Chapter 11 – Complete Maxillectomy

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Tumors affecting the hard palate and maxillary sinus may originate from any of the tissues forming these structures. Squamous cell cancer is the most common pathologic diagnosis. Tumors both benign and malignant that originate in bone or minor salivary glands, as well as tumors that develop from the odontogenic apparatus, are encountered occasionally. Standard therapy for all these tumors, with the exception of lymphoma, rhabdomyosarcoma, and other cancers that are highly responsive to chemotherapy or radiotherapy, is surgical removal, frequently followed by adjuvant radiation therapy.

Tumors involving the infrastructure of the maxillary sinus are tumors of the oral cavity. These tumors, both benign and malignant, may be effectively treated by partial maxillectomy in which only the inferior aspect of the sinus is removed and the trimalar complex, inferior orbital rim, and orbital floor are preserved. The precise limits of the resection must, of necessity, be determined by the extent of the tumor. For most patients the defects are rehabilitated with the aid of a maxillofacial prosthodontist.[1] However, special circumstances may arise that call for tissue reconstruction; when resection requires transection of the nasolacrimal duct, immediate dacryocystorhinostomy is mandatory.

PATIENT SELECTION

Staging of tumors of the maxillary sinus is best accomplished with either computed tomography (CT) or magnetic resonance imaging (MRI). Ohngren's line, an imaginary line drawn from the medial canthus to the angle of the mandible (Fig. 11-1), separates the maxillary sinus into anteroinferior and posterosuperior aspects.[2] Not surprisingly, tumors anterior to Ohngren's line are associated with a better prognosis. Tumors posterior to Ohngren's line are more likely to have involvement of the orbit and infratemporal fossa and, because of the proximity of these structures, are less curable.

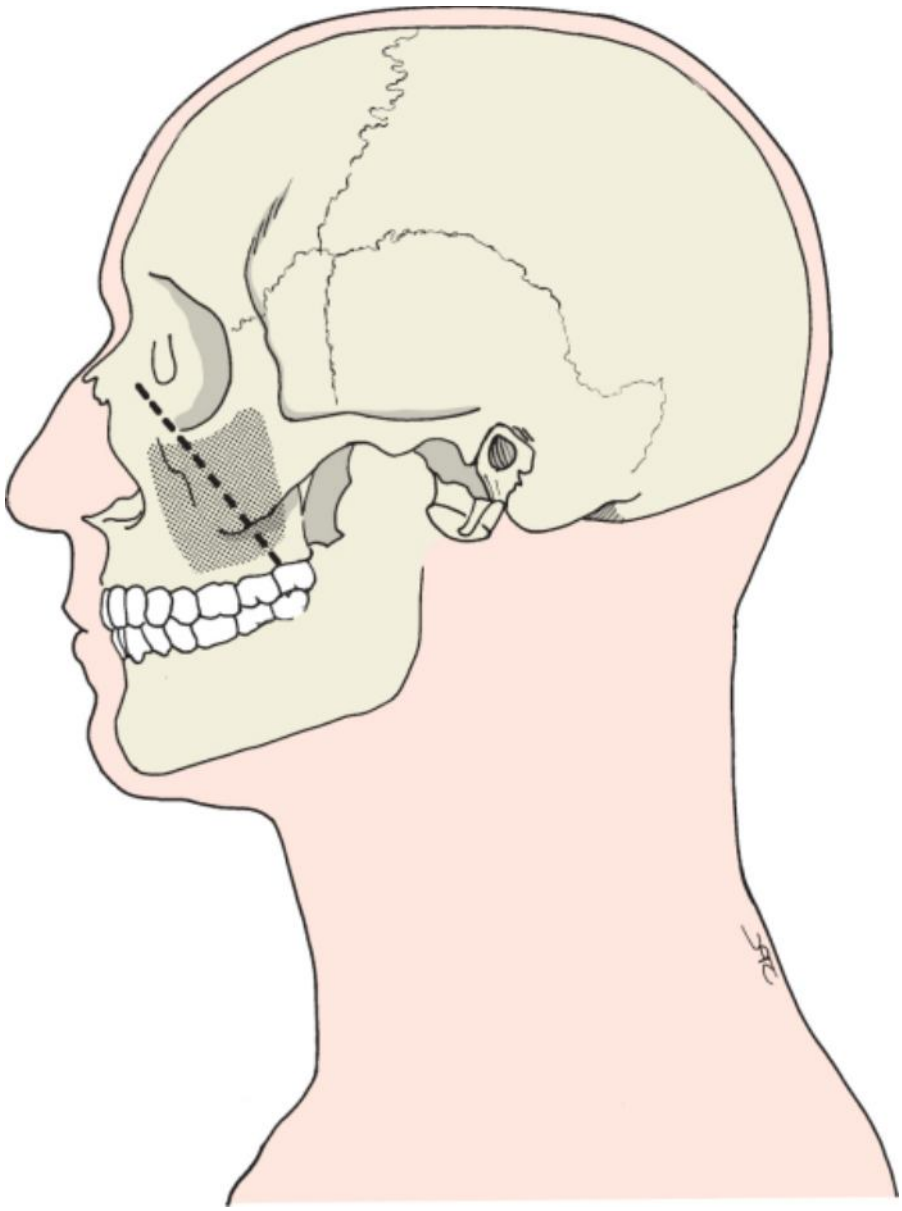

Figure 11-1 Ohngren's line is an imaginary line drawn from the lateral projection of the medial canthus to the angle of the mandible. It divides the maxillary sinus into an anteroinferior quadrant and a posterosuperior quadrant.

Therapeutic intervention depends on the extent of the tumor and the patient's general condition, comorbid conditions, and life expectancy, as well as the patient's preference and the bias of the treatment team. Complete surgical excision with or without adjuvant radiation therapy results in the best chance for local control. However, involvement of vital or important neurosensory structures and the propensity for perineural spread of tumor may make complete surgical removal difficult, impossible, or unacceptable. Management with radiation therapy as the sole modality is often associated with significant injury to the skin, adnexa, and orbit and may result in osteomyelitis with progression of the tumor. Cancer involving bone is generally thought to be incurable by radiation therapy. Combined-modality protocols consisting of radiation therapy and chemotherapy are commonly used but have not yet proved superior in dealing with these difficult-to-treat tumors.

Most patients undergoing maxillectomy suffer loss of oral-nasal separation, which results in reduction of speech intelligibility and nasal reflux of fluids. Such patients are best rehabilitated with the help of a maxillofacial prosthodontist who can fabricate an obturator.[3] The integrity of the nasolacrimal system should be restored intraoperatively through the performance of dacryocystorhinostomy. Involvement of the orbital floor by cancer is not an absolute indication for orbital exenteration; however, when the cancer invades through the periorbita to involve the orbital muscles and fat, useful vision can rarely be preserved and orbital exenteration should be considered. Extended total maxillectomy is required for patients with involvement of the soft tissue of the cheek or with posterior involvement of the soft tissue of the pterygopalatine or infratemporal fossa. This procedure may be adapted to include a transcranial skull base approach, thereby permitting resection of the bone of the middle fossa to ensure completion of resection. Perineural spread of tumor is most likely responsible for the high incidence of local recurrence despite complete tumor resection. Decisions regarding the administration of radiation therapy

must consider the potential for damage to vital structures, most importantly the central nervous system and eye.

PREOPERATIVE EVALUATION

Preoperative evaluation should include physical examination with special emphasis directed to the nasal fossa and nasopharynx. Use of a nasal endoscope allows detailed inspection of intranasal anatomy. Assessment of the integrity of the inferior orbital nerve and the bony walls of the sinus is necessary to determine spread of the tumor outside the maxillary sinus either anteriorly into the soft tissues of the cheek or posterolaterally into the infratemporal fossa.

All patients are evaluated preoperatively with CT, MRI, or both. CT shows bony anatomy in more detail and is generally our group's first choice to image tumors of the maxillary sinus. Both axial and coronal planes should be studied. CT clearly demonstrates bone abnormality; however, it may overestimate the extent of tumor (Fig. 11-2). MRI distinguishes tumor from surrounding soft tissue and is especially valuable in differentiating tumor from secretions resulting from sinus obstruction (Fig. 11-3). MRI also demonstrates perineural spread better than CT does.

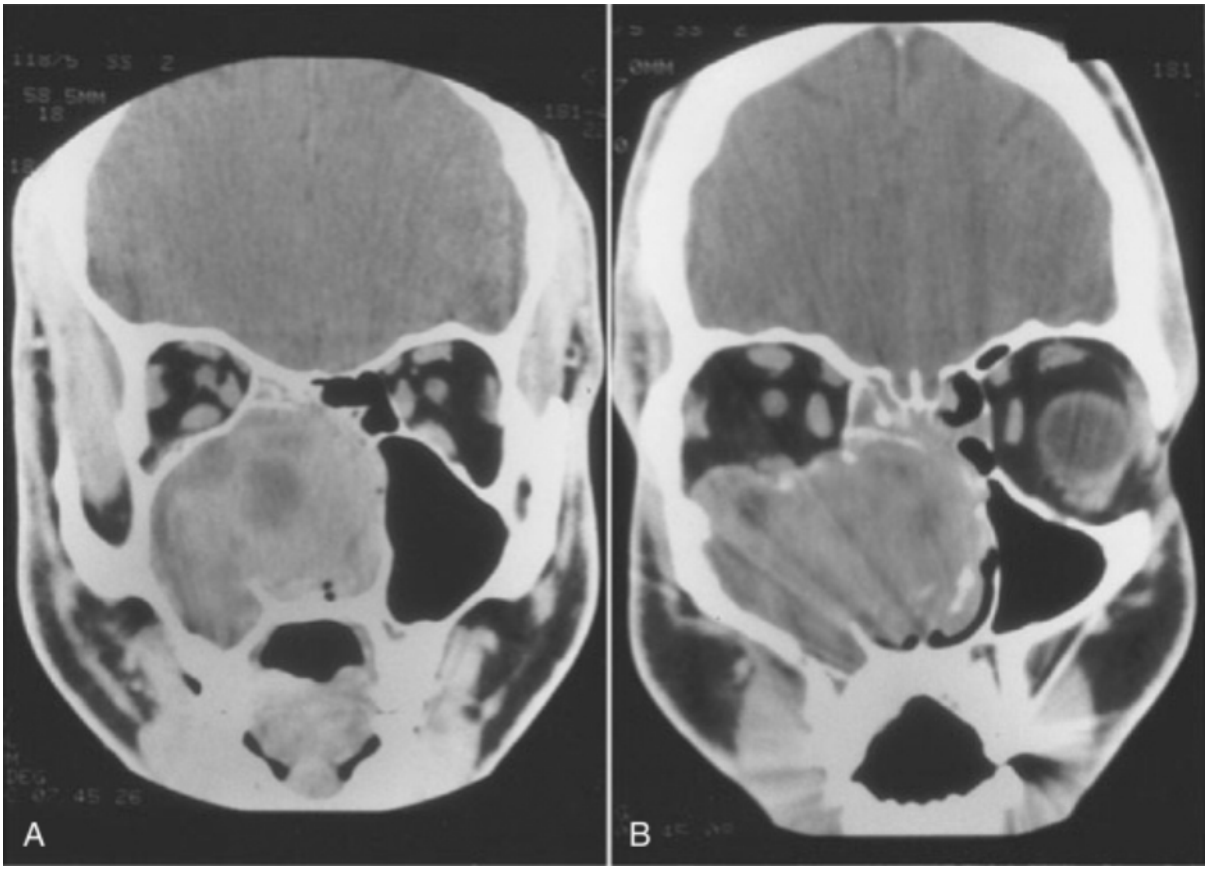

Figure 11-2 **A**, A coronal computed tomography (CT) scan clearly identifies a massive tumor within the maxillary sinus. The orbital floor appears intact. **B**, This coronal CT scan demonstrates orbital involvement by the tumor, thus suggesting that complete surgical removal of the lesion will require orbital exenteration.

