Paparella: Volume III: Head and Neck

Section 2: Disorders of the Head and Neck

Part 2: The Oral Cavity

Chapter 16: Malignancy of the Lip

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The lip is the most common site of cancer in the oral cavity, with an overall incidence of 1.8/100.000 population in the USA. The disease occurs most commonly on the lower lip of elderly men. Also when men are compared with females, there is a much greater tendency for carcinoma to occur on the lower lip (79:1) than on the upper lip (5:1). The disease predominates in men in the sixth decade of life, with an average age of onset between 59 and 62 years. However, carcinoma of the lip may occur as early as the second or third decade of life.

On the lower lip, cancer is most frequently located on the exposed vermilion border just peripheral to the line of contact with the upper lip. It occurs in a lateral region between the midline and the commissure in approximately 85 per cent of cases. Tumor arising at the commissure is rare, occurring in less than 1 per cent of cases. Upper lip cancer composes less than 3 per cent of all lip cancers and usually arises near the midline.

Etiology

Excessive sun exposure appears to be the major causative factor associated with carcinoma of the lip. Greater than one third of patients with lip cancer have outdoor occupations. Loss of elastic fibers, atrophy of fat and granular elements, and hyperkeratosis with atypical cells are common histologic features observed in the majority of patients with lip carcinoma regardless of age. The prevalence of lower lip carcinoma in comparison with the upper lip is probably related to the considerably greater solar radiation that is received by the lower lip. The lip is particularly susceptible to solar damage in white races because it lacks a pigment layer for protection. In contrast, black races have pigment in the lip; thus, lip cancer is rare in this portion of the population. Overall, carcinoma of the lip is ten times more commonly observed in whites than in non-whites.

In addition to exposure to sunlight, other causative factors have been less strongly associated with carcinoma of the lip. The use of tobacco, particularly in the form of pipe smoking, has been suggested as an important causative factor. An association of lip cancer with a positive Wassermann reaction or clinical signs of syphilis has also been observed. Other factors include poor oral and dental hygiene, ill-fitting dentures, and chronic alcoholism.

More recently, carcinoma of the lip has been associated with immunologic suppression. The author has treated a case of cancer of the lip in a 20-year-old renal transplant patient who

was on immunosuppressant drugs. This phenomenon has also been observed in a 27-year-old man and a 17-year-old girl, both of whom were renal transplant patients receiving immunosuppressant agents. Immunologic systems may provide a surveillance function by which neoplastic cells are identified and destroyed. Immunosuppressive therapy may prevent this system from recognizing tumor-specific antigens, and thus the recognition of tumor cells as foreign to the body.

Certain predisposing factors appear to separate persons who are prone to multiple primary carcinomas of the lip from the general population of patients with cancer of the lip. Persons with lip cancer and occupations requiring prolonged sun exposure have a 3.4 times greater chance of having a second primary carcinoma of the lip than do persons who are not subject to this exposure. An individual with actinic skin changes of the face in association with carcinoma of the lip has a 2.5 times greater chance of having a second lip primary than does a person without these changes. This chance increase to 5.5 if a squamous cell or basal cell carcinoma of the skin is associated with cancer of the lip. Individuals with carcinoma of the lip who smoke or have a positive serologic reaction for syphilis are also at higher risk for a second lip carcinoma developing. Those who smoke are 6.4 times more likely to have a second primary lesion, and those with a positive serologic reaction for syphilis have a 4.9 times greater risk of a second carcinoma of the lip.

Patients who have carcinoma of the lip at a young age or who have occupations requiring prolonged exposure to the sun should have lifelong follow-up after treatment for their tumor. Use of sunscreen medication should be encouraged in patients with cancer of the lip who continue to be exposed to the other factors of tobacco, alcohol, and syphilis must be warned of an increased risk of a second or third carcinoma of the lip, even though cure of their initial tumor may be achieved.

Classification

The vast majority of malignant neoplasms of the lip are squamous cell carcinomas. Although basal cell carcinomas do not arise on the vermilion, they may extend from the skin of the lip onto the labial surface. When basal cell carcinoma does extend onto the vermilion, it is usually the upper lip that is involved. Basal cell carcinoma, in fact, is the most common form of cancer of the upper. In addition to squamous cell carcinoma and basal cell carcinoma, other malignant epithelial neoplasms of the lip can occur and are usually of minor salivary gland origin. Adenoid cystic carcinoma is the predominant malignancy, followed by adenocarcinoma and mucoepidermoid carcinoma.

