others.com, for detailed information on anatomy books, visit our website www.jaypeebrothers.com, for detailed information on anatomy books

Complimentary Online Student Resource

diginerve
A Jaypee Initiative
Your Guide at Every Step
Video Lectures | Notes | Self-Assessment
Scan code to check out courses

Inderbir Singh's

Textbook of ANATOMY

As per the Competency Based Medical Education Curriculum (NMC)

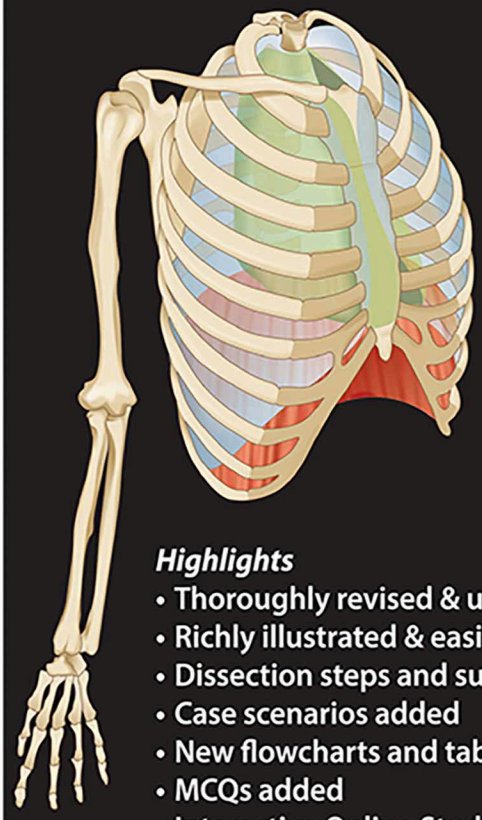
Volume One

Upper Limb
Thorax

SEVENTH EDITION

Revised and Edited by

V Subhadra Devi



Highlights

- Thoroughly revised & updated
- Richly illustrated & easily reproducible figures
- Dissection steps and surface anatomy included
- Case scenarios added
- New flowcharts and tables included
- MCQs added
- Interactive Online Student Resource

Revised Reprint

JAYPEE

Contents

Section 1 Upper Limb

1. Introduction to Upper Limb 3
2. Bones of Upper Limb 10
3. Brachial Plexus and Major Nerves of Upper Limb 55
4. Arteries of Upper Limb 88
5. Venous Drainage of Upper Limb 109
6. Lymphatic Drainage of Upper Limb 115
7. Pectoral Region and Mammary Gland 123
8. Axilla 143
9. Back and Scapular Region 149
10. Arm 173
11. Forearm 194
12. Hand 217
13. Joints of Upper Limb 246
14. Multiple Choice Questions: Upper Limb 288

Section 2 Thorax

15. Introduction to the Thorax 297
16. Vertebral Column 307
17. Bones of Thorax 327
18. Joints of the Thorax 346
19. Walls of the Thorax 356
20. Mediastinum 383
21. Trachea, Bronchi and Esophagus 394
22. Pleura 408
23. Lungs 420
24. Heart and Pericardium 438
25. Blood Vessels of Thorax 472
26. Lymphatics of the Thorax 493
27. Nerves of the Thorax 504
28. Multiple Choice Questions: Thorax 519

Index *523*

JAYPEE BROTHERS

Contents

Section 1 Lower Limb

1. Introduction to Lower Limb 3
2. Bones of Lower Limb 10
3. Nerves of Lower Limb 62
4. Arteries of Lower Limb 89
5. Venous Drainage of Lower Limb 112
6. Lymphatic Drainage of Lower Limb 122
7. Front and Medial Side of Thigh 128
8. Gluteal Region, Back of Thigh and Popliteal Fossa 158
9. Anterior and Lateral Compartments of Leg and Dorsum of Foot 181
10. Posterior Compartment of Leg and Sole of Foot 198
11. Joints of Lower Limb 226
12. Multiple Choice Questions: Lower Limb 259

Section 2 Abdomen and Pelvis

13. Introduction to the Abdomen 267
14. Bones and Joints of Abdomen 278
15. Anterior Abdominal Wall 289
16. External Genitalia and Perineum 314
17. Peritoneum 338
18. Esophagus, Stomach, Small Intestine, Pancreas and Spleen 358
19. Large Intestine and Liver 391
20. Kidney, Ureter and Suprarenal Glands 429
21. Posterior Abdominal Wall and Some Related Structures 450
22. Walls of Pelvis and Related Structures 491
23. Pelvic Viscera 508
24. Multiple Choice Questions: Abdomen and Pelvis 547

Index *551*

JAYPEE BROTHERS

Contents

Section 1 Head and Neck

1. Introduction to the Head and Neck 3
2. Bones and Joints of Head and Neck 14
3. Scalp, Face and Lacrimal Apparatus 63
4. Parotid Region 88
5. Temporal Region, Infratemporal Region and Temporomandibular Joint 98
6. Submandibular Region 119
7. Oral Cavity—Teeth, Tongue, Tonsil and Palate 129
8. Cranial Cavity and Vertebral Canal Including Meninges 158
9. Fascia, Muscles and Triangles of the Neck 176
10. Nasal Cavity, Paranasal Sinuses and Viscera of Neck 210
11. Orbit and Eye 249
12. Ear and the Organs of Hearing and Balance 273
13. Endocrine Glands of the Head and Neck, Carotid Sinus and Carotid Body 298
14. Blood Vessels of Head and Neck 313
15. Nerves of the Head and Neck 364
16. Multiple Choice Questions: Head and Neck 429

Section 2 Neuroanatomy

17. Introduction to Central Nervous System 437
18. Spinal Cord—Gross Anatomy and Internal Structure 451
19. Gross Anatomy of the Brainstem 463
20. Tracts of the Spinal Cord and Brainstem 480
21. Cranial Nerves—Nuclei and Functional Aspects 498
22. Cerebellum—Gross Anatomy and Internal Structure 511
23. Cerebrum, Thalamus and Hypothalamus—Gross Anatomy and Internal Structure 524
24. Ventricles of the Brain 557
25. Special Senses and their Pathways 567
26. Blood Supply of the Central Nervous System 577
27. Multiple Choice Questions: Neuroanatomy 592

Index *597*

JAYPEE BROTHERS

CHAPTER

15

Introduction to the Thorax

Learning Objectives

- Thoracic cage
- Thoracic inlet
- Suprapleural membrane/Sibson's fascia
- Thoracic outlet
- Intercostal spaces
- Thoracic cavity
- Clinical application of anatomical knowledge

INTRODUCTION

❖ The thorax is the cone-shaped upper part of the body that a lay person calls the chest (Fig. 15.1). It is the part of the trunk lying between neck and abdomen. It has a musculoskeletal framework forming a flexible wall, the ***thoracic cage***. The thorax has a narrow opening (*thoracic inlet*) superiorly and a much wider opening (*thoracic outlet*) inferiorly.