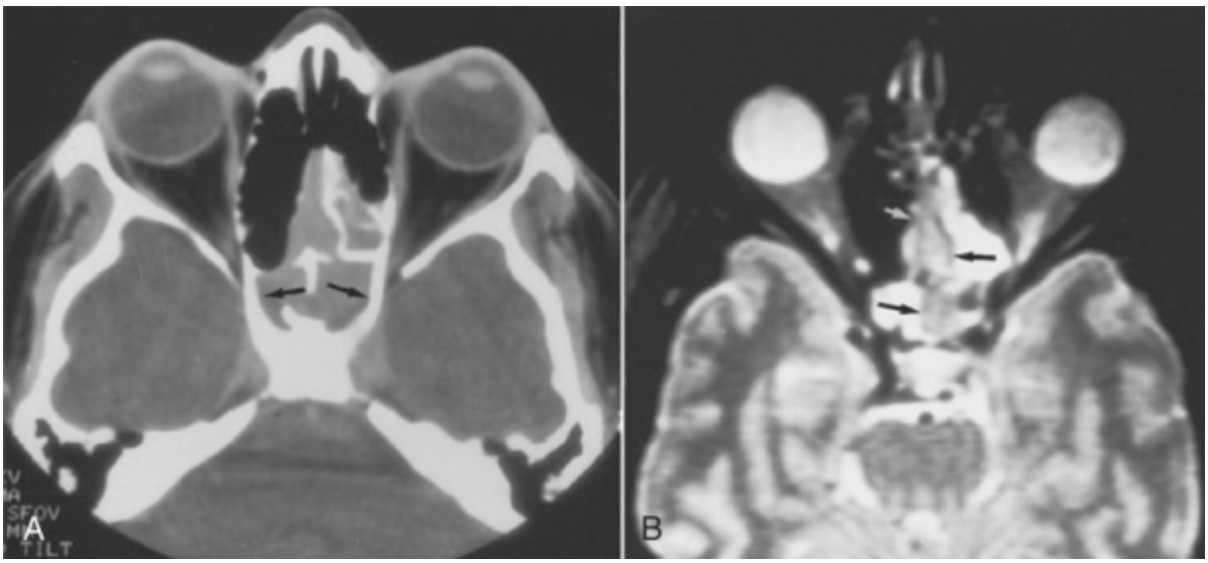

Figure 11-3 **A**, Axial computed tomography scan demonstrating a tumor filling the posterior ethmoid and sphenoid sinuses *(arrows)*. **B**, Axial T2-weighted magnetic resonance imaging allows differentiation of the tumor *(black arrows)* from the mucus-filled sinus *(white arrow)* in the ethmoid and part of the sphenoid.

A biopsy specimen should be obtained for histologic confirmation as a preliminary to surgical resection. The timing and technique of obtaining the specimen depend on the site of the tumor. Tumors visible in the nasal fossa may be biopsied directly through the nose. Tumors involving the alveolus or hard palate may be biopsied directly through the oral cavity. Tumors confined within the maxillary sinus may be accessible to biopsy through the nose, on occasion with the use of endoscopic sinus instrumentation. In some instances, an anterior antrostomy through an incision in the buccogingival sulcus may be needed to obtain histologic confirmation of malignancy confined to the maxillary sinus. In highly unusual circumstances, when radiographic findings conclusively disclose a destructive process, excisional biopsy may be justi-fied without benefit of a histologically confirmed diagnosis.

An inferior maxillectomy is adequate for tumors confined to the alveolus, palate, or the inferior portion of the sinus cavity. Extension of tumor to the floor of the orbit and inferior orbital rim is a contraindication to inferior maxillectomy, and total maxillectomy is considered the procedure of choice. Similarly, extension through the posterior maxillary wall to involve the infratemporal or pterygopalatine fossa is an indication for extended maxillectomy.

Consultation with an ophthalmologist may help determine the potential for orbital involvement, as well as document the status of the visual system preoperatively. All patients should be seen before surgery by a maxillofacial prosthodontist so that impressions can be obtained and a surgical obturator constructed. Most patients require postoperative adjuvant radiation therapy when being treated for squamous cell carcinoma or other high-grade neoplasms based on the biologic behavior of bone involvement and perineural spread. Accordingly, consideration of the status of the remaining dentition should be made at the time of surgery and extractions and restorations performed when indicated. Provision for treatment of the remaining teeth should be provided. Cervical metastases are unusual and occur in less than 10% of patients. Metastasis should be considered a sign of advanced disease. Routine treatment of the uninvolved part of the neck is not indicated.

Preoperative evaluation by a maxillofacial prosthodontist affords the opportunity to take the necessary impressions so that a surgical obturator can be fabricated. This obturator should be available for insertion in the operating room after completion of the procedure. The design of the prosthesis may vary according to the specifics of the anticipated resection and the surgeon's intended method of stabilizing it. If the resection is more extensive than planned, the prosthodontists can add to it with acrylic to be certain of a comfortable and effective fit.

Soft tissue reconstruction of defects that involve half of the hard palate may be undertaken with a regional flap such as a forehead or temporalis flap. The flap obscures possible areas of recurrence in the maxillary cavity that might have been seen if a full view of the cavity were possible. Additionally, soft tissue flap reconstructions tend to herniate into the oral cavity by gravity, thus making prosthetic rehabilitation difficult.

The advent of microvascular techniques has allowed the application of free tissue transfer to palatal reconstruction.[4–8] Purely soft tissue reconstruction does not address maxillary rehabilitation; therefore, rehabilitation of masticatory function remains a major deficiency because dentures cannot generally be used in such cases. The best function is achieved with a compound free flap involving bone and soft tissue. Techniques of reconstruction with an osseocutaneous free flap may provide the possibility of dental implants. The bone must be

covered with soft tissue internally (within the sinus). This bulk may result in obstruction of the nasal fossae.

The choice of incision depends on the surgeon's preference, the wishes of the patient, and the type and extent of the cancer.

SURGICAL APPROACH

Total Maxillectomy

Total maxillectomy should be performed with the patient under general anesthesia and anesthetic monitoring appropriate to the patient's condition. Extreme blood loss is unusual; however, precautions should be taken for the rapid replacement of fluid volume should excessive hemorrhage be encountered. Such hemorrhage most commonly occurs with transection of the internal maxillary artery in the infratemporal fossa at the time of tumor removal. The eye is protected by temporary tarsorrhaphy of the eyelid on the side of the maxillectomy. The suture is removed at the conclusion of the procedure. Total maxillectomy with orbital exenteration can be performed through a lateral rhinotomy incision (Figs. 11-4 and 11-5). The upper lip is divided on the ipsilateral side of the philtrum. The cheek flap is elevated with the periosteum of the anterior maxilla unless tumor has penetrated the anterior wall of the maxillary sinus. The infraorbital nerve is divided. A Weber-Ferguson extension along the inferior orbital lid is not ordinarily required unless exposure is needed to perform orbital exenteration or tumor involves the infratemporal fossa. In this case, better exposure posteriorly may be appropriate. When tumor extends posteriorly to involve the cranial base, additional techniques may be appropriate and are discussed in Chapter 100.

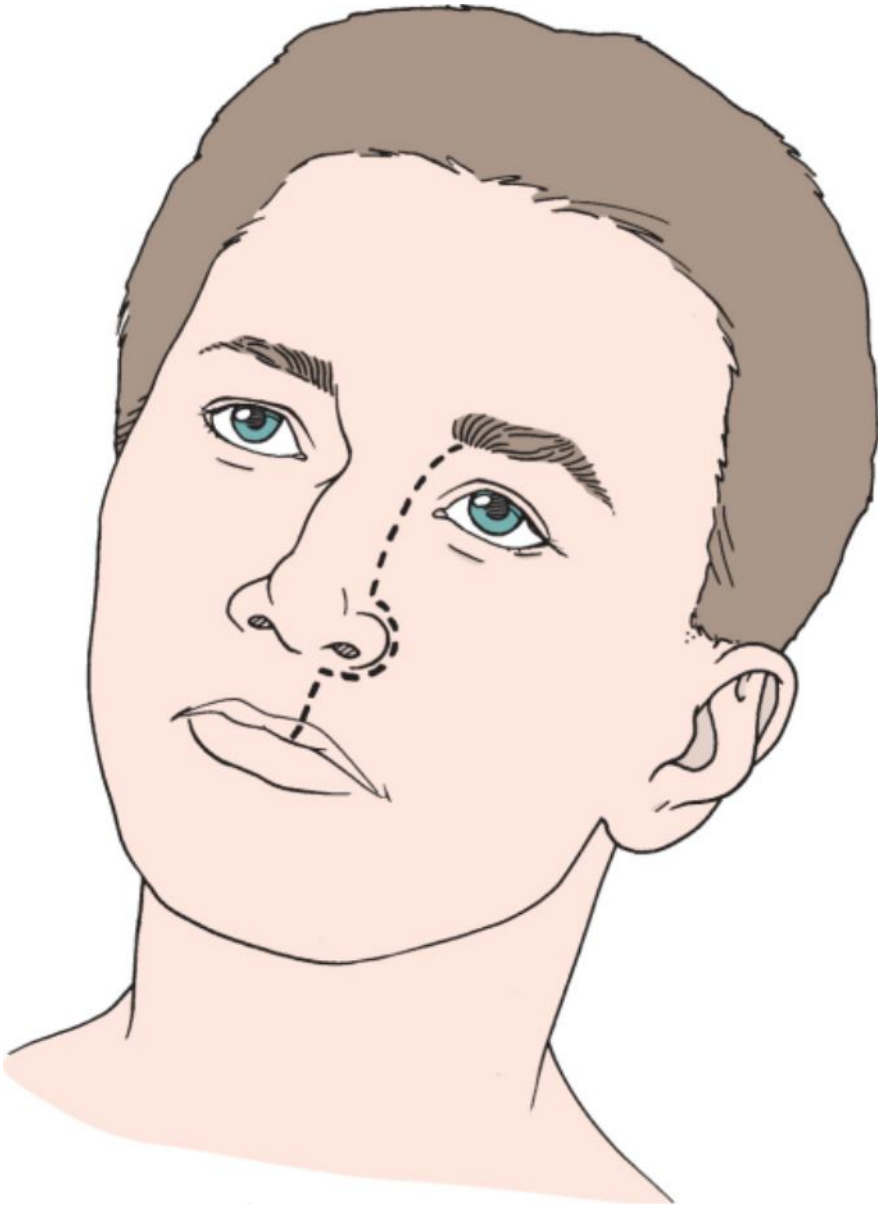

Figure 11-4 A lateral rhinotomy is a skin incision that begins approximately midway between the medial canthus and the dorsum of the nose and extends in a vertical direction around the alae. Lip splitting is used adjunctively as indicated.

