

## Chapter 31 – Resection of the Floor of the Mouth

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The floor of the mouth is the second most common site of cancer of the oral cavity, and more than 95% of these cancers are squamous cell carcinoma. Local control of early lesions (T1/T2) is favorable when treated by surgery. Studies suggest that surgery affords good local control, facilitates histologic staging of the tumor (thereby offering the opportunity to modify therapy), and is associated with fewer long-term side effects (such as xerostomia, loss of taste, trismus, and osteoradionecrosis) than radiation therapy is. Unfortunately, however, patients frequently have locally advanced cancer (T3/T4) at initial evaluation, often with involvement of the tongue, the mandible, or both. Increasing tumor size correlates with poorer prognosis, as well as increased treatment morbidity. Metastasis to the cervical lymph nodes is also common in oral cavity carcinoma. Cervical metastatic disease occurs in 30% to 40% of patients with T1/T2 tumors and is associated with worsening of the prognosis.[1,2]

Carcinoma of the oral cavity is principally a disease of the middle-aged and elderly. The average age at diagnosis is 60 years, with 95% of lesions occurring in persons 40 years or older.[2] The majority of these patients have a history of long-term tobacco and alcohol use.

The therapeutic goals in the management of cancer of the oral cavity are elimination of the tumor with return of the patient to the best possible form and function.[3] Speech is often impaired after excision of cancers of the oral cavity.[4] A number of treatment factors may have an impact on this impairment. The extent of surgical resection, particularly the amount of oral tongue resected, has been implicated as the primary correlate of speech impairment, although fibrosis with lack of tongue mobility is also an important factor. Larger resection volumes and a greater percentage of oral tongue resection have been correlated with reduced intelligibility and articulation.[5–9] Other retrospective studies suggest that postoperative speech function is more dependent on the method of reconstruction than on the degree of resection.[10] Patients who underwent reconstruction with pedicled or free flaps appeared to have worse postsurgical speech function than those whose wounds were closed primarily or with split-thickness skin grafts.[11–15]

Schliephake and associates[16] in 1996 studied a series of 85 consecutive patients with squamous cell carcinoma of the floor of the mouth. Reconstruction was carried out with local tissue, jejunal grafts, and cutaneous and myocutaneous flaps. Thirty percent of these patients underwent marginal mandibulectomy and 31.7% underwent segmental resection of the mandible. They concluded that rehabilitation of patients operated on for cancer of the oral cavity is particularly difficult in the case of large soft tissue defects and is not always accomplished completely even with primary microsurgical flap reconstruction.

Treatment decisions in patients with carcinoma of the floor of the mouth is dependent on the size and depth of the tumor, the presence of invasion of the mandible, and the presence or absence of cervical lymph node metastasis. Over the years, treatment programs have consisted of

- Resection of the primary tumor with or without elective neck dissection
- Radiotherapy of the primary tumor and neck
- Radiotherapy of the primary tumor with or without elective neck dissection
- Combination therapy, including resection of the primary tumor followed by radiotherapy of the neck

Excellent local control of early-stage cancer of the oral cavity (T1/T2) has been achieved with either surgery or radiotherapy.[2] Resection of T1/T2 lesions is usually performed transorally, and the defect is resurfaced with a split-thickness skin graft. A marginal mandibulectomy may be necessary, depending on the location of the cancer. Three-dimensional en bloc resection through an anterior mandibulotomy approach is usually necessary for T3/T4 tumors because these larger tumors may involve adjacent structures, such as the tongue and tonsil, and require improved visualization. Infiltration of cancer into the mandible requires segmental mandibulectomy for local control. A combination of external beam radiation followed by brachytherapy has been used with good results, although this regimen requires a tracheostomy, is associated with morbidity, and carries with it the potential complication of osteonecrosis of the adjacent mandible.

