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Chapter 4

Early Detection and Multidisciplinary Approach to Oral Cancer Patients

Nihat Akbulut and Ahmet Altan

Additional information is available at the end of the chapter

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Abstract

"Oral cancer" is a term usually describing oral cavity and oropharyngeal malign tumors. The most histologic type of carcinoma is squamous cell carcinoma, seen in oral and oropharyngeal region with the incidence of 90%. Prevention or early diagnosis of premalignant and oral cancer requires increased public awareness and educating practitioners to be skillful in identifying oropharyngeal region pathology. To prevent oral cancers, the etiological factors should be known, and measures must be taken according to those factors. Premalignant lesions are leukoplakia, lichen planus in oral and cutaneous form, erythroplakia, stomatitis nicotina, and submucous fibrosis. Premalignant lesions should be treated, if possible, or followed up on carefully. To date, there are many clinical, histopathological, radiological, and optical techniques to diagnose or capture precancerous and oral cancer lesions early. The routine management of oral cancers is firstly surgical resection with or without postoperative adjuncts and other therapies such as the use of postoperative chemoradiation and radiation. Successful treatment of oral cancer patients is a complex issue that requires a multidisciplinary approach, including oral and maxillofacial surgeons, oral and maxillofacial radiologists, ENT specialists, medical and radiological oncologists, prosthodontists, dentists, speech therapists, supportive care experts, and also pathologists or, if possible, oral and maxillofacial pathologists.

Keywords: oral squamous cell carcinoma, preventive actions, early diagnosis, management of oral cancer, multidisciplinary approach, improving quality of life

1. Introduction

"Oral cancer" is a term usually used to describe oral cavity and oropharyngeal malign tumors. Oropharyngeal cancers include the regions known as buccal mucosa, hard-soft palate, and floor

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of mouth—gums, tonsils, and base and oral tongue remain oropharynx regions [1]. Despite this, the typical use of the term "oropharyngeal cancer" is unsuitable for this current topic due to earlier determination of "oral cancer." Although some reverse knowledge is in the literature, incidence of pharyngeal cancers is increasing, while oral cancer is declining in the USA according to the recent LeHew et al. report [1]. In addition, they connected this issue to human papillomavirus (HPV) and how it may cause many more pharyngeal cancers than oral cancers, while heavy alcohol consumption and tobacco use also cause more oral cancer. The same author emphasized ethnicity, gender, age, and other demographic factors that influence the occurrence of pharyngeal or oral cancers [1–4]. The other paper published by Yadav [2] mentioned the increase of oral or mouth cancer in young individuals, especially female individuals, and that lifestyles affect the likelihood it occurs (such as smoking or chewing tobacco, chewing betel nuts). On the other hand, lip cancer occurrence is increasing because of ozone layer loss [2].

The International Agency for Research on Cancer determined 25 years ago that types HPV 16–18 had a carcinogenic effect in humans which were responsible for the huge proportion (90%) of carcinoma of the cervix. HPV 16–18 had also been an etiologic factor related to various head, neck, and also oral carcinomas [5]. Fortunately, as relatively consolatory features of HPV-related cancers, Ang et al. [6] and Yadav [2] reported that these cancers are more sensitive to the current treatment options and have higher survival rates than other different etiologic factors, such as tobacco, causing carcinomas. Some of the other etiologic factors have mostly been seen in Southern Chinese ancestry: nasopharyngeal cancer, Epstein-Barr virus (EBV) exposure, and also consumption of salted fish [7].

Worldwide, oral cancer cases are meanly estimated at 500,000, with nearly 389,000 new cases per year and nearly 130,000 deaths [3, 4, 8]; 45,000 oral cancer cases in the USA face nearly 8500 deaths, and in the European Union, there are nearly 66,650 new cases faced each year [1, 3]. In further information found in the literature, Sri Lanka, India, Pakistan, Bangladesh, Hungary, and France show higher rates of new cases [3]. In addition to this information, South and Southeast Asian countries such as Pakistan, India, the Philippines, and Bangladesh are 80% of the newest cases due to increasing tobacco use and alcohol consumption and especially in Malaysian betel quid chewing [7–9].

