

The Stages of Mouth and Throat Cancer: An In-Depth Overview

Mouth and throat cancers both part of head and neck cancers, are some of the most difficult health problems in the world, affecting millions every year. While mouth cancer occurs in easily visible areas such as the lips, tongue, and gums, throat cancer occurs deeper within the pharynx or larynx, often impairing vital functions such as speech and swallowing. About 3,77,000 new cases of mouth(oral) cancer and over 98,000 cases of throat cancer are diagnosed globally each year with men being at higher risk than women. Staging of mouth and throat cancers helps in knowing the extent to which the disease has spread and thus determines how it would be treated. Doctors choose the most effective treatment for the patient by identifying if the cancer is confined to a small area or has reached the lymph nodes or even other organs. Staging is usually done through tests, such as imaging and biopsies. Early detection and proper staging can significantly increase the chances of successful treatment, so regular screenings and awareness are most important. This process lets doctors plan the right approach and improves chances of survival by catching the cancer earlier, in a stage that is more treatable. Understanding these cancers' stages is vital for determining their spread, guiding treatment plans, and improving survival outcomes.[1] [2] [4] [6]

Fig1. Mouth and Throat Cancer Regions

Before categorizing mouth and throat cancer into its respective stages let's briefly have an idea about anatomy of tumor development which means the regions of mouth and throat that are more likely to develop tumors.[2] [3]

Mouth Cancer	Throat Cancer
Lips: Exposed to excess sunlight or tobacco	Oropharynx: This includes the back of tongue, tonsils and soft palate.
Tongue: Especially the sides and bottom.	Hypopharynx: Below the oropharynx, near the esophagus.
Gums: Around areas of poorly fitting dentures or tobacco contact.	Nasopharynx: Located behind the nose, linking the nasal passages to the throat.
Floor of Mouth: Most common because carcinogens such as tobacco remnants collect here.	Larynx: The voice box, producing sound and air.

The TNM Staging System

Fig 2. TNM Staging System

The above image illustrates the TNM Staging System that is Tumor, Node involvement, Metastasis which forms the base for classifying the cancer into its respective stages.

The staging of mouth and throat cancer is usually based on the TNM classification system, which was developed by the American Joint Committee on Cancer (AJCC). These letters T, N, and M represent Tumor, Node, and Metastasis respectively. This helps estimate the extent of the malignancy (tumor growth), which is highly important in planning the treatment or prognosis meaning prediction of the disease. Staging may also be classified into different categories, ranging from Stage 0 to Stage IV, depending on the extent of progression.[3]

1) **T (Tumor):** Describes the extent and size of the primary tumor.

T1: Tumor Size is 2 cm or less.

T2: The tumor size is between 2 cm and 4 cm.

T3: The tumor size is more than 4 cm, or has spread to nearby organs like jaws.

T4: The tumor has spread to surrounding tissues such as skull base, jawbone and also sometimes into the large blood vessels.

2) **N (Node):** Represents involvement of regional lymph nodes.

N0: No involvement of regional lymph nodes.

N1: The cancerous cells are spread to a single lymph node which is 3cm or less in size, on the same side of the neck.

N2: Cancer has spread to multiple lymph nodes; however, the nodes are up to 6 cm or less. They can be further categorized into:

- N2a: Only Single lymph node involvement greater than 3 cm but less than 6 cm.
- N2b: Multiple lymph node involvement on the same side with size less than 6 cm.

- N2c: Widely spread to lymph nodes on both sides of the neck but all less than 6 cm.

N3: Cancer extended to numerous lymph nodes larger than 6 cm.

3) **M(Metastasis):** Describes whether the cancer is restricted to its original site or has spread to distant organs.

M0: The cancer hasn't spread to other organs which means no distant metastasis.

M1: Cancer has spread to other organs like lungs or liver which means distant metastasis is seen. [3]

Stages of Mouth and Throat Cancer (Based on TNM System)

The TNM system stages mouth and throat cancers from 0 to 4 based on the tumor's size and extent, whether nearby lymph nodes are affected, and if the cancer has spread to distant organs. Stage 0 is localized, non-invasive cancer. Stage 4 is advanced cancer that has spread extensively. This is helpful in the determination of which treatment options should be offered and provides a clear idea based on the progression of the cancer.

