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APRENDIZAJE ANATÓMICO *MEDIANTE:*
APLICACIONES PRÁCTICAS

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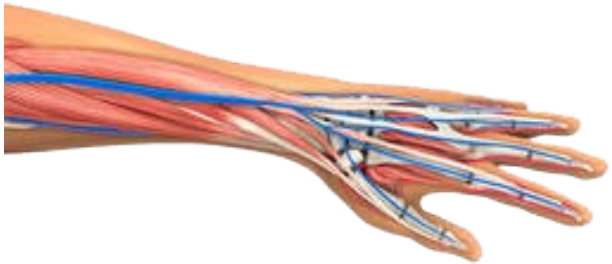
CONTENIDO PRESENTACIÓN



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- Importancia de la: *Anatomía Funcional y Aplicada*
- Conceptos Básicos: *Terminología Común Fundamental*
- Aplicaciones prácticas de la: *Anatomía*
- Avalúo del material de la conferencia: *Assessment*
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APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

VALOR

APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

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APLICACIONES PRÁCTICAS

- Traumas y problemas médicos vía ejercicio/deporte
- Evaluación: *Pre-participación, Aguda/Crónica, Orto-M*
- Ortóticos: *Preventivos y Terapéuticos*
- Vendaje Terapéutico: *Atlético, Kinesio, "Strapping"*
- Masaje Terapéutico: *Atlético o Deportico*
- Ejercicios: *Estiramiento, Calisténicos, Funcionales*
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APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

LESIONES Y PATOLOGÍAS ATLÉTICAS

SOFTBALL/BASEBALL

LESIONES

SOBREUSO

Hombro/Codo

Comunes en

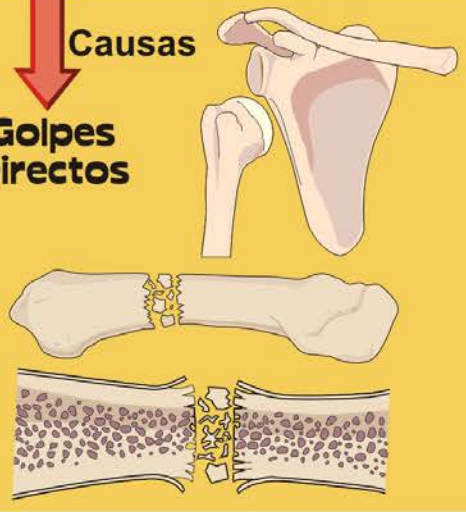
Lanzadores

HUESO/COYUNTURAS

Fracturas/Dislocaciones

Causas

Golpes Directos



TEJIDO BLANDO

Músculos, Tendones, Ligamentos, Cápsulas

Desgarres

Torceduras

Piel

Ampollas, Callos

Magulladuras, Hematomas

Causas

Golpes Directos

Caídas

Heridas

Raspaduras

Laceraciones

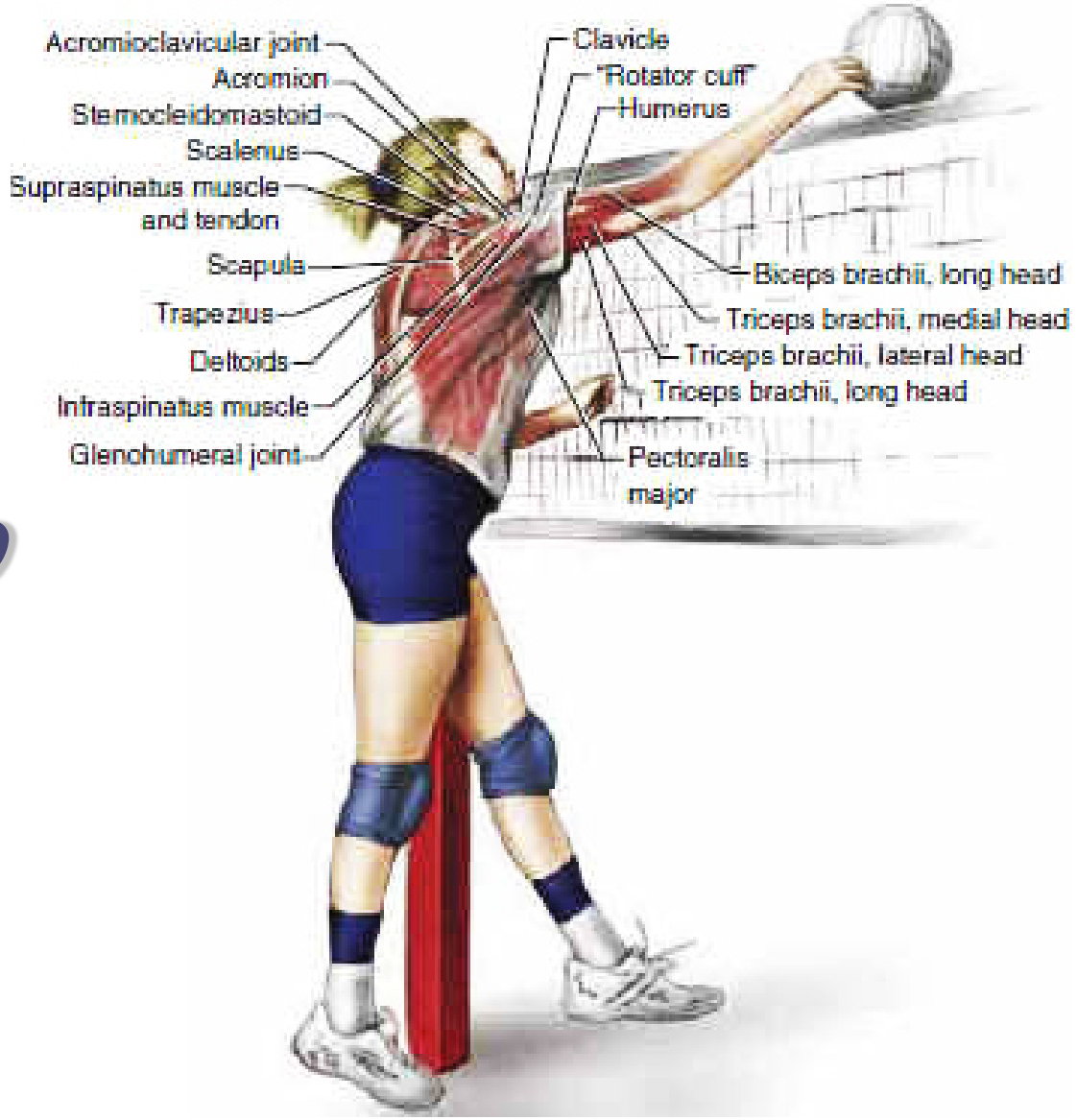
LESIONES DEPORTIVAS – *TEJIDO DURO:*
Subluxaciónn de la Articulación Esternoclavicular

NOTA. Reproducido de: ***Diagnostic Picture Tests in Injury in Sport***. (pp. 61, 118), por J. G. P. William, 1988, Ipswich, England: Year Book Medical Publishers, Inc. Copyright 1988 por: J. G. P. Williams.

LESIONES DEPORTIVAS

EXTREMIDAD SUPERIOR:

* Hombro *



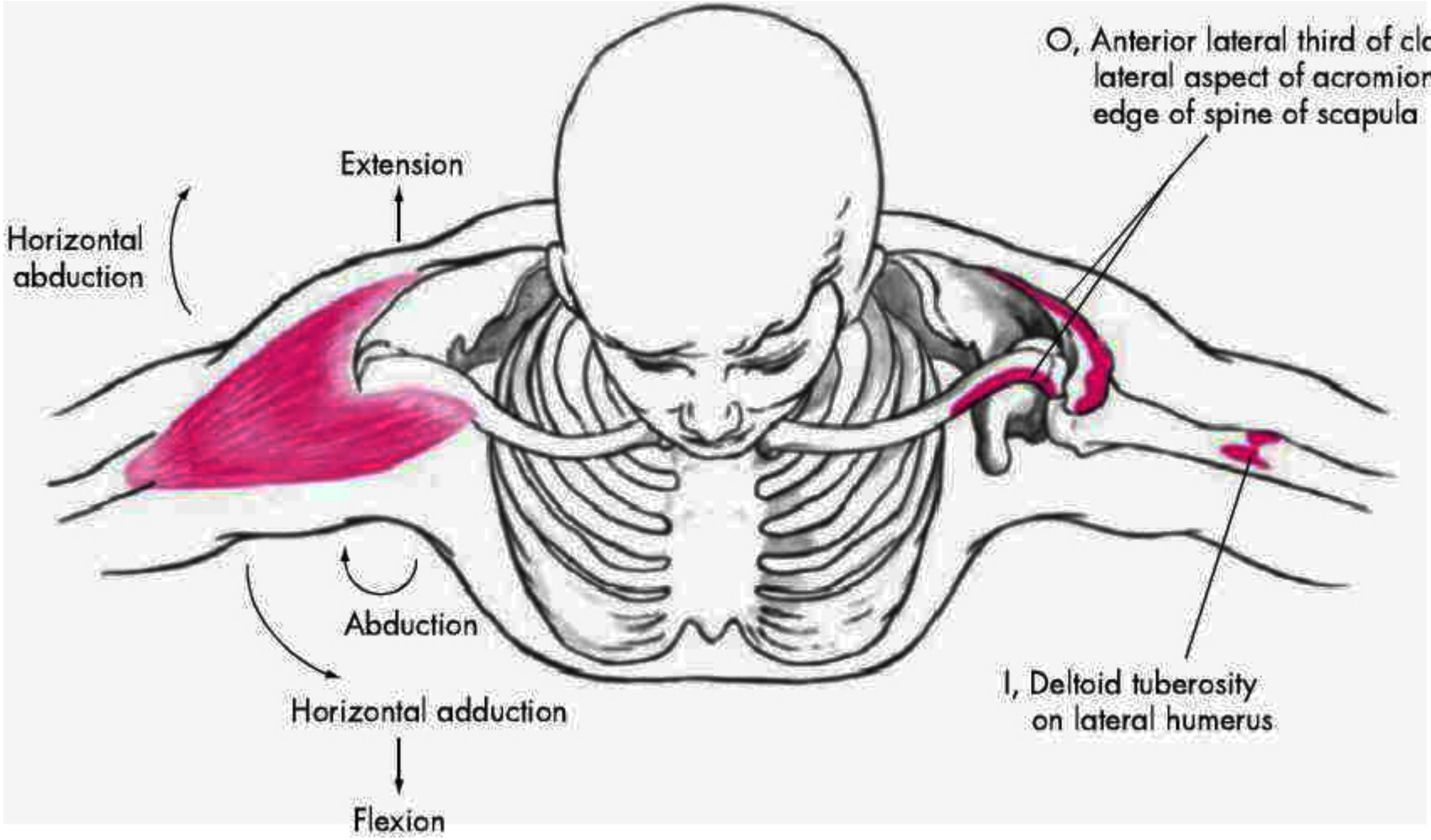
NOTA. Adaptado de: "Shoulder Injuries," por E. S. Evangelista. En ***Sports Injuries Guidebook***. (p. 77), por R. S. Gotlin (Ed.), 2008, Champaign: Human Kinetics, Inc.

APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

EVALUACIÓN DEL ATLETA

EXTREMIDAD SUPERIOR – *HOMBRO:*
Deltoides: *Anterior, Medio y Posterior*



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Deltoid muscle FIG. 5.14

(del-toyd')

Shoulder abduction

Shoulder flexion

Shoulder horizontal adduction

Origin

Anterior fibers: anterior lateral third of the clavicle
Middle fibers: lateral aspect of the acromion
Posterior fibers: inferior edge of the spine of the scapula

Insertion

Deltoid tuberosity on the lateral humerus

Action

Anterior fibers: abduction, flexion, horizontal adduction, and internal rotation of the glenohumeral joint
Middle fibers: abduction of the glenohumeral joint
Posterior fibers: abduction, extension, horizontal abduction, and external rotation of the glenohumeral joint

Chapter 5

Palpation

Anterior fibers: from the clavicle toward the anterior humerus during resisted flexion or horizontal adduction
Middle fibers: from the lateral border of the acromion down toward the deltoid tuberosity during resisted abduction
Posterior fibers: from the lower lip of the spine of the scapula toward the posterior humerus during resisted extension or horizontal abduction

Innervation

Axillary nerve (C5, C6)

Application, strengthening, and flexibility

The deltoid muscle is used in any lifting movement. The trapezius muscle stabilizes the scapula as the deltoid pulls on the humerus. The anterior fibers of the deltoid muscle flex and internally rotate the humerus. The posterior fibers extend and externally rotate the humerus. The anterior fibers also horizontally adduct the humerus, while the posterior fibers horizontally abduct it. Any movement of the humerus on the scapula will involve part or all of the deltoid muscle.

Lifting the humerus from the side to the position of abduction is a typical action of the deltoid. Sidearm dumbbell raises are excellent for strengthening the deltoid, especially the middle fibers. By abducting the arm in a slightly horizontally adducted (30 degrees) position, the anterior deltoid fibers can be emphasized. The posterior fibers can be strengthened better by abducting the arm in a slightly horizontally abducted (30 degrees) position. See Appendix 3 for more commonly used exercises for the deltoid and other muscles in this chapter.

Stretching the deltoid requires varying positions, depending on the fibers to be stretched. The anterior deltoid is stretched by taking the humerus into extreme horizontal abduction or by extreme extension and adduction. The middle deltoid is stretched by taking the humerus into extreme adduction behind the back. Extreme horizontal adduction stretches the posterior deltoid.

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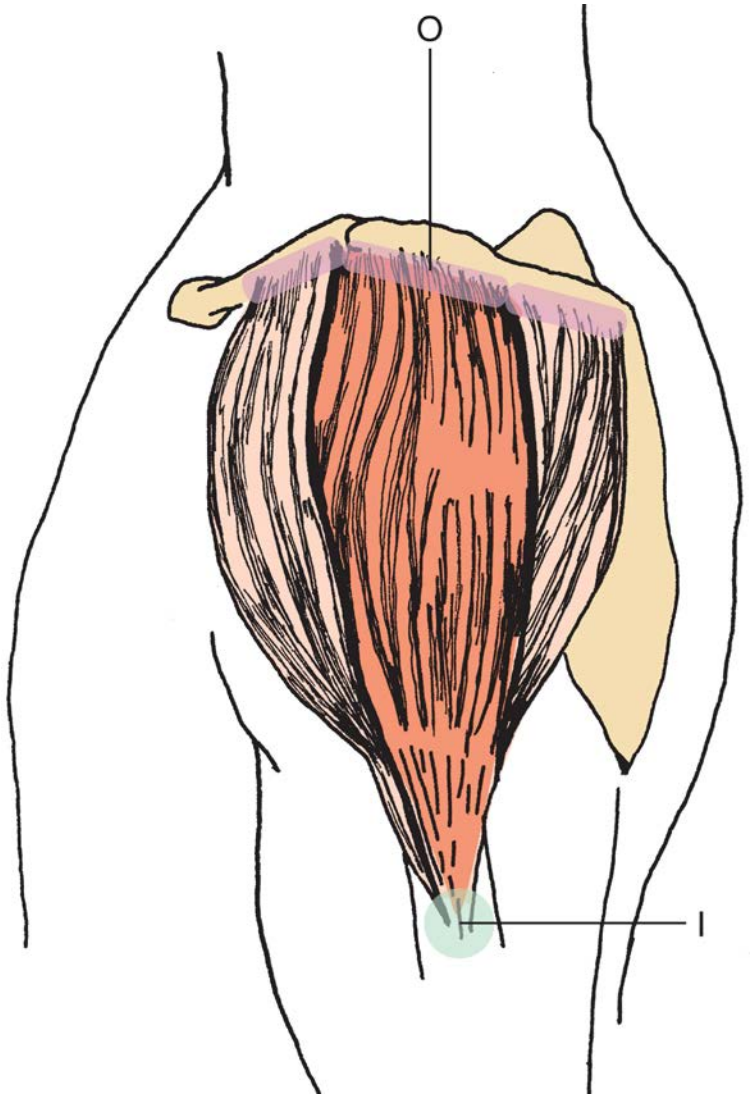
EXTREMIDAD SUPERIOR:

ARTICULACIÓN DEL HOMBRO:

DELTOIDES MEDIO

(Vista Lateral)



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Middle Deltoid

O	Acromion process
I	Deltoid tuberosity
A	Shoulder abduction
N	Axillary nerve

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LESIONES DEPORTIVAS – *TEJIDO BLANDO:*
PRUEBA FUNCIONAL DE LOS MÚSCULOS ESQUELÉTICOS

Fortaleza / Nivel de Tonicidad del Músculo Deltoides Medio

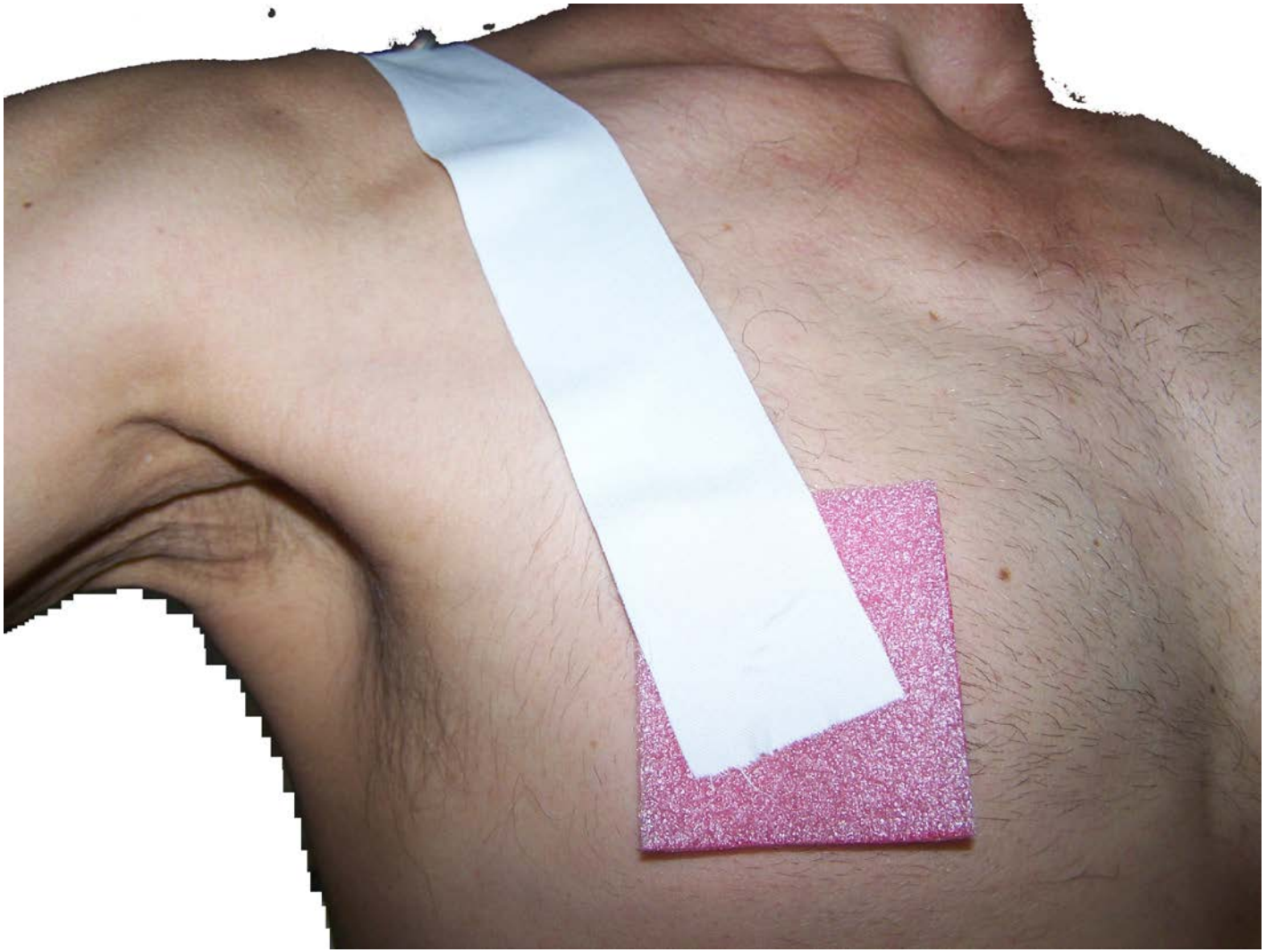
APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