The most histological type of carcinoma is squamous cell carcinoma, seen in the oral and oropharyngeal region with 90% [3, 7, 10–18]. The histological variants of squamous cell carcinomas are revealed in the literature to be adenosquamous, verrucous squamous, basaloid squamous, and papillary squamous cell carcinomas. In addition, carcinoma in situ is the previous form of the invasive squamous cell carcinomas. The other type of carcinoma of oropharyngeal mucosa in basal cells is seen rarely, in the oral cavity under 5%. On the other hand, there are many types of epithelial malignancies, such as mucoepidermoid carcinoma with 54%, low-grade adenocarcinoma with 17%, and adenoid cystic carcinoma with 15% mostly in hard palate minor salivary glands (60%), lips (25%), and vestibular mucosa (15%). Moreover, tumors being aggressive in any part of the body, mucosal melanomas are rarely seen in the hard palate and gingiva. Bony tumors, such as very rare cases of ameloblastic carcinoma, can be seen in the oral region [3]. Lymphomas and all aspects of sarcomas and odontogenic tumors, as those have a different etiology, are managed with different methods [17].

In this chapter, detection, diagnosis, multidisciplinary management, and post-management of patients with oral cancer and improvement of their quality of life will be used, instead of oral squamous cell cancer terms.

Prevention of oral cancer is an essential goal worldwide; if it is not possible to achieve this, then we should detect or diagnose oral cancer in early stages to completely manage it [1]. Prevention or early diagnosis of this entity requires public awareness action and practitioner education to be skillful in identification of oropharyngeal region pathology [4, 8].

Severity or aggression of a disease, usually termed in the literature as "stage," is essential to treating it in secure conditions without any recurrence. In addition, if it features severe aspects, it needs aggressive treatment modality such as surgical eradication and a reconstruction process. In body regions wherein cancer occurs, the classifications, severity, and level determination systems differ. The most popular system evaluating cancer type and severity is the TNM system according to two recent American Joint Committee on Cancer (AJCC) editions, the seventh and eighth [13, 19], used the world over due to its simplicity and friendly aspect [3]. The eighth edition has been in use since January, 2018. Additionally, the eighth edition differs from previous editions because it has taken HPV into account as an etiological factor [19].

In the head and neck region, the classification of cancer has been standardized with TNM levels or a stage grouping system and a histological aspect, meaning the histological grading of a disease [5, 20]. Oral cancers are also included in this system [3].

The patients diagnosed with oral cancer early should start treatment immediately, as soon as possible, to not worsen the prognosis. At advanced stages, oral cancer (especially in stages III and IV) has a very low survival rate at 9–50% [2, 4, 14]. According to some literature, 30% of patients' efforts to seek out or find professional help for about 3 months without any intervention to malignancy but 1 month of delaying causes stage advancing and also dramatically reduces odds of survival [4, 21].

Diagnoses of oral cancer have been carried out to date by using clinical, radiological, and histopathological tools. In recent years, new technological tools and biomarkers have begun promising use as tools to diagnose oral cancer early. It can be caught in stages of cancer as early as stages I and II [10]. In addition, nanotechnology has started to see its use in diagnosing oral cancer [15]. Besides this, biomarkers were suggested to be used in detecting the malign transformation potential of premalignant lesions such as oral leukoplakia [22].

The other issue: public awareness about premalignant lesions and formed oral cancer is very important to prevent or to cure them without any morbidity or threat to life [3, 4, 8, 22]. Public awareness about self-inspection of the mouth tissue and individuals recognizing the appearance of oral cancer is crucial [3, 4]. Fortunately, in the literature, there are many actions taken on this topic [2, 8] that should be continued by healthcare providers; also, world governments should support healthcare providers' works and actions [1, 4, 8, 22] because the prognosis of oral cancer is continuing to worsen survival rates due to utilizing these pathologies at advanced stages [22].

