

# HEAD & NECK TUMOUR CONDITIONS

AND THEIR  
MANAGEMENT

 SingHealth **DUKE NUS**  
ACADEMIC MEDICAL CENTRE

**Head & Neck Centre**

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**40 Medical Specialties**  
**150 Sub-specialties**

SingHealth provides tertiary medical care across a comprehensive spectrum of over 40 medical specialties with the in-depth expertise of 150 sub-specialties. Supported by a faculty of over 1000 internationally qualified medical specialists and well-equipped with advanced medical diagnostic and treatment technology, the group is recognised in the region for charting new breakthroughs in treatments.

As an Academic Medical Centre, we seek to transform patient care by integrating clinical services, teaching and research. Patients at SingHealth enjoy the benefit of leading-edge treatments with a focus on quality and holistic care, in an integrated and multi-disciplinary setting.



Singapore General Hospital



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National Heart Centre Singapore



National Neuroscience Institute



Singapore National Eye Centre



Polyclinics  
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Bright Vision Hospital

**PATIENTS. AT THE HEART OF ALL WE DO.®**

# FOREWORD

**Holistic, integrated care of the highest standard that is truly centred on the patient** – this is the vision of the SingHealth Duke-NUS Head and Neck Centre. We bring together different specialists across the SingHealth cluster to organise care around the patient and their needs.

As a one-stop facility, patients with multiple medical conditions have the convenience of seeing their doctors in the same place. This innovative model of care also enables us to excel in research advancements and continue to set new standards for education, training and clinical service.

Since May 2012, the SingHealth Duke-NUS Head and Neck Centre has reviewed more than 15,000 patients referred for a range of signs and symptoms requiring further evaluation.

This booklet is prepared for you to help understand and manage your condition better. It focuses on Head and Neck tumours, which are increasing concerns in this region. The booklet also serves as a ready reference for General Practitioners who have patients who present with these conditions.

For easy reading, we have four main sections:

1. Common signs and symptoms;
2. Common diseases in the Head and Neck region;
3. Head and Neck reconstruction; and,
4. Support services within the Head and Neck Centre.

Articles have been contributed by specialists from the SingHealth Duke-NUS Head & Neck Centre comprising clinical specialists, advanced nurse practitioners and allied health professionals.

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# COMMON SIGNS AND SYMPTOMS

- **Neck Lumps**
- **Dysphagia (Difficulty in Swallowing)**
- **Odynophagia (Pain on Swallowing)**
- **Recurrent/Non-healing Mouth Ulcers**
- **Enlarged Neck Lump Nodes**
- **Skin and Subcutaneous Lumps**
- **Epistaxis**
- **Hemoptysis**

Specialist services available at:

**Head & Neck Centre @ Singapore General Hospital**

Tel: 6321 4377 (for appointments)

**Head & Neck Centre @ National Cancer Centre Singapore**

Tel: 6436 8088 (for appointments)

# Neck Lumps



## What are neck lumps?

Lumps or swellings in the neck are common. Although the patient may discover the lump by himself or herself, very often the patient only becomes aware of the lump when another person points it out to them. Although most neck lumps are benign, they sometimes can be a presentation of a more serious underlying disease.

## What are the causes of lumps in the neck?

There are many causes of lumps/swellings in the neck. Below are some of the more common causes.

### 1. Lymph Nodes

There are many causes for lymph nodes in the neck to be enlarged, but one of the most common causes is due to infection. Lymph nodes may be enlarged due to

acute infections such as upper respiratory tract infection, skin infections, ear infections. They can also be enlarged due to chronic infections such as tuberculosis.

Sometimes an enlarged lymph node in the neck can also be the first sign of underlying cancer. Certain cancers (e.g. nasopharyngeal cancers, melanoma, oral cancers) tend to spread to lymph nodes and an enlarged lymph node can sometimes be the first sign of underlying cancer. Some cancers like lymphoma also first develop in lymph nodes.

### 2. Thyroid Nodules

The thyroid is a butterfly-shaped gland located in the front of the neck. It produces hormones that control and regulate the growth and

rate of function of many systems in the body. The thyroid gland can sometimes develop solid or fluid-filled lumps.

Although most of these lumps are not cancerous lumps, a small proportion of them will be cancerous. Some of these lumps may also cause problems when they grow larger and compress on other structures in the neck causing swallowing and breathing difficulties.

Some of these lumps may also secrete too much thyroid hormone that may cause symptoms of *hyperthyroidism*.

It is important to see a doctor to evaluate these lumps, as it is not easy to tell which lumps need treatment without doing proper investigations.

### 3. Skin and Subcutaneous Lumps

Lumps in the neck can also arise from the skin or just below the skin. Most of these lumps are not cancerous and do not cause symptoms. However a small proportion of these lumps can occasionally turn out to be cancerous. Worrying signs include:

- Change in size of a lump
- Change in colour of surface of the lump
- Bleeding

- Other lumps appearing around the lump
- Enlarged lymph nodes

It is important to seek a medical opinion if you have any of these symptoms.

### 4. Salivary Gland Enlargement

Salivary glands are organs in the neck that secrete saliva, which helps us digest our food. These glands can sometimes become enlarged for various reasons that include tumours, infection or secondary to an underlying medical condition.

### 5. Thyroglossal Cysts/Branchial Cysts

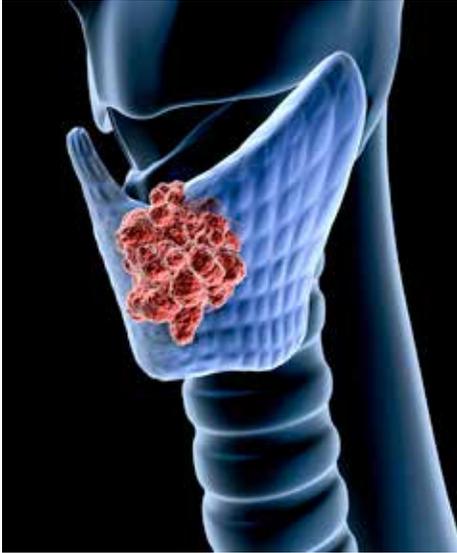
These are lumps/cysts that occur during the body's development. Although present at birth, they may only enlarge and be discovered later on in life. These lumps/cysts should usually be removed surgically to prevent complications.

### What tests should I go for?

If you find a lump in a neck that you are worried about, the first step you take is to get it checked by a doctor. Depending on what he finds, he may order one or more of the following tests:

#### 1. Imaging Tests

Depending on the condition, the doctor may order one or more



imaging tests to investigate the lump. These tests can include:

- Ultrasound scans
- X-rays
- Computer Tomographic (CT) scans
- Magnetic Resonance Imaging (MRI) scans
- Positron Emission Tomography (PET) scans

### Role of GPs

General Practitioners (GPs) should assess patients presenting with neck lumps to look for any suspicious or worrying features. A proper examination of the skin of the scalp, ears, oral cavity and throat should be done. Patients with thyroid nodules should be referred for further assessment. Patients with persistent enlarged lymph nodes, which fail to resolve, should also be referred for further evaluation in the SingHealth Duke-NUS Head & Neck Centre.



## 2. Fine-needle Aspiration Cytology (FNAC)

Your doctor may advise you to undergo a biopsy to evaluate the lump if he feels it is needed.

A fine-needle aspiration biopsy is a procedure where the doctor will pass a small needle through the lump to aspirate some cells for the lump for further testing. To improve accuracy, most FNAC are performed under ultrasound guidance.

### What kind of treatment will I undergo?

Depending on what the doctor finds, the doctor may advise you to have the lump removed surgically. In cases where the lump is cancerous, it may be necessary to remove the lymph nodes in the neck as cancer cells may have spread to them.

Some lumps in the neck can be safely observed. Your doctor may advise you to have a follow-up test at a later date to check if there are new changes.

# Dysphagia (Difficulty in Swallowing)



## What is Dysphagia?

Dysphagia refers to difficulty in swallowing.

The process of swallowing comprises of three phases:

1. The **oral phase**: This is when food is prepared in the mouth and propelled towards the pharynx (throat). This stage can be consciously controlled.
2. The **pharyngeal phase**: This is where food moves through the pharynx (throat) towards the oesophagus. This stage cannot be consciously controlled.
3. The **oesophageal phase**: This is where food is transferred through the oesophagus into the stomach. This stage also cannot be consciously controlled.

Difficulty swallowing can happen in any of these three phases.

## Oropharyngeal Dysphagia

Patients with dysphagia affecting the oropharyngeal phase of swallowing may complain of the following symptoms:

- Difficulty initiating swallowing
- Sensation of food “stuck” in the throat
- Coughing or choking during swallowing
- Recurrent chest infections

Causes of oropharyngeal dysphagia include:

### 1. Neurological Disorders

Patients who have suffered a previous stroke or spinal cord injury can have difficulty swallowing. Other neurological conditions such as Parkinson’s disease, muscular atrophy, multiple sclerosis can cause difficulty in swallowing.

### 2. Cancer/Tumours

The presence of certain cancers may cause difficulty in swallowing (e.g. tongue cancer). Additionally, patients who have undergone surgery or radiotherapy to the head and neck region may also develop difficulty swallowing.

## Oesophageal Dysphagia

Patients with dysphagia affecting the oesophageal phase of swallowing may

complain of the following symptoms:

- Sensation of food “stuck” in the throat or chest
- Symptoms of heartburn, burping, regurgitation
- Recurrent chest infections

Causes of oesophageal dysphagia include:

### 1. Oesophageal Tumour

Tumours in the oesophagus can cause obstruction. Difficulty swallowing is usually progressive and usually starts, with solid food and later as the tumour grows larger, liquids.

### 2. Achalasia

This is a condition where the lower oesophageal muscle (sphincter) fails to relax adequately to allow food to enter the stomach from the oesophagus.

### 3. Gastro-oesophageal Reflux Disease

When the muscle in the lower oesophagus (sphincter) is inappropriately lax, acid from the stomach can reflux back into the oesophagus. This can lead to spasm and even scarring and narrowing of the oesophagus.

### 4. Oesophageal Stricture

Narrowing in the oesophagus can be a result of scarring from repeated irritation by acid reflux from the stomach or other caustic substances, previous radiotherapy or previous procedures done.

### 5. Connective Tissue Disease

Connective tissue diseases such as scleroderma can sometimes cause hardening of the tissue in the oesophagus and cause it to become stiff. This can in turn cause difficulty in swallowing.

### 6. Oesophageal Spasm

In this condition, multiple involuntary poorly co-ordinated contractions of the oesophagus occur after swallowing.

### 7. Foreign Body

Objects that get lodged can block the passage of food down the oesophagus. This is seen more commonly in older people who may have difficulty chewing their food well and resultantly swallow a large piece of food bolus that gets lodged in the oesophagus.

## What tests can be done to investigate Dysphagia?

Depending on your symptoms and your doctor’s findings, he or she may order one of the following tests:

#### 1. Nasoendoscopy

A thin flexible tube with a camera and light source can be passed via one of the nostrils to look at the back of the nasal passage, throat and voice box. This is a quick test that can be done in the clinic itself to look for abnormalities in the upper aerodigestive tract.

#### 2. Oesophago-gastro-duodenoscopy (OGD)

In an OGD, the doctor will pass



a flexible tube with a camera and light through your mouth into your oesophagus, stomach and the duodenum (first part of the small intestine). An OGD is useful for looking for mechanical causes of dysphagia (e.g. tumours, strictures). It is usually a day procedure.

### 3. Videofluoroscopic swallow (VFS) Study

This procedure is where a speech therapist examines your oropharyngeal swallow with the aid of a video X-ray. You will be instructed to take a variety of liquid and solid food in an X-ray suite. This is useful to look for anatomical and functional changes in the oral and pharyngeal phases of swallowing. The procedure is not invasive and takes about half an hour.

### 4. Other Imaging Studies

Your doctor may order some X-rays or scans. One of these X-rays is a **barium swallow**. In a barium swallow, an X-ray of your oesophagus and stomach is taken after swallowing some dilute

barium to outline the stomach. This test is good to assess for mechanical causes of obstruction such as tumours and strictures.

### 5. Manometry

In manometry, a small tube is inserted into your oesophagus to record the pressure and pattern of the contractions of your oesophagus. This test is useful to diagnose functional causes of dysphagia such as achalasia and diffuse oesophageal spasm.

### What kind of treatment do I have to undergo?

The type of treatment you will need to undergo will depend on the underlying cause of the dysphagia. Your doctor will usually discuss this with you.

#### Role of GPs

Causes of dysphagia are varied and it is important to recognise cases which are required to be referred for further investigations. Cases in which cancer is strongly suspected (e.g. associated with loss of weight, progressive swallowing difficulty from solids to liquids) should be referred urgently to the SingHealth Duke-NUS Head & Neck Centre to avoid delays in diagnosis.



# Odynophagia (Pain on Swallowing)



## What is Odynophagia?

Odynophagia refers to pain on swallowing.

## What are the causes of Odynophagia?

Some of the common causes of odynophagia include:

### 1. Infections

Infections involving the tonsils, throat, epiglottis and oesophagus may cause pain on swallowing.

