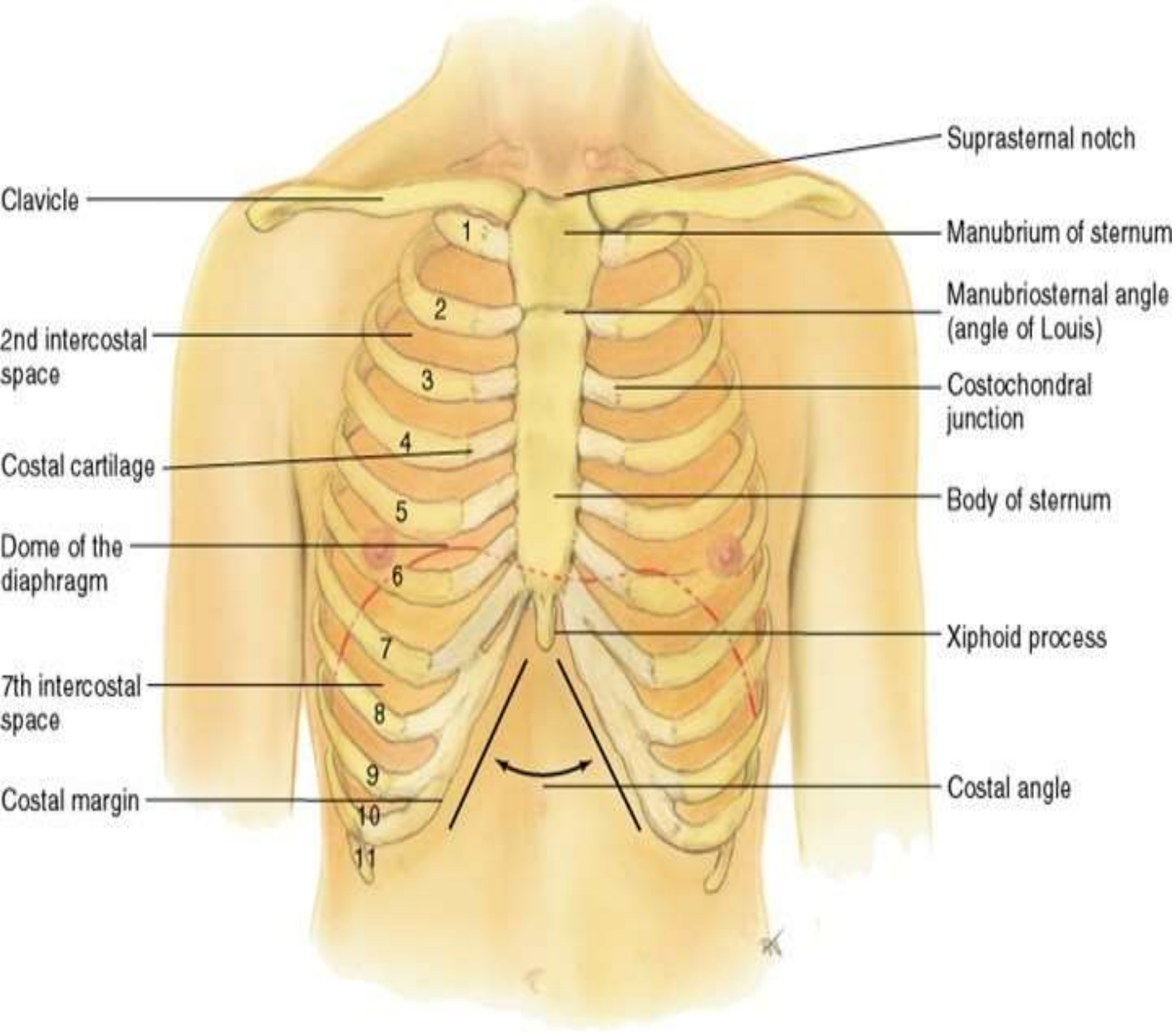
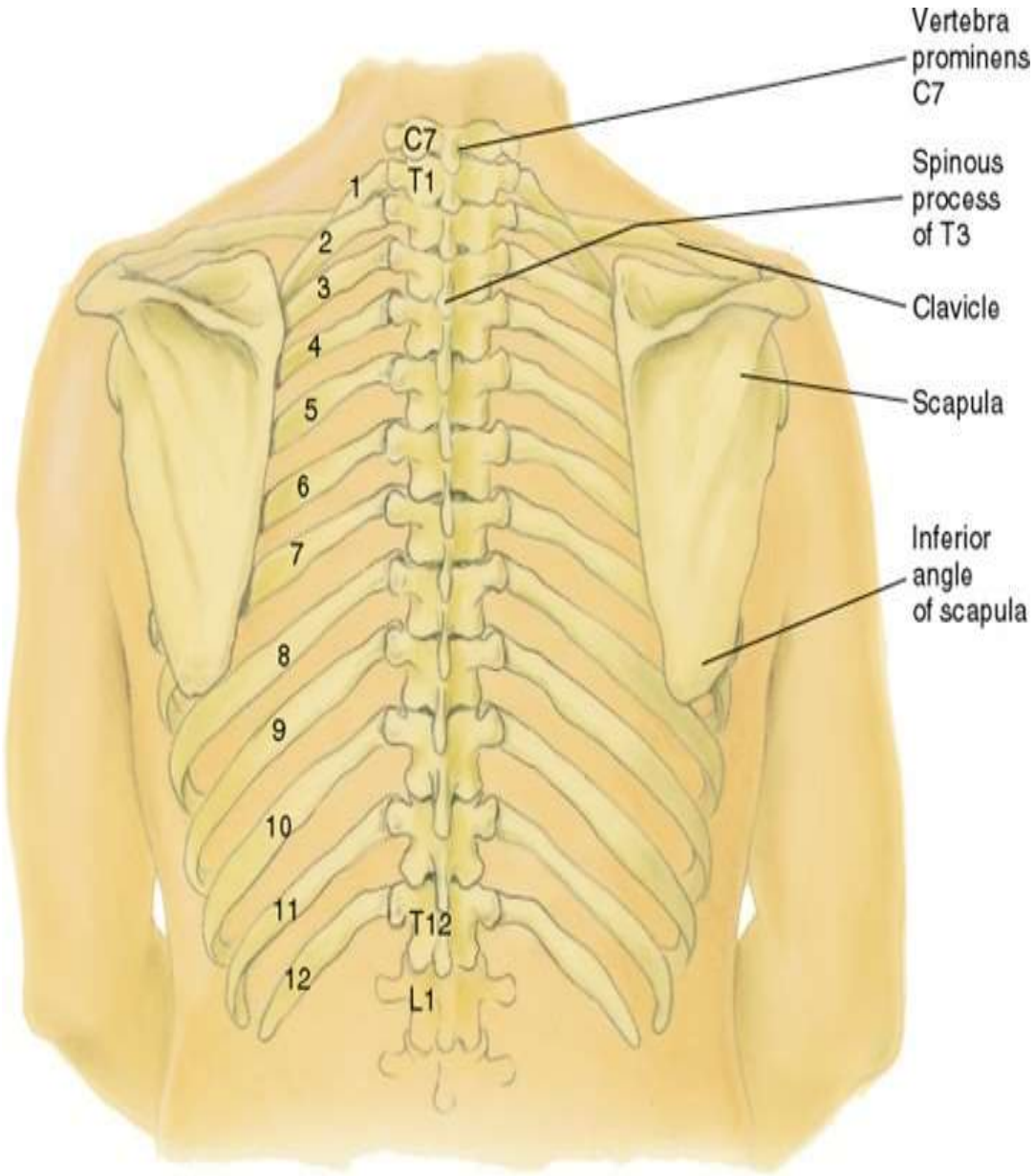
