EXTERNAL CONFIGURATION OF THE HEART

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- I. GENERAL OVERVIEW
- II. EXTERNAL CONFIGURATION

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- III. CARDIAC MEASUREMENTS AND SHAPES
- IV. TOPOGRAPHICAL RELATIONS OF THE HEART
- V. CLINICAL NOTES
- VI. CONCLUSION



I-GENERAL OVERVIEW

- The heart is located in the thoracic cavity and occupies the anterior mediastinum.

– It has a pyramidal shape with a triangular base.

- It functions as a discharge and suction pump of blood, capable of rythmic contractions at a rate of 64 to 74 beats per minute.

- It is divided into :
- A right heart.
- A left heart.

- Its average weight is 270 grams in men and 260 grams in women.







Posteroinferior view of the heart showing its inferior surface

A-THE SURFACES OF THE HEART

- THE ANTERIOR OR 1 STERNOCOSTAL SURFACE OF THE HEART
- 2. THE INFERIOR OR DIAPHRAGMATIC SURFACE OF THE HEART
- 3. THE LEFT LATERAL OR PULMONARY SURFACE OF THE HEART



Schematic lateral view of the thorax







Left posterioinferior view



Anterior surface of the heart



<u>1-THE ANTERIOR OR</u> <u>STERNOCOSTAL SURFACE</u> <u>OF THE HEART</u>

- The ventricular segment has two zones :
- The posterior or arterial zone, entirely occupied by the aortic orifice and the orifice of the pulmonary artery.



<u>1-THE ANTERIOR OR</u> <u>STERNOCOSTAL SURFACE</u> <u>OF THE HEART</u>

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- The ventricular segment has two zones :
- The posterior or arterial zone occupied by the aortic orifice and the orifice of the pulmonary artery.
- The anterior zone is divided into two fields by the anterior interventricular sulcus.



1-THE ANTERIOR OR STERNOCOSTAL SURFACE OF THE HEART

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- The auricular segment : overhangs the arterial part and extends laterally and forward by the auricles.





<u>1-THE ANTERIOR OR</u> <u>STERNOCOSTAL SURFACE</u> <u>OF THE HEART</u>

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- The auricular segment : overhangs the arterial part and extends laterally and forward by the auricles.

• The right auricle.



1-THE ANTERIOR OR STERNOCOSTAL SURFACE OF THE HEART

- The auricular segment : each atrium has an anterior extension which are the auricles.

- The right auricle.
- The left auricle.







Schematic posterior view of the heart showing the base and the inferior surface of the heart. 14

2-THE INFERIOR OR DIAPHRAGMATIC SURFACE OF THE HEART

- The ventrical segment is divided by the lower part of the interventricular sulcus into two fields : left and right.



Schematic posterior view of the heart showing the base and the inferior surface of the heart. $_{15}$

2-THE INFERIOR OR DIAPHRAGMATIC SURFACE OF THE HEART

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- The ventrical segment is divided by the lower part of the interventricular sulcus into two fields :

left and right.

- The atrial segment is more narrow.



Atrial segment

Schematic posterior view of the heart showing the base and the inferior surface of the heart.



3-THE LEFT LATERAL OR PULMONARY SURFACE OF THE HEART

- It is convex from top to bottom, with this convexity being particularly pronounced in the ventricular segment.





Left posteroinferior view of the heart

3-THE LEFT LATERAL OR MONARY SURFACE OF THE HEART

- It is convex from top to bottom, with this convexity being particularly pronounced in the ventricular segment.

- In the auricular segment, the left auricle is visible and wraps around the lateral left side of the pulmonary artery.



Left posteroinferior view of the heart

B-BORDERS OF THE HEART

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- 1. RIGHT BORDER
- 2. TWO LEFT BORDERS



Anterior view of the heart showing the cardiac borders.

1. RIGHT BORDER

Located between the anterior surface and the inferior surface of the heart.



Right border

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Anterior view of the heart showing its borders

1. RIGHT BORDER

Located between the anterior surface and the inferior surface of the heart.

2. TWO LEFT BORDERS

Superior and inferior, are rounded and separate the left lateral surface from the anterior and inferior surfaces.



Left inferior border

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Base of the heart

C-BASE OF THE HEART

1. LEFT SEGMENT

It responds to :

The orifices of the four pulmonary veins.

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- Between the right and left veins where lies the sinus of Haller.



Schematic posterior view of the heart showing the base and the inferior surface of the heart. 24

C-BASE OF THE HEART

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1. LEFT SEGMENT

It responds to :

- The orifices of the four pulmonary veins.
- Between the right and left veins where lies the sinus of Haller.

2. RIGHT SEGMENT

- Superior vena cava at the top.
- Inferior vena cava at the bottom.
- Limited on the right by a vertical sulcus: the sulcus terminalis.



Schematic posterior view of the heart showing the base and the inferior surface of the heart.

D-THE APEX OF THE HEART

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Is divided by a slight depression that connects the anterior interventricular sulcus to the posterior interventricular sulcus into two parts :

目 - The right part, smaller, corresponding 1 to the right ventricle. 110000

- The left part, larger, belonging to the left ventricle and occupying the very apex of the heart.





Anterior view of the heart





E-THE SULCI OF THE HEART

- 1. INTERAURICULAR SULCUS
- 2. INTERVENTRICULAR SULCUS
- 3. AURICULOVENTRICULAR SULCUS



1-THE INTERAURICULAR SULCUS

- It separates the right atrium of the left atrium.
- Convex on the right on its upper part,
 it corresponds on the left to the
 pulmonary veins.
- Concave on the right in its lower part,
 it corresponds on the right to the left
 border of the opening of the inferior
 vena cava.