Some of these infections include:

- Acute viral/bacterial pharyngitis
- Acute tonsillitis
- Oral and oesophageal candidiasis
- HIV infections
- Herpes simplex infections

### 2. Tumours

Cancers of the mouth, throat,

voice box (larynx), tongue and oesophagus can also sometimes cause pain when swallowing.

### 3. Inflammation

Inflammation of the mouth, pharynx and oesophagus can sometimes occur when they are exposed to caustic substances. These can sometimes be ingested substances (e.g. hot fluids, acidic substances). Medical conditions such as gastro-oesophageal reflux disease (GERD) can also cause inflammation when these organs are constantly exposed to acid reflux from the stomach.

### 4. Foreign Body

Foreign bodies (e.g. fish-bones) sometimes can get stuck when they are swallowed. They can lodge in the tonsils, throat or oesophagus and cause pain on swallowing.

## 5. Oesophageal Disorders

Sometimes, pain on swallowing can be due to a disorder in the motility of the oesophagus. These include:

- Oesophageal spasm
- Achalasia
- Nutcracker Oesophagus

### What tests can be done to investigate odynophagia?

Depending on your doctor's findings, he or she may ask you to undergo one or more of the following investigations:

#### 1. Nasoendoscopy

A flexible camera with light is passed through one of your nostrils to look at the back of your nose, larynx and throat. This test can be done in the clinic and is useful to look for conditions affecting the throat, larynx and back of the tongue (e.g. ulcers and tumours).

#### 2. Oesophago-gastro-duodenoscopy (OGD)

In an OGD, the doctor will pass a flexible tube with a camera and light through your mouth into your oesophagus, stomach and the duodenum (first part of the small intestine). An OGD is useful for looking for mechanical causes of dysphagia (e.g. tumours, strictures). It is usually a day procedure.

#### 3. Manometry

A tube with pressure sensors is passed down your oesophagus to measure the strength and

co-ordination of the contractions of your oesophagus. This test is useful to investigate motility disorders affecting swallowing.

#### 4. Imaging Studies

Your doctor may order some X-rays or scans. One of these X-rays is a **barium swallow**. In a barium swallow, an X-ray of your oesophagus and stomach is taken after swallowing some dilute barium to outline the stomach. This test is good for looking for tumours and strictures.

### What kind of treatment do I have to undergo?

The type of treatment you will need to undergo will depend on the underlying cause of the odynophagia. Your doctor will usually discuss this with you.

#### Role of GPs

It is important to recognise cardinal signs of odynophagia which are required to be referred for further investigations. Cases in which cancer is strongly suspected (e.g. loss of weight or unresolved pain on swallowing and progression to swallowing difficulty) should be referred early at the SingHealth Duke-NUS Head & Neck Centre for further investigations.



# Recurrent/Non-Healing Mouth Ulcers



## What is a mouth ulcer?

A mouth ulcer is a loss of part of the mucous lining of your mouth. Most single mouth ulcers are the result of minor trauma (e.g. accidentally biting yourself while eating) and will heal within a week or two. Although troublesome and painful, these ulcers are usually benign and are no cause for worry.

## Recurrent or non-healing mouth ulcers

Some people develop ulcers in the mouth that keep coming back. Although in many cases the cause is not clear, certain underlying medical conditions can predispose a person to having recurrent ulcers.

## Non-healing ulcers - could it be cancer?

If an ulcer fails to heal within 2-3 weeks, it is important to have it evaluated by a doctor. In some instances, these ulcers can turn out to be cancerous. If you smoke, drink alcohol or chew betel nuts, you are at a higher risk of developing mouth or tongue cancers. However, even if you do not smoke, drink alcohol or chew betel nut, it is still important to see a doctor if your ulcer fails to heal after 2-3 weeks as it may still be a cancerous ulcer.

### 1. Viral Infections

The Herpes Simplex Virus causes **cold sores**. The virus causes

painful ulcers that are usually located over the lips or mouth. Although the ulcers may recover, the virus usually lies dormant (inactive) but can be activated by various triggers such as stress, or in women, their menstrual period. Other virus such as the Cocksackie, Varicella and HIV viruses can also cause mouth ulcers.

## 2. Nutritional Deficiencies

Deficiencies of certain vitamins (e.g. vitamin B12) and minerals (e.g. iron, folate) can also predispose a person to recurrent ulcers.

## 3. Medications

Certain medications can cause ulcers as a side effect. These include drugs such as bisphosphonates (used for osteoporosis), NSAIDs (a class of pain-killer), beta-blockers and certain cytotoxic drugs.

## 4. Inflammatory Bowel Disease

Patients with inflammatory bowel disease especially Crohn's disease may also develop recurrent mouth ulcers.

## 5. Behçet's Disease

Behçet's disease is a poorly understood disease that causes inflammation of the blood vessels throughout the body. Patients may develop recurrent mouth ulcers,

eye inflammation, skin rashes as well as genital sores.

## 6. Connective Tissue Diseases

Patients with connective tissue diseases such as Systemic Lupus Erythematosus (SLE), Reactive Arthritis and Sweet's Syndrome (rare skin disease, characterised by fever and appearance of tender solid red lumps).

### Role of GPs

GPs should refer cases of ulcers that fail to heal after 2-3 weeks of treatment for biopsy. Mouth ulcers that have rolled or heaped-up edges should be viewed with a high-index of suspicion and referred for early review at the SingHealth Duke-NUS Head & Neck Centre.



# Enlarged Neck Lymph Nodes



Lymph nodes are small bean-shaped organs found throughout the body and linked by lymphatic channels. Lymph nodes are an important part of the immune system and act as “filters” which can trap foreign particles and cancer cells.

In their normal state, they are usually smaller than a pea in size, but in certain conditions, such as infections and cancers, they may become enlarged. When the lymph nodes in your neck are enlarged, you may be able to feel them as round to oval shaped swellings in your neck.

## What are the causes of enlarged neck lymph nodes?

There are many reasons why the lymph nodes in the neck may become enlarged, but the two most common causes are due to infection and cancers.

## Cancers

Another common cause of lymph node enlargement is from cancer. The cancer may arise primarily from the lymph nodes (e.g. lymphoma), but often they have spread to the lymph nodes from somewhere else (e.g. tongue cancer, nasopharyngeal cancer).

### 1. Primary Malignancies

These include:

- Leukemia
- Lymphoma

### 2. Secondary (Metastatic) Malignancies

These are cancers that have spread to the lymph nodes from elsewhere in the body. It is important to examine the areas from where the cancers might have spread to look for a primary cancer (e.g. oral cavity, nasopharynx, skin, scalp, ears). Common cancers that can spread to the neck lymph nodes include:

- Tongue and Oral cancers
- Skin/Scalp cancers
- Thyroid cancers
- Nasopharyngeal cancers
- Gastrointestinal cancers (e.g. stomach and colon cancers)
- Breast cancers
- Lung cancers

## Infections

### 1. Viral Infections

Lymph nodes in the neck can often be enlarged as a reaction after an upper respiratory tract infection. Many viruses can cause enlargement of the lymph nodes. These include the following:

- Epstein-Barr Virus (EBV)
- Cytomegalovirus (CMV)
- Varicella-Zoster Virus
- Rubella
- Human Immunodeficiency Virus (HIV)

### 2. Bacterial infections

Lymph nodes in the neck may also be enlarged from bacterial infections. The source of the infection may not be in the neck itself but may be from the areas of lymph drainage (e.g. throat, skin, ears). It is important to examine the areas where the lymph nodes drain to look for a source of infection.

Streptococcal infections of the throat (Streptococcal Pharyngitis) can be a source of lymph node enlargement in the neck.

### 3. Other Infections

Other infections that can cause enlargement of the lymph nodes in the neck include tuberculosis and syphilis.

### Other causes

Some other less common conditions in which lymph nodes of the neck can be enlarged include:

- Systemic Lupus Erythematosus (SLE)
- Juvenile chronic arthritis
- Rheumatoid arthritis
- Sarcoidosis
- Kawasaki Disease

### What tests will I have to undergo?

Depending on the presentation and findings, your doctor may need to



perform a thorough head and neck examination that will include:

- Examination of the oral cavity and pharynx
- Neck examination
- Otoscopy (examination of the ears)
- Nasoendoscopy (examination of the nasal cavity, back of the nose and larynx with a flexible camera)

A breast examination and abdominal examination may be also required.

Further tests may be ordered that may include:

#### 1. **Ultrasound Scan**

In this scan, a probe that produces sound waves is used to create an image of your neck and its lymph nodes on a screen. This test is non-invasive, painless and does not involve any ionising radiation.

#### 2. **Computer Tomographic (CT) scans and Magnetic Resonance Imaging (MRI)**

Your doctor may order a CT or MRI scan for you. These scans will usually entail you lying down on a motorised bed that will pass through a scanner to obtain an image. The CT scan uses ionising radiation to produce an image whereas an MRI scan entails the use of a strong magnetic field and radio frequency waves.

#### 3. **Fine-needle Aspiration Biopsy**

Sometimes your doctor may decide if it is necessary to obtain a biopsy of an enlarged lymph node. In this

test, the doctor passes a small needle through the lymph node and aspirates some cells from it for testing. The cells from the lymph nodes are smeared onto a glass slide for staining and analysis by a cytologist.

#### 4. **Surgery**

At times, more tissue than obtainable from a fine-needle aspiration will be required. In these cases your doctor will schedule you to go to the operating theatre to remove a lymph node for testing. This can usually be done as a day surgery procedure and can be done under local or general anaesthesia.

#### **Role of GPs**

Patients who present with enlarged lymph nodes should undergo a thorough history taking and physical examination to look for the underlying cause. In patients where enlarged lymph nodes are suspicious of an underlying malignancy (rubbery or hard nodes, lymph nodes >3cm, fixed or matted lymph nodes, evidence of a primary cancer, associated loss of appetite and weight) should be referred for early evaluation at the SingHealth Duke-NUS Head and Neck Centre.



# Skin and Subcutaneous Lumps



Lumps in the neck can arise from the skin and the subcutaneous tissue. Two of the most commonly seen lumps are lipomas and epidermal cysts.

## 1. Skin Cancers

Skin cancers are cancers that arise from the skin. It is usually slow-growing and of low malignancy. It often appears as a painless raised area of skin which result in non-healing ulceration of the area.

## 2. Lipomas

Lipomas are benign tumours composed of adipose (fat) tissue. They are soft, small and usually painless but can enlarge gradually over time. Sometimes the lumps can become troublesome if they enlarge and may need to be removed surgically.

## 3. Epidermoid cysts

These are benign cysts that arise from the skin. They are usually slow growing and painless. They can however become infected and when this happens the lump may become red, painful and have discharge.

### What treatments are available?

If the lump is troublesome or your doctor feels it is necessary to remove it, you may be advised to undergo an **excision biopsy**. This is usually done in an operating theatre under local or general anaesthesia and is usually done as a day surgery procedure.

### Role of GPs

Skin cancers can appear as painless areas of raised skin/ moles which can develop into non-healing ulcers. It is important to identify and recognise symptoms that requires further investigation. Cases in which skin cancer is strongly suspected (e.g. increase in size of abnormal skin area and moles and non-healing ulcers on the skin) should be referred early for further investigations at the SingHealth Duke-NUS Head & Neck Centre.



# Epistaxis



Epistaxis refers to bleeding from the nose and is a common complaint with both adults and children. The exact incidence is hard to determine as most cases are minor and patients do not seek treatment. Patients may complain of per-oral bleeding or blood-stain sputum as well since blood can flow backwards and down the throat.

## Causes

- 1. Little's Area Epistaxis:** By far, the most common cause of epistaxis is the rupture of small blood vessels (Kiesselbach's Plexus) at the Little's Area of the nose. This is often precipitated by minor trauma, such as nose-picking or rubbing, but can sometimes occur spontaneously in dry air, resulting
  - the breaking of the overlying mucus membrane of the Little's Area.
- 2. Trauma:** Blunt trauma can result in nasal contusion or nasal bone/cartilage fractures. Patients can experience epistaxis immediately after the trauma and the bleeding may persist indefinitely until some first aid measures are instituted. Most of such cases will cease without a need for any surgical intervention.
- 3. Sinonasal Infections/ Inflammation:** Conditions such as allergic rhinitis and infective rhinosinusitis can cause inflammation of the nasal mucosa, sometimes resulting in breakage and bleeding.
- 4. Cancer**

Nasopharyngeal cancers (NPC) is the most common cancer of the nose. Common symptoms of NPC include blood-stained nasal drainage, blocked ears and nose, loss of weight and pain over facial area. It is commonly linked with infection by the Epstein-Barr virus (EPV), smoking and inherited characteristics.
- 5. Nasal Tumours**

Nasal tumours are abnormal growth in the nose. It can occur as a benign or malignant tumour. Associated symptoms of numbness

or pain, swelling in areas of the face or lymph nodes in the neck, change in symmetry of the eyes or face and visual changes are cardinal signs to be investigated.

## Management

First aid measures for Little's Area Epistaxis includes applying pressure over the bleeding vessels by pinching firmly on the soft, cartilaginous portion of the external nose and tilting the head forward and downwards for 3-5 minutes. Cold-compress over the forehead and ice-water gargles can also help.

The underlying cause should be determined and treatment directed at that. For example, if the clinical impression is that of a Little's Area Epistaxis, the patient can be given the advice to avoid nose-picking and a barrier ointment (like white soft paraffin) to apply over the Little's Area.

