

## פיזיותרפיה אורטופדית המבוססת על עקרונות הקינזיולוגיה היישומית

25 שרירים שישנו את גישתכם לבעיות אורטופדיות



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קורס זה מתמקד בבדיקות שרירים ככלי רגיש ואמין להערכת מצב מערכת שריר- שלד- עצב ומה שביניהם, בהתבסס על עקרונותיה של הקיניזיולוגיה היישומית.

לרוב הקיניזיולוגיה היישומית אינה נוגעת ישירות לבעיות שבהן מתמקדת הפיזיותרפיה. אך הקורס הנוכחי מבוסס על עקרונות פיזיולוגיים ידועים וביומכניקה קלאסית. הוא נבנה באופן כזה שאינו שולל דבר ממה שידענו עד כה, אלא משלים ופותח זוויות הסתכלות נוספות ודרכי חשיבה חדשות.

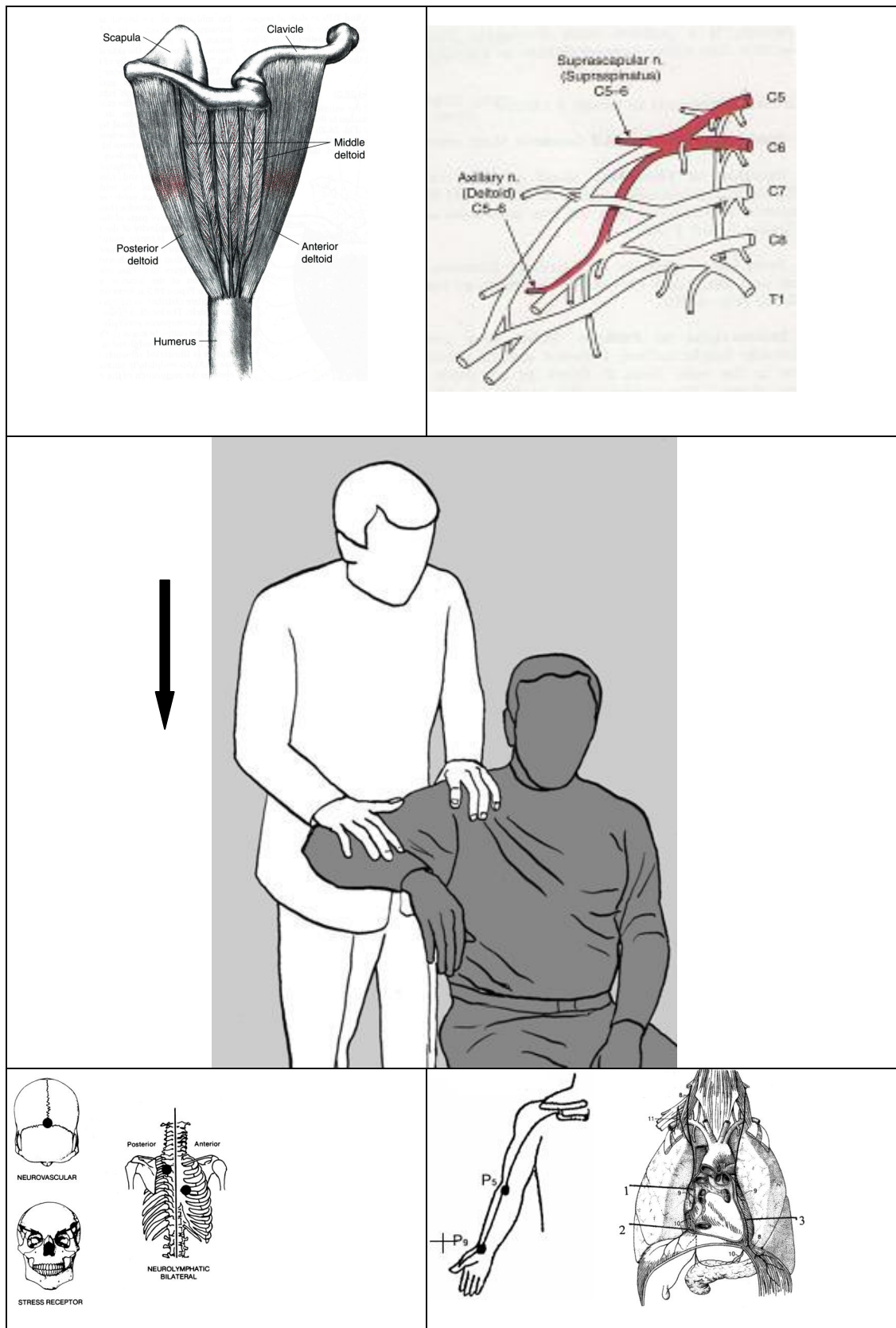
### **מטרת הקורס:**

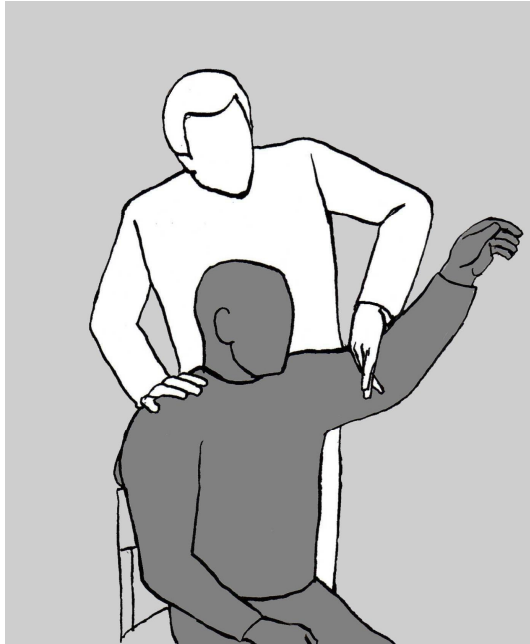
- לשפר יכולת זיהוי שריר חלש בשרשרת קנימטית.
- לדעת לזהות סיבה לחולשתו של השריר.
- להבין יחסים בין-שריריים בשרשרת קינמטית והשלכה של שריר חלש לאזורים אחרים.
- להכיר תבניות ליקויי תנועה חדשות.
- לרכוש מיומנות לאבחון ודרכי טיפול ומניעה.

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# 1. Deltoid m





Anterior division



Posterior division

## Deltoid — Middle Division

Origin: upper surface of acromion process. Insertion: deltoid tuberosity of humerus. Action: abduction of the humerus.

Test: The seated or standing patient flexes the elbow and abducts the shoulder to 90°. The horizontal forearm indicates neutral humerus rotation. Pressure is applied against the distal end of the humerus in straight adduction.

Nerve supply: axillary, C5, 6.

Neurolymphatic:

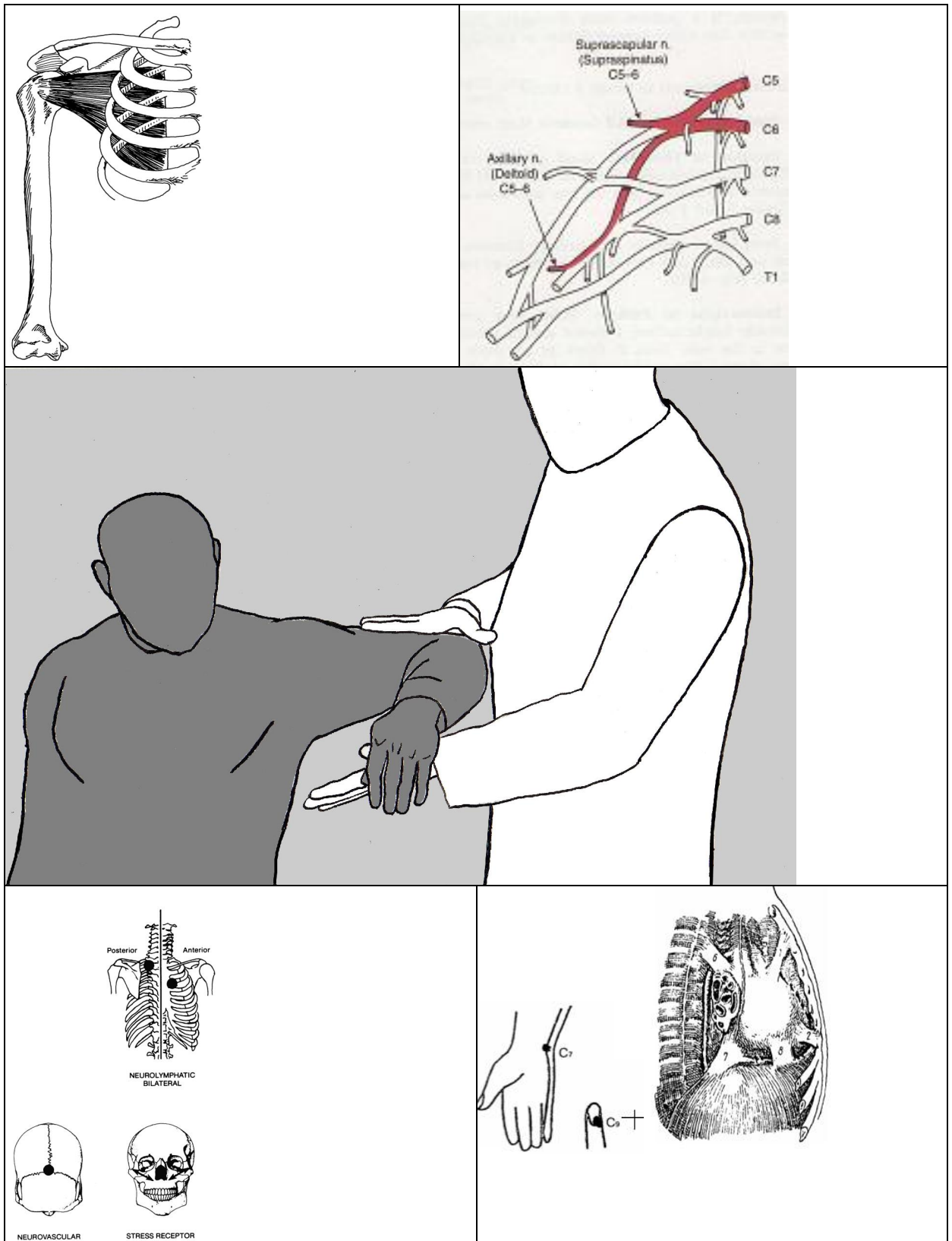
Anterior: 3rd intercostal space near sternum.

Posterior: between T3, 4 near laminae.

Neurovascular: bregma.

