

ABC of oral health

Oral cancer

Crispian Scully, Stephen Porter

Most mouth cancer is oral squamous cell carcinoma. This is uncommon in the developed world, except in parts of France, but is common in the developing world, particularly South East Asia and Brazil. It is mainly seen in men over middle age (though it is increasing in younger people), tobacco users, and lower socioeconomic groups.

Aetiological factors (acting on a genetically susceptible individual) include tobacco use (75% of people with oral cancer smoke), betel use (Bidi leaf, and often tobacco, plus spices, slaked lime, and areca nut), alcohol consumption, a diet poor in fresh fruit and vegetables, infective agents (*Candida*, viruses), immune deficiency, and (in the case of lip carcinoma) exposure to sunlight.

Additional primary neoplasms may arise mainly in the aerodigestive tract. This occurs in up to 25% of people who have had oral cancer for over three years, and in up to 40% of those who continue to smoke. Similarly, patients with lung cancer are at risk from second primary oral cancers.

Potentially malignant lesions or conditions may include some erythroplasias, dysplastic leucoplakias (about half of oral carcinomas have associated leucoplakia), lichen planus, submucous fibrosis, and chronic immunosuppression. Rare causes of oral cancer include tertiary syphilis, discoid lupus erythematosus, dyskeratosis congenita, and Plummer-Vinco syndrome (iron deficiency and dysphagia).

- Oral squamous cell carcinoma is mainly a disease of men over middle age, but its prevalence is increasing
- Tobacco use and alcohol consumption are the main aetiological factors
- Patients are at risk from second primary neoplasms

Diagnosis

Too many patients with oral cancer present or are detected late, with advanced disease and lymph node metastases. With earlier detection, treatment is less complicated, the cosmetic and functional results are better, and survival is improved.

Carcinomas may present anywhere in the oral cavity, often on the posterolateral margin of the tongue and floor of the mouth—the “coffin” or “graveyard” area. It is crucial, therefore, not only to examine visually and manually the whole oral cavity but to carefully inspect and palpate the posterolateral margins of the tongue and the floor of the mouth. There is usually a solitary chronic ulceration, red or white lesion, indurated lump, fissure, or enlarged cervical lymph node. Lip carcinoma presents with thickening, crusting, or ulceration, usually of the lower lip.

Enlargement of an anterior cervical lymph node may be detectable by palpation. Some 30% of patients present with palpably enlarged nodes containing metastases, and, of those who do not, a further 25% will develop nodal metastases within two years. Molecular techniques show tumour to be present in many histologically normal nodes.

There should therefore be a high index of suspicion, especially of a solitary lesion present for over three weeks,

Oral malignant neoplasms

Common

- Squamous cell carcinoma

Uncommon

- Malignant salivary gland tumours
- Malignant melanoma
- Lymphomas
- Neoplasms of bone and connective tissue
- Some odontogenic tumours
- Maxillary antral carcinoma (or other neoplasms)
- Metastatic neoplasms (from breast, lung, kidney, stomach, or liver cancer)
- Langerhans' cell histiocytoses
- Kaposi's sarcoma



Carcinoma of tongue presenting as a lump



Carcinoma of tongue presenting as an ulcer



Carcinoma of tongue with associated white lesions

particularly if it is indurated, there is cervical lymphadenopathy, or the patient is in a high risk group.

Investigations

It is essential to confirm the diagnosis and determine whether cervical lymph nodes are involved or there are other primary tumours or metastases. Therefore, almost invariably indicated are

- Lesional biopsy (usually an incisional biopsy, but an oral brush biopsy is now available, mainly for cases of widespread potentially malignant lesions and for revealing malignancy in lesions of more benign appearance)
- Jaw and chest radiography
- Endoscopy
- Full blood count and liver function tests.