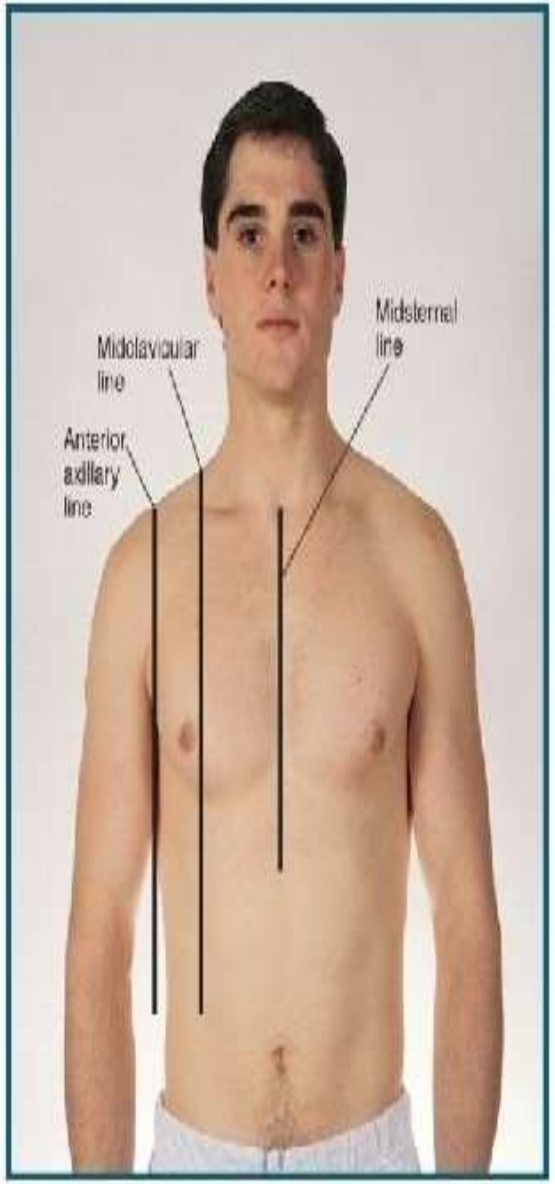




