

Chapter 9 – Oral-Antral Fistulas

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Oral-antral fistulas are usually encountered as sequelae of tooth extraction or anterior antrostomy. All of the maxillary teeth are potentially in close proximity to the antrum. This is especially true of the molar teeth (Fig. 9-1A). In patients with extensive development of the maxillary sinus, all the molar teeth may be immediately adjacent to the maxillary sinus. In one study, oral-antral fistula was investigated in 87 patients. The tooth most frequently involved was the first molar, followed by the second and third molars.[1,2] Tooth extraction may be associated with the development of an iatrogenic oral-antral fistula. If recognized at the time of tooth extraction, local tissues can sometimes be used to close the defect. Unfortunately, wound breakdown, chronic maxillary sinusitis, and the development of an epithelium-lined tract between the oral cavity and the sinus mucosa result in a true oral-antral fistula. Oral-antral fistulas may also complicate maxillary implant surgery.[3] They are an uncommon complication of the Caldwell-Luc operation. In one series of 670 patients, oral-antral fistulas developed in 5 patients (<1%).[4]

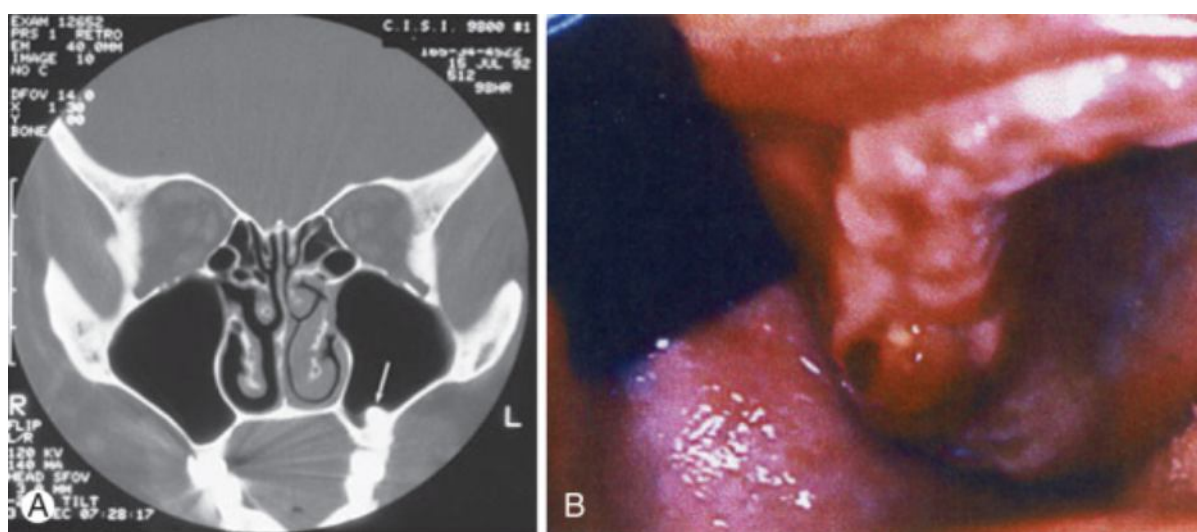


Figure 9-1 A, Computed tomography scan clearly demonstrating the relationship between a molar tooth (arrow) and a well-aerated maxillary sinus. B, Oral-antral fistula that developed after tooth extraction. The most common explanation for this is failure to provide adequate nasal drainage.

PATIENT SELECTION

Patients with an oral-antral fistula should be evaluated to determine the cause of the fistula. An oral-antral fistula that develops in the setting of chronic sinus disease may reflect underlying obstruction of the natural ostium of the maxillary sinus (Fig. 9-1B). Accordingly, these patients should be studied with intranasal endoscopy to ascertain the patency of the natural ostium or surgically created nasal-antral window. Evidence of osteomyelitis in the margins of the fistula should prompt the administration of antibiotics and a plan for débridement.

In patients in whom an oral-antral fistula develops after tooth extraction, evaluation of the extraction site frequently reveals necrotic debris and osteomyelitis. Oral-antral fistulas that are due to tooth extraction usually lead to secondary sinusitis (Fig. 9-2). In one study of odontogenic sinusitis with a persistent oral-antral fistula, opacification of the maxillary sinus was observed in all patients. Surgical treatment consisted of antrostomy and closure of the oral-antral fistula.[5]

