# THE AXILLA

Contents

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**Contents of the axilla**

Passing through the axilla are the major vessels, nerves, and lymphatics of the upper limb. The space also contains the proximal parts of two muscles of the arm, the axillary process of the breast, and collections of lymph nodes, which drain the upper limb, chest wall, and breast.

**Axillary artery**

The axillary artery supplies the walls of the axilla and related regions and continues as the major blood supply to the more distal parts of the upper limb.

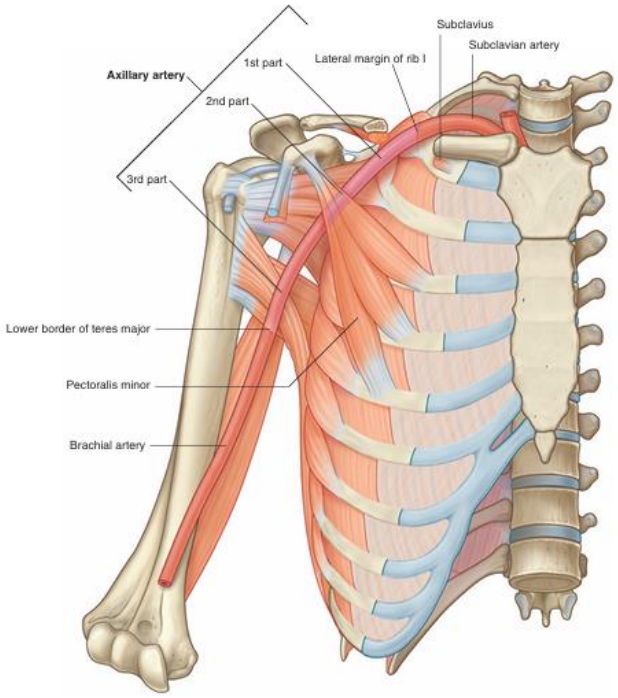
The subclavian artery in the neck becomes the axillary artery at the lateral margin of rib I and passes through the axilla, becoming the brachial artery at the inferior margin of the teres major muscle.

The axillary artery is separated into three parts by the pectoralis minor muscle, which crosses anteriorly to the vessel:

■ The first part is proximal to the pectoralis minor.

■ The second part is posterior to the pectoralis minor.

■ The third part is distal to the pectoralis minor.




Generally, six branches arise from the axillary artery:

■ **One branch**, the superior thoracic artery, originates from the first part.

■ **Two branches**, the thoraco-acromial artery and the lateral thoracic artery, originate from the second part.

■ **Three branches**, the subscapular artery, the anterior circumflex humeral artery, and the posterior circumflex humeral artery, originate from the third part.

**Superior thoracic artery**

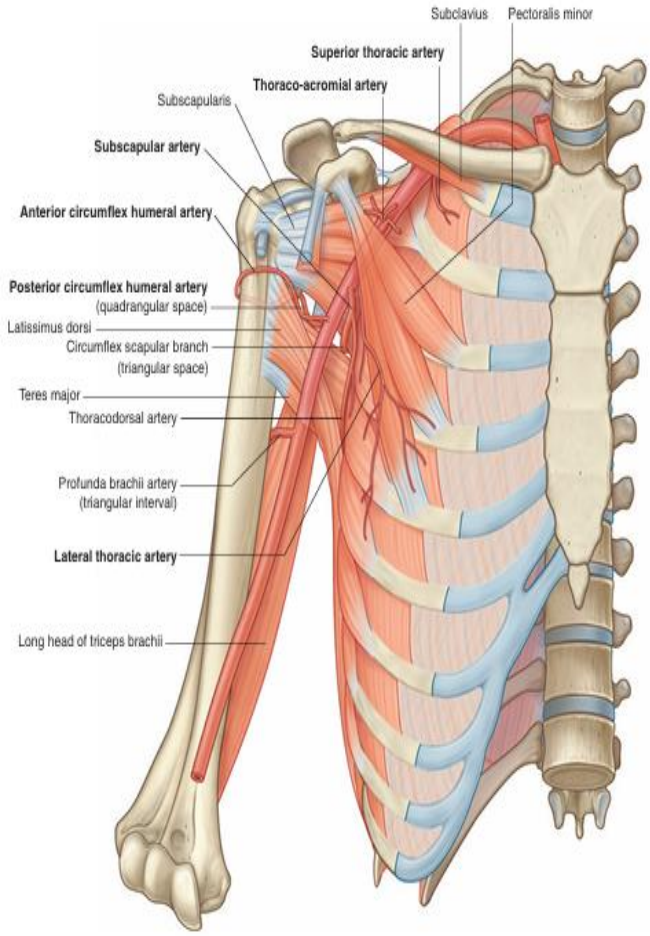
The superior thoracic artery is small and originates from the anterior surface of the first part of the axillary artery. It supplies upper regions of the medial and anterior axillary walls.