VENDAJES Y "WRAPS"

KINESIO-TAPING
Aplicaciones Musculares
DELTOIDES:

VENDAJE ATLÉTICO - Aplicaciones Musculares: *HOMBRO:*



APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

MASAJE ATLÉTICO

APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

EJERCICIOS

APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL:

EJERCICIOS: DELTOIDES

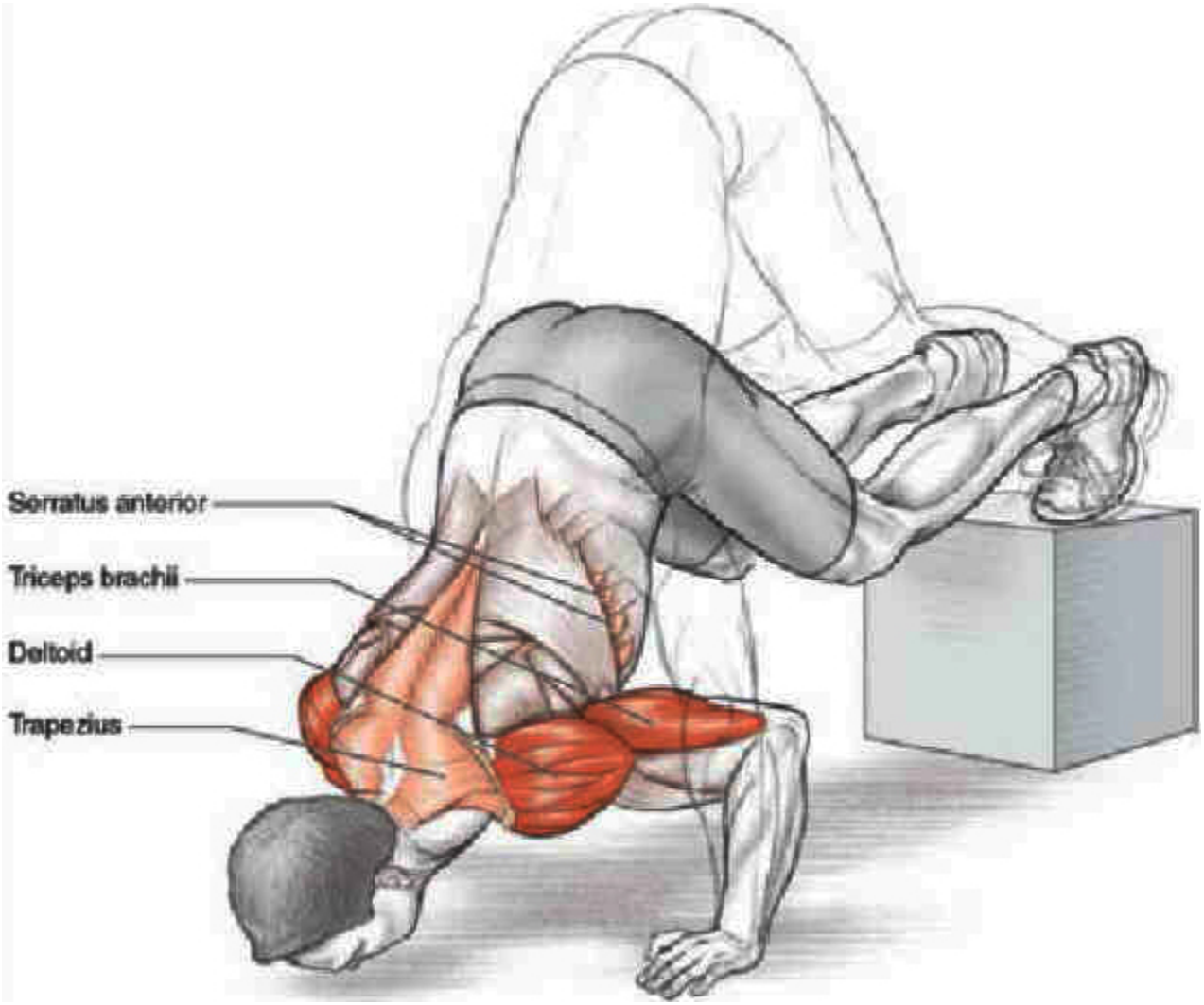
DELTOIDES – *ANTERIOR Y MEDIAL: Calisténico*

DELTOIDES – *ANTERIOR Y MEDIAL: Con Resistencias*

DELTOIDES – *Y OTROS:*
Calisténico

LAGARTIJAS CON PIES ELEVADOS

DELTOIDES – *Y OTROS: Calisténico*



NOTA. Reproducido de: ***Bodyweight Strength Training Anatomy***.. (p. ?), por B. Contreras, 2014, Champaign, IL: Human Kinetics. Copyright 2014 por: Bret Contreras.

DELTOIDES – *ANTERIOR: Estiramiento*

DELTOIDES – *POSTERIOR: Estiramiento*

DELTOIDES: *Estiramiento*

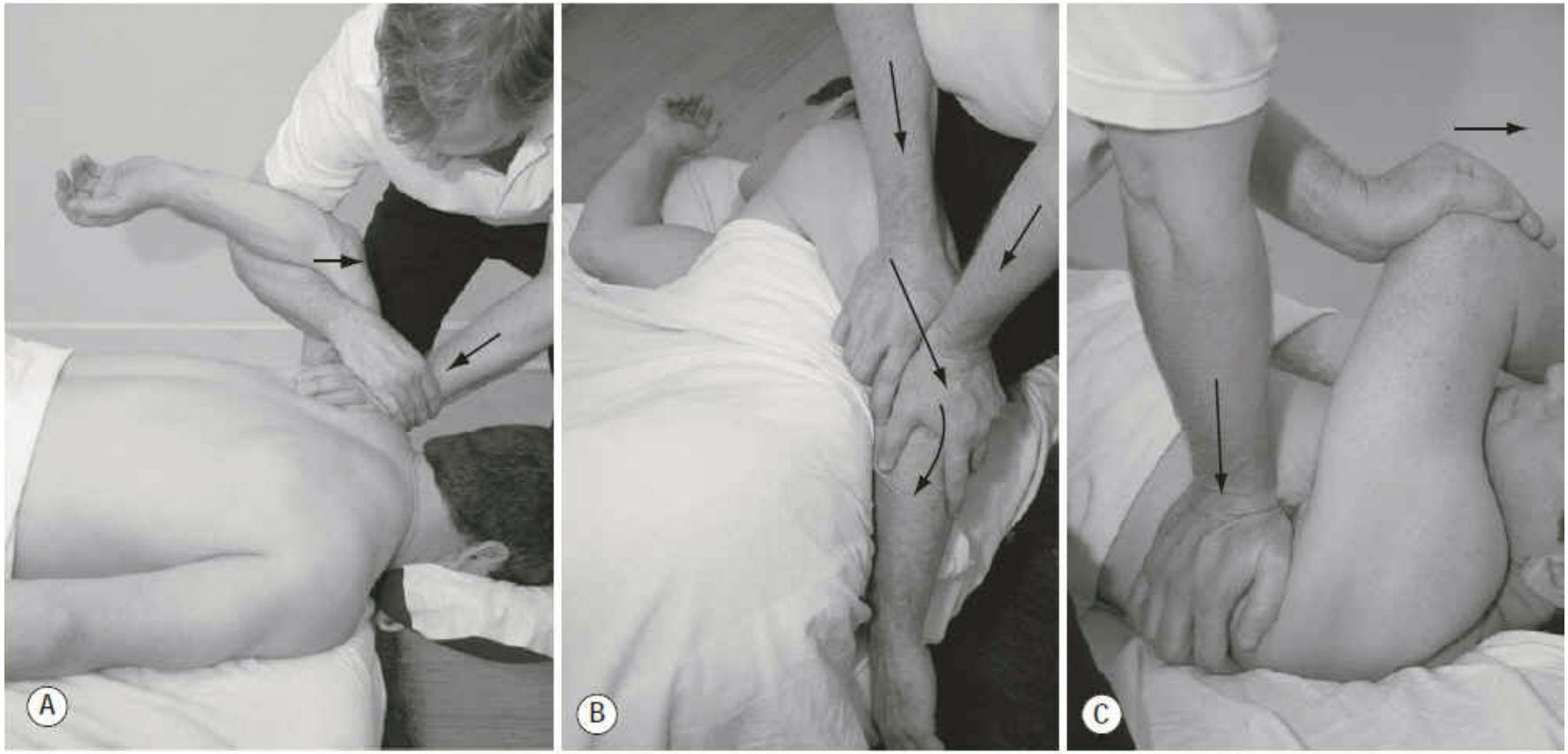


Figure 7.33 • Stretch of the deltoid muscle • A Anterior B Intermedius C Posterior

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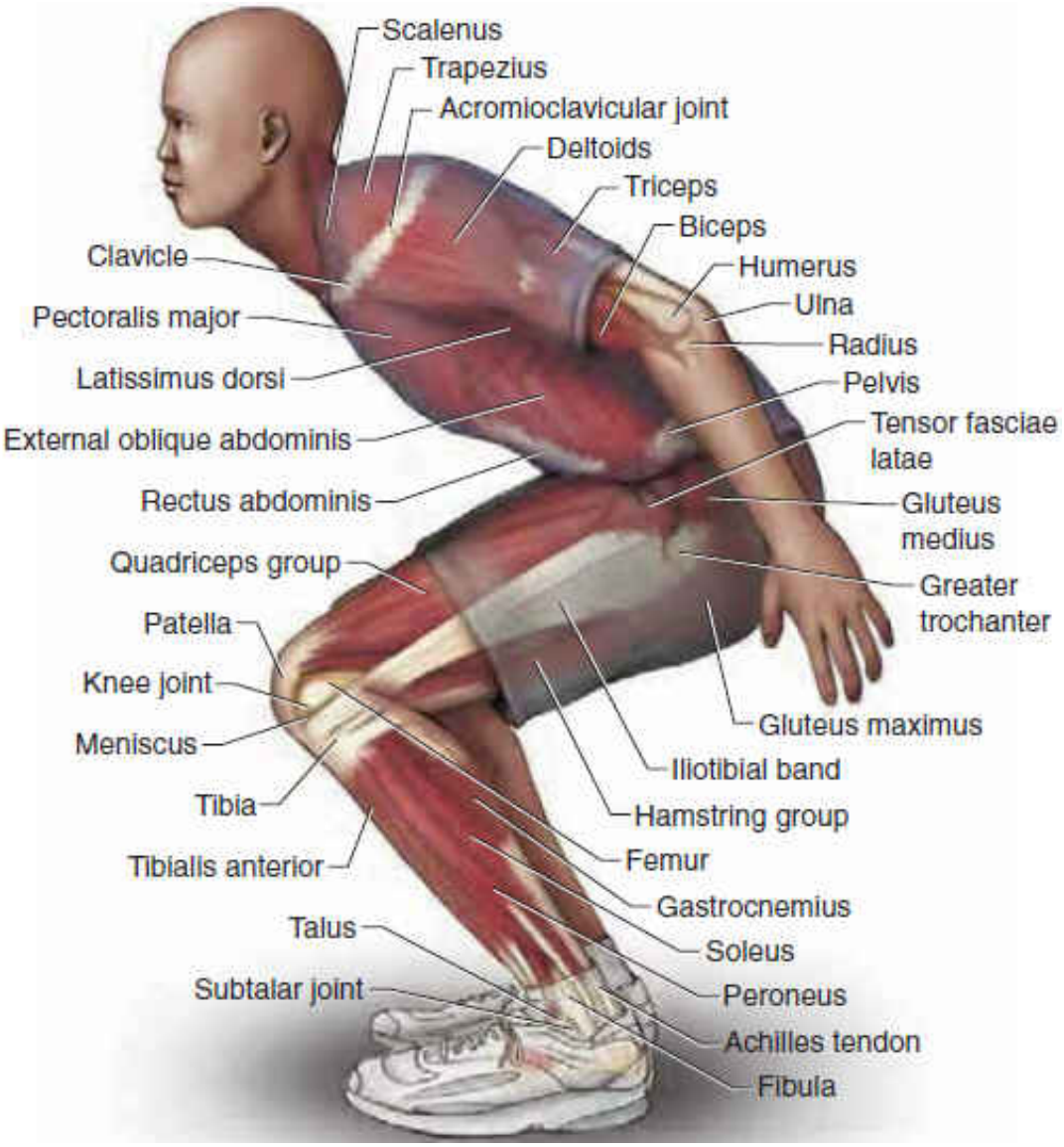
APRENDIZAJE ANATÓMICO:

APLICACIONES PRÁCTICAS DE LA ANATOMÍA FUNCIONAL: ENTRENAMIENTO FÍSICO

ENTRENAMIENTO FUNCIONAL



NOTA. Adaptado de: "Shoulder Injuries," por E. S. Evangelista. En ***Sports Injuries Guidebook***. (p. 1), por R. S. Gotlin (Ed.), 2008, Champaign: Human Kinetics, Inc.

MÚSCULOS ESQUELÉTICOS – *ANATOMÍA: Pared Abdominal*

Lumbar flexion

Lumbar lateral flexion

Lumbar rotation unilaterally

Muscles of the abdominal wall

FIGS. 12.20, 12.21, 12.22

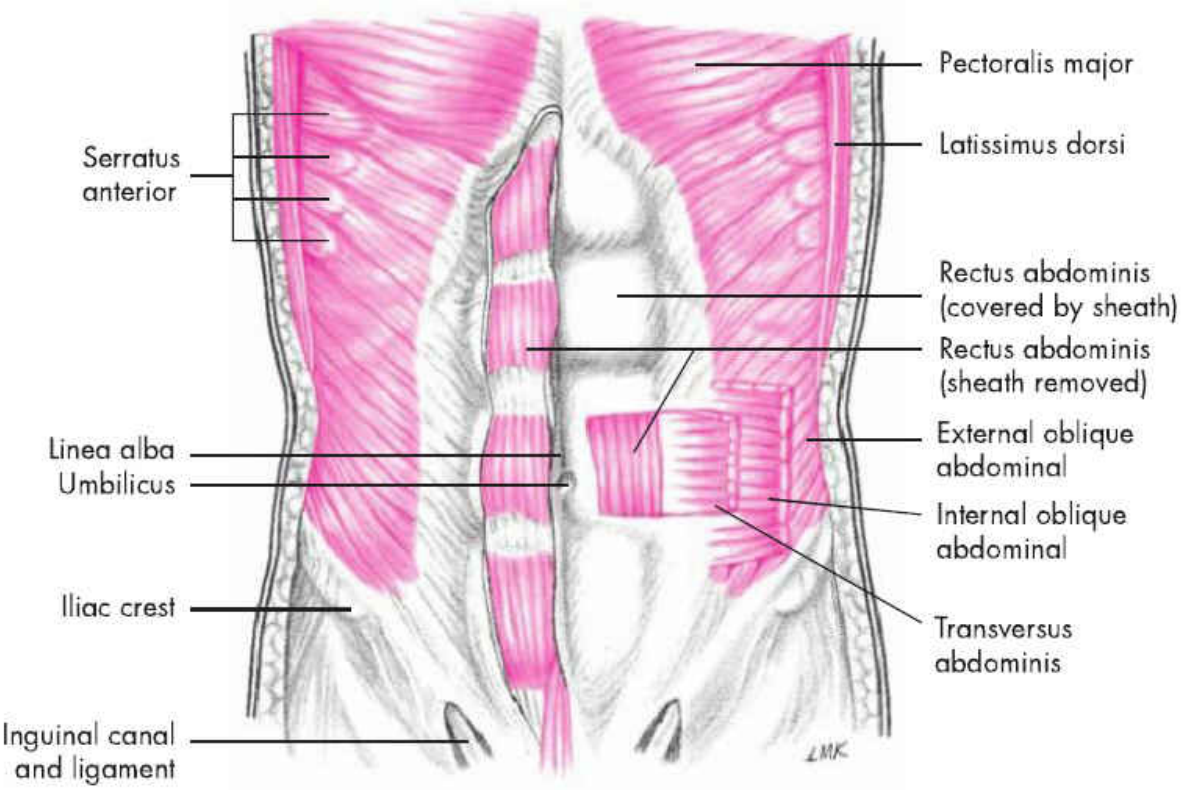


FIG. 12.20 • Muscles of the abdomen: external oblique and rectus abdominis. The fibrous sheath around the rectus has been removed on the right side to show the muscle within.

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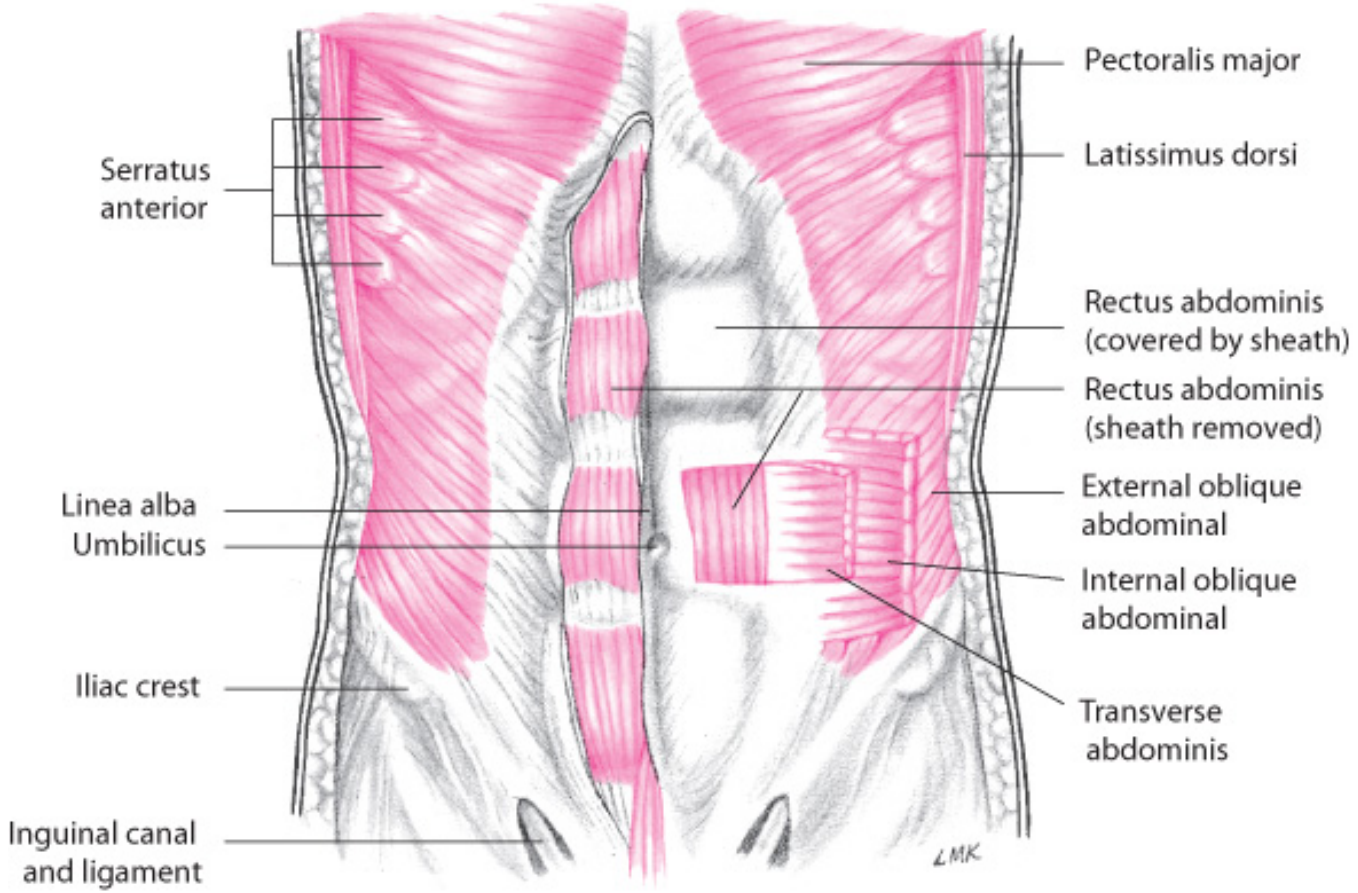
MÚSCULOS ESQUELÉTICOS – *ANATOMÍA: Pared Abdominal*