Computed tomography or magnetic resonance imaging help determine a tumour's extent and invasion, and involvement of the cervical lymph nodes. Ultrasound guided cytology of nodes may help. The staging systems of tumour, nodes, metastases (TNM) classification and T and N integer score (TANIS) are often used. Molecular techniques are being introduced for prognostication in potentially malignant lesions and tumours and to identify nodal metastases.

Management

The prognosis of oral squamous cell carcinoma is very site dependent. For intraoral carcinoma, five year survival may be as low as 30% for posterior lesions presenting late, as they often do. For lip carcinoma, however, five year survival is often over 70%. Important factors to consider in management are quality of life and patient education: in one study, at least six months after the diagnosis of oral cancer, 47% of patients still smoked and 36% drank alcohol to excess. Only a third were aware that these habits were important in the development of oral cancer.

Oral squamous cell carcinoma is now treated largely by surgery or irradiation, although there are few unequivocal controlled trials of treatment modalities. Photodynamic therapy and chemotherapy have occasional applications. Combined clinics, with both surgeons and oncologists, and support staff, usually have an agreed treatment policy and offer the best outcomes.

Surgery

Surgery allows the complete excision of a tumour and lymph nodes and full histological examination for staging, which has implications for prognostication and assessing the need for adjuvant radiotherapy. It can also be used for radioresistant tumours. Disadvantages are mainly the perioperative mortality and morbidity, but modern techniques have significantly decreased these and aesthetic and functional defects.

Patients who succumb to oral cancer almost always die because of failure to control the primary cancer or because of nodal metastases. Death due to distant metastasis is unusual.

Ablative surgery excises the cancer with, ideally, at least a 2 cm margin of clinically normal tissue. If a node has clinical signs of invasion it is reasonable to presume that others may also be involved, and they must be removed by traditional radical neck dissection. "Functional" neck dissections, modified to preserve the jugular, sternomastoid, or accessory nerve while ensuring complete removal of involved nodes, have gained popularity. Moderate dose radiotherapy is sometimes used to "sterilise" such necks.

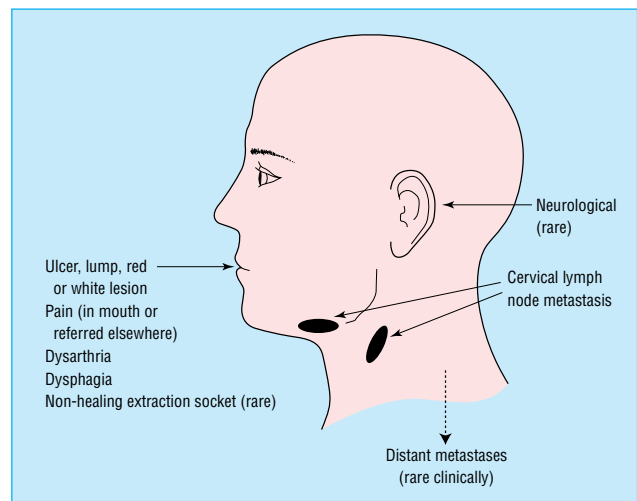
- **Potentially malignant lesions include erythroplasia and some white lesions**
- **Oral cancer may present as a solitary lump, ulcer, or red or white lesion**
- **Earlier diagnosis offers better treatment, cosmetic and functional outcome, and survival**
- **Any oral lesion persisting more than three weeks should be treated with suspicion**
- **Biopsy is mandatory**
- **Second primary neoplasms must be excluded**



Carcinoma of gingiva



Carcinoma of lip



Possible features of oral carcinoma

Reconstruction

Reconstruction is tailored to the patient's ability to cope with a long operation and the risk of substantial morbidity.

Soft tissue reconstruction

Local flaps (such as nasolabial flaps) provide thin reliable flaps suitable for repairing small defects. However, tissue must often be brought into the region in order to repair larger defects. For these, split skin grafts or flaps, free flaps or pedicle flaps, are required.

Free flaps—Microvascular surgery facilitates excellent reconstruction in a single operation by means of, for example, forearm flaps based on radial vessels, which are particularly useful to replace soft tissue. Alternatively, flaps based on the fibula may be used if bone is also required.