**Thoraco-acromial artery**

The thoraco-acromial artery is short and originates from the anterior surface of the second part of the axillary artery just posterior to the medial (superior) margin of the pectoralis minor muscle. It curves around the superior margin of the muscle, penetrates the clavi pectoral fascia, and immediately divides into four branches—the pectoral, deltoid, clavicular, and acromial branches, which supply the anterior axillary wall and related regions. Additionally, the pectoral branch contributes vascular supply to the breast, and the deltoid branch passes into the clavipectoral triangle where it accompanies the cephalic vein and supplies adjacent structures.

**Lateral thoracic artery**

The lateral thoracic artery arises from the anterior surface of the second part of the axillary artery posterior to the lateral (inferior) margin of the pectoralis minor. It follows the margin of the muscle to the thoracic wall and supplies the medial and anterior walls of the axilla. In women, branches emerge from around the inferior margin of the pectoralis major muscle and contribute to the vascular supply of the breast.




**Subscapular Artery**

The subscapular artery is the largest branch of the axillary artery and is the major blood supply to the posterior wall of the axilla. It also contributes to the blood supply of the posterior scapular region. The subscapular artery originates from the posterior surface of the third part of the axillary artery, follows the inferior margin of the subscapularis muscle for a short distance, and then divides into its two terminal branches, the circumflex scapular artery and the thoracodorsal artery.

■ **The circumflex scapular artery** passes through the triangular space between the subscapularis, teres major, and long head of the triceps muscle. Posteriorly, it passes inferior to, or pierces, the origin of the teres minor muscle to enter the infraspinous fossa. It anastomoses with the suprascapular artery and the deep branch (dorsal scapular artery) of the transverse cervical artery, thereby contributing to an anastomotic network of vessels around the scapula.

■ **The thoracodorsal artery** approximately follows the lateral border of the scapula to the inferior angle. It contributes to the vascular supply of the posterior and medial walls of the axilla.

**Anterior circumflex humeral artery**

The anterior circumflex humeral artery is small compared to the posterior circumflex humeral artery and originates from the lateral side of the third part of the axillary artery. It passes anterior to the surgical neck of the humerus and anastomoses with the posterior circumflex humeral artery.

This anterior circumflex humeral artery supplies branches to surrounding tissues, which include the glenohumeral joint and the head of the humerus.

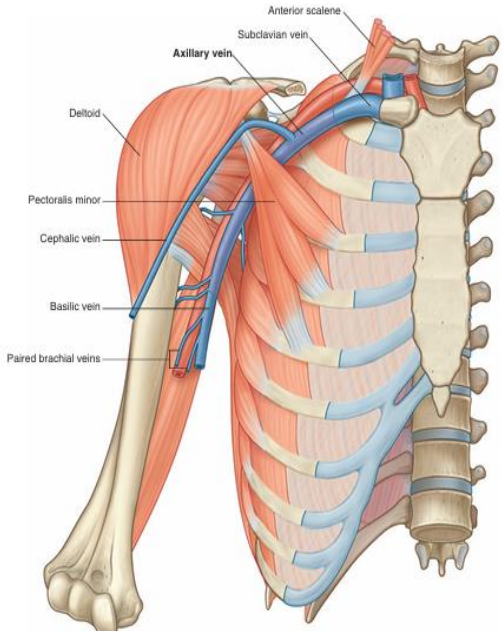
**Posterior circumflex humeral artery**

The posterior circumflex humeral artery originates from the lateral surface of the third part of the axillary artery immediately posterior to the origin of the anterior circumflex humeral artery. With the axillary nerve, it leaves the axilla by passing through the quadrangular space between the teres major, teres minor, and long head of the triceps brachii muscle and the surgical neck of the humerus.