Nutrition: lung concentrate or nucleoprotein extract, vitamin C, RNA. Meridian association: lung.  
Organ association: lung.

## 2. Subscapularis



Origin: subscapular fossa.

Insertion: lesser tuberosity of humerus and capsule of shoulder joint.

Action: internally rotates humerus. Draws head of humerus forward and down when arm is raised, acting as part of the force couple of shoulder abduction. Test: The seated or prone patient abducts the shoulder to 90°, with the elbow flexed to 90°. The humerus is placed in slight internal rotation. The examiner directs pressure against the patient's wrist to externally rotate the humerus, using the forearm for leverage.

Nerve supply: upper and lower subscapular, C5, 6.

Neurolymphatic:

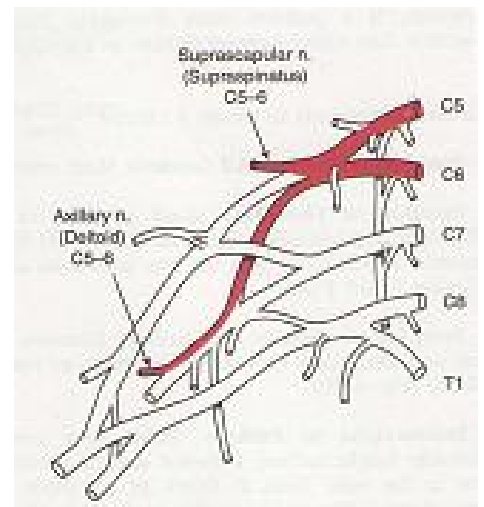
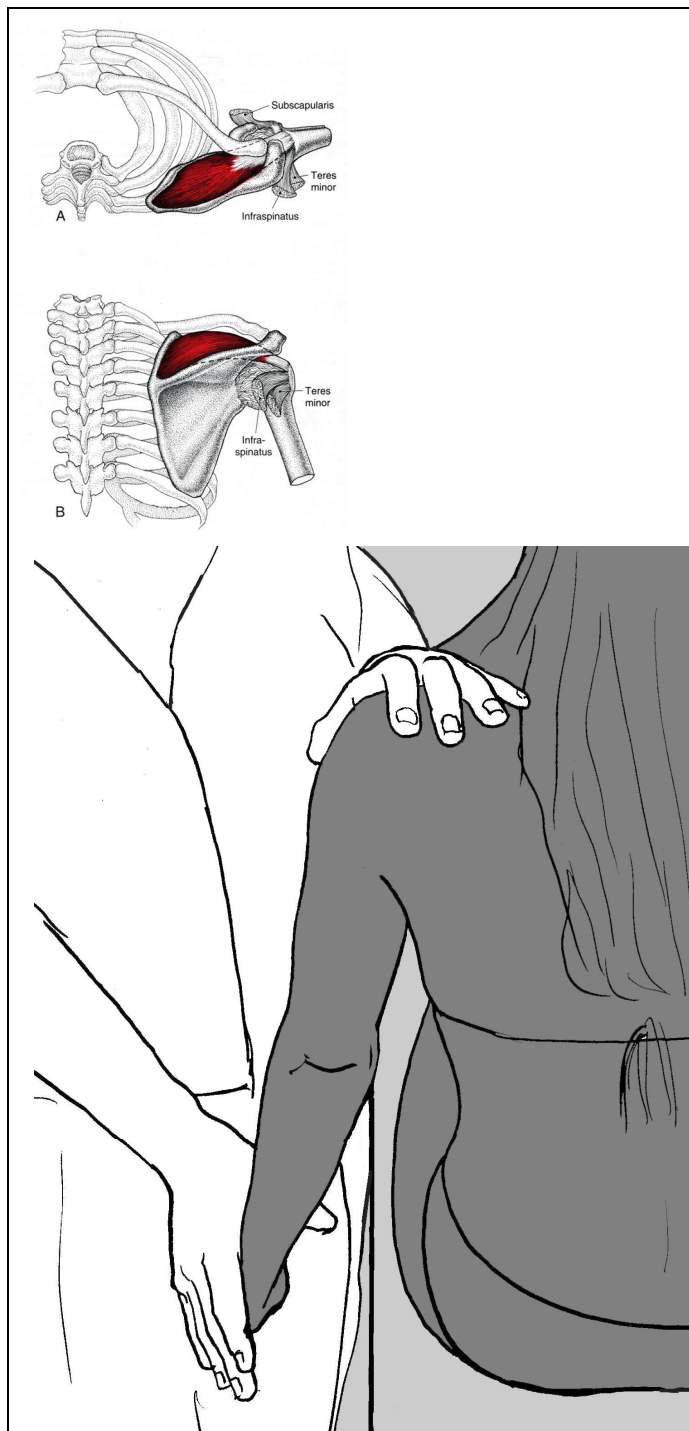
Anterior: 2nd intercostal space near sternum.

Posterior: T2,3 between transverse processes.

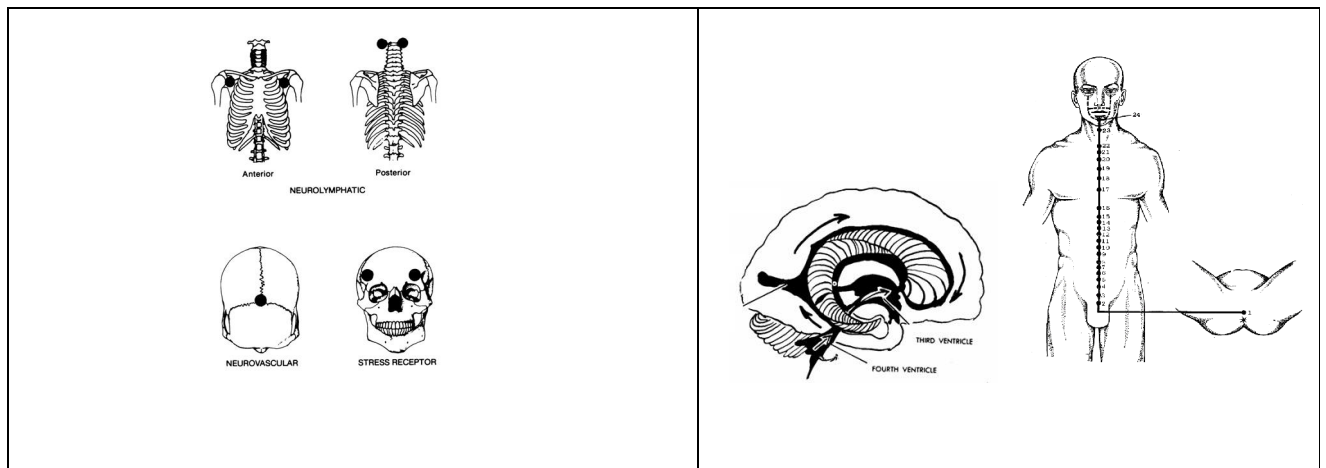
Neurovascular: bregma.

Nutrition: heart concentrate or nucleoprotein extract, vitamin E, B complex, C. Meridian association: heart. Organ association: heart.

### 3. Supraspinatus







Origin: medial two-thirds of supraspinatus fossa of scapula.

Insertion: superior facet of greater tuberosity of humerus and capsule of shoulder joint.

Action: abducts arm with deltoid. Holds head of humerus in glenoid cavity.

Test: The seated or standing patient abducts his arm approximately 15°, with the antecubital fossa facing anteriorly. The examiner contacts the wrist and directs force toward adduction of the arm with slight extension. The deltoid is synergistic in this test, and must be correlated to make final determination of the supraspinatus muscle function.

Nerve supply: suprascapular, C5, 6.

Neurolymphatic:

Anterior: below coracoid process.

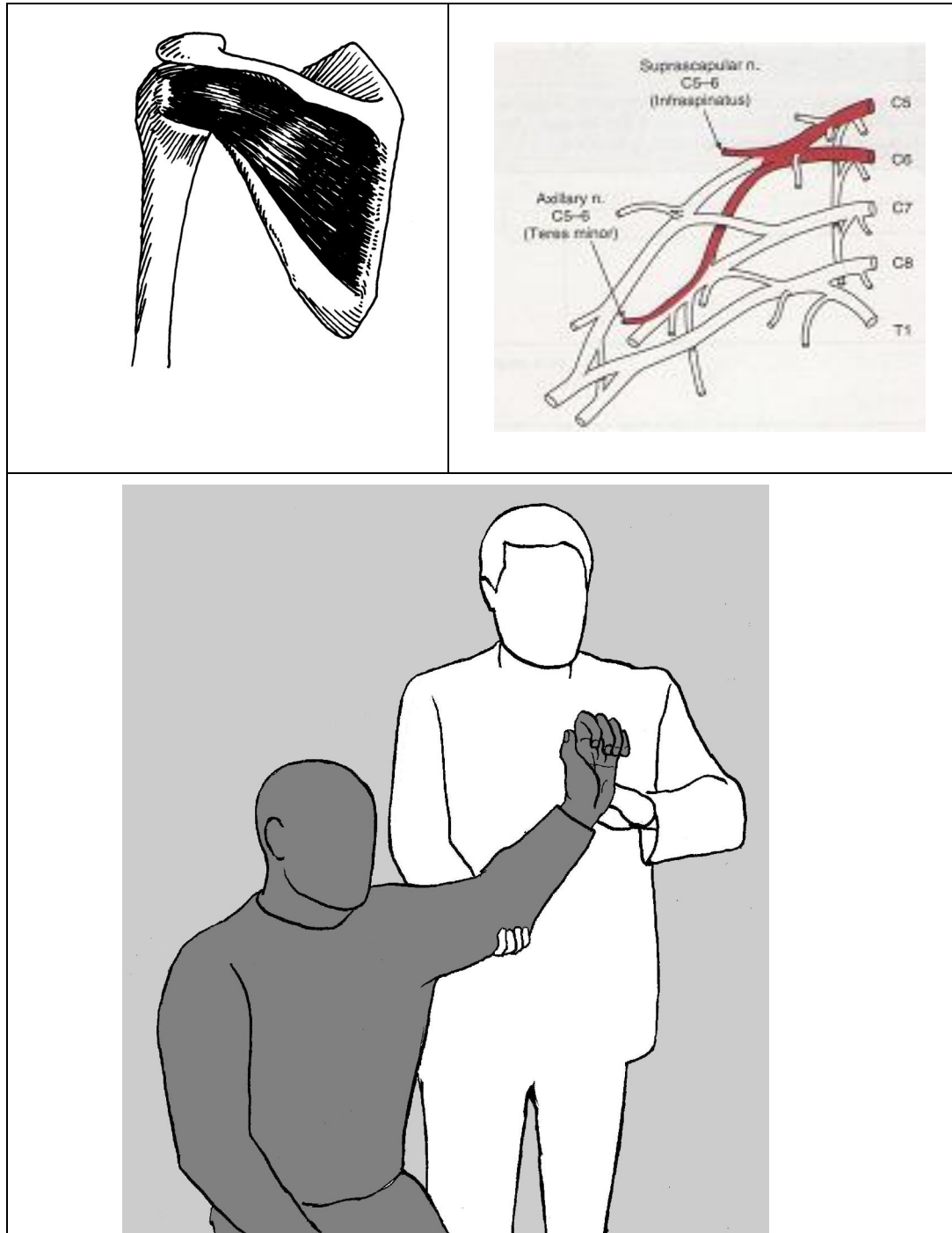
Posterior: posterior to transverse process of atlas. Neurovascular: bregma.