Oral cancer has still been challenging for public health and requires significant, demanding efforts [2, 3, 7, 23, 24]. The management of oral cancer is a complex issue that requires a

multidisciplinary approach, including oral and maxillofacial surgeons, oral and maxillofacial radiologists, ENT specialists, medical and radiological oncologists, prosthodontists, dentists, general surgeons, primary care clinicians (such as family medicine), physical therapy and rehabilitation specialists, dietitians, speech therapists, supportive care experts, and also pathologists or, if possible, oral and maxillofacial pathologists [2, 24, 25].

After radical, surgical, and other treatment modalities such as radiotherapy and chemotherapy—especially in stages III and IV patients—improving a patient's quality of life is very important [7, 14, 24, 26, 27]. Besides these, if patients have more advanced surgical (and other) treatment modality, the important thing is, of course, survival. Also, the second issue is improving quality of life. In this aspect, prosthodontics, speech therapy, dental implant-supported restoration with oral and maxillofacial surgeons, and other supportive specialties such as providers like physical therapists, mental health professionals, and dietitians and applications improve a patient's quality of life [2, 24].

2. Preventive awareness and control care for oral cancers

Preventive medicine acts as a unique control for oral cancers and also charges at all-time low costs to states across the world [2, 15]. In this way, many actions can be taken by health organizations, especially by the World Health Organization in the risky geographic regions of the world [28]. Prevention of oral cancer is mainly a management of those diseases, so public awareness should be the first priority for health workers (e.g., by using media to promote fast outcomes) [3, 14]. For awareness about encountering precancerous lesions [1, 22, 28], Jeihooni et al. [9] reported that 30.4% of patients had preventable oral cancer, while 50% did not, and the remaining 19.6% of patients were unclear as to whether or not oral cancer is preventable.

To prevent oral cancers, the etiological factors should be known, and measures must be taken according to those causes. Etiological factors are tobacco use, especially in individuals older than 40 years of age, alcohol consumption, betel chewing, HPV infection or carriage, dietary intakes such as salted meat consumption, poor oral hygiene, genetic predisposition, Epstein-Barr virus (EBV) infection, long-term exposure to sunlight, and immune system disease such as organ transplant recipients and HIV-infected patients, especially as it causes lip cancer [1, 3, 4, 9, 13, 14, 29, 30].

HPV-related oral cancers, especially oropharyngeal cancers, differ from other cause-related cancers as HPV-related cancers have been seen in young, non- or former tobacco users, nonalcoholic patients, and also patients with small T tumors but with nodal involvement (fortunately, their prognosis is more satisfactory than non-related HPV tumors). In addition, HPV-related tumors are well-defined borderline, more exophytic with smaller sizes and lymph node metastasis with dominant cystic features [19]. To prevent HPV-related oral cancers, vaccination against HPV should be performed to decrease the incidence of oropharyngeal SCC [31], whereas Owosho et al. [31] reported that HPV-related oropharyngeal cancer reached its highest rate in the year 2006 and has since started to decline but not at a statistically significant rate. In the literature, vaccination programs have primarily focused on HPV infection related

to cervical cancer [1]. Thus, Center for Disease Control and Prevention (CDC) is recommending that the vaccination program for HPV-related oropharyngeal cancers should be carried out for children at ages 11–12 in two doses by health providers [31].

Other efforts to prevent oral cancer should be done by controlling tobacco use or reduction programs [3, 6, 7, 11, 14, 29]. Alcohol consumption should be reduced or cut off as well [3, 7, 14]. If tobacco and alcohol are used together by the same individuals, that increases the oral cancer rate and may be a dramatically worse prognosis than HPV-related cancers [3, 5, 7, 11]. Unfortunately, alcohol is related to a very risky factor for cancer occurring even in nonsmoking individuals [3, 5, 7].

On the other hand, improving especially rich vegetable and fruit diet intake awareness programs, physical activity-increasing programs in daily life, regular sexual education for adolescents, and oral hygiene education activities may be helpful for reducing oral cancer rates in the future [1, 14, 32]. Awareness programs and activities should be conducted by healthcare providers or governments worldwide, especially in more risky regions such as Southeast Asia. For example, images of early oral cancer can be placed on cigarette packages [4].

