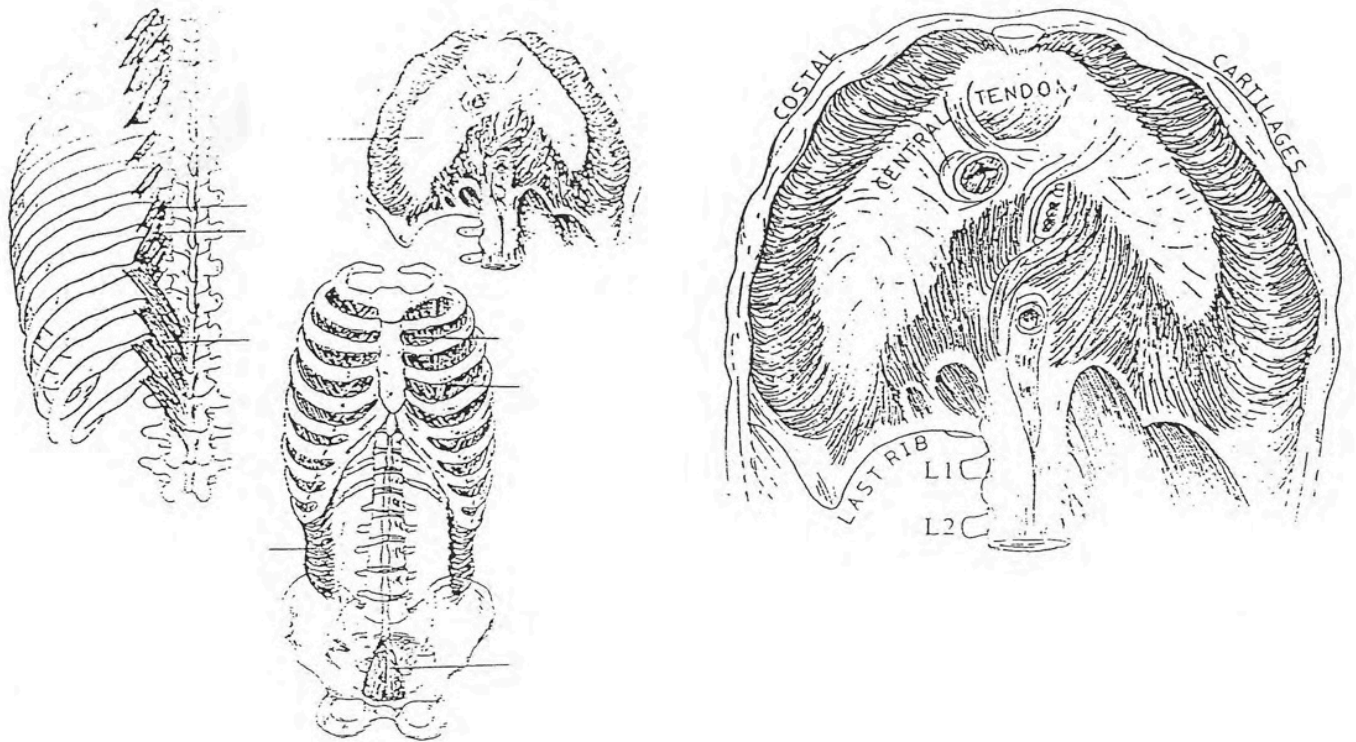


# MUSCLES OF RESPIRATION

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Credit: Bryan Edwards Publications



## MUSCLES OF RESPIRATION

### THE DIAPHRAGM

EXTERNAL INTERCOSTALS

INTERNAL INTERCOSTALS

LEVATORES COSTARUM LONGIS

LEVATORES COSTARUM BREVES

SERRATUS POSTERIOR SUPERIOR

SERRATUS POSTERIOR INFERIOR

TRANSVERSUS ABDOMINIS  
(Note: Anterior muscle of trunk)

PYRAMIDALIS  
(Note: Anterior muscle of trunk)

### Anterior Inferior View

### DIAPHRAGM

**ORIGIN:** An approximately circular line passing entirely around the inner surface of the body wall.

**STERNAL PORTION:** Two slips from the back of the xiphoid process.

**COSTAL PORTION:** The inner surfaces of the cartilages and adjacent portions of the lower 6 ribs on either side, interdigitating with the transversus abdominis.