So let's delve into the journey of cancer progression—breaking down the stages and the changes occurring at that particular stage. [4] [3]

Stage 0 - Carcinoma in situ:

Carcinoma in situ means the earliest stage where abnormal cells are found only on the surface layer of the tissue where the cancer begins. They are found only in the lining of the mouth or throat. In this stage the tumor has not spread into deeper tissues or to lymph nodes or other parts of the body. In this stage the cancer is highly curable since there are only a few cells to eliminate.[3] [4]

Stage I - T1, N0, M0:

The tumor size is 2 cm or smaller and restricted to the area of origin. It is restricted to one area such as the section of tongue or throat. There is no spread to regional lymph nodes (N0) and distant metastasis is not seen (M0). Cancer if detected at this stage has good chances of curability, often treated successfully with surgery.[3] [4]

Stage II - T2, N0, M0:

The tumor is more than 2 cm but not more than 4 cm in size. Cancer at this stage can be seen at primary sites such as parts of the tongue, gums, or throat. No involvement of lymph nodes and distant metastasis is not seen. This stage is still curable with more aggressive treatment.[3] [4]

Stage III - T3, N0, M0 or T1–T3, N1, M0:

The tumor is more than 4 cm or has started invading deeper surfaces or tissues. Majorly affecting parts of the oral cavity e.g tongue, gums, floor of the mouth or palate and the throat(oropharynx or hypopharynx). Alternatively, the cancer has spread to one nearby lymph node that is 3 cm or smaller on the same side of the neck. No distant metastasis is seen. Being potentially curable still has health risks involved.[3] [4]

Stage IV: Advanced Cancer

This is the final stage which is called Advanced Cancer or Metastatic Cancer. It is often impossible to cure at this stage due to widespread cancerous cells. Stage IV is subdivided into three categories based on the extent of spread : [4] [3]

- 1) Stage IVA (T4, N0/N1, M0 or Any T, N2, M0) : The tumor has grown significantly, possibly invading nearby structures such as the jawbone, base of the skull or skin. Lymph node involvement may include numerous nodes on one or probably both sides of the neck, but the ones which are not larger than 6 cm. No distant metastasis is seen.
- 2) Stage IVB (Any T, N3, M0 or T4b, Any N, M0) :The cancer has spread to large lymph nodes of size greater than 6 cm or has significantly invaded nearby critical structures like major blood capillaries or vessels like carotid artery or may be in sometimes bones as well like base of skull. No distant metastasis is seen.
- 3) Stage IVC (Any T, Any N, M1) : The cancer has widely spread to other distant organs, such as the lungs, liver, or bones. This is the most advanced and critical stage, indicating widespread disease and threat. [4] [3]

At which stage cancer is usually detected?

It varies as it depends on the symptoms, awareness, and medical care while diagnosing mouth and throat cancer.

Fig 3. Common sites of oral cancer

The above image illustrates common sites of oral cancer which plays an important role in detecting cancer at its initial stages.

Stage I or II: Commonly it is detected in routine visits if the patient recognizes sores or some kind of difficulty in swallowing.

Stage III or IV: More often diagnosed because of symptoms like pain, persistent ulcers, trouble speaking, or swollen lymph nodes. Advanced stages are more likely to occur if initial symptoms are ignored or misdiagnosed. Early detection depends on regular medical screenings.[3] [4]

How Do Doctors Determine the Exact Stage ?

Fig 4. Mouth Cancer self-examination

Fig 5. Throat Cancer self-examination

Doctors find out the stage of mouth and throat cancer by mainly assessing the tumor size, lymph node involvement and metastasis which means extent of spread to distant organs. These all examinations are carried out through certain clinical processes. Some of the processes are listed below:[6] [4]

- Physical Examination: Finding out visible abnormalities in or near the affected areas.
- Biopsy: Examining tissue samples for confirmation of cancer and to determine how critical it is.
- Imaging: Clinical Tests like MRI Scans, CT Scans, X-Rays, PET scans help to visualize the tumor size and extent of its spread.
- Endoscopy: Majorly for throat cancers a camera equipped tube is used to examine the internal structures like the throat and larynx.