- Rectus abdominis
- External oblique abdominal
- Internal oblique abdominal
- Transverse abdominis



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MÚSCULOS ESQUELÉTICOS – *ANATOMÍA: Pared Abdominal*

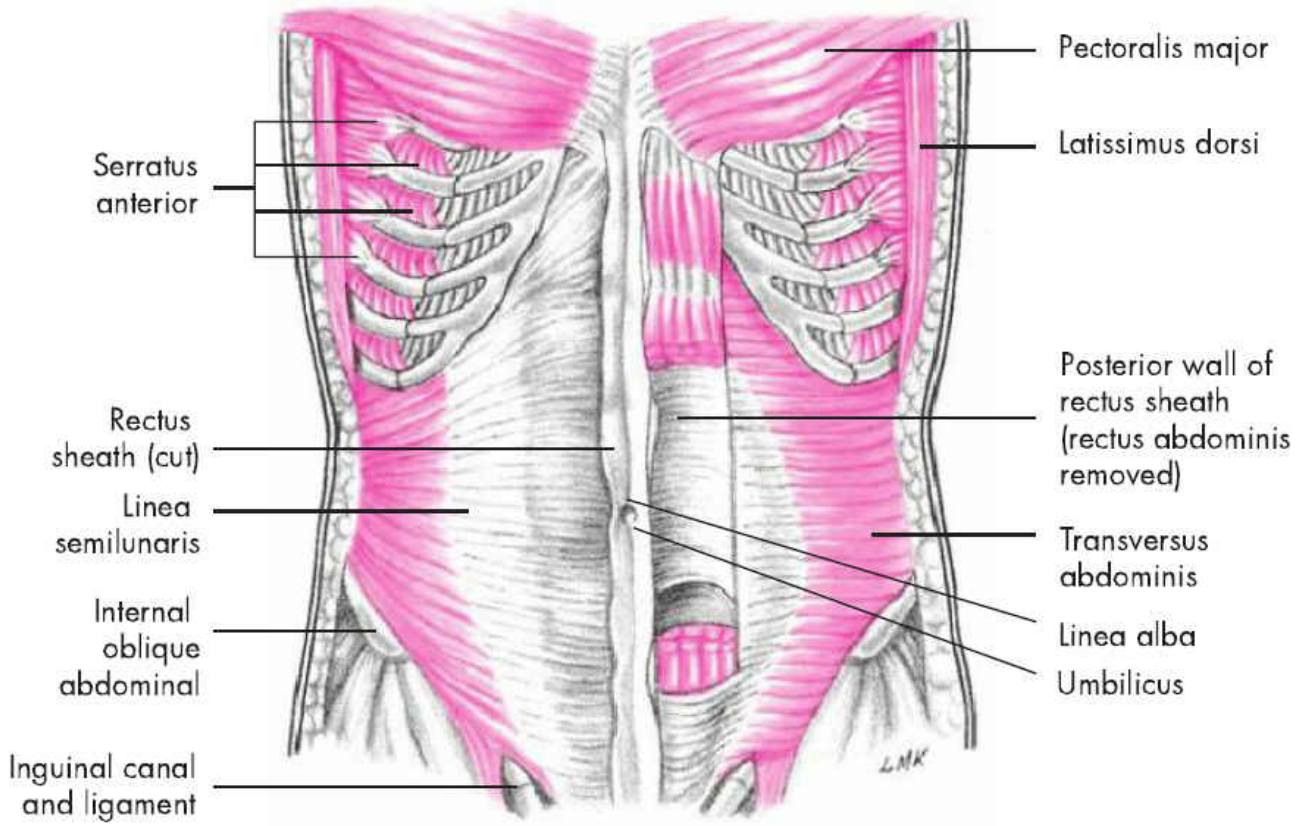

FIG. 12.21 • Muscles of the abdomen. The external oblique has been removed on the right side to reveal the internal oblique. The external and internal obliques have been removed on the left side to reveal the transversus abdominis. The rectus abdominis has been cut to reveal the posterior rectus sheath.

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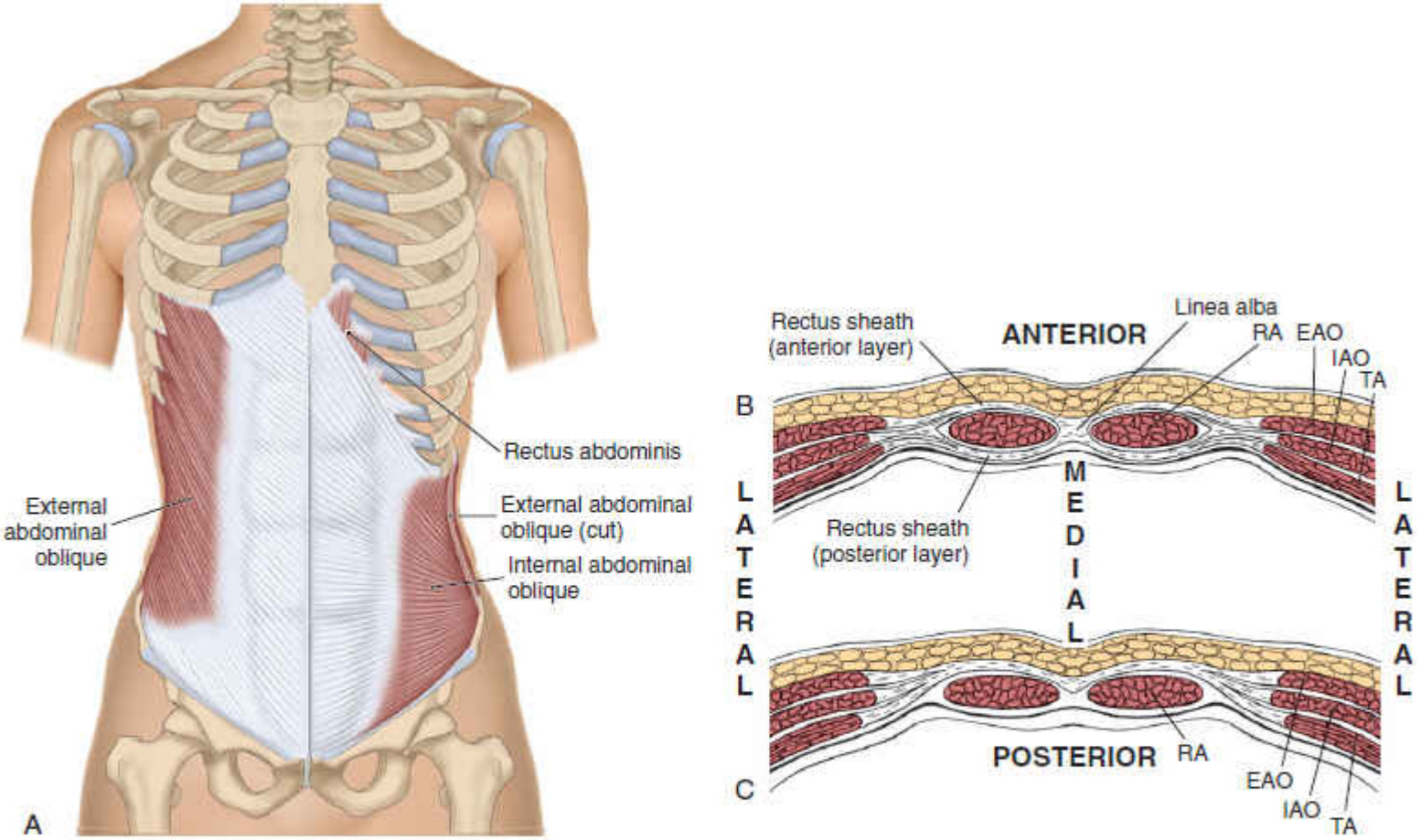


FIGURE 7-43 *A*, View of the anterior trunk illustrating the abdominal aponeurosis. The abdominal aponeurosis is a thick layer of fibrous tissue that is an attachment site of the transversus abdominis and external and internal abdominal oblique muscles. *B* and *C*, Transverse plane cross-section illustrating the abdominal aponeurosis superiorly and inferiorly in the trunk, respectively. The abdominal aponeurosis is also known as the *rectus sheath* because it ensheathes the rectus abdominis muscle. *EAO*, External abdominal oblique; *IAO*, Internal abdominal oblique; *RA*, Rectus abdominis; *TA*, transversus abdominis. *(From Muscolino JE: The muscular system manual: the skeletal muscles of the human body, ed 3, St Louis, 2010, Mosby.)*

NOTA. Reproducido de: ***Kinesiology: The Skeletal System and Muscle Function***. 5ta. ed.; (p. 253), por J. E. Muscolino, 2011, St. Louis, MO: Mosby, Inc., an affiliate of Elsevier Inc. Copyright 2011 por: Mosby, Inc., an affiliate of Elsevier Inc.

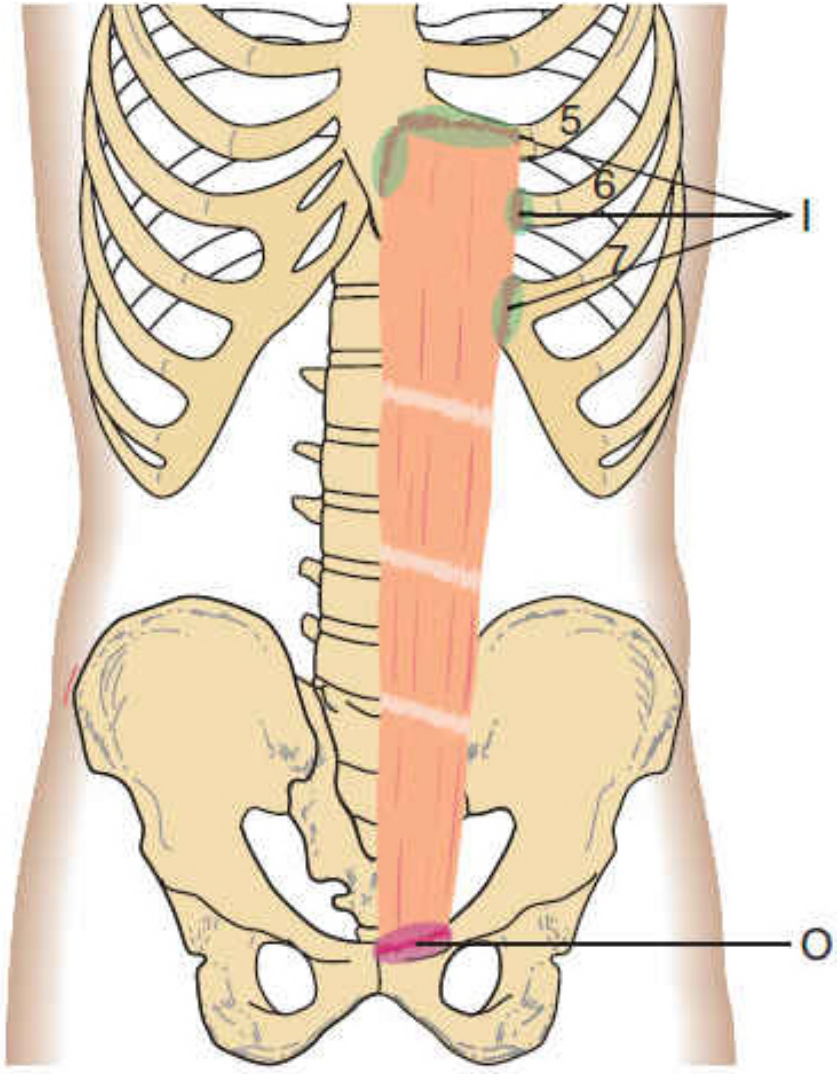
TRONCO Y COLUMNA VERTEBRAL:

PARED :

ABDOMINAL

(Vista Anterior)

Recto Anterior del Abdomen



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TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Recto Anterior del Abdomen

O	Pubis
I	Xiphoid process and costal cartilages of fifth, sixth, and seventh ribs
A	Trunk flexion; compression of abdomen
N	Seventh through 12th intercostal nerves

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Rectus abdominis muscle FIG. 12.23

(rek´tus ab-dom´i-nis)

Origin

Crest of the pubis

Insertion

Cartilage of the fifth, sixth, and seventh ribs and the xiphoid process

Action

Both sides: lumbar flexion
Posterior pelvic rotation
Right side: weak lateral flexion to the right
Left side: weak lateral flexion to the left

Palpation

Anteromedial surface of the abdomen, between the rib cage and the pubic bone with isometric trunk flexion

Innervation

Intercostal nerves (T7–T12)

Application, strengthening, and flexibility

The rectus abdominis muscle controls the tilt of the pelvis and the consequent curvature of the lower spine. By rotating the pelvis posteriorly, the rectus abdominis flattens the lower back, making the erector spinae muscle more effective as an extensor of the spine and the hip flexors (the iliopsoas muscle, particularly) more effective in raising the legs.

In a relatively lean person with well-developed abdominals, three distinct sets of lines or depressions may be noted. Each represents an area of tendinous connective tissue connecting or supporting the abdominal arrangement of muscles in lieu of bony attachments. Running vertically from the xiphoid process through the umbilicus to the pubis is the **linea alba**. It divides each rectus abdominis and serves as its medial border. Lateral to each rectus abdominis is the **linea semilunaris**, a crescent, or moon-shaped, line running vertically. This line represents the aponeurosis connecting the lateral border of the rectus abdominis and the medial border of the external and internal abdominal obliques. The **tendinous inscriptions** are horizontal indentations that transect the rectus abdominis at three or more locations, giving the muscle its segmented appearance. Refer to Fig. 12.20.

There are several exercises for the abdominal muscles, such as bent-knee sit-ups, crunches, and isometric contractions. Bent-knee sit-ups with the

Lumbar flexion

Lumbar lateral flexion

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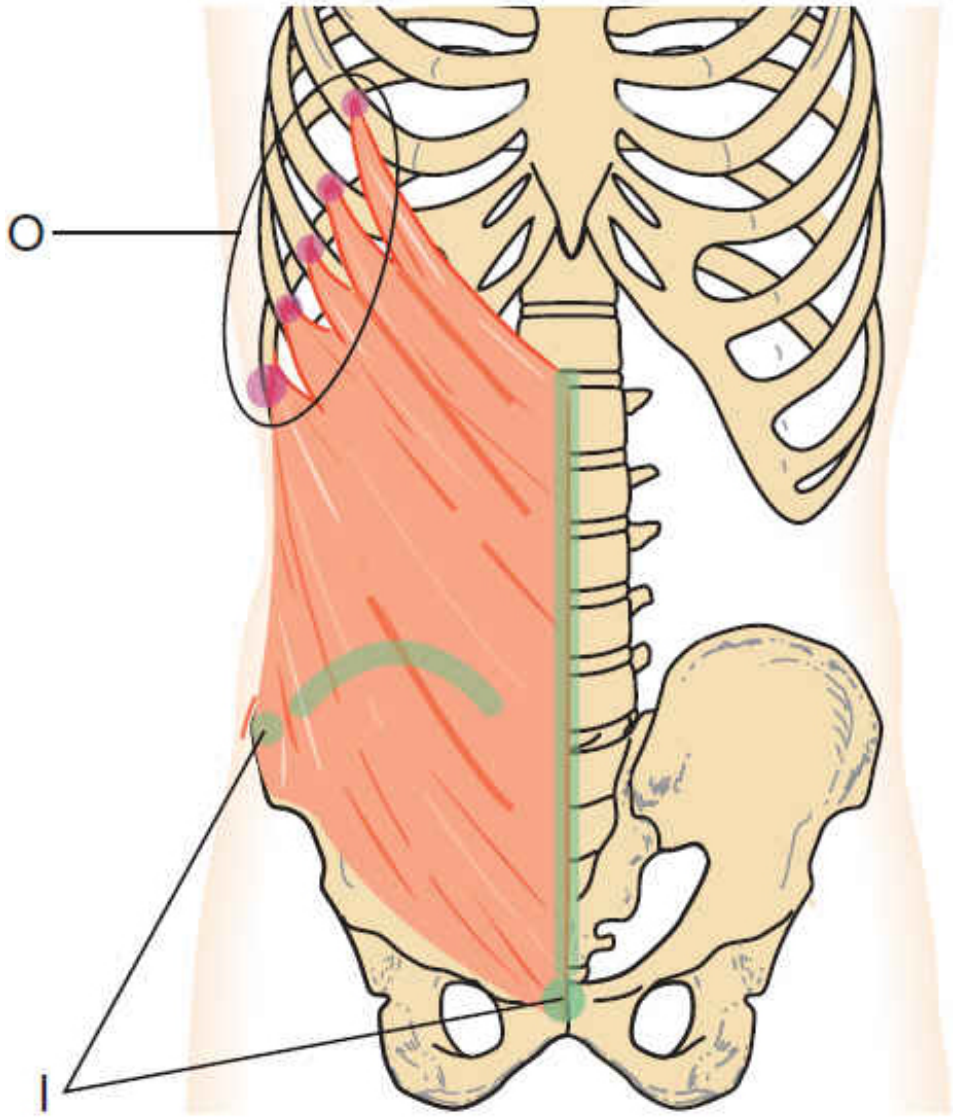
TRONCO Y COLUMNA VERTEBRAL:

PARED :

ABDOMINAL

(Vista Anterior)

Oblicuo Externo



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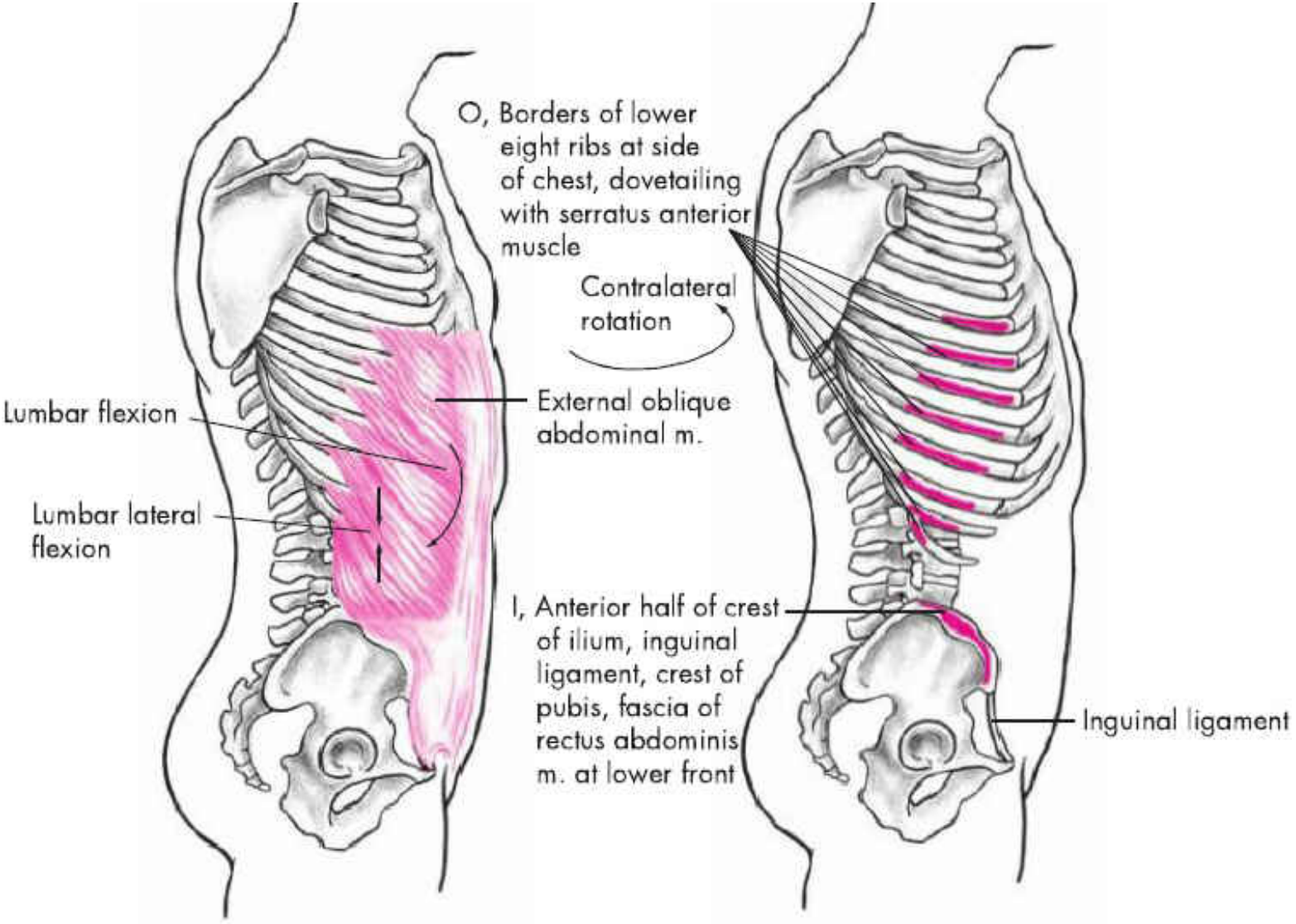
ANATOMÍA – *TRONCO: Oblicuo Externo*



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TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Oblicuo Externo

O	Lower eight ribs laterally
I	Iliac crest and linea alba
A	Bilateral: Trunk flexion; compression of abdomen Unilateral: Trunk lateral bending; rotation to opposite side
N	Eighth through 12th intercostal, iliohypogastric, and ilioinguinal nerves

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ANATOMÍA – *TRONCO: Oblicuo Externo*

Lumbar flexion

Lumbar lateral flexion

Lumbar rotation unilaterally

External oblique abdominal muscle FIG. 12.24

(ek-stur´nel o-bleek´ ab-dom´i-nel)

Origin

Borders of the lower eight ribs at the side of the chest, dovetailing with the serratus anterior muscle*

Insertion

Anterior half of the crest of the ilium, the inguinal ligament, the crest of the pubis, and the fascia of the rectus abdominis muscle at the lower front

Action

Both sides: lumbar flexion
Posterior pelvic rotation
Right side: lumbar lateral flexion to the right and rotation to the left, lateral pelvic rotation to the left
Left side: lumbar lateral flexion to the left and rotation to the right, lateral pelvic rotation to the right

*Sometimes the origin and insertion are reversed in anatomy books. This is the result of different interpretations of which bony structure is the more movable. The insertion is considered the most movable part of a muscle.