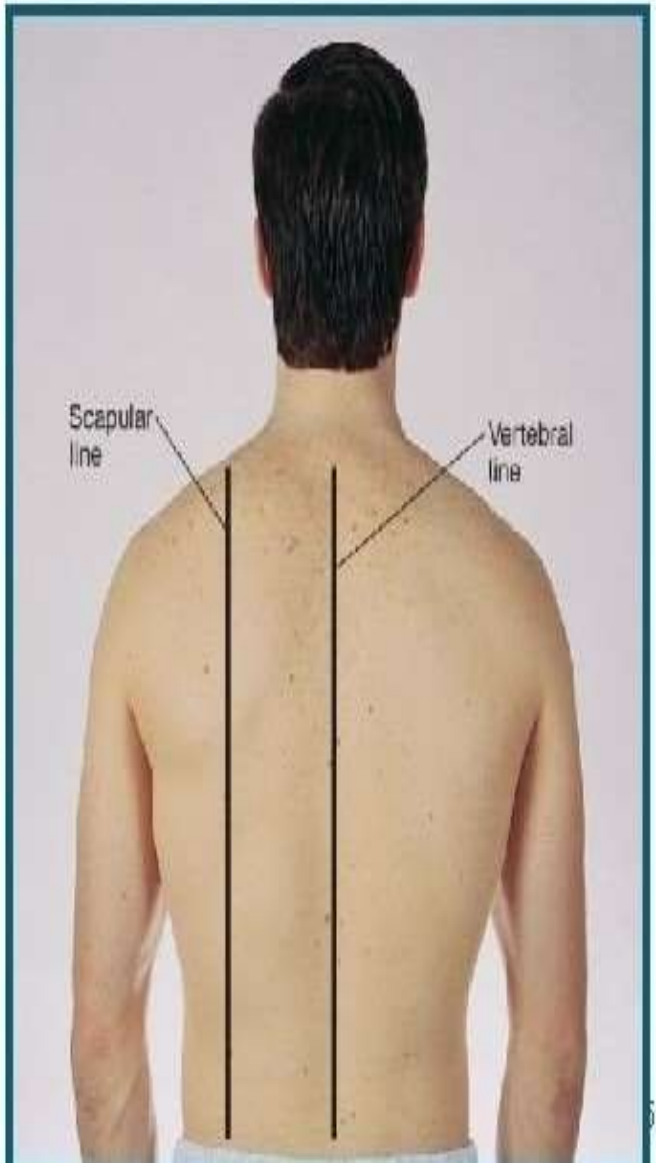
# Reference lines-Anterior

- Midsternal line
- Midclavicular line
- Scapular line
- Vertebral line
- Anterior, posterior, midaxillary lines



