Muscles Of the Trunk

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Muscles of The Thorax
Muscles of the Thorax

1. External intercostal.
2. Internal intercostal.
3. Innermost intercostal
4. diaphragm.
5. Levator costarum.
6. Serratus posterior superior.
7. Serratus posterior inferior.
<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>External intercostal muscle (11) (fibers</td>
<td>inferior border of rib</td>
<td>superior border of rib below</td>
<td>intercostal</td>
<td>With first rib fixed, they raise ribs during inspiration and</td>
</tr>
<tr>
<td>pass downward and forward)</td>
<td></td>
<td></td>
<td>nerves</td>
<td>thus increase antero-posterior and transverse diameters of thorax.</td>
</tr>
<tr>
<td>Internal intercostal muscle (11) (fibers</td>
<td>inferior border of rib</td>
<td>superior border of rib below</td>
<td>intercostal</td>
<td>With last rib fixed by abdominal muscles, they lower ribs</td>
</tr>
<tr>
<td>pass downward and backward)</td>
<td></td>
<td></td>
<td>nerves</td>
<td>during expiration</td>
</tr>
<tr>
<td>Innermost intercostal muscle (incomplete</td>
<td>adjacent ribs</td>
<td>adjacent ribs</td>
<td>intercostal</td>
<td>Assist external and internal intercostal muscles</td>
</tr>
<tr>
<td>layer)</td>
<td></td>
<td></td>
<td>nerves</td>
<td></td>
</tr>
<tr>
<td>Diaphragm (most important muscle of</td>
<td>xiphoid process; lower six costal cartilages,</td>
<td>central tendon</td>
<td>phrenic nerve</td>
<td>Very important muscle of inspiration; increases vertical diameter of</td>
</tr>
<tr>
<td>respiration)</td>
<td>first three lumbar vertebrae</td>
<td></td>
<td></td>
<td>thorax by pulling central tendon downward, assists in raising lower</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ribs. Also used in abdominal straining and weight lifting</td>
</tr>
<tr>
<td>Levatores costarum (12)</td>
<td>tip of transverse process of C7 and T1-11</td>
<td>rib below</td>
<td>posterior rami of</td>
<td>Raise ribs and therefore inspiratory muscles</td>
</tr>
<tr>
<td></td>
<td>vertebrae</td>
<td></td>
<td>thoracic spinal</td>
<td></td>
</tr>
<tr>
<td>Serratus posterior superior</td>
<td>lower cervical and upper thoracic spines</td>
<td>upper ribs</td>
<td>intercostal</td>
<td>Raises ribs and therefore inspiratory muscles</td>
</tr>
<tr>
<td>Serratus posterior inferior</td>
<td>upper lumbar and lower thoracic spines</td>
<td>lower ribs</td>
<td>intercostal</td>
<td>Depresses ribs and therefore expiratory muscles</td>
</tr>
</tbody>
</table>

External Intercostal Muscles

- **Origin:**
  The inferior border of the rib above.

- **Insertion:**
  The muscle fibers are directed downwards, forwards and medially to be inserted into the superior border of the rib below.

- **Nerve Supply:**
  Intercostal nerves.

- **Action:**
  With fixation of the first rib, they pull the ribs upwards, so they are muscles of inspiration.
Internal Intercostal Muscles

- **Origin:**
The upper border of the rib below.

- **Insertion:**
The muscle fibers are directed upwards, forwards and medially to be inserted into the inferior border of the rib above.

- **Nerve Supply:**
Intercostal nerves.

- **Action:**
With fixation of the last ribs, they pull the ribs downwards, so they are muscles of expiration.
Innermost Intercostal Muscles

Incomplete layer of muscles fibers that can transverse more than one intercostal space

**Nerve Supply:**
Intercostal nerves.

**Action:**
Muscles of respiration.
Diaphragm

- **Origin:**
  1. Sternal head: from xiphoid process.
  2. Costal head: lower six ribs and costal cartilage.
  3. Vertebral head: right and left crura from the first, second and third lumbar vertebrae and arcuate ligaments.

- **Insertion:**
  Central tendon of the diaphragm.

- **Nerve Supply:**
  Motor: phrenic nerve.
  Sensory: phrenic and Intercostal nerves.