Treatment Approaches for Mouth and Throat Cancer Across Stages:

Treatment for mouth and throat cancer depends on its stage. For early stages (0–2), surgery or radiation therapy may be enough. For more advanced stages (3–4), a combination of surgery, radiation, and chemotherapy is usually necessary. The treatment strategy depends on the size of the tumor, the involvement of lymph nodes, and metastasis which is based on the TNM System. Stage 4 cancers may involve targeted therapies or immunotherapy to control distant spread. Improved detection will lead to more effective treatment, especially through reduction of tumor sizes and prevention of further spread.[7] [6]

Stage	Treatment Options
Stage 0	Removal of abnormal cells through surgery.
Stage I	Surgery to eliminate the tumor, Radiation therapy if necessary.
Stage II	Surgery or Radiation therapy, Chemotherapy only in some cases.
Stage III	Chemotherapy, Chemoradiation(combination of radiation and chemotherapy).
Stage IV	Stage IVA: Surgery, Chemotherapy.
	Stage IVB: Chemotherapy, Chemoradiation, Palliative surgery.
	Stage IVC: Chemotherapy, Immunotherapy, Palliative surgery.

It is important to know and understand the stages of mouth and throat cancer in order to have an early diagnosis and proper treatment. Early diagnosis gives better outcomes than advanced stages, which needs more intensive care. Educating the public on stages of cancer and the need for screening will save lives. Advances in cancer therapies continue to provide hope for better survival rates and improved quality of life for patients.

References:

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- [3] https://www.entnet.org/wp-content/uploads/files/NeckDissection_QuickRefGuide_highresFINAL.pdf
- [4] <https://www.cancerresearchuk.org/about-cancer/mouth-cancer/stages-types-grades/number-stages>
- [5] <https://www.nature.com/articles/s41572-020-00224-3>

[6]<https://www.mayoclinic.org/diseases-conditions/mouth-cancer/diagnosis-treatment/drc-20351002>

[7]<https://www.cancerresearchuk.org/about-cancer/mouth-cancer/treatment/treatment-decisions>

Image Section:

Fig 1. Mouth and Throat Cancer Regions

<https://www.cancer.gov/types/head-and-neck/head-neck-fact-sheet>

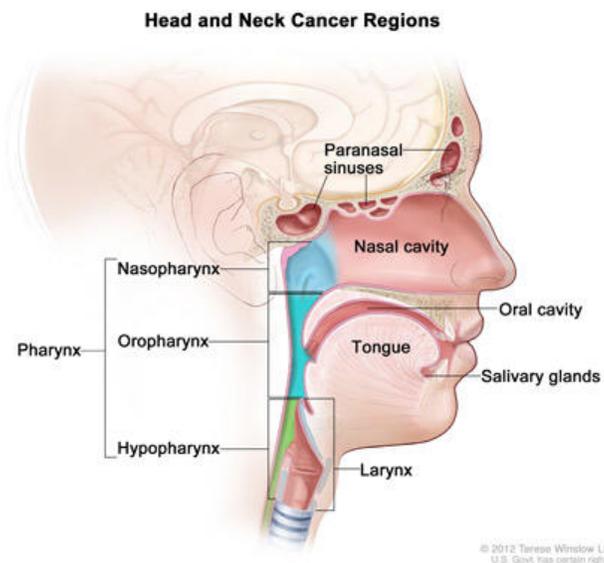


Fig 2. TNM Staging System

<https://epomedicine.com/medical-students/tnm-classification-cancer-staging-simplified/>