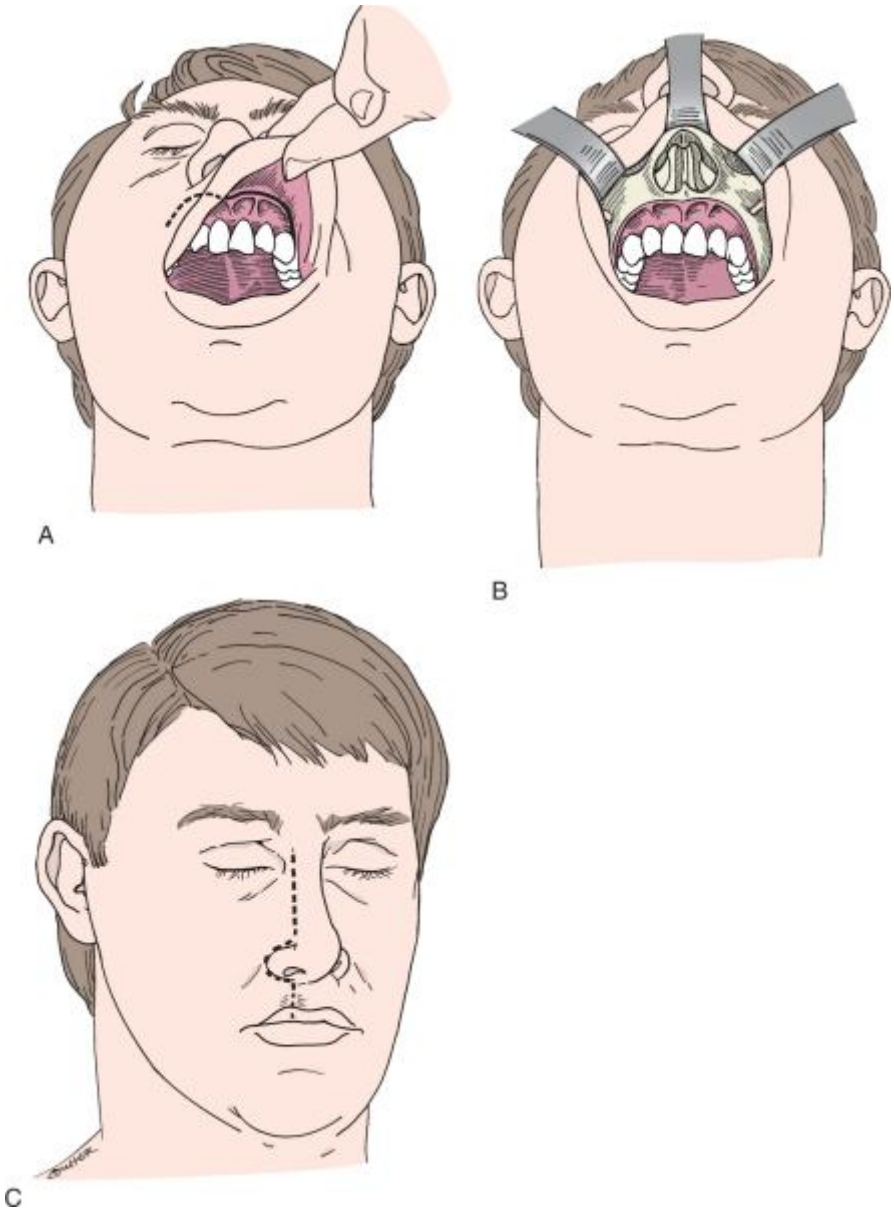

Figure 11-5 **A**, An incision in the buccal sulcus allows elevation of a cheek flap. **B**, This approach affords adequate exposure for most patients who require removal of the infrastructure of the maxilla. **C**, A lateral rhinotomy incision affords good exposure of the maxillary infrastructure.

After the skin incision, dissection is carried to the bone of the ascending process of the maxilla. The periorbita is elevated inferiorly and medially to expose the floor of the orbit, lacrimal fossa, and lamina papyracea. The lacrimal sac is identified, resected, and retracted, and the nasolacrimal duct is transected. At this juncturein the operation, the surgeon has the opportunity to assess the extent of orbital involvement to determine whether orbital exenteration is required. Direct extension of tumor through the periorbita is an indication for orbital exenteration. In some cases, frozen section evaluation may be of assistance in making this decision.

The inferior orbital rim is transected laterally through the trimalar buttress and medially into the ethmoid sinus at approximately the level of the frontoethmoid suture line (Figs. 11-6 and 11-7). When cancer involves the ethmoid sinus and extends through the fovea ethmoidalis, a cranial skull base approach should be considered. When the ethmoid is free of tumor, it can be taken down with biting forceps along the frontoethmoid suture line to afford the surgeon good visualization of this incision. An alternative is to make this osteotome cut with a fine chisel, although orientation of the chisel in the correct plane is critical to avoid inadvertent entry into the anterior cranial fossa. In situations in which the margin is not close, we prefer to use a rongeur because it affords a wider osteotomy and improved visibility. The palate is divided with an osteotome or saw. When possible, this incision should ideally be made 2 to 3 mm ipsilateral to the nasal septum to facilitate maxillofacial reconstruction (Fig. 11-8). In dentulous patients, the ipsilateral central and, when possible, the lateral incisor teeth should be preserved and the osteotomy made through the socket of the lateral incisor. Preservation of the central incisor helps the prosthodontist provide a much better cosmetic result. The soft tissue of the palate should be separated between the hard and soft palates intraorally. This incision is carried laterally to join the buccogingival sulcus incision at the posterior maxillary

buttress. The lateral orbital wall is then divided with either a saw or heavy scissors, after which the maxilla can be fractured and removed from the pterygoid plates with a curved osteotome placed just anterior to the pterygoid process. Bleeding will be brisk at this point and cannot be easily managed until the specimen is removed. Hence, the final heavy scissors cuts are made blindly by digital identification of the location of the soft tissue attachments posterior to the maxilla.

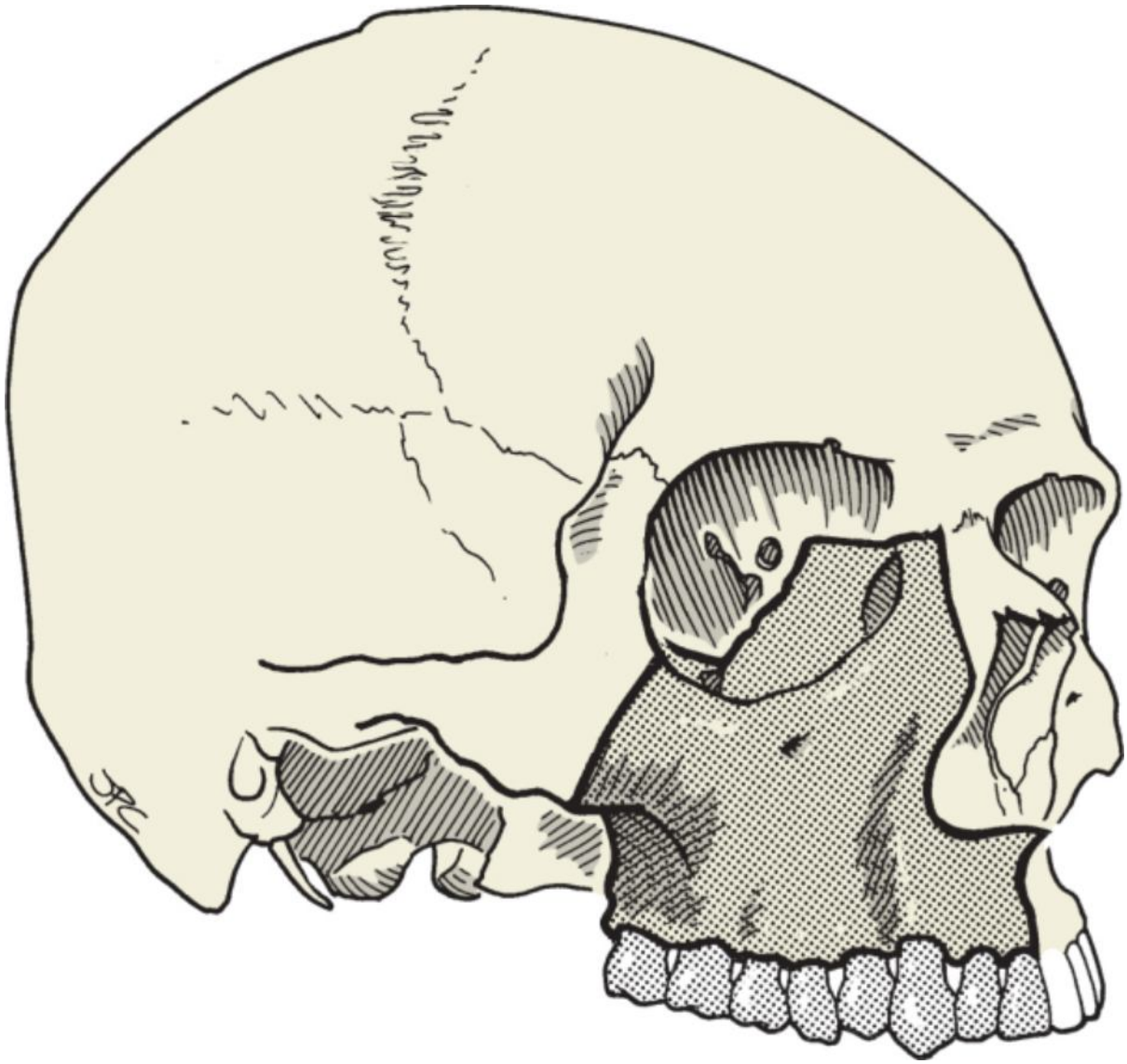

Figure 11-6 The bone cuts ordinarily used for a hemimaxillectomy are outlined. Modifications are made depending on the size and location of the tumor.