Palpation

With subject supine, palpate lateral to the rectus abdominis between iliac crest and lower ribs with active rotation to the contralateral side

Innervation

Intercostal nerves (T8–T12), iliohypogastric nerve (T12, L1), and ilioinguinal nerve (L1)

Application, strengthening, and flexibility

Working on each side of the abdomen, the external oblique abdominal muscles aid in rotating the trunk when working independently of each other. Working together, they aid the rectus abdominis muscle in its described action. The left external oblique abdominal muscle contracts strongly during sit-ups when the trunk rotates to the right, as in touching the left elbow to the right knee. Rotating to the left brings the right external oblique into action.

Each side of the external oblique must be stretched individually. The right side is stretched by moving into extreme left lateral flexion combined with extension, or by extreme lumbar rotation to the right combined with extension. The opposite movements combined with extension stretch the left side.

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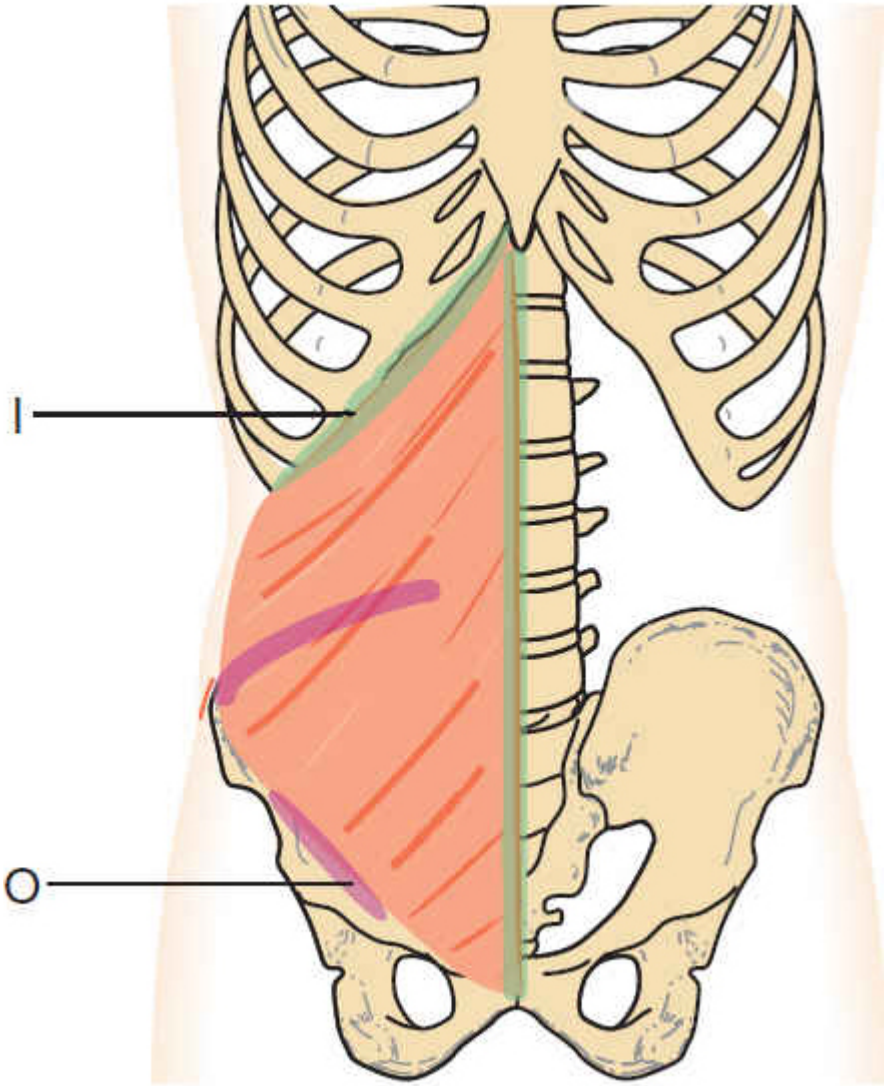
TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Oblicuo Interno



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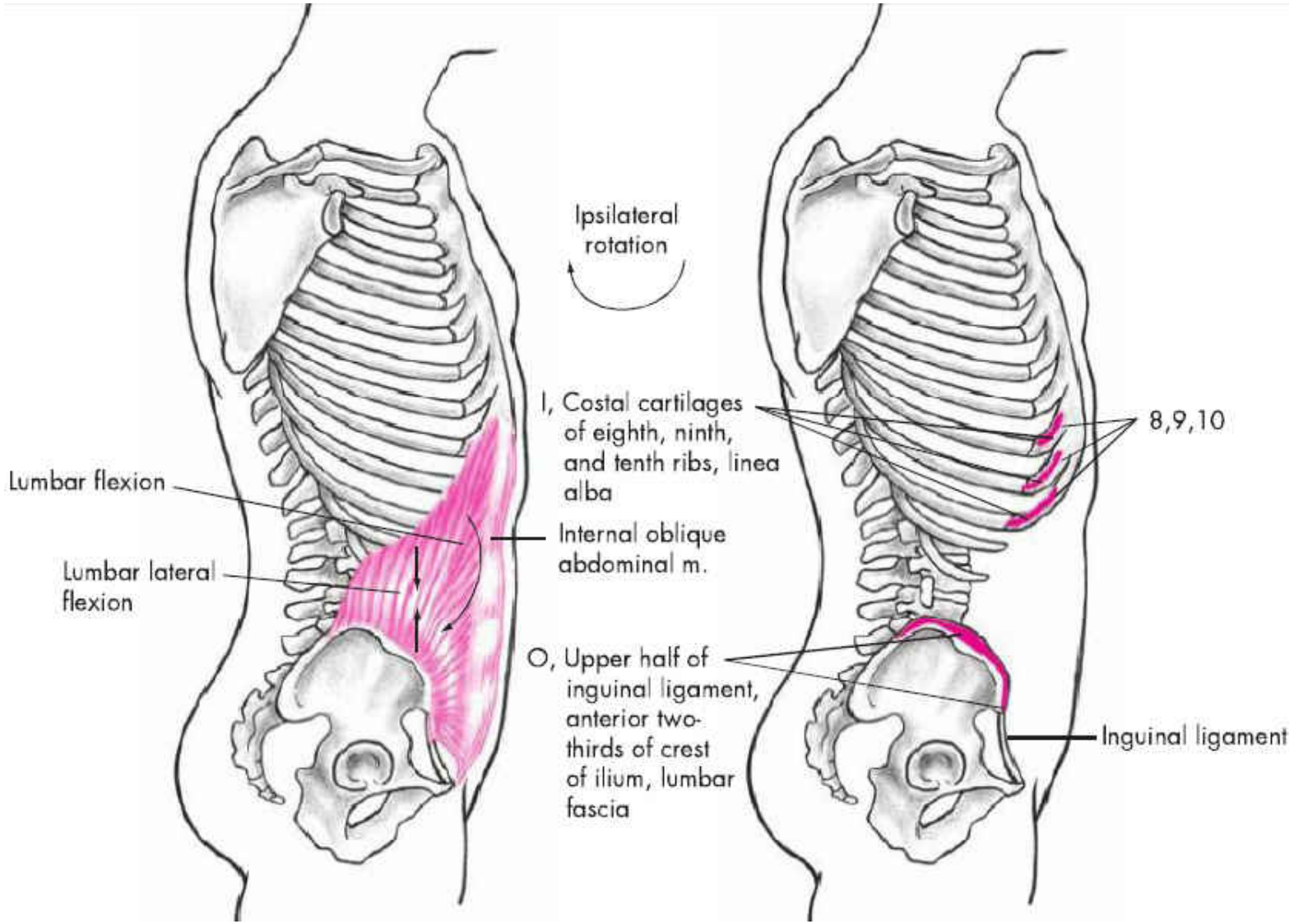
ANATOMÍA – *TRONCO: Oblicuo Interno – Inserción (I), Origen (O)*



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TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Oblicuo Interno

O	Inguinal ligament, iliac crest, thoracolumbar fascia
I	Tenth, 11th, and 12th ribs; abdominal aponeurosis into linea alba
A	Bilateral: Trunk flexion; compression of abdomen Unilateral: Trunk lateral bending; rotation to same side
N	Eighth through 12th intercostal, iliohypogastric, and ilioinguinal nerves

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ANATOMÍA – *TRONCO: Oblicuo Interno*

Internal oblique abdominal muscle

FIG. 12.25

(in-ter´nel o-bleek´ ab-dom´i-nel)

Origin

Upper half of the inguinal ligament, anterior two-thirds of the crest of the ilium, and lumbar fascia

Insertion

Costal cartilages of the eighth, ninth, and tenth ribs and the linea alba

Action

Both sides: lumbar flexion
Posterior pelvic rotation
Right side: lumbar lateral flexion to the right and rotation to the right, lateral pelvic rotation to the left
Left side: lumbar lateral flexion to the left and rotation to the left, lateral pelvic rotation to the right

Palpation

With subject supine, palpate anterolateral abdomen between iliac crest and lower ribs with active rotation to the ipsilateral side

Innervation

Intercostal nerves (T8–T12), iliohypogastric nerve (T12, L1), and ilioinguinal nerve (L1)

Application, strengthening, and flexibility

The internal oblique abdominal muscles run diagonally in the direction opposite that of the external obliques. The left internal oblique rotates to the left, and the right internal oblique rotates to the right.

In touching the left elbow to the right knee in crunches, the left external oblique and the right internal oblique abdominal muscles contract at the same time, assisting the rectus abdominis muscle in flexing the trunk to make completion of the movement possible. In rotary movements, the internal oblique and the external oblique on the opposite side always work together.

Like the external oblique, each side of the internal oblique must be stretched individually. The right side is stretched by moving into extreme left lateral flexion and extreme left lumbar rotation combined with extension. The same movements to the right combined with extension stretch the left side.


Lumbar flexion


Lumbar lateral flexion


Lumbar rotation unilaterally

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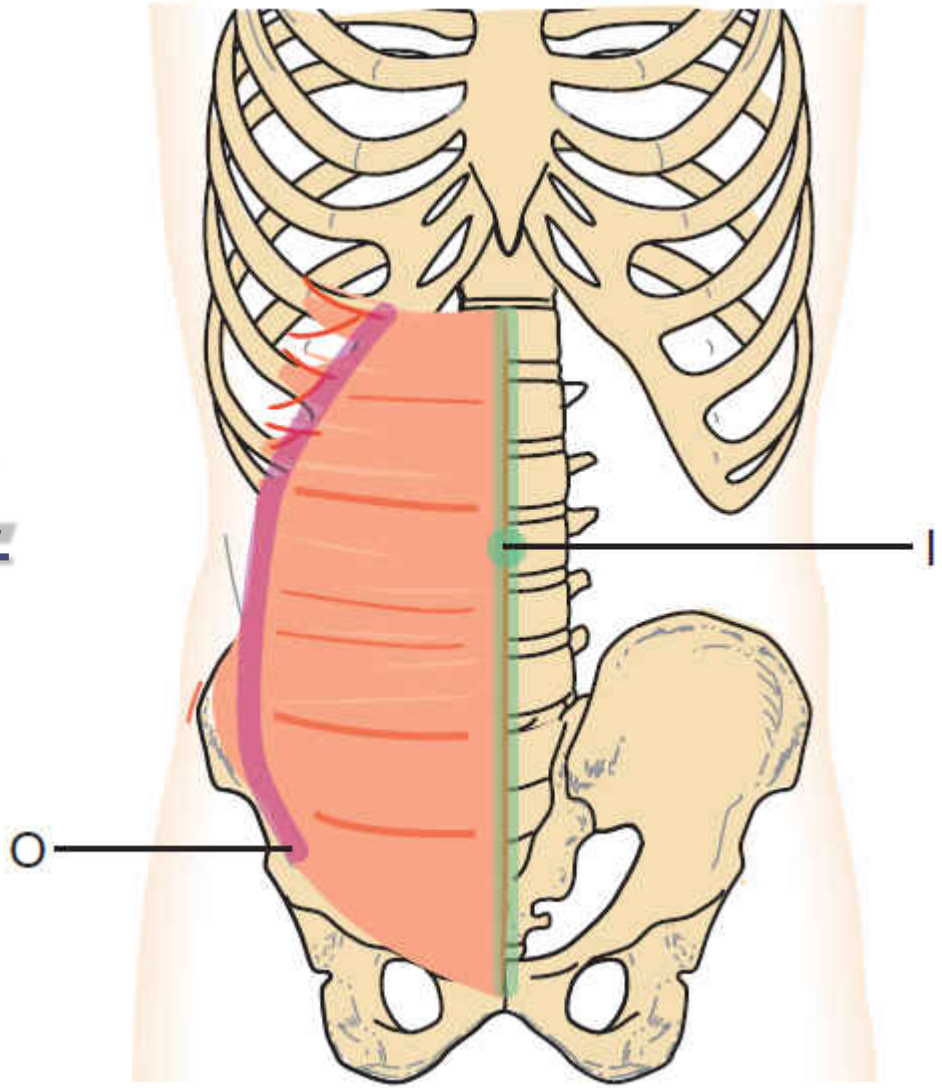
TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Transverso del Abdomen



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ANATOMÍA – *TRONCO: Transverso Abdomen – Inserción (I), Origen (O)*

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TRONCO Y COLUMNA VERTEBRAL:

PARED : ABDOMINAL

(Vista Anterior)

Transverso del Abdomen

Transverse Abdominis

O	Inguinal ligament, iliac crest, thoracolumbar fascia, and last six ribs
I	Abdominal aponeurosis and linea alba
A	Compression of abdomen
N	Seventh through 12th intercostal, iliohypogastric, and ilioinguinal nerves

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CUELLO Y TRONCO – *MOTORES PRIMARIOS: Agonistas Principales*

Table 15-8 Prime Movers of the Neck and Trunk

Action	Muscle
Head (Occiput on C1)	
Flexion	Prevertebral group
Extension	Suboccipital group
Neck	
Flexion	Sternocleidomastoid
Extension	Splenius capitis, splenius cervicis, erector spinae, transversospinalis, interspinales
Lateral bending	Sternocleidomastoid, splenius capitis, splenius cervicis, scalenes, erector spinae, intertransversarii
Rotation (same side)	Splenius capitis, splenius cervicis
Rotation (opposite side)	Sternocleidomastoid, transversospinalis
Trunk	
Flexion	Rectus abdominis, external oblique, internal oblique
Extension	Erector spinae, transversospinalis, interspinales
Lateral bending	Quadratus lumborum, erector spinae, internal oblique, external oblique, intertransversarii
Rotation same side	Internal oblique
Rotation opposite side	External oblique, transversospinalis
Compression of abdomen	Rectus abdominis, external oblique, internal oblique, transverse abdominis

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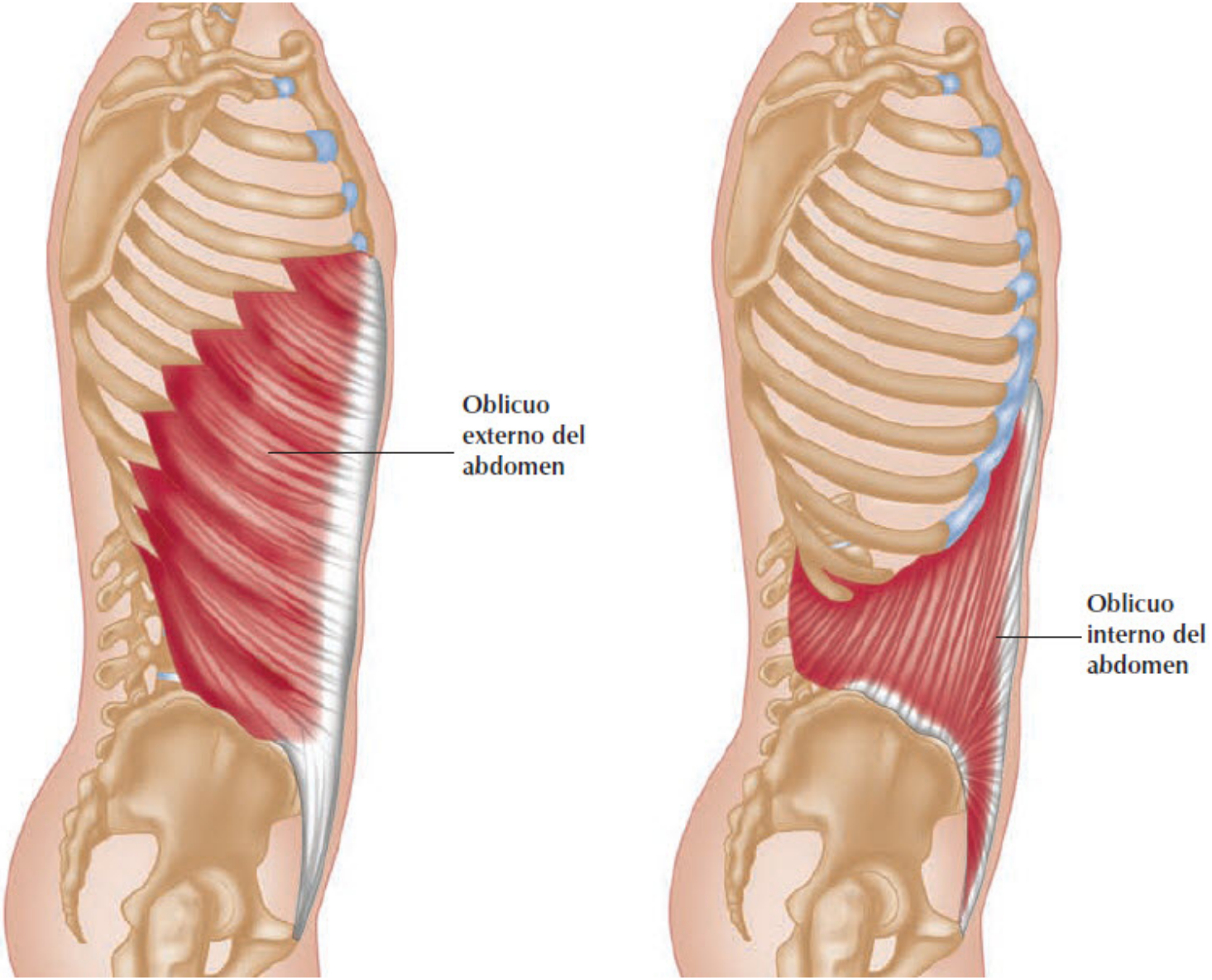