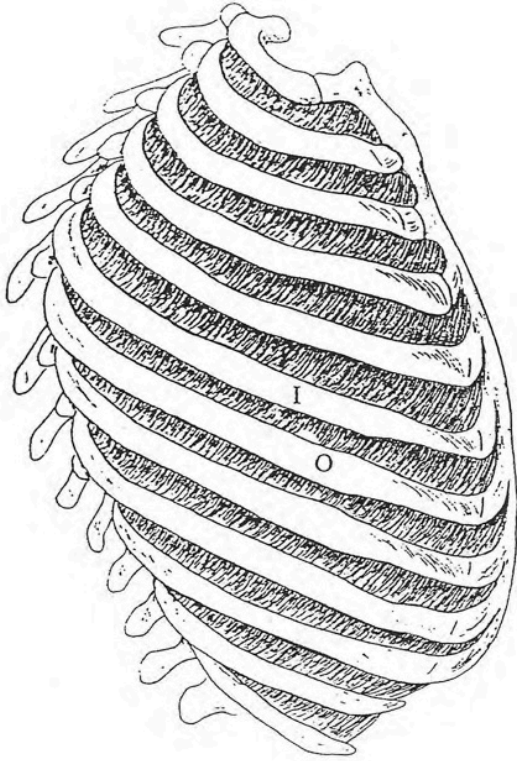
**LUMBAR PORTION:** Medial and lateral arcuate ligaments and right and left crura from the anterolateral surfaces of the bodies and discs of the upper three lumbar vertebrae.

**INSERTION:** The central tendon, which is an oblong sheet forming the summit of the dome.

**ACTION:** Principal muscle of respiration. Draws the central tendon downward, during quiet inspiration, pressing against the abdominal viscera.

**NERVE SUPPLY:** The phrenic nerve from the cervical plexus, C3, 4, 5.

**SYNERGISTS:** External and internal intercostals, serratus posterior superior, the 3 scaleni, levatores costarum.



Lateral View

**INTERNAL INTERCOSTALS**

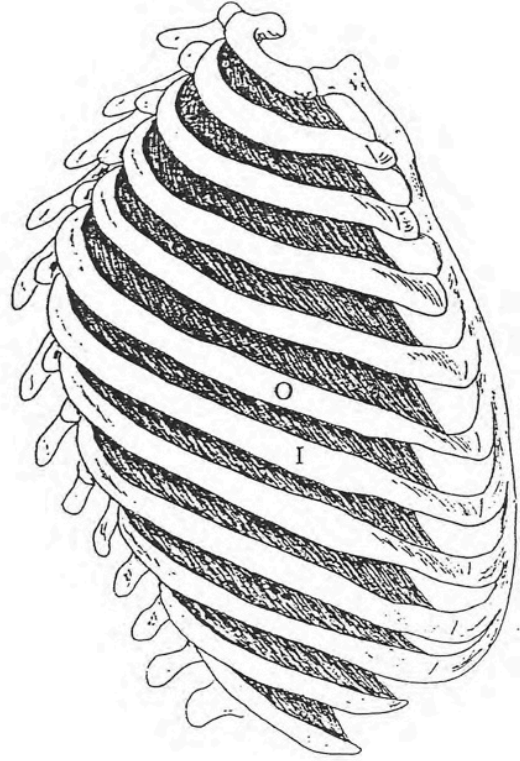
**ORIGIN:** Superior border of rib below.

**INSERTION:** Inferior border of rib above.

**ACTION:** Depresses the ribs during expiration.

**NERVE SUPPLY:** Branches from corresponding intercostal nerves.

**SYNERGISTS:** Serratus posterior inferior, quadratus lumborum.



Lateral View

**EXTERNAL INTERCOSTALS**

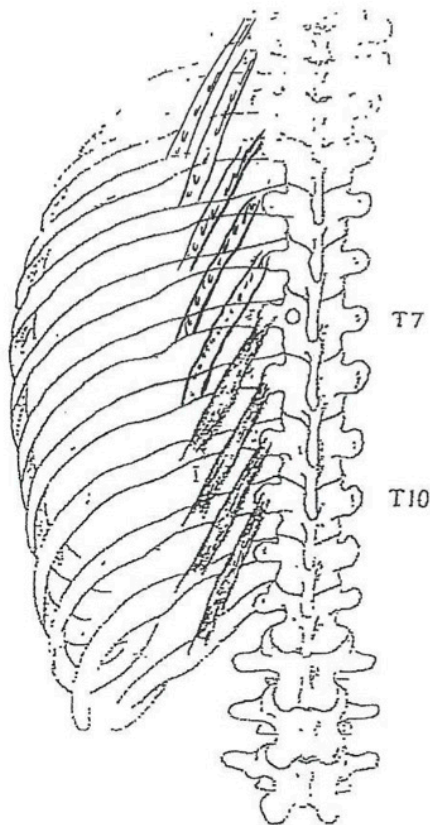
**ORIGIN:** Inferior border of rib above.