It is now recognized that although T1/T2 cancers of the floor of the mouth can be locally controlled in a high percentage of patients with minimal morbidity, the untreated, clinically negative neck may be the site of recurrent disease in 30% to 40% of patients. Failure to control neck disease then leads to death of the patient. Studies comparing survival rates of patients with node-negative necks who have undergone elective and therapeutic neck

dissection seem to indicate improved survival for those who undergo elective neck dissection. Spiro and Strong<sup>[17]</sup> have indicated that it is beneficial to remove occult cervical lymph node metastasis before it becomes clinically apparent. These authors reported that patients with stage N0 necks who were subsequently discovered to have occult nodal metastasis after elective neck dissection had longer survival than did patients with cervical metastasis at the time of initial examination. Silver and Moisa<sup>[18]</sup> reported that both control of neck disease and patient survival may be significantly increased if neck dissection is performed before cervical metastases become clinically evident. Dias and colleagues studied a series of patients with T1 squamous cell carcinoma of the tongue and floor of mouth.<sup>[19]</sup> The authors concluded that patients who underwent elective neck dissection had a 23% higher disease-free survival rate than did those who underwent resection of the tumor only.

McGuirt and coworkers<sup>[1]</sup> performed a retrospective outcome analysis of 129 patients with TxN0 squamous cell carcinoma of the floor of the mouth to evaluate the role of neck dissection. The majority consisted of T1/T2 lesions, and all were treated by transoral excision with a split-thickness skin graft with or without marginal mandibulectomy. Elective neck dissection was performed in 26 patients. Histologic evaluation revealed occult metastases in 23%. In contrast, of 103 patients managed without elective neck dissection, cervical lymph node metastasis eventually developed in 37%. The determinant survival rate at 3 years was 100% for patients with occult disease who underwent elective neck dissection, whereas the 3-year determinant survival rate in patients receiving no initial treatment of the neck was 85%. The salvage rate for those in whom metastases to the neck did develop was 59%. We believe that a more aggressive approach that includes elective neck dissection in node-negative necks is warranted because the limited morbidity of selective neck dissection seems to be a reasonable tradeoff to the high failure rate in patients in whom metastasis to the neck eventually develops.

We routinely perform selective neck dissection on patients with cancer of the floor of the mouth and an N0 neck. Levels I to III are dissected (supraomohyoid). It does not appear to be necessary to dissect level IV because this level seems vulnerable only to metastasis from cancer of the lateral tongue.<sup>[20]</sup> If the lesion is in the midline, both sides of the neck should be dissected. Care must be taken to include the prevascular and postvascular lymph nodes associated with the facial artery and vein adjacent to the mandible in the dissection. This requires identification and preservation of the ramus mandibularis of the facial nerve. These are first-echelon lymph nodes for metastatic cancer from the floor of the mouth. Some surgeons may not routinely dissect this area because of the risk of injury to the facial nerve, which is adjacent to these lymph nodes, thereby leaving potentially involved nodes in situ.

A major limitation in the evaluation of patients with oral cavity carcinoma is the inability to detect which patients with node-negative necks harbor occult cervical lymph node metastasis. Simple physical examination leads to substantial error. Studies carried out with computed tomography (CT) and magnetic resonance imaging (MRI) have established criteria for malignancy, such as lymph nodes greater than 1 cm in diameter, matted nodes, or nodes with a hypodense center. Nevertheless, imaging studies fail to detect microscopic metastasis. Hence, we routinely perform selective (bilateral in midline lesions) neck dissection in all patients with floor of the mouth carcinoma.

## **PATIENT SELECTION**

Carcinoma of the floor of the mouth is best managed surgically. Rodgers and coworkers<sup>[21]</sup> demonstrated that although locoregional control rates for early lesions (T1/T2) were similar for both surgery and radiation therapy, radiotherapy was associated with a higher overall incidence of complications, such as bone and soft tissue necrosis. We concur with the recommendation that surgery be used for the management of early cancer and that a combination of surgery followed by radiation therapy be used for more advanced cancer. It is worthwhile noting that in the approximately 15 years that we have systematically been performing selective neck dissection in patients with T1/T2 lesions (stage I-II), approximately a third of the patients have been upstaged to stage III based on pN1-N2 in a clinically N0 neck.