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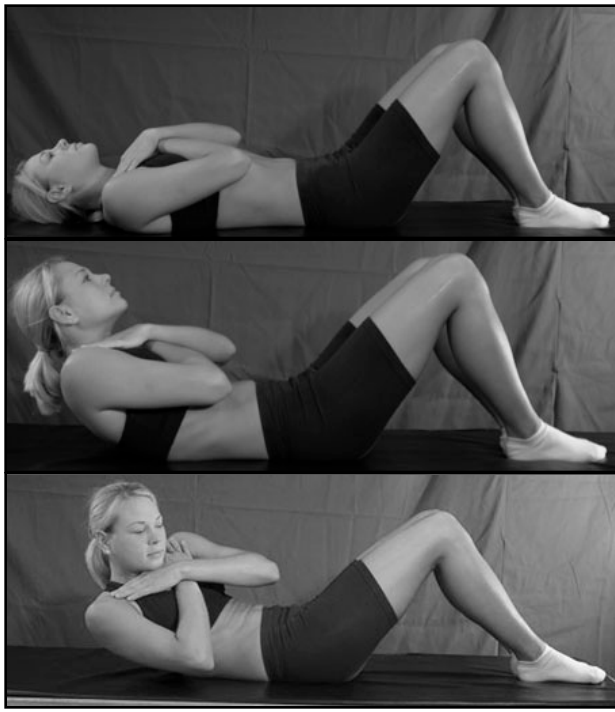
KINESIOLOGÍA:

ANATOMÍA FUNCIONAL:

ANÁLISIS DEL TRONCO

Sit-up, bent knee

- Participant lies on back, forearms crossed and lying across chest, with knees flexed 90 degrees & feet about hip-width apart
- Hips & knees are flexed in this manner to reduce hip flexor length, thereby reducing their contribution to sit-up & allow more emphasis on abdominals
- Participant curls up to a sitting position, rotates trunk to right, touches left elbow to right knee
- Returns to starting position
- Rotate to left on next repetition



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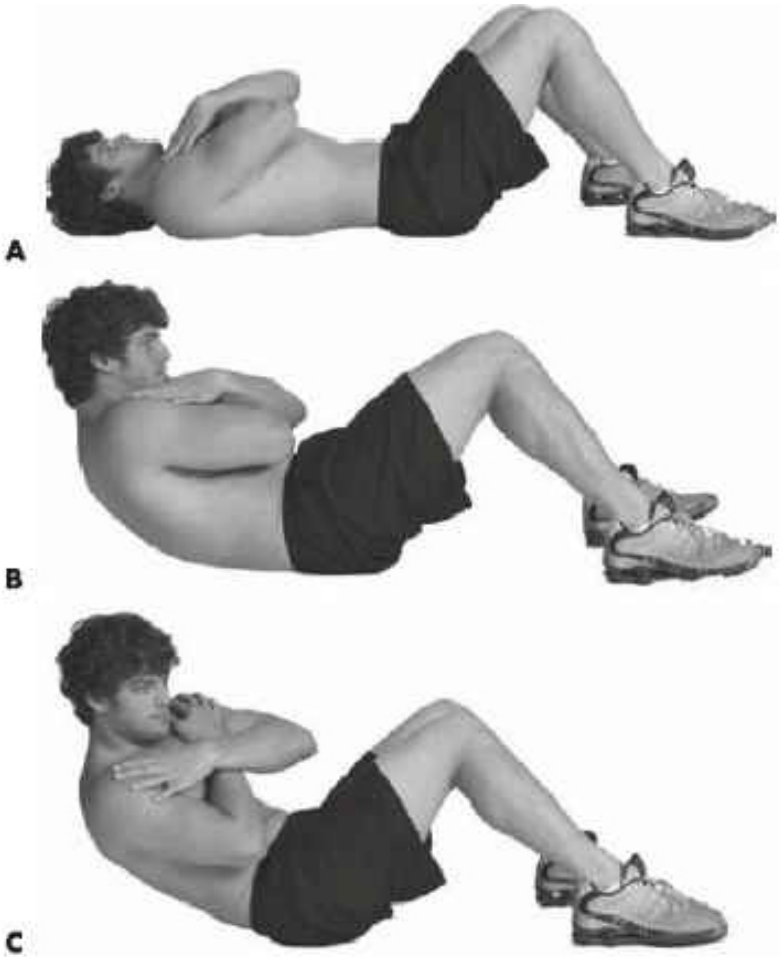

FIG. 13.1 • Abdominal curl-up. **A,** Beginning relaxed position; **B,** Trunk flexion to curl-up position; **C,** Trunk flexion and right rotation curl-up position.

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ANÁLISIS MOVIMIENTO SIMPLE – *TRONCO: Flexión hacia el Frente*

Motores Primarios:

- Recto del abdomen
- Oblicuo mayor del abdomen
- Oblicuo menor del abdomen y flexores de la cadera
- Recto femoral
- Psoas iliaco
- Tensor de la Fascia Lata
- Sartorio
- Otros

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ABDOMINALES (SITUPS) – *RODILLAS FLEXIONADAS: Análisis Ejercicio*

Joint	Trunk flexion phase to curl-up position		Rotating to right/left phase		Return phase to curl-up position		Return phase to starting position	
	Action	Agonists	Action	Agonists	Action	Agonists	Action	Agonists
Cervical spine	Flexion	Cervical spine flexors Sternocleido-mastoid	Mainte-nance of cervical flexion	Cervical spine flexors (isometric contraction) Sternocleido-mastoid	Mainte-nance of cervical flexion	Cervical spine flexors (isometric contraction) Sternocleido-mastoid	Extension	Cervical spine flexors (eccentric contraction) Sternocleido-mastoid
Trunk	Flexion	Trunk flexors Rectus abdominis External oblique abdominal Internal oblique abdominal	Right lumbar rotation	Right lumbar rotators (R) Rectus abdominis (L) External oblique abdominal (R) Internal oblique abdominal (R) Erector spinae	Left lumbar rotation to neutral position	Right lumbar rotators (eccentric contraction) (R) Rectus abdominis (L) External oblique abdominal (R) Internal oblique abdominal (R) Erector spinae	Extension	Trunk flexors (eccentric contraction) Rectus abdominis External oblique abdominal Internal oblique abdominal
Hip	Flexion	Hip flexors Iliopsoas Rectus femoris Pectineus	Mainte-nance of hip flexion	Hip flexors (isometric contraction) Iliopsoas Rectus femoris Pectineus	Mainte-nance of hip flexion	Hip flexors (isometric contraction) Iliopsoas Rectus femoris Pectineus	Extension	Hip flexors (eccentric contraction) Iliopsoas Rectus femoris Pectineus

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ABDOMINALES (SITUPS) – *RODILLAS FLEXIONADAS: Análisis Ejercicio*

Joint	Curling phase to sitting-up position		Rotating to left phase	
	Action	Agonists	Action	Agonists
Cervical spine	Flexion	*Cervical spine flexors* Sternocleidomastoid	Maintenance of cervical flexion	*Cervical spine flexors (isometric contraction)* Sternocleidomastoid
Trunk	Flexion	*Trunk flexors* Rectus abdominis External oblique abdominal Internal oblique abdominal	Right lumbar rotation	*Right lumbar rotators* R) Rectus abdominis L) External oblique abdominal R) Internal oblique abdominal R) Erector spinae
Hip	Flexion	*Hip flexors* Iliopsoas Rectus femoris Pectineus	Maintenance of hip flexion	*Hip flexors (isometric contraction)* Iliopsoas Rectus femoris Pectineus

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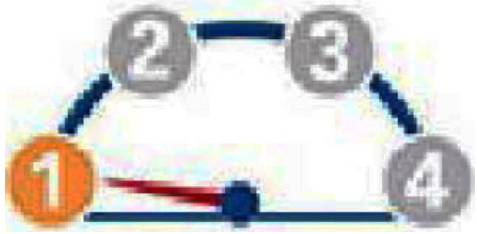
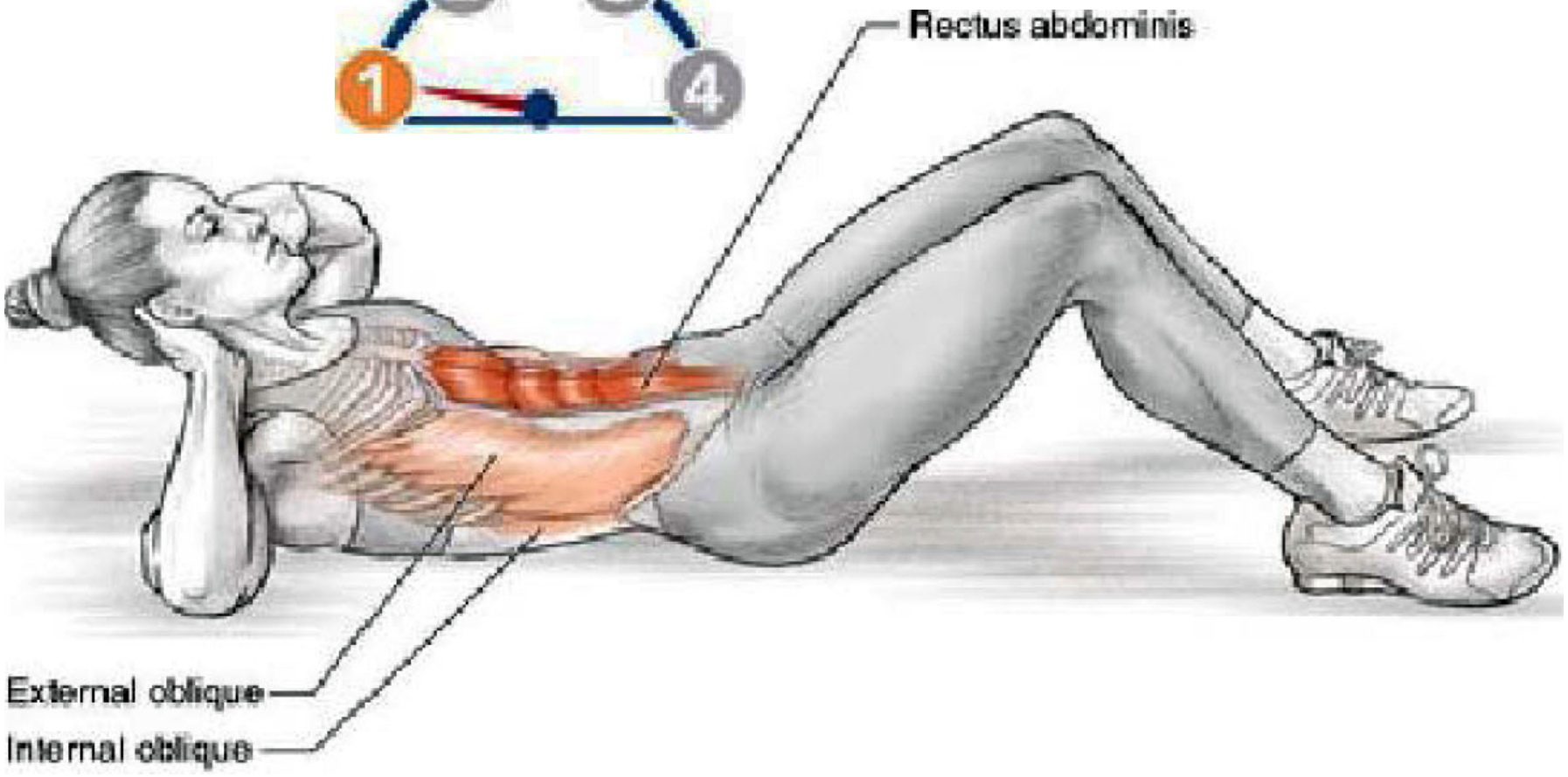
Sit-up, bent knee

Joint	Return phase to sitting-up position		Return phase to starting position	
	Action	Agonists	Action	Agonists
Cervical spine	Maintenance of cervical flexion	*Cervical spine flexors (isometric contraction)* Sternocleidomastoid	Extension	*Cervical spine flexors (eccentric contraction)* Sternocleidomastoid
Trunk	Left lumbar rotation to neutral position	*Right lumbar rotators (eccentric contraction)* R) Rectus abdominis L) External oblique abdominal R) Internal oblique abdominal R) Erector spinae	Extension	*Trunk flexors (eccentric contraction)* Rectus abdominis External oblique abdominal Internal oblique abdominal
Hip	Maintenance of hip flexion	*Hip flexors* Iliopsoas Rectus femoris Pectineus	Extension	*Hip flexors (eccentric contraction)* Iliopsoas Rectus femoris Pectineus

Crunch





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Muscles Involved

Primary: Rectus abdominis

Secondary: External oblique, internal oblique

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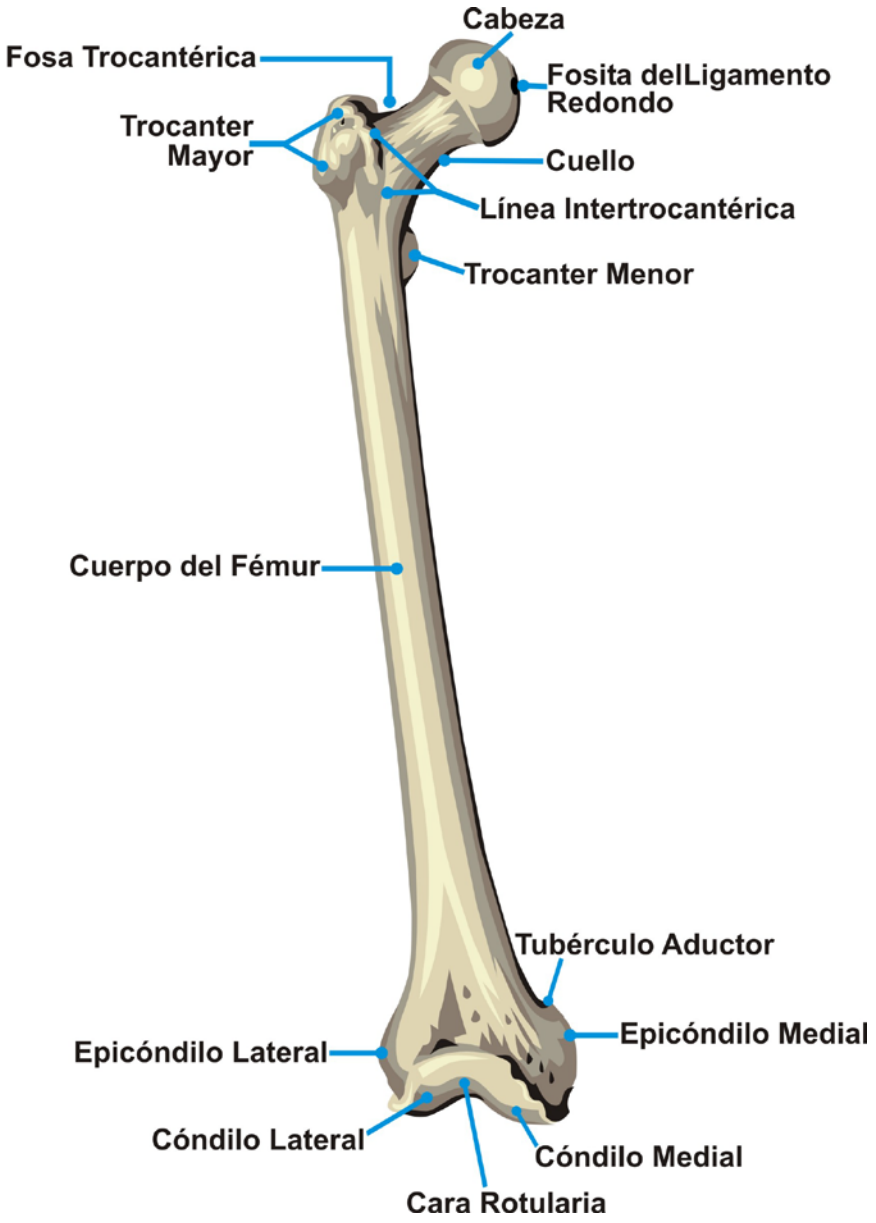
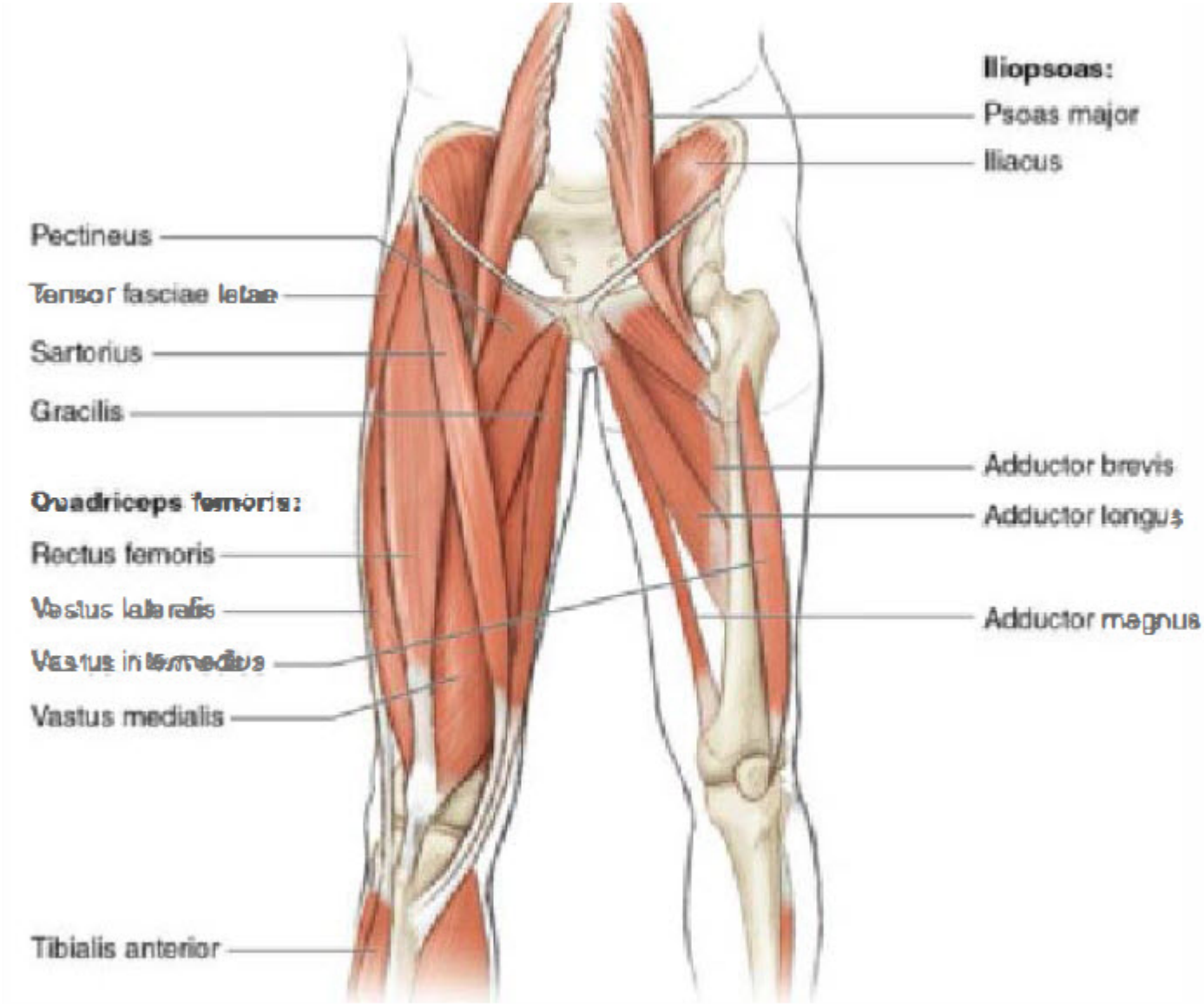
EXTREMIDAD INFERIOR:

PIERNA:

FÉMUR

(Vista Anterior)