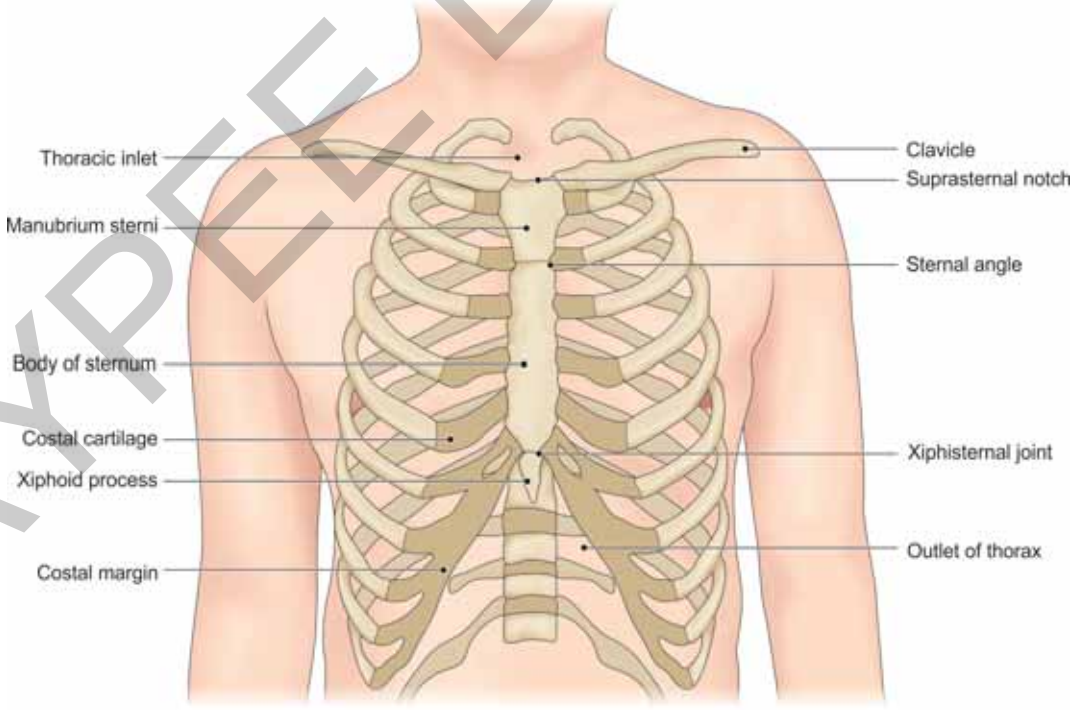


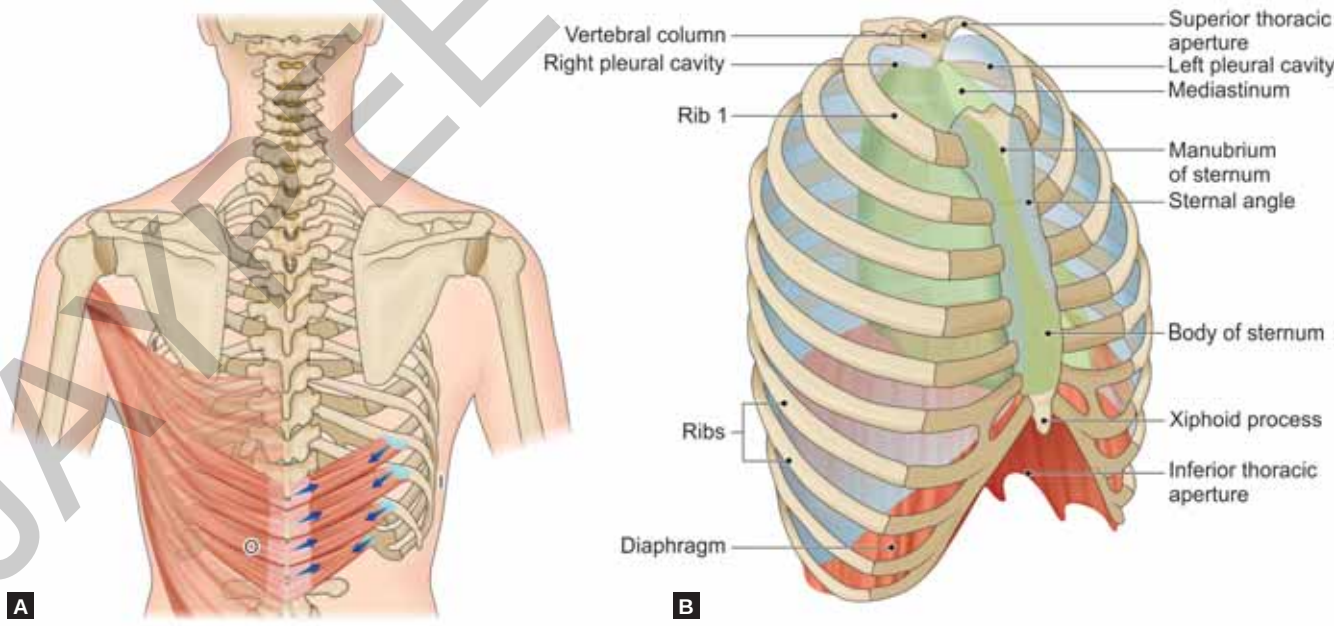
Fig. 15.1: Thorax—boundaries (as seen from the front).

JAYPEE BROTHERS

- Boundaries of thorax
  - Superiorly: Jugular notch, sternoclavicular joint, superior border of clavicle, acromion process and spine of scapula and spine of C7 vertebra.
  - Inferiorly: Xiphoid process, costal margin, 11th and 12th ribs, T12 vertebra.
- Regions of thorax are
  - Thoracic wall and cage
  - Thoracic cavity.
- The thorax is a region of vital importance and injury or disease in this region can threaten life. In the study of the thorax, we have to consider the formation of its walls (thoracic cage); and the contents lying within the thoracic cavity.

THORACIC CAGE (FIGS. 15.2A AND B)

- The wall of the thorax has a skeletal basis that is reinforced by a number of muscles, ligaments and membranes. As the walls of the thorax have to enclose a cavity their skeletal framework is in the form of a cage (***thoracic cage***).
- *Shape:* The thoracic cage is shaped somewhat like a cone, the apical part of which has been cut away (or truncated).
- The ***boundaries of thoracic cage*** are
  - *Posterior:*
    - Bodies of twelve thoracic vertebrae and their intervening intervertebral disks.
    - Posterior parts of 12 pairs of ribs up to posterior angles.
    - Thoracic part of vertebral column is concave anteriorly forming the primary curvature of vertebral column.
    - Maximum antero-posterior diameter of thorax is at mid thoracic level (T5-T9).
    - At the superior and inferior apertures of thorax, it is narrow. On either side of the thoracic vertebrae is the paravertebral gutter, that has formed because of the posterolateral curvatures of ribs from the posterior ends to the posterior angles.
  - *Anterior:* Sternum—manubrium, body and xiphoid process
    - Manubrium: It lies opposite bodies of T3 and T4
    - Body of sternum: It is opposite bodies of T5 -T8
    - Manubriosternal joint/sternal angle: Corresponds to lower border of T4 vertebral body. The sternal angle forms a prominent land mark that projects forwards.