If the cause is deemed to be infective sinusitis, the patient should be given appropriate oral antibiotics. In cases where cancer is highly suspected, examination with a nasoendoscopic and a biopsy is recommended.

## Less common causes

Occasionally, epistaxis may herald uncommon conditions such as the following:

- Blood coagulation disorders
- Excessive anti-coagulation
- Vascular malformations
- Auto-immune disorders



## Role of GPs

### When to seek specialist review

1. Do not forget the ABC (airway, breathing, circulation) for any patient with excessive epistaxis and have them reviewed and managed at the nearest Accident & Emergency department.
2. Repeated consultations for recurrent epistaxis despite medical treatment.
3. Family history of head & neck and hematological malignancies.
4. Previous history of head & neck and hematological malignancies.

Cases in which cancer is strongly suspected, an early referral to the SingHealth Duke-NUS Head & Neck Centre for further investigations is encouraged to avoid delay in diagnosis.



# Hemoptysis



## What is Hemoptysis?

**Hemoptysis** is best described as “coughed up blood”. Often hemoptysis is not a disease itself but can signify a variety of underlying problems and should therefore be properly assessed by a doctor. Blood can manifest in many different forms, however often it is frothy and bright red.

The amount can be as minimal as blood stains in the spit (sputum) to more obvious larger amounts of blood or clots that would need a more immediate attention of a doctor. Amounts larger than 600ml are usually regarded as massive hemoptysis and do require emergency medical attention.

Hemoptysis should not be confused with hematemesis – which describes the vomiting of blood and, unlike hemoptysis, is often associated with

nausea and vomiting as well as food particles that can be seen. The colour of the blood can range from bright red to dark, almost black dotted (“coffee ground” like) and should be best assessed by a physician as well.

## What causes Hemoptysis?

The lungs, which are situated in the chest with the heart sitting between the right and the left lung lobe, usually get their blood supply from 2 different sources.

Most of the blood (95%) comes from the low-pressure pulmonary arteries and ends up in the pulmonary capillary bed, where gas is exchanged. A small portion (about 5%) of the blood supply circulates via high-pressure bronchial arteries, which come from the aorta and supply the structures of the major airways with blood.

In most cases of hemoptysis the blood originates from the pulmonary capillary bed (low pressure) and only in more rare cases (e.g. due to trauma or injury) from the high-pressure bronchial arteries.

If large volumes of blood enter the airway there is a risk of drowning and massive hemoptysis may result in severe anemia, both of which are life threatening.

The reasons for hemoptysis can vary widely, common causes of hemoptysis include:

- a. **Infection:** An infection of the main airways (called bronchitis) and the lung tissue (called pneumonia)

are perhaps the most common (approximately 70%) causes of mild episodes of hemoptysis. Often other symptoms such as fatigue, fever or even shortness of breath are present as well. Usually with treating the underlying infection, the hemoptysis will disappear as well. Another typical cause of hemoptysis is still tuberculosis, which can present with night sweats and loss of weight.

- b. Cancer:** Cancer of the lung can develop from the cells lining the bronchi (airways). One of the earliest symptoms of lung cancer can be the coughing of blood; in fact, it can be the first symptom before others develop. Usually lung cancer develops in people above the age of 50 and who are smokers or have had a history of smoking or passive smoking. There are also other types of lung cancer that can develop in younger, non-smoking patients.



- c. Bronchiectasis:** One or more airways are unusually widened. This can lead to an extra production of mucous that collects in these areas – which explains the main symptom of a recurrent cough with large amounts of phlegm. These widened airways have a preponderance of getting infected, which can result in blood being mixed in the phlegm.
- d. Inhalation of foreign bodies:** The inhalation of small objects such as peanuts or small toy parts can cause injury and bleeding from the airways. This can frequently happen in children and when suspected, should be addressed by a pediatrician (doctor specialising in children care).
- e. Pulmonary embolism:** A pulmonary embolism is a blood clot blocking the main blood vessels of the lung. This is a potentially life-threatening condition that can present with (severe) breathlessness, chest pain and hemoptysis.
- f. Heart failure:** Severe heart failure can lead to a build-up of fluids in the lungs and which, besides breathlessness, can also lead to blood stains in the sputum – which often is frothy.
- g. Inflammation and abnormal tissue deposits:** Usually these are much more rare conditions, which may not only affect the lung tissue but can lead to abnormal tissue deposits in a variety of organs.

Sometimes these inflammatory lesions and tissue deposits can lead to bleeding which then causes hemoptysis. Some conditions that would fall under this category would be Wegener's granulomatosis, Goodpasture's syndrome, lupus pneumonitis or endometriosis.

- h. No cause identified:** Some patients (about 5%) may fall under this category, where no clear cause can be established even when all necessary investigations have been performed.

### What investigations do I have to go for?

Ideally, all patients presenting with hemoptysis should undergo further tests to rule out any underlying sinister causes. Besides the routine physical examination, your doctor will order a chest x-ray as a first assessment. If that is normal, further investigations might be necessary such as a computed tomography (CT) of the chest. Often a bronchoscopy – an endoscopic examination of the airways

– is performed to identify a source of the bleeding or to even get a tissue biopsy from suspicious lesions.

Besides these, your doctor might order an electrocardiogram (ECG) or echocardiogram (Echo) if a heart problem or a pulmonary embolism is suspected.

Other tests such as sputum analysis and culture, full blood count and tests of the blood clotting ability might be ordered. In unclear cases more sophisticated tests such as CT angiograms (CT to show specific blood vessels) or even Positron Emission Tomography/CT (PET or PET/CT) may be ordered to further investigate.

### What is the treatment for Hemoptysis?

Depending on the underlying cause of the hemoptysis the treatment might range from observation and antibiotic treatment to more invasive treatment such as bronchoscopy or open surgery.

## Role of GPs

A detailed history, including currently used medications, performing a physical examination and auscultation of the lungs are important steps in the investigation of the underlying causes. If available a chest x-ray should be taken. If the cause is unclear or a more significant diagnosis such as lung cancer, underlying heart problems or infections (especially tuberculosis) are suspected, a specialist referral should be made. If a massive hemoptysis is noted or a inhaled foreign body is suspected, send the patient to the Department of Emergency immediately as these conditions are potentially life threatening.



# DISEASES IN THE HEAD & NECK REGION

- **Salivary Gland Disorders**
- **Oral Cancers**
- **Oropharyngeal Cancers**
- **Esophageal Cancer**
- **Hypopharyngeal Cancers**
- **Laryngeal Cancer**
- **Thyroid Nodules**
- **Thyroglossal Duct Cysts**
- **Thyroid Cancer**
- **Nasopharyngeal Carcinoma**
- **Paranasal Sinus Tumour**
- **Jaw Cysts/Tumours**

Specialist services available at:

**Head & Neck Centre @ Singapore General Hospital**

Tel: 6321 4377 (for appointments)

**Head & Neck Centre @ National Cancer Centre Singapore**

Tel: 6436 8088 (for appointments)

## MOUTH/THROAT

# Salivary Gland Disorders

Salivary gland disorders can be divided into infection/inflammation or tumours.

### Salivary gland infection/inflammation (sialadenitis)

Any patient with salivary gland infection will complain of a painful swelling that developed over a few days. Pain and swelling usually increase with meals. These episodes may be recurrent especially if they are precipitated by salivary duct stones causing obstruction to the salivary flow.

Acute treatment consists of painkillers and antibiotics. However, if the episodes are recurrent, a computed tomography scan or sialendoscopy is performed to look for possible stones or other causes of ductal obstruction.

### What is a sialendoscopy?



A sialendoscopy is a tiny scope that is passed into the salivary duct which allows visualization of the ductal

lumen. There are special forceps and catheters that can be passed through this scope that enable extraction of stones and administration of medication such as steroids. Hence, this procedure is both diagnostic and therapeutic.

### Is there a role for surgery in sialadenitis?

In cases whereby the salivary ductal stones are too large or too deep within the salivary gland parenchyma to be reached by the sialendoscope, surgery is then advised.

### Salivary Gland Tumours

Salivary gland growths make up 6% of all head and neck tumours. They can be benign or malignant. Salivary gland cancers are rare with an incidence of 1 in 100 000 per population per year in Singapore.

Salivary glands are divided into two groups: major and minor salivary glands.

- The major salivary glands are the parotid, submandibular and sublingual glands.
- The minor salivary glands are numerous and they are scattered throughout the upper aerodigestive tract.

Majority of salivary gland tumours grow in the parotid glands, fortunately, most of them are benign. 50% of submandibular gland growths are



cancerous while 75% of sublingual and minor salivary gland tumours are cancerous.

### How do salivary gland tumours present?

Patients with salivary gland tumours usually complain of a painless slowly

enlarging lump. Those with advanced parotid cancers may also suffer from unilateral facial weakness. Rarely in cases of laryngeal minor salivary gland tumours, patients may complain of shortness of breath as a result of airway obstruction from the tumour mass.

### How do we investigate a salivary gland tumour?

After a thorough head and neck physical examination, we will perform a fine needle aspiration cytology of the lump and a computed tomography scan or magnetic resonance imaging to determine the size of the growth, its extent and infiltration and possible nodal spread.

### What are the main modalities of treatment?

For benign growths, surgery alone will be adequate. However in cancerous growths, patients may need to undergo radiotherapy with or without chemotherapy after surgery is performed.

## Role of GPs

GPs play a pivotal role in identifying suspicious lesion around the salivary glands. Red flag signs include increasing growth, lymph nodes enlargement and facial weakness or asymmetry, and for these patients, early referral to a specialist at the SingHealth Duke-NUS Head & Neck Centre is highly recommended.



## MOUTH/THROAT

# Oral Cancers

### Overview

Oral cancers are more commonly seen in the middle-aged group and elderly, affecting men more than women.

Risk factors include:

1. Smoking
2. Heavy alcohol consumption
3. Betel nut chewing
4. Tobacco chewing
5. Chronic irritation from ill-fitting dentures
6. Sun exposure (for lip cancer)
7. Poor immunity states, e.g. patients on immunosuppressants or HIV
8. Human Papilloma Virus (HPV) infection
9. Poor nutrition especially diets low in fruits and vegetable
10. Premalignant oral lesions:
  - Leukoplakia, which is a persistent white patch in the oral cavity
  - Erythroplakia, which is a persistent brightly coloured smooth area in the oral cavity (erythroplakia has higher risks of turning cancerous than leukoplakia)

### What are the symptoms of oral cancers?

Patients usually present with non-healing ulcers of more than 3 weeks



despite medication. Other complaints include:

1. Persistent presence of blood in saliva
2. Lump/nodule with contact bleeding
3. Numbness of chin or lower lip
4. Pain upon eating/swallowing
5. Persistent earache
6. Lump in the neck (which usually indicates a spread of the cancer to the lymph nodes)

### How do we and diagnose oral cancers?

A thorough head and neck examination is performed which includes examination of the oral cavity, the neck and a nasoendoscopy. A biopsy of the oral cavity lesion is then performed under local anesthesia as a clinic procedure. A fine needle

aspiration cytology is also performed on any neck node. Either a computed tomography scan or magnetic resonance imaging (CT or MRI) is done to evaluate the extent of the oral cavity lesion and possible neck node involvement. If the biopsy confirmed the diagnosis of cancer, then a CT scan of the thorax and liver are done as part of the staging work-up, looking for distant spread to the lungs or the liver.

### How do we treat oral cancers?

All cases will be discussed at the multidisciplinary tumour board where the best recommended treatment options will be detailed. Treatment modality depends on:

1. Age and general health of the patient
2. Extent of the oral cavity lesion infiltration
3. Stage of the cancer
4. Patient's expectations and preferences



The preferred treatment is surgery of the oral cavity cancer and the associated lymphatic/nodal drainage pathway in the neck. The surgical defect may require reconstruction to ensure a functional and cosmetic outcome (refer to chapter on Head & Neck Reconstruction). Post-operative radiotherapy with or without chemotherapy will be decided based on tumour characteristics.

Even after completing treatment of the cancer, patients often have to undergo months of rehabilitation as surgery can result in altered speech and swallowing. Hence, intensive speech and swallowing therapy as well as regular dietician review is to be expected by our patients.

### Role of GPs

The oral cavity is an easy area to be examined even in the primary care setting. Any premalignant oral cavity lesions, non-healing ulcers, suspicious ulcers with heaped up edges, nodules or ulcers with contact bleeding and patients with oral cavity lesions with associated neck nodes should be referred urgently to the SingHealth Duke-NUS Head & Neck Centre for further evaluation. In addition, counselling by the primary care physician to manage modifiable risk factors is extremely essential in the primary prevention of oral cavity cancers.



## MOUTH/THROAT

# Oropharyngeal Cancers

### Overview

Oropharyngeal cancers are usually seen in the middle-aged group and elderly, with the exception of Human Papilloma Virus (HPV) related cancers which occur in the younger age group. Men are more commonly affected than women.

Risk factors include:

1. Smoking
2. Heavy alcohol consumption
1. Human Papilloma Virus (HPV) infection
1. Poor nutrition especially low in dietary fibre
2. Immunocompromised states, e.g. patients on immunosuppressants, HIV

### Where exactly is the oropharynx?

The oropharynx lies between the nasopharynx and hypopharynx.