The three morphologic types of squamous cell carcinoma that occur on the lip are exophytic, ulcerative, and verrucous. The exophytic type is slightly more common than is the ulcerative type and grows superficially for prolonged periods with a tendency to metastasize late in the course of disease. The tumor may achieve the size of 6 to 7 cm, with minimal local destruction of underlying tissues. The exophytic form, however, eventually ulcerates as a result of tumor necrosis. It also gradually becomes more deeply infiltrative in advanced stages and loses its papillomatous appearance.

Like the exophytic form, the ulcerative form begins as an epithelial thickening or blister on the vermilion. In contrast, however, ulceration occurs earlier and, in fact, may begin as an ulceration of the lip. The ulcerative form also manifests a relatively greater tendency for infiltration and invasion and is usually of a higher histologic grade than the exophytic form.

Verrucous carcinoma is a rare form of lip cancer. These tumors do not grow vertically into underlying muscle but rather spread laterally. Often evolving from areas of leukoplakia, verrucous carcinoma has an indolent growth pattern and display a piled-up papillary surface. Histologic features include a well-differentiated squamous cell carcinoma with fingerlike extensions and considerable keratin production. Cellular atypism and mitoses are rare.

Approximately 85 per cent of all squamous cell carcinomas of the lip are considered to be well differentiated (Broders' grades I and II). Only 5 per cent are poorly differentiated or spindle cell variants, with the remainder being moderately differentiated (Broders' grade III). As would be expected, poorly differentiated carcinoma and spindle cell variants manifest greater biologic activity, with a tendency to grow along nerves and to metastasize earlier to regional lymph nodes.

Metastases from lip carcinoma occur late in the course of disease when compared with cancers located elsewhere in the oral cavity. The single greatest factor influencing the likelihood of cervical metastases is the size of the primary tumor. This is explained in part by the knowledge that larger tumors tends to be less well differentiated, and it has been suggested that metastases are influenced by histologic grade. Better differentiated tumors tend to show a lesser tendency for metastasis. In addition to larger tumors, carcinoma of the upper lip and oral commissure also manifest a highest incidence of neck metastases than do tumors located elsewhere on the lips. Tumors located in these regions ulcerate sooner, grow more rapidly, and have an overall poorer prognosis. In addition, mandibular involvement by tumor offers a higher incidence of regional metastases and, thus, a poorer prognosis. This is probably related more to the unusually large size of the tumor than to the actual bone involvement by neoplasm.

Clinical evidence of cervical lymph node involvement with metastases is present in fewer than 10 per cent of patients presenting with squamous cell carcinoma of the lower lip and is only slightly more frequent among patients with upper lip cancer. Approximately 20 per cent of oral commissure cancers present with regional metastases when initially seen. The development of cervical metastases subsequent to treatment of a lip cancer ranges from 5 to 15 per cent. In a manner similar to the remainder of the oral cavity, most metastases present within 2 years after treatment of the primary tumor. The likelihood of regional metastases increases with the length of symptoms and the size of the tumor at presentation. The risk of developing metastases also increases with repeated local recurrences.

Cervical metastases usually progress in an orderly fashion from first-echelon nodes to those located more distally. The submental nodes are more commonly involved from tumors located on the midportion of the lower lip, whereas nodes located in the submandibular triangle are most frequently involved by tumors located lateral to the midline. Subsequent metastases

spread to the upper deep cervical nodes and later to the middle and lower deep cervical regions.

Contralateral or bilateral metastases may develop when the lip cancer encroaches upon or extends beyond the midline. Upper lip carcinoma usually metastasizes first to the preauricular or infraparotid lymph nodes. Metastases subsequently spread more rapidly to lymph nodes in the submandibular triangle and in the upper and middle jugular chain.

Metastases that develop subsequent to initial treatment, whether they be from the upper or lower lip, follow the same progression to submandibular triangle nodes or submental nodes and then to nodes of the deep cervical lymphatic chain. Metastatic lip carcinoma tends to remain localized to cervical nodes for lengthy periods before manifesting systemic dissemination. Only 15 per cent of patients dying of carcinoma of the lip have disseminated disease.