- **Action:**
  Increase the vertebral diameter of the thoracic cavity (muscle of inspiration).
Muscles of The Abdomen
Muscles of the Anterior Abdominal Wall

1. External oblique.
2. Internal oblique.
3. Transversus abdominis.
4. Rectus abdominis.
5. Pyramidals (if present).
**Table 13-5  Muscles of the Anterior Abdominal Wall**

<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>External oblique</td>
<td>Lower eight ribs</td>
<td>Xiphoid process, linea alba, pubic crest, pubic tubercle, iliac crest</td>
<td>Lower six thoracic nerves and iliohypogastric and ilioinguinal nerves (L1)</td>
<td>Supports abdominal contents; compresses abdominal contents; assists in flexing and rotation of trunk; assists in forced expiration, micturition, defecation, parturition, and vomiting</td>
</tr>
<tr>
<td>Internal oblique</td>
<td>Lumbar fascia, iliac crest, lateral two thirds of inguinal ligament</td>
<td>Lower three ribs and costal cartilages, xiphoid process, linea alba, symphysis pubis</td>
<td>Lower six thoracic nerves and iliohypogastric and ilioinguinal nerves (L1)</td>
<td>As above</td>
</tr>
<tr>
<td>Transversus</td>
<td>Lower six costal cartilages, lumbar fascia, iliac crest, lateral third of inguinal ligament</td>
<td>Xiphoid process linea alba, symphysis pubis</td>
<td>Lower six thoracic nerves and iliohypogastric and ilioinguinal nerves (L1)</td>
<td>Compresses abdominal contents</td>
</tr>
<tr>
<td>Rectus abdominis</td>
<td>Symphysis pubis and pubic crest</td>
<td>Fifth, sixth, and seventh costal cartilages and xiphoid process</td>
<td>Lower six thoracic nerves</td>
<td>Compresses abdominal contents and flexes vertebral column; accessory muscle of expiration</td>
</tr>
<tr>
<td>Pyramidalis (if present)</td>
<td>Anterior surface of pubis</td>
<td>Linea alba</td>
<td>Twelfth thoracic nerve</td>
<td>Tenses the linea alba</td>
</tr>
</tbody>
</table>

External oblique Muscle

- **Origin:** The lower eight ribs.
- **Insertion:** Xiphoid process, linea alba, pubic crest, pubic tubercle, anterior half of iliac crest.
- **Nerve Supply:** Intercostal nerves.
- **Action:** Increase the intra-abdominal pressure.
Internal oblique Muscle

- **Origin:**
The lumbar fascia, anterior 2/3 of iliac crest, lateral 2/3 of inguinal ligament.

- **Insertion:**
Lower 3 ribs and costal cartilage, xiphoid process, linea alba, pubic crest and pectineal line.

- **Nerve Supply:**
Intercostal nerves.

- **Action:**
Increase the intra-abdominal pressure.
Transversus Abdominis Muscle

- **Origin:**
  The lower 6 costal cartilage, lumbar fascia, anterior 2/3 of iliac crest, lateral 1/3 of inguinal canal.

- **Insertion:**
  The xiphoid process, linea alba, pubic crest and pectineal line.

- **Nerve Supply:**
  Intercostal nerves.

- **Action:**
  Increase the intra-abdominal pressure.
Rectus Abdominis Muscle

- **Origin:**
The symphysis pubis and pubic crest.

- **Insertion:**
5th, 6th, 7th costal cartilage and xiphoid process.

- **Nerve Supply:**
Intercostal nerves.

- **Action:**
1. Increase the intra-abdominal pressure.
2. Flexion of the trunk.
Muscles of the Posterior Abdominal Wall

1. Psoas major.
2. Quadratus lumborum.
3. Iliacus.
<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psoas</td>
<td>Transverse processes, bodies, and intervertebral discs of twelfth thoracic and five lumbar vertebrae</td>
<td>With iliacus into lesser trochanter of femur</td>
<td>Lumbar plexus</td>
<td>Flexes thigh on trunk; if thigh is fixed, it flexes trunk on thigh, as in sitting up from lying position</td>
</tr>
<tr>
<td>Quadratus lumborum</td>
<td>Iliolumbar ligament, iliac crest, tips of transverse processes of lower lumbar vertebrae</td>
<td>Twelfth rib</td>
<td>Lumbar plexus</td>
<td>Fixes twelfth rib during inspiration; depresses twelfth rib during forced expiration; laterally flexes vertebral column same side</td>
</tr>
<tr>
<td>Iliacus</td>
<td>Iliac fossa</td>
<td>With psoas into lesser trochanter of femur</td>
<td>Femoral nerve</td>
<td>Flexes thigh on trunk; if thigh is fixed, it flexes the trunk on the thigh, as in sitting up from lying position</td>
</tr>
</tbody>
</table>

From Snell RS: Clinical Anatomy. 7th Ed. Philadelphia: Lippincott Williams & Wilkins, 2004, p. 188.
Psoas Major Muscle

- **Origin:**
The transverse processes and sides of vertebral bodies and their intervertebral discs from T12 till L5 vertebrae.