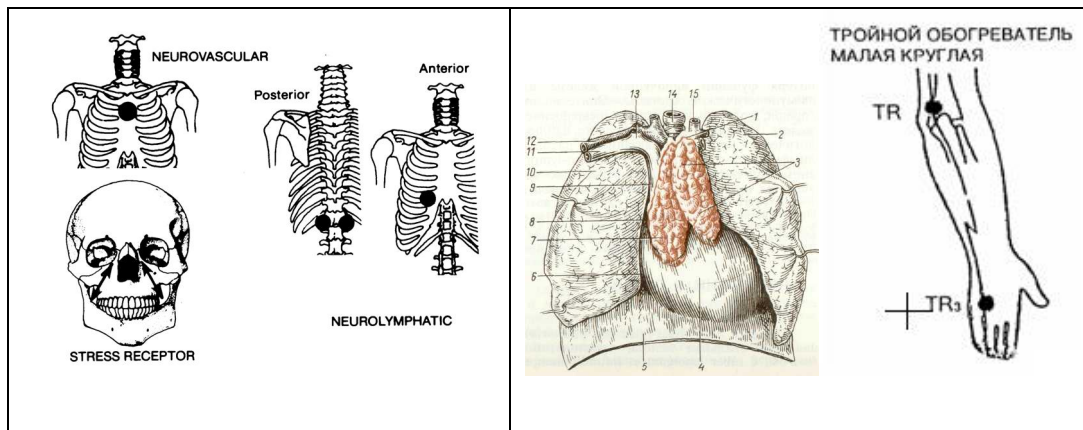
Nutrition: RNA, brain concentrate or nucleoprotein extract.

Meridian association: conception vessel.

Organ association: brain.

## 4. Infraspinatus





Origin: middle two-thirds of infraspinatus fossa of scapula.

Insertion: middle facet of greater tuberosity of humerus, capsule of shoulder joint.

Action: external rotation of humerus with teres minor. Stabilization of the head of the humerus with the glenoid cavity.

Test: The seated or prone patient abducts his humerus to 90°, with 90° elbow flexion and external humeral rotation. The examiner directs pressure to internally rotate the humerus. During the test, the examiner must observe for adequate scapula fixation. When this is not present, an assistant can aid in the test by stabilizing the scapula. Nerve supply: suprascapular, C5, 6.

Neurolymphatic:

Anterior: 5th intercostal space near sternum on right.

Posterior: T12 laminae, bilateral.

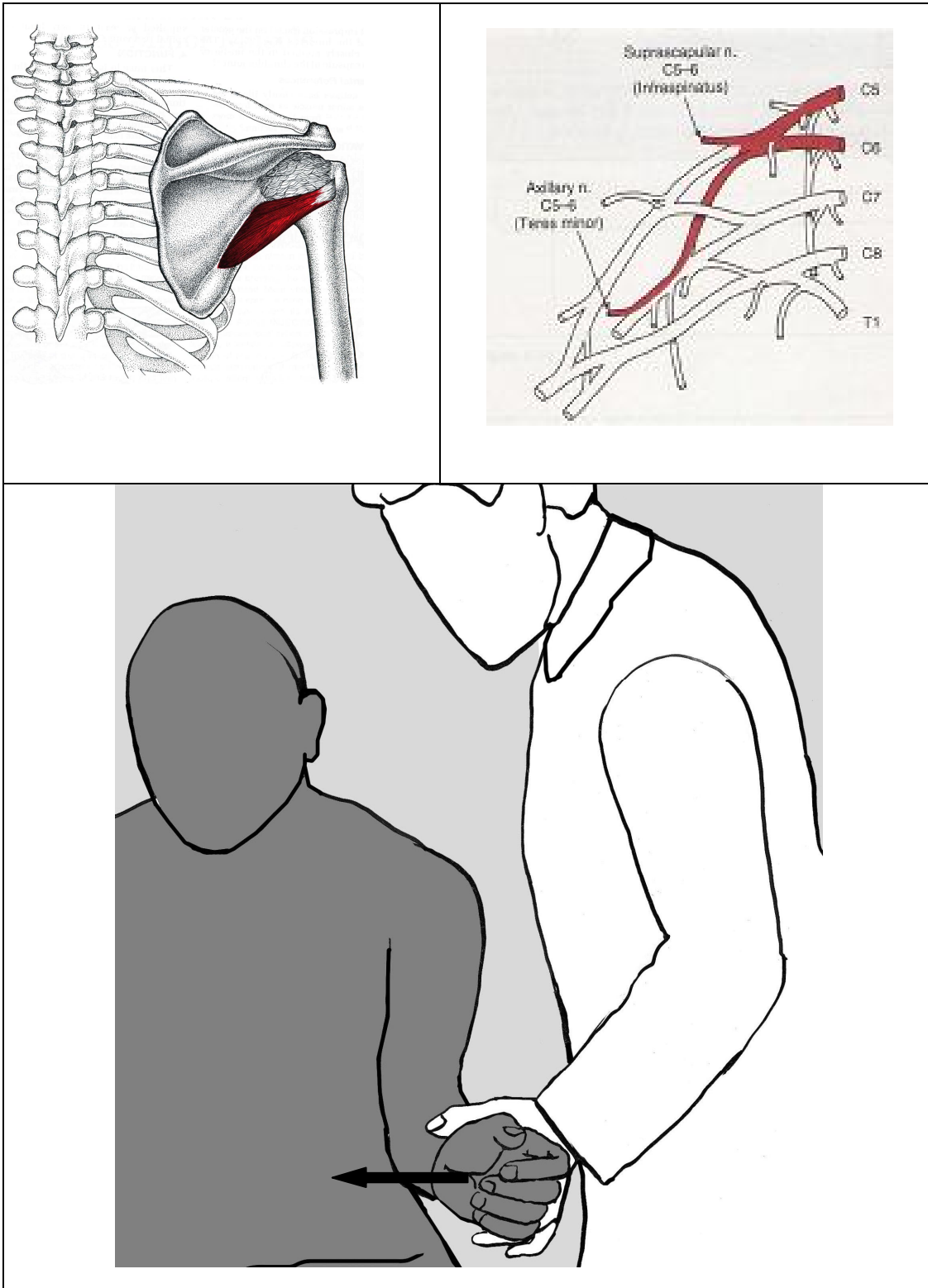
Neurovascular: angle of Louis on the sternum.

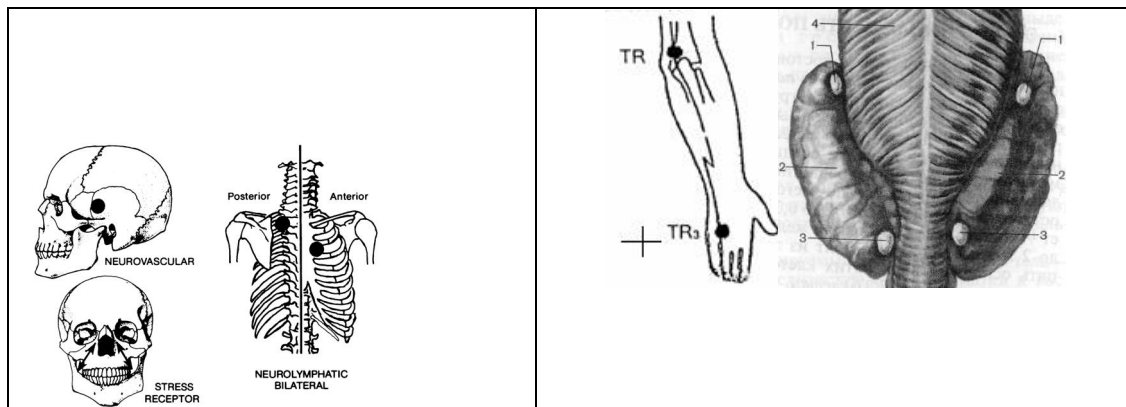
Nutrition: thymus concentrate or nucleoprotein extract.

Meridian association: triple heater. The alarm point for involvement of the thymus is CV 18, located on the sternum just above the alarm point for the circulation sex meridian. This is a point that has been determined clinically in applied kinesiology, and is not one of classic acupuncture.

Gland association: thymus.

## 5. Teres minor





Origin: upper two-thirds of dorsal surface of axillary border of scapula.

Insertion: low on the greater tuberosity of the humerus; capsule of the shoulder joint.