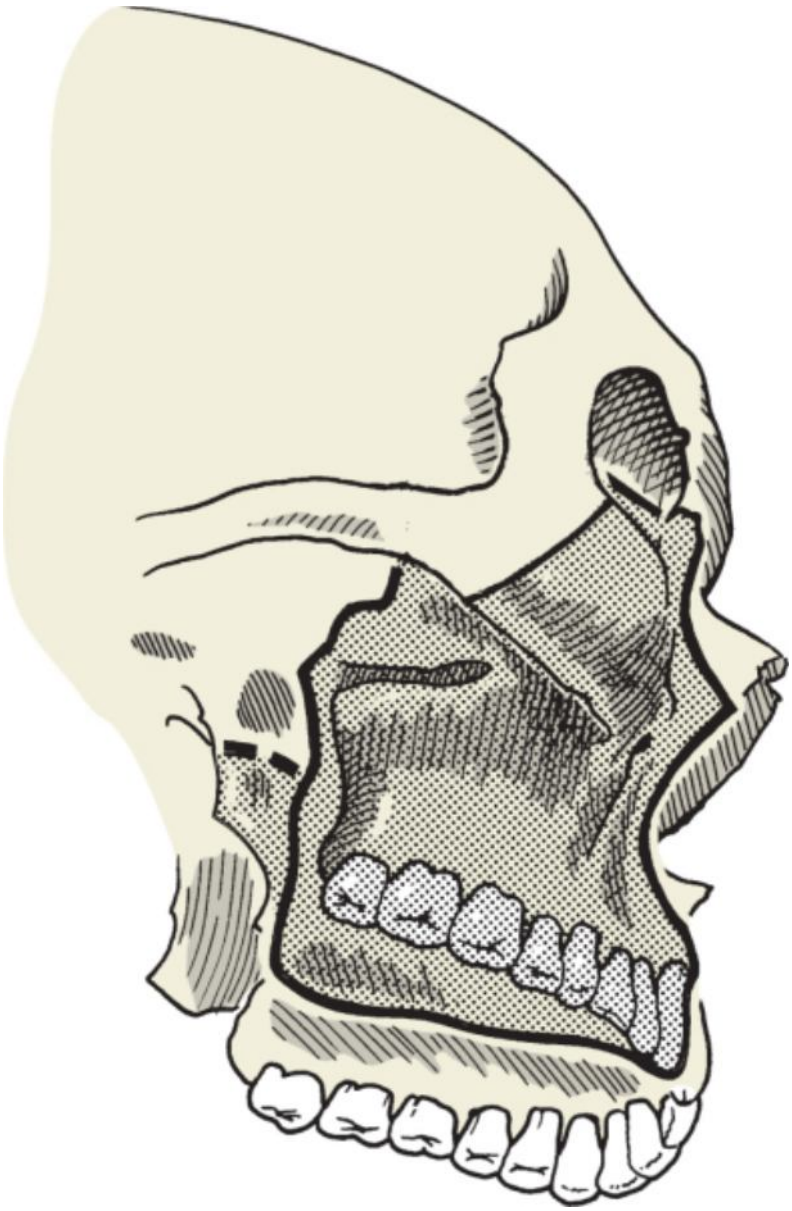

Figure 11-7 The bone cuts made for maxillectomy are further demonstrated.

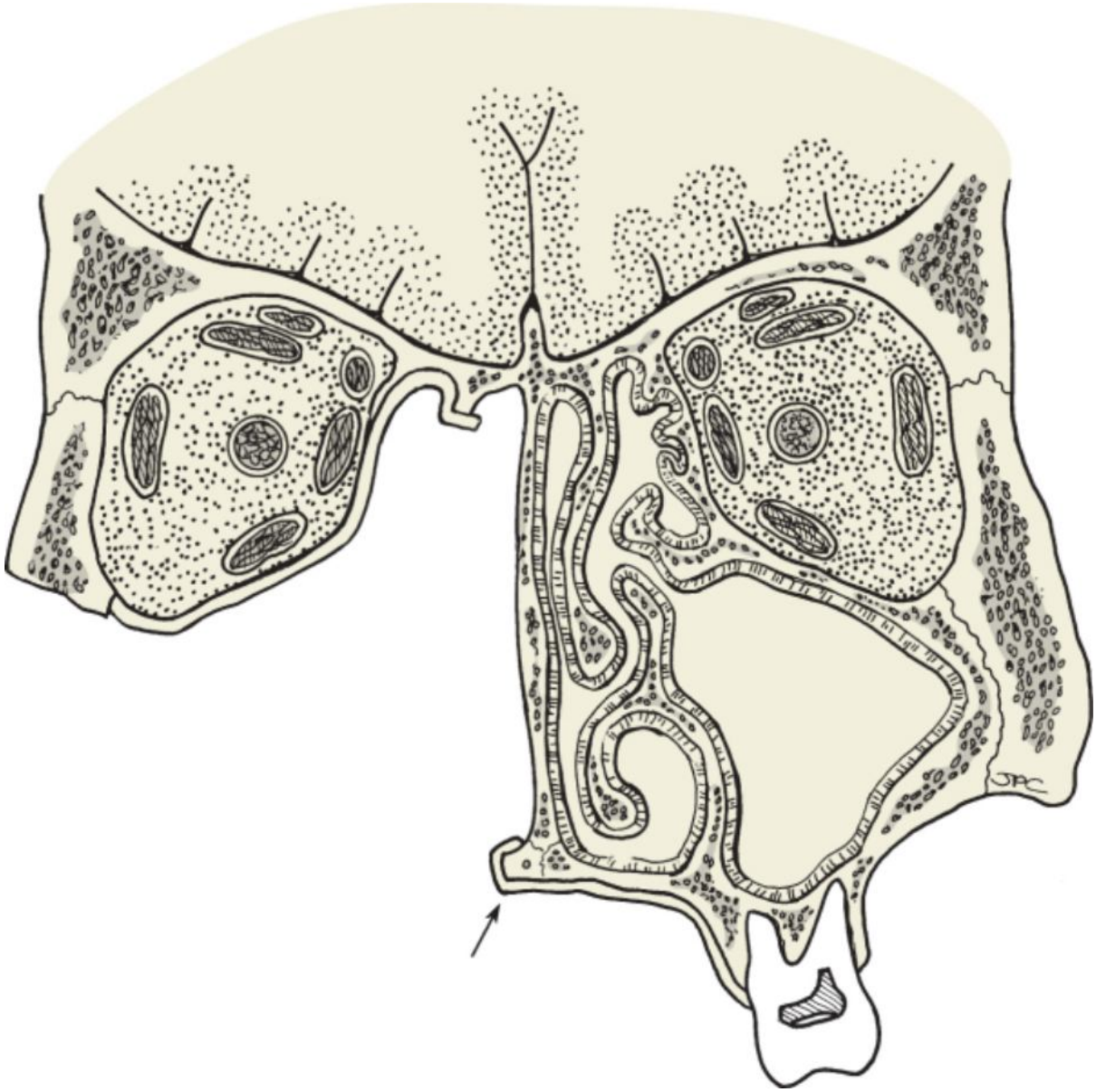

Figure 11-8 When a radical maxillectomy is performed, a shelf of bone on the nasal floor adjacent to the nasal septum *(arrow)* should be preserved if possible. This shelf provides a ledge to help retain a prosthesis.

Once the specimen is removed, bleeding from the internal maxillary artery is initially controlled with packing, after which the artery must be identified and either clipped or suture-ligated. Venous bleeding of the pterygoid veins can be managed by packing bipolar cautery, or suture ligature. A dacryocystorhinostomy is performed by first passing a lacrimal probe through the inferior punctum, which facilitates identification of the lacrimal sac. The sac is incised and marsupialized by suturing the cut edges to the adjacent soft tissue (Fig. 11-9).

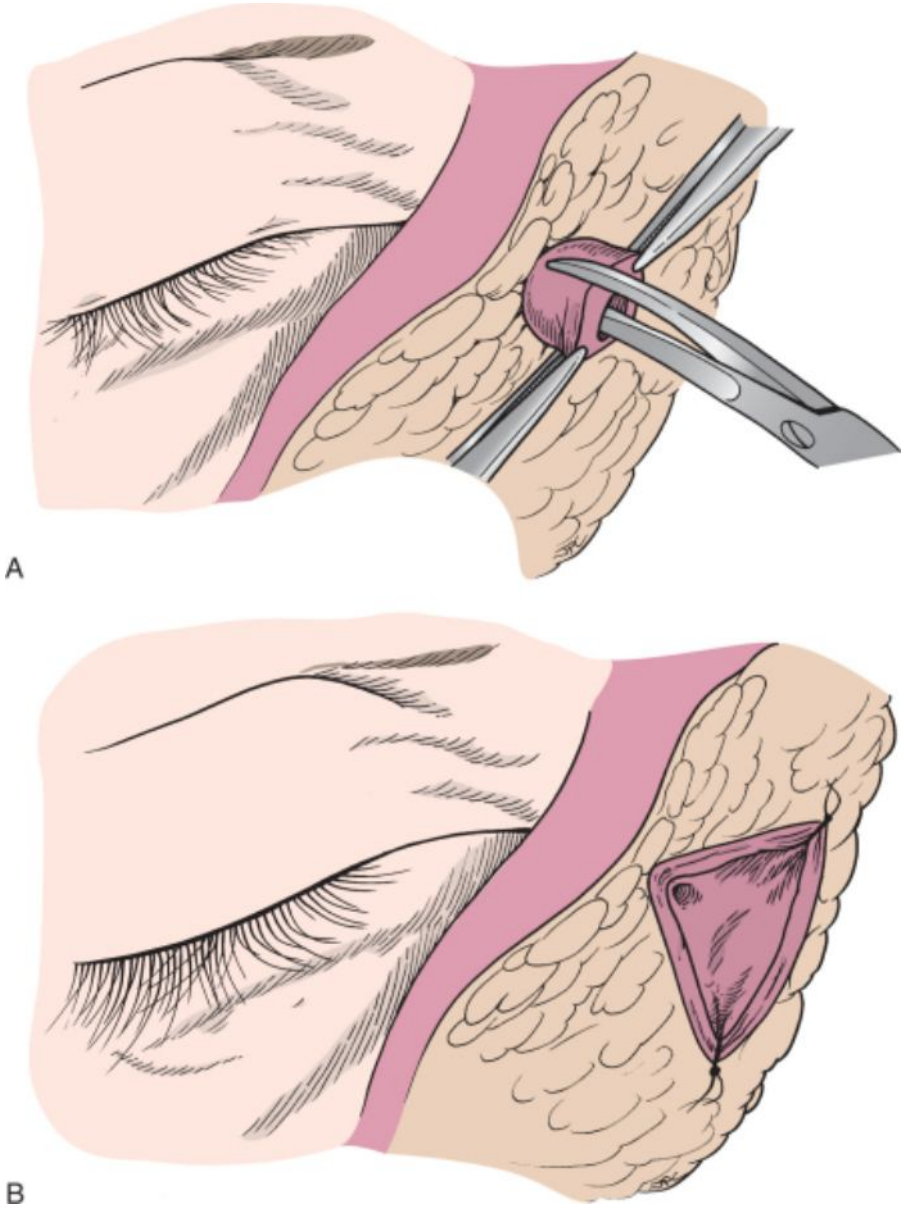

Figure 11-9 **A**, The lacrimal sac is opened with fine scissors. **B**, Dacryocystorhinostomy is accomplished by suturing the walls of the lacrimal sac open.

The facial skin flap should be lined with a split-thickness skin graft to promote rapid re-epithelialization in the maxillary cavity. The skin graft will prevent contracture of the facial skin, and the interface between the skin graft and the residual buccal mucosa forms a shelf that helps retain the prosthesis (Fig. 11-10).