**INSERTION:** Superior border of rib below.

**ACTION:** Elevate ribs during inspiration.

**NERVE SUPPLY:** Branches from corresponding intercostal nerves.

**SYNERGISTS:** Serratus posterior superior, levatores costarum.  
Scaleni group.



Posterior View

### LEVATORES COSTARUM LONGI

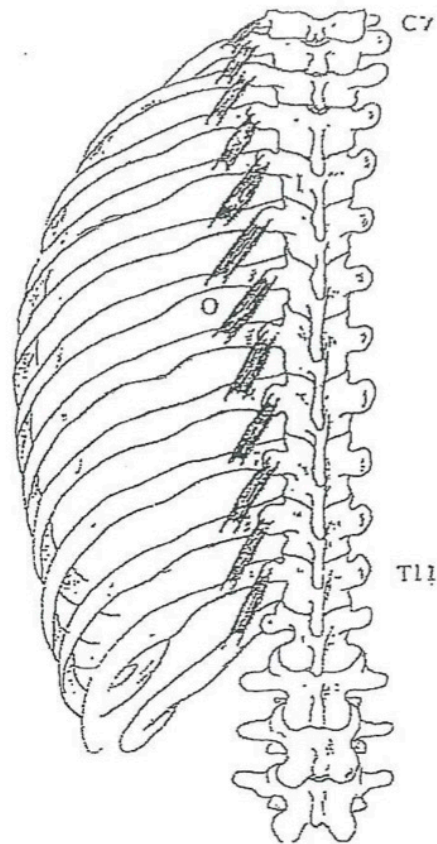
**ORIGIN:** Transverse processes of the 7th - 10th thoracic vertebrae.

**INSERTION:** The outer surface of the 2nd rib below its origin, between the tubercle and the angle.

**ACTION:** Elevate the ribs during inspiration. Extend the vertebral column, bend it laterally and rotate it slightly toward the opposite side.

**NERVE SUPPLY:** From the corresponding thoracic dorsal rami lateral branches.

**SYNERGISTS:** External intercostals, internal intercostals, levator costarum brevis.



Posterior View

### LEVATORES COSTARUM BREVES

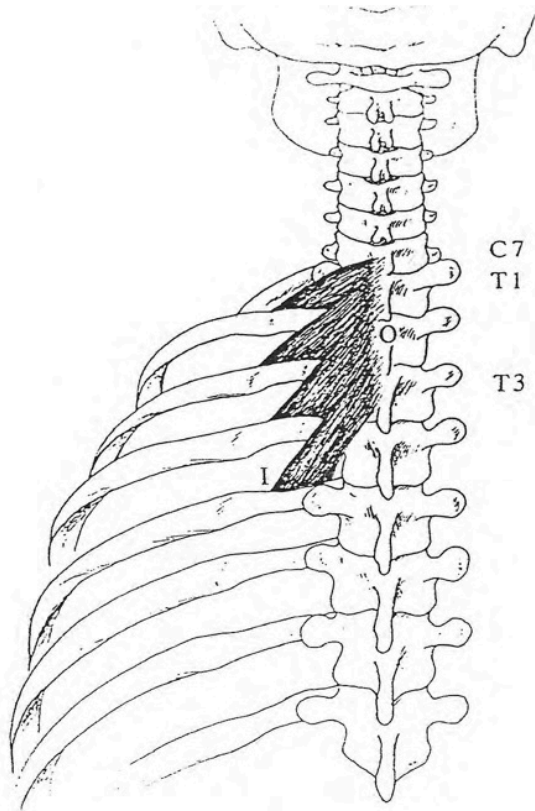
**ORIGIN:** Transverse processes of the 7th cervical and upper 11 thoracic vertebrae.

**INSERTION:** The outer surface of the rib immediately below the vertebra from which it takes origin, between the tubercle and the angle.

**ACTION:** Elevate the ribs during inspiration. Extend the vertebral column, bend it laterally and rotate it slightly toward the opposite side.