The posterior circumflex humeral artery curves around the surgical neck of the humerus and supplies the surrounding muscles and the glenohumeral joint. It anastomoses with the anterior circumflex humeral artery and with branches from the profunda brachii, suprascapular, and thoraco-acromial arteries.

**Axillary vein**

The axillary vein begins at the lower margin of the teres major muscle and is the continuation of the basilic vein, which is a superficial vein that drains the posteromedial surface of the hand and forearm and penetrates the deep fascia in the middle of the arm.




The axillary vein passes through the axilla medial and anterior to the axillary artery and becomes the subclavian vein as the vessel crosses the lateral border of rib I at the axillary inlet. Tributaries of the axillary vein generally follow the branches of the axillary artery. Other tributaries include brachial veins that follow the brachial artery and the cephalic vein.

**The cephalic vein** is a superficial vein that drains the lateral and posterior parts of the hand, the forearm, and the arm. In the area of the shoulder, it passes into an inverted triangular cleft (the clavipectoral triangle) between the deltoid muscle, pectoralis major muscle, and clavicle. In the superior part of the clavipectoral triangle, the cephalic vein passes deep to the clavicular head of the pectoralis major muscle and pierces the clavipectoral fascia to join the axillary vein. Many patients who are critically ill have lost blood or fluid, which requires replacement. Access to a peripheral vein is necessary to replace the fluid. The typical sites for venous access are the cephalic vein in the hand or veins that lie within the superficial tissues of the cubital fossa.

**Lymphatics**

All lymphatics from the upper limb drain into lymph nodes in the axilla. In addition, axillary nodes receive drainage from an extensive area on the adjacent trunk, which includes regions of the upper back and shoulder, the lower neck, the chest, and the upper anterolateral abdominal wall. Axillary nodes also receive drainage from approximately 75% of the mammary gland.

The 20–30 axillary nodes are generally divided into five groups on the basis of location.

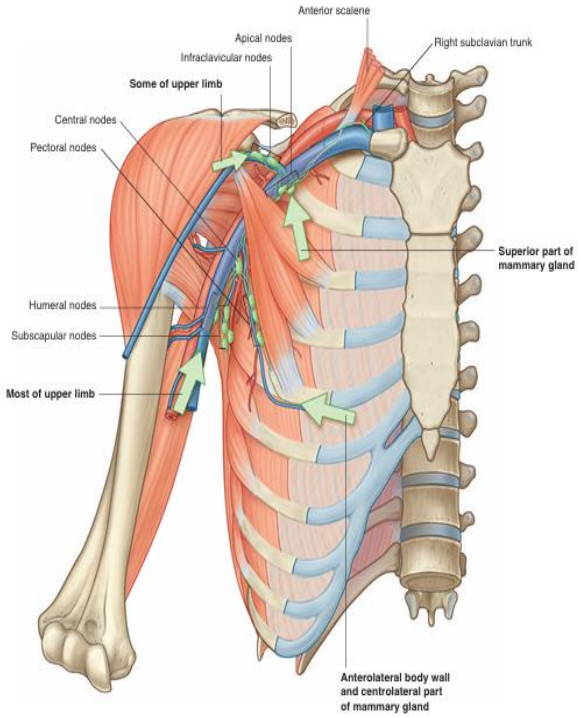
■ **Humeral (lateral) nodes** posteromedial to the axillary vein receive most of the lymphatic drainage from the upper limb.

■ **Pectoral (anterior) nodes** occur along the inferior margin of the pectoralis minor muscle along the course of the lateral thoracic vessels and receive drainage from the abdominal wall, the chest, and the mammary gland.

■ **Subscapular (posterior) nodes** on the posterior axillary wall in association with the subscapular vessels drain the posterior axillary wall and receive lymphatics from the back, the shoulder, and the neck.

■ **Central nodes** are embedded in axillary fat and receive tributaries from humeral, subscapular, and pectoral groups of nodes.

■ **Apical nodes** are the most superior group of nodes in the axilla and drain all other groups of nodes in the region. In addition, they receive lymphatic vessels that accompany the cephalic vein as well as vessels that drain the superior region of the mammary gland.




Efferent vessels from the apical group converge to form the subclavian trunk, which usually joins the venous system at the junction between the right subclavian vein and the right internal jugular vein in the neck. On the left, the subclavian trunk usually joins the thoracic duct in the base of the neck.