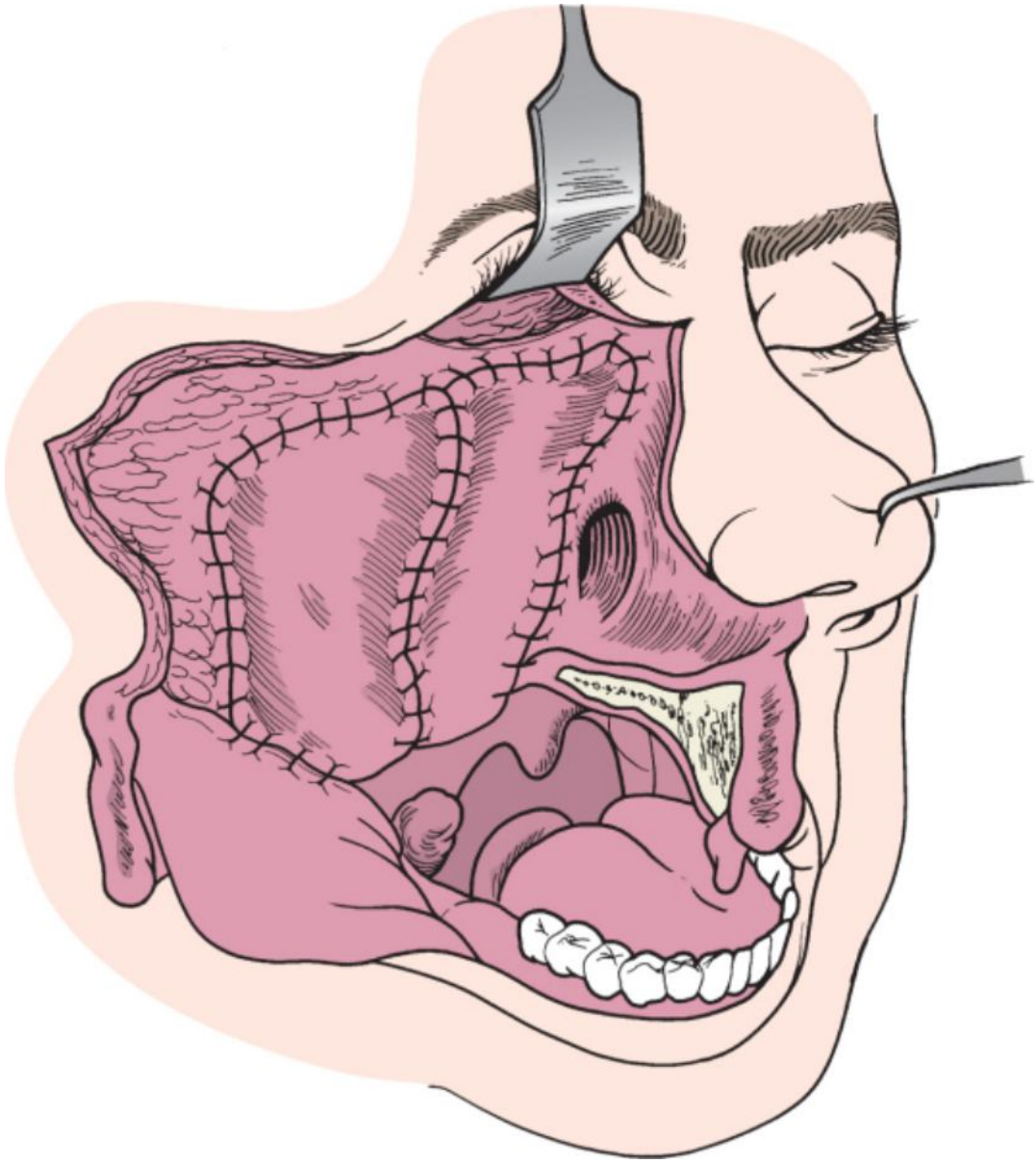

Figure 11-10 A split-thickness skin graft is used to line the facial flap and cover the exposed soft tissue in the infratemporal fossa.

The surgical prosthesis is then inserted and fixed with a lag screw (Fig. 11-11). The posterior edge of the splint should have drill holes to permit suturing of the soft palate to the prosthesis, which reduces the potential for nasopharyngeal reflux of food and facilitates early return to an oral diet. Use of the prosthesis also eliminates the need for a nasogastric feeding tube. The cavity is packed with antibiotic-impregnated gauze. The skin incision is closed in layers, with care taken to reapproximate the medial canthal tendon to the periosteum of the nasal bone. The eyelid suture is removed. An external dressing is applied to reduce eyelid edema and to coapt the cheek flap to the split-thickness skin graft. Trache-otomy is rarely required in patients undergoing maxillectomy.[9] A final prosthesis is completed when the wound is healed (Fig. 11-12).

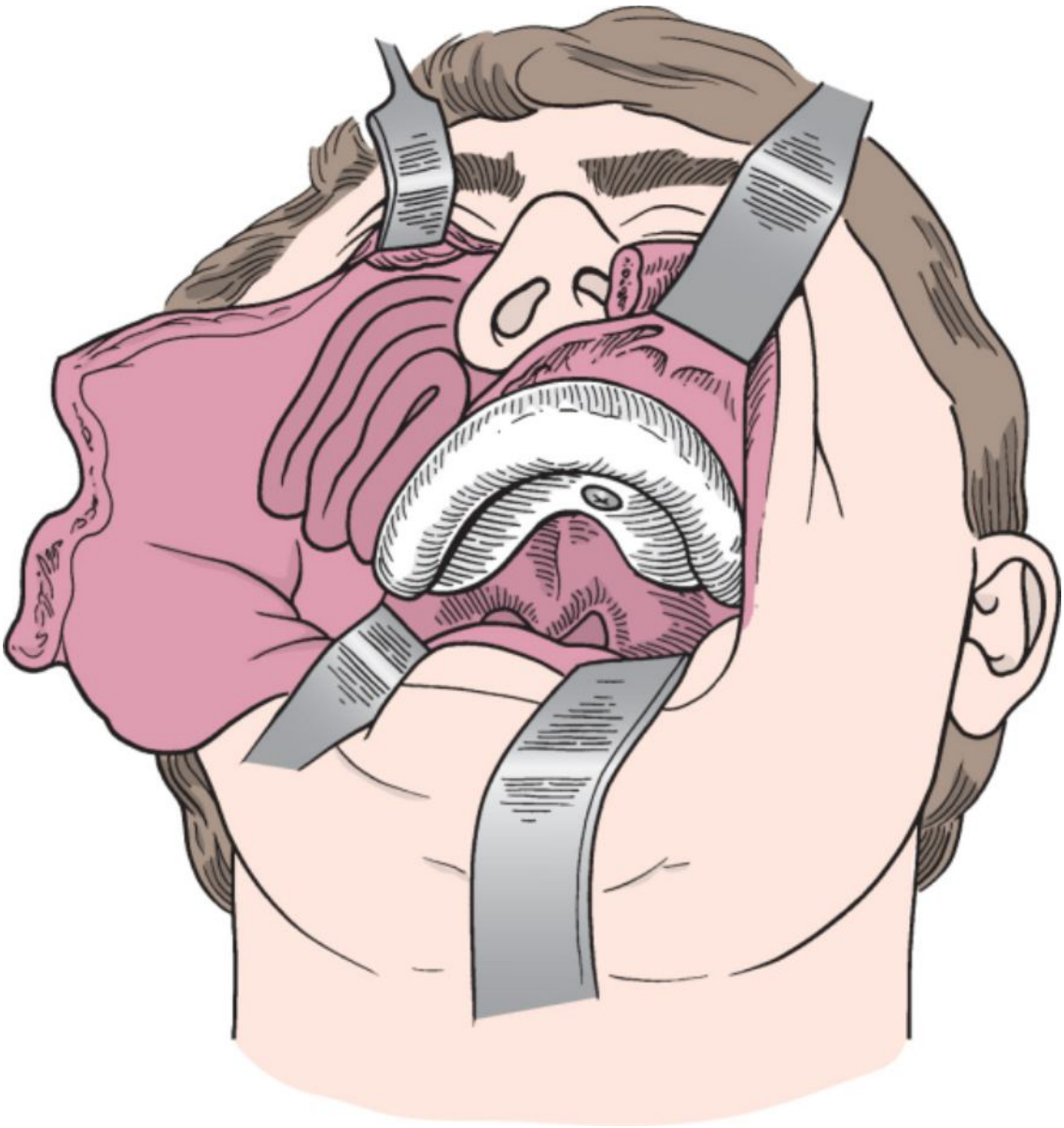

Figure 11-11 Placement of an acrylic splint after inferior maxillectomy. Packing is used to hold the skin graft in place. A lateral rhinotomy, used in this circumstance, affords good exposure. A single lag screw fixes the splint.

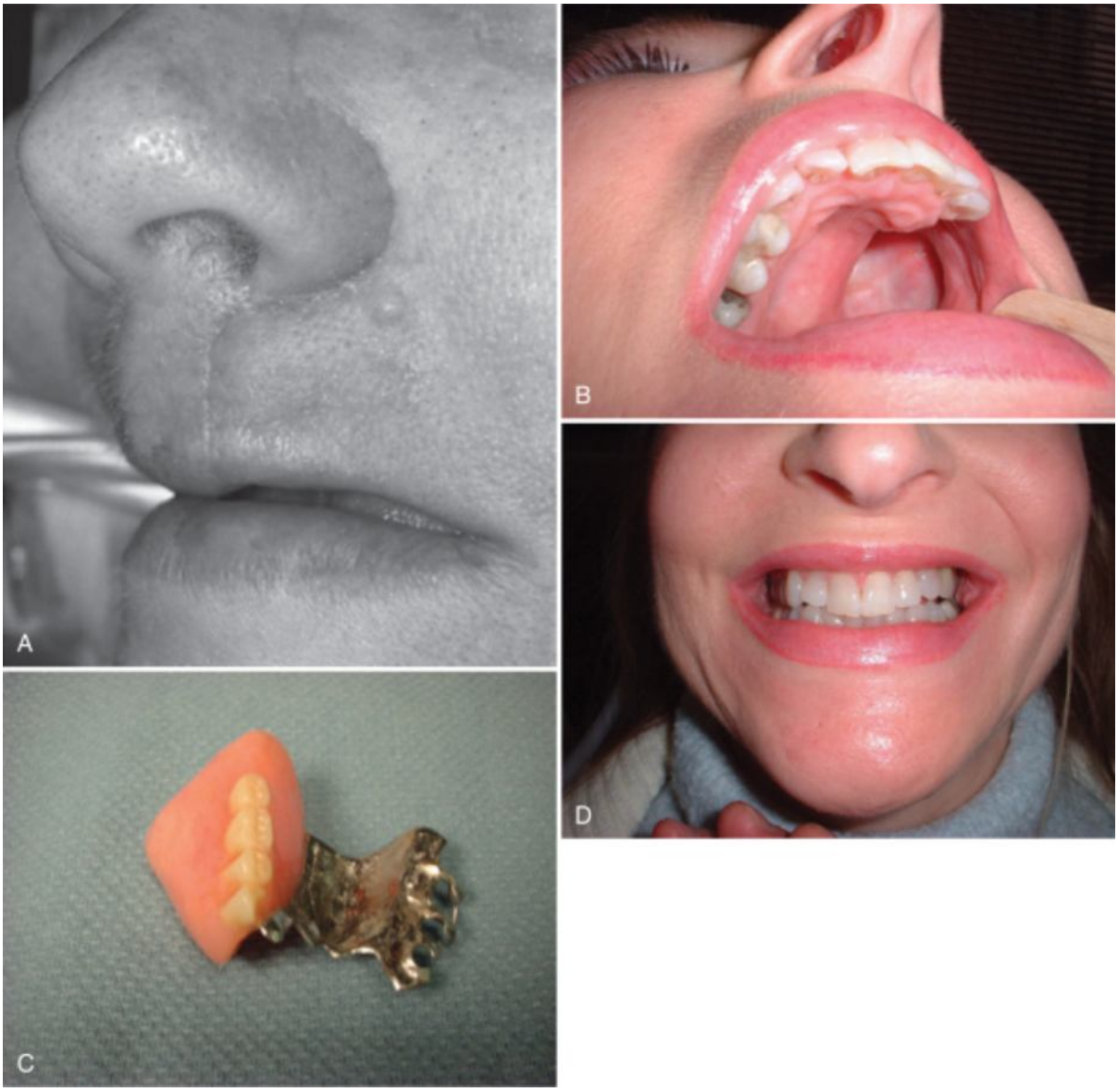

Figure 11-12 **A**, The excellent cosmesis that one can expect after use of the lateral rhinotomy incision. **B**, The defect after inferior maxillectomy is well healed. **C**, The prosthetic device uses clasps on residual teeth for stabilization. **D**, Excellent cosmesis is achieved.