Many different methods of staging carcinoma of the lip have been offered by authors in reporting retrospective patient series. Until recently, the TNM (tumor, node, metastases) system for the oral cavity has not been applied to lip cancer, presumably because of the significant difference in biologic activity observed between tumors occurring on the lip and tumors within the interior of the oral cavity. In contrast, the recent Task Force for Head and Neck Sites suggests the same T classification as for tumors located elsewhere in the oral cavity (Table 1). As in the past, clinical staging of lymph nodes is the same for carcinoma of the lip as for cancer of all other areas of the head and neck.

Table 1. Classification of carcinoma of the lip according to the Task Force for Head and Neck Sites 1988

T_{is}	Carcinoma in situ
T_1	Tumor measuring 2 cm or less in its greatest dimension
T_2	Tumor greater than 2 cm and not more than 4 cm in greatest dimension
T_3	Tumor with greatest dimension more than 4 cm
T_4	Tumor invades adjacent structures (bone, tongue, skin of neck).

Patient Evaluation

It is uncommon for cancer of the lip to arise de novo from an entirely normal-appearing vermilion. More commonly, carcinoma arises from a pre-existing area of leukoplakia and demonstrates an indolent behavior frequently presenting as a blister or induration. A history of recurrent crusting on the lip that bleeds on removal is characteristic. Such a crust may exist for many years before evidence of infiltration develops. This protracted clinical course may lull the physician and patient into a false sense of security.

It is easy to recognize cancer of the lip clinically because of its superficial location, making it readily accessible to inspection and palpation. Fortunately, most cancers of the lip remain localized for extended periods as an exophytic or ulcerative growth that slowly increases in size. Tissue destruction by tumor is not usually a prominent feature. Although the diagnosis

of carcinoma is usually easily made on a clinical basis, it is imperative to confirm this suspicion by biopsy.

Advanced stages of lip cancer are manifested by involvement of the skin of the lip. Necrosis and secondary infection may occur, resulting in the tumor being surrounded by erythema and covered by exudate. Inflammatory lymphadenopathy as a result of the infection may be confused with the presence of cervical metastases. When infection is present, pain and tenderness of the tumor are prominent features.

Large lip cancers may involve the mandible, resulting in invasive erosion of bone demonstrable on roentgenograms. Patients with such cancer should be examined carefully for the presence of hypesthesia in the distribution of the mental nerve. Even without cortical bone destruction, tumors may extend along the mental nerve great distances from the original site and have been noted to extend as far as the cranial cavity. The mental nerve may become involved by extension of tumor into the skin of the chin. In this location, the nerve becomes involved as it exits the mental foramen. In other circumstances, hypesthesia in the distribution of the mental nerve occurs as a result of direct invasion of the posterior inferior alveolar nerve by bony destruction of the mandible. Hypesthesia is more common in edentulous patients who have undergone considerable alveolar bone resorption, causing the posterior inferior alveolar nerve as well as the mental nerve to be in a more superficial location and thus more vulnerable to tumor invasion.

Metastatic lymphadenopathy is most frequently observed in patients with tumors larger than 2 cm. However, approximately 3 per cent of patients will experience metastases early in the course of their disease when the primary tumor is 1 cm or less. This suggests an aggressive biologic nature. Not all lymphadenopathy, however, represents metastases. Infection of the tumor or poor oral hygiene may result in the presence of inflammatory nodes. Lymph nodes that are larger than 2 cm are rarely inflammatory and most often represent metastatic disease. Fine needle aspiration of enlarged lymph nodes may be helpful in clarifying the issue.

Differentiation of carcinoma of the lip from other lesions is usually not difficult. Hyperkeratosis and cheilitis may occur concurrently with carcinoma. Likewise, leukoplakia is associated with cancer of the lip and has been observed in 2 to 75 per cent of cases. *Leukoplakia* is a clinical term denoting a white plaque that may possess varying degrees of histologic features from hyperkeratosis through carcinoma in situ to invasive carcinoma. The frequency with which malignant degeneration occurs in leukoplakia of the lip is unknown but may approach 30 per cent.

Occasionally squamous cell carcinoma of the lip may be confused with a number of benign and malignant neoplasms. Melanomas rarely occur on the vermilion but may involve it secondarily. They often display distinct pigmentation, providing the neoplasm with a bluish black color. Melanomas have less tendency for necrosis and ulceration when compared with squamous cell carcinoma. Sarcomas of the lip are also rare and may be more difficult than melanomas to differentiate from carcinoma. Histologic examination, often with the help of special stains, will

assist the clinician in delineating various carcinomas from squamous cell carcinoma.