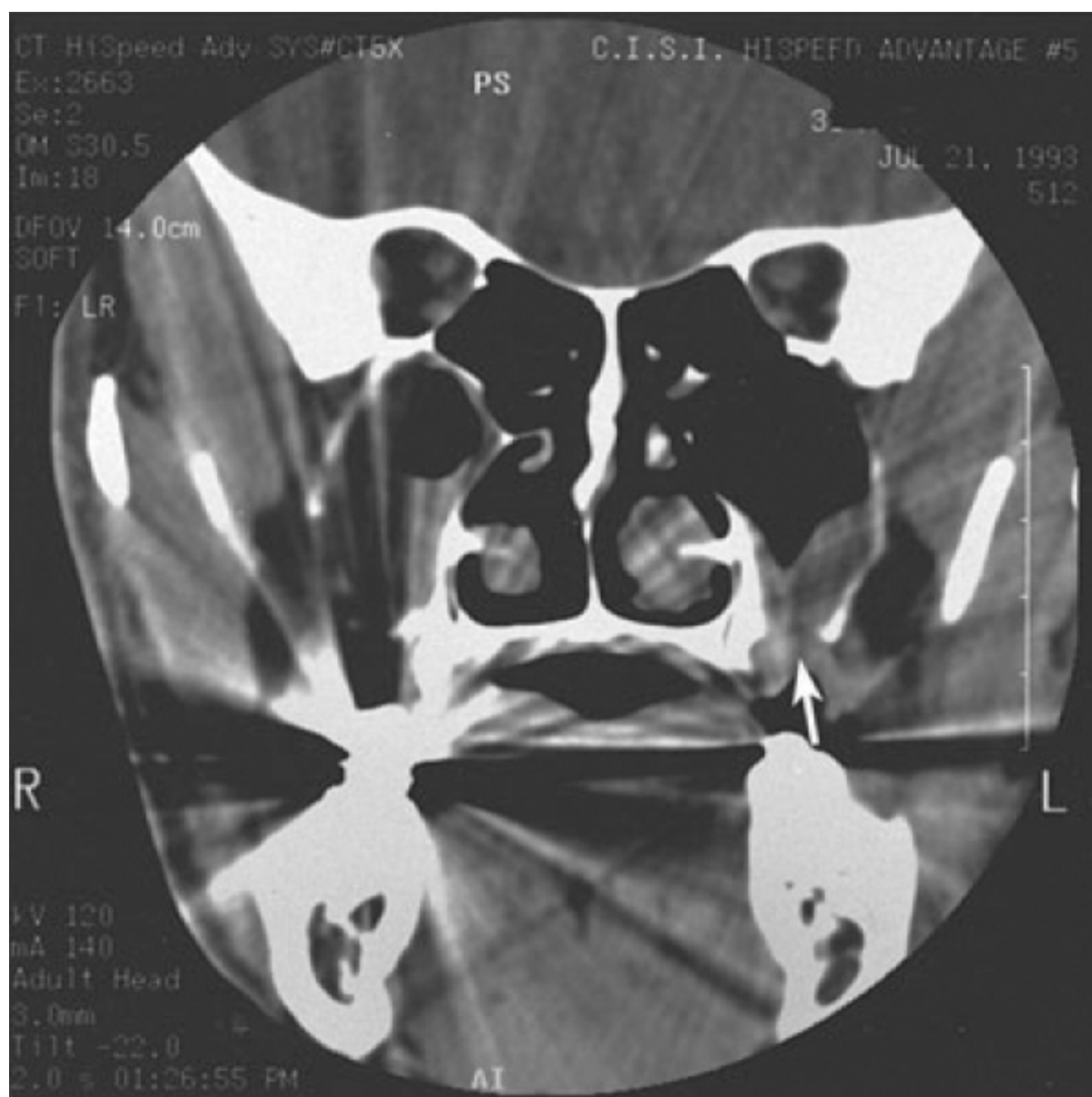


Figure 9-2 Oral-antral fistula (arrow) that developed after extraction of the maxillary second molar. Soft tissue in the tract between the maxillary sinus and the oral cavity must be removed before closure.

PREOPERATIVE EVALUATION

The status of the maxillary sinus and ostiomeatal complex should be determined endoscopically. Coronal computed tomography helps assess the status of the maxillary sinus and can identify retained dental roots and unerupted teeth. When evidence of obstruction of the sinus ostium is present, the planned procedure should include reestablishment of maxillary sinus drainage (Fig. 9-3).