Orbital Exenteration

Orbital exenteration should be performed when tumor invades through the floor of the orbit and involves the orbital muscles or fat. Bone erosion without involvement of the periosteum of the orbit may be treated with a maxillectomy without orbital exenteration. MRI best demonstrates the relationship between tumor and normal tissue. The relationship between tumor and periorbita is subtle, and in many cases the decision to exenterate cannot be made preoperatively but is made in the operating room at the time of exploration. After elevation of the periorbita, the floor of the orbit is evaluated. If the orbital periosteum is free of tumor, the orbital contents can be preserved; however, the surgeon should recognize that ultimate function of that eye will be compromised. The compromised vision is due in part to the fact that it is difficult to reconstruct the floor of the orbit except by means of an osseocutaneous free flap. A number of factors, such as reabsorption of orbital fat and wound contracture during healing, may result in enophthalmos with diplopia. Similarly, range of motion is often compromised. Secondarily, patients with high-grade cancer almost always require postoperative radiation therapy. Radiation results in atrophy of fat, tissue contraction, and eventual cataract formation. Accordingly, a practical approach in patients with erosion of the bone of the floor of the orbit is to discuss the situation with the patient in an honest and open fashion and undertake elective orbital exenteration when the patient will permit it.

Tumors that involve the roof of the orbit or the orbital apex may be better treated via a cranial base approach (see Chapter 100).

The eyelids can be preserved unless involved by the cancer. When the eyelids are tumor free, they may be closed at the completion of surgery. Alternatively, when tumor involvement requires more extensive surgery with removal

of facial skin, the facial defect may be improved with the use of an orbital-facial moulage or a free flap. The decision to leave the orbit exposed will facilitate postoperative evaluation but is a definite cosmetic compromise. When all else is equal, closure of the eyelids is preferable because the maxillary cavity can be inspected through the mouth. After orbital exenteration, all the soft tissue of the orbit has been resected, so an orbital prosthesis cannot be used. Camouflage with the use of an eye patch or facial moulage or surgical closure with lid approximation and soft tissue closure has been satisfactorily undertaken.

Technique

Exposure for orbital exenteration when undertaken via maxillectomy can ordinarily be accomplished through the same lateral rhinotomy incision used for the maxillectomy. The incision can be carried superiorly so that it passes approximately midway between the medial canthus and the dorsum of the nose up to the medial aspect of the brow as needed. Resection of the lower lid may be necessary if the cancer extends through the orbital septum. When the orbital septum is free of cancer, the incision may be made through the conjunctiva of the lower lid to allow reflection of the cheek flap laterally. Similarly, an incision may be made through the conjunctiva of the upper lid, which would permit complete resection of the entire contents of the orbit. When the cancer is limited to the infrastructure of the orbit, it may be prudent to preserve the periosteum of the roof of the orbit, thereby facilitating subsequent skin grafting. As the dissection is carried posteriorly along the roof of the orbit, the anterior and then posterior ethmoid arteries may be ligated.

When undertaking orbital exenteration for control of tumor, the entire contents of the orbit are removed, including the rectus muscles in continuity with the globe. Accordingly, these muscles are retracted inferiorly to allow them to be divided at the orbital apex. The optic nerve should be identified and clamped before ligation, after which it is securely tied with permanent suture. This allows the resection to be carried through the inferior rectus muscles at the orbital apex. The osteotomy cuts are then made to separate the ethmoid from the frontal bone, with the frontoethmoid suture used as a landmark. A lateral osteotomy must be made to separate the superior orbital rim from the specimen. Some judgment can be used relative to the location and extent of the cancer. Preservation of the lateral orbital rim and maxillary buttress permits better cosmesis; however, such preservation must not be done at the expense of control of the cancer. The orbital specimen is removed in continuity with the maxilla as the pterygoid plates are detached from the skull base. This maybe accomplished with a mallet and osteotomy or, alternatively, with Mayo scissors.

The cheek flap is lined with a split-thickness skin graft. Sufficient skin graft should be obtained to resurface the roof of the orbit as well. If tumor considerations required resection of the lower lid, it is possible to denude the upper lid and close the lids entirely; the inner aspect of the lid is relined with a split-thickness skin graft. If resection of the periosteum of the bone on the roof of the orbit was required, reconstruction may be facilitated by mobilizing a temporalis muscle flap through a separate incision posterior to the frontal branch of the freed nerve. An appropriately sized flap is elevated and freed from its attachments in the skull and mandible, with care taken to preserve its blood supply from the maxillary artery. It is passed into the orbit and sutured to the nasal septum medially. The inferior aspect of the temporalis flap is skin-grafted into the cavity. This serves to ensure coverage of the bone at the skull base and improves the success rate of the split-thickness skin graft. Under ordinary circumstances, the conjunctival margin is denuded on both the upper and the lower lids, and the lid margins are sutured together. The entire cavity is then packed with gauze impregnated with antibacterial ointment. This packing is maintained in place with a surgical obturator constructed preoperatively by the maxillofacial prosthodontist. The prosthesis is held in place with either suspension wires, suturing of the prosthesis to the remaining tissue, or the use of a lag screw inserted directly into residual palate. A bulky compressive dressing is applied to reduce postoperative flap edema.

POSTOPERATIVE MANAGEMENT

Assuming that the surgical split has been satisfactorily fashioned and secured, the patient is fed a soft diet orally when the gastrointestinal tract returns to normal function. Oral hygiene is promoted through the use of irrigation with half-strength hydrogen peroxide in a “swish and spit” technique. Administration of perioperative intravenous antibiotics may be indicated to decrease colonization of the antral packing; however, wound infection is rarely encountered.

Arrangements should be made so that the prosthodontist is available on approximately the fifth postoperative day when the surgical splint and packing are removed. After removal of the obturator, the patient should be seen immediately by the prosthodontist for insertion of an interim prosthesis, which will allow the patient to continue with an oral diet as convalescence proceeds. Significant morbidity will ensue, particularly dysphasia with the risk of aspiration if the interim prosthesis cannot be placed at the time of splint removal. The interim prosthesis is modified as frequently as needed until the healing process is complete. When postoperative radiation therapy is deemed necessary, the changes incurred may prevent final modification of the prosthesis until the radiation therapy has been completed and wound contracture has stabilized. The final prosthetic repair should facilitate chewing and help restore appearance when teeth are added to the prosthesis. The ease with which masticatory function is retained

is directly related to the extent of the resection, the care with which the cavity was prepared operatively, and the status of residual dentition.

Treatment of maxillary cancer always affects eustachian tube function[10]; hence patients with middle ear effusion benefit from myringotomy and tube insertion.

Tissue Reconstruction of Palatal Defects

When the size or location of the cancer requires resection of more than half the palate, prosthetic repair becomes increasing difficult, especially in edentulous patients. When the entire hard palate and alveolar ridge must be removed, retention of the prosthesis may be facilitated by the placement of osteointegrated pins in the trimalar complex or infraorbital rim; however, chewing force may not be tolerated or may result in fracture of the orbital floor. We have found retention of the prosthetic device in these patients to be nearly impossible. Accordingly, tissue reconstruction must be performed.

Temporal Muscle Flap Reconstruction

We prefer the use of free temporalis muscle to provide oral-nasal separation. The muscle need not be resurfaced because it re-epithelializes rapidly and assumes an almost normal appearance. This reconstruction is usually done with one temporal muscle, but occasionally bilateral flaps may be necessary. The loss of temporal bulk results in a moderate cosmetic deformity. The nasal cavity may also be obstructed by the bulk of the flap. When circumstances allow, the choice of free tissue transfer may be superior.

Free Tissue Transfer for Palatal Reconstruction

Soft tissue repair of the palate does not allow the use of a dental appliance because of the absence of maxillary bone. Use of an osseocutaneous free flap has definite advantages; other flaps that have been used to reconstruct the hard palate and inferior maxilla include the latissimus dorsi myocutaneous flap, free latissimus flap, dorsalis pedis flap, free scapular osseocutaneous flap, and the rectus free muscle flap with a split-thickness skin graft.

Reconstruction of Extended Maxillectomy with Orbital Exenteration

We have encountered some patients with massive tumors involving the maxillary sinus that extend through the anterior wall to involve the skin of the cheek and through the orbital floor to involve the orbital soft tissue (Fig. 11-13). Resection requires removal of the entire maxilla (including the hard palate), as well as orbital exenteration with removal of the soft tissues of the cheek (Fig. 11-14). This defect may be difficult or impossible to obturate with a prosthetic device. We advocate the use of microsurgical techniques for free tissue transfer in these circumstances. A latissimus dorsi myocutaneous flap is one approach to facilitate this reconstruction. After the myocutaneous flap is harvested to conform to the dimensions of the defect, a strip of skin is removed (Fig. 11-15) to create a bipedicle flap that can be folded for reconstruction of the anterior facial defect and the hard palate defect simultaneously (Fig. 11-16). The palatal inset is performed before revascularization of the flap (Fig. 11-17).