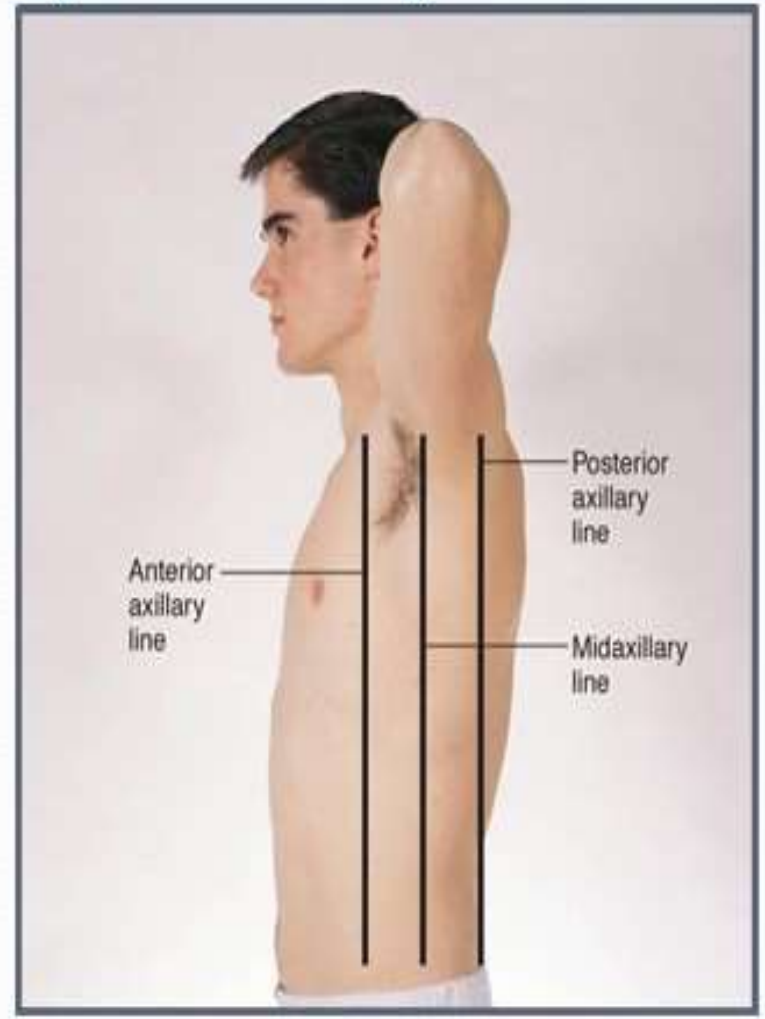

# Reference Lines (Posterior)

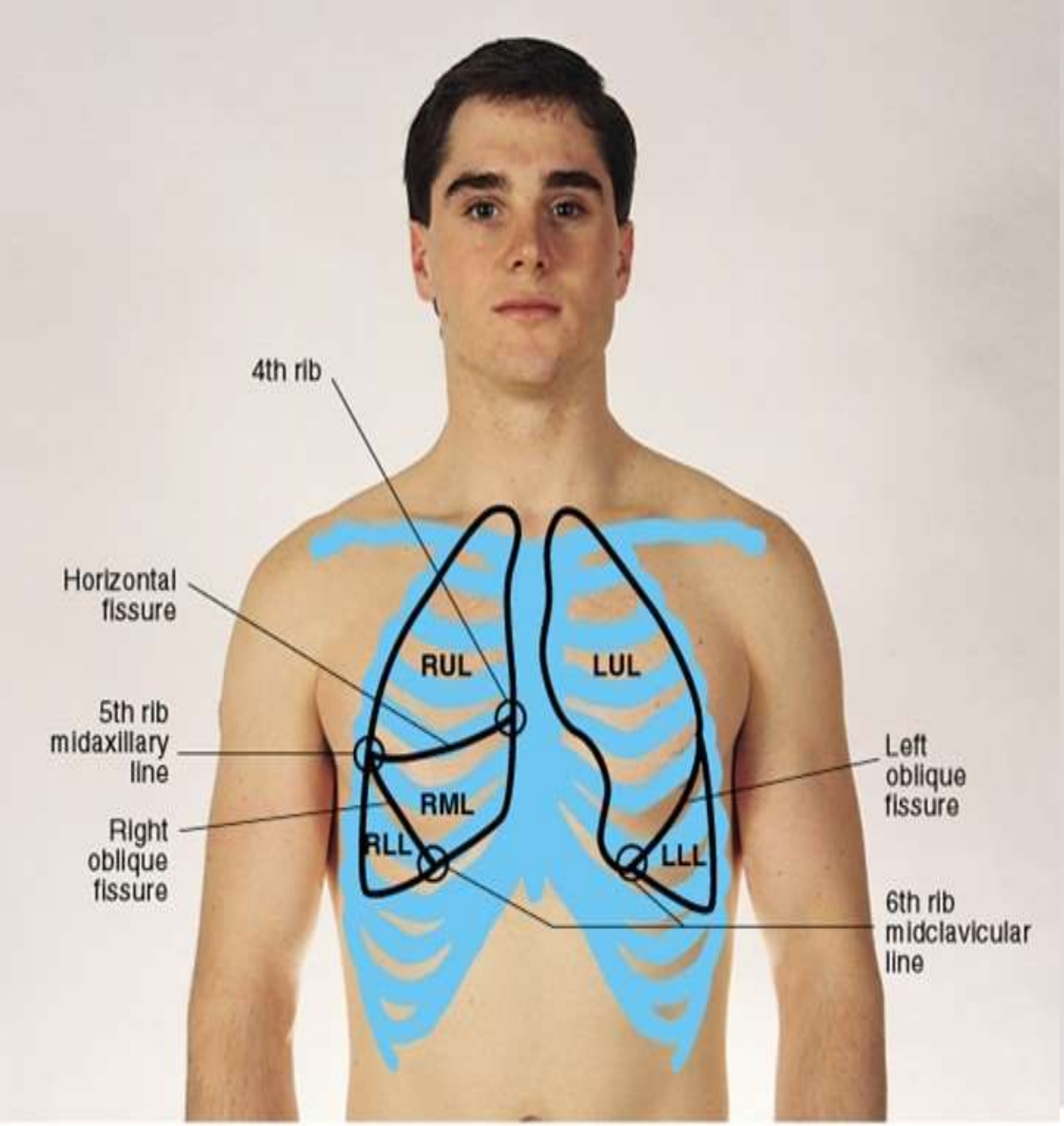
- Vertebral Line
- Scapular Line



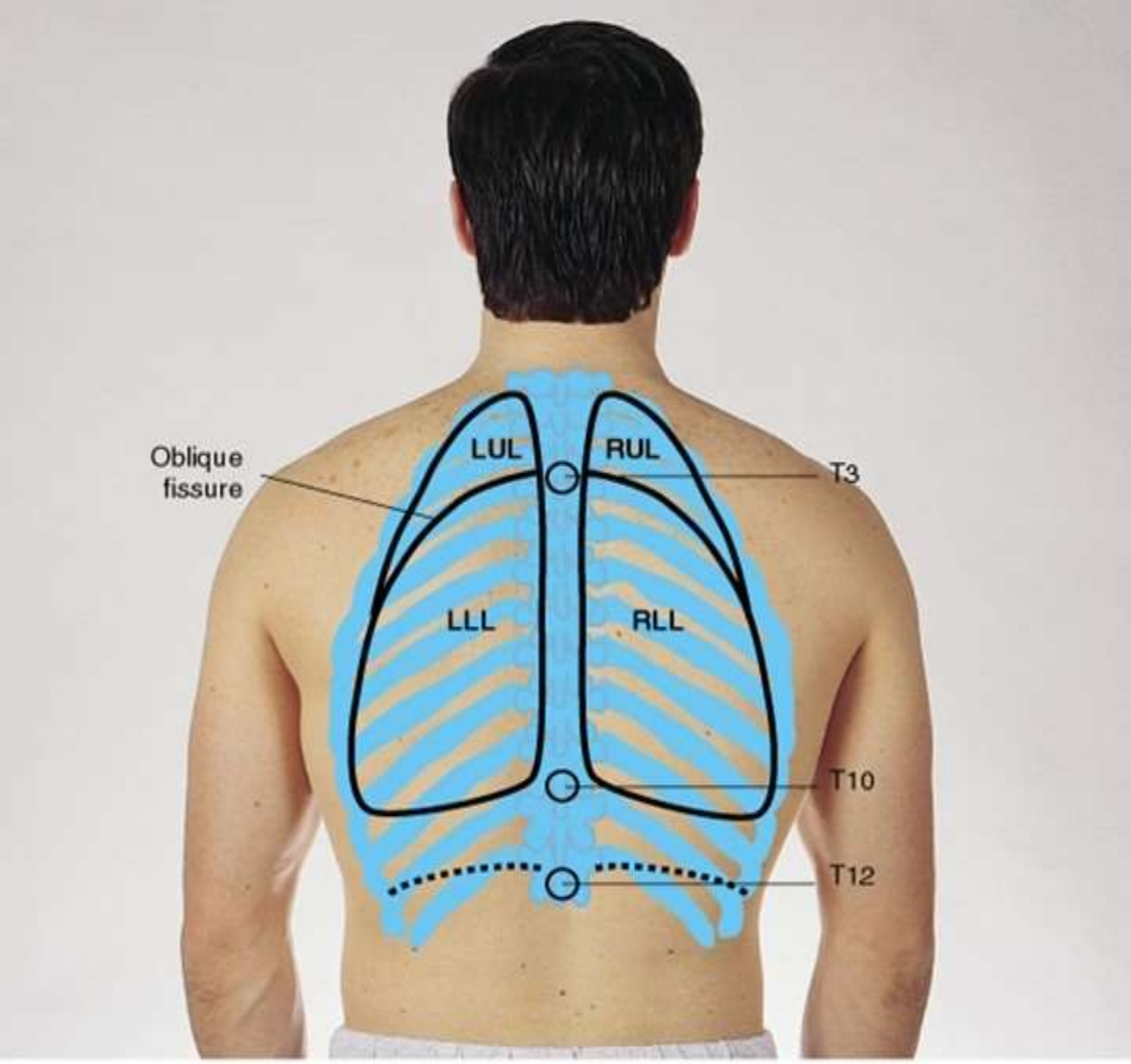
# Reference Lines (Lateral)

- Anterior Axillary
- Midaxillary
- Posterior Axillary







# Chest Examination

- The clinical examination of the chest is part of almost any physical examination. Due to the close relationship with nearby structures such as the heart, great vessels, esophagus, and diaphragm, a careful examination of the chest can provide clues towards a diagnosis.