It consists of:

1. Soft palate
2. Tonsils
3. Back of throat (posterior pharyngeal walls)
4. Posterior one-third of the tongue

### What are the symptoms of oropharyngeal cancers?

Most patients complain of:

1. Persistent presence of blood in saliva
2. Pain upon eating/swallowing
3. Chronic sore throat
4. Change in voice
5. Persistent feeling of lump in throat
6. Persistent earache
7. Difficulty in mouth opening
8. Lump in the neck (which usually indicates a spread of the cancer to the lymph nodes)

### How do we work-up and diagnose oropharyngeal cancers?

A thorough head and neck examination is performed which includes examination of the oral cavity, the neck and a nasoendoscopy.

A biopsy of the oropharyngeal lesion may be attempted in the clinic under local anaesthesia if it is visible and accessible via the oral cavity. Otherwise, a panendoscopy and biopsy under general anaesthesia are done in the operating theatre. For tonsillar cancers, a tonsillectomy may be performed during the panendoscopy for diagnosis.

A fine needle aspiration cytology is also performed of any neck node. Either a computed tomography scan or magnetic resonance imaging (CT or MRI) is done to evaluate the extent of the oropharyngeal lesion and possible neck node involvement. If the biopsy

confirmed the diagnosis of cancer, a CT scan of the thorax and liver is done as part of the staging work-up, looking for distant spread to the lungs or the liver.

### How do we treat oropharyngeal cancers?

All cases will be discussed at the multidisciplinary tumour board where the best recommended treatment options will be detailed. Treatment modality depends on:

1. Age and general health of the patient
2. Extent of the oropharyngeal lesion infiltration
3. Stage of the cancer
4. Patient's expectations and preferences

For early stage disease, single modality treatment is considered either with radiotherapy or surgery of the primary oropharyngeal lesion and the associated nodes in the neck. For more advanced stages, multi-modality treatment is needed, either a combination of chemo-radiotherapy or surgery with post-



operative radiotherapy, with or without chemotherapy.

Surgery for oropharyngeal cancers can be done through the mouth (transoral approach) or may require open approaches that involve splitting the lip and/or the mandible or through the neck. With the increasing use of robotic surgery, transoral approach can be applied to many more cases of oropharyngeal cancers that previously needed the open approaches for access.

Even after completion of treatment of cancer, patients often have to undergo months of rehabilitation due to altered speech and swallowing. Hence, intensive speech and swallowing therapy, as well as regular dietician review, is to be expected by our patients.

### Role of GPs

Unlike oral cavity lesions, oropharyngeal lesions are not easily visualised and examined. Good history taking is imperative in suggesting malignant oropharyngeal pathology in the primary care setting. Patients who complain of chronic sore throat, earache with abnormal ear examination findings or non-resolving globus sensation should be referred to the SingHealth Duke-NUS Head & Neck Centre for further evaluation.



## MOUTH/THROAT

# Esophageal Cancer

### Overview

The esophagus is a long muscular tube, that connects the throat to the stomach, transporting food that is swallowed to the stomach for digestion. Esophageal cancer is more common in males, and usually appears in patients 60-70 years of age.

Risk factors include:

1. Smoking
2. Heavy alcohol consumption
3. Diet low in fruits and vegetable
4. Obesity
5. Reflux
6. Barret's esophagus (in this condition, the esophageal lining is altered as a complication of long-standing poorly controlled reflux)

### What are the symptoms of esophageal cancers?

Patients complain of:

1. Difficulty swallowing
2. Weight loss
3. Bloody vomit
4. Black tarry/sticky stools
5. Central chest pain
6. Heartburn
7. Hoarse voice



### How do we work-up and diagnose esophageal cancer?

A thorough head and neck examination is performed which includes the examination of the oral cavity, the neck and a nasoendoscopy. Physical examination is usually normal, unless there is a lymph node spread in the neck or enlarged liver due to distant spread. An OGD (esophagoduodenoscopy) is performed to visualize the growth and for biopsy.

Endoscopic ultrasound may also be done to determine the depth and local extent of the growth. A Computed Tomography scan (CT) evaluates the extent of the tumour and invasion of the surrounding structures. If the biopsy confirmed the diagnosis of cancer, then a CT scan of the thorax and liver is done as part of the staging work-up, looking for distant spread to the lungs or the liver.

### How do we treat esophageal cancers?

All patients will be discussed at the multidisciplinary tumour board where the best recommended treatment options will be detailed. Treatment options depends on:

1. Age and general health of the patient
2. Extent of the esophageal lesion infiltration

3. Stage of the cancer
4. Patient's expectations and preferences

For early stage disease, endoscopic surgery may be performed. However in more advanced disease, a combination of chemo-radiation and surgery is usually preferred. Surgery of more advanced disease is done via open approaches (transhiatal or transthoracic e.g. through the diaphragm or the chest respectively). Suitably selected cases can be done via minimally invasive techniques.

### Role of GPs

All patients complaining of unexplained weight loss or difficulty swallowing warrants an early referral at the SingHealth Duke-NUS Head & Neck Centre for early evaluation. An OGD is usually done as part of the initial investigation.



## MOUTH/THROAT

# Hypopharyngeal Cancers



### Overview

Hypopharyngeal cancers are usually seen in the middle-aged group and elderly, with the incidence rising above the age of 40. Men are more commonly affected than women with a 3:1 ratio. It accounts for 7% of all cancers of the upper aerodigestive tract.

Risk factors include:

1. Smoking
2. Heavy alcohol consumption
3. Chewing tobacco
4. Poor nutrition especially low in dietary fibre
5. Plummer-Vinson syndrome (a disease marked by iron-deficiency anaemia, and formation of web-like membranes in the throat causing difficulty swallowing)

### Where exactly is the hypopharynx?

The hypopharynx is the most inferior part of the pharynx that leads into the esophagus.

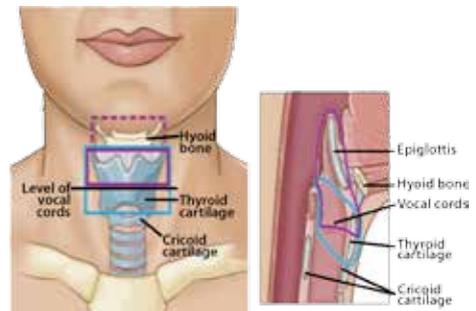
It consists of 3 parts:

1. Posterior pharyngeal wall
2. Pyramidal sinus
3. Post-cricoid area

### What are the symptoms of hypopharyngeal cancers?

Hypopharyngeal cancers are usually silent in the early stages. Larger tumours are responsible for majority of patient's complaints. Patients may complain of:

1. Persistent sore throat
2. Difficulty swallowing
3. Persistent feeling of lump in throat
4. Persistent earache
5. Blood in saliva or sputum
6. Change in voice
7. Lump in the neck (which usually indicates a spread of the cancer to the lymph nodes)



### How do we work-up and diagnose hypopharyngeal cancers?

A thorough head and neck examination is performed which includes examination of the oral cavity, the neck and a nasoendoscopy. A panendoscopy and biopsy under general anaesthesia is done in the operating theatre for tissue diagnosis. A fine needle aspiration cytology is also performed of any neck node. Either a computed tomography scan or magnetic resonance imaging (CT or MRI) is done to evaluate the extent of the hypopharyngeal lesion and possible neck node involvement. If the biopsy confirmed the diagnosis of cancer, a CT scan of the thorax and liver is done as part of the staging work-up, looking for distant spread to the lungs or the liver.

### How do we treat hypopharyngeal cancers?

All patients will be discussed at the multidisciplinary tumour board where the best recommended treatment options will be detailed. Treatment modality depends on:

1. Age and general health of the patient
2. Extent of the hypopharyngeal lesion infiltration
3. Stage of the cancer
4. Patient's expectations and preferences

For early stage disease, single modality treatment is considered either with radiotherapy or surgery of

the primary hypopharyngeal lesion and the associated nodes in the neck. Conservative surgery may be performed for small tumours, especially if robotics expertise is available. For more advanced stages, multi-modality treatment is needed, either a combination of chemo-radiotherapy or surgery with post-operative radiotherapy, with or without chemotherapy.

Even after completion of treatment of cancer, patients often have to undergo months of rehabilitation due to altered speech and swallowing. Hence, intensive speech and swallowing therapy as well as a regular dietician review is to be expected by our patients.

### Role of GPs

Hypopharyngeal cancers are not easily detected due to its anatomical position. A detailed history is important in the evaluation of the condition. Cases where cancer is highly suspected (e.g. persistent sore throat, globus sensation during swallowing, voice changes and lymph nodes in the neck) should be referred early to the SingHealth Duke-NUS Head & Neck Centre for early evaluation and investigations.



## MOUTH/THROAT

# Laryngeal Cancer



### Overview

Laryngeal cancers are the most common cancers of the upper aerodigestive tract, affecting men more than women and in the older age group.

Risk factors include:

1. Smoking
2. Heavy alcohol consumption
3. Human papillomavirus infection
4. Low dietary fibre or diets rich in preserved meats and fats
5. Exposure to industrial fumes or reagents such as paint, asbestos, diesel, gasoline fumes
6. Chronic laryngopharyngeal reflux

### Where exactly is the larynx?

The larynx opens into the trachea (windpipe).

It divided into 3 main parts:

1. **Supraglottis**, the part above the vocal chords

2. **Glottis**, the area of the vocal chords
3. **Subglottis**, the part below the vocal chords leading into the trachea

### What are the main functions of the larynx?

The larynx is responsible for:

1. Maintaining an open airway (breathing)
2. Voice production
3. Preventing aspiration (preventing food particles from accidentally entering the windpipe)
4. Protecting the lungs from harmful or irritative substances

### What are the symptoms of laryngeal cancers?

Patients complain of:

1. Voice hoarseness
2. Shortness of breath
3. Recurrent lung infection due to aspiration
4. Blood stained sputum
5. Difficulty swallowing
6. Lump in the neck (which usually indicates a spread of the cancer to the lymph nodes)
7. Persistent throat pain or earache

## How do we work-up and diagnose laryngeal cancers?

A thorough head and neck examination is performed which includes examination of the oral cavity, the neck and a nasoendoscopy. A panendoscopy and biopsy under general anaesthesia is done in the operating theatre for tissue diagnosis. A fine needle aspiration cytology is also performed of any neck node. Either a computed tomography scan or magnetic resonance imaging (CT or MRI) is done to evaluate the extent of the laryngeal lesion and possible neck node involvement. If the biopsy confirmed the diagnosis of cancer, a CT scan of the thorax and liver is done as part of the staging work-up, looking for distant spread to the lungs or the liver.

## How do we treat laryngeal cancers?

All patients will be discussed at the multidisciplinary tumour board where the best recommended treatment options will be detailed. Treatment modality depends on:

1. Age and general health of the patient
2. Extent of the laryngeal lesion infiltration
3. Stage of the cancer
4. Preservation of voice
5. Patient's expectations and preferences

For early stage disease, single modality treatment is considered either with radiotherapy or surgery of the primary laryngeal lesion and the associated nodes in the neck. For more advanced stages, multi-modality treatment is needed, either a combination of chemo-radiotherapy or surgery with post-operative radiotherapy, with or without chemotherapy.

Even after completion of treatment of cancer, patients often have to undergo months of rehabilitation due to altered speech and swallowing. Hence, intensive speech and swallowing therapy as well as a regular dietician review is to be expected by our patients.

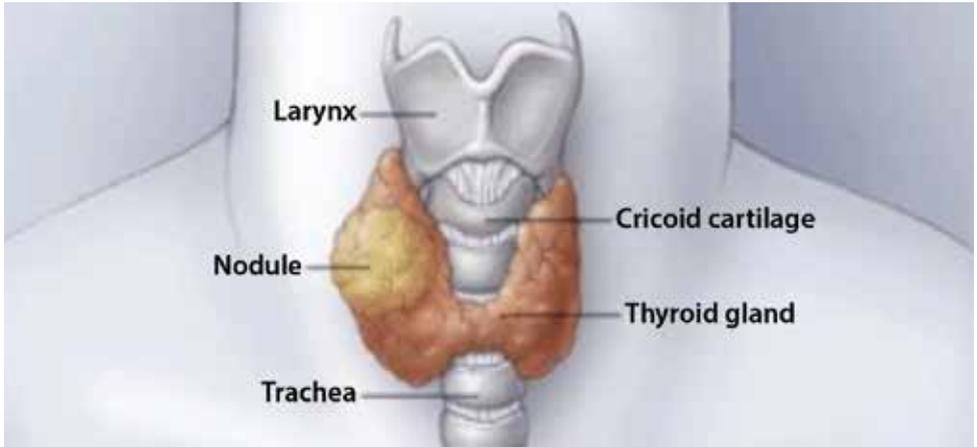
### Role of GPs

Any patient with progressive worsening hoarseness, breathlessness, persistent sore throat and difficulty swallowing should be referred early to the SingHealth Duke-NUS Head & Neck Centre for further evaluation and investigations.



## NECK

# Thyroid Nodules



### What are thyroid nodules?

The thyroid is a butterfly-shaped gland located in the front of the neck. It produces hormones that control metabolism in the body. The thyroid gland can sometimes develop solid or fluid-filled lumps (cysts). These lumps often do not cause symptoms and many of them are found incidentally during a medical consultation for another problem or during routine check-ups.