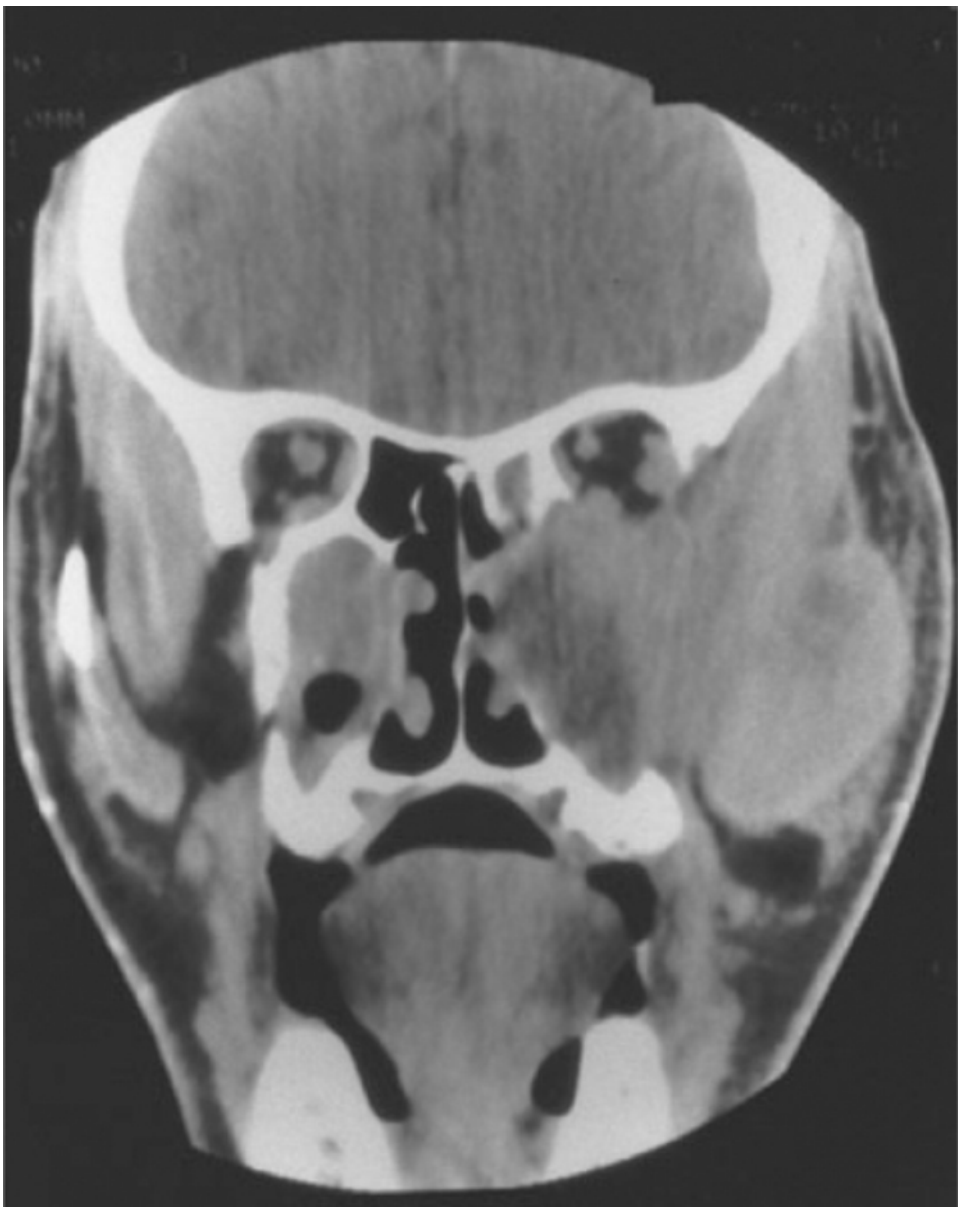

Figure 11-13 Coronal computed tomography scan demonstrating a massive tumor in the maxillary sinus with extension involving the soft tissue of the cheek and the orbit.

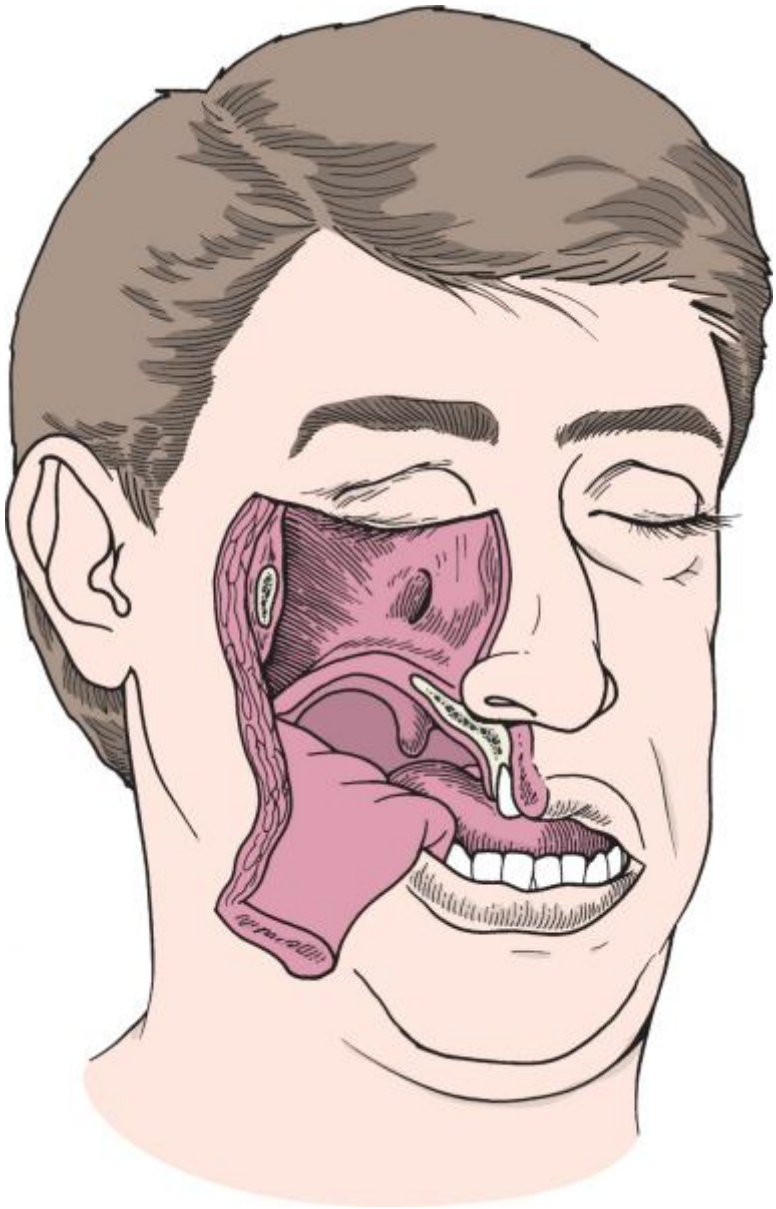

Figure 11-14 After resection of the maxilla, anterior cheek skin, and lower eyelid, as well as orbital exenteration, a major defect is demonstrated.

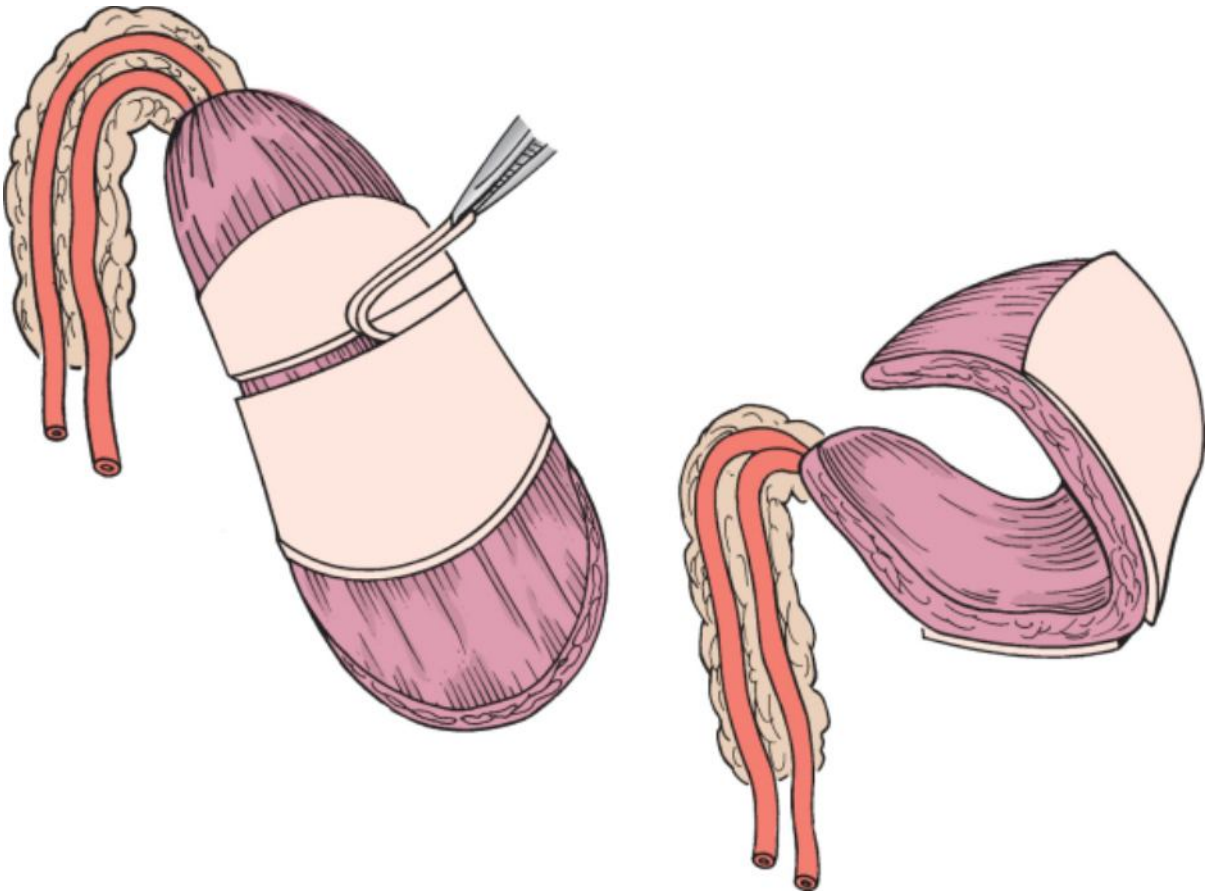

Figure 11-15 The latissimus dorsi free flap is harvested. A portion of skin is resected from the middle of the skin pedal to create a bipedicle flap.