2-THE INTERVENTRICULAR SULCUS

 It separates the anterior surface into two fields corresponding to the right and left ventricles and the diaphragmatic surface at the back.

- It divides the apex of the heart into parts with the larger part, that is of the left ventricle, forming of the apex of the heart.

- This sulcus is traversed by the interventricular vessels.



<u>3-THE</u> <u>AURICULOVENTRICULAR</u> <u>SULCUS</u>

- It separates the atria from ventricles.

- It is concave in front, encircling the arterial zone of the ventricular field, it runs along the right atria and curves around the right border of the heart to pass over the diaphragmatic surface.

- On this surface it connects with the posterior interauricular and interventricular sulci.



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F-THE AURICLES OF THE HEART

1. RIGHT AURICLE

- It is triangular with a posterior base, located in the right atrium and with an anterior apex in contact with the right border of the pulmonary artery.

- It partially covers the right auriculoventricular sulcus.

2. LEFT AURICLE

- Its lower border covers the left auriculoventricular sulcus.

- Its apex hangs over the anterior surface of the left ventricle.



III-CARDIAC MEASUREMENTS AND SHAPES

- A. THE MAXIMAL TRANSVERSAL DIAMETER
- B. THE LONGITUDINAL DIAMETER
- C. THE TRANSVERSAL DIAMETER
- D. THE AORTIC WIDTH
- E. THE CARDIAC INCLINATION ANGLE

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Anterior view of the heart showing the cardiac measurements on the radiological image.



Various morphological types of the cardiac silhouette.







Appearance of the heart and aortic arch according to the morphological type

A. Frontal type B. Sagittal type

Aortic arch
 Stomach

IV-TOPOGRAPHICAL RELATIONS OF THE HEART

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- A. ANTERIOR RELATIONS
- B. LATERAL RELATIONS
- C. POSTERIOR RELATIONS
- D. SUPERIOR RELATIONS
- E. INFERIOR RELATIONS
- F. APEX OF THE HEART







Heart and pericardium

1-PARIETAL RELATIONS

- The lower three-quarters of the sternum.
- The third, fourth and fifth costal cartilages.
- The anterior ends of the corresponding intercostal spaces.
- They define the area of the cardiac projection.





Projection of the cardiopleuropulmonary silhouette on the anterior thoracic wall.

2-VISCERAL RELATIONS

- The anterior borders of the lungs.

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- Pleural recesses.



Heart in situ, resected thorax.

B-LATERAL RELATIONS

- The mediastinal surface of each lung on which it forms a depression, particularly on the left known as the cardiac notch. 12

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Heart



Cardiac notch

Cardiac impression

B-LATERAL RELATIONS

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A summary

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- The mediastinal surface of each lung on which it forms a depression, particularly on the left known as the cardiac notch.

- The mediastinal pleura.

 The phrenic nerves and the superior diaphragmatic vessels.



C-POSTERIOR RELATIONS

1. RIGHT SEGMENT

It is in contact with :

- The right phrenic nerve.
- And the inferior vena cava.

2. LEFT SEGMENT

It is in contact with the organs of the posterior mediastinum, namely :

- The esophagus.
- The vagus nerves.
- The thoracic aorta.
- The thoracic duct.
- The azygos vein.
- And the vertebral column.



Posterior relations of the heart

D-SUPERIOR RELATIONS

They are represented by the upper floor of the mediastinum and its contents, namely :

- The large vessels :
- The aortic arch.
- The bifurcation of the pulmonary artery.
- The brachiocephalic venous trunks.

- The thymic space.
- The tracheal bifurcation.



Superior relations of the heart

E-INFERIOR RELATIONS

They occur through the phrenic center with :

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- The large tuberosity of the stomach.





Inferior relations of the heart



Superior view of the diaphragm showing the general configuration.

F-APEX OF THE HEART

It projects, in adults, inward and below the left nipple, in the fifth intercostal space. 町

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Projection of the cardiopleuropulmonary silhouette on the anterior thoracic wall.

F-APEX OF THE HEART

It projects, in adults, inward and below the left nipple, in the fifth intercostal 同

space.

Pointing forward and to

the left.

V-CLINICAL NOTES:

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The precordial region.

• The apex projects into the 6th intercostal space, to the right of the midclavicular line.

• The vertical part of the right border corresponds to the right atrium. It runs along the right border of the sternum, from the 3rd to the 6th intercostal space.

• The horizontal part of the right border corresponds to the right ventricle.

• The left border corresponds to the left auricle and right ventricle.

According to KAMINA

Left auricle Right Left atrium ventricle Apex Right venticle

> Precordial region (surface anatomy of the heart and major vessels).

The precordial region.

• The aortic focus is located near the border of the sternum, in the second right intercostal space.

• The pulmonary focus is located in the second left intercostal space, near the sternum.

• The tricuspid focus is located at the base of the xiphoid process.

• The mitral focus is located in the fifth left intercostal space, on the midclavicular line.

VI-CONCLUSION:

- The heart has a **pyramidal shape** with distinct surfaces and borders, fitting snugly in the mediastinum.
- Its external features relate closely to nearby structures like the **lungs**, **pleurae**, and great vessels, ensuring efficient cardiac function.