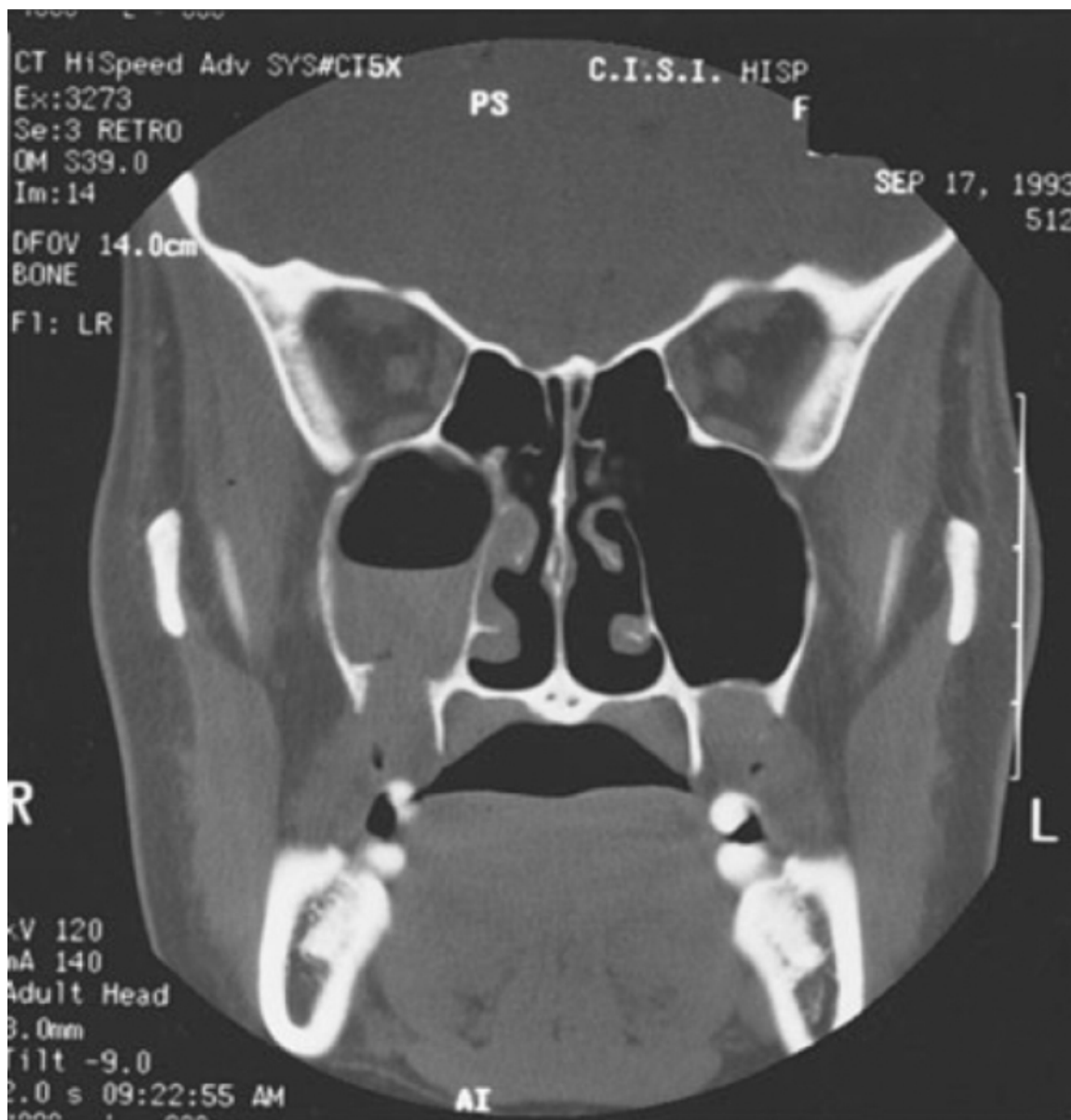


Figure 9-3 Computed tomography scan demonstrating an oral-antral fistula with obstruction of the maxillary sinus. Adequate intranasal drainage to either the middle meatus or the inferior meatus must be achieved to ensure success when the fistula is closed.

If a palatal flap is planned, patients can be aided through fabrication of an acrylic splint that is fixed with clasps to the residual dentition for protection of the wound while it heals.

SURGICAL APPROACHES

Closure of an oral-antral fistula consists of two procedures completed at the same setting. First, chronic sinusitis must be dealt with either by drainage through a nasoantral window and complete removal of the infected mucosa or by opening of the natural ostium.

Closure of an oral-antral fistula may be undertaken with the patient under either local anesthesia with intravenous sedation or general anesthesia. Local anesthesia may be achieved with a local field block, occasionally supplemented with lidocaine injected into the greater palatine foramen.

Necrotic bone and soft tissue must be removed. The status of the mucosa in the sinus is ascertained, and diseased or polypoid mucosa is removed if it is obstructing sinus drainage. The preferred technique is enlargement of the natural ostium. Epithelium bridging the defect from the oral cavity to the maxillary sinus must be removed, as well as infected or necrotic bone. At this point, either a sliding bipedicle flap or an advancement rotation flap should be developed from the adjacent buccal or palatal mucosa (Fig. 9-4). The surgeon must plan the flap so that the gingivobuccal sulcus is not obliterated in patients who use dentures. Adequate length of the flap must be achieved to allow closure without tension. The flap is developed in a plane just superficial to the periosteum and rotated or advanced to close the oral-antral fistula (Fig. 9-5). Either permanent sutures (e.g., silk) or long-lasting absorbable

sutures (e.g., Vicryl) are used.