In the risky region, or those patients that have high risk, they should be encouraged to carry out self-inspection of their oral mucosa, and if they see any mouth abnormality, they are obligated to take professional advice or treatment [4]. In addition, oral hygiene education and encouragement to improve it in individuals are key factors in preventing or early detection of oral cancer [9]. Moreover, Rahmati-Najarkolaei et al. [32] reported that awareness activities with students about risky factors decreased fear of oral cancer and also changed their attitude about knowing whether they have oral cancer. Lack of public awareness about cancer-causing factors and predictors produces diagnosis of oral cancer at stages as late as III or IV [4]. Therefore, awareness may provide early diagnosing of lesions; it reduces the cost of treatment and also reduces treatment morbidity [16, 22].

To date, many strategies have experimented with community awareness in the literature, such as mass media campaigns, which have gained some success from increased public awareness [1, 3, 8]. Unfortunately, these improvements are still not enough in terms of public awareness. Nowadays, Internet-based or online connections such as social media are very popular communication tools across the whole world. For example, the online-supported education or activities for tobacco cessation counseling revealed limited success in a randomized experiment [1, 8]. Internet-based education also applied for alcohol counseling with some success gained [1]. Billboards have also not been successful in delivering improved awareness to risky populations [1]. Prevention is the main management of oral cancers, and public awareness is a key part of prevention: where, when, and how it should be done and how it is possible is not important.

2.1. Look and see: precancerous mouth lesions

Many types of oral lesions have malignant transformation potential, aptly named premalignant or precancerous lesions. Premalignant lesions are described by using clinical, pathological, histochemical, and also many other screening techniques for which lesions such as leukoplakia, lichen planus with oral and cutaneous form, erythroplakia, stomatitis nicotina,

and submucous fibrosis are named or classified [3, 10, 15, 18, 22, 33–35]. In addition, there is less malign transformation potential in lesions such as discoid lupus erythematosus and also a lesser likelihood of malignant transformation in hereditary entities such as epidermolysis bullosa and dyskeratosis congenita [34]. For the lip cancer, there are precancerous lesions like xeroderma pigmentosum, radiodermatitis, and chronic cheilitis [18]. However, histological investigation has only produced knowledge about malignant transformation potential—named dysplasia—and has been indicated or used as a prediction of malignant changes [34]. According to the WHO's (2005) statement, carcinoma in situ has the highest degree of dysplasia and is also defined as a premalignant lesion [3, 10, 34]. Premalignant lesions are usually clinically screened for mouth mucosa such as white, red, or red-white mixed patches and are also called leukoplakia or erythroplakia [34, 35].

3. Early diagnosis of precancerous and oral cancer lesion techniques

Early detection of premalignant lesions and also cancer lesions is a crucial issue for the head and neck region, as the late diagnosing rate of 60% worldwide causes huge surgical and oncological interventions or low survival rate [14, 15, 36]. To date, there are many clinical, histopathological, radiological, and optical techniques to diagnose or capture precancerous and oral cancer lesions, such as vital tissue staining (toluidine blue stain), exfoliative cytology, OralCDx (OralCDx Laboratories, Suffern, NY) or Orcellex® (Rovers Medical Devices, BV, the Netherlands), brush cytology, and cell markers or biomarkers. There are also many new developments of novel real-time in vivo imaging and spectroscopy-based devices: high-resolution microendoscopy (HRME), autofluorescence imaging (AFI), targeted fluorescence imaging (TFI), and optical coherence tomography (OCT); also, there are other optical visualization methods such as ViziLite Plus with Orascoptic DK (Orascoptic, a Kerr Company, Middleton, Wis.), VELscope™ (Visually Enhanced Lesion Scope, LED Dental, White Rock, British Columbia, Canada), Microlux DL (AdDent, Danbury, Conn.), ViziLite (Zila Pharmaceuticals), TBlue (Zila Pharmaceuticals, Phoenix), Raman spectroscopy (RS), elastic scattering spectroscopy (ESS), narrowband imaging (NBI), diffuse reflectance spectroscopy (DRS), and confocal reflectance microscopy (CRM) in addition to normal biopsy of the tissue with histopathological investigation [12, 15, 16, 28, 34–38].