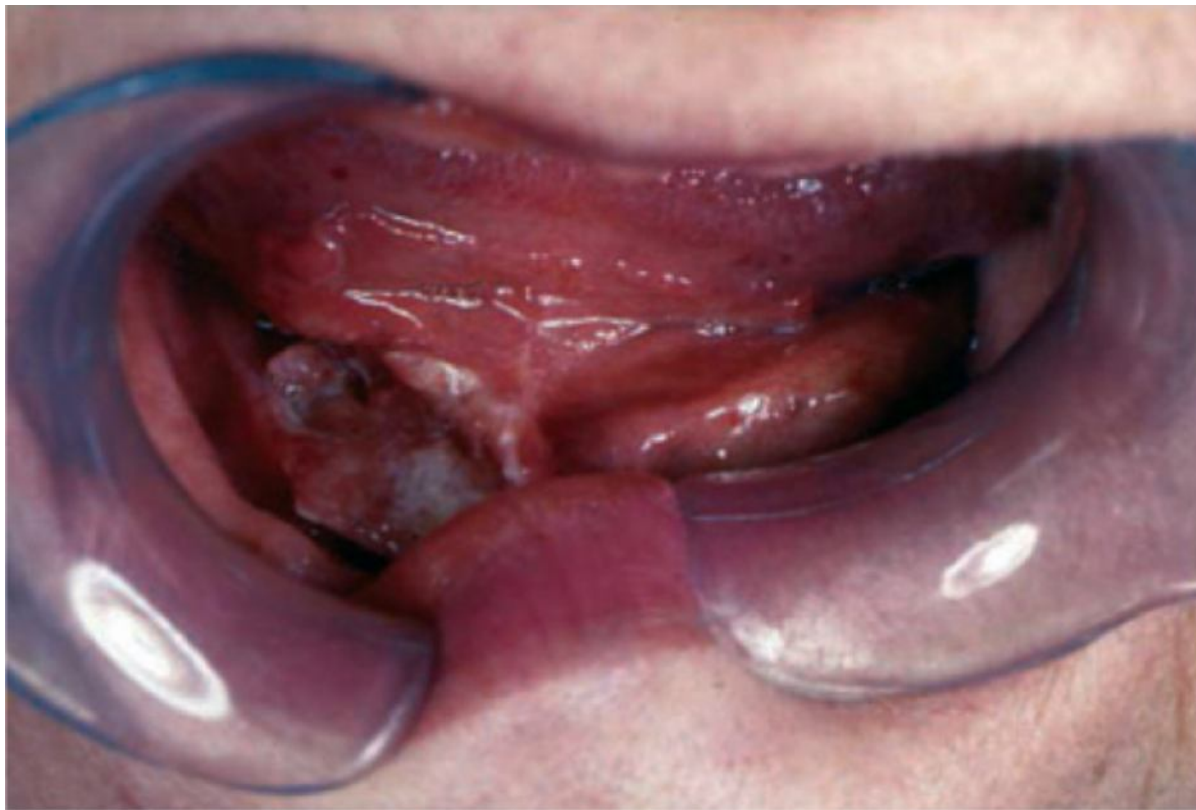
Surgical removal of the cancer plus selective neck dissection is offered to all patients who are physically fit enough to undergo an extensive surgical procedure under general anesthesia. Patients who do not qualify for surgery because of ill health or because they refuse surgery are referred for radiation therapy.