Action: externally rotates the humerus and slightly ad-ducts and extends humerus; stabilizes head of humerus in glenoid cavity during movement, and acts as a couple with the deltoid in arm abduction. Test: The supine or seated patient flexes his elbow to 90° and externally rotates his humerus. The examiner directs pressure against the wrist, using the patient's forearm for leverage to internally rotate the humerus. Nerve supply: axillary, C4, 5, 6. Neurolymphatic:

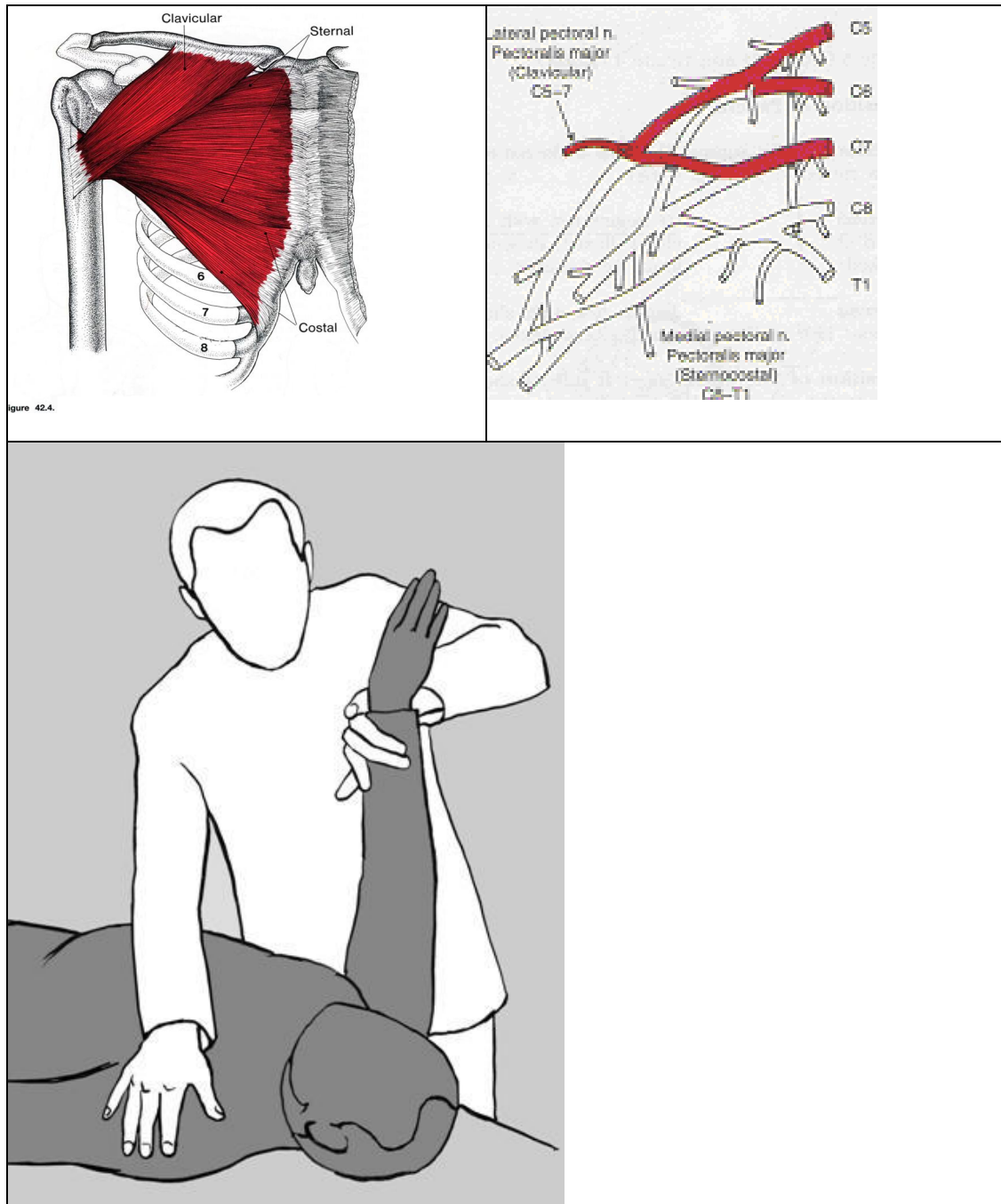
Anterior: 2nd intercostal space near sternum.

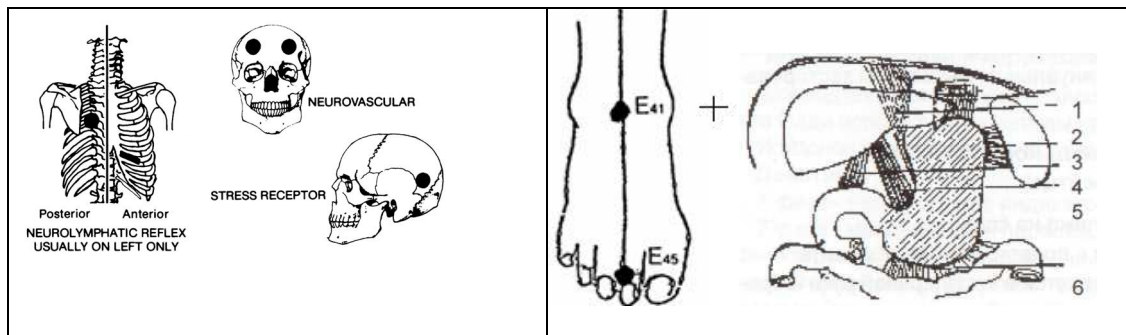
Posterior: T3 laminae. Neurovascular: 1" below the pterion and at the junction of the 1st rib, clavicle, and sternum. Nutrition: thyroid concentrate or nucleoprotein extract, organic iodine.

Meridian association: triple heater.

Gland association: thyroid.

## 6. Pectoralis Major — Clavicular Division





Action: flexes the shoulder joint and horizontally ad-ducts the humerus toward the opposite shoulder. Participates in internal rotation in some subjects. Test: The supine patient extends the elbow and flexes the shoulder to 90°, with internal rotation, so the thumb points toward the feet. Pressure is directed on the distal end of the forearm in the direction of abduction and slight extension of the shoulder. The direction of pressure can best be determined if the examiner visualizes a line from the origin to the insertion, with the direction of pressure extending from that line, giving best alignment of the fibers of the clavicular portion. The vector of testing force will vary somewhat between subjects.

Common testing errors occur when the opposite shoulder is allowed to rise from the table, or when the patient is permitted to recruit additional synergistic action of the biceps by flexing the elbow. Nerve supply: lateral pectoral, C5, 6, 7.

Neurolymphatic:

Anterior: 6th intercostal space from mamillary line to sternum on left, which usually affects both right and left muscles. Occasionally found on right, affecting the right pectoralis major (clavicular division). When found on right, always evaluate to determine if the patient is switched.

Posterior: between T6, 7 near lamina on left.

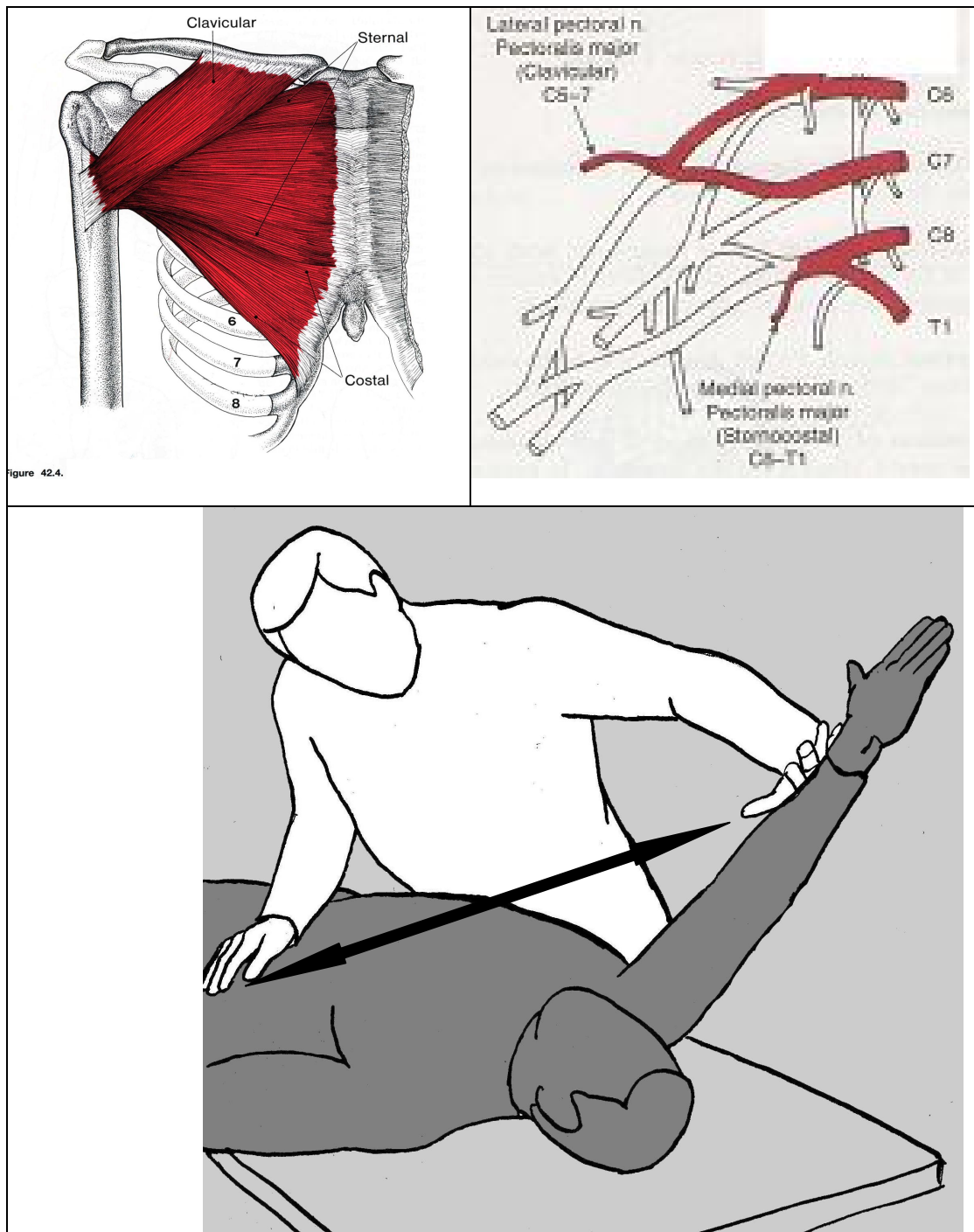
Neurovascular: bilateral frontal bone eminences.

Nutrition: vitamin B, betaine hydrochloride, stomach concentrate or nucleoprotein extract with vitamin B<sub>12</sub>.

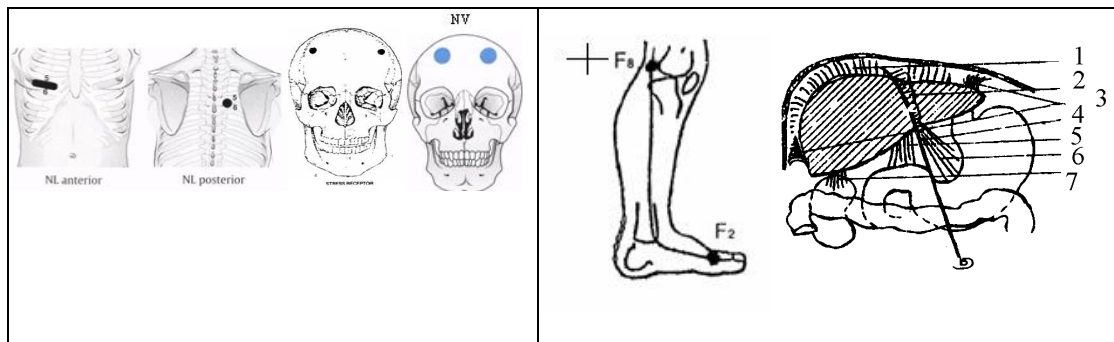
Meridian association: stomach.