Pedicle flaps—Myocutaneous or osteomyocutaneous flaps are based on a feeding vessel to muscle and perforators to the skin paddle. They may be used in a one stage operation to replace skin, and, since they also contain muscle, they have adequate bulk to repair defects and may also be used to import bone (usually rib). Examples include flaps based on the pectoralis major, latissimus dorsi, or trapezius. Flaps from the forehead or deltopectoral pedicle were once the mainstay for reconstruction, but they required a two stage operation, replaced only skin, and relied on a tenuous blood supply.

Hard tissue reconstruction

Ideally, hard tissue reconstruction is done at the time of tumour resection. Dental implants can then be inserted to carry a prosthesis. Bone is traditionally taken as free non-vascularised bone grafts from iliac crest or rib, but these may survive poorly if contaminated or the vascularity is impaired after irradiation. In such cases, or where there is a large defect, an osteomyocutaneous flap greatly improves the graft's vascular bed. True free vascularised bone grafts such as fibula grafts have great benefits, but they are time consuming and require considerable expertise.

The benefits of bone grafting for maxillary defects are less certain, and maxillary reconstruction is usually with an obturator (bung), which has the advantage that the cavity can be readily inspected subsequently.

Specific complications from the surgery of oral cancer may include infection and rupture of the carotid artery, salivary fistulae, and thoracic duct leakage (chylorrhoea).

Radiotherapy

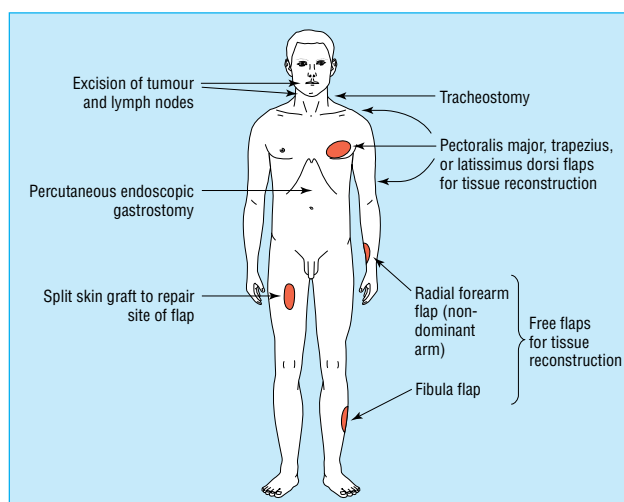
With radiotherapy, normal anatomy and function are maintained, general anaesthesia is not needed, and salvage surgery is still available if radiotherapy fails. However, adverse effects are common, cure is uncommon (especially for large tumours), and subsequent surgery is more difficult and hazardous (with survival further reduced). Radiotherapy can be delivered by external beams or by implanting a radioisotope.

External beam radiation (teletherapy) is commonly accompanied by side effects (see below).

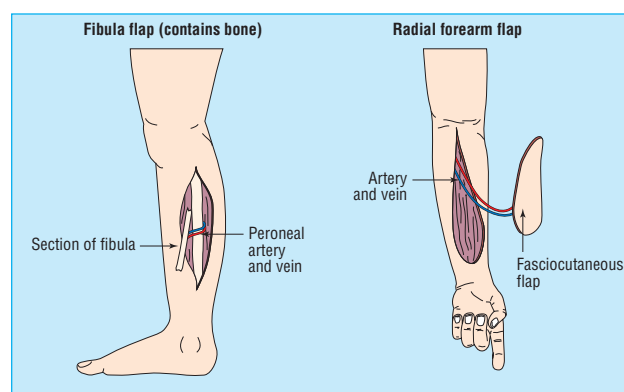
Interstitial therapy (brachiotherapy, plesiotherapy)—Implants of iridium-192 for a few days are often used, giving a radiation dose equivalent to teletherapy but confined to the lesion and immediate area. Plesiotherapy thus causes fewer complications but is used mainly for tumours less than 2 cm in diameter and in selected sites.

