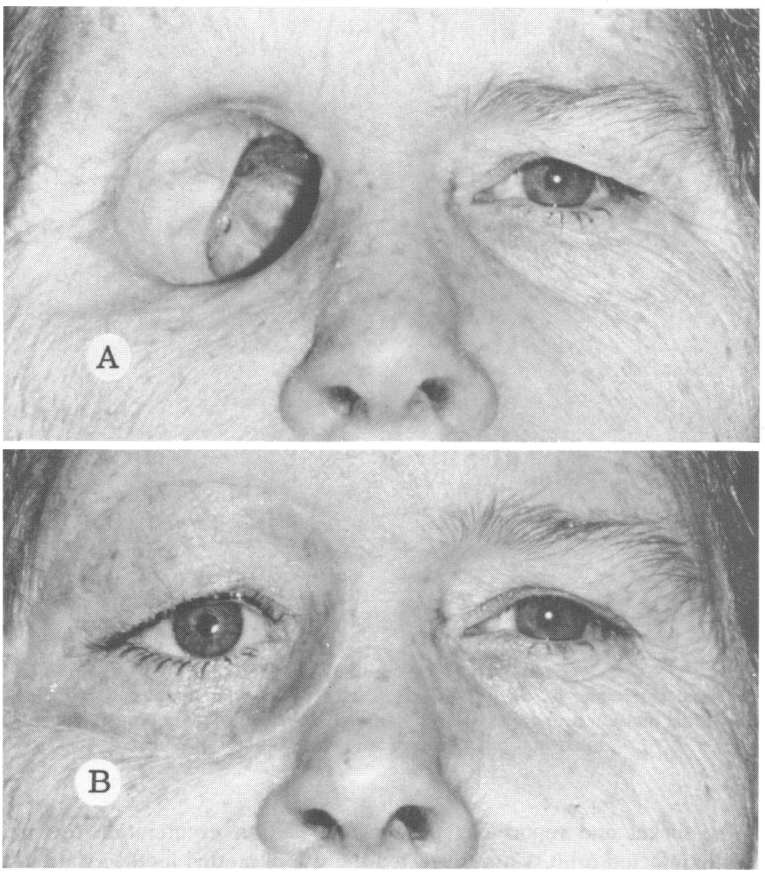

FIGURE 14
Case 8: Wegener's midline granuloma involving nasopharynx, ethmoids, maxillary sinuses and right orbit. A: Patient had breakdown along nasal orbital wall due to Staphylococcus infection. B: Patient was successfully treated with prosthesis.

DISCUSSION

DR CHARLES E. ILIFF. In a paper I gave at the First International Oculo-Plastic Congress in Dallas in 1976, I made the statement "Exenteration of the orbit is mandatory when a malignant neoplasm so involves the lids, the globe, or some part of the orbital contents that it cannot be removed by simple excision or irradiation. The criterion of success is complete eradication of the tumor which may require a combination of surgery, irradiation, or chemotherapy. All suspect tissues should be excised and this includes the lids."

It is also important that the socket should not be filled with any material that could mask a recurrence. Naquin first recommended the use of temporalis muscle

FIGURE 15
Case 9: Nasal carcinoma or the lid extended over orbital rim temporally with orbital invasion. Initial incision broke down due to tension, however; reunion occurred spontaneously and full thickness skin covers the orbit.

to fill the socket and reported a patient that had an exenteration to cure a chronically infected orbit. Gass suggested the use of methyl methacrylate to fill the exenterated orbit but that material, like the temporalis muscle, could mask a tumor recurrence. Neither of these materials should be used when an exenteration is to be done to eradicate a malignant tumor.

Doctors Coston and Small have presented an excellent paper utilizing the skin of the lids to close the exenterated orbit.

In our series of 21 exenterations, 12 patients had tumors originating in or involving the lids. Thus we feel that preservation of the lids in any tumor of the orbit, lids or orbital contents which may possibly have tumor tissue in the lids is not acceptable.

The second point of importance is the ability to observe the exenterated socket for possible tumor recurrence. To illustrate this is a picture of the recurrence of a rhabdomyosarcoma in the apex of the orbit of a child (a patient of Dr Harrell Pierce) (slide). Because of the thin skin graft, the recurrence was observed early and irradiation and chemotherapy given immediately. There has been over a 15-year-follow up on this well patient.