Organ association: stomach.

## 7. Pectoralis Major - Sternal Division







Origin: sternum to 7th rib, cartilages of true ribs and aponeurosis of external oblique abdominal muscle. Insertion: lateral lip of the bicipital groove of the humerus.

Action: adducts humerus toward opposite iliac crest; major anterior shoulder stabilizer. Test: The patient extends the elbow and flexes the shoulder to 90° in internal rotation so the thumb points toward the feet. Pressure is directed on the distal forearm in the direction of abduction and increased shoulder flexion. The best alignment of pressure can be observed by drawing an imaginary line from the middle of the origin through the center of the insertion; the direction of pressure extends from that line. Nerve supply: lateral and medial pectoral, C6, 7, 8, T1. Neurolymphatic:

Anterior: 5th intercostal space from mamillary line to sternum on right, which usually affects both right and left muscles. Occasionally the neurolymphatic reflex may be found on the left, especially if there is left pectoralis major (sternal division) weakness. If therapy localization to the left side strengthens the muscle, consider the possibility of switching and treat accordingly.

Posterior: between T5, 6 near lamina, usually on right.

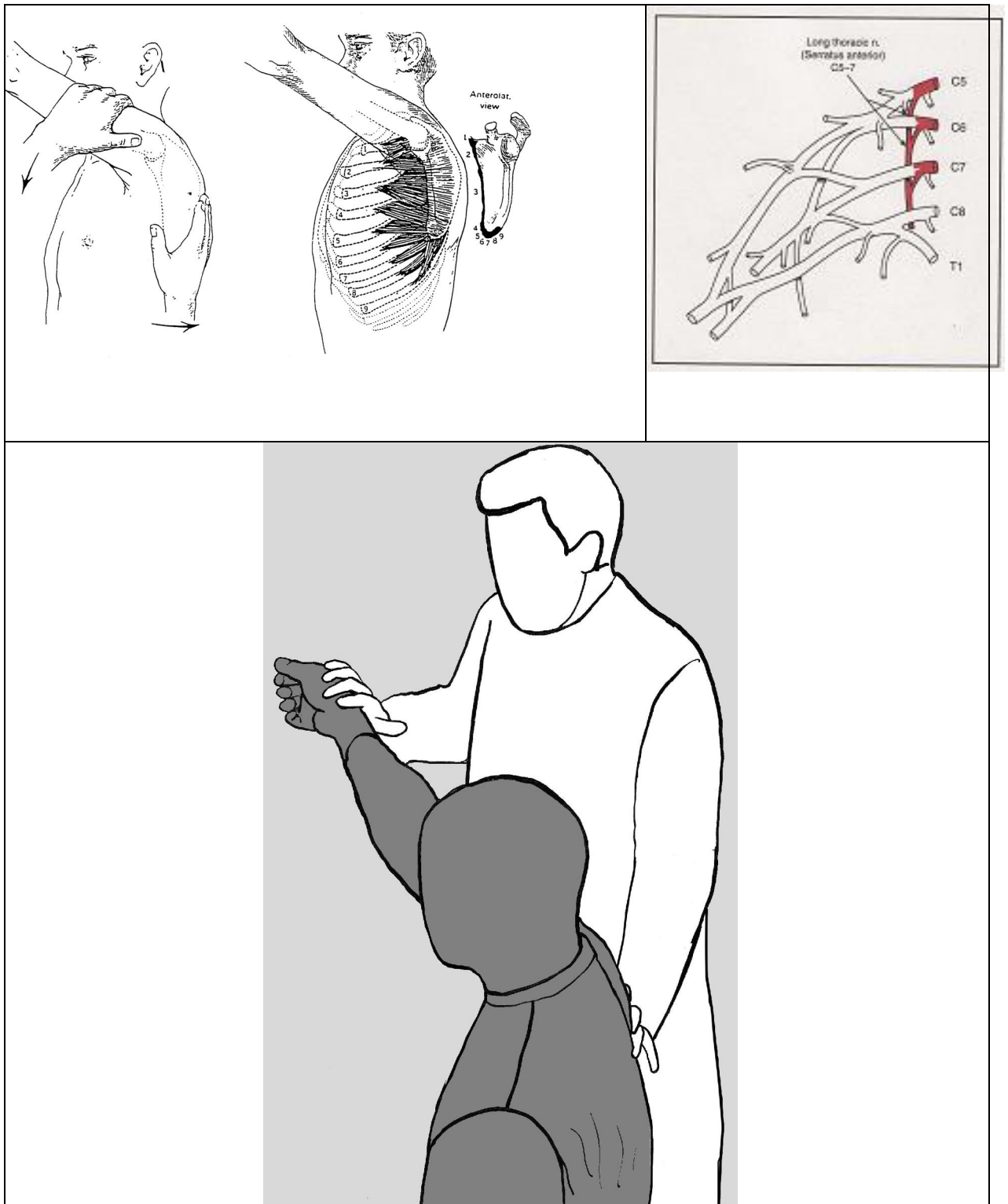
Neurovascular: bilaterally 1-1/2" up from prominent bulges on anterior frontal bone, 1-1/2" from midline.

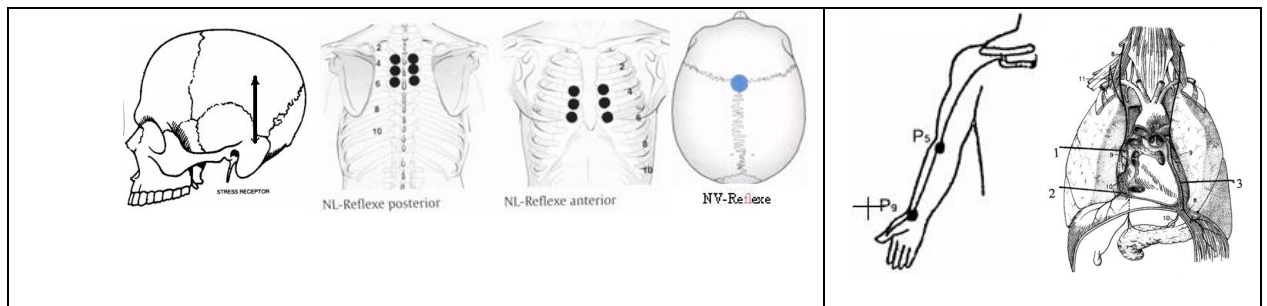
Nutrition: vitamin A, bile salts, liver concentrate or nucleoprotein extract.

Meridian association: liver.

Organ association: liver.

## 8. Serratus anterior





Origin: outer surfaces and superior borders of upper eight or nine ribs.

Insertion: costal surface of the vertebral border of scapula.

Action: abducts scapula and rotates it to point the glenoid cavity more superiorly; holds vertebral border of scapula to thoracic cage, along with rhomboids and middle trapezius.

Test: The seated or standing patient holds his arm to approximately 100-130° flexion, with abduction. This brings the inferior angle of the scapula into abduction and the glenoid cavity into superior rotation. Testing pressure is directed on the humerus or at the wrist, depending upon the amount of leverage the examiner wishes to use. The integrity of the glenohumeral articulation must be taken into consideration, making certain that no movement takes place at that joint. The examiner's other hand contacts the inferior lateral border of the scapula, rotating the inferior angle medially, while applying pressure to bring the arm downward in the direction of extension and adduction. Movement evaluation is of the scapula, not the arm.

Nerve supply: long thoracic, C5, 6, 7.

Neurolymphatic:

Anterior: 3rd, 4th, and 5th intercostal spaces near sternum

Posterior: T3, 4, and 5 at laminae.

Neurovascular: bregma.

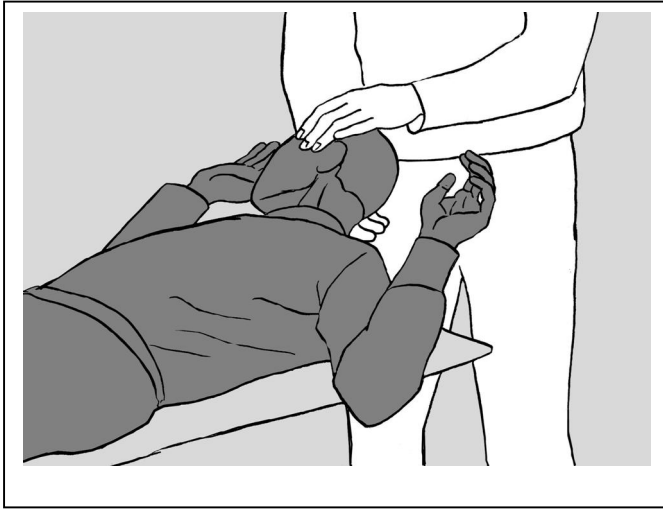
Nutrition: lung concentrate or nucleoprotein extract, vitamin C.

Meridian association: lung.

Organ association: lung.

## 9. Sternocleidomastoid





Origin:

Sternal head: anterior surface of the manubrium.

Clavicular head: upper surface of the medial half

of the clavicle. Insertion: lateral surface of the mastoid process of the temporal bone, and lateral half of the superior nuchal line of the occiput.

Action: acting unilaterally, draws head toward the ipsi-lateral shoulder and rotates head to opposite side; acting bilaterally, flexes head.