Although most of these lumps are not cancerous lumps, a small proportion of them will be cancerous. Some of these lumps may also cause problems when they grow larger and compress on other structures in the neck causing swallowing and breathing difficulties. Some of these lumps may also secrete too much thyroid hormone that may cause symptoms of hyperthyroidism.

### What tests will I have to undergo?

#### 1. Thyroid function tests

This is a blood test where the levels of your thyroid hormones (T4) and thyroid-stimulating hormone (TSH) are measured. If your levels of thyroid hormones are too high (hyperthyroidism), you may experience symptoms such as palpitations, feeling hot easily, irritability, diarrhoea, weight loss and increased appetite.

If your thyroid hormone levels are too low (hypothyroidism) you may feel easily tired and lethargic, gain weight easily, constipation, memory loss and feeling cold easily.

Thyroid-related diseases cannot be excluded even if the thyroid function test is within normal ranges.

## 2. Ultrasound Scan

In this scan, sound waves are used to produce a picture of your thyroid gland and neck structures on a screen. The ultrasound scan is very useful for evaluating thyroid nodules and to look for features that may indicate that the thyroid nodule is suspicious for cancer. It is also useful for looking for any enlarged lymph nodes in the neck. This scan is painless and there is no ionising radiation involved.

## 3. Fine-needle Aspiration Cytology (FNAC)

Your doctor may advise you to undergo a biopsy to evaluate the lump if he feels that it is needed.

A fine-needle aspiration biopsy is a procedure where the doctor will pass a small needle through the lump to aspirate some cells for the lump for further testing. These cells will be examined under a microscope to look for signs of cancer.

This biopsy is often done using an ultrasound to guide the doctor to biopsy the correct place.

### What treatment will I need to undergo?

If the results of the ultrasound and fine-needle aspiration show that the thyroid nodule is unlikely to be cancer, your doctor may choose to observe the lump and repeat an ultrasound scan 6-12 months later to look for any growth or changes in the lump.



However if there is a chance the lump may be a cancerous lump, or the lump is causing symptoms, your doctor may advise you for surgery. Surgery will usually involve removal of the thyroid gland (thyroidectomy).

Some thyroid cancers can spread to the lymph nodes in the neck and your doctor may need to remove some of the lymph nodes in your neck during the operation as well.

### Role of GPs

Patients who present with neck lumps that are suspicious or have worrying features should be referred for further investigation. Cases where cancer is highly suspected (e.g. firm to hard lesions, compressive symptoms or hoarseness and enlarged lymph nodes) should be referred early to the SingHealth Duke-NUS Head & Neck Centre to avoid delays in diagnosis.



## NECK

# Thyroglossal Duct Cysts



### What are Thyroglossal Cysts?

These are lumps found in the front of the neck in the midline. They are formed due to a persistent thyroglossal duct.

During the development of the thyroid gland before birth, the thyroid gland in the foetus migrates from the bottom of the tongue to its final position in the neck. The path that the thyroid gland takes during its descent into the neck usually disappears, but sometimes persists as a persistent thyroglossal duct.

This persistent duct can give rise to cysts (fluid-filled lumps) or sinuses (blind-ending tracts that lead to the skin).

### How do Thyroglossal cysts present?

These lumps usually are hemispherical lumps that appear in the

front of the neck in the midline. These lumps tend to move with swallowing and protrusion of the tongue. These lumps are usually painless, however they can become infected and if they do, they may become painful and red.

**What tests will I have to undergo?**  
(Please refer to page 38 & 39)

### What treatment will I undergo?

These lumps are usually treated with surgery. The operation to remove them is called a **Sistrunk operation**. It involves removal of the lump as well as the middle part of one of the bones in the front of the neck called the hyoid bone which the lump is usually attached to.

### Role of GPs

Patients who present with neck lump that is painful and infected are to be treated with antibiotic and referred to the SingHealth Duke-NUS Head & Neck Centre for further investigation. Neck lumps that are increasing in size and causes compressive symptoms with enlarged lymph nodes should be reviewed early as there is a 1% chance of malignancy.



## NECK

# Thyroid Cancer



### Overview

Thyroid cancer is cancer that arises from the thyroid gland. It is more common in women than men. In Singapore, it is the 9th most common cancer diagnosed in women. It is commonly diagnosed at a younger age than most other cancers and most cases occur in patients less than 60 years old. The incidence of thyroid cancer appears to be rising, but this appears to be mostly due to the increased use of ultrasound scanning, picking up more thyroid nodules that may not have been discovered in the past.

### What are the symptoms and signs of thyroid cancer?

Patients with thyroid cancer often first present with a lump in the neck. Often they may not have been the first to

notice the lump and other people may have pointed it out to them.

Thyroid cancers are also sometimes found incidentally when there are nodules in the thyroid gland noted on a scan done on the neck for other reasons. These cancers found this way very often cannot be felt and can only be seen on ultrasound scans. Nevertheless, just because a lump cannot be felt does not mean it is not a cancerous lump and all thyroid nodules should be investigated properly to exclude cancer.

Patients who have advanced thyroid cancer can sometimes present with hoarseness. This can occur when cancer invades the nerves that control the movement of the larynx (voice-box). If the cancer has spread to the lymph nodes in the neck, the

patient may also be able to feel other enlarged lumps in the neck. Cancers can also cause breathlessness if they cause compression of the trachea and problems swallowing if they compress on the oesophagus.

### What kinds of thyroid cancer are there?

There are many types of thyroid cancers.

#### *Differentiated Thyroid Cancers*

##### **1. Papillary Thyroid Cancer**

This is the most common kind of thyroid cancer seen, accounting for about 75% of thyroid cancers. Papillary thyroid cancers usually are slow growing but they have a tendency to spread to the lymph nodes in the neck. However, most of these cancers can still be treated successfully.

There are many subtypes of papillary thyroid cancer. Some less common subtypes (follicular variant, tall cell, insular, diffuse sclerosing) tend to have more aggressive behaviour and may grow and spread more quickly.

##### **2. Follicular Thyroid Cancer**

Follicular thyroid cancer is the second most common type of thyroid cancer seen, accounting for about 15% of cases. These cases tend to spread via the bloodstream to other parts of the body such as the lungs and bones.

#### *Other types of Thyroid Cancers*

##### **3. Medullary Thyroid Cancer**

Medullary thyroid cancer is much less common and accounts for about 5% of thyroid cancers. These cancers arise from the parafollicular C cells in the thyroid gland. These cells usually are responsible for producing a hormone called calcitonin, which helps to control the level of calcium in the body.

About 20% of these cases are hereditary (familial medullary carcinoma). Patients with familial medullary thyroid carcinoma tend to develop thyroid cancers at an earlier age in childhood and may also develop other types of cancers (e.g. pheochromocytoma, parathyroid tumours).

Although the outcome of treatment for medullary thyroid cancer is not as good as for papillary and follicular thyroid cancers, many patients can still be treated successfully.

##### **4. Anaplastic Thyroid Cancers**

This type of cancer accounts for about 2% of thyroid cancers. These cancers tend to be very aggressive tumours and grow very quickly and spread rapidly to other parts of the body. Treatment of these cancers is usually very difficult.

## 5. Thyroid Lymphoma

This is a very rare cancer that sometimes develops in the thyroid gland. Lymphoma is a type of cancer that arises from white blood cells. These cancers are usually treated with chemotherapy, with or without radiotherapy.

### What investigations will I need to undergo?

#### 1. Thyroid Function Tests

This is a blood test where the levels of your thyroid hormones and thyroid-stimulating hormone (TSH) are measured. If your levels of thyroid hormones are too high (hyperthyroidism), you may experience symptoms such as palpitations, feeling hot easily, irritability, diarrhoea, weight loss and increased appetite. If your thyroid hormone levels are too low (hypothyroidism) you may feel easily tired and lethargic, gain weight easily, constipation, memory loss and feeling cold easily.

#### 2. Ultrasound Scan

In this scan, sound waves are used to produce a picture of your thyroid gland and neck structures on a screen. The ultrasound scan is very useful for evaluating thyroid nodules and to look for features that may indicate that the thyroid nodule is suspicious for cancer. It is also useful for looking for any enlarged lymph nodes in the neck.

This scan is painless and there is no ionising radiation involved.

#### 3. Fine-needle Aspiration Cytology (FNAC)

Your doctor may advise you to undergo a biopsy to evaluate the lump if he or her feels it is needed. A fine-needle aspiration biopsy is a procedure where the doctor will pass a small needle through the lump to aspirate some cells for the lump for further testing. These cells will be examined under a microscope to look for signs of cancer. This biopsy is often done using ultrasound to guide the doctor to biopsy the correct place.

#### 4. Computer Tomographic (CT) scan

This scan will usually entail you lying down on a motorised bed that will pass through a scanner to obtain an image. The CT scan uses ionising radiation to produce an image and may involve the use of contrast injected through a vein to make the details of the scan easier to interpret.

### How are thyroid cancers usually treated?

#### *Surgery*

The treatment of most thyroid cancers will usually involve surgery. Depending on what the doctor finds he will usually recommend one or more of the following operations.

### a. Thyroidectomy

A thyroidectomy is a removal of the whole or part of the thyroid gland. In cancers, most of the time your doctor will recommend removing the whole thyroid gland (**Total thyroidectomy**). In certain patients with low risk cancers, an option to remove only half of the thyroid gland may be recommended (**Hemi-thyroidectomy**).

### b. Central compartment dissection

In patients with papillary and medullary thyroid cancer, the cancer tends to spread to the lymph nodes around the thyroid gland. Your doctor may advise you to remove the lymph nodes around the thyroid gland and trachea together with the thyroid gland.

### c. Modified radical neck dissection

Thyroid cancer may spread to lymph nodes in the neck at the side of the neck as well. In these

cases, your doctor may ask you to undergo an operation to remove lymph nodes in the neck which are positive for cancer.

### *Radioactive Iodine Treatment*

This is a form of targeted radiotherapy that uses a radioactive form of iodine (iodine-131/I-131). Thyroid cells take up and concentrate iodine much more than the rest of the cells in the body, radioactive iodine can be used to selectively administer radiation to thyroid cancer cells with little effect on the rest of the cells in the body.

Radioactive iodine treatment works better for *well differentiated* thyroid cancers such as papillary and follicular thyroid cancers as these cancers usually take up iodine well. Other cancers such as medullary and anaplastic cancers tend not to take up iodine as well thus do not respond well to radioactive iodine treatment.





Radioactive iodine treatment can be used after surgery to kill any remnant cancer cells left in the body. Radioactive can also be used in cases where cancer has spread to other parts of the body. It can also be used in cases where cancer has come back after being treated previously.

Radioactive iodine is usually administered orally in either a capsule or liquid form. You may be required to be admitted in a single room during the treatment to minimise radiation exposure to other people around you.

### External Beam Radiotherapy

This treatment involves using ionising radiation to kill cancer cells. This treatment usually involves directing an external source of radiation into the part of the body treated (e.g. neck) while the patient is lying down.

This treatment is not commonly used but may be used in cases where

surgery is unable to remove cancer completely. It is also sometimes used in cases where cancer cells do not readily take up iodine (e.g. anaplastic, medullary thyroid cancers).

### Thyroid Hormone Treatment

After removal of the thyroid gland, you will need to take medication to replace your thyroid hormone as there will no longer be thyroid hormone produced in your body.

Thyroid hormone is sometimes given at a higher dose than usual in some cases of cancer to suppress the TSH (thyroid stimulating hormone) levels. This helps to reduce the chance of the cancer relapsing.

### Role of GPs

Patients who present neck lumps that are suspicious or have worrying features should be referred for further investigation. Cases where cancer is highly suspected should be referred early (e.g. compressive symptoms or hoarseness and enlarged lymph nodes) to the SingHealth Duke-NUS Head & Neck Centre for further investigation.



## EAR/NOSE

# Nasopharyngeal Carcinoma (NPC)

The nasopharynx is part of the upper aerodigestive tract and it lies at the back of the anterior nasal space. Due to its inaccessible location, lesions of the nasopharynx are not easily detected, and hence tumours of the nasopharynx may present only at a later stage. NPC is a malignant neoplasm that arises from the epithelium of this anatomical site. It has a low incidence in the western population but in the local context, it is seen more commonly amongst people of Southern Chinese and Javanese descent.

### Types of NPC

World Health Organisation (WHO) classifies NPC into the following three types, based on their histological appearance:

1. **Type I – Keratinising Squamous Cell Carcinoma (SCC)**
2. **Type II – Non-keratinising Squamous Cell Carcinoma (SCC)**
3. **Type III – Undifferentiated Carcinoma**

In the local context, it is Type III that is by far the most common of the three.

