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Oromandibular Reconstruction After Cancer Resection

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The oral cavity includes the buccal mucosa (ie, inside lining of the lips and cheeks), the teeth, the anterior two thirds of the tongue, the floor of the mouth below the tongue, the hard palate, and the retromolar trigone (area behind the wisdom teeth) [1].

For reconstructive purposes and in consideration of the functions of this anatomic entity (ie, mastication, deglutition, and speech), Yousif et al [2] divided the oral cavity into 10 functional units:

Oral sphincter
Lingual and buccal sulci
Alveolar ridges
Floor of mouth
Mobile tongue
Base of tongue
Tonsillar pillars
Soft palate
Hard palate
Buccal mucosa

From a pragmatic and reconstructive point of view, the authors classify the defects as those requiring

Lining only
Lining and bone
Bone alone
Cover and bone
Lining, bone, and coverage (through and through defects)

Epidemiology

Head and neck cancers are common in several regions of the world where rates of tobacco use and alcohol consumption are high. The age-standardized incidence rate of head and neck cancer in males circa 1990 exceeds 30 per 100,000 in regions of France, Hong Kong, the Indian subcontinent, Central and Eastern Europe, Spain, Italy, and Brazil, and in the United States among African

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Americans. The variation in incidence of cancers by anatomic site within the head and neck is mostly related to the relative distribution of major risk factors, such as tobacco or betel quid chewing, cigarette or bidi smoking, and alcohol consumption [3].

From 1985 to 1994, the largest proportion of head and neck cancers arose in the larynx (20.9%) and the oral cavity, including the lip (17.6%) (lip = 3.5%, oral cavity = 14.1%, oropharynx = 12.3%) [4].

In a recent analysis of 221 patients with squamous cell carcinoma (SCC) of the oral cavity, 161 patients had cancer of the tongue, 28 had cancer of the oral cavity, 12 had cancer of the hard palate, 11 had cancer of the buccal mucosa, and nine had cancer of the gingival area [5].

The median age of patients with oral cavity cancers was 64.0 years. Men represented 60.2% of patients. Pathologic diagnosis was SCC in 86.3% of cases. African Americans (independent of income), lower-income patients, and patients with higher-grade disease were seen more frequently with advanced-stage SCC [6].

An estimated 28,260 new cases of oral cavity and pharynx carcinoma were expected in the United States in 2004. Incidence rates are more than twice as high in men as in women and are highest in men older than 50 years. Incidence rates for cancer of the oral cavity and pharynx continued to decline in the 1990s in African American and white men and women. An estimated 7230 deaths from oral cavity and pharynx cancer are expected in 2004. Death rates have been decreasing since the late 1970s, with this decline more rapid in the 1990s. For all stages combined, about 84% of persons with oral cavity and pharynx cancers survive 1 year after diagnosis. The 5-year and 10-year survival rates are 57% and 45%, respectively [7].

Unfortunately, this trend does not apply everywhere. Male incidence rates of head and neck cancer are rising in most regions of the world. Age-adjusted incidence rates of oral and pharyngeal cancer increased after 1970 by 11% per 5-year period and 14% per 5-year period, respectively. The prognosis has not improved substantially since the 1950s [8].

Despite dramatic improvements in surgical and reconstructive techniques in the past 3 decades, the overall mortality rates remain relatively unchanged. The overall 5-year survival rate for persons with oral cavity and pharyngeal cancer is only 52%. When we consider that the risk factors are known and the lesions in the oral cavity and pharynx are easily accessible for early detection, the lack of progress in controlling this cancer is perplexing. The lack of awareness of the disease burden and the risk factors, the tendency for occurrence in lower socioeconomic classes and poorly compliant populations, and the lack of a simple screening test have hindered progress [9].

Scant change was seen in early detection of oral cancer or 5-year relative survival rates between the periods 1973 to 1984 and 1985 to 1996 in nine Surveillance, Epidemiology, and End Results regions. This finding suggests a deficiency in professional and public education regarding early diagnosis of oral cancer [10].

The degree of mandibular invasion influences the survival rate of patients with SCC of the oral cavity, and this difference is not due to local failure. The 5-year survival is 25.4% after segmental mandibulectomy, as compared with 40% after rim mandibulectomy. The degree of mandibular involvement does not influence the local failure treated by surgery and radiotherapy [11].

The overall 5-year survival rate of oral cavity cancer in a retrospective review of 277 patients receiving initial treatment at Washington University Medical Center between 1980 and 1989 was 46%. Survival rates by tumor, node, and metastasis (TNM) stage were as follows: stage I, 72%, stage II, 54%, stage III, 37%, and stage IV, 29%. When patients were grouped according to the clinical-severity staging system, survival rates were as follows: stage I, 77%, stage II, 56%, stage III, 42%, and stage IV, 14%. The current TNM staging system for oral cavity cancer is based solely on the morphologic description of the tumor and disregards the clinical condition of the patient. Patient factors, such as cancer symptom severity and comorbidity, have a significant impact on survival [12].

These discouraging statistics indicate that oromandibular cancer, with its obligatory resection and reconstruction, will continue to consume scarce health care resources in the future. Third party payers and those in decision-making positions need to ensure that our institutions consider this problem in their budgeting plans.

Classifications

Various classification schemes for segmental mandibular defects have been described over the years [13–16], reflecting the progress that has been made in understanding the consequences of the defects and the technical improvements that have taken place. One such classification by Boyd et al [16] is shown in **Fig. 1**. This classification is based on three upper case and three lower case characters: *H*, *C*, *L* and *o*, *m*, *s*. *H* defects are lateral defects on any length, including the condyle but not significantly crossing the midline; *L* defects are the same but exclude the condyle; *C* defects consist of the entire