Figs. 15.2A and B: Thoracic cage as seen from. (A) Behind; (B) Side.

JAYEE BROTHERS

- Xiphisternal joint: Disk between T8 and T9
- Xiphoid process: Location corresponds to T9 vertebra
- Anterior parts of ribs and their costal cartilages

- *Lateral:*
  - 12 pairs of ribs and their associated costal cartilages, intercostal spaces occupied by intercostal muscles, vessels and nerves.
  - At their anterior ends, the ribs are attached to bars of cartilages (***costal cartilages***) through which they are attached to the sternum. This arrangement is seen in its typical form in the upper seven ribs (which are, therefore, called ***true ribs***).
  - The costal cartilages of the 8th, 9th and 10th ribs do not reach the sternum, but end by getting attached to the next higher costal cartilage. These ribs are called ***false ribs***.
  - The 11th and 12th ribs are short and are confined to the posterior part of the thoracic wall. Their lateral ends are free, and they are, therefore, called ***floating ribs***.
  - The ribs and costal cartilages of the same side are separated by 11 ***intercostal spaces*** that are occupied by intercostal muscles, vessels and nerves. These spaces are narrow posteriorly and wider anteriorly with the widest part at the costochondral junction.
- *Above:* It is continuous with the neck at the ***thoracic inlet***. It is partly separated by the suprapleural membranes on either side.
- *Below:* It is continuous with the abdomen at the ***thoracic outlet***. It is separated from the cavity of abdomen by the dome-shaped diaphragm with openings in it for the passage of structures between the two cavities.

SUPERIOR THORACIC APERTURE/THORACIC INLET (FIG. 15.3)

- At its upper end, the thoracic cage has an opening that is called the ***superior thoracic aperture***, also called the ***thoracic inlet***.
- *Boundaries*
  - Posterior: Upper end of the body of the first thoracic (T1) vertebra.
  - Lateral: Inner border of the first rib and its cartilage
  - Anterior: Upper border (jugular notch) of the manubrium sterni.

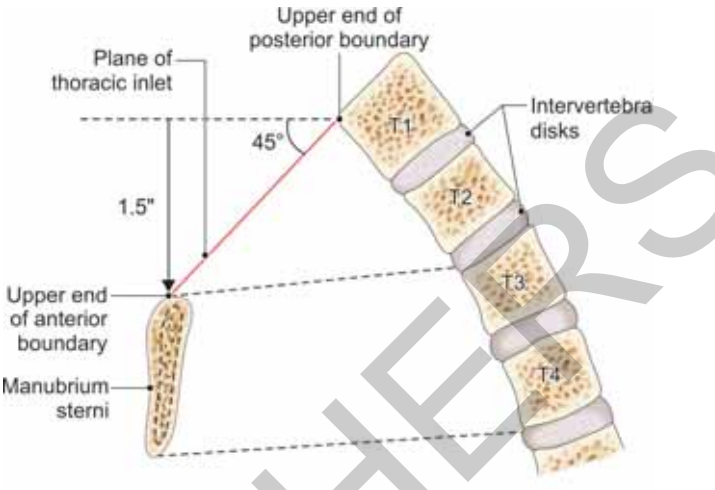


Fig. 15.3: Superior thoracic aperture.

- *Orientation:* This aperture is obliquely placed. Anterior part is 3.75 cm (1.5 inches) below the posterior part. As the upper border of the manubrium sterni lies at the level of the lower border of T2 vertebra, it follows that the superior aperture is not placed horizontally but has a slope that runs downwards and forwards.
- *Shape*: It is kidney shaped with T1 vertebra forming the hilum. The inlet is narrow and there is crowding of great vessels, nerves, trachea, esophagus, thoracic duct, thymus, etc. here. The size of the superior aperture corresponds to the diameter of the neck.
- *Measurements:*
  - Anteroposterior diameter—5.0 cm
  - Transverse diameter—10.00 cm
- Structures passing: The superior aperture gives passage to several structures that pass from the neck into the thorax, or ***vice versa***. These include (Figs. 15.4 and 15.5)
  - Trachea
  - Esophagus
  - Arteries
    - Brachiocephalic
    - Left common carotid
    - Left subclavian
    - Internal thoracic—right and left
    - Superior intercostal—right and left
  - Veins
    - Right and left brachiocephalic
    - Inferior thyroid
    - First posterior intercostal
  - Nerves
    - Vagus nerves
    - Phrenic nerves

JAYPEE BROTHERS

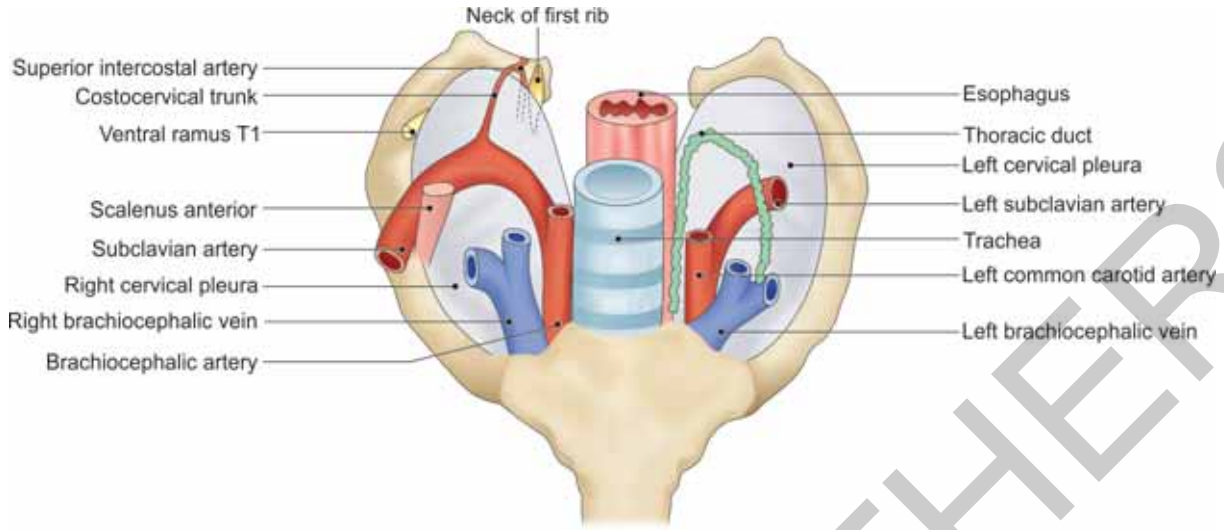


Fig. 15.4: Thoracic inlet—Anterior view.