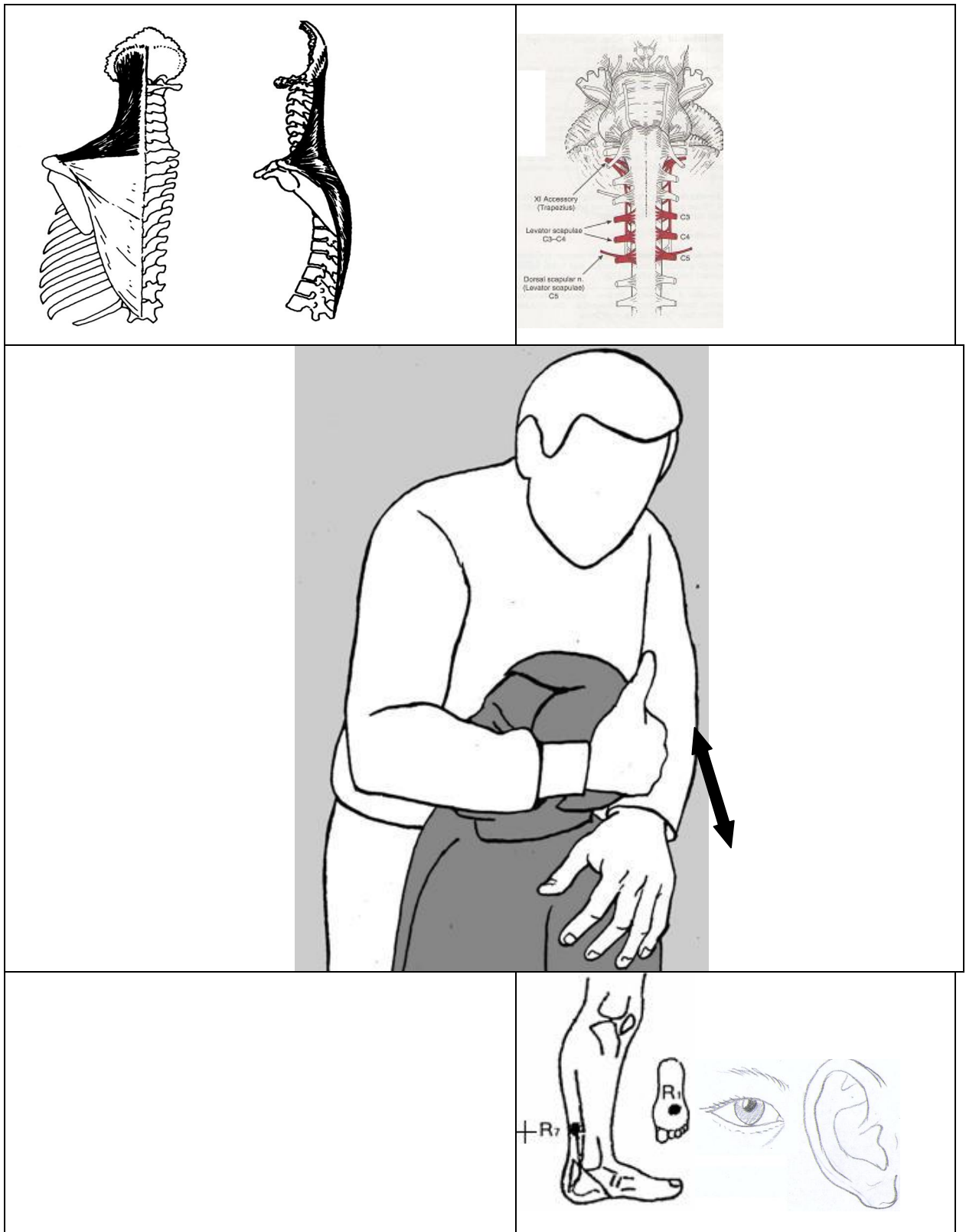
Test: The supine patient places the hands above the head by shoulder abduction and elbow flexion to avoid pressing against the table during the test. The patient rotates his head away from the muscle to be tested and lifts it from the table. Pressure is applied against the temporal area in a posterolateral direction. The examiner should observe for the patient's attempts to turn his head medially, recruiting more synergistic action of the scalene group and other neck flexors.

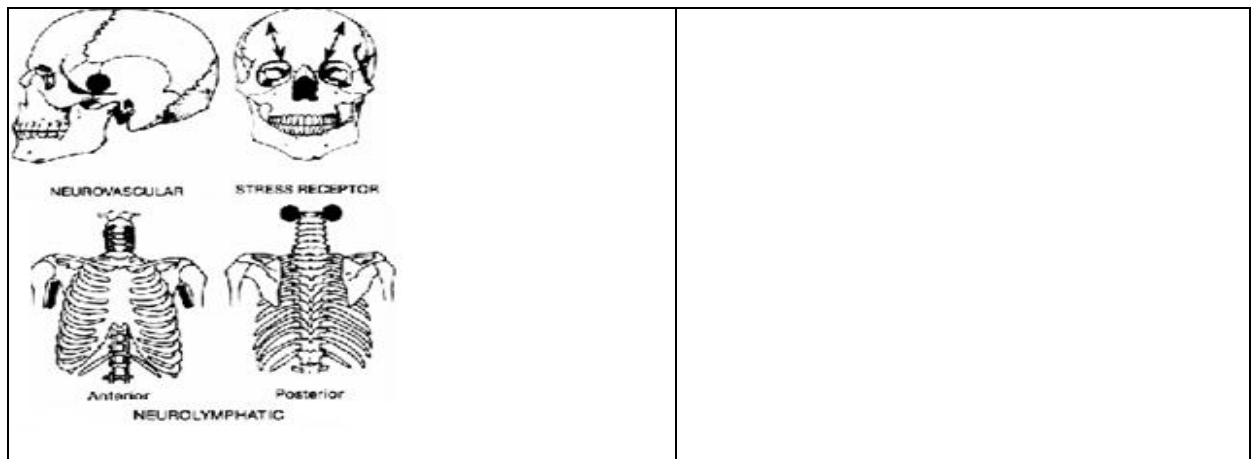
Nerve supply: anterior rami of C2,3; spinal portion of the accessory nerve (cranial XI).

Neurolymphatic:

Anterior: 1st intercostal space, 3-1/2" from the sternum. Posterior: laminae of C2. Neurovascular: ramus of jaw below zygoma. Nutrition: niacinamide or niacin and vitamin B<sub>6</sub>. For sinusitis, organic iodine may be needed. Meridian association: stomach. Organ association: sinuses.

## 10. Upper Trapezius





Origin: external occipital protuberance, medial one-third of superior nuchal line, ligamentum nuchae and spinous process of C1 vertebra. Insertion: lateral one-third of clavicle and acromion process.

Action: rotation of scapula so glenoid cavity faces superiorly; adducts the scapula when acting with the other sections of the trapezius.

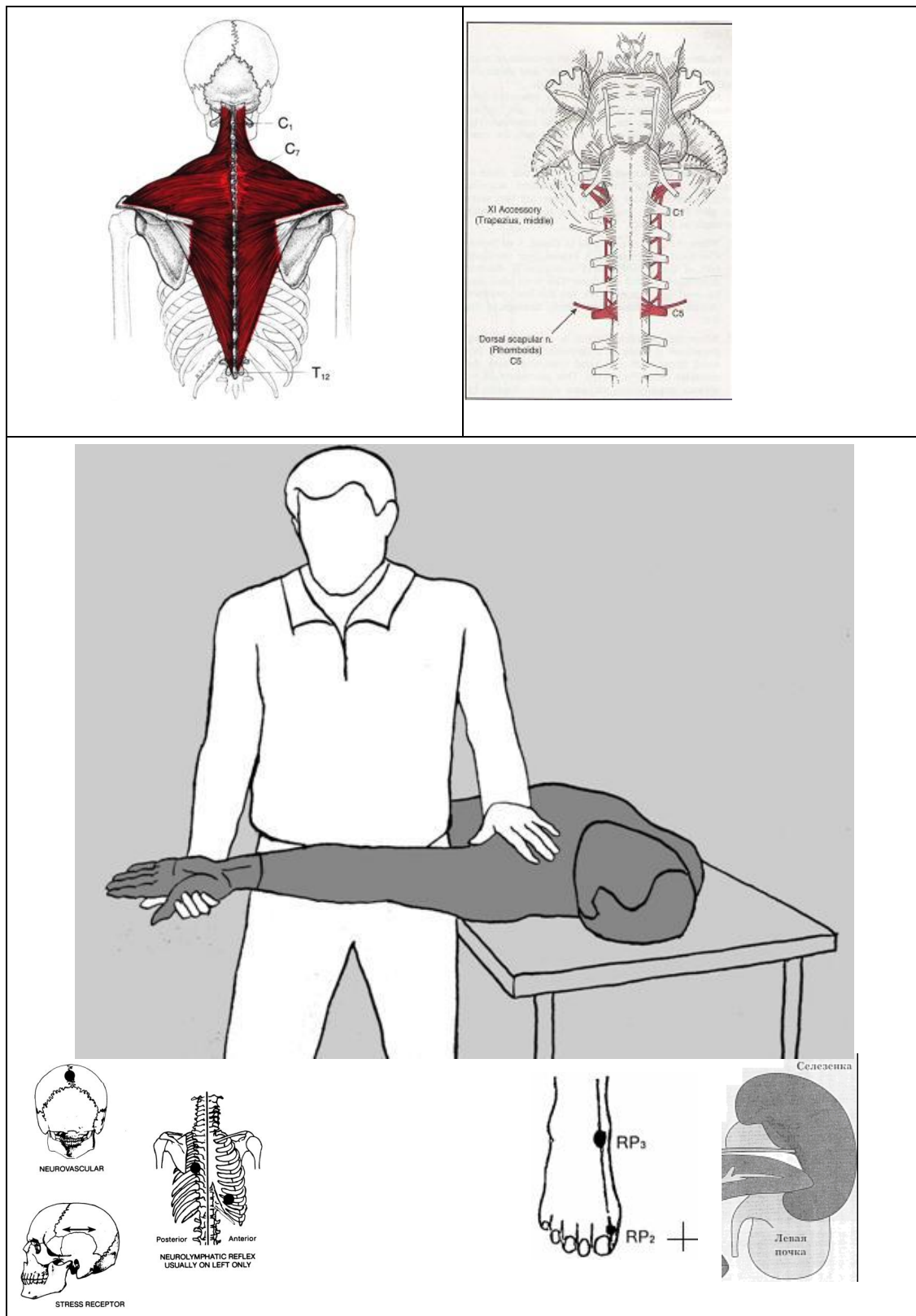
Test: The seated patient elevates his shoulder and laterally flexes his neck and head, with rotation of the head slightly away from the side being tested. The examiner places one hand on the shoulder and the other on the head, directing force to reduce the approximation of the head and shoulder.

Nerve supply: spinal accessory and ventral ramus of C2, 3, 4. Neurolymphatic:

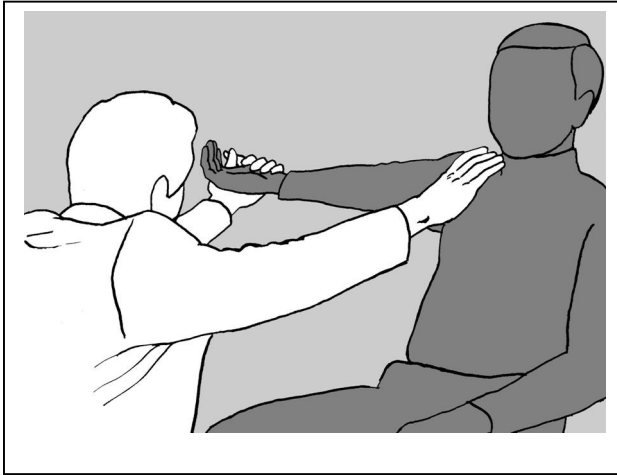
Anterior: 3" of anterior upper arm.