**NERVE SUPPLY:** From the corresponding thoracic dorsal rami lateral branches.

**SYNERGISTS:** External intercostals, serratus posterior superior, internal intercostals.



Posterior View

### SERRATUS POSTERIOR SUPERIOR

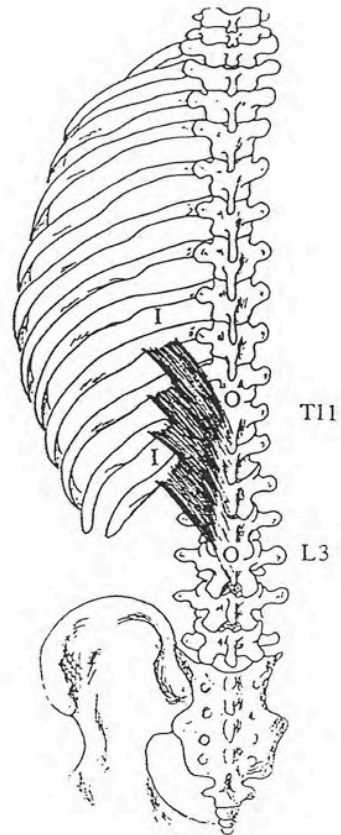
**ORIGIN:** Lower portion of ligamentum nuchae and spinous processes of the 7th cervical and 1st, 2nd and 3rd thoracic vertebrae.

**INSERTION:** Superior borders of 2nd - 5th ribs distal to the angles.

**ACTION:** Elevates the ribs and is a muscle of inspiration.

**NERVE SUPPLY:** Ventral rami of T2 - 5.

**SYNERGISTS:** Levatores costarum breves, scalenus posterior.



Posterior View

### SERRATUS POSTERIOR INFERIOR

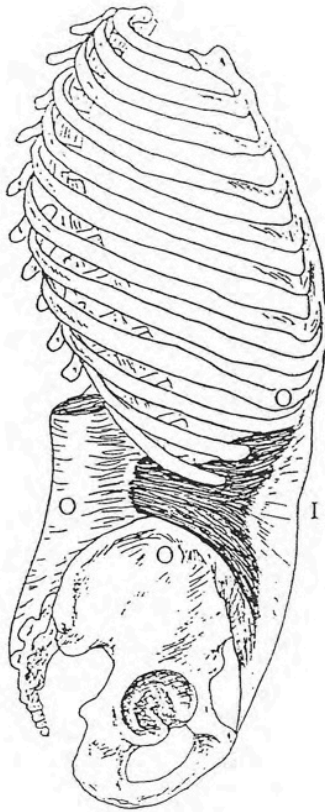
**ORIGIN:** Spinous processes of 11th and 12th thoracic and 1st, 2nd and 3rd lumbar vertebrae, and the thoracolumbar fascia.

**INSERTION:** Inferior borders of lower 4 ribs just beyond their angles.

**ACTION:** Counteracts the pull of the diaphragm by drawing the ribs posterior and inferior, aids in respiration.

**NERVE SUPPLY:** Ventral rami of T9 - 12.

**SYNERGISTS:** Internal intercostals.



Lateral View

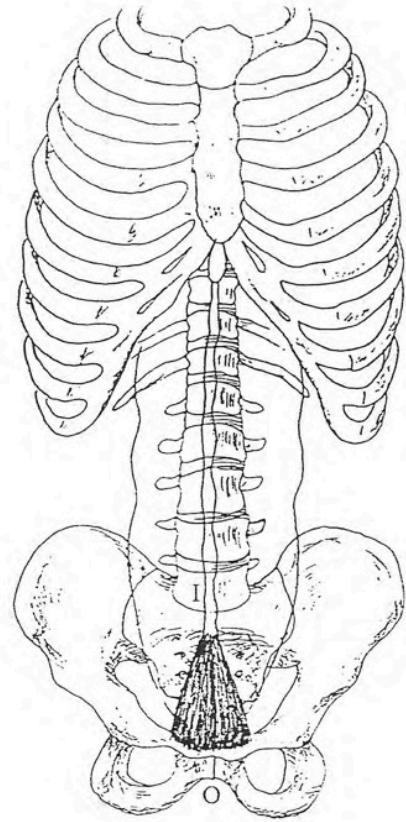
### TRANSVERSUS ABDOMINIS

**ORIGIN:** Lateral  $\frac{1}{3}$  of the inguinal ligament, anterior  $\frac{2}{3}$  of inner lip of the iliac crest, thoracolumbar fascia and from the inner edges of the lower 6 costal cartilages.

**INSERTION:** The linea alba by its aponeurosis.

**ACTION:** Constricts abdominal contents; assists in forced expiration.

**NERVE SUPPLY:** Branches of the 7th - 12th intercostal and the iliohypogastric and ilioinguinal nerves, L1.



Anterior View

### PYRAMIDALIS

**ORIGIN:** Anterior aspect of the symphysis pubis and pubic bone.

**INSERTION:** Linea alba, midway between the umbilicus and pubis.

**ACTION:** Compresses the abdomen, supports abdominal viscera, tenses the linea alba and is active in forced expiration.

**NERVE SUPPLY:** Subcostal nerve, T12.

**SYNERGISTS:** Rectus abdominis, external abdominal oblique, internal abdominal oblique, transversus abdominis.