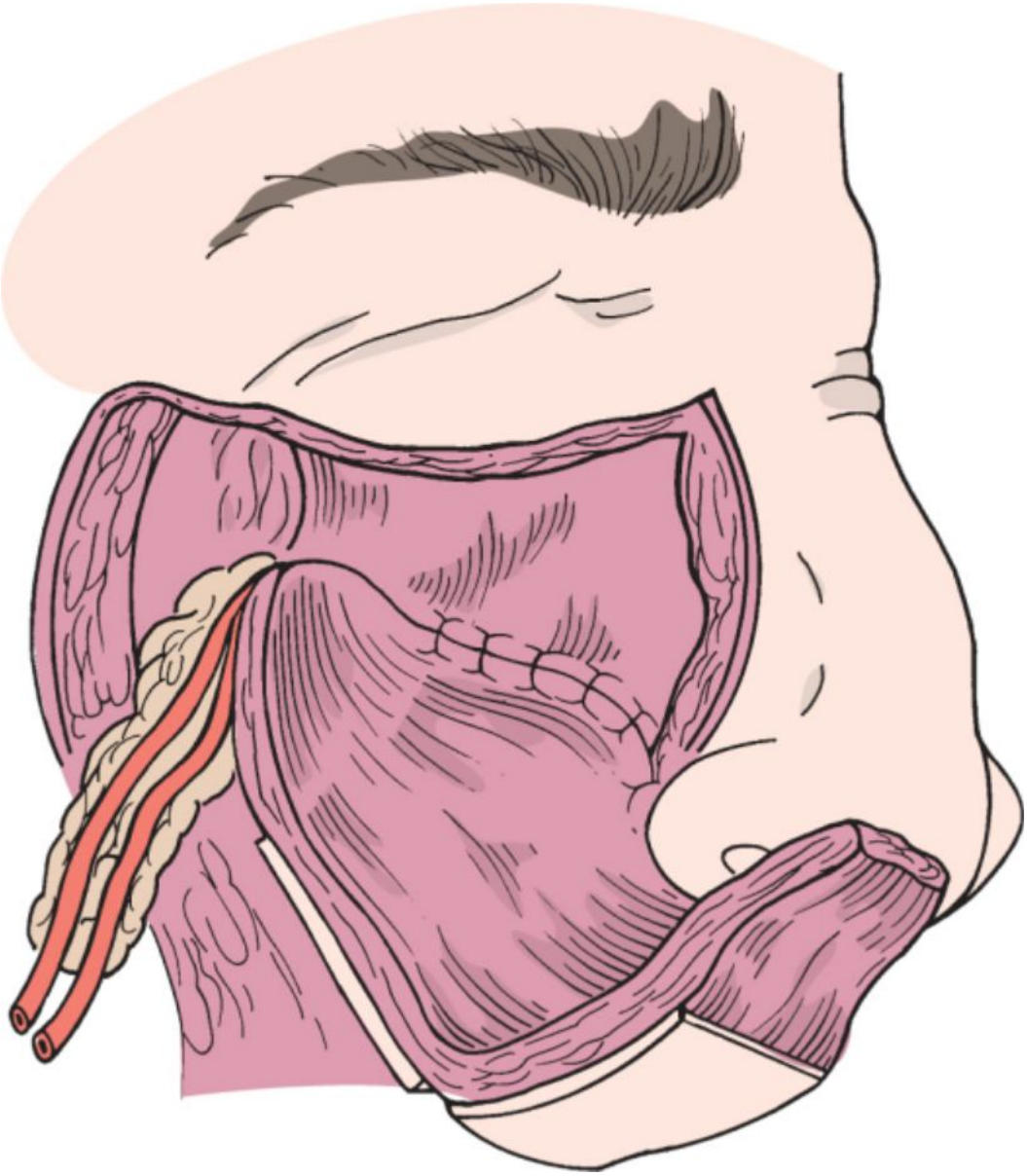

Figure 11-16 The folded latissimus dorsi flap is inset to close the pedicle defect and cheek-eyelid defect simultaneously.

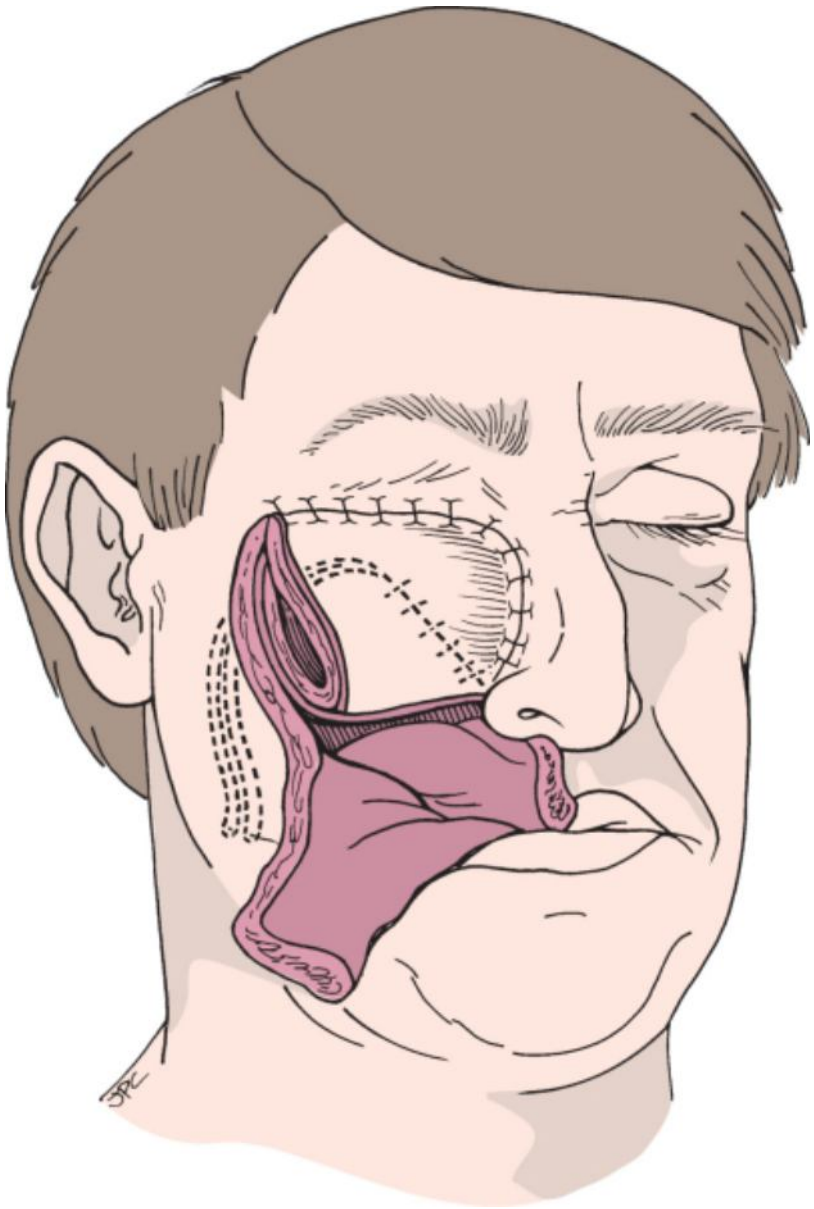

Figure 11-17 The vesicles are tunneled subcutaneously into the neck for microvascular anastomosis.

The vessels for the arterial anastomosis are passed through a subcutaneous tunnel external to the mandible into the neck for the microvascular anastomoses. Subsequent to this step, the external portion of the flap is inset to effect closure of both the cutaneous and palatal defects (Fig. 11-18).

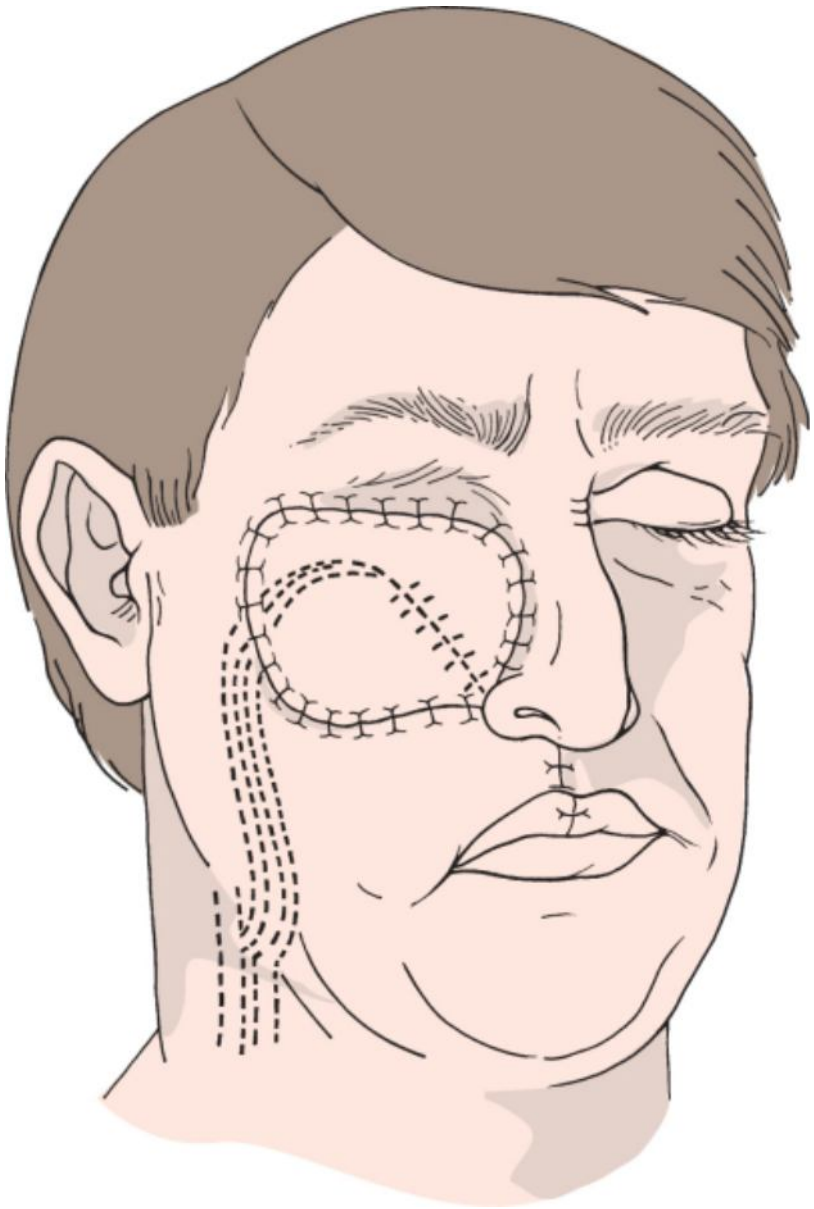

Figure 11-18 The final reconstruction provides satisfactory cosmesis with simultaneous oral-nasal separation.

Monitoring of the vascular anastomosis is accomplished with the use of pencil laser Doppler ultrasonography. The vascularity of the free flap can be assessed clinically by looking for cutaneous blanching. Oral feeding is withheld until the 10th postoperative day, at which point fluids can be reinitiated.

PEARLS

- Inferior maxillectomy may be accomplished with limited morbidity.
- The soft tissue defect on the medial aspect of the cheek flap must be lined with a split-thickness skin graft if prosthetic rehabilitation is planned. The junction between the split-thickness skin graft and the buccal mucosa also affords a prominent scar band that facilitates retention of the prosthesis.
- Success of split-thickness skin grafting for defects of the oral cavity requires that the surgeon ensure that the graft is not separated from the recipient bed by a collection of fluid. This necessitates absolute hemostasis before skin grafting, and the graft must be securely immobilized during the healing phase.
- The inferior turbinates should be resected when the hard palate is removed to facilitate prosthetic rehabilitation and avoid the necessity for further surgical débridement at a later date.
- Secure fixation of the surgical splint in the operative site is critical to facilitate oral feeding in the postoperative period. A lag screw placed directly into the residual palate is effective.
- Application of a bulky compressive external dressing serves to further immobilize the soft tissues and thereby promote good healing of the skin graft. It also serves to reduce edema in the flap, which improves early postoperative cosmesis.

PITFALLS

- Failure to use a skin graft will result in contracture of the buccal flap with resultant cosmetic deformity.
- Development of a postoperative wound infection after inferior maxillectomy is exceedingly unusual. Nevertheless, the use of antibiotic-impregnated gauze packing helps control the proliferation of bacteria during the healing phase.
- When the resection has been carried posteriorly to involve the tensor veli palatini, the patient should be expected to experience eustachian tube dysfunction with the development of middle ear effusion. Insertion of ventilating tubes will restore hearing.[10]
- Failure to consult a maxillofacial prosthodontist preoperatively will hamper postoperative care and rehabilitation.
- Failure to preserve or restore the lacrimal drainage system will result in postoperative epiphora.