The success rate in achieving control of the primary cancer in patients treated by transoral wide excision and skin grafting is related to tumor depth of invasion, as well as T stage. Patients with superficial cancer have better survival than do those with deeply infiltrating cancer. Schramm and colleagues<sup>[22]</sup> found that the surface size of the cancer, even when it was larger than 4 cm, did not influence local control if complete excision was achieved. Brown and associates<sup>[23]</sup> demonstrated that tumor with a depth of invasion greater than 7 mm was more likely to be accompanied by occult cervical metastases than were thinner lesions.

## **PREOPERATIVE EVALUATION**

History and physical examination remain the mainstay of evaluation in patients with cancer of the floor of the

mouth. The anterior floor of the mouth is the most common anatomic location of these tumors, although cancer of the anterolateral or lateral area occurs occasionally (Fig. 31-1). Most patients with symptoms of pain or bleeding from the oral cavity or ill-fitting dentures go to their dentist rather than their physician for initial evaluation.



**Figure 31-1** Squamous cell carcinoma involving the anterior floor of the mouth.

Patients with cancer in the anterior floor of the mouth may complain of bleeding, low-grade pain, difficulty with ill-fitting dentures, loosening of the teeth, fetid breath, alteration of speech because of decreased mobility of the tongue, or a mass in the neck. Unfortunately, most patients who wear dentures are used to a certain amount of discomfort in the oral cavity, and they may seek to relieve the pain in the floor of the mouth by simply removing their dentures. Although this eases the discomfort, such patients may not seek timely evaluation by their dentist, thereby resulting in a delay in diagnosis. Further reduction in the number of patients initially seen with advanced-stage oral cavity cancer will depend on greater emphasis on examination of the oral cavity by primary care practitioners.

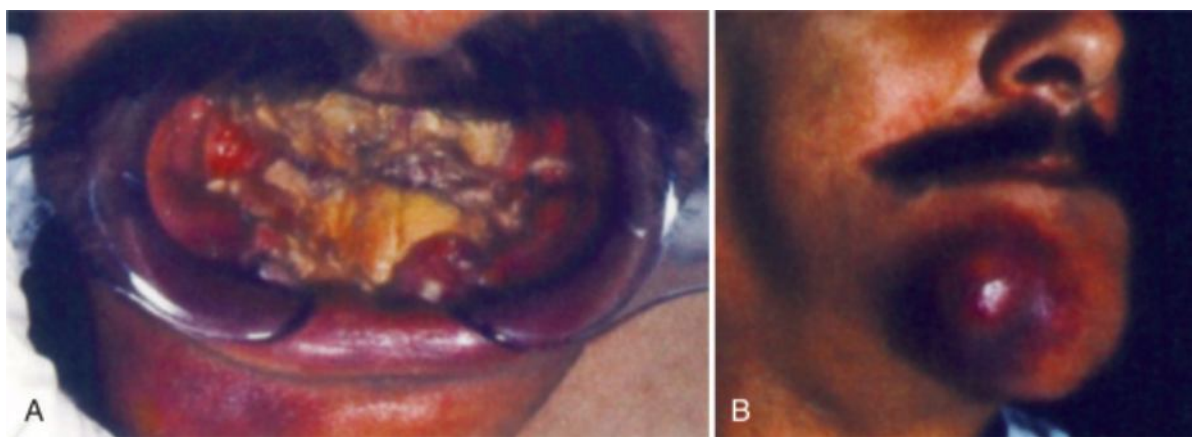
Complete examination of the head and neck must be performed. Examination of the floor of the mouth should consist of inspection and palpation (Fig. 31-2). Palpation of the lesion is also of utmost importance because it gives an indication of whether the lesion is superficial and therefore easily excised through the oral cavity or more deeply infiltrative and requiring a "pull-through" type of operation. Palpation should be used to determine whether the mandible is involved by the tumor. Lesions are generally ulcerative but may also be exophytic or deeply infiltrative. The patient should be asked to protrude the tongue to determine whether infiltration of muscles has resulted in fixation of the tongue because this influences the treatment program. The surface dimension of the cancer must be measured to assign the proper tumor stage. The location of the lesion should be clearly described and marked appropriately on a diagram of the oral cavity.