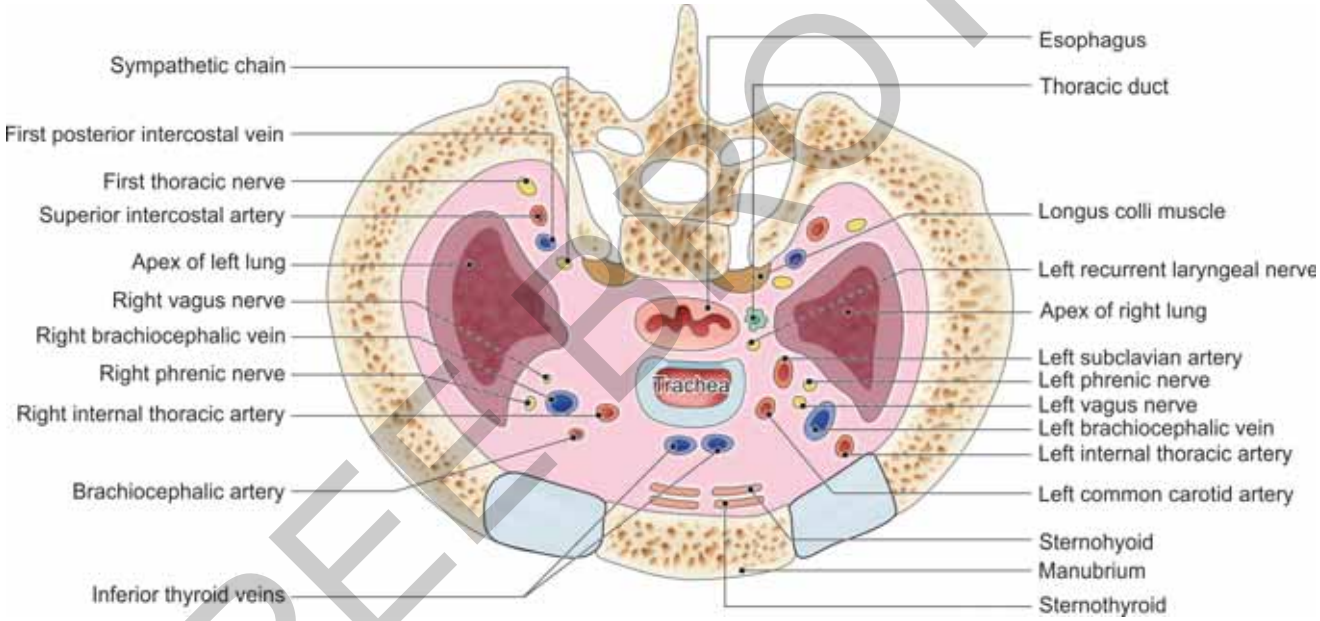


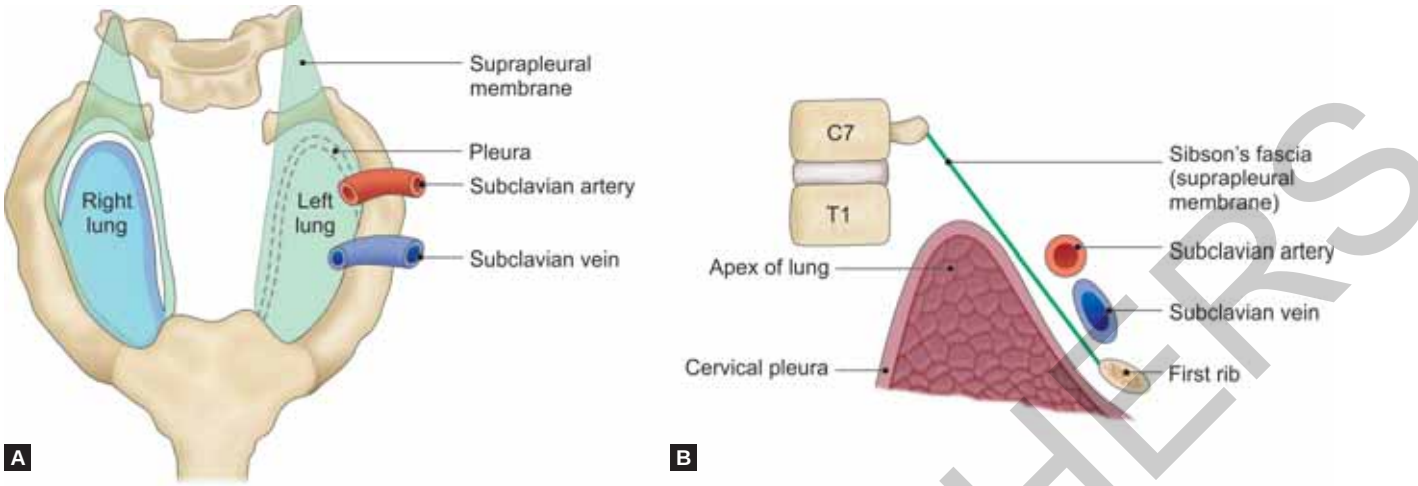
Fig. 15.5: Thoracic inlet contents—Superior view.

- ♦ Left recurrent laryngeal nerve
- ♦ Sympathetic chain
- ➢ Muscles
  - ♦ Anterior
    - ❍ Sternohyoid
    - ❍ Sternothyroid
  - ♦ Posterior
    - ❍ Longus colli
- ➢ Apex of lung
- ➢ Apex of pleura protected by suprapleural membrane /Sibson's fascia
- ➢ Thymus.

SUPRAPLEURAL MEMBRANE/SIBSON'S FASCIA (FIG. 15.6)

- ❖ *Definition:* It is a dome/triangular-shaped musculofascial thickening that covers the apex of each lung.
- ❖ *Components:* It has muscular and fascial components
  - ➢ Muscular part: It is a derivative of scalenus minimus muscle
  - ➢ Fascial part: It is derived from endothoracic fascia.
- ❖ *Attachments*
  - ➢ Posteriorly: It is attached to the tip of the transverse process C7 vertebra

JAYPEE BROTHERS



Figs. 15.6A and B: Suprapleural membrane—attachments and relations.
(A) Both sides seen from the front; (B) One side seen from the side.

- Anteriorly: It is attached to the inner border of 1st rib and its cartilage
- Medially: It is continuous with the pre-tracheal fascia by the side of trachea

❖ *Relations:* Subclavian artery, vein and first rib are in front of it.

❖ *Function:* Protects the apex of lung and cervical pleura. Injury to this membrane may result in herniation of cervical fascia.

INFERIOR APERTURE OF THORAX/ THORACIC OUTLET (FIG. 15.2)

Description: At its lower end the thoracic cage has an inferior aperture that is much larger than the superior aperture. The diameter of the aperture corresponds to that of upper part of the abdomen. As T10-T12 vertebrae are in a more anterior plane the thorax narrows as it is nearing the outlet.