N.B. The axillary lymph nodes are also described in terms of levels at which they are situated

• **Level I nodes**: They lie lateral to the lower border of pectoralis minor muscle.

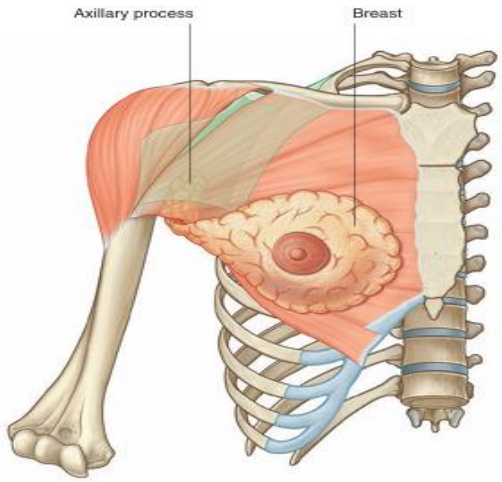
• **Level II nodes**: They lie deep to the pectoralis minor muscle.

• **Level III nodes:** They lie medial to the upper border of pectoralis minor muscle.

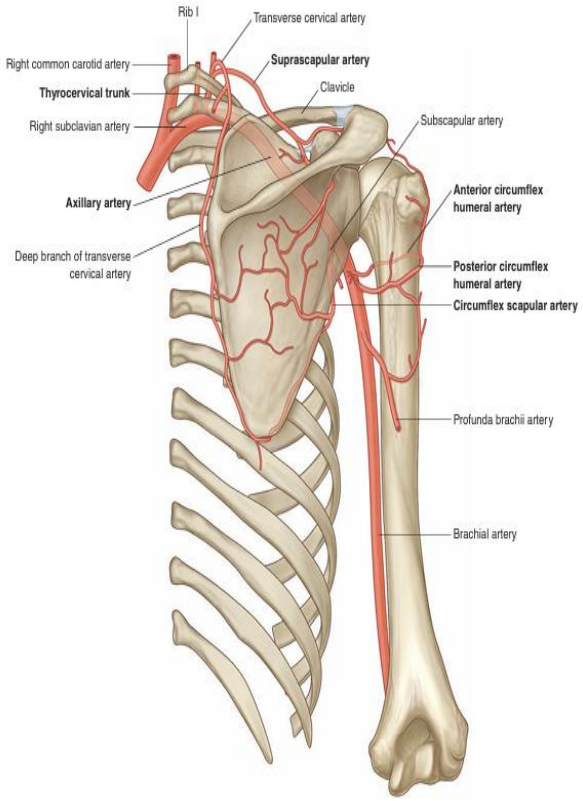
The lymph nodes first receive the lymph from the area of breast involved in cancer are termed sentinel lymph nodes. These are usually the level I lymph nodes. The sentinel nodes are confirmed by injecting a radioactive substance into the affected area of the breast.

**Axillary process of the mammary gland**

Although the mammary gland is in superficial fascia overlying the thoracic wall, its superolateral region extends along the inferior margin of the pectoralis major muscle toward the axilla. In some cases, this may pass around the margin of the muscle to penetrate deep fascia and enter the axilla. This axillary process rarely reaches as high as the apex of the axilla.



**Arterial Anastomosis Around Scapula**




The arterial anastomosis around scapula is principally formed between the branches of the first part of the subclavian and the third part of the axillary arteries.

The scapular anastomosis takes place at two sites: around the body of scapula and over the acromion process of the scapula.

1. **Around the body of scapula**: It occurs between the

(a) suprascapular artery, a branch of the thyrocervical trunk from the first part of the subclavian artery,

(b) circumflex scapular artery, a branch of the subscapular artery from the third part of the axillary artery, and

(c) deep branch of the transverse cervical artery, a branch of the thyrocervical trunk.

2. **Over the acromion process**: It occurs between the

(a) acromial branch of the thoraco-acromial artery,

(b) acromial branch of the suprascapular artery, and

(c) acromial branch of the posterior circumflex humeral artery.

(Collateral circulation through scapular anastomosis: If the subclavian and axillary arteries are blocked anywhere between 1st part of subclavian artery and 3rd part of axillary artery, the scapular anastomosis serves as a potential pathway (collateral circulation) between the first part of the subclavian artery and the third part of the axillary artery, to ensure the adequate circulation to the upper limb.)