**Figure 31-2** Palpation of cancer of the tongue and floor of the mouth should be done routinely.

Mental nerve hypoesthesia may indicate invasion of bone. Primary carcinoma of the oral cavity with mandibular involvement sometimes infiltrates the skin of the overlying mentum. This must be carefully palpated, and infiltration must be noted (Fig. 31-3A and B).



**Figure 31-3** **A**, Patient with advanced cancer of the floor of the mouth. **B**, Destruction of the anterior mandible and infiltration of cancer into the skin of the chin.

Attention must be paid to evaluation of the patient's dentition. Any salvageable teeth should be restored. Patients with fractured or carious teeth or advanced periodontal disease should undergo tooth extraction at the time of the surgical procedure, particularly if radiation therapy will be administered postoperatively. This requires advanced planning with dental colleagues to avoid unnecessary intraoperative delays.

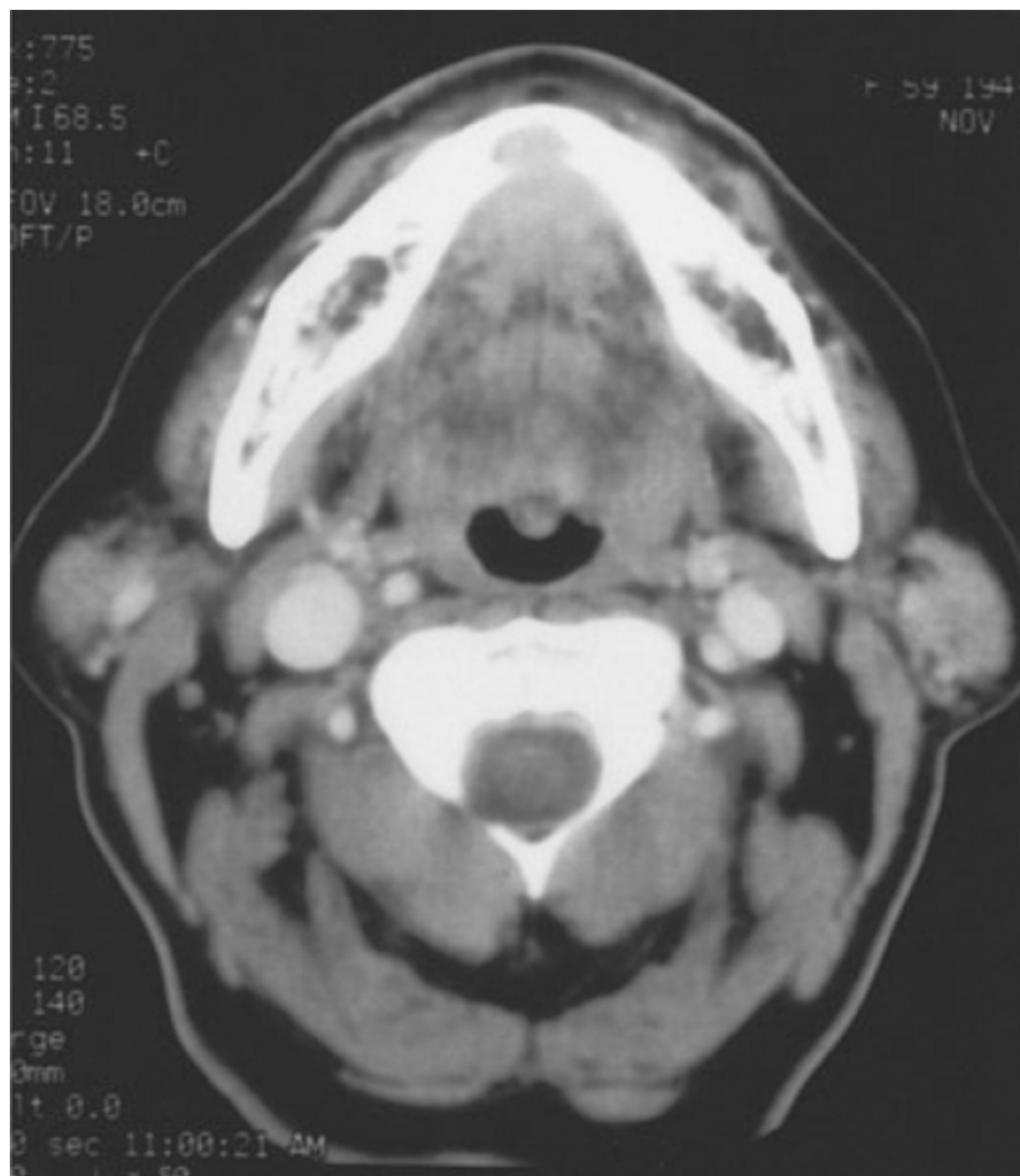
The neck must be examined in detail, and any masses palpated in the neck should be measured to assign a proper nodal stage. Fine-needle aspiration biopsy may be necessary to verify the presence of metastatic cancer (Fig. 31-4). Examination of the neck is of the utmost importance. A high percentage of patients with T1/T2N0 tumors