❖ Its *boundaries* are

- *Anterior:* This boundary is V-shaped and is formed (in each half) by the xiphoid process, 7th, 8th, 9th and 10th costal cartilages and 11th and 12th ribs. This boundary passing downwards and laterally from the xiphoid process, is called the ***costal margin*** which is the medial margin formed by the 7th to 10th ribs. It can be easily palpated in a living person and is an important landmark.
- *Posterior:* It is bounded in the median plane, by the lower border of the 12th thoracic vertebra, and more laterally by the 12th pair of ribs.
- *Below:* The inferior thoracic aperture is closed by a muscular partition, the ***diaphragm***. The diaphragm is not flat, but has a marked upward convexity. The uppermost part of the abdominal cavity (Liver, part of stomach and spleen), therefore, lies under cover of the lower part of the thoracic cage.

❖ *Structures passing through:* Structures passing from the thorax to the abdomen have to pass through the apertures in the diaphragm. The largest of these are the ***aorta*** and the *esophagus*. The ***inferior vena cava*** is the largest structure entering the thorax from the abdomen.

Clinical Application of Thoracic Cage

Distortion of the thoracic cage: The shape of the thorax and its cavity may be distorted by congenital anomalies and acquired defects of the vertebral column, sternum or ribs. Diseases which cause destruction of the vertebral column lead to changes in the curvature of the column and thus cause distortion.

INTERCOSTAL SPACES (FIGS. 15.7 AND 15.8)

❖ The spaces between adjacent ribs, are called ***intercostal spaces***. They are completely closed by ***intercostal muscles*** and membranes associated with them. Intercostal nerves and vessels lie within the spaces. There are 11 intercostal spaces.

❖ In the region of an intercostal space, the thoracic wall is made up of three layers of muscle.

- The outermost layer (dark brown) is constituted by the ***external intercostal muscle***. In the anterior most part of the space, this muscle is replaced by

JAYPEE BROTHERS

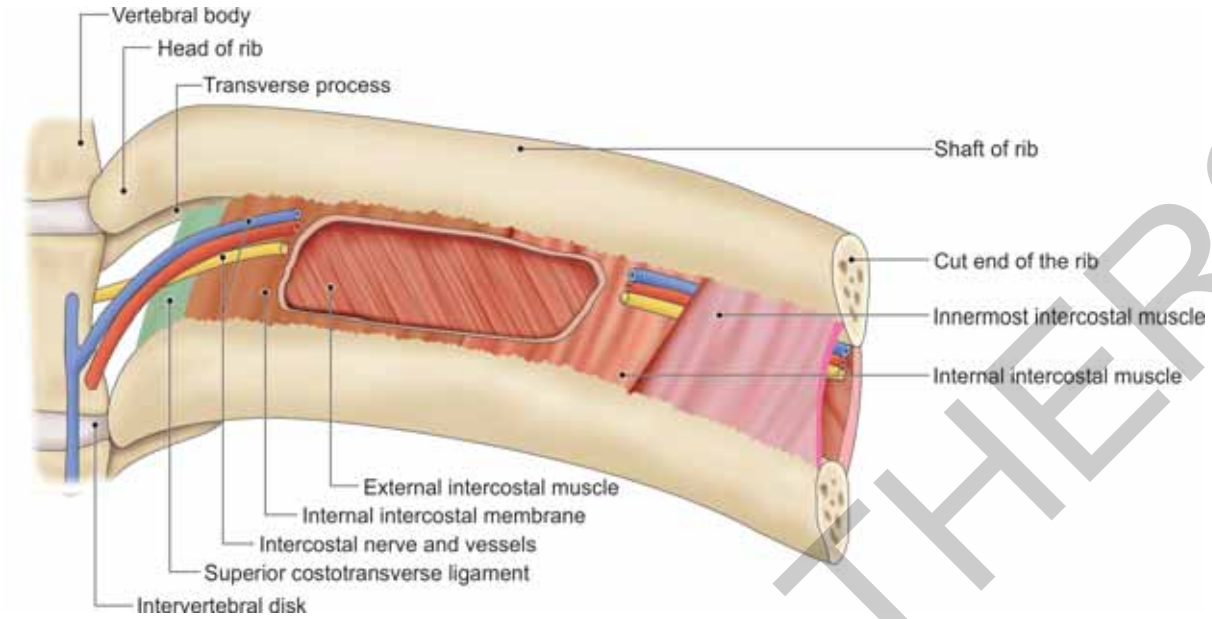


Fig. 15.7: Intercostal space from behind.

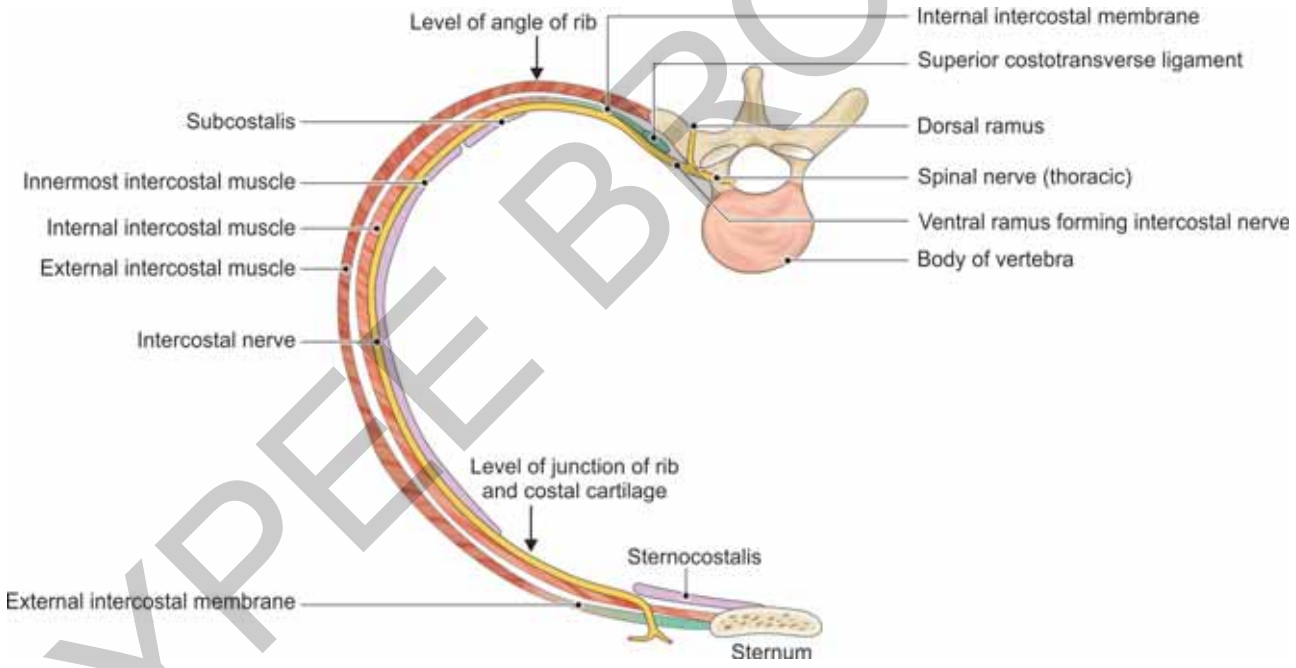


Fig. 15.8: Intercostal muscles.