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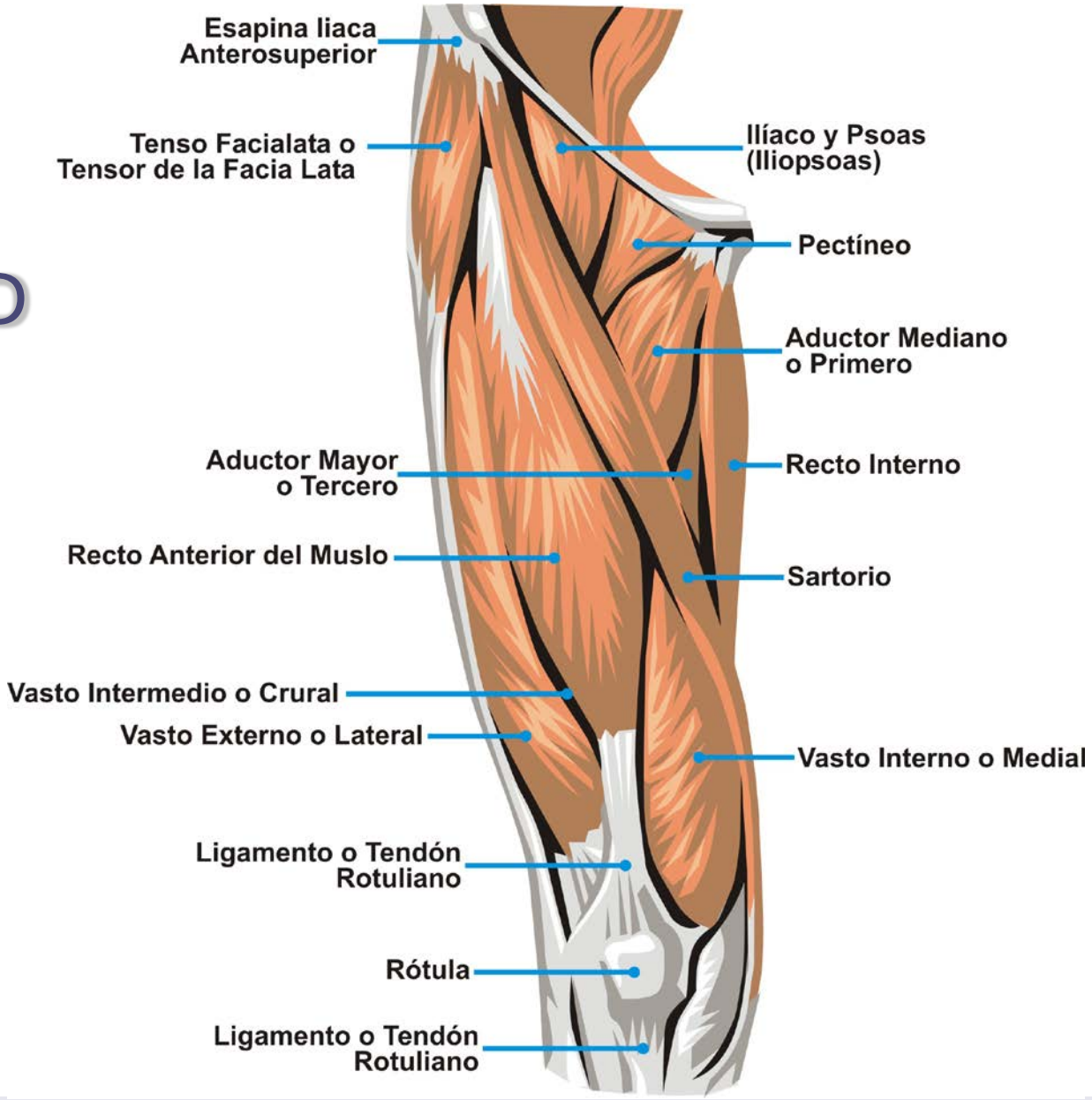
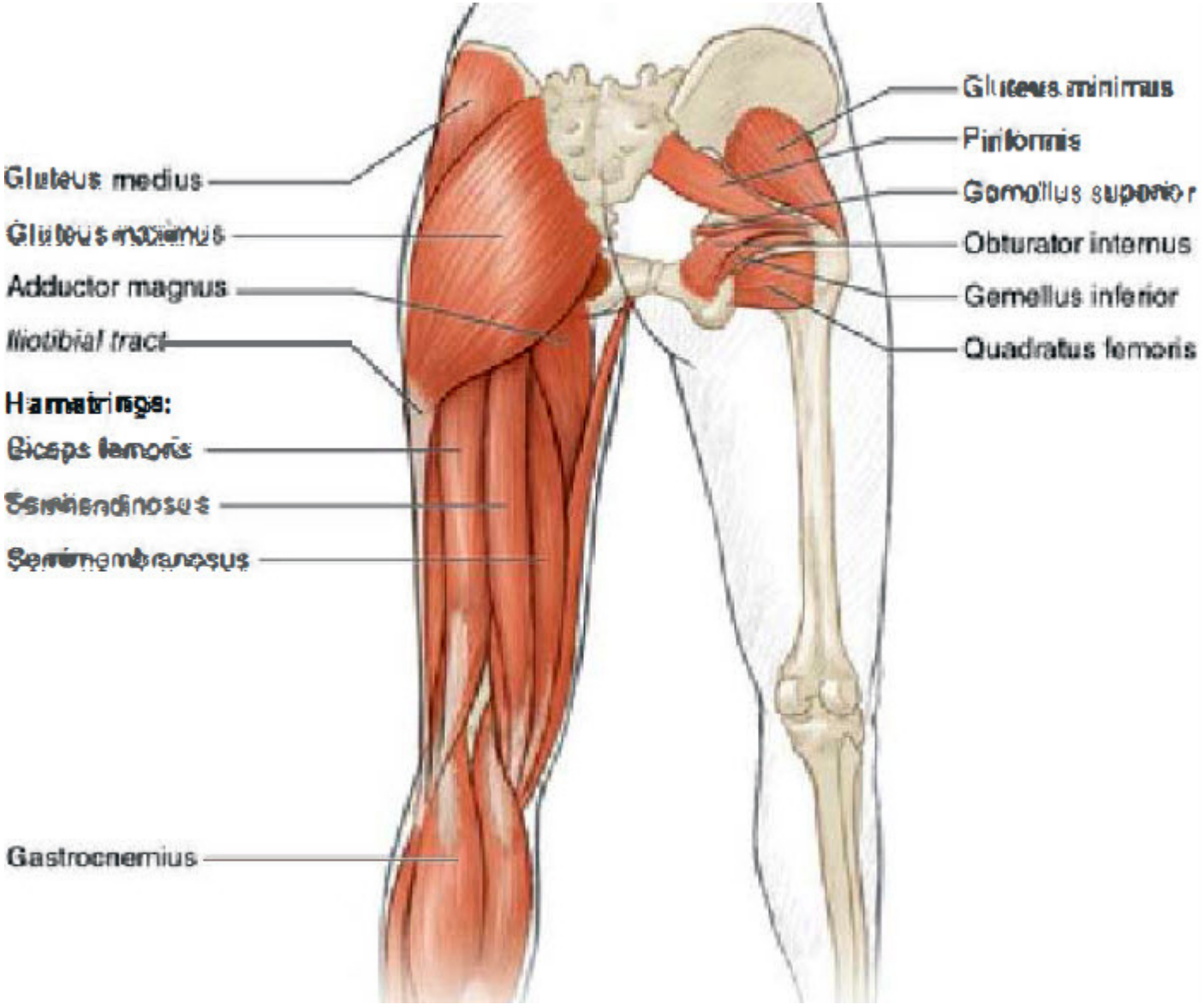
EXTREMIDAD INFERIOR:

PIERNA:

MUSLO

(Vista Anterior)





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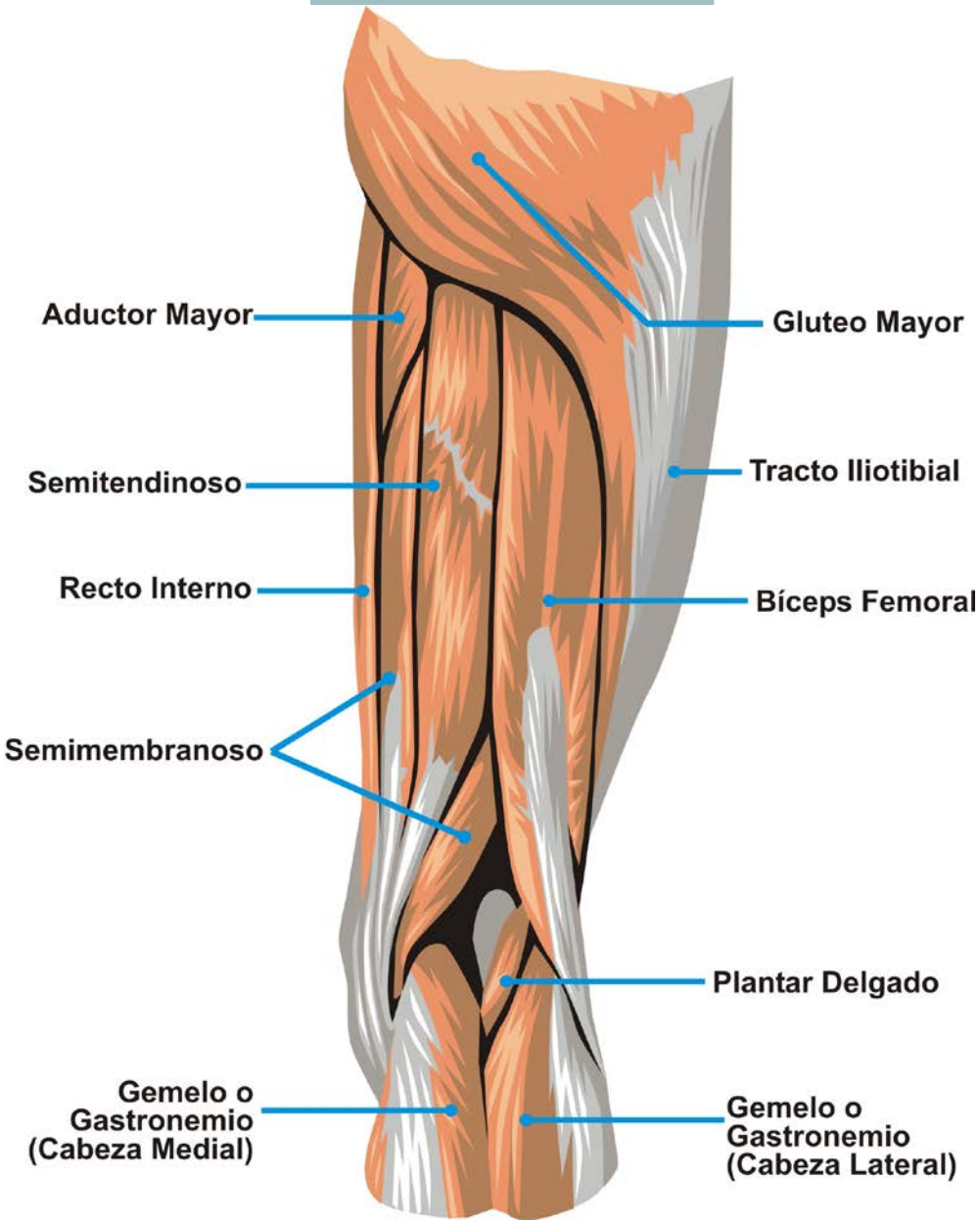
EXTREMIDAD INFERIOR:

PIERNA:

MUSLO

(Vista Posterior)

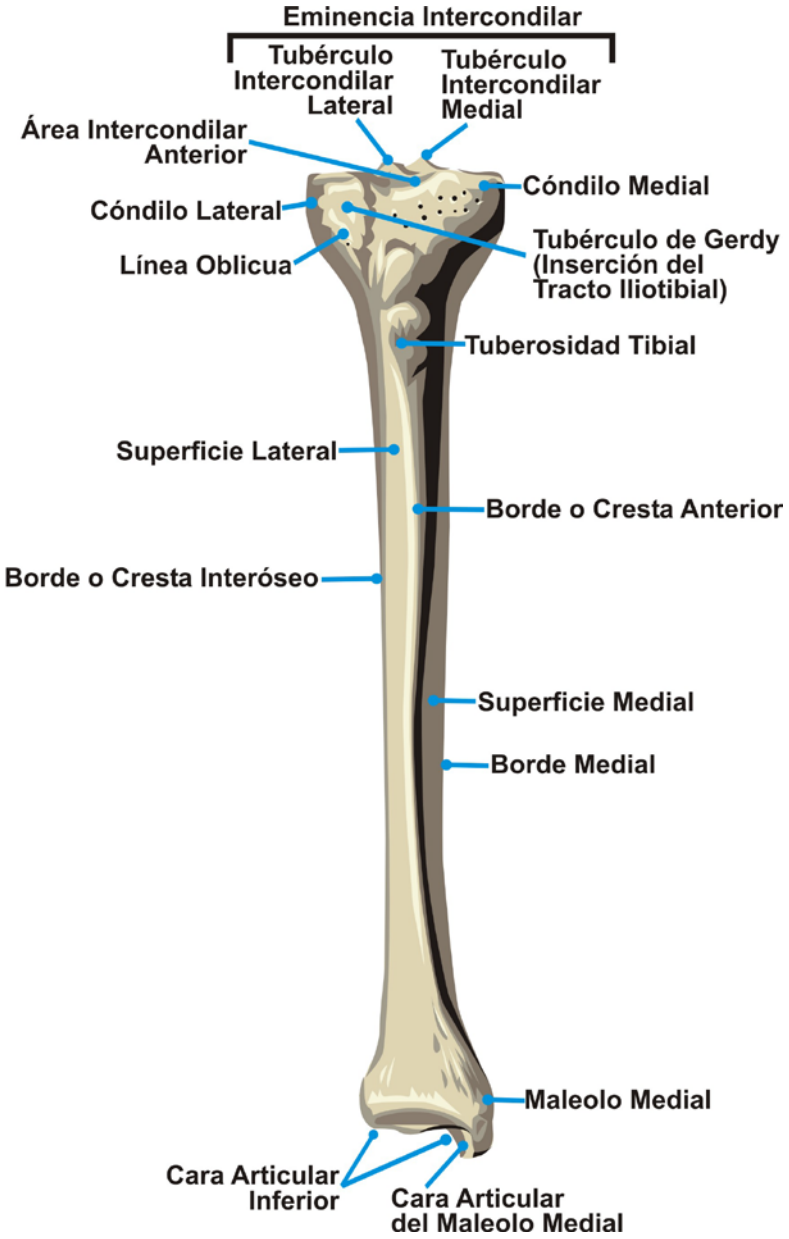


EXTREMIDAD INFERIOR:

PIERNA:

TIBIA

(Vista Anterior)

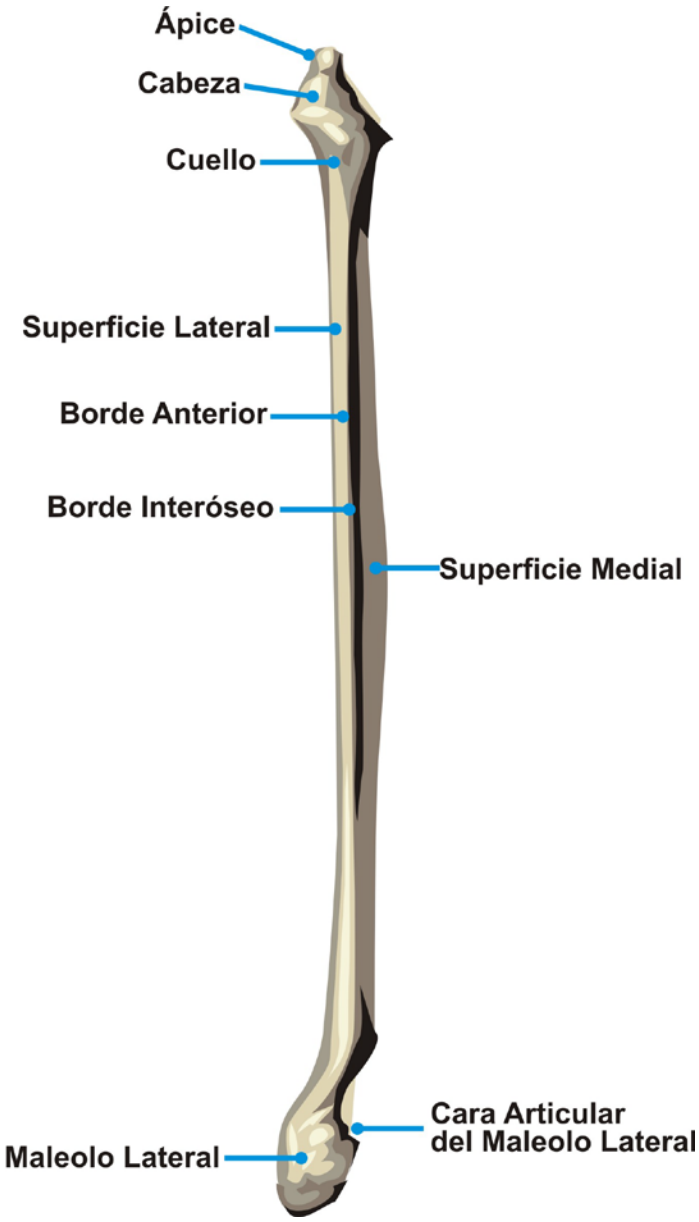


EXTREMIDAD INFERIOR:

PIERNA:

PERONÉ

(Vista Anterior)

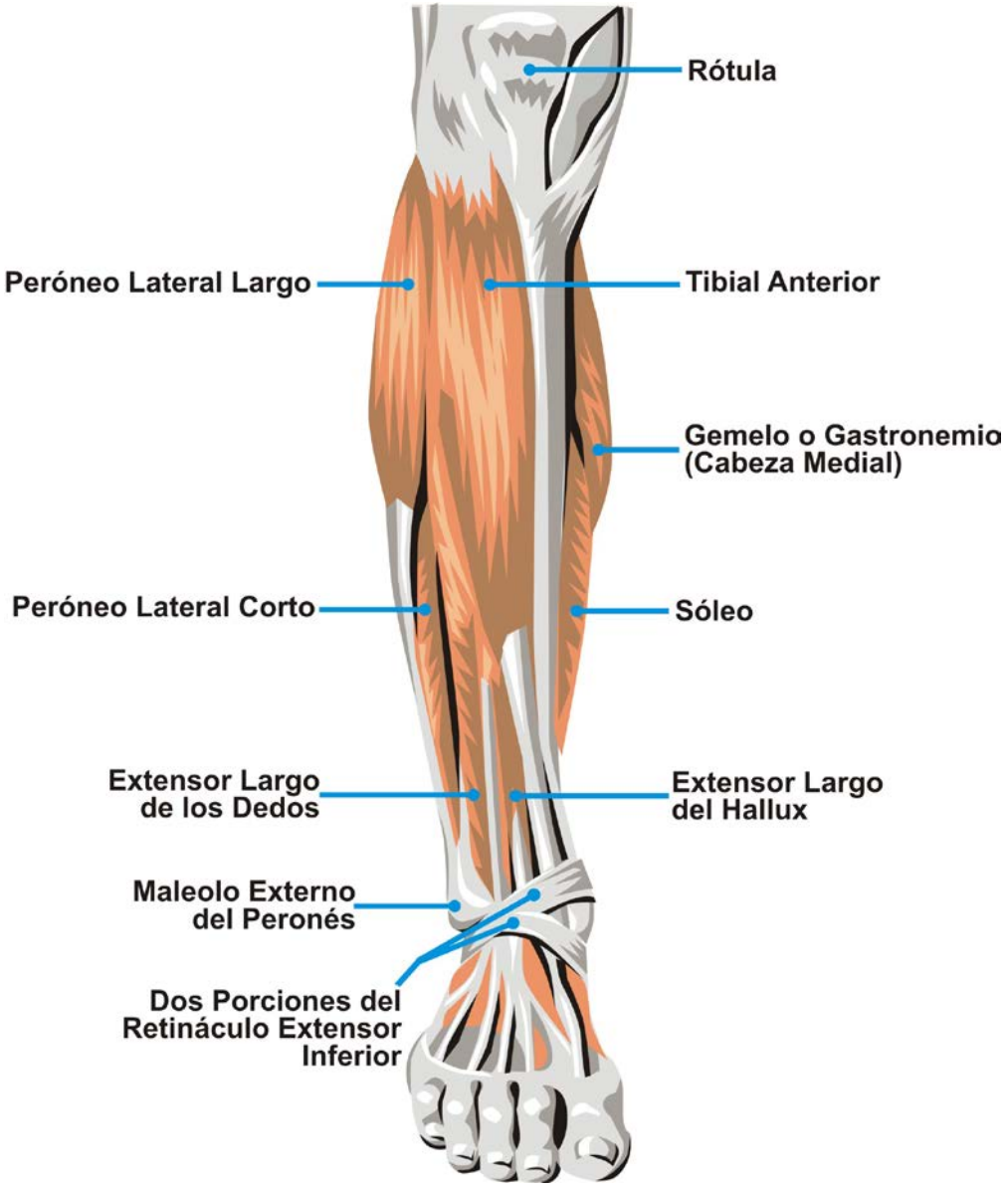


EXTREMIDAD INFERIOR:

PIERNA:

INFERIOR

(Vista Anterior)

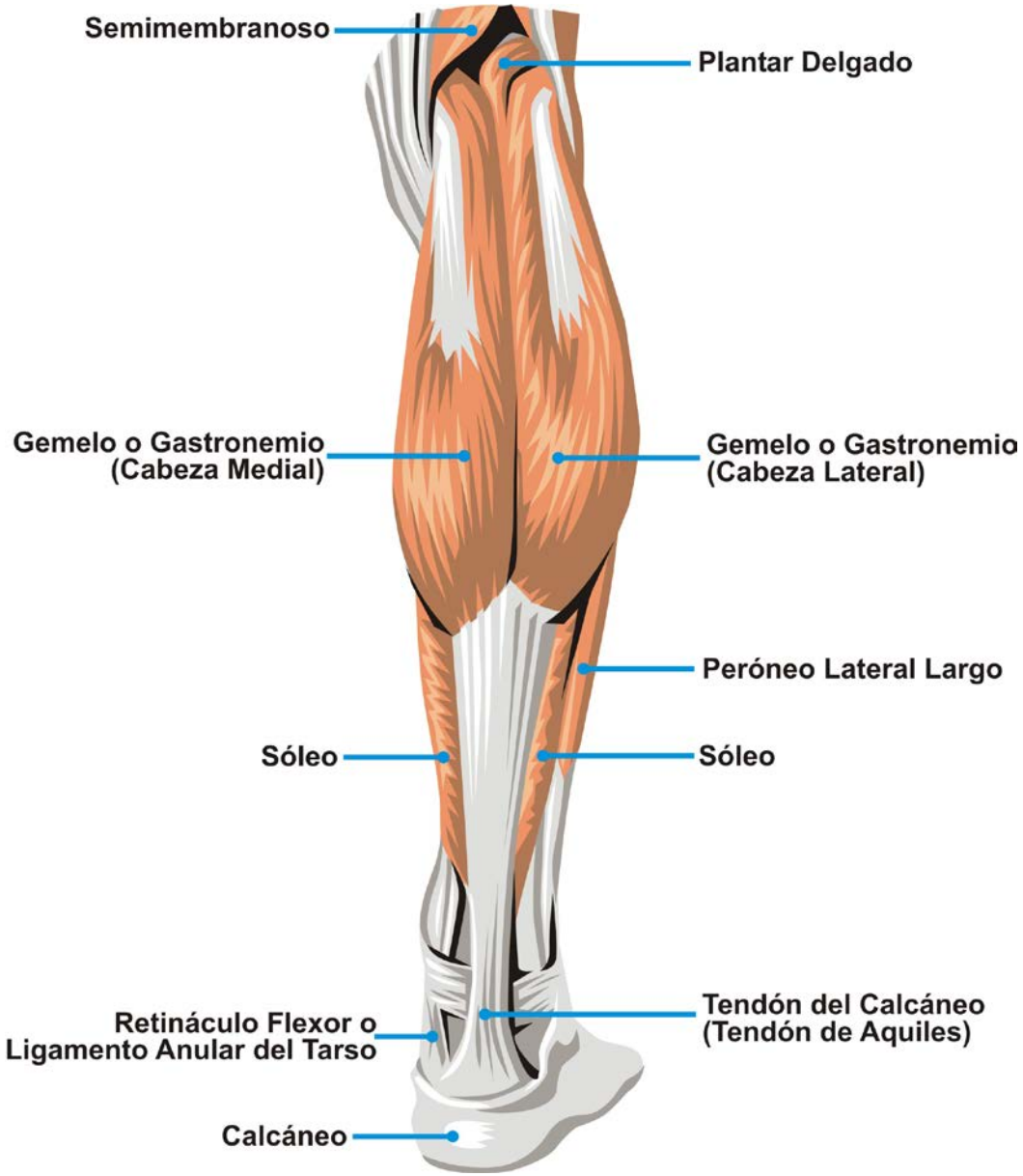


EXTREMIDAD INFERIOR:

PIERNA:

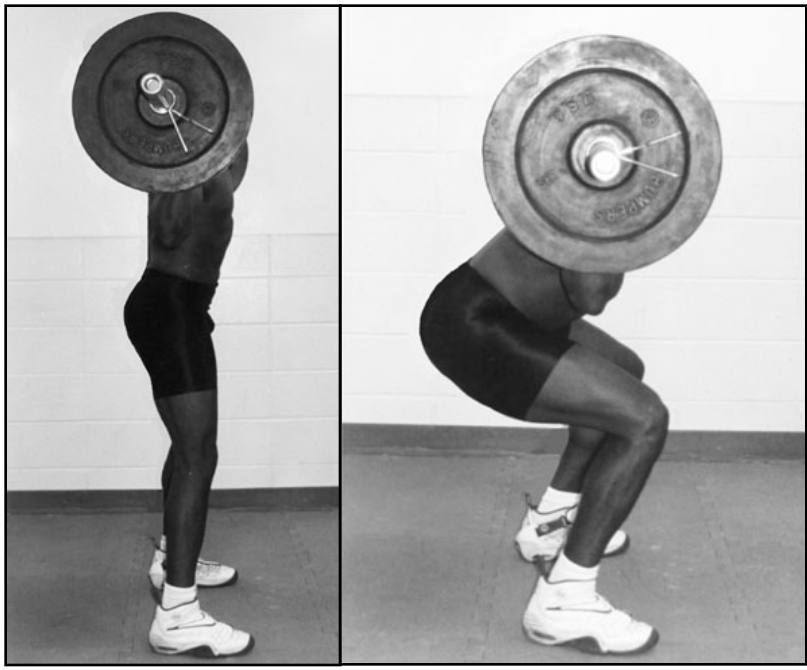
INFERIOR

(Vista Posterior)



Squat

- Participant places a barbell on the shoulders behind the neck and grasps it with palms-forward position of hands
- Participant squats down until thighs are parallel to floor, keeping back straight
- Return to starting position
- Ensure that the shins remain as vertical



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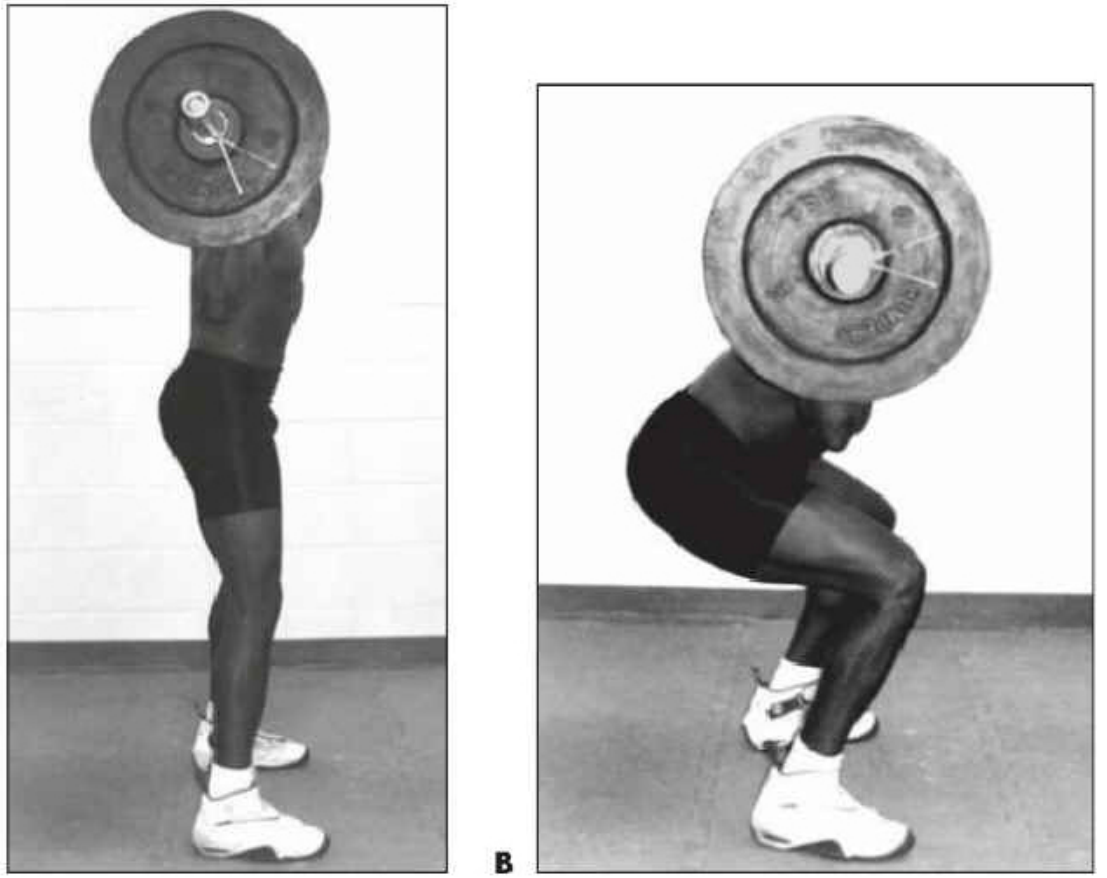

FIG. 13.3 • Squat. **A,** Starting position; **B,** Squatted position.

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SENTADILLAS (SQUATS) – *FLEXIÓN HASTA MITAD: Análisis Ejercicio*

Joint	Lowering phase to squatted position		Lifting phase to starting position	
	Action	Agonists	Action	Agonists
Hip	Flexion	Hip extensors (eccentric contraction) Gluteus maximus Semimembranosus Semitendinosus Biceps femoris	Extension	Hip extensors Gluteus maximus Semimembranosus Semitendinosus Biceps femoris
Knee	Flexion	Knee extensors (eccentric contraction) Rectus femoris Vastus medialis Vastus intermedius Vastus lateralis	Extension	Knee extensors Rectus femoris Vastus medialis Vastus intermedius Vastus lateralis
Ankle	Dorsiflexion	Plantar flexors (eccentric contraction) Gastrocnemius Soleus	Plantar flexion	Plantar flexors Gastrocnemius Soleus

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SENTADILLAS (SQUATS) – *FLEXIÓN HASTA MITAD: Análisis Ejercicio*

Joint	Action	Agonists in Lowering	Action	Agonists in Lifting
Hip	Flexion	Hip extensors (eccentric contraction) Gluteus maximus Semimembranosus Semitendinosus Biceps femoris	Extension	Hip extensors Gluteus maximus Semimembranosus Semitendinosus Biceps femoris
Knee	Flexion	Knee extensors (eccentric contraction) Rectus femoris Vastus medialis Vastus intermedius Vastus lateralis	Extension	Knee extensors Rectus femoris Vastus medialis Vastus intermedius Vastus lateralis
Ankle	Dorsiflexion	Plantar flexors (eccentric contraction) Gastrocnemius Soleus	Plantar flexion	Plantar flexors Gastrocnemius Soleus

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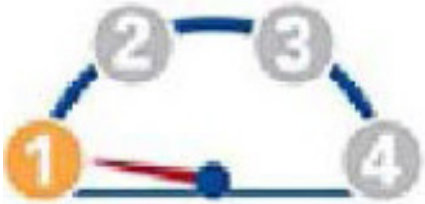
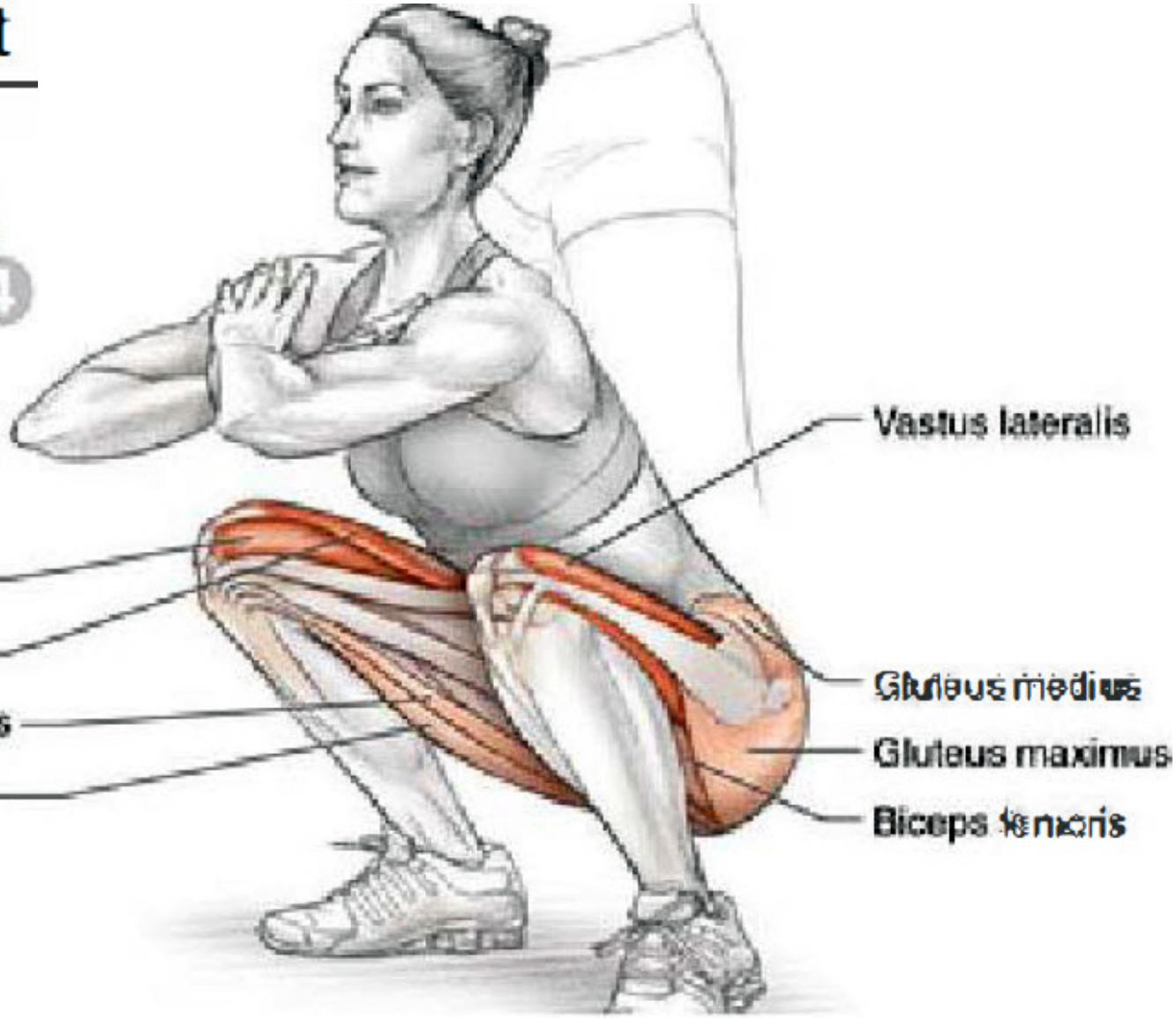
Full Squat





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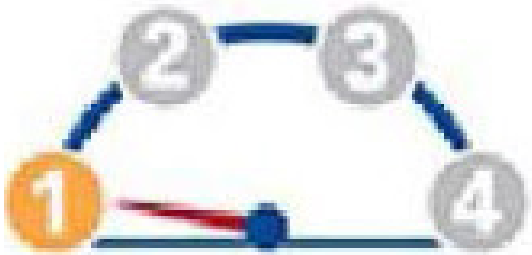
Full Squat



Muscles Involved

Primary: Quadriceps (rectus femoris, vastus lateralis, vastus medialis, vastus intermedius)
Secondary: Gluteus maximus, gluteus medius, gluteus minimus, hamstrings (biceps femoris, semitendinosus, semimembranosus), erector spinae (spinalis, longissimus, iliocostalis)

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Counterbalance Full Squat

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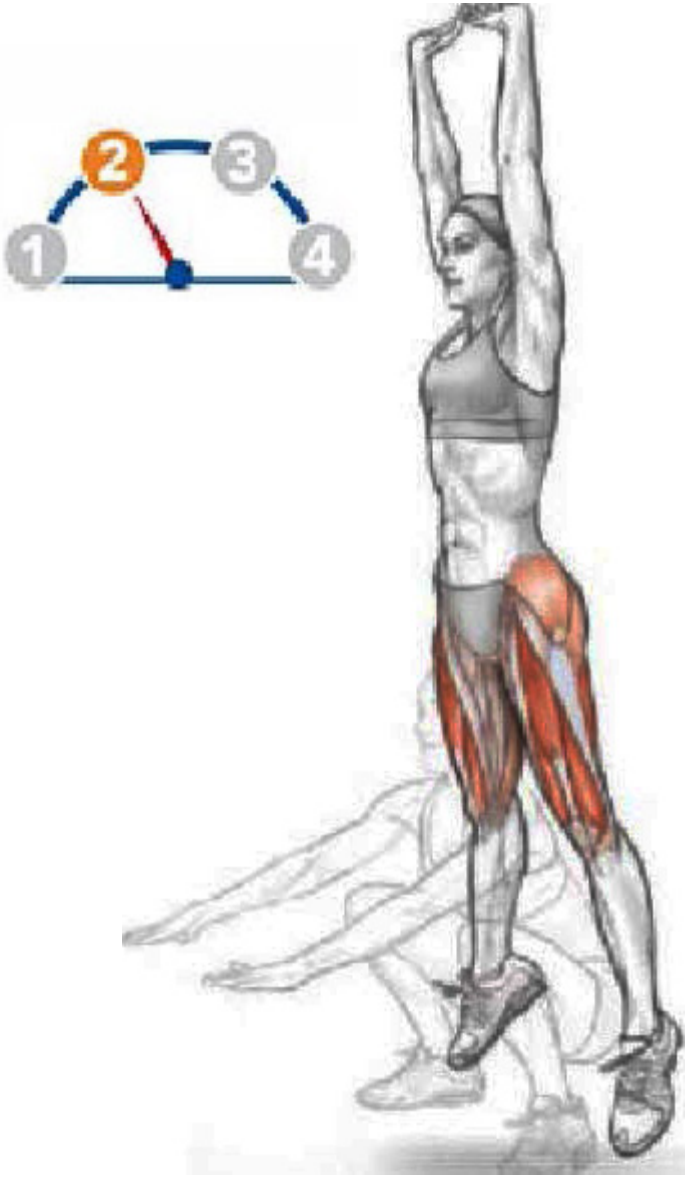
Jump Full Squat