have occult metastasis. The reported incidence of recurrent carcinoma in the untreated cervical lymph nodes after treatment of only the primary tumor is 15% to 50%.<sup>[1]</sup>



**Figure 31-4** A, Patient with advanced cancer of the floor of the mouth with metastasis to the neck. B, Computed tomography scan demonstrating necrotic lymph nodes.

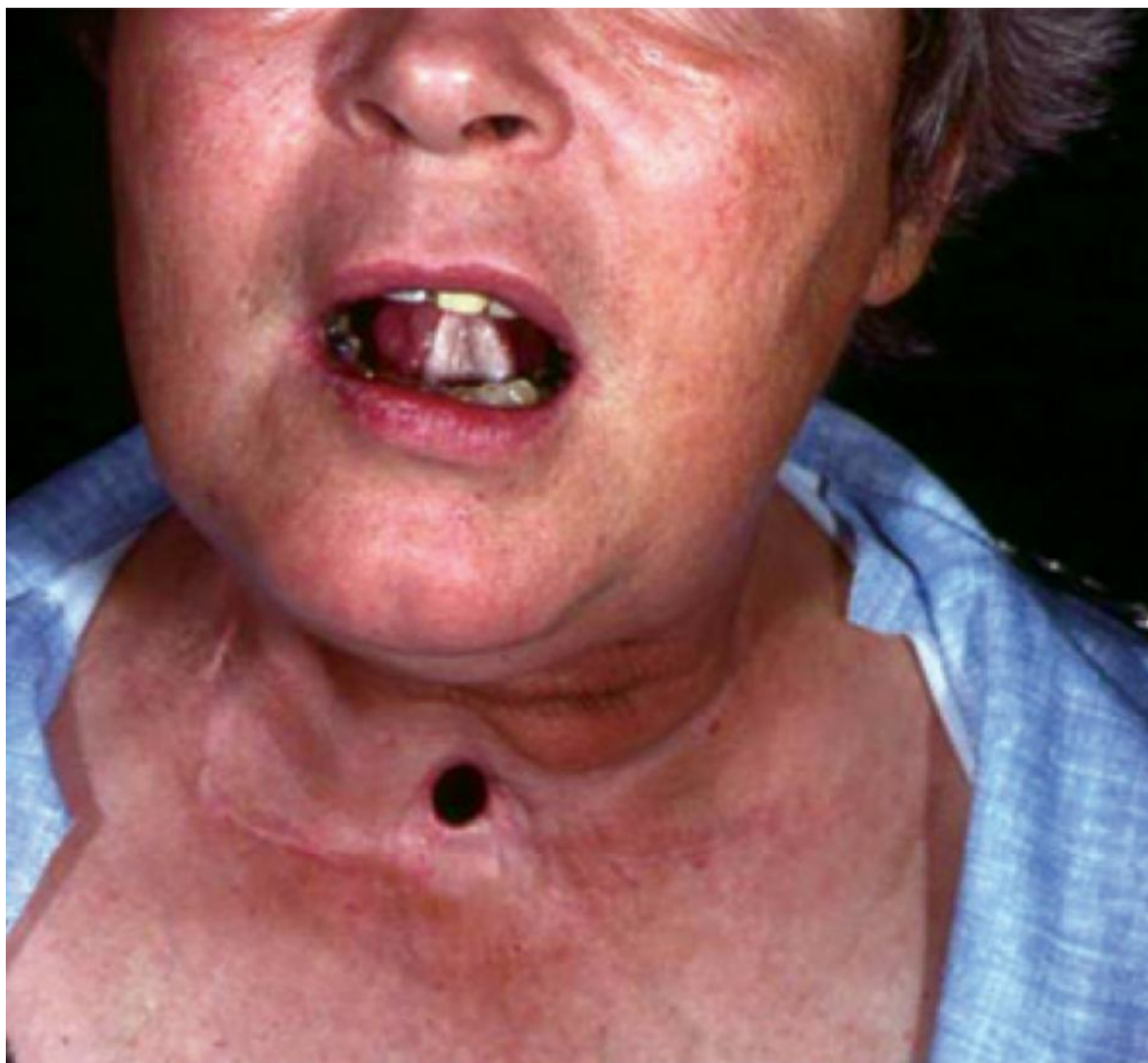
Imaging plays two major roles in the evaluation of patients with carcinoma of the anterior floor of the mouth. CT may be helpful in determining whether the mandible is infiltrated by cancer and, if so, to what extent (Fig. 31-5). MRI may help estimate marrow involvement by tumor, but like CT, it may overlook subtle cortical involvement. If palpation indicates that the cancer involves only the soft tissues of the floor of the mouth, imaging is not required because palpation gives adequate information for planning treatment. The second indication for scanning is to assist with staging of the neck. This may also be unnecessary because selective neck dissection is contemplated in all patients regardless of the clinical status of the neck. Imaging does help in staging a “hard to examine” (muscular or obese) neck. Because most primary cancers occur in the midline, there is a real risk of bilateral lymph node metastasis.