- History of presenting complaint
- Breathlessness is a major symptom of respiratory disease.

Shortness of breath or breathlessness is a very common symptom related to many underlying pathologies including lung disease. It is important to determine the onset and chronicity of breathlessness. For example:

- Sudden onset: may be consistent with pneumothorax or pulmonary embolism
- Acute onset: may be due to an exacerbation of asthma or COPD
- Chronic onset: may be secondary to fibrosis or COPDgetting better or worse,

- As well as onset, you need to determine the duration of breathlessness, and whether it is associated with any other symptoms (e.g. chest pain with pulmonary embolism). It is useful to ask when the breathlessness is worse. For example, is it exacerbated at work that might suggest occupational asthma.

The key symptoms to determine in the respiratory history include:

- Breathlessness
- Chest pain focus on location, whether the pain is unilateral or bilateral, and if there is a pleuritic component (i.e. Worse on breathing in)

1.The nature, onset, duration, site, and radiation of chest pain
2.Exacerbating and relieving factors of chest pain
3.Associated symptoms.

- Wheeze: anything precipitates it (e.g. cold, exercise, animals)?
- Cough: productive/non-productive
- Sputum: color, quantity, consistency, smell
- Hemoptysis: how often and how much?
- Atopy history: itchy eyes, runny nose, eczema symptoms
- Weight loss: may suggest lung cancer

## Past medical history

It is vital to determine whether there is any pre-existing lung disease so ask about any pre-existing lung diseases such as asthma, COPD, or bronchiectasis. With each condition, determine whether these are well controlled  or poorly controlled (i.e. recurrent symptoms despite treatment).

# Surgical history

Patients with pulmonary disease may have undergone previous thoracic surgery.

Establish whether the patient has undergone thoracic surgery including the type of operation, date, and any complications. If the patient had surgery for lung cancer, determine if they are still under follow-up or having adjuvant therapy (i.e. treatment after surgery).

# Drug history

It is essential to note the type of inhaler, device, concordance, and technique with every patient.

Remember to ask all patients about inhalers and other medications during the consultation. Don't forget to ask about adaptors (e.g. spacer) and whether they are getting side-effects.

For example:

- *Which inhalers are they currently taking?*
- *Do they use a spacer?*
- *Do they use their inhaler every day?*
- *When was their inhaler technique last checked?*
- *Do they have home oxygen therapy or home nebulizers?*

Ensure you ask about any current or recent steroids courses. Consider asking about steroid side-effects if long-term use or recurrent courses.

# Family history

Some pulmonary diseases are inherited like cystic fibrosis.

Ensure you enquire about any conditions that run through the family and consider drawing out a family tree. It is useful to know whether any family members have a history of atopy or have previously been diagnosed with TB.

# Social history

It is vital to determine the functional impact of their symptoms, particularly breathlessness.

Relevant components on social history that are related to respiratory disease include:

- Smoking history: type, amount, pack-years (don’t forget E-cigarette use that can cause vaping-associated lung injury)
- Occupation (current & previous): exposure to organic (e.g. moulds) or non-organic (e.g. asbestos) material?
- Hobbies: close contact with any specific animals or birds?
- Pets
- Recent travel and long haul flights
- Asbestos exposure
- Vaccinations: COVID, pneumococcal, influenza

- **The physical examination of the chest is composed of inspection, palpation, percussion, and auscultation.**

**Inspection**

During the inspection, the examiner should pay attention to the pattern of breathing: thoracic breathing, thoracoabdominal breathing, costal markings, and use of accessory breathing muscles. The use of accessory breathing muscles could point to excessive breathing effort caused by pathologies.