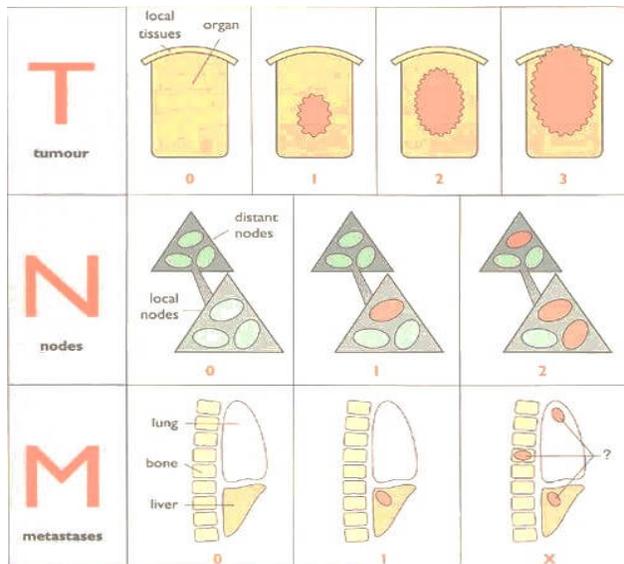


Fig 3. Common sites of oral cancer

<https://collegevilledentistry.com/oral-cancer-facts-symptoms-to-look-out-for/>

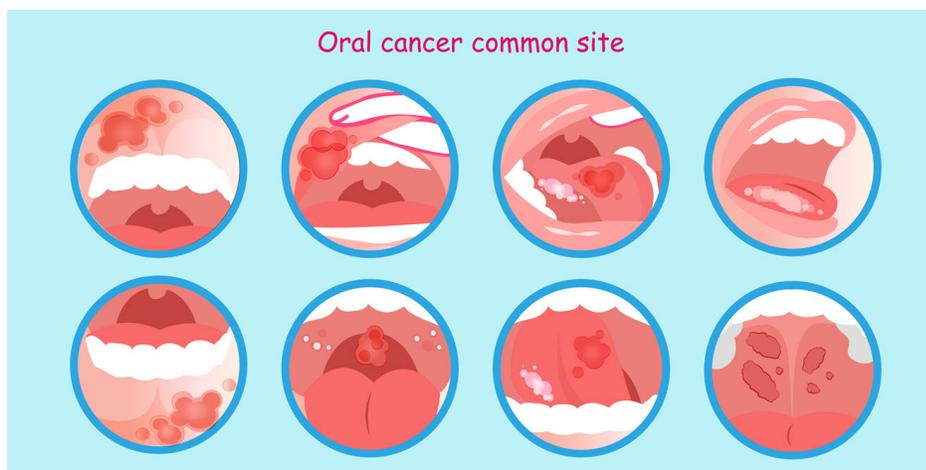


Fig 4. Mouth Cancer self-examination

<https://www.healthline.com/health/oral-cancer/oral-cancer-screening?epik=dj0yJnU9X2pNb29jQlZLcVFRUmhVc1VpQzRtY1Z2cVE4UHloRllmcD0wJm49ZFBQOURUOVpQamhsMnlLenZ1cThjdyZ0PUFBQUFBR2RYSWtr>

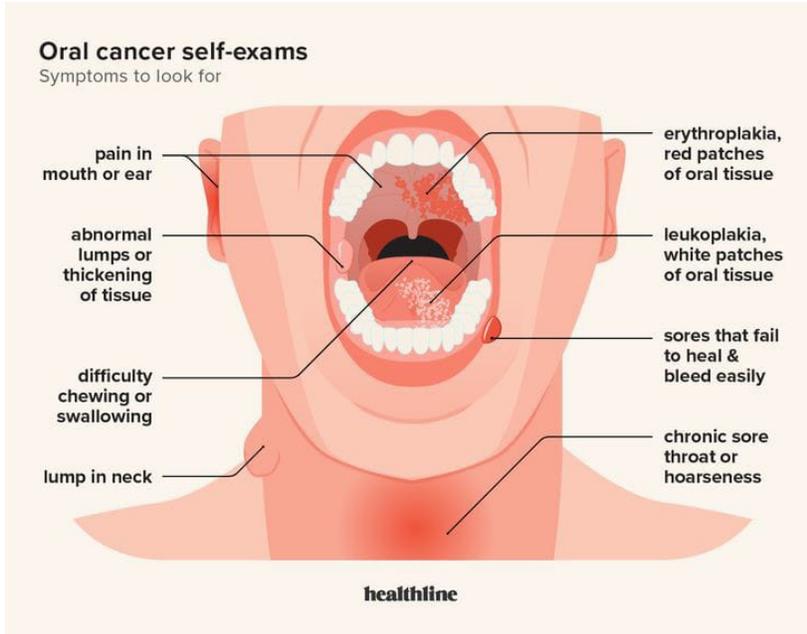


Fig 5. Throat Cancer self-examination

<https://www.verywellhealth.com/throat-cancer-pictures-signs-symptoms-and-causes-5115065>