Malignant and benign tumors of minor salivary gland origin occur rarely in the lip. When they do occur, they develop deep within the lip's substance, and only later do they involve the surface of the lip, at which point they may be confused with fibromas, lipomas, and retention cysts of the lip. Myoblastomas occur in the lip and remain beneath the mucosa.

Granuloma pyogenicum, keratoacanthoma, and papillomas are exophytic and occur on the vermilion or adjacent skin and thus can be confused with squamous cell carcinoma of the lip. Granuloma pyogenicum has a blue-red tint and rises above the vermilion like a cupola. It bleeds copiously when manipulated and has a softer consistency than cancer.

Benign papillomas of the lip are pedunculated and more exophytic for their size than are carcinomas. Minimal induration of the lip is observed because the base of the papilloma is situated chiefly in the epithelium of the lip.

Keratoacanthoma (molluscum sebaceum) is the most common lesion confused with squamous cell carcinoma of the lip. Histologically, the tumors are well circumscribed, have a central keratinizing core, and on occasion may be difficult to distinguish from well-differentiated squamous cell carcinoma. Keratoacanthomas are circular, with a central crater occurring on the cutaneous aspect of the lip. They may demonstrate rapid growth and require surgical resection in spite of their tendency to regress spontaneously. Concern about malignancy should remain high until growth has ceased and there are signs of involution.

Extragenital chancre of syphilis may occur on the lip and can have the appearance of squamous cell carcinoma. Darkfield microscopy should reveal spirochetes, thus confirming the diagnosis. Granulomatous cheilitis must occasionally be differentiated from squamous cell carcinoma of the lip. Among these diseases are tuberculosis, leprosy, sarcoidosis, and Crohn's disease. Acute tuberculous ulcers can occur on the oral mucosa of the lips and are associated with an active pulmonary focus.

Biopsy of lip lesions is mandatory prior to treatment because hyperkeratosis, cheilitis, keratoacanthoma, and other benign and malignant lesions can be confused with carcinoma. An elliptic incision is achieved under local anesthesia encompassing a portion of the lesion as well as adjacent normal-appearing tissue. The biopsy specimen should be sufficiently deep to enable assessment of tumor invasiveness.

Treatment

Radiotherapeutic treatment of carcinoma of the lip may consist of interstitia, contact, or external radiation therapy. Interstitial and contact application of radium were once the standard techniques of radiologic treatment. These methods have largely given way to external radiotherapy, which is more versatile and controllable.

Satisfactory results have been achieved in treating small, shallow cancers of the lip less than 1.5 cm in diameter with low-voltage roentgen radiation (100 kV). A total dose of 3000 to 4500 rad (measured in air) is administered in divided doses over a 1- to 4-week period. Tumors larger than 1.5 cm in diameter are managed by higher energy (200 kV) with appropriate filtration. More advanced tumors require a much larger field of exposure. Frequently, total doses of 4500 to 6000 rad (measured in air) are fractionated over a 4- to 6-week interval.

Increasingly, electron beam irradiation on the order of 7 to 18 MeV is being used for treating carcinoma of the lip. Electron beam irradiation provides greater depth of penetration and more accurate focusing of the energy beam than does conventional voltage radiation therapy. The electron beam results in 80 to 100 per cent of delivered energy at a depth of 2 cm with 7 MeV and of 3 cm with 11 MeV. There is a rapid fall-off in dose beyond those depths, which is an added advantage when compared with more conventional techniques. Thus, the mandible receives very little irradiation in treating small and intermediate-size lip cancers. Very small lip cancers are usually managed with 2000 rad delivered in 2 weeks or less using electron beam therapy. Larger or more deeply infiltrating tumors are treated with 7000 to 8000 rad in fractions over 6 to 8 weeks.

Regardless of the form of radiotherapy used, care must be taken to protect normal tissues surrounding the lip cancer by using a cutout lead contact. This limits the beam exposure to the desired area and confines the resulting radiomucositis and dermatitis to a limited area of the lip. The major sequela of radiotherapy is a permanent increased sensitivity of the treatment area to thermal and solar stimuli. This is a particular disadvantage for patients having occupations requiring prolonged periods of sun exposure.