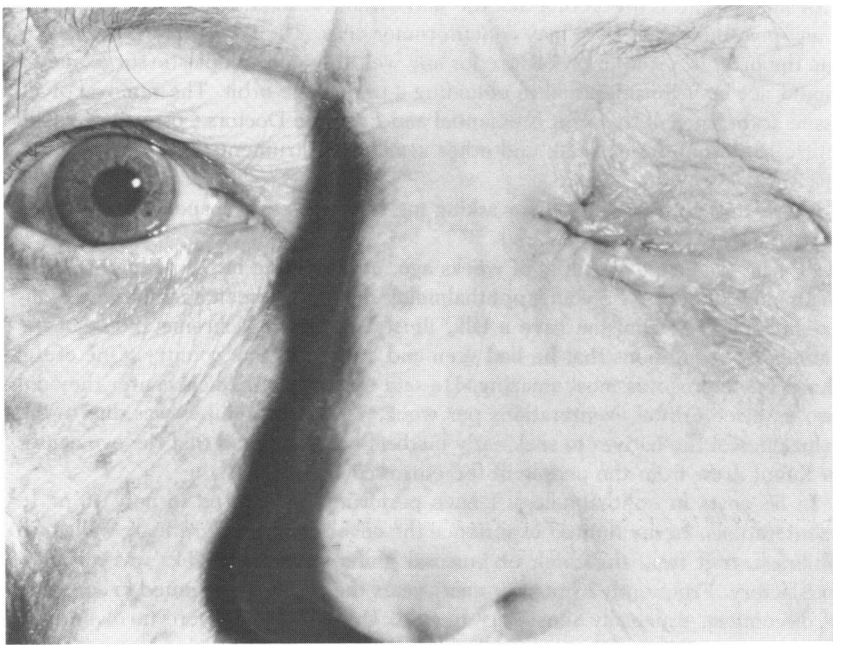

FIGURE 16
Case 10: Malignant melanoma of conjunctiva extended into orbit. Well healed skin incision without complications.

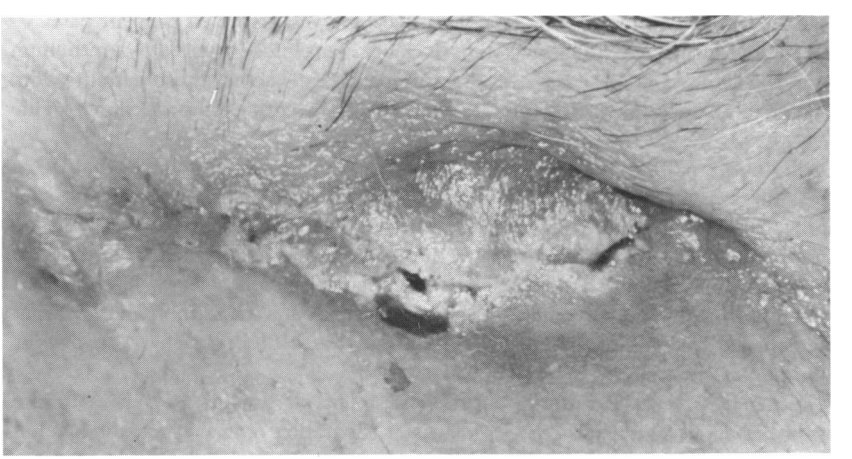

FIGURE 17
Case 11: Malignant melanoma of choroid. No postoperative complications following exenteration.

In summary, it is my feeling that the skin of the lids should be sacrificed if there is any possibility that they may contain tumor cells. The taking of a skin graft to line the orbit is a simple procedure for any well-trained oculoplastic surgeon and should not be a consideration in obtaining a tumor free orbit. The removal of all tissue at the apex of the orbit is essential and I assume Doctors Coston and Small utilize the exenteration knife and other available instruments for accomplishing this.

I wish to thank the authors for asking me to discuss their paper.

DR PHILIP M. LEWIS. A couple of weeks ago, at a meeting of the Memphis Ophthalmological Society, a young ophthalmologist who had been a medical missionary in Kabul, Afghanistan gave a talk, illustrated by Kodachrome slides, of the various eye conditions that he had seen and treated in that country. One of the things he told us was most amazing. He said that at this medical center they did two or three orbital exenterations per week. The large number was due to the reluctance of the natives to seek early medical treatment and that the eye center in Kabul drew from the people of the entire country.

In 58 years in ophthalmology I have performed or assisted in only 10 or 12 exenterations. In my limited experience the covering of the bare bony walls by a Thiersch graft from the thigh or mucosal grafts from the cheeks was not very satisfactory. Frequently even after many years the patients continued to complain of discomfort, especially sensitivity to cold. Unless the lids were involved by a large cancerous lesion they were used to cover the orbital rims and were packed back firmly against the bare bone of the orbit. The cilia were completely excised after first splitting the lids and removing the tarsal plates and conjunctiva. The orbital cavity was allowed to granulate. Granulations which tended to override the skin edges were removed when indicated by curettage and applications of lunar caustic. Topical application of 10 percent cocaine were used to prevent pain.