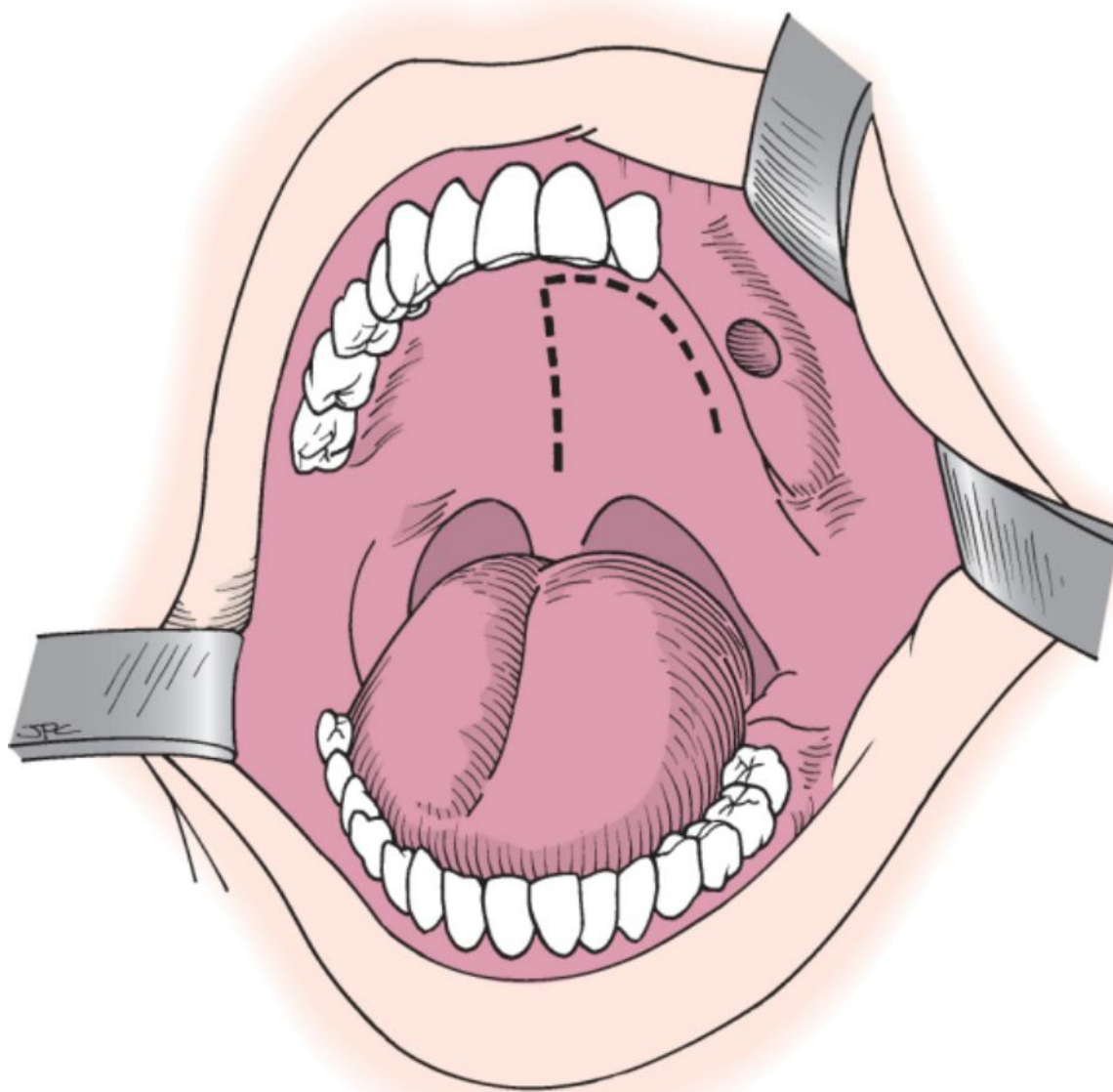


Figure 9-4 Design of a posteriorly based palatal flap.