Complications following radiotherapeutic treatment of lip cancer include dermatitis and on occasion chronic ulceration with subsequent cicatricial scarring of the lip. Radiation therapy of advanced tumors of the lip in which extensive tissue destruction has occurred results in an anatomic deficit of the lip necessitating surgical reconstruction. Such malignancies should be treated initially with surgery. In addition, radiation osteomyelitis may be observed in the treatment of larger tumors when the radiation fields include the mandible or when tumor has invaded bone. This will require complex reconstruction to restore the defect.

Surgical Treatment

The algorithm displays the author's approach to the diagnosis and management of patients presenting with lesions of the lip. A history of prolonged sun exposure or smoking in combination with a typical-appearing squamous cell carcinoma would warrant an incisional biopsy. Subsequent treatment would depend on the results of the histologic examination. Patients with no predisposing factors for lip cancer and with small lesions that do not have a typical appearance for malignancy should be managed by excisional biopsy of the area in question.

Small, less advanced carcinomas of the lip may be treated equally successfully by surgery or irradiation, and the results are cosmetically acceptable with both methods. In advanced tumors,

surgery or a combination of surgery and postoperative radiotherapy are preferred. Primary surgery offers eradication of disease, pathologic survey of margins, and reconstruction of the defect in a single procedure.

The lips play a key role in deglutition and formation of speech and in facial expression. Their reconstruction offers a unique challenge to the surgeon. Few other sites require attention to such precise details of form and function.

Surgical procedures to reconstitute the lip following tumor ablation may be classified as follows: (1) those that use remaining lip tissue, (2) those that borrow tissue from the opposite lip, (3) those that use adjacent cheek tissue, and (4) those that use distant flaps.

The algorithms displayed may be helpful in the cognitive process of managing the problem of lip reconstruction. This method categorizes the size of lip defects into those that are less than one half of the width of the lip, those between one half and two thirds of the lip, and those that are greater than two thirds of the entire lip width.

Defects of less than one half of the lip width can usually be managed by primary closure. A W-shaped excision is preferred, and in its simplest form it is usually adequate for primary closure, though modification to include lateral advancement flaps may be required when the defect base is broad. The W-shaped excision prevents an unsightly pointed chin when it is necessary to extend the incision beyond the mental crease. Primary closure should be in three layers, that is, mucosa, muscle, and skin. Care is taken to perform a precise approximation of the "white line" at the vermilion border on either side of the defect. When extensive leukoplakia is present along the entire lip, vermilionectomy is indicated. A new vermilion is reconstructed by advancing the mucosal lining of the lip outward. In instances in which leukoplakia is present in association with a small invasive carcinoma, a W-shaped excision can be combined with vermilionectomy.

Primary closure of defects in the midline of the upper lip can be facilitated by excising a crescent of cheek skin in the perialar region. This method is similar to that described by Webster. Perialar skin excision allows advancement of the remaining lip segments medially and lessens the wound tension after primary closure.

Vermilion mucosal defects may be reconstructed with simple mucosal advancement flaps from inside the mouth. When vermilion substance has been lost in addition to mucosa, a flap of muscle and mucosa from the anterior portion of the tongue may be used. A mucosal flap from the ventral surface of the tongue is initially attached to the skin at the vermilion-cutaneous border. Fourteen to 20 days later, the pedicle is transected, releasing the tongue and retaining muscle for bulk and mucosa for vermilion reconstruction. Although this technique does not result in discernible limitation of tongue mobility, the newly created vermilion mucosa retains a somewhat pebbled surface, reminiscent of the tongue surface.

Reconstruction of defects consisting of one half to two thirds of the lip width usually requires lip augmentation procedures. Closure can be most readily achieved by a full-thickness pedicle flap from the opposite lip (lip-switch flap) or from the adjacent cheek. The Karapandzic flap may also be effective in closing medium-sized defects of the lip and in some instances may provide better functional results than other static flaps. This technique consists of circumoral incisions through skin and subcutaneous tissue, encompassing the remaining portions of upper and lower lips. The orbicularis oris is mobilized and remains pedicled bilaterally on the superior and inferior labial arteries. Adequate mobilization enables primary closure of the defect by rotating portions of the unoperated lip into the defect.

Local flaps are preferable to regional flaps for closing defects of less than two thirds of the lip width because of their close skin color and texture match and the availability of mucous membrane for internal lining. Defects located medially are best closed using an Abbé flap consisting of a full-thickness flap from the opposite lip pedicled on the vermilion border and containing the labial artery. Estlander's original operation was devised for closure of lower lip defects near the commissure of the mouth. Since the original description of the Abbé and Estlander flaps, the operations have been modified in many ways to accommodate surgical defects located anywhere on the lower or upper lip.