The position of the patient should also be noted, patients with extreme pulmonary dysfunction will often sit up-right, and in distress, they assume the tripod position (leaning forward, resting their hands on their knees).

Breathing through pursed lips, often seen in cases of emphysema.

Ability to speak: patients that are unable to speak or become short of breath during the interview are likely to have a worse pulmonary function or reserve.

Skeletal chest abnormalities should also be noted during the inspection. The most common chest osseous abnormality is pectus excavatum where the sternum is depressed in to the chest cavity. Pectus carinatum is the exact opposite of pectus excavatum: in this anatomical abnormality, the sternum is protruding from the chest wall. Barrel chest could also be present which consists in increased anterior-posterior diameter of the chest wall and is a normal finding in children, but it is suggestive of hyperinflation with chronic obstructive pulmonary disease (COPD) in adults.

Thoracic spine abnormalities such as kyphosis and scoliosis could also be noted during physical examination of the chest.

**Palpation**

Palpation should focus on detecting abnormalities like masses or bony crepitus. During palpation the examiner can evaluate **tactile fremitus**: the examiner will place both of his hands on the patient's back, medial to the shoulder blades, and ask the patient to say "ninety-nine."
An increase in the tactile fremitus points towards an increased intraparenchymal density and a decreased fremitus hints towards a pleural process that separates the pleura from the parenchyma (pleural effusion, pneumothorax). Of note, the fremitus can also be auscultated and can be referred to as vocal fremitus.

## Percussion

It is an assessment technique which produces sounds by the examiner tapping on the patient's chest wall. Just as lightly tapping on a container with your hands produces various sounds, so tapping on the chest wall produces sounds based on the amount of air in the lungs.

The purpose of percussion (Table 46.3) is to determine if the area under the percussed finger is air filled (sounding resonant like a drum), fluid filled (a dull sound) or solid (a flat sound).

## Auscultation

Auscultation of the lungs should be systematic and follow a stepwise approach in which the examiner surveys all the lung zones. For practical purposes, the lung can be divided into apical, middle and basilar regions during auscultation. The description of abnormal breathing sounds should be tagged with the location in which it was heard.

The movement of air generates normal breath sounds through the large and small airways. The absence of breath sounds should prompt the health care provider to consider shallow breath,

- **Vesicular breath sounds/normal breath sounds:** While Laënnec considered normal lung sounds to originate from the flow of air in and out of alveoli, later investigations of the origin of respiratory sounds have not shown lung “vesicles” to participate in sound generation. Therefore, vesicular breath sounds is a misnomer for normal breath sounds.

- Tubular breath sounds are high pitched, bronchial breath sounds, seen in the following conditions: consolidation, pleural effusion, pulmonary fibrosis, distal collapse, and mediastinal tumor over a large patent bronchus.

- **Wheezes:** High-pitched continuous sounds with a dominant frequency of 400 Hz or more. (ATS) Suggestive of asthma, COPD, airway obstruction, or mucus plug.

- **Ronchi:** Low-pitched continuous musical sounds with a dominant frequency of about 200 Hz or less (ATS).

- **Crackles:** A "popping" sound generated by the passage of air through the accumulated secretions within the large and medium-size airways, creating the bubbling sounds (brief, non-musical, “discontinuous” sounds). Seen in COPD, Pneumonia and Heart Failure.

- **Pleural Rub:** Occurs due to inflamed pleural surface rubbing each other during breathing. It is difficult to differentiate from fine crackles, but the sound is similar to rubbing your stethoscope against cotton.

- **Stridor:** A loud, high-pitched, musical sound produced by upper respiratory tract obstruction. It indicates an extra thoracic upper airway obstruction (supraglottic lesions like laryngomalacia, vocal cord lesion) when heard on inspiration. It occurs in expiration if associated with intrathoracic tracheobronchial lesions (tracheomalacia, bronchomalacia, and extrinsic compression). It occurs in both phases if a lesion is fixed, for example, stenosis.