The final result was a shallow, smooth cavity completely covered by epithelium from the skin. As no prosthesis were cosmetically satisfactory those patients wore a patch or an opaque lens in a spectacle frame usually with a temporal slide shield.

DR J. REIMER WOLTER. I would like to support Doctor Coston and state that there are situations in orbital tumor surgery where it makes sense to preserve the patient's lid skin during exenterations of the orbit for a better postoperative appearance—and I have done this frequently. Examples for such situations are locally malignant orbital neoplasms or neoplasms which already have caused systemic metastatic involvement. There also are patients who simply demand that as much as possible of the normal tissues in the orbital region is saved—for non-medical reasons.

Technically, I have found it best to first cut off the lid borders with the eyelashes all around using scissors for easier separation of the skin at the level of the dermis. Traction sutures placed through the tarsal parts of the lids allow for exposure and a cut is made under the skin all around to the bone of the orbital rim. The remainder of the exenteration proceeds as usual. After the preserved lid

skin is sutured horizontally, a layer of gauze is placed on the skin and cotton balls packed into the orbit will stretch the skin and push it against the bone.

Preserving the lid skin makes the healing much faster and the scar more acceptable, but the deep hole caused by an exenteration still is very disturbing to lay persons. To avoid this deep hole, I have, in some cases, saved as much orbital tissues as possible and placed an implant into the orbit with good success. Glass beads can also be used.

To demonstrate my procedure, I present a patient who had an orbital intra-epithelial epithelioma originating in the conjunctiva. This had grown out of control in spite of radiation therapy and the eye had ruptured spontaneously. Metastatic spread is not expected. Thus, lid borders, conjunctiva, eyeball and much of the orbital contents were removed. A 20 mm Tantalum mesh implant was placed in the orbit (slide). The patient uses an opaque lens in his glasses and a side shield.

DR ROBERT KENNEDY. This was a most unique presentation and I wish I had had the opportunity to hear it some twenty-five years ago. It could have saved much grief. In reference to Doctor Lewis' statement about Afghanistan, in 1966 I was there at the beginning of the CARE/MEDICO program and can certainly attest to that being an area where one might build up a series of exenteration patients.

Necessity is the Mother of invention. The first time I encountered the problem that Doctor Coston has described was on the HOPE Ship in Conakry, Guinea on the West Coast of Africa in 1965 (slide). We had limited facilities and this man seemed to be forever around. His tumor was so large that by leaving and saving the skin, after complete exenteration to the bone, the extensive amount of skin could be invaginated into the orbit and packed to line the bone without leaving the air space described by Doctor Coston. The procedure took about 45 minutes and recovery was rapid with an eyepad dressing used for three or four days.

The invagination of skin with packing on the outside to establish contact with underlying tissue can be used successfully when one knows that the orbital contents and tumor cannot be completely removed (slide). Secondary invasion into the orbit by meningiomas or sinus carcinomas which may or may not have already been partially removed are examples. Leaving the skin after an incision near the lash line allows removal of the eye and as much of the orbital contents and tumor tissue as is safely possible then allows the skin to be invaginated and well closed. Pressure externally establishes skin contact with the underlying bone or residual unresectable tumor. Limbal or conjunctival carcinomas which may be inoperable may be extensive or may have blinded the eye. By a similar skin incision near the lash line with complete resection of the conjunctiva and globe allows the skin to be closed primarily.

The invaginated skin can be closed directly and pressure produces contact to underlying tissue allowing hospital discharge in two or three days. It is not necessary to do an extensive exenteration.

When the invagination of skin cannot be accomplished and when the skin can be saved, the closure leaving the air to absorb as described by Doctor Coston is intriguing as he has demonstrated. I would hope there would be adequate control

of bleeding so that there would be no accumulation to cause the wound to break down.

DR TULLOS O. COSTON. I wish to thank the discussors. Doctor Iliff, you were a little mild in your discussion. In squamous cell carcinoma and basal cell carcinoma involvement of the lids, one must monitor the cut edges with frozen section biopsies to be certain to be beyond the tumor area.

In regard to recurrences it is just as readily detected with full thickness, as with split thickness grafts, because both lie flat against the orbital walls.

The Naquin technique leaves a sunken defect over the temple, and prosthetic devices cannot be fit nearly as well since a deep orbit is essential for a self retaining prosthesis. The technique just described allows the patient to remove the prosthesis once daily and clean the orbit exactly as one cleans the face.

The ocularist at the McGee Eye Institute, Henry LaFuente, invented a changing pupil for artificial eyes. He said a gentleman came in and said he liked his artificial eye very well, but his lady friend told him the pupil was larger than that of the normal eye, in the evening in low light. Mr LaFuente made an eye with a moveable diaphragm embedded in it, and a tiny hand-held magnet passed over the front of the eye changes the size of the pupil to match the normal eye whether in low light or bright light.