These techniques are local detectors of lesions. Besides these, oral cancer may spread regionally and may also have distant metastasis. For instance, to make stage determining and treatment strategies for lesions, imaging systems as computed tomography (CT), magnetic resonance imaging (MRI), cone beam computerized tomography (CBCT), and positron emission tomography (PET) can be useful to scan the head and neck region for regional spread of oral cancer [15]. These techniques are divided into two categories, as either lesion detection or lesion assessment. Whether these tests have been tested across several works, however, remains questionable [37].

Toluidine blue stain is a metachromatic thiazine material that binds to DNA in alcohol and water. Toluidine blue (TB) is a member of the thiazine group of metachromatic dyes, which binds to DNA and is partially soluble both in water and in alcohol. Theoretically, dysplastic

and malignant cells have higher nucleic acid content; hence, it is stained with dyes that can be identified under the microscope due to nucleic acid and have been used since 1980 [34]. Toluidine blue stain, ViziLite, and VEL scope sensitivity and specificity in oral dysplasia patients are presented by Awan et al. [37] to be 84.1 and 77.3%, 15.3 and 27.8%, and 65.8 and 56.8%, respectively.

Exfoliative cytology procures cells from a wide surface area of the affected tissue with fewer invasive effects on the tissue than biopsy. It also involves a lower contamination risk prior to DNA obtaining than surgical intervention [5]. Exfoliative cytology is obtained by scrapping the mucosa lesion using a blade as tongue blade. The obtained material is spread on a dry, clean glass lam and fixed with 100% ethanol. The lam is then sent to an experienced pathologist for examination under a light microscope for dysplastic evidences in the cells [35]. In addition, serum and saliva are the most commonly used as less invasive, easily accessible, cost-effective, and convenient samples for cancer detection [15]. The sensitivity and specificity of exfoliative cytology for oral cancer detection were revealed as 93.5 and 50.6%, respectively [15]. Although exfoliative cytology is less invasive, it is highly subjective and dependent upon the expertise of examiners. Moreover, exfoliative cytology related to the DNA aneuploidy and quantitative cytomorphometry has low specificity due to the collection of disassembled cells [15]. If the exfoliative cytology is used on heavy smoker and alcohol-using patients with negative malignancy findings, a biopsy procedure should be carried out as an additional supportive test [22].

OralCDx or Orcellex® brush cytology is a bit advanced for complementary forms of the exfoliative cytology, due to it including representative cells of all layers of epithelial tissue [34, 38]. Moreover, brush cytology has provided diagnostic accuracy because of computer assistance screening [34, 38]. Studies demonstrated that OralCDx or Orcellex® cytology has a potential value as an adjunct to oral diagnosing or screening in identifying premalignant pathologies at early stages that provides surgical or curative treatment that is most effective [39]. In the future, developing automatic, cytometric, or cytomorphometric techniques combined with genetic and related features may enhance screening strategies [34]. Affecting tissue with any pathology sample technique is still recommended if there is a strong suspicion of any lesion with malignancy regardless of the oral brush cytology result [34].

Biological, chemical, or reactional molecular agents named cell markers and biomarkers mean that signs of living organisms and the obviousness of their availability as tumor necrosis factor-alpha (TNF-α), epithelial growth factor (EGFR), vascular endothelial growth factor (VEGF), IL-8 and IL-8 mRNA, and interleukin 6 (IL-6) [10, 15]. Biomarker investigation of abnormalities of oral tissues as normal, tumorous, and inflammatory keratinocyte proteomes is likely to find new biomarker agents for oral cancer diagnosis, treatment, follow-up, and the development of personalized therapies for oral cancer and other tumorous regions [16].