- the ***external (or anterior) intercostal membrane*** (green).
- The second layer (light brown) is formed by the ***internal intercostal muscle***. In the posterior most part of the space, this muscle is replaced by the ***internal (or posterior) intercostal membrane*** *(green)*.
- The third, or innermost layer, is incomplete. Over the middle two-thirds of the space, it is formed by the ***innermost intercostal muscle*** (purple). Posteriorly, the third layer is represented by a muscle called ***subcostalis***; while anteriorly, it is represented by the ***sternocostalis***. (All the three components may not be seen over each space).

JAYPEE BROTHERS

- Contents of intercostal space
  - The ***intercostal nerve*** runs along the interval between the second and third layers of muscle. The intercostal nerve is the ventral ramus of a thoracic nerve. The nerve is accompanied by an artery and a vein. The vein is placed highest, the artery is in the middle, and the nerve is lowest in position.

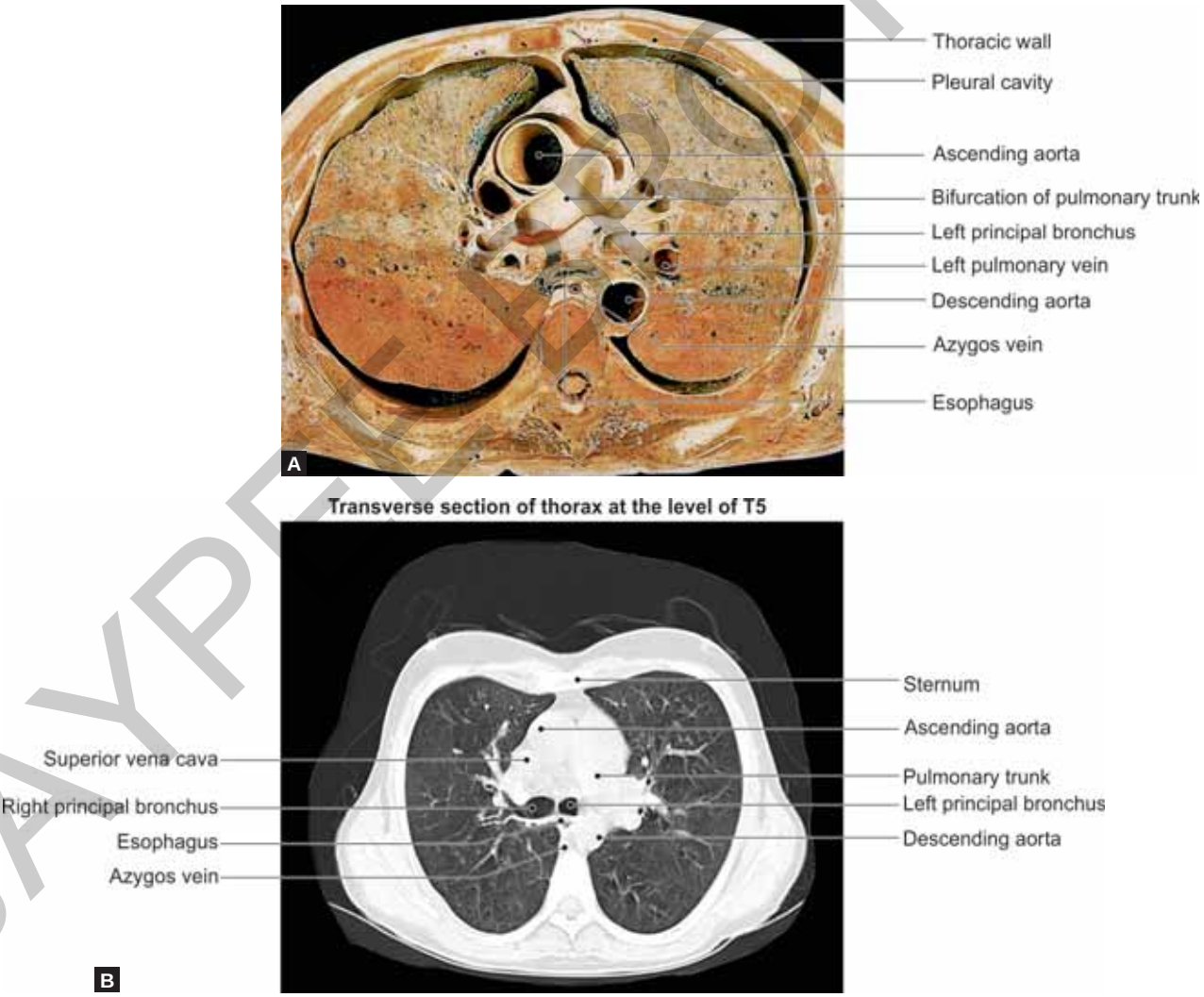
Pneumonic to remember contents of intercostal space in order:
The relationship of these can be stated as ***VAN*** *from above downwards.*

  - In each space, there is the single ***posterior intercostal artery*** and a pair of ***anterior intercostal arteries.***
  - In each space, there is a single ***posterior intercostal*** and two ***anterior intercostal veins***.
- The right and left ***sympathetic trunks*** run vertically along the corresponding sides of the vertebral column. Note the series of thickenings on the trunk (sympathetic ***ganglia)***. The ganglia are connected to intercostal nerves through small nerves called *rami communicantes*.

THORACIC CAVITY (FIGS. 15.9A AND B)

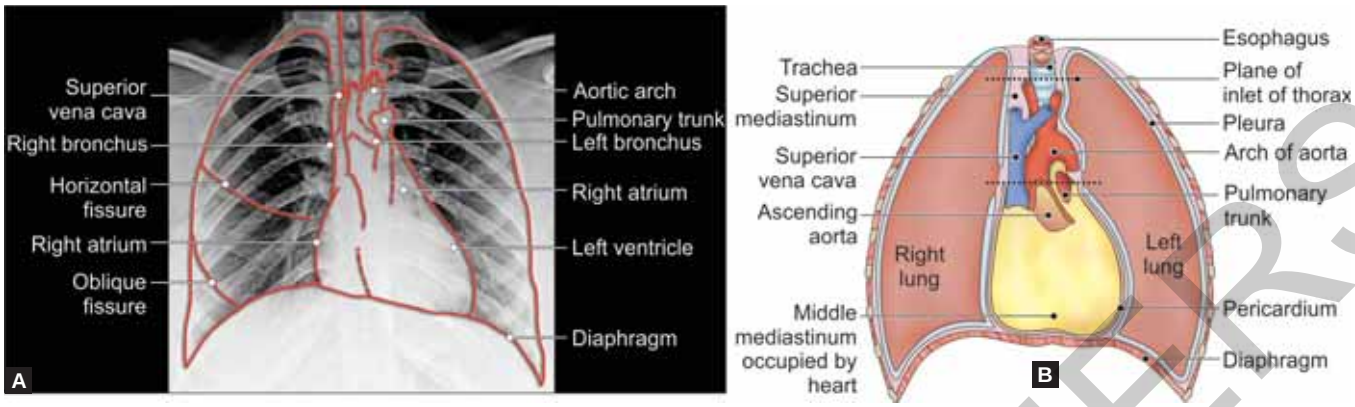
It is a space within the walls of thorax and between the superior and inferior apertures.