### Common presentations

The following are some ways in which NPC can present in patients:

1. Neck lump (Cervical lymphadenopathy), usually upper neck in levels II and Va.
2. Blood-stained sputum



3. Epistaxis (Nose bleed)
4. Blocked hearing (Middle ear effusion)
5. Diplopia (Cranial nerve IV involvement)
6. Numbness over cheek (Cranial nerve V2 involvement)
7. Nasal obstruction

### Risk factors

1. Family history of NPC – persons with first-degree relatives who had NPC are 20-25 times more likely to develop NPC
2. Diet high in preserved foods early in life (Eg. salted fish, preserved vegetables)
3. Prior Epstein-Barr virus infection – this is almost ubiquitous in adults



### Screening

Blood investigations such as serum EBV VCA-IgA (viral capsid antigen), EBV Ea-IgA (early antigen) and EBV DNA have been used as a method for screening for NPC but routine screening of the general population who is not at increased risk is not advised.

### Diagnosis

Patients require nasoendoscopic examination and diagnosis are confirmed when a biopsy performed showed histological evidence of NPC. Post-nasal space biopsy is usually performed under topical local anaesthesia and nasoendoscopic guidance in the outpatient setting.

The procedure is often uncomplicated and takes less than 10 minutes. For patients on anti-coagulants or anti-platelets, their medication may be stopped prior to the procedure to prevent excessive bleeding.

### Treatment

NPC is treated primarily with radiotherapy or concurrent chemoradiotherapy. The role of surgery is only necessary in recessive or recurrent setting.

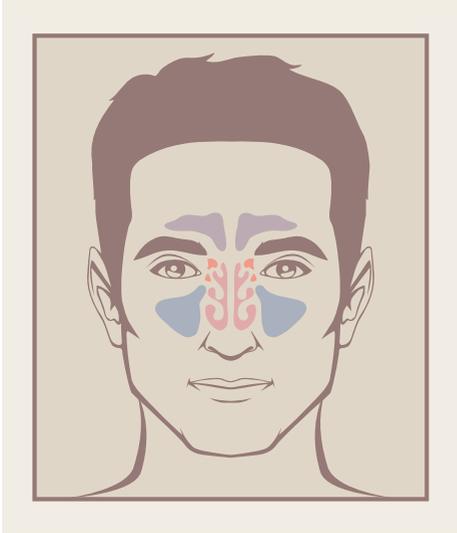
### Role of GPs

A detailed history of the presenting symptoms and performing a physical examination is important in establishing a provisional diagnosis. Cases in which cancer is strongly suspected (e.g. positive family history of NPC, persistent epistaxis, lymph node enlargement, pain or numbness around cheek area and blocked ears) should be referred to the SingHealth Duke-NUS Head & Neck Centre for further investigations.



## EAR/NOSE

# Paranasal Sinus Tumours



The paranasal sinuses are air-filled spaces and comprises of the maxillary sinuses, the ethmoid sinuses, the sphenoid sinuses and the frontal sinuses. As they are air-filled, tumours that arise in the paranasal sinuses often only present when they are large enough to obstruct the sinuses, or when they cause compressive symptoms on neighbouring structures (such as the orbit).

### Types of Tumours

Various neoplasms ranging from benign to malignant tumours can arise in the paranasal sinuses. Fortunately, malignant neoplasms of the paranasal sinuses are uncommon and account for <1% of all neoplasms. Several more commonly seen neoplasms are listed in the table here:

### Benign Tumours

- Inverted papilloma
- Juvenile angiofibroma
- Osteoma
- Capillary hemangioma
- Pleomorphic adenoma

### Malignant Tumours

- Squamous cell carcinoma
- Undifferentiated carcinoma
- Adenoid cystic carcinoma
- Adenocarcinoma
- Esthesioneuroblastoma

### Paranasal Sinuses Tumours

The following are some ways in which paranasal sinuses tumours can present in patients:

1. Nasal obstruction
2. Blood-stained nasal discharge or sputum
3. Epistaxis (Nose bleed)
4. Visual disturbances such as diplopia
5. Epiphora (obstruction of lacrimal duct)
6. Facial fullness or pain

### Risk Factors

Certain environmental agents have been linked to the development of certain paranasal sinus malignancies. Squamous Cell Carcinoma (SCC)

has been associated with things like aflatoxin, which is produced by *Aspergillus fungi* that can colonize and contaminate grain; chromium, nickel, hydrocarbons and other organic chemicals. Adenocarcinoma has been linked with wood dust exposure. Both these malignancies are also linked with exposure to tobacco smoke, salted and smoked foods and heavy metals. Although inverted papillomas are benign, there is a risk of malignant transformation to SCC.

### Diagnosis

Patients require nasoendoscopic examination and the diagnosis is made with a biopsy. Depending on the location of the tumour, sometimes radiologic investigations such as CT-scan or MRI-scan with intra-operative biopsy may be necessary.



### Treatment

Treatment depends on the histology of the tumour. Generally, most tumours of the paranasal sinuses are treated surgically with possible post-surgery radiotherapy +/- chemotherapy for certain malignant tumours. An endoscopic operative approach is often preferable as it avoids any facial incisions and scars but much depends on the size and location of the tumour. Patients will need to have an open discussion with the surgeon on the most appropriate treatment option.

### Role of GPs

A detailed history of the presenting symptoms and performing a physical examination is important in establishing a provisional diagnosis. Cases in which cancer is strongly suspected (e.g. persistent blocked nose/ ears, abnormal discharges from nose, diplopia or face fullness/ pain) should be referred for further investigations.



## EAR/NOSE

# Jaw Cysts/Tumours

### What are Jaw Cysts and Tumours?

Jaw cysts and tumours can develop in the upper or lower jaw bone and can affect anyone from children to adults. Cysts and tumours can develop as a single lesion or as multiple lesions in the upper and lower jaws.

They usually go unnoticed when they are small but some might progress to significant swelling of the jaws which then prompt patients to seek consultation. Because of their generally slow growth, most cases are discovered through x-rays either during routine checks or during investigation of other problems in the jaws.

### Causes of Jaw Cysts and Tumours

The lesions can arise from odontogenic (tooth related) or non-odontogenic causes. Most lesions are developmental but some of the multiple lesion types can be hereditary in nature.

### Symptoms

Below are some of the signs and symptoms that might occur with jaw cysts and tumours:

- Swelling of the jaw
- Pain from the jaw (infection in cysts and tumours)
- Numbness of lower lips and chin
- Numbness of anterior part of the tongue
- Difficulty in biting or chewing
- Facial deformities

### Diagnosis

A biopsy (whereby a sample of the tissue is taken for study) is usually indicated for accurate diagnosis of the lesions.

X-rays and CT scans can be used to assess the severity of jaw cysts and tumours.

### Treatment

Treatment of jaw cysts and tumours usually require a surgery for removal. The surgery can range from simple removal of the lesion and/or part of the jawbone which will require reconstruction (refer to Head & Neck Reconstruction). Treatment might be indicated for the teeth involved in the form of extractions or root canal treatment.

### Role of GPs

The oral cavity is easily accessible for examination in the primary care setting. A detailed history of the onset of symptoms and examination of the oral cavity, face and neck region is useful in the evaluation of any associate symptoms. Any oral lesions suspicion of cancer with associated enlarged lymph nodes, facial asymmetry and numbness around tongue, lips and chin should render a referral to the SingHealth Duke-NUS Head & Neck Centre for a thorough examination and further investigations.



# COMMON HEAD & NECK RECONSTRUCTION

- **Nasolabial Flap**
- **Rhomboid Flap**
- **Pectoralis Major Flap**
- **Latissimus Dorsi Flap**
- **Radial Forearm Flap**
- **Anterolateral Thigh Flap**
- **Fibula Free Flap**

Specialist services available at:

**Head & Neck Centre @ Singapore General Hospital**

Tel: 6321 4377 (for appointments)

**Head & Neck Centre @ National Cancer Centre Singapore**

Tel: 6436 8088 (for appointments)

# About Head and Neck Reconstruction

Operative treatment of head and neck cancers can result in impairment of swallowing, speech, respiration and appearance. Alongside control of the disease, rehabilitation is an essential goal of treatment. Reconstruction, often in the form of flap surgery, aims to restore form and function for rehabilitation.

Flap surgery refers to the transfer of tissue, with its blood supply, from a healthy part of the body (donor site) to the defect (recipient site). Flaps can be categorized into local, regional and free flaps.

## A) Local Flaps

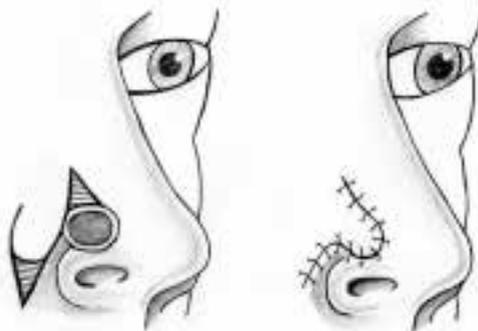
Local flaps are harvested from tissue adjacent to the defect. Local flaps are favoured in the head and neck when compared to distant flaps due to its excellent colour and texture match. They are commonly used for closure after resection of small skin cancers. Examples of local flaps include the nasolabial and rhomboid flap.

### 1) *Nasolabial Flap*

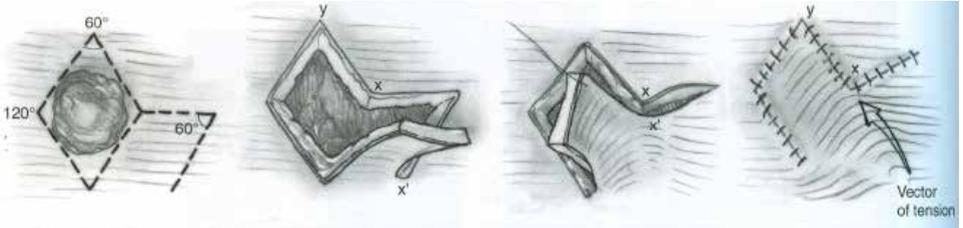
The nasolabial flap utilizes skin laxity around the nasolabial fold to close nasal, perioral and intraoral defects, with the option of performing a bilateral procedure for larger defects.

The flap can be harvested as a random pattern flap or an axial flap based on perforators from the facial and angular arteries, and can be used as a one-stage or two-stage flap.

For the two-stage procedure, the flap is divided 2 to 4 weeks after the initial surgery and appropriately thinned and contoured. The nasolabial flap provides good aesthetic outcomes, and a low incidence of post-operative trismus due to the proximity of the donor site.



*Nasolabial Flap*



*Rhomboid Flap*

## 2) Rhomboid (Limberg) Flap

Rhomboid flaps are transposition flaps that are rotated about a pivot point. They are designed with 60- and 120- degree angles, and the longitudinal axis of the rhomboid parallels the line of minimal skin tension. This technique can be expanded to create a double or triple rhomboid flap. The donor site of the flap can be closed by direct sutures.

## B) Regional Flaps

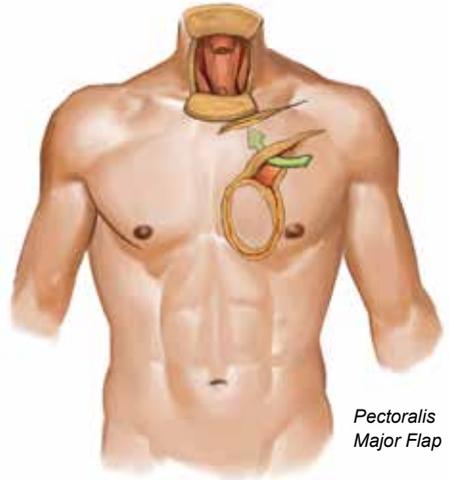
When there is inadequate tissue adjacent to the defect for coverage, regional flaps are harvested from tissue in the vicinity of the defect. Regional flaps are raised based on a specific vascular system. The flap is rotated into the recipient site with its pedicle attached at its base.

Donor sites can be closed by direct suture or skin graft. Examples of regional flaps commonly used in the head and neck include the pectoralis major and latissimus dorsi flap, which are pedicled flaps usually harvested as a myocutaneous flap consisting of muscle and skin.

In addition to reconstructing large defects, these flaps serve to protect the great vessels after neck dissection, especially against the effects of radiation therapy.

## 1) Pectoralis Major Flap

The pectoralis major flap is the most widely used regional flap in head and neck cancer reconstruction due to its versatility, reliability and ease of harvest. Its skin paddle is designed over the medial aspect of the muscle.



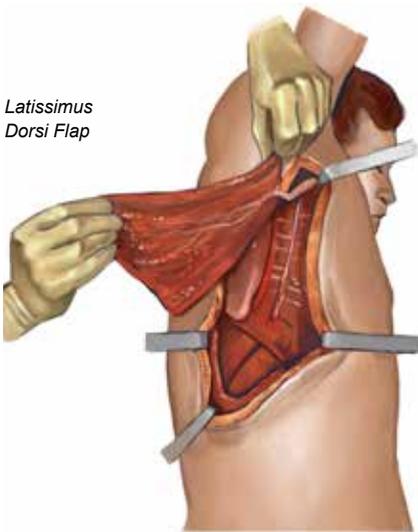
*Pectoralis Major Flap*

The flap is raised based on the pectoral branch of the thoracoacromial artery and tunneled through the neck. The pectoralis major flap can be used for defects up to the temporal line, and as a tubular flap to reconstruct the hypopharynx and cervical esophagus.

## 2) *Latissimus Dorsi Flap*

The skin paddle of the latissimus dorsi flap is designed over the upper two-thirds of the muscle. The flap is raised based on the thoracodorsal artery and tunneled through the axilla into the defect.