The most visible oral premalignant or precancerous lesion is oral leukoplakia (OL) that has been studied for its establishment of a biomarker that signals the malign transformation of OL [22]. For instance, OL has low prevalence in western countries, so the development of a new biomarker is challenging due to the low rate of malignant transformation, and it requires long follow-up periods to achieve a new biomarker [22]. Besides these, loss of heterozygosity (LOH) was described as the strongest and most valuable biomarker by Mao et al. at the end

of the twentieth century. They reported that OL housing LOH at 3p14 or 9p21 was related to the 37% chance of developing invasive cancer compared with only 6% in lesions without these biomarkers [22]. Dysplasia is a very important sign of OL malign transformation; however, it does not mean that it will transform into a malign lesion, such as an oral squamous cell carcinoma lesion. Detecting or signaling oral leukoplakia malignant-transforming biomarkers is crucial in the future. Chemoprevention actions or works using retinoid evoked unique prospective gathering of biodata that led to the development of biomarkers [22]. Evidence-based studies showed that a visual examination of oral regions may be a cost-effective screening model, and finding adjunct auxiliaries and biomarkers is becoming more popular [28].

Hence, if the environmental conditions could be changed, oral leukoplakia may be reversible even with advanced dysplasia, which does not change into any malign lesion such as OSCC [22]. However, the existence of dysplasia is often the important criterion that affects clinical treatment of oral leukoplakia [22].

Microendoscopy (HRME) is a novel in vivo optical imaging and spectroscopy-based tool that has the content to provide an early diagnosis of cancer in real time. This tool is a cost-effective and noninvasive technique for point-of-care detection of premalignant and cancer in body regions including the oral cavity and hypopharynx. The HRME technique provides direct screening of malignant indicators such as nuclear crowding, pleomorphism, and elevated nuclear-to-cytoplasmic area ratio. This technique has almost identical possibility with cytology and invasive biopsy procedures. The HRME technique therefore has a promising development in the future [36, 40].

The ViziLite system, as an oral optical lumenoscopy technique alone or in combination with other techniques mentioned above, has been used successfully in the last decade. The US Food and Drug Administration has received a combination of both ViziLite and TB systems (ViziLite Plus with TBlue System; Zila, Batesville, AR, USA), as an adjunct to visual screening of the oral cavity. This combined technique for detecting or diagnosing premalignant or cancerous lesions provides almost the same level of outcome that invasive method biopsy and histopathological investigation provide [15, 22, 34, 37].

VELscope™ (LED Dental, White Rock, British Columbia, Canada) is noninvasive and directly screens the changes of tissue autofluorescence characteristic screening tools in the oral cavity [12, 22]. It uses blue light between 400 and 460 nm wavelengths to influence the endogenous fluorophores. Because of its simplicity, it does not require any special training on the system and can be used in daily general subspecialty practice. Farah et al. [41] reported that VELscope™ screening did not provide a definitive diagnosis on the existence of epithelial dysplasia, so VELscope™ is not reliable for detecting epithelial dysplasia without clinical examination. In contrast to the Farah et al. [41] report, the other study carried out by Awan et al. [42] reported that VELscope™ is useful in confirming the existence of erythroplakia, oral leukoplakia, and other soft tissue diseases, but it cannot discriminate between low-risk and high-risk pathologies [34].

Raman spectroscopy (RS), a common optical diagnostic technique, works with vibrational spectroscopies that discriminate normal mucosa and malignant pathologies by reflecting variables within tissues and returning optical signals [15]. However, this optical tool's original yet

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subjective finding outcomes depend on the practitioners' evaluation experience [15]. Stone et al. [43] first applied the Raman spectroscopy in the head and neck region in 2000 to investigate the laryngeal mucosa by comparing with normal biopsy procedures in 15 patients. According to this study, RS produced a specificity of 90 and 92% sensitivity for detecting squamous cell carcinoma [43]. We may thus conclude that the RS technique is useful for daily practice.

3.1. Multidisciplinary approach to diagnosis and management of precancerous and oral cancer lesions: healthcare providers and patients' role

Early diagnosis, a crucial issue as mentioned above, is very easy, but across the world, oral cancer is being detected in late stage due to its subtlety in early stage [3]. The routine management of oral cancer is first surgical resection, with or without postoperative adjuncts and other therapies used as part of postoperative chemoradiation and radiation. This approach of combining multiple treatments has increased survival rates in the last decade.