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Squat

ART	ACCIÓN	AGONISTAS EN BAJAR	ACCIÓN	AGONISTAS EN SUBIR
Hip				
Knee				
Ankle				

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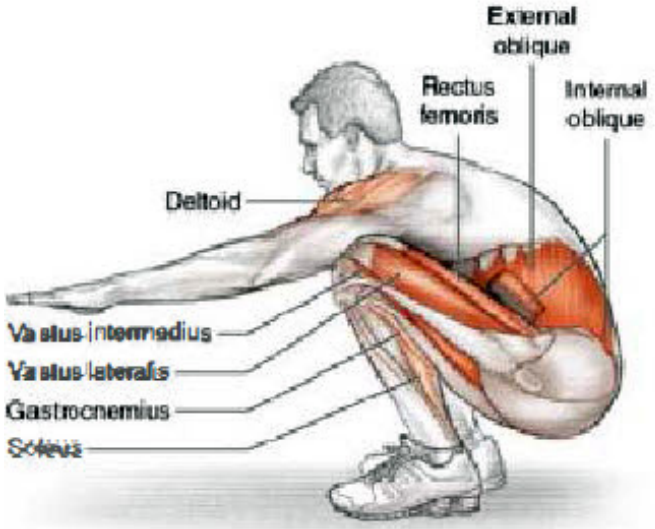
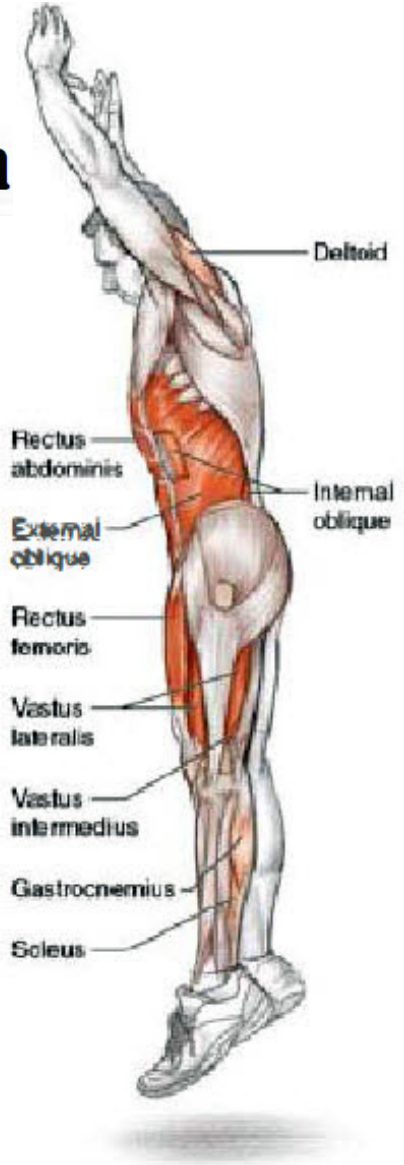
Sit-Up to Stand With Jump and Reach





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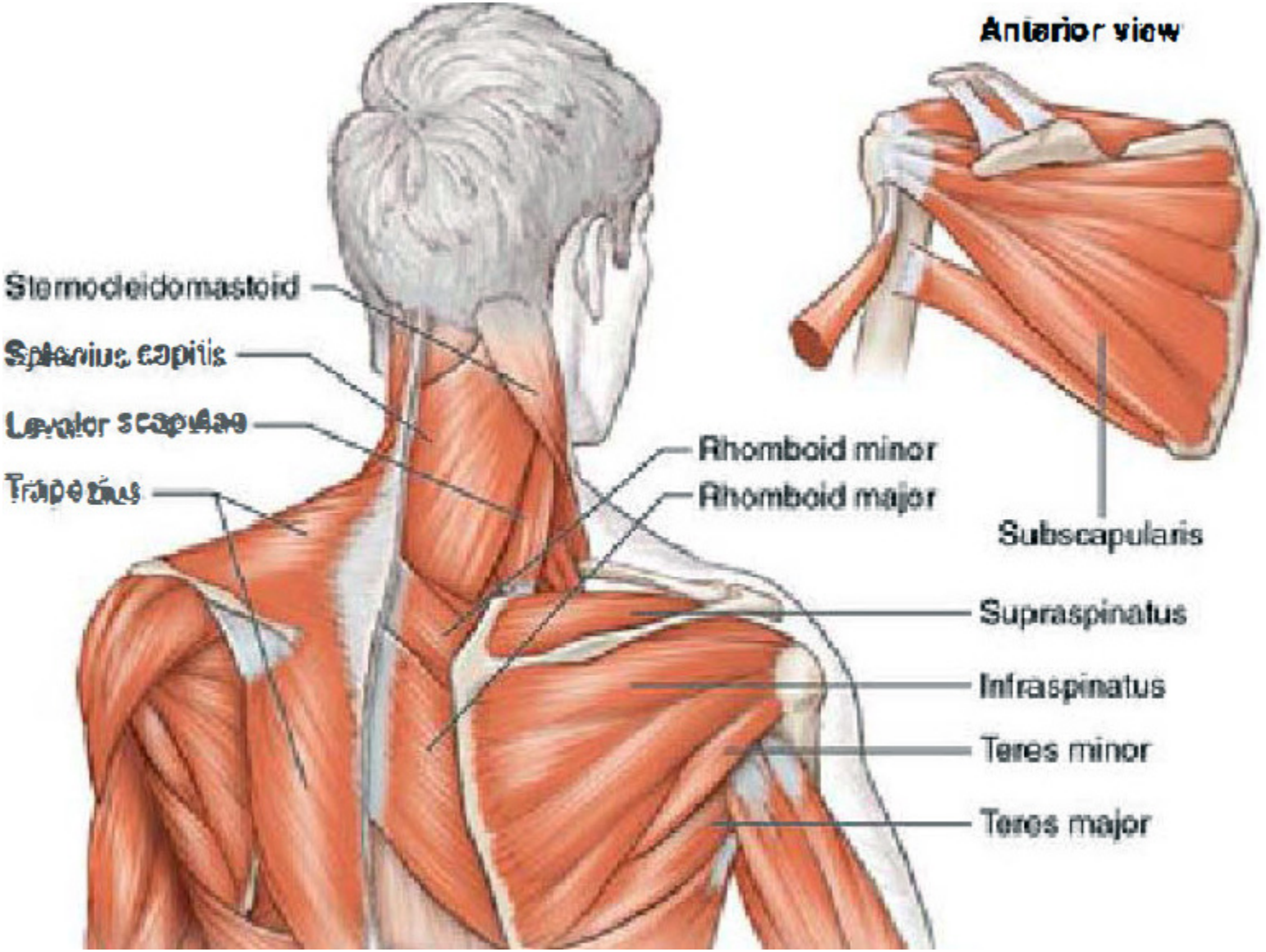

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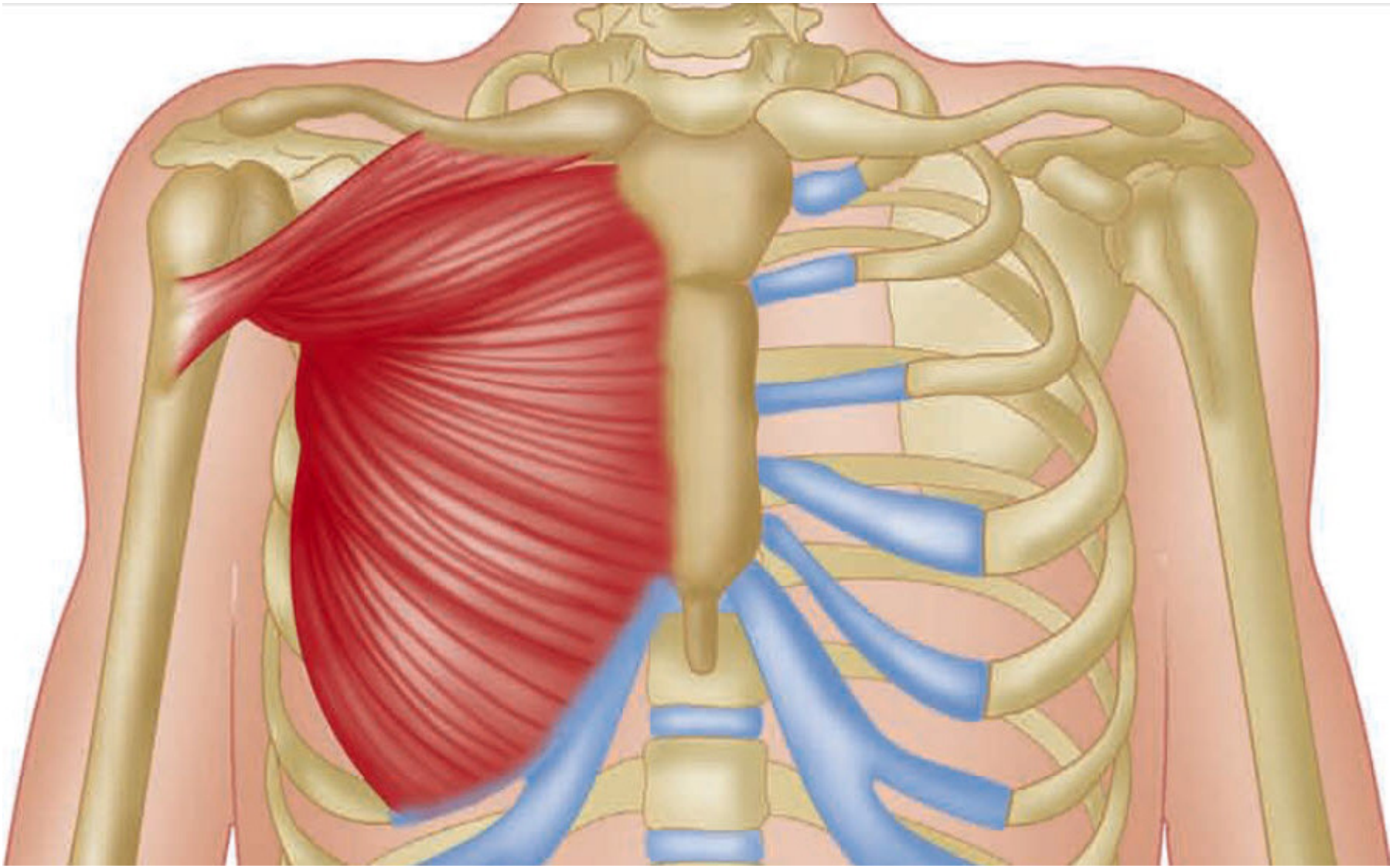

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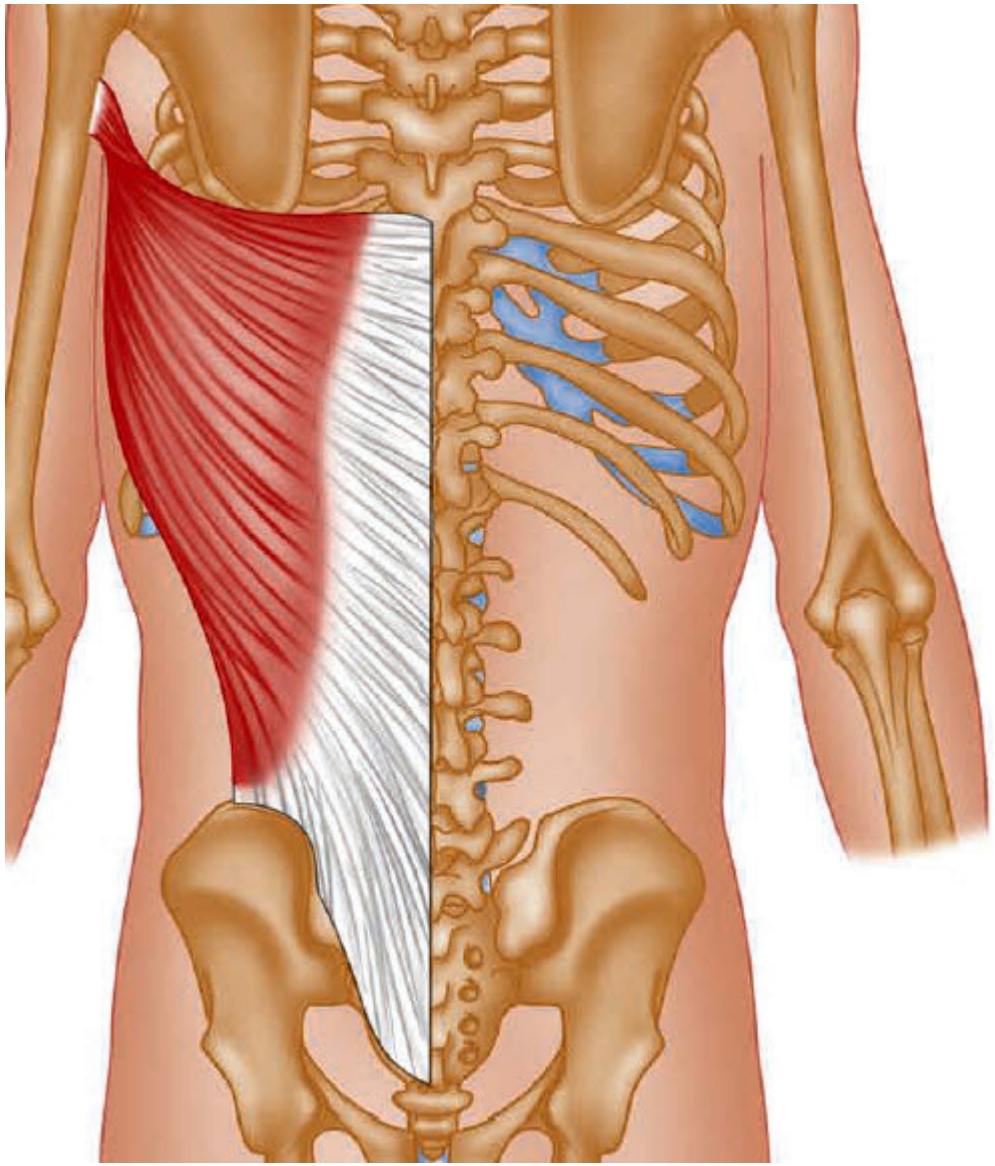

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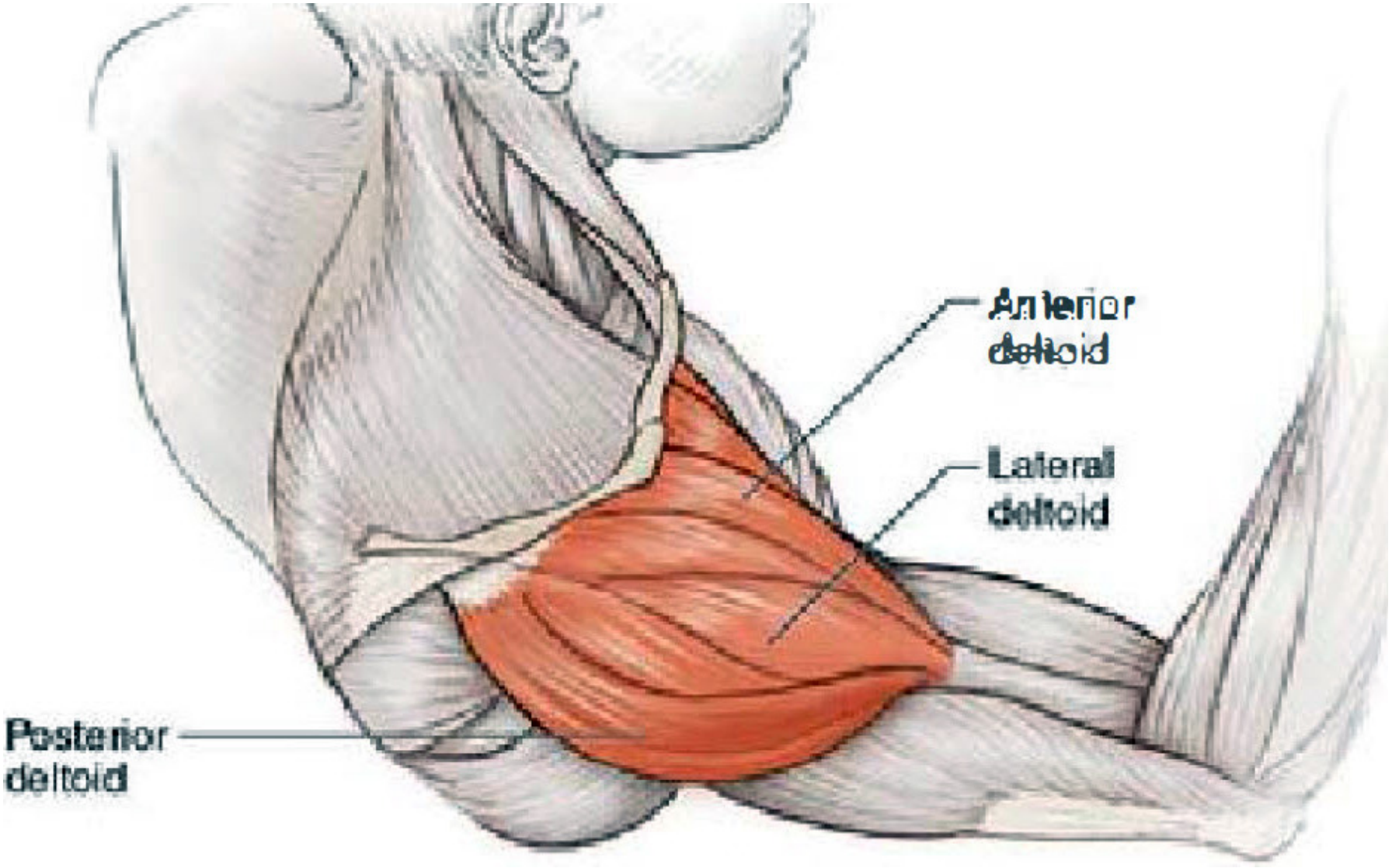

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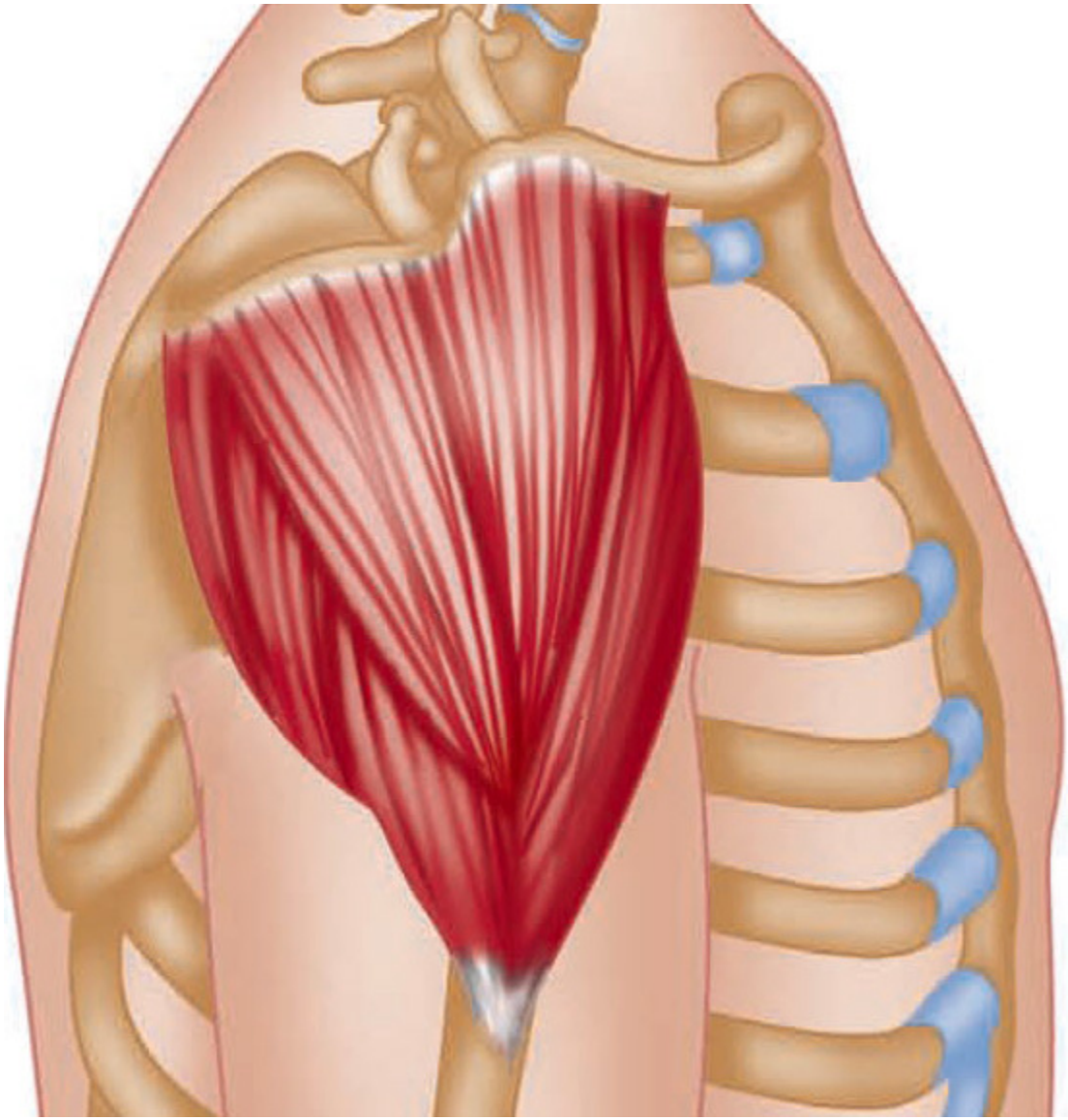

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