The Abbé and Estlander flaps should be constructed so that the height of the flap equals the height of the defect. The width of the flap should be approximately one half of the width of the defect to be reconstructed so that the two lips are reduced in width proportionately. The pedicle should be made narrow to facilitate transposition, but care must be taken not to injure the labial artery. The secondary defect should be closed in three layers. Accurate approximation of the vermilion border of the flap with that of the remaining lip segment prevents a notched appearance.

The superiorly based Estlander flap may be modified from its original description by designing the flap so that it lies within the nasolabial fold. This provides better scar camouflage of the donor site and at the same time allows easy rotation of the flap into the lower lip defect. Oral commissure distortion is caused by the Estlander flap. This distortion, or microstomia, may be corrected with a secondary commissuroplasty when desired.

The pedicle of the Abbé flap crosses the oral stoma and may be severed in 2 to 3 weeks. During this time, the patient is maintained on a liquid or soft diet that does not require excessive chewing. It is essential that precise approximation of the vermilion border be assured at the time of pedicle severance.

Defects greater than two thirds of the entire lip, and some smaller lateral defects, are best reconstructed using adjacent cheek flaps in the form of advancement or transposition flaps. Massive or total lip defects are best reconstructed using regional or distant flaps or vascularized free flaps.

Large defects of the upper lip may be reconstructed by excising crescent-shaped perialar cheek tissue and advancing flaps medially. If the wound tension is excessive, an Abbé flap may be added in the midline.

Similarly, midline lower lip defects may be closed by full-thickness advancement flaps as described by Burow, Bernard, May, and Webster. These techniques require excision of additional triangles in the nasolabial region to allow advancement of the cheek flaps. The triangular excision should follow the lines of the nasolabial fold and should include only skin and subcutaneous tissues. The underlying muscle is mobilized to form a new commissure. The mucous membrane is separated from the muscle and advanced outward to provide a vermilion border. Incisions are made in the gingivobuccal sulcus, as far back as the last molar tooth if necessary, to allow proper approximation of the remaining segments without tension.

Full-thickness nasolabial transposition flaps, consisting of skin, subcutaneous tissues, and mucosa or skin only, can be useful in reconstructing lip defects as large as three fourths of the width of the lip. Matched full-thickness flaps can be created in the area of the nasolabial folds of each cheek with a Z-plasty at their base to enhance the ease of transposition. The flaps are transposed into the lip defect and sutured in three layers. Mucosa from the flaps can be advanced to create a new vermilion, or a tongue flap may be required.

Adjacent cheek tissue may not be applicable or sufficient for reconstruction of near total or total defects of the lip. In such cases, regional flaps may be used for reconstruction. Excisions of the lower lip, chin, and anterior section of the mandible often require such flaps for reconstruction after resection of carcinoma.

The temporal forehead flap may be used for total upper lip reconstruction, but the unsightly secondary deformity precludes its common use. The temporal forehead flap may be lined with a split-thickness skin or mucosal graft. In males, hair-bearing scalp may be incorporated to provide hair growth for scar camouflage.

In the past, the medially based deltopectoral or Bakamjian flap has been the most commonly used regional flap for reconstruction of the lower lip. The deltopectoral flap may be lined with a skin or mucosal graft. The flap may also be turned on itself to supply the inner lining of the reconstructed lip. In one case, a deltopectoral flap was used to create a new inner lining of the lower lip, and a nasolabial flap was used to reconstruct the external portion of the lip. The adjacent cheek tissue provides a superior color and texture match with that of the remaining lip, whereas the deltopectoral flap provides tissue coverage for the exposed mandible and internal lining to the lip.

More recently, the pectoralis major myocutaneous flap has been used for lip reconstruction following extensive ablative surgery for malignancy of the anterior floor of the mouth involving large portions of the lip or skin of the chin. Ariyan was first to describe the pectoralis major myocutaneous flap and reported its use in the reconstruction of large facial defects. Since the introduction of this flap, it has gained wide popularity among surgeons who perform head and

neck reconstructions. The pectoralis major myocutaneous flap has the advantage of being an axial myocutaneous flap that may be elevated as a strip of muscle and an attached segment of overlying skin for a one-stage reconstruction of the lip. A portion of the flap may be turned on itself to provide tissue for the inner aspect of the lips or the anterior floor of the mouth, or both. The flap has sufficient bulk to provide structural support when a mandibulectomy is necessary for tumor exenteration.