Successful treatment of oral cancer patients is a complex issue that requires multidisciplinary approaches, including oral and maxillofacial surgeons, oral and maxillofacial radiologists, ENT specialists, medical and radiological oncologists, prosthodontists, dentists, general surgeons, primary care clinicians (such as family medicine), physical therapy and rehabilitation specialists, dietitians, speech therapists, supportive care experts, and also pathologists or, if possible, oral and maxillofacial pathologists [2, 3, 24, 25]. In addition, multidisciplinary approaches to oral cancer patients allow for the maximization of reliable oncologic control and also minimize morbidities such as patient function and form [3].

Early diagnosis of oral cancer is vital for a patient's survival rate and also for future quality of life. In addition, a dentist has an important role in initial diagnosing of any pathology in the oral region because of daily oral health practice [2, 14, 43]. So, any ignorance on behalf of dentists' education and daily practice is a crucial phenomenon for detecting any lesions in early phase. If a dentist has detected any abnormality of oral tissue in an emergency situation, he or she should perform a biopsy procedure or immediately refer the patients to advanced specialties such as oral and maxillofacial surgeons, otolaryngologists, or advanced oncological-trained oral and maxillofacial surgeons, if it is possible [2, 14].

In a majority of world regions, the oral and maxillofacial surgery specialty is based on dentistry education and is concerned with diagnosis, medical and surgical, and advanced treatment of disease, disorders, injuries, and malformation, including the functional and esthetic features of the oral and maxillofacial region's soft and hard tissues and related neighboring structures [2]. Oral and maxillofacial surgeons take part in the biopsy, which checks whether it is a true- or false-positive diagnosis; advanced radiological imaging is required to investigate in this stage of pathology. In addition, they surgically treat precancerous lesions and also take part in the treatment of early-stage cancer.

A case with a 67-year-old male patient was referred to an experienced oral and maxillofacial surgeon and diagnosed with oral leukoplakia. The patient was treated with a diode laser using evaporation mode. According to the follow-up period, no recurrence has been revealed with the patient in healthy oral condition (**Figures 1** and **2**).



Figure 1 . Prelaser treatment of oral leukoplakia (Case 1 patient).



Figure 2 . Postoperative laser treatment view of oral leukoplakia (Case 1 patient).

If the OMF surgeon has not accrued enough experience for more extensive pathology, he or she should refer patients to trained or sufficiently experienced head and neck surgeons such as an oral and maxillofacial surgeon, ear nose throat surgeon, general surgeon, or a plastic surgeon; plastic surgeons and oral and maxillofacial surgeons have a duty to perform pre-prosthetic surgery, revision surgery, and also dental and oral and maxillofacial implants to rehabilitate the oral cavity for speech improvement, swallowing, mastication, and esthetic appearance. In addition, oral and maxillofacial surgeons promote maxillofacial prosthodontists for the construction of maxillofacial and oral prosthesis [2].

Oral and maxillofacial oncology training was part of a related oral and maxillofacial surgery residency program for about 3–4 years, following the 5–6 years for a basic dentistry degree. In addition, these specially trained people take an additional 1 or 2 years' oncological surgery training for cancer surgery and rehabilitation and reconstruction surgery such as regional vascular flap reconstruction, e.g., a pectoralis major flap with five to six costal grafts, a latissimus dorsi muscular flap with scapular graft, and other regional soft and hard tissue vascular flaps to reconstruct mandibular and maxillary resection defects are used. In addition, distant vascular-free flaps such as perineal musculocutaneous with fibula and an anterior radial forearm flap are used to reconstruct maxillary and mandibular oncologic resected defects by oral and maxillofacial oncologic program surgeons. On the other hand, the oncologic oral and maxillofacial surgeon training program includes core rotations on resection and reconstruction surgery, medical oncology, and radiation oncology. They also carry out duties like educating others in the dental profession on cancer screening and management. They take part in the oncological multidisciplinary team, including pathologists, radiologists, ENT specialists, and other professions [2].

The transoral access is a common surgical approach to precancerous pathologies and superficial cancers of anterior portions of the mouth, tongue, and alveolus. In the posterior region of the mouth, an invasive approach is needed, especially if there is a limitation due to inadequate surgical view and trismus. Median lip-split paramedian mandibulotomy access is used for tumor management of the posterior mouth region. In addition, midfacial degloving and upper cheek access are typically useful for maxillary tumors [3].