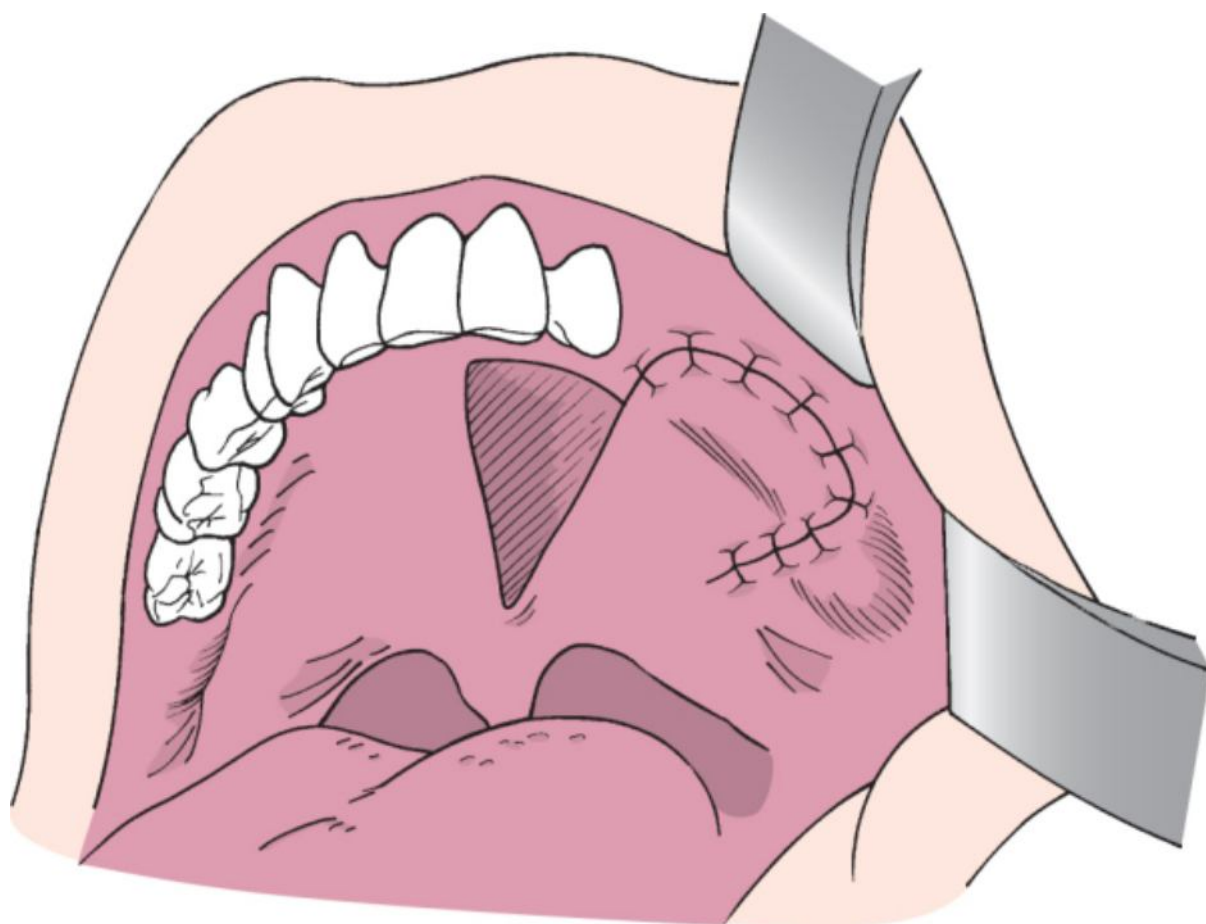


Figure 9-5 Mobilization and rotation of the palatal flap to cover the fistula. The resulting mucosal defect in the palate is allowed to granulate and heal by secondary intention. Most patients will be more comfortable if an acrylic splint is fabricated for use during eating.

We use an alternative technique for the management of oral-antral fistulas that develop after dental extractions (Fig. 9-6). These fistula frequently arise directly on the alveolar ridge. Once again, it is necessary to débride necrotic bone and remove any diseased epithelium bridging the mucosa of the maxillary sinus with the alveolar ridge. This is facilitated by making an incision through the mucosa of the alveolar ridge parallel to the alveolar ridge (Fig. 9-7). The necrotic bone is débrided superiorly until normal bone is identified (Fig. 9-8) to permit mobilization of the mucosal flaps for primary closure. With adequate débridement of bone, the mucosa of the alveolus can be closed directly over the fistula site (Fig. 9-9).