Posterior: posterior arch of atlas to lateral mass. Neurovascular: on temporal sphenoidal suture just above zygomatic arch. Nutrition: vitamins A, B, F, G, and calcium. Meridian association: kidney. Organ association: eye and ear.

## 11. Trapezius — Middle Division







Origin: spinous processes of 1st-5th thoracic vertebrae. Insertion: superior borders of spine of scapula. Action: adducts and slightly elevates scapula; draws back acromion process.

Test: The prone patient extends the elbow with the shoulder in 90° abduction and external rotation (thumb toward ceiling). The examiner directs force against the arm toward the floor. Observation should be made for strong glenohumeral fixation. The test is of abduction of the scapula from the spine and must be observed or palpated by the examiner.

Many examiners fail to observe for the abduction of the scapula, and list the mid-trapezius as weak simply because the arm fails to resist the testing pressure. The failure may be due to inadequate glenohumeral fixation.

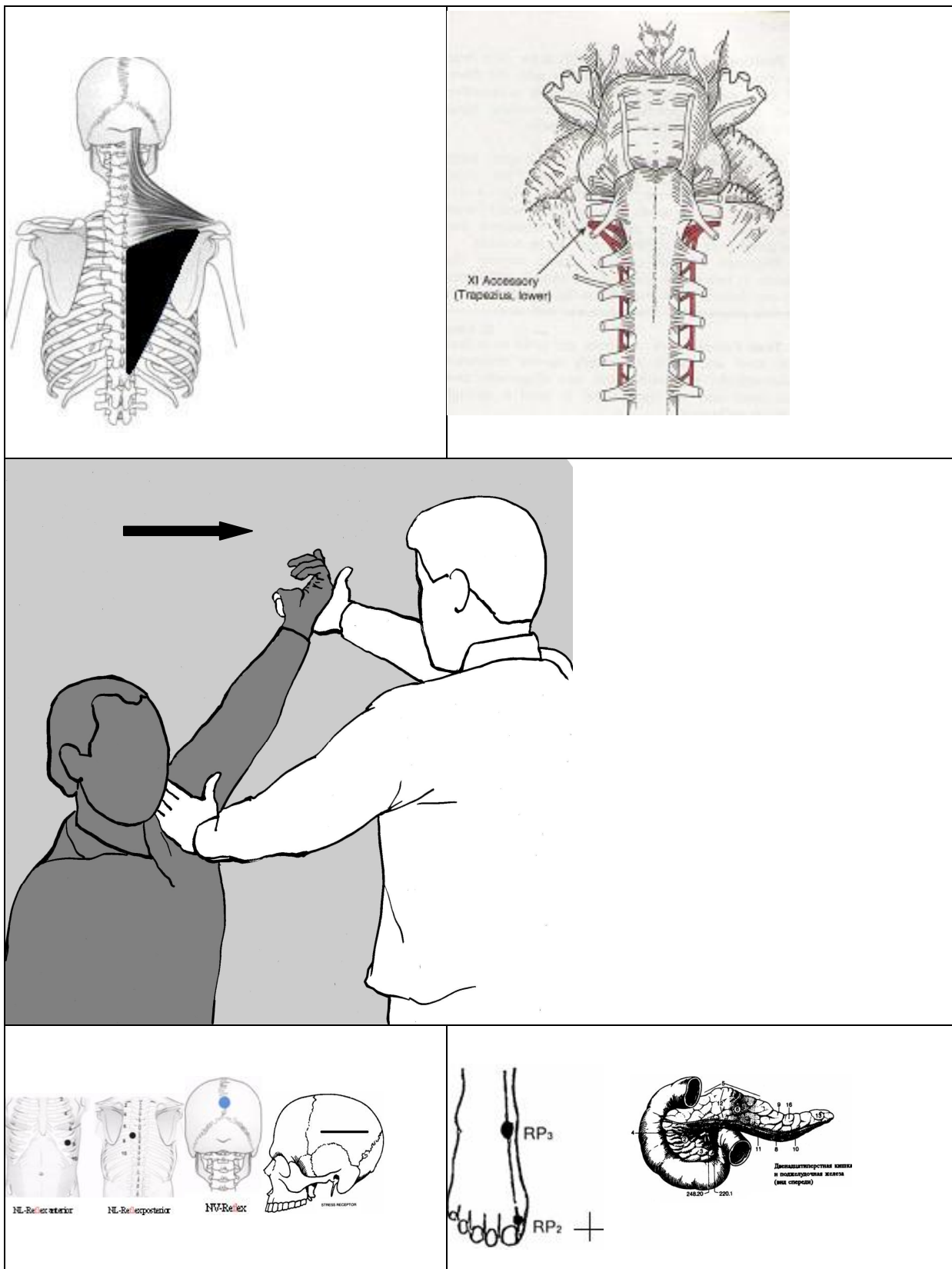
Nerve supply: spinal accessory and ventral ramus, C2, 3,4 Neurolymphatic:

Anterior: 7th intercostal space on the left.

Posterior: between T7, 8 near lamina on left. Neurovascular: 1" above lambda. Nutrition: spleen concentrate or nucleoprotein extract, vitamin C, calcium. Meridian association: spleen.

Organ/gland association: spleen

## 12. Trapezius — Lower Division



Origin: spinous processes, 6th-12th thoracic vertebrae. Insertion: medial one-third of spine of the scapula. Action: rotation of scapula; gives inferior stabilization to scapula; helps maintain spine in extension; draws back acromion process.

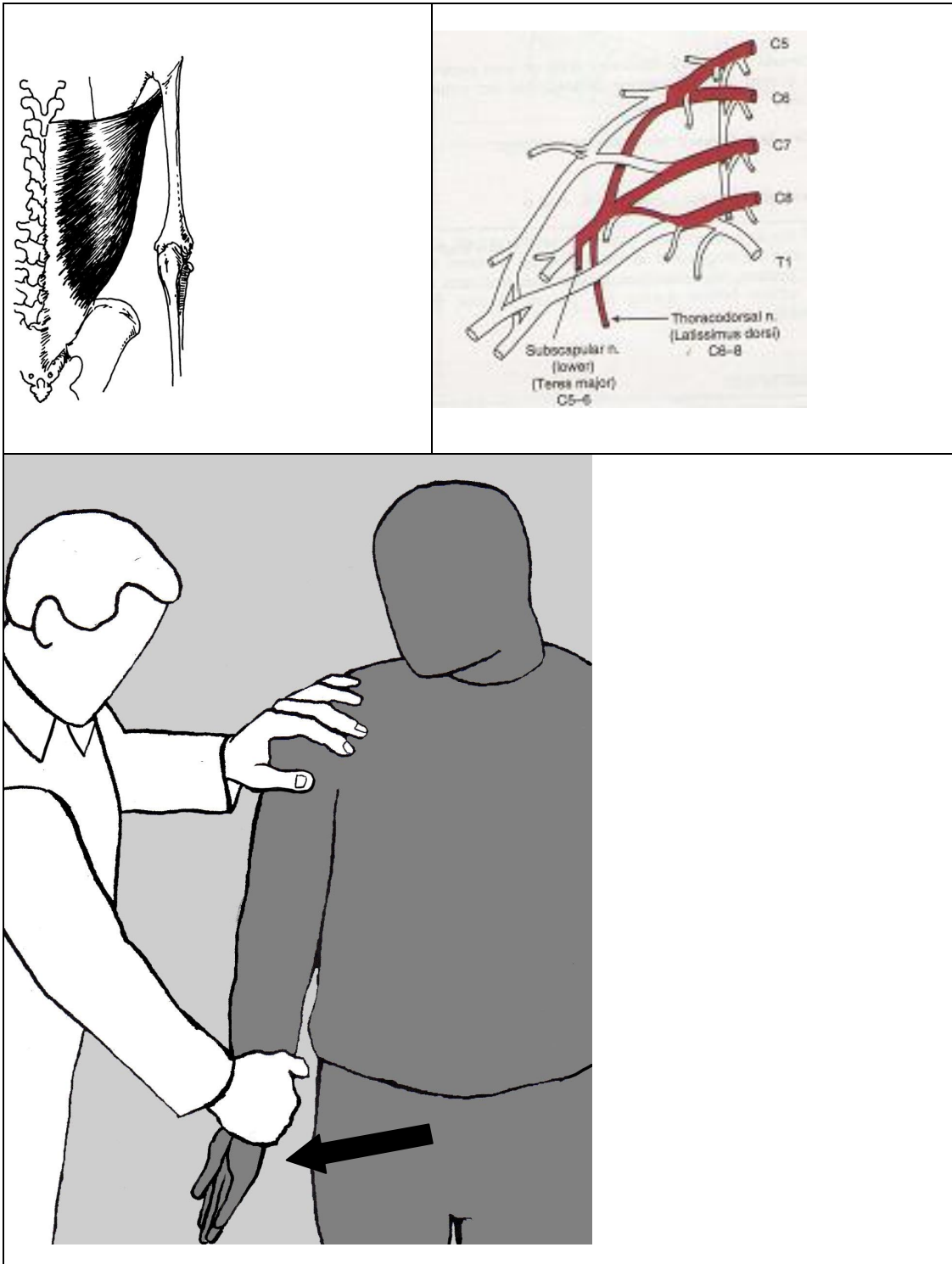
Test: The prone patient extends the elbow and externally rotates the arm (thumb toward ceiling). The arm is abducted to approximately 150° to align the arm with the fibers of the lower trapezius. Examining pressure is directed against the arm toward the floor. The point of contact varies, depending upon the amount of leverage the examiner desires. There should be no motion at the glenohumeral articulation, and the elbow should not flex. The test is abduction and elevation of the scapula from the spine, and must be observed or palpated by the examiner.