Complications of radiotherapy

Immediate complications include painful mucositis. The time to healing depends on the radiation dose but is usually



Surgical procedures that may be used in treating patients with oral cancer



Free flaps that may be taken for tissue reconstruction after tumour resection

• **Dental treatment, both preventive and curative, is essential before radiotherapy to minimise oral disease and the possible adverse consequences of operative intervention**



Radiation induced mucositis

complete within three weeks of the end of treatment. Tobacco smoking delays resolution, and mucositis can provide a portal for systemic infection. Mucositis can be reduced by minimising doses of radiation or cytotoxic drugs, avoiding irritants (smoking, spirits, and spicy foods), good oral hygiene, cooling the mouth with ice, and drugs (topical aspirin, benzydamine, lidocaine (lignocaine), chlorhexidine, sucralfate, or polymyxin E and tobramycin).

Osteoradionecrosis is a potentially serious complication. The mandible, with its high density and poor vascularity, is more prone to it than the maxilla. Risk of osteoradionecrosis increases with high radiation dose, fraction size and number, and extraction of teeth after radiotherapy.

Complications in children include enamel hypoplasia, microdontia, impaired tooth development and eruption, and alterations to the developing craniofacial skeleton.

Dry mouth (xerostomia) may cause a subjective complaint of dry mouth, difficulty with speech and swallowing dry foods, a burning sensation in the mouth, dental caries, oral candidiasis, and bacterial sialadenitis. Residual salivary tissue may be stimulatory by gustatory (sugar-free chewing gum) or pharmacological (cholinergic agents) stimuli. Pilocarpine in doses of up to 5 mg three times daily can be effective. Patients with a dry mouth should avoid anything that further impairs salivation—such as drugs, tobacco, and alcohol—and may benefit from frequent sips of water (particularly during eating), saliva substitutes (such as Artificial Saliva, Saliva Orthana, Oralbalance), dietary control, and topical fluorides.

Other complications include loss of taste and cervical atherosclerosis.

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Osteoradionecrosis affecting the mandible, showing exfoliating necrotic bone

Causes of a complaint of dry mouth

Iatrogenic

- Drugs
 - Anticholinergics (such as antidepressants, antihistamines, antihypertensives, antiretrovirals)
 - Sympathomimetics (such as bronchodilators)
- Irradiation damage
- Graft versus host disease

Salivary gland disease

- Sjögren's syndrome
- HIV infection
- Hepatitis C virus
- HTLV-I infection
- Sarcoidosis
- Aplasia

Dehydration

- Uncontrolled diabetes

Psychogenic

Further reading

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One hundred years ago

Death of Professor Thomas Jones

These misfortunes cast a heavy gloom over our little camp. We were all very depressed, and things looked very black on June 18th when our beloved chief, Professor Thomas Jones, also died. The circumstances surrounding the death of Professor Jones were very sad and tragic. He was greatly upset by the deaths among our staff. Dr. Davies was an old house-surgeon of his and Mr. Eames an old dresser. He suffered from insomnia; he lost his appetite; his pulse became irregular and intermittent. We were all anxious to get him away, but feared that he was not strong enough to travel.

For some days there had been rumours of a possible attack on Springfontein. On the evening of June 18th some shots were fired

on the kopjes behind our camp. These were followed by volley firing and cries of "lights out." It was thought that there was a night attack and preparations were accordingly made. It was discovered afterwards that the firing was due to a false alarm. Poor Professor Jones died that night of a broken heart brought on by grief and sorrow at the deaths among our staff and the worry and anxiety inseparable from a hospital like ours. He was one of the kindest and most conscientious of men, but his nature was far too sensitive and tender for a rough campaign. His virtues were so many and so well known that it is quite unnecessary for me to enumerate them here. I will only say, with all that knew him, that to know Tom Jones was to love him. (*BMJ* 1900;ii:253.)