- **Insertion:**
Lesser trochanter of the femur.

- **Nerve Supply:**
Lumbar spinal nerves (lumbar plexus).

- **Action:**
Flexion of the hip joint.
Quadratus Lumborum Muscle

- **Origin:**
The ilio-lumbar ligament, iliac crest and transverse processes of the lower lumbar vertebrae.

- **Insertion:**
Last rib and transverse processes of upper lumbar vertebrae.

- **Nerve Supply:**
Lumbar spinal nerves (lumbar plexus).

- **Action:**
1. Lateral flexion of the vertebral column.
2. Fixation of the last rib during expiration.
Iliacus

- **Origin:** Iliac fossa.
- **Insertion:** Lesser trochanter of the femur.
- **Nerve Supply:** Femoral nerve.
- **Action:** Flexion of the hip joint.
Muscles of the Pelvic Wall

1. Piriformis.
2. Obturator Internus.
3. Levator ani.
<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piriformis</td>
<td>Front of sacrum</td>
<td>Greater trochanter of femur</td>
<td>Sacral plexus</td>
<td>Lateral rotator of femur at hip joint</td>
</tr>
<tr>
<td>Obturator internus</td>
<td>Obturator membrane and adjoining part of hip bone</td>
<td>Greater trochanter of femur</td>
<td>Nerve to obturator internus from sacral plexus</td>
<td>Lateral rotator of femur at hip joint</td>
</tr>
<tr>
<td>Levator ani</td>
<td>Body of pubis, fascia of obturator internus, spine of ischium</td>
<td>Perineal body, anococcygeal body, walls of prostate, vagina, rectum, and anal canal</td>
<td>Fourth sacral nerve, pudendal nerve</td>
<td>Supports pelvic viscera; sphincter to anorectal junction and vagina</td>
</tr>
<tr>
<td>Coccygeus</td>
<td>Spine of ischium</td>
<td>Lower end of sacrum; coccyx</td>
<td>Fourth and fifth sacral nerve</td>
<td>Assists levator ani to support pelvic viscera; flexes coccyx</td>
</tr>
</tbody>
</table>

Piriformis

- **Origin:**
  Anterior surface of the 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} sacral vertebrae.

- **Insertion:**
  Upper border of the greater trochanter of femur

- **Nerve Supply:**
  Anterior rami of the 1\textsuperscript{st} and 2\textsuperscript{nd} sacral nerves.

- **Action:**
  Lateral rotation of the thigh (hip joint).
Obturator internus

- **Origin:** Inner surface of obturator membrane and surrounding bones.
- **Insertion:** Upper border of the greater trochanter of femur
- **Nerve Supply:** Nerve to obturator internus.
- **Action:** Lateral rotation of the thigh (hip joint).
Sacrum
Greater sciatic notch
Piriformis m.
Greater trochanter of femur
Trochanteric fossa
Ischial spine
Obturator internus m.
Inf. pubic ramus
Sacrotuberous lig. (cut)
Ischial tuberosity
Sup. pubic ramus
Levator Ani Muscle

- **Parts:**
  1. Anterior fibers: levator prostatae or sphincter vaginae: from a sling around prostate or vagina.
  2. Intermediate fibers: puborectalis, pubococcygeus.

- **Nerve Supply:**
  Perineal branches of both 4th sacral nerve and pudendal nerve.

- **Action:**
  1. Increase intra-abdominal pressure.
  2. Anorectal sphincter.
  3. Vaginal sphincter.
Medial view from left

- Hip bone
- Pubic symphysis
- Rectum
- Coccyx
- Puborectalis
- Wall of anal canal

80° anorectal angle (perineal flexure) at anorectal junction
Coccygeus

- **Origin:** The ischial spine.
- **Insertion:** Lower end of sacrum and coccyx.
- **Nerve Supply:** 4th and 5th sacral spinal nerves.
- **Action:** Supports the pelvic viscera.
(A) Medial view of hemisected pelvis

(B) Posterior view

(C) Inferior view of structures lying superior to the perineal membrane in the male (left) and female (right)