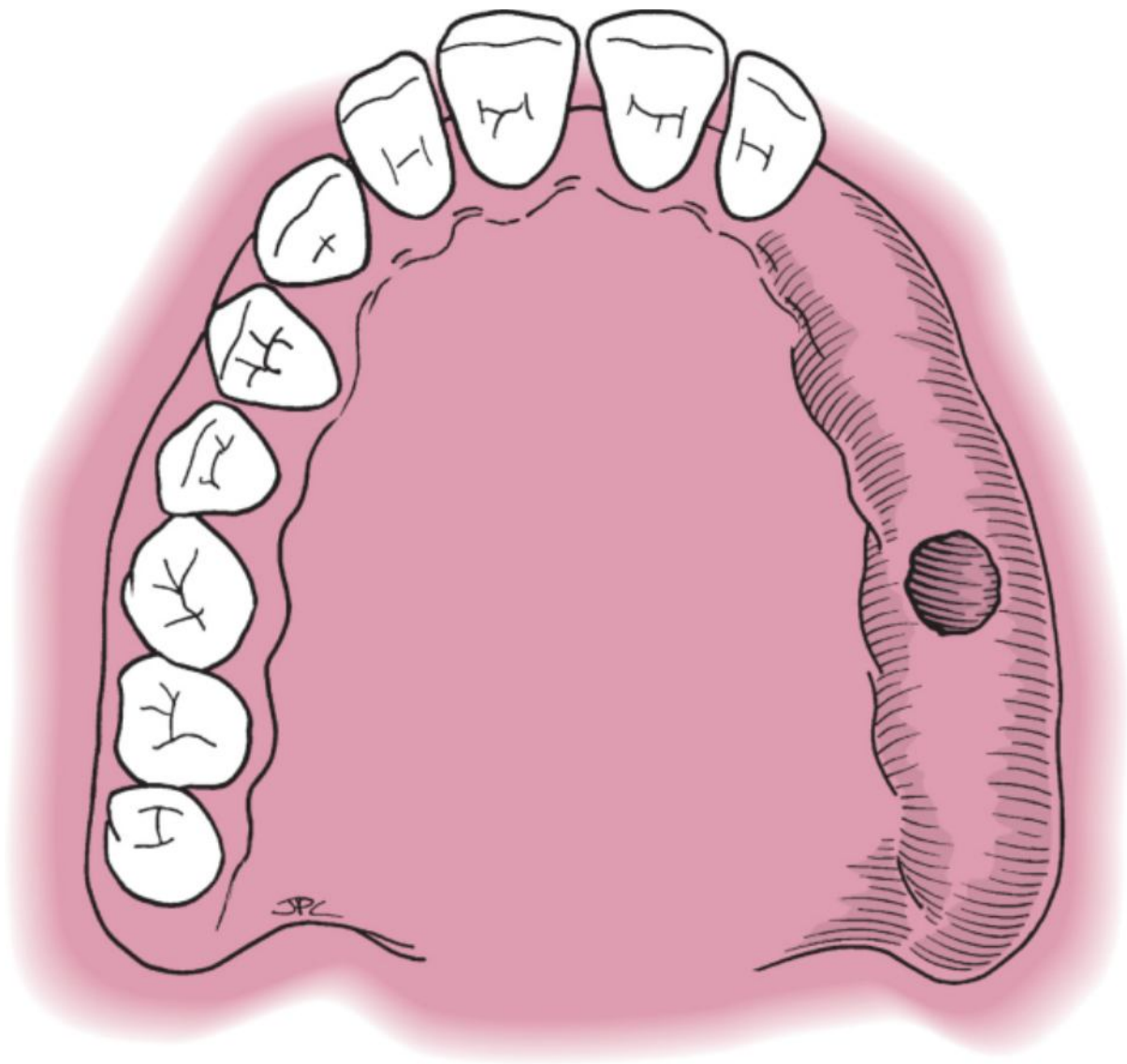


Figure 9-6 Oral-antral fistula on the maxillary alveolus after removal of a molar tooth.

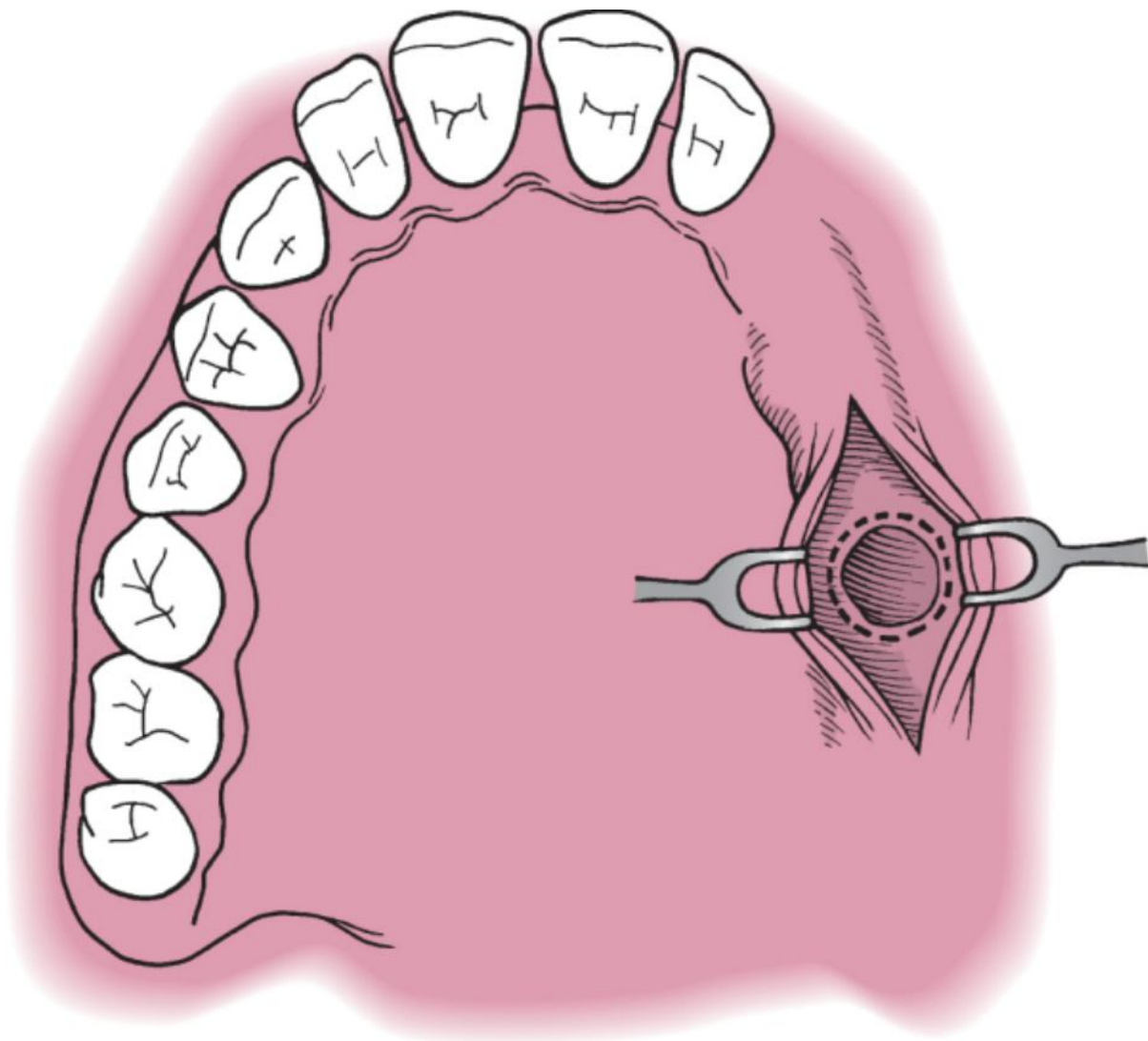


Figure 9-7 The mucosa is mobilized in either direction through a longitudinal incision made along the alveolus. The soft tissue lining the fistula is removed.