Neck dissection is a very important part of oral cancer surgical management. Fortunately, 60% of cases with an early-stage tumor have clinically negative neck metastasis. Unfortunately, nearly 20–30% of entities have microscopically prominent neck nodal metastasis according to elective neck dissection (END). Nodal metastasis risk occurs for several reasons. One, cervical lymph node metastasis can reduce the survival rate by 50% when compared with similar primary tumors, excepting cervical or other regions. Tongue cancer on the mouth floor is more likely to advance into the neck lymph node; thus, these cases should require elective neck dissection, even if they are in an early stage.

The maxillary gum and hard palate have relatively lower chances of neck metastasis occurring, and if this is determined to be the case, there is no need for END to be indicated [3].

Isolated node biopsy is an adjunct alternative to END for determining the stage of a cN0 neck in the T1–T2 stage of SCCOC [3, 44]. This method was first carried out in 2001 by Shoaib et al. [44], and it has been used by several other studies in Europe and the USA. However, this

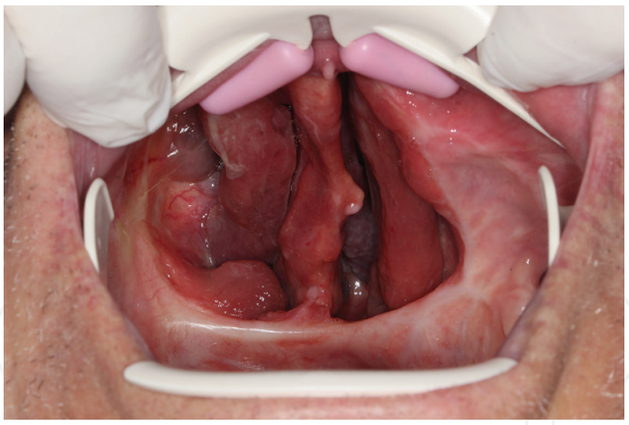


Figure 3 . Prereconstruction dentures' view of Case 2 patient's oral structures after a maxillary cancer operation.



Figure 4 . Maxillomandibular dentures' view of Case 2 patient.

technique requires experienced practitioners to be able to carry out the procedure. It should therefore be done in select centers with experienced doctors [3].

If patients are clinically or radiographically determined to have positive neck nodes, a comprehensive neck dissection should be done involving level I to V dissection. The requirement to sacrifice important structures like the sternocleidomastoid muscle, spinal accessory nerve, and internal jugular vein depends on the location of the nodal metastasis and its features [44]. A common type of wide neck dissection is the modified radical neck dissection, named MRND type 1. MRND, as a treatment choice, is a rarely selected option due to direct infiltration of



Figure 5 . The appearance of prosthetic dentures placed in Case 2 patient.

the gross extranodal structures [3]. A patient with clinically negative neck node metastasis has metastasis risk mainly throughout levels I to III. Therefore, supraomohyoid neck dissection (SOHND) is usually enough for these diseases. However, patients with primary tongue squamous cell carcinoma require neck dissection level IV and may be obligated due to the likelihood of skip metastasis [3].

Oral pathologists and oral medicine specialists also play key roles in oral cancer prevention, diagnosing, early management, and follow-up procedures. They perform the biopsy procedures in oral pathologies that identify lesions; hence, strategies are formed for the management process of the detected lesion [2].

Maxillofacial prosthodontists take part in key positions in management specifically to restore the function of jaws and maxillofacial tissue after tumor eradication. To improve the patients' psychological condition, they replace the functional and cosmetic defects with prosthetic construction carried out by prosthodontics in the maxillofacial region [2].

Case 2 features a 78-year-old male patient who underwent total maxillectomy due to squamous cell carcinoma. With an oral and maxillofacial surgeon's guidance, to improve the life quality of the patient, the maxillomandibular dentures were constructed by an experienced prosthodontist. The patient is chewing and eating smoothly, and he is still under the control period in uneventful condition (**Figures 3**–**5**).

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Conflict of interest

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