**Figure 31-5** Computed tomography scan demonstrating erosion of the anterior mandible.

Evaluation of the lungs is essential because patients with squamous cell carcinoma of the upper aerodigestive tract frequently have synchronous second primaries in the upper or lower aerodigestive tract (Fig. 31-6). Many surgeons obtain a chest CT scan in all patients. Positron emission tomography (PET) or PET/CT scanning has begun to play a greater role in the diagnosis of cancer of the head and neck because PET may identify unexpected lesions in the neck or lungs, which would influence the treatment program.





**Figure 31-6** A patient with synchronous primary cancers of the larynx and floor of the mouth treated by laryngectomy, excision of the floor of the mouth, and skin grafting.

The cancer must be biopsied, or if it has been biopsied elsewhere, the slides must be reviewed and the diagnosis verified. Biopsy may be done under local anesthesia in the outpatient setting. Panendoscopy should be carried out to evaluate the other areas of the upper and lower aerodigestive tract to rule out synchronous second primaries. Endoscopy is usually performed at the time of extirpative surgery.

The timing of surgical excision and neck dissection is not critical, but with proper planning, efficient use of operative time can be optimized. If the primary tumor is resected at the time of endoscopy, before neck dissection, the pathologist can examine and review the specimen while the neck dissection is performed. The defect can be reconstructed at the completion of the neck dissection after the margins have been carefully examined.

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