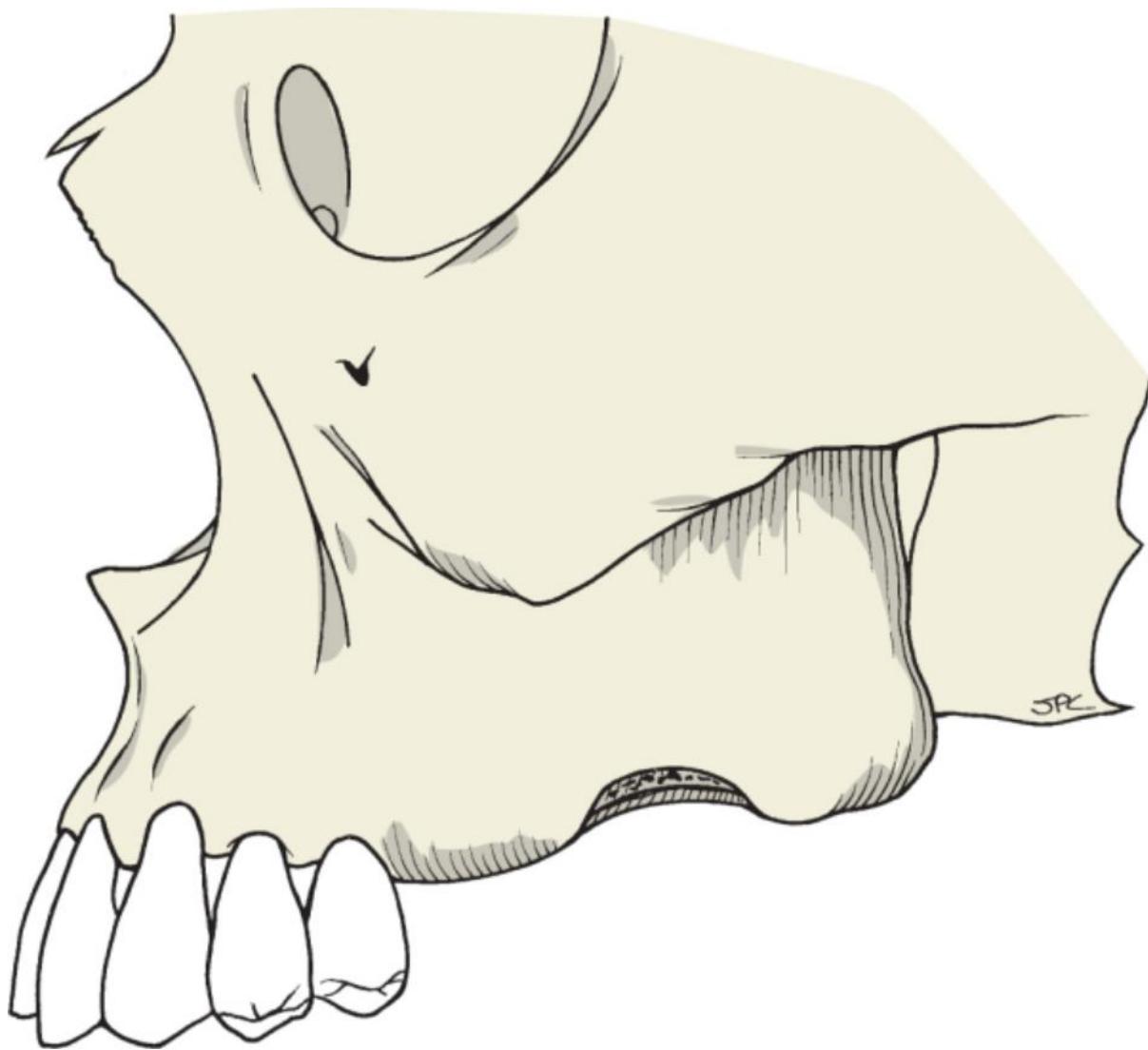


Figure 9-8 The bone is recessed superiorly to ensure removal of all osteomyelitic bone. This, in turn, enhances primary closure of the mucosa.