The latissimus dorsi flap is the largest soft tissue flap that can be harvested in the body with



*Latissimus Dorsi Flap*

excellent pedicle length that can reach the anterior midline, and defects as high as the skull vertex. The skin paddle is hairless and the donor scar is less noticeable.

## C) *Microsurgical Free Flaps*

The arrival of microsurgical techniques, which uses special operating microscopes and instruments, has allowed the possibility of performing intricate operations on tiny blood vessels in our body. This, in turn, has made tissue transfer from a distant site to reconstruct defects in the head and neck region after surgical resection feasible.

The tissue that is harvested from the patient's own distant body site for reconstruction is known as a free flap. This may include the skin layer and the underlying muscles and tissues together with its supplying blood vessels. This flap is then transferred to the head and neck area where the blood vessels are reconnected under microscopic magnification and the skin used to resurface the defect.

This has allowed surgeons to adopt a more aggressive approach in resecting tumours that would have resulted in defects that were previously deemed too extensive for reconstruction.

Besides allowing for a larger volume of tissue to be transferred

to these defects, the use of free flaps has also resulted in more precise reconstruction of head and neck defects. Reconstruction of complex defects involving bone, muscle and soft tissue can also be reliably achieved.

The common free flaps that are used for reconstruction of head and neck defects in our institution are the anterolateral thigh flap (outer border of thigh), fibula free flap (lower leg) and flap radial forearm flap (lower arm). Each patient is unique and the expertise of the reconstructive surgeon is harnessed to plan the most suitable method of reconstruction to achieve both functionally and aesthetically acceptable outcomes.

### 1) *Anterolateral Thigh (ALT) Flap*

An anterolateral thigh (ALP) flap is obtained from the outer border of the thigh. This is often used in reconstruction in the mouth and throat after removal of tumour. The flap is connected to the blood vessels in the neck as it is a living graft.



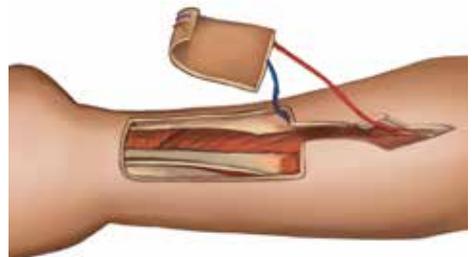
*Anterolateral  
Thigh*

The doctors and nurses will ensure that the graft is healthy by monitoring the reconstructed area and donor site (where graft is obtained) closely. It is important for you to start exercising (as indicated by the doctors) your hip and knee to ensure that you regain full movement. There may be some restriction in movement after surgery due to swelling, bandaging or drains in your leg. Gentle lower limb exercises can also help to reduce any swelling. Complete recovery of the leg can be expected within 3 months.

### 2) *Radial Forearm Flap*

A radial forearm flap is an area of skin and tissue obtained from the lower arm. It is a commonly used flap for reconstruction of the mouth area following head and neck surgery. It is considered one of the most reliable flaps for reconstruction surgery.

The area where the flap is taken from the forearm is usually covered



*Radial Forearm Flap*

with a skin graft. The doctors and nurses will ensure that the graft is healthy by monitoring the reconstructed area and donor site (are where graft is obtained) closely.

It is important to exercise your elbow, wrist and fingers (as indicated by the doctors) in order to regain full movement. You will need to wear a splint to stabilize the forearm after the bandages are removed. Gentle exercises will help to reduce any swelling, and prevent stiffness at the elbow and wrist joints. Complete recovery of the arm can be expected within 3 months.

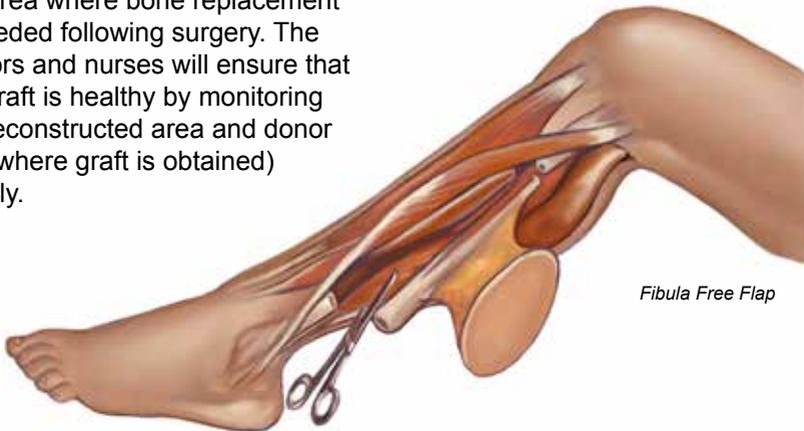
### 3) *Fibula Free Flap*

A fibula free flap is obtained from the lower leg (fibula) where tissue and bone is taken for reconstruction. The area commonly reconstructed using this flap is the jaw area where bone replacement is needed following surgery. The doctors and nurses will ensure that the graft is healthy by monitoring the reconstructed area and donor site (where graft is obtained) closely.

You will need to avoid placing any weight on the leg where the flap is obtained as it may be sore after the surgery. To help reduce the pain and improve the movement in the leg, gentle exercise can be done on while on the bed or chair.

Your leg will be bandaged and placed on a plaster cast to stabilise the area. You may start mobilising with a walking frame or crutches initially and progress to a walking stick when the leg can take more weight as it recovers. Complete recovery of the lower leg can be expected in 3 to 6 months.

Our multidisciplinary team of Allied Health Professionals, which includes the physiotherapist, occupational therapist, dietitian will aid in your recovery during the hospital stay and after you are discharged.



*Fibula Free Flap*

# SUPPORT SERVICES

- **Allied Health Professionals**
- **Common oral complication post head and neck therapy**
- **Oral Rehabilitation**
- **About SingHealth Duke-NUS Head & Neck Centre**

Specialist services available at:

**Head & Neck Centre @ Singapore General Hospital**

Tel: 6321 4377 (for appointments)

**Head & Neck Centre @ National Cancer Centre Singapore**

Tel: 6436 8088 (for appointments)

# Allied Health Professionals (AHP) Services

Head and Neck cancers can involve a wide variety of sites, including the lips, oral cavity, pharynx, larynx, nasal cavity, paranasal sinuses, major salivary glands and thyroid glands. Tumours affecting these sites require multimodality treatment including surgery, radiotherapy and chemotherapy. Treatment-related side effects may leave the patient with psychological, physical and nutritional issues that can directly impact their treatment. Thus, a multidisciplinary team is paramount in a patient's treatment process.

A pre-treatment assessment is done in order to develop an individualised care plan for the patient. Most patients scheduled for major head and neck surgery will be referred to the Allied Health Professionals (AHP) clinic. In this clinic, patients are assessed on their pre- and post-surgery needs. Our AHPs are introduced and speak to patients and their loved ones to adequately prepare and support them in their rehabilitation, nutritional and emotional needs.

1. Most of the patients scheduled for major head and neck surgery will be referred to the Allied Health Professional clinic for education on pre, during and post- surgery care & management and assessment by the group.



2. This will prepare the patient and their caregivers on pre & post-surgery rehabilitation, nutritional and psychosocial needs.

## Speech Therapist

Speech and language therapists (SLTs) are allied health professionals who assess, treat, and manage communication and swallowing difficulties.

Head and neck cancers and their treatment can cause changes in a patient's voice, speech and swallowing abilities.

Our SLTs help in the compensation and rehabilitation of these difficulties. They work closely in the multidisciplinary team, and are

involved in a patient's care from diagnosis through to supporting them back to work and life long after treatment is complete.

### Communication

Before your treatment, the SLT will speak with you about your communication habits and needs. She will explain to you the possible changes in voice and speech that may occur during and after your treatment. If necessary, the SLT will work with you to establish an alternative method of communication in the time when you may find speaking difficult.

After your treatment, the SLT will work with you to improve the precision and clarity of your speech. Close collaboration with your surgeons and prosthodontists allow for customised rehabilitation.

If your surgery involves removal of your voice box, the SLT will work with you and your surgeon to find a method of rehabilitating your voice that is most suitable for you.

These methods may include:

1. Oesophageal speech: Talking by swallowing and burping out air from the oesophagus.
2. Artificial larynx: Using external or electronic devices to produce a voice.
3. Tracheoesophageal prosthesis (TEP): Speaking through a small

one-way valve that allows air to pass from the lungs to the throat.

The SLT can also work with you on using external communication aids, such as electronic tablets and communication charts to help you communicate.

### Swallowing

Before your treatment, the SLT may assess the way you swallow, so as to identify and help you with any difficulties you may have. She will explain to you the changes in swallowing that may happen during and after your treatment.

The SLT will work with you to develop strategies to compensate for your swallowing difficulties, and exercises to rehabilitate your swallowing function.

These may include:

- Posture and positioning changes when eating and drinking



- Special swallowing techniques
- Muscle-strengthening exercises

After surgery, you may need to undergo a videofluoroscopic swallow (VFS) study or a fibre-optic endoscopic evaluation of swallowing (FEES). A VFS is a video X-ray study that allows the SLT to review the oral and pharyngeal phases of swallowing. A FEES is where an SLT passes a small flexible endoscope through the nose to the throat to look at how the swallowing muscles move. In both studies, you will be given a range of food consistencies to try.

### Dietitian

Malnutrition is highly prevalent in patients with cancer and it is well recognised that patients with head and neck cancer are among those at highest nutritional risk, even before treatment starts.



This is because symptoms associated with cancer e.g. ulceration/difficulty in swallowing can directly affect the patient's intake. Malnutrition is found to be associated with increased risk for infections, decreased response to treatment and poorer quality of life.

Nutritional status can further be compromised when treatment starts due to their adverse effects. Common side effects of surgery include difficulty in swallowing or pain during swallowing, while those of radiotherapy and chemotherapy include difficulty in swallowing, mucositis, stomatitis, nausea, anorexia and altered taste sensation.

These adverse effects experienced by the patient lead to a reduction in nutritional intake, and thus causing unintentional weight loss and malnutrition.

### *Nutrition screening and assessment*

At the Head and Neck Centre, a quick and simple questionnaire that can be administered by the patient, nursing staff or doctor, is used to help identify patients at high risk of malnutrition before the surgery. These patients are then referred to the Dietitian for a detailed nutritional assessment and intervention.

### *Early nutrition intervention*

The intervention includes medical nutrition therapy recommended by the

Dietitian to help optimise the nutritional status and thus minimise the risk of malnutrition-related complications.

Individualised nutrition care plan may include food texture modification if there are chewing or swallowing difficulties, food choices, food fortification, use of oral nutritional supplements and devising tube feeding regimen.

### Physiotherapist

Physiotherapists (PT) are professionals who provide services that develop, maintain and restore people's maximum movement and functional ability. All patients who are seen by a PT will be assessed on the domains of fitness, respiratory health and functional limitation. The PT will then prescribe and guide patients



through specific exercises to help them regain functional mobility and joint movement and maintenance of pulmonary hygiene.

During the early post-operative period, the assistance and guidance by the PT for patients post head and neck surgery is critical as they may experience pain, stiffness, swelling and weakness in the affected and surrounding areas.

Limitation in mobility may worsen after surgery due to immobility associated with the post-operative discomfort. PTs will gradually introduce patients and carers to various exercises to optimise posture, strengthen neck and shoulders muscles and prevent limb swelling.

Additionally, PTs can perform procedures and teach patients techniques to assist in clearing secretions.



### Occupational Therapist

Occupational Therapists (OT) are professionals who help to improve your ability to perform activities in your daily living and working environment to a desired level of functioning. They assess patients and carry out treatment interventions that help improve patient basic motor function and reasoning ability.

Activities of daily living such as eating, dressing and showering are incorporated into treatment interventions to maximize patient's independence in self-care. OTs also advise on assistive devices and

educate patients on compensatory techniques when there is impaired function e.g. blindness/loss of a limb.

Home visits and caregiver trainings are provided for patients and their caregivers who may require modifications to their home environment post-surgery. Assessments on physical and work demands would be conducted by OTs to facilitate early return to work and resumption of roles in the family.

The OT trained in the management of lymphoedema uses specialised massage techniques to manage swelling post-operatively or as a result

of cancer treatment. Customised pressure garments are also provided to patients to manage swelling and/or scarring.

In SGH, the OTs conduct a weekly group therapy session to educate patients and their caregivers on the importance of exercises post-surgery, and to facilitate discussion on issues related to activities of daily living. It is also a channel for patients to overcome their fears through the support and sharing during the group session.

Our team of occupational therapists, with their skills and knowledge of health management, ensure that there is a high standard of service provision to people with diverse needs. We hope that the provision of these quality services would help our clients reduce the cost of injuries and disabilities and lead a better quality of life.

### Clinical Psychologist

Head and Neck Cancers and its treatment bring extraordinary challenges for patients and their families. You and your family may experience significant emotional challenges from dealing with the shock of the diagnosis and the implications of treatment to an acceptance of the illness. Psychosocial and emotional support can ease the strain of a challenging illness and enhance coping during your cancer journey.

Clinical psychologists aim to enhance and promote well-being and manage emotional distress. They will work closely with you and your loved ones to help strengthen the way you cope and manage your illness concerns. Treatment effects from surgery, chemotherapy and radiotherapy often bring about concerns about body image, implication on lifestyle and other practical matters.