When large segments of the lower lip have been resected, oral competence requires adequate support for the reconstructed lip. Whenever possible, orbicularis oris muscle flaps should be advanced, with or without overlying skin and mucosa, into the reconstructed lip segment. If this is not possible, it may be necessary to sling the lower lip with a fascia lata graft from upper lip muscle on either side.

When the anterior mandibular arch has been resected or destroyed, oral competence requires support of the lower lip. This is best accomplished by reconstructing the mandibular arch, though sometimes the mass of soft tissue alone (as with a pectoralis major myocutaneous flap) will provide sufficient rigidity to allow oral competence. The author prefers to use an iliac crest bone graft to restore the mandibular arch in a separate stage after soft tissue healing of the oral cavity is achieved. Stabilization of the mandibular segments is provided by an acrylic biphase appliance and the graft itself, using figure of 8 wires.

The development of microvascular surgical techniques has allowed one-stage reconstruction of lip, chin, and anterior mandibular arch by transferring free composite osteomyocutaneous and osteocutaneous flaps, providing vascularized bone grafts for mandibular reconstruction and soft tissue for restoration of the lip and chin. Revascularized bone is advantageous because it heals more readily and has an overall better success rate than does conventional nonvascularized bone grafts. In addition, the simultaneous reconstruction of soft tissue deficits provides a superior rehabilitation technique for patients with massive defects of the lip and jaw.

Postoperative Care

Following surgical resection of lip cancer, the wound should be kept clean and dry. Dressings are usually not required for local flaps or after primary closure has been achieved. An antibiotic ointment may be applied to the suture line for a few days postoperatively. Sutures are removed between the fifth and seventh days following surgery unless the patient has had previous irradiation. Systemic antibiotics are not indicated unless wound infection supervenes.

Postoperative feeding of patients who have undergone lip surgery should be restricted to liquids the first 24 to 48 hours, followed by a soft diet for 4 to 5 days. Soft foods require less biting and chewing, and thus less movement of the lips compared with foods that are not soft. A semiliquid diet should be maintained in patients with pedicled flaps crossing the oral stoma until division of the pedicle takes place.

Postoperative complications may include ectropion of the lip, disruption of the vermilion, and microstomia. The first two complications are minimized or eliminated by avoiding tension along suture lines and by careful approximation of the vermilion margins. Microstomia is prevented by liberal use of local and regional flaps. Distortion of the commissure may follow operative procedures in this region. Lip-switch operations at the commissure often require secondary commissuroplasty to prevent distortion and microstomia.

Management of Lymph Node Metastases

Most authorities believe cervical metastases should be managed surgically. Interstitial radium or external roentgen therapy may be used to treat lymph node metastases but is less successful than surgery. Control of cervical metastases by radiotherapy is achieved in approximately 35 per cent of patients presenting with palpable nodes at the time of initial presentation. Control by radiotherapy of cervical metastases subsequent to the treatment of the initial lip tumor approaches only 16 per cent of cases. This discrepancy in successful management of lymphadenopathy is probably due to the greater frequency of inflammatory nodes in the former group of patients that are mistakenly interpreted as representing metastatic disease. By contrast, surgical management of cervical metastases offers a 5-year cure rate of approximately 50 per cent. Surgical treatment of patients with neck nodes that develop after initial therapy is about as successful as for those initially presenting with a cervical node. Information is lacking concerning the efficacy of combined therapy consisting of surgery and radiotherapy in either sequence for the treatment of cervical metastases from lip cancer. Presumably, combined therapy could provide better control of neck disease in cases in which metastatic nodes are large, multiple, or bilateral. The author prefers neck dissection followed by postoperative radiotherapy for the treatment of patients with confirmed cervical metastases.

Prophylactic neck dissection for occult metastases is not indicated. One reason is that the percentage of patients who have occult neck metastases is less than 10 per cent. Another reason is that the cure rate for patients having a therapeutic neck dissection compares favorably with the cure rate of patients undergoing prophylactic neck dissection for confirmed occult metastases. Thus, the relatively small group of patients who will eventually experience neck metastases have a similar chance of survival with adequate surgical treatment. On occasion, however, prophylactic neck dissection may be advised in the management of large undifferentiated tumors that invade the oral commissure and upper lip.