- *Shape:* The thoracic cavity of adult is kidney shaped.
- *Diameters:*
  - The transverse diameter is greater than the anteroposterior diameter and the reason being the obliquity of ribs in adults. In case of infants, the ribs are horizontal in position and thoracic cavity is circular and the anteroposterior and transverse diameters are equal.



Figs. 15.9A and B: (A) Transverse section of thorax at T5 vertebra; (B) Same CT view.
Courtesy: Sapthagiri Scan Center, Tirupati, Andhra Pradesh, India.

JAYPEE BROTHERS



Figs. 15.10A and B: Coronal section of thorax: (A) X-ray chest PA views (*Courtesy:* Sapthagiri Scan Center, Tirupati, Andhra Pradesh, India.); (B) Schematic diagram of same.

- Posteriorly, the vertebral column projects forwards into the cavity, and that on each side of it the thoracic cavity extends backwards to the level of the transverse processes of vertebrae. The backward extensions of the thoracic cavity, on either side of the vertebral column, are called the ***paravertebral grooves***. If observed from one side the thoracic cavity will be seen to have a kidney-like shape with narrow mid-sagittal diameter and a wider parasagittal diameter.

❖ The lateral walls of the cavity are formed by ribs and intercostal muscles and the dome-shaped diaphragm closes the cavity inferiorly.

❖ The thoracic cavity can be divided into *three parts*. To the *right and left* sides, there are large spaces the *pleural cavities* which are almost completely filled by the corresponding *lungs*. Separating the spaces for the right and left lungs, there is a thick *median* partition which is called the *mediastinum*. The most important structure in the mediastinum is the heart (Figs. 15.10A and B).

❖ ***Contents of thoracic cavity*** are:

- Pleural sacs: That cover the lungs lie in the pleural cavity
- Fibroserous sac: The pericardium that covers the heart in the mediastinum
- Organs of circulation: The heart and great blood vessels leaving or entering the heart.
- Organs of respiration: The trachea and bronchi through which the air passes and lungs where exchange of gases takes place.
- Part of food passage: The food pipe or ***esophagus*** which enters the thorax at its upper end and leaves it at its lower end to enter the abdomen.

❖ To understand the arrangement of contents of the thoracic cavity a transverse section through the cavity has to be observed (Fig. 15.9).

❖ In a coronal section (Fig. 15.10) through the thoracic cavity, the lateral walls formed by ribs and intercostal muscles and the dome-shaped diaphragm closing the cavity inferiorly can be observed.

❖ In a sagittal section across the mediastinum, we can observe (Fig. 15.11):

- The inlet of the thorax sloping downwards and forwards. (the level of the upper border of the manubrium sterni corresponds to the level of the intervertebral disk between T2 and T3).
- The diaphragm is attached anteriorly to the xiphoid process and passes backwards to reach the vertebral column at the level T12 vertebra (we will see later that the attachments of the diaphragm extend to the lumbar vertebrae).
- The vertical extent of the mediastinum is greater posteriorly than anteriorly (as is true for the thoracic cavity as well).
- The mediastinum can be divided into upper and lower parts by a horizontal plane passing from the lower end of the manubrium sterni (sternal angle) to the intervertebral disk between vertebrae T4 and T5 (Fig. 15.11).
  - The part of the mediastinum lying between this plane and the inlet of the thorax is called the ***superior mediastinum***. The trachea, esophagus, and several large vessels lie in it.
  - The part of the mediastinum lying below the superior mediastinum, i.e. ***inferior mediastinum*** is divided into three parts as follows:

JAYPEE BROTHERS

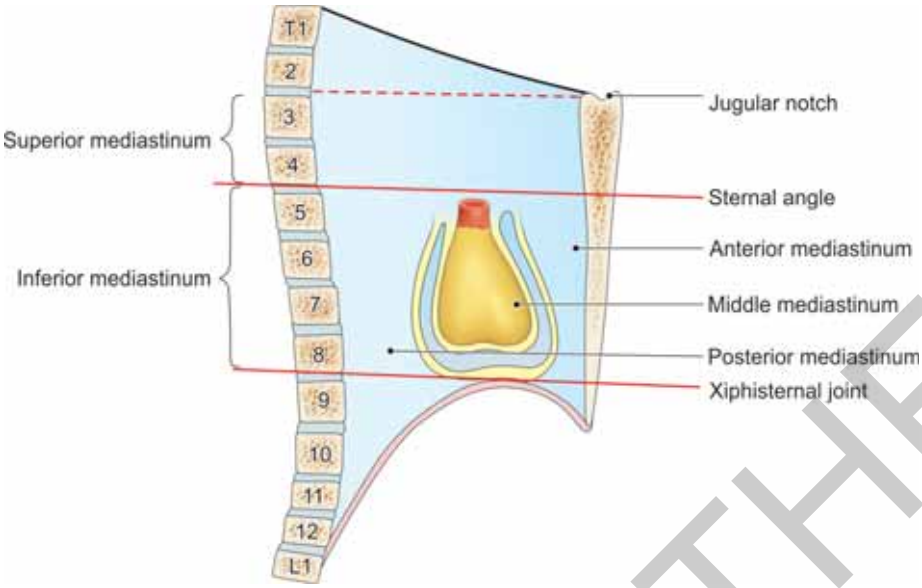


Fig. 15.11: Sagittal section of thorax.

1. The greater part of the area is occupied by the heart and great vessels near it. This part is the ***middle mediastinum***.
2. The part of the mediastinum in front of the heart is the anterior mediastinum. Its most important content is the ***thymus***.
3. The part behind the heart is the ***posterior mediastinum***. Its main contents are the aorta and the esophagus.