Our clinical psychologist will assist to develop an individualised plan to help you be more prepared for the upcoming treatment journey ahead and support you as you come to terms with the illness and the treatment required. You may speak to your doctor for a referral to our service.

# Common Oral Complications of Head and Neck Cancer Therapy

## Is there anything I should do before starting my radiation therapy?

Radiation therapy of the head and neck can increase your risk of getting dental decay. Oral care is therefore aimed at preventing oral problems before they occur. Before starting radiation therapy, your radiation oncologist will refer you for a dental examination. Dental X-rays will be taken and a comprehensive examination will be carried out to check for:

- Tooth decay (caries)
- Gum (periodontal) disease
- Infected teeth
- Retained root tips

Any other conditions that may cause problems during or after radiation therapy.

It is important to undergo the necessary dental treatments before radiation therapy starts and continue to see a dentist after you have completed your radiation therapy.



## What are the common side effects of head and neck cancer therapy?

Most of the side effects start within 2-3 weeks of treatment but can increase throughout the duration of the radiation. Some side effects are temporary and will improve with time; however, others may be permanent.

Some common side effects:

- Skin redness and irritation
- Changes in taste (Dysgeusia)
- Sores in the mouth (Mucositis)
- Dry mouth (Xerostomia)
- Tooth decay (Caries)
- Bone death (Osteoradionecrosis)
- Limited mouth opening (Trismus)
- Difficulty in Using Dentures or Prosthesis

## Skin redness and irritation

The skin area undergoing radiation may become red and itchy. Be very careful not to apply anything unless instructed by your radiation oncologist. Depending on the area treated and dosage used, your skin may or may not return to normal.

### Changes in taste (Dysgeusia)

Food will taste differently during your radiation therapy. The taste buds are affected by the radiation. Usually the sense of taste will improve over time. In most people the ability to taste foods return to normal within 6 months to a year.



### Sores in the mouth (Mucositis)

Soreness in your mouth will usually appear in the second and third week of the radiation therapy. It is likely to decrease from the fifth week onwards up to a month after your treatment ends. The sores and ulcers can get uncomfortable and may interfere with proper intake of food, speech and oral hygiene. You can soothe the soreness by rinsing with warm alkaline solution or applying anaesthetic gel to numb

the mouth before eating or brushing. If you experience difficulties with these activities, your physician or dentist can prescribe the appropriate medication for you.

### Dry mouth (Xerostomia)

Saliva serves to lubricate the mouth and protect teeth. Radiation affects the salivary glands resulting in a decrease in normal salivary flow. Saliva will thicken and make swallowing difficult.

Drinking as much fluid as possible will loosen the thick saliva and lubricate the mouth. When eating, try to take a drink between each bite of food. Pureed food will be easier to eat, as with foods served with sauces, gravy and butter.

Eating more often with smaller portions will be easier than eating the traditional three meals daily. If you have difficulty eating, ask your





physician for liquid food supplements. If the dryness worsens, salivary substitutes are available to help your mouth feel more comfortable.

### **Tooth decay (Caries)**

When salivary flow is decreased, the protective mechanism of the saliva is diminished, resulting in teeth being susceptible to decay. It is very important that you avoid foods high in sugar and brush regularly after each meal to prevent decay.

The use of fluoride will help prevent caries and your dentist can fabricate a customised tray to help apply fluoride to your teeth. It is important to see your dentist regularly every 3 to 6 months to check on your dental health.

### **Bone death (Osteoradionecrosis)**

The most debilitating side effect of radiation therapy is bone death from

the destruction of small vessels which carry nutrients and oxygen to the living bone. This reduces the bone's ability to heal itself. Should you require tooth extraction after radiation therapy, you are at risk of developing bone death.

This is a difficult condition to treat; therefore, it is important that dental extractions are done before the start of radiation therapy and after treatment, maintenance of good oral health is crucial.

### **Limited mouth opening (Trismus)**

Trismus is another complication that may develop after radiation therapy. It is a result of scarring of the facial muscles from radiation. Limited mouth opening, combined with dry mouth, may interfere with speech, eating and the ability to maintain oral hygiene.

Stretching exercises are important to minimise post-treatment trismus. Your

doctors and therapists may prescribe jaw stretching exercises suitable for you. It is advisable to do these exercises as often as prescribed to minimise post-treatment trismus.

### Difficulty in Using Dentures or Prosthesis

Due to less saliva and soreness in the mouth, you should avoid wearing dentures during the treatment period. After completing your radiation therapy, you should consult your

dentist before you begin to wear dentures again. If you find major differences in fit, your dentist will be able to help you correct it.



## GENERAL CARE TIPS

### Do's

- Rinse with warm alkaline solution (1 teaspoon salt and 1 teaspoon baking soda dissolved in a 240ml glass of warm water) to lubricate and soothe sore tissues
- Brush and apply fluoride regularly to prevent decay
- Exercise mouth opening to reduce trismus

### Don'ts

- Avoid using deodorants or deodorant soap on radiated skin areas
- Avoid rubbing the skin in the areas that have been exposed to radiation
- Avoid direct sun exposure on the radiated areas
- Avoid shaving with a razor; using an electric razor is safer
- Avoid alcoholic beverages & tobacco use
- Avoid very sweet and spicy foods
- Avoid alcohol-based mouthwash as it may worsen mouth sores
- Avoid wearing dentures during the treatment period

# Oral Rehabilitation



After cancer therapy, depending on your oral health status, missing teeth can be replaced by:

- Removable prostheses such as partial or complete dentures
- Fixed prostheses such as bridges or implants
- Combination of removable and fixed prostheses

Also, it is important to get regular dental check ups and routine dental cleaning by a dentist or dental hygienist to ensure healthy gums and treat dental decay early to avoid the need for complex dental treatment like root canal therapy or tooth extraction.

In those who had undergone radiation therapy, it is important to eliminate any possible sources of bone infection that can lead to osteoradionecrosis of the jaw bones.

# About SingHealth Duke-NUS Head & Neck Centre



## Head & Neck Centre

The SingHealth Duke-NUS Head & Neck Centre specialises in management of diseases and tumours of the head and neck region. It provides a disease-based multidisciplinary one-stop service dedicated to complex Head & Neck diseases/tumours. The centre is helmed by five specialties which are:

- General surgery
- Otolaryngology (ENT)
- Plastic Reconstructive and Aesthetic surgery
- Oral and Maxillofacial surgery
- Allied Health Professional

The Centre forms a unique platform for the collaborative work of a multidisciplinary team of healthcare professionals to meet the needs of the patient throughout the disease trajectory.

Our clinicians work closely together with the nurses and allied health professionals, to achieve the best outcomes for our patients in the

pursuit of comprehensive oncological resection, aesthetic reconstruction and functional rehabilitation.

Cases are discussed at a multi-disciplinary tumour board comprising of surgeons, medical oncologists, radiation oncologists, speech therapists and other allied health professionals.

Our team of specialists are experienced in the assessment and management of complex head and neck diseases and tumours. Besides providing clinical services to our local population, we are also a regional referral centre and a leading centre for clinical research.

The multidisciplinary one-stop SingHealth Duke-NUS Head and Neck Centre is currently located at **Block 3, Singapore General Hospital, and Clinic C, National Cancer Centre Singapore.**

We will see all referrals within two weeks for specialist evaluation.

## Our Services

Evaluation and treatment of confirmed or suspected head and neck tumours, including:

- Thyroid and Parathyroid gland swellings
- Salivary gland tumours
- Tumours of the oral cavity, oropharynx, nasopharynx, hypopharynx and larynx
- Nasopharyngeal carcinoma
- Skin tumours and sarcomas in the head and neck region
- Sinonasal tract tumours
- Cervical lymphadenopathy

We are specialised in the following treatment/procedures:

- Oncological resections of complex head and neck malignancies
- Transoral robotic & endoscopic robotic skull base surgery
- Head and neck oncologic reconstructive surgery & skin malignancy
- Salivary gland, thyroid and parathyroid surgery including endoscopic and robotic thyroidectomy
- Resection of salivary gland tumours
- Paediatric head and neck surgery
- Oral and maxillofacial surgery and rehabilitation

## Allied Health Professionals

### *Speech and Language Therapist*

Speech and Language Therapist (SLT) are allied health professionals who assess, treat and manage patients with communication and swallowing difficulties. Head and neck cancer and its treatment can cause changes in voice, speech and swallowing. Our SLTs will work with you and your loved ones/ caregivers to support and rehabilitate your communication and swallowing difficulties.

Our services include:

- Speech and swallowing therapy
- Post-laryngectomy voice rehabilitation
- Prosthetic speech and swallow rehabilitation (PSSR)

### **Dietitians**

Dietitians are qualified healthcare professionals who assess patients' nutritional status, diagnose and plan the necessary intervention for the patients' requirements based on their medical, dietary and psychosocial history.

The adverse effects experienced by the patient lead to a reduction in nutritional intake which can result in unintentional weight loss and malnutrition. Thus, dietitians play a pivotal role in ensuring that the nutritional needs of our Head and

Neck patients are met to minimise the risk of malnutrition-related complications.

Services include:

- Nutrition assessment
- Early nutrition intervention including food texture modification, food fortification, use of nutritional supplements and devising tube feeding regimen if indicated, (taking into account the patient's other medical conditions where applicable)

### Occupational Therapist

Occupational Therapy is a health care profession concerned with people of all ages whose everyday life has been affected by physical, cognitive, and/or mental health problems.

Occupational therapists use everyday activities (occupations) in a purposeful and meaningful manner, and a variety of treatment methods to obtain a desired level of functioning to perform their roles and tasks in daily living such as productivity (work/education), self-care, play and leisure.

Our team of occupational therapists, with their skills and knowledge of health management, ensure that they continue to provide a high standard of service to people with diverse needs.

We hope that the provision of these quality services would help our



clients reduce the cost of injuries and disabilities, leading to better quality of life.

Services include:

- Upper limb rehabilitation
- Activity of Daily Living Re-training
- Scar management
- Lymphedema management

### Physiotherapist

Patients with head and neck tumours sometimes experience pain, stiffness and swelling in the affected and surrounding areas. They also may present with difficulty clearing their own secretions. After surgery, these problems may worsen. The physiotherapist can assess and initiate exercises to help improve your mobility and strengthen your neck and shoulders. The physiotherapist will also assess your posture and advise

you accordingly. Physiotherapists can perform treatment and advise on various techniques to help with clearing of your secretions and manage the swelling in your limbs.

Services include:

- Teaching of airway clearance techniques
- Advice on posture
- Advice on stretching exercises for shoulder and neck
- Advice on range of motion exercises
- Issue of anti-embolism stockings
- Issue of incentive spirometer if applicable (patients with tracheostomies, laryngectomies and not for surgery on the face or jaw)

## Psychosocial Oncology

The Department of Psychosocial Oncology from National Cancer Centre Singapore provides a comprehensive range of psychosocial services to support patients and their loved ones deal with psychological, emotional, social and practical demands of the treatment and recovery process.

It supports the Head & Neck service with a competent team of allied health professionals, many of whom are Medical Social Workers and additionally qualified as Clinical Psychologist, Art Therapist, Psychotherapists or Counsellors.

Services include:

1. Pre-operative/treatment psychosocial assessment and preparation
2. Psychological, emotional and social support and intervention for effective coping throughout treatment and recovery process through:
  - Individual counselling
  - Family counselling
  - Psychotherapy
  - Caregiver support



We have a dedicated team of sub-specialist surgeons and allied health professionals to provide unparalleled holistic and comprehensive care for our patients with Head and Neck diseases.

This multidisciplinary team with complementary skillset enable the relentless pursuit of comprehensive oncological resection, aesthetic reconstruction and functional rehabilitation.

# Acknowledgements

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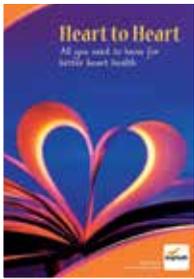
Department of Physiotherapy, SGH

Department of Speech Therapy, SGH

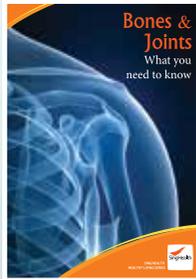
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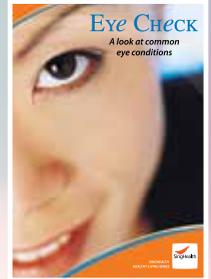
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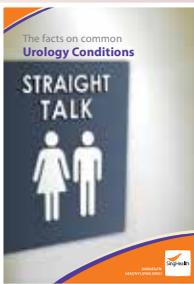
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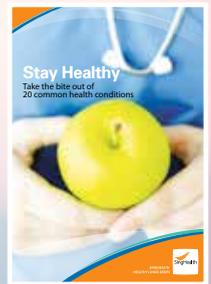
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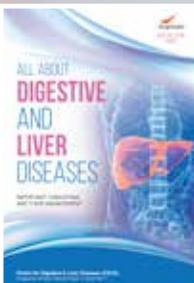
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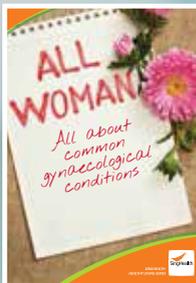
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#### National Specialty Centres



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