Results

The prognosis for cure of patients with cancer of the lip is dependent upon the stage of disease. Patients with tumors less than 3 cm in greatest dimension that involve the lower lip enjoy an excellent prognosis. The cure rate for stages I and II are generally greater than 90 per cent whether treated with surgery or radiotherapy. The average 5-year absolute and determinate survival approximates 65 and 80 per cent, respectively, in a combined series of 10.230 patients treated by a number of methods including irradiation, surgery, and a combination of the two.

Because most patients with lip cancer present with stage I and stage II disease, the survival rates for series of patients treated with radiotherapy or surgery are remarkably similar. Using primarily radiotherapy, Molner and associates noted a 5-year determinate survival rate of 86 per cent. Bernier and Clark, reporting on a large series of patients with lip cancer treated primarily by surgery, observed a 5-year determinate survival rate of 82 per cent. Ashley and colleagues compared the success rate of treating patients with lip cancer by surgery and radiotherapy. Of 106 patients treated surgically, 87 per cent were free of tumor for 5 years, whereas 77 per cent of 43 patients treated initially with radiotherapy survived 5 years without recurrence. Most recurrences in the surgery group occurred in the neck, whereas half of the radiation therapy group failures were due to local recurrence in the lip. Sixty-six per cent of the postirradiation recurrences were salvaged by subsequent surgery.

The incidence of recurrent disease increases and the cure rate drops precipitously in large tumors of the lip. The presence of regional metastases also offers a considerably poorer prognosis when compared with that in patients lacking nodal disease. Overall, successful control of disease in patients with cervical metastases approaches only 50 per cent. This is similar to the survival rate for patients with cancer elsewhere in the oral cavity and with regional metastases, substantiating the fact that the presence of nodal disease overshadows the significance of the size or location of the primary tumor. The poorest results are obtained when nodal metastases are fixed to the deep structures of the neck or when there is clinical or radiographic evidence of mandibular involvement by neoplasm. It is also apparent that control of the primary tumor in patients with evidence of lymph node metastases is more difficult. In a review of 3166 patients with squamous cell carcinoma of the lip, control of the primary tumor was achieved in 85 per cent of those patients without nodal disease compared with 68 per cent of those with cervical metastases.

A history of previous therapy for lip cancer is associated with poorer results in controlling the second primary tumor as well as curing the patient of lip cancer. Gladstone and Kerr noted a 3-year determinate survival rate of 90 per cent for patients treated initially compared with a 70 per cent survival rate for those treated for relapses or recurrences of tumor. Similarly, Cross and co-workers demonstrated a 78.7 per cent 5-year cure for primary tumors versus 34.6 per cent for cases treated secondarily. These findings are consistent with the knowledge that recurrent or persistent tumors tend to be more advanced lesions and are of higher histologic grade.

In addition to the factor of secondary treatment, another important factor related to poorer results in treating lip cancer is a history of multiple independent carcinomas of the lip. Baker noted that 36 patients having more than one primary squamous cell carcinoma of the lip had 3- and 5-year determinate survival rates of 82 and 79 per cent, respectively. Survival was less when compared with the larger series of 285 patients in which the 3- and 5-year determinate survival rates were 91 and 89 per cent, respectively.

Malignant tumors of the upper lip account for 3 to 5 per cent of all carcinomas of the lip with a predilection for females. The male to female ratio of patients with upper lip cancer approaches 5:1 compared with the lower lip for which it is 10:1. Cancer of the upper lip is

associated with a poorer prognosis for cure than is the lower lip because of the more aggressive biologic nature of tumors occurring in this region and the tendency toward earlier metastases. On occasion, metastases may be widespread throughout the preauricular nodes and cervical chain at the time of treatment. The 5-year cure rate for upper lip cancer is 50 to 60 per cent.

The commissure or both lips are involved with carcinoma in 1 to 2 per cent of cases. Multicentric tumors have approximately the same incidence. Tumors of the commissure are more difficult to cure than lesions elsewhere on the lip because they behave similarly to tumors involving the buccal mucous membrane. They also have similar cure rates to cancer of the buccal mucosa. Cross and associates reported only a 34 per cent 5-year survival rate in 42 patients with oral commissure carcinoma.