Landmarks of Thorax

These can be summarized as skeletal and soft tissue land marks and lines of demarcation

- *Skeletal landmarks*
  - Jugular notch: Corresponds to lower border of T2 vertebra.
  - Sternal angle of Louis: Corresponds to 2nd costal cartilage and junction between T4 and T5 vertebrae.
  - Xiphoid process: Corresponds to upper border of T9 vertebra.
  - Clavicle.
  - Ribs and intercostal spaces.
  - Costal margin: Formed by cartilages of 7th to 10th ribs and free ends of 11th and 12th ribs.
  - Subcostal/infrasternal angle: Lower end of sternum between sternal attachments of 7th costal cartilage.
  - 7th cervical spine: Vertebra prominence is the palpable spine at the lower part of back of neck.
  - 3rd thoracic spine: Corresponds to root of spine of scapula.
  - 7th thoracic spine: Corresponds to inferior angle of scapula.
- *Soft tissue landmarks*
  - Nipple of mammary gland: At the level of 4th intercostal space in midclavicular line.
  - Apex beat of heart: Left 5th intercostal space, about ½ inch internal to mid clavicular line.
- Lines of demarcation for identifying location of structures (all are vertical lines)
  - Midsternal line: A vertical line in the middle of anterior aspect of sternum.
  - Midclavicular line: A vertical line from the midpoint of clavicle to mid inguinal point that crosses 9th costal cartilage.
  - Anterior axillary line: Along the anterior axillary fold
  - Mid-axillary line: From the point of axilla between anterior and posterior axillary folds.
  - Posterior axillary line: Along the posterior axillary fold.
  - Scapular line: Along the inferior angle of scapula with the arms hanging at the sides of body.

JAYPEE BROTHERS

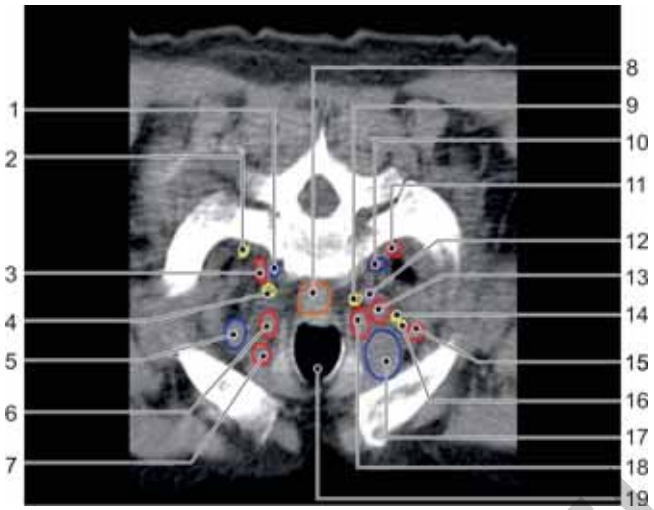


Fig. 15.12: CT image of thorax at the level of T1 vertebra (*Courtesy:* Sapthagiri Scan Center, Tirupati, Andhra Pradesh, India).

Clinical Importance

KNOWLEDGE OF ANATOMY OF THORACIC CAGE AND CAVITY

Case scenario 15.1

Observe marked areas with numbers in the Figure 15.12. Compare it with that of Figure 15.5 and write names of marked areas.

Questions:

- What type of radiological image is the given figure?
- What is the orientation of the section transverse or coronal?
- How does the knowledge about location of structures presented in Figure 15.5 and the interpretation of the radiological image in Figure 15.12 help in clinical practice?

Explanation:

- The given radiological image is the CT image at the level of 1st thoracic vertebra at the level of superior thoracic inlet.
- This is a transverse section.
- The information provided in Figure15.5 facilitates in identifying the structures at the inlet of thorax in the transverse section of CT in Figure 15.12. The knowledge of identification of structures at the inlet in a radiological image facilitates the identification of abnormal constituents or abnormalities of normal constituents of inlet and their clinical interpretation.

Review or Practice Questions

Write short notes on:

- Superior thoracic aperture.
- Suprapleural membrane.

Glossary of terms

Thorax—(Greek) torso = chest.

TAKE HOME MESSAGE

INTRODUCTION THORAX

- The thoracic cage is formed by ribs, vertebra and sternum.
- Boundaries of thoracic cage and contents of thoracic cavity were introduced.
- Radiological images of thoracic cavity at various levels and in different planes can be interpreted with the basic knowledge of cross-sectional images of thorax at different levels of vertebra, sternum, etc.
- Surface marking of thoracic structures (heart, lungs, aorta, esophagus, etc.) are possible by using the landmarks.
- This knowledge facilitates in interpretation of radiological images in health and disease and in assessing the extent of enlargement of viscera by palpation method of examination.

JAYPEE BROTHERS

or detailed information on anatomy books, visit our website **www.jaypeebrothers.com,** for detailed information on anatomy books, visit our webs

Inderbir Singh's Textbook of ANATOMY

Salient Features

- Simple language and presentation of material in the form of points for ease of understanding, remembering and reproduction by the students
- Simplified presentation in the form of flowcharts, tables and several images for better perception, comprehension and presentation in the examination
- Simplification and organization of content under several subheadings to motivate the students to read the subject in a sequence
- Organization of book into various chapters with each chapter presenting all the relevant components that has to be followed for continuity at one place like all arteries of that part in one chapter
- Clinical importance of each structure was presented in boxes for greater emphasis on clinical application of anatomical knowledge
- Dissection of the region wherever required is explained in brief in a separate box
- Osteology of individual bones in limbs and thorax are presented in a novel way with description of general features in text form and the muscular attachments in table format for easy reference
- Take home message for each chapter to recap the highlights of that chapter was done
- Greater emphasis on clinical application of anatomical knowledge by providing case scenarios with explanation
- Mnemonics given in respective chapters are close to the students, for easy to remembering and recall
- To motivate the students in this direction almost all chapters are provided with real-time case scenarios and explanations to introduce the anatomical basis for the clinical practice.

V Subhadra Devi MS (Anatomy) is Professor and Head, Department of Anatomy, Sri Padmavathi Medical College for Women (SPMCW); Sri Venkateswara Institute of Medical Sciences (SVIMS) University, Tirupati, Andhra Pradesh, India, and Ex-Vice Principal (Academic), Professor and Head, Department of Anatomy, Sri Venkateswara Medical College, Tirupati. She did her graduation and postgraduation from Sri Venkateswara Medical College, Tirupati. She has a teaching and research experience of over 38 years. Her students are spread all over the globe. She has to her credit 70 publications in national and international journals. She is the author of Textbook of Basic Histology – A Color Atlas and Text, Textbook of General Anatomy and edited the 11th edition of Inderbir Singh's Textbook of Embryology.

She is a recipient of Andhra Pradesh State Meritorious Teacher Award. She is a life member of Anatomical Society of India, Society of Clinical Anatomists, Basic Sciences Association and Indian Society of Human Genetics. She is also Honorary Editor-in-Chief for International Journal of Anatomy and Research and editorial board member in various national and international journals.

Printed in India

Available at all medical bookstores
or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

Shelving Recommendation
ANATOMY

ISBN 978-93-89034-99-8