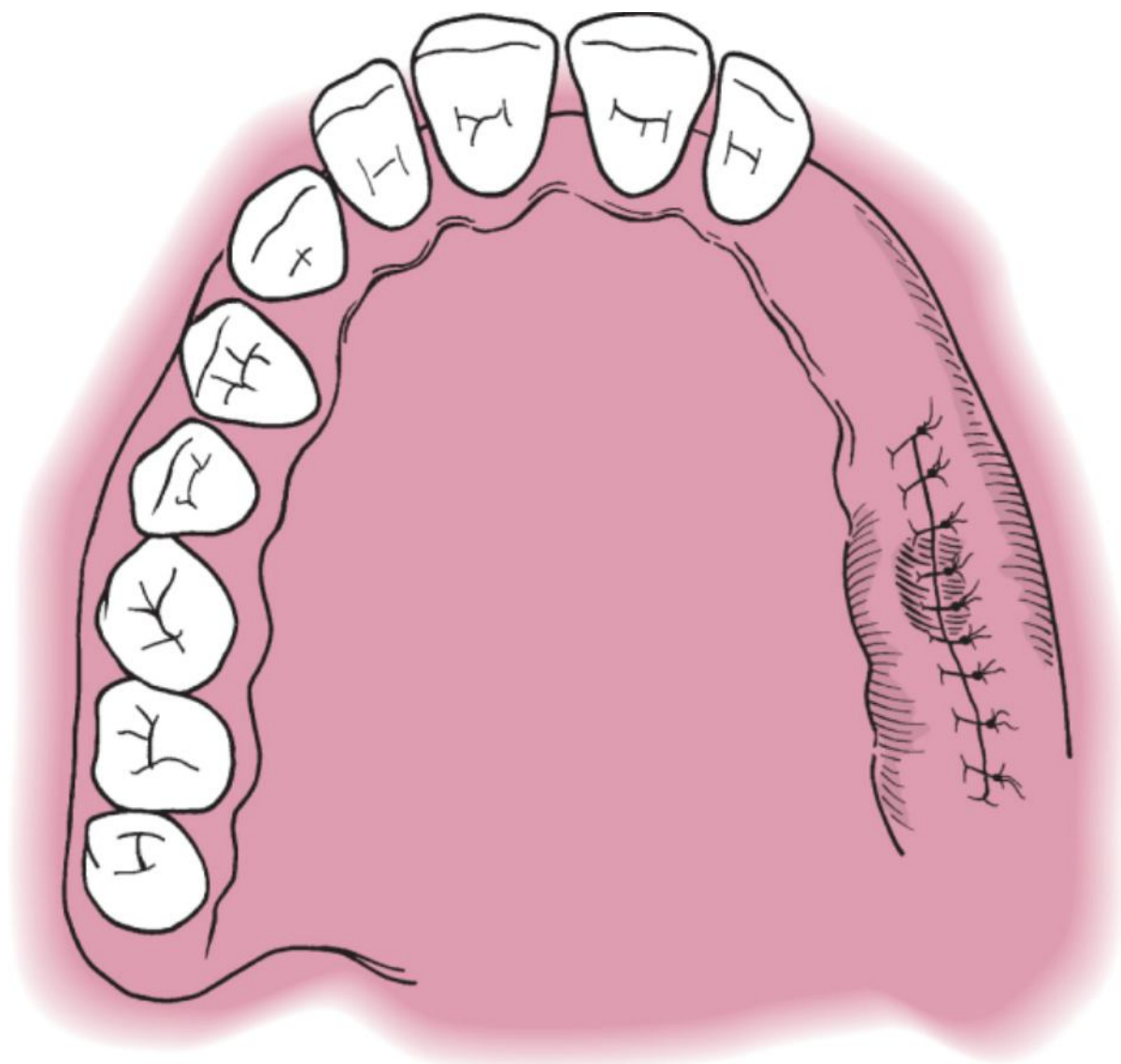


Figure 9-9 The mucosa is closed primarily over the fistula site.

POSTOPERATIVE MANAGEMENT

Two to 3 weeks of healing is required to achieve adequate wound strength to withstand the trauma of mastication. The use of a dental prosthesis (bridgework or dentures) and chewing are avoided during convalescence. If an acrylic splint is available to cover the palatal defect, most patients can begin to drink fluids the afternoon of surgery. Administration of an antibiotic effective against oral flora may be of some benefit. Patients are instructed to eat a soft diet and chew on the contralateral side. The patient must clean the mouth and suture line with half-strength peroxide or Peridex after each meal for 6 weeks.

Failure to ensure adequate drainage of the maxillary sinus into the nasal cavity may result in a persistent oral-antral fistula. Effort must be made to ensure either that the natural ostium is patent or that a new nasal antrostomy has been created.

Failure to remove necrotic tissue, osteomyelitic bone, chronically infected antral mucosa, and epithelial bridges from the oral mucosa to the maxillary sinus may prevent healing and result in persistent infection and recurring fistula. These issues should be carefully addressed during surgery.

Development of a buccal or palatal flap of insufficient length or breadth may compromise healing because of a tight suture line and lead to a resultant recurrent fistula. Similarly, repair with absorbable sutures such as catgut or chromic catgut may be inadequate to ensure healing before dissolution of the suture material.

A recurrent oral-antral fistula after attempted surgical repair is usually a result of inadequate management of the sinusitis, which is frustrating to both the surgeon and patient. The literature abounds with techniques advocated for repair of chronic oral-antral fistulas, including the use of vascularized tissue such as buccal fat pad,^[6] a submental

island flap,[7] and palatal rotation.[8] Some patients benefit from nonsurgical management with a prosthesis.[9]

PEARLS

- Extraction of maxillary molar teeth is the most common cause of an oral-antral fistula.
- An acrylic splint facilitates protection of the palate repair.
- Successful repair requires débridement of necrotic tissue, bone, and intervening epithelium.
- Avoid crossing the buccogingival sulcus with the flap because this will obliterate the sulcus and interfere with wearing dentures.

PITFALLS

- Maxillary sinus obstruction may contribute to a failed fistula repair.
- Rotation flaps of insufficient length may fail.
- Do not obliterate the gingival sulcus with soft tissue.
- Failure to remove infected bone may result in failure.

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