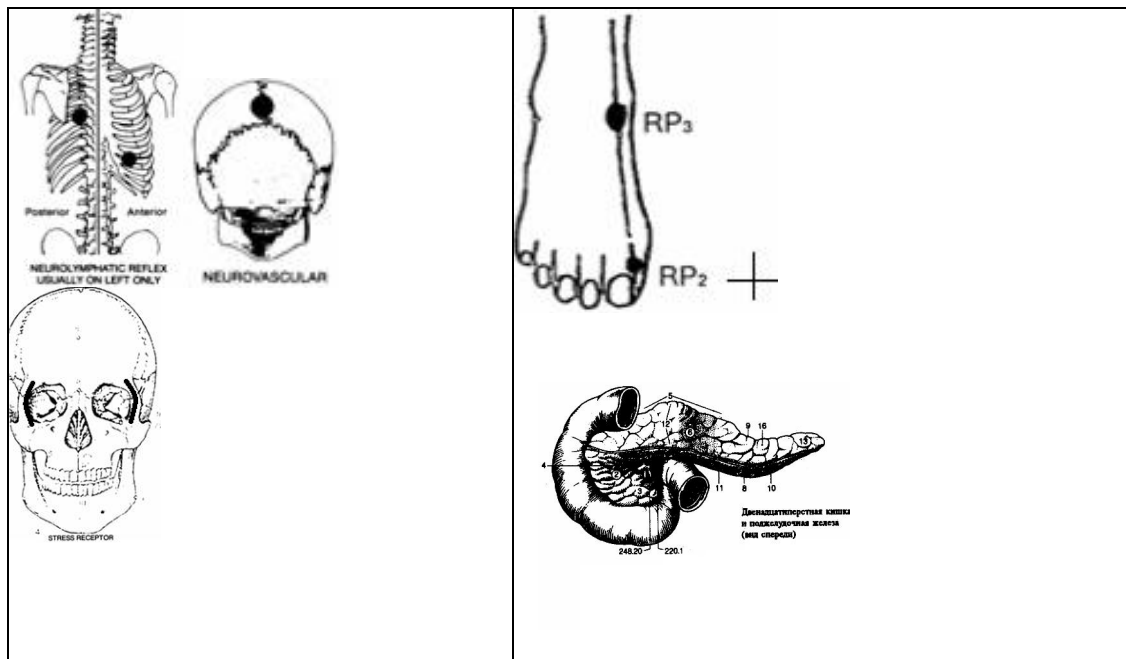
Nerve supply: spinal accessory and ventral ramus, C2, 3, 4. Neurolymphatic:

Anterior: 7th intercostal space on left.

Posterior: between T7, 8 near lamina on left. Neurovascular: 1" above lambda. Nutrition: spleen concentrate or nucleoprotein extract, vitamin C, calcium. Meridian association: spleen. Organ/gland association: spleen.

### 13. Latissimus Dorsi





Origin: a broad aponeurosis by which it originates from the lower six thoracic vertebrae, spinous processes, lumbar spinous processes, posterior crest of the ilium, lower three or four ribs, and an attachment to the tip of the scapula.

Insertion: twists upon itself to insert into the floor of the intertubercular groove of the humerus. Action: extends, adducts, and rotates the humerus internally; draws the inferior angle of the scapula inferi-orly and medially.

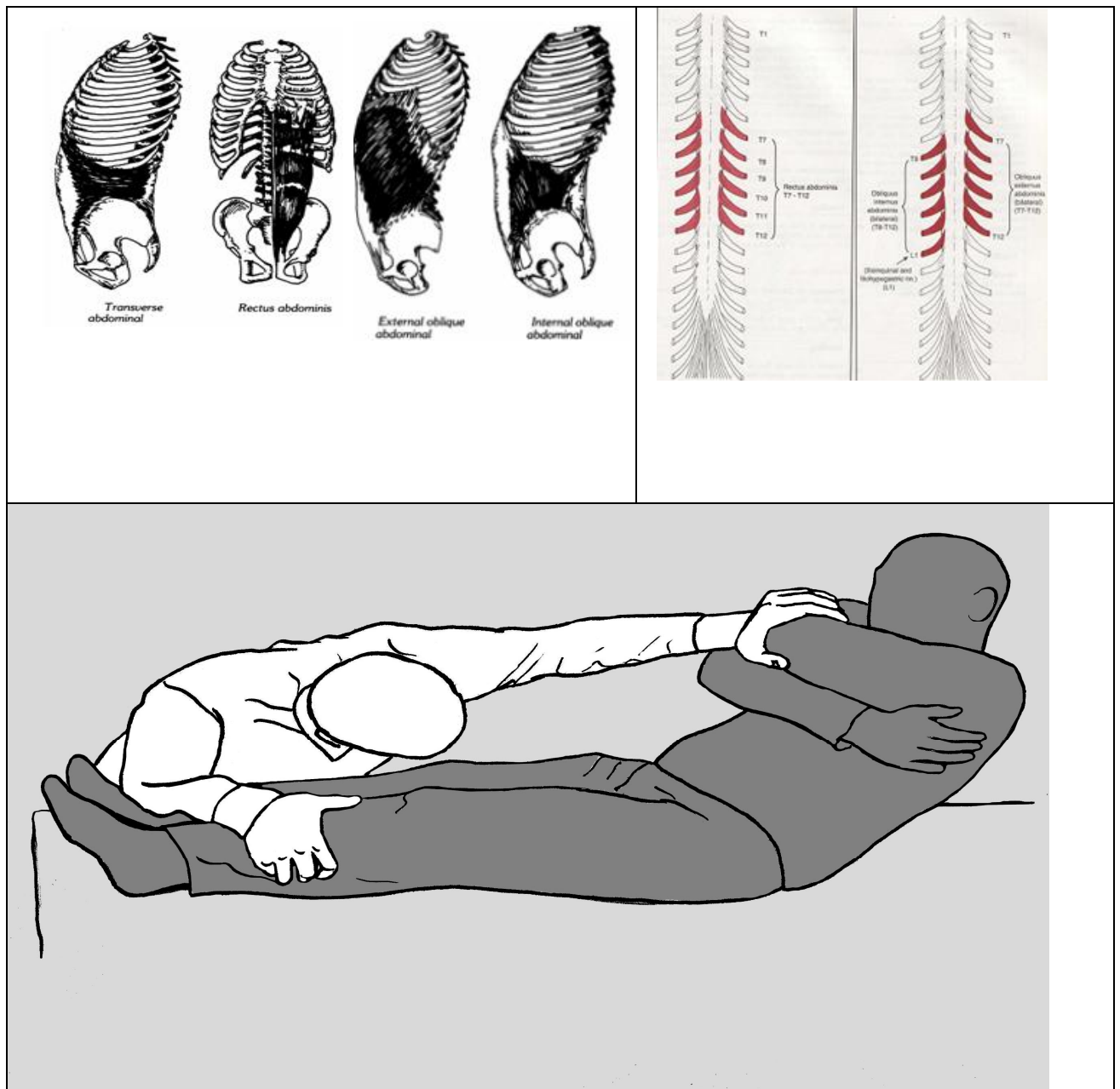
Test: The standing or seated patient holds his arm in adduction, with internal rotation, so the antecubital fossa faces medially. The examiner directs pressure to the patient's wrist in a direction to abduct and slightly flex the shoulder. Care should be taken that the pressure against the wrist does not cause pain to the patient. The examiner must avoid touching the meridian pulse points of the wrist, which are located along the radial artery, accidentally causing therapy localization. Nerve supply: thoracodorsal from brachial plexus, C6, 7,8. Neurolymphatic:

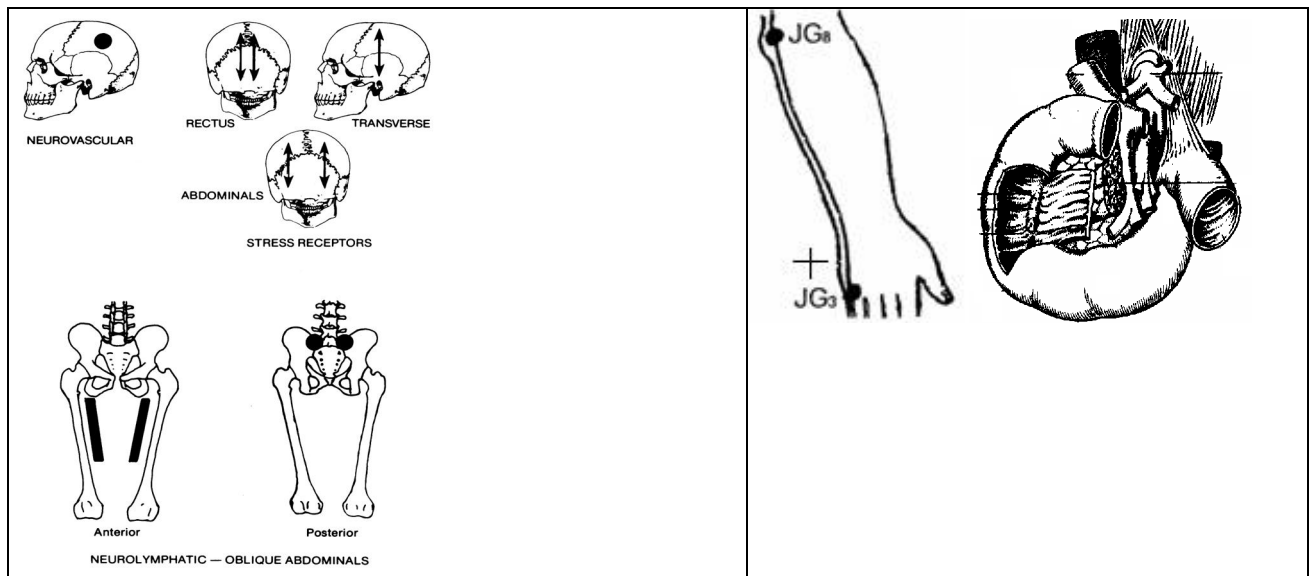
Anterior: 7th intercostal space on left at rib cartilage junction.

Posterior: between T7, 8 at lamina on left. (Note: Generally both latissimus dorsi muscles will be affected by the left neurolymphatic reflexes. Occasionally the neurolymphatic reflex may be on the

right, influencing the right muscle; if so, evaluate the patient for switching, which may or may not be present.) Neurovascular: superior to temporal bone on a line slightly posterior to the external auditory meatus. Nutrition: vitamins A, F (unsaturated fatty acids) and betaine; pancreas concentrate or nucleoprotein extract. Meridian association: spleen. Gland association: pancreas

## 14. Abdominals





Transverse Abdominal Origin: lateral third inguinal ligament, anterior three-quarters of the internal edge of the iliac crest, lumbo-dorsal fascia, and from the inner surfaces of the lower six costal cartilages.

Insertion: into the linea alba aponeurosis, which passes behind the rectus abdominis.

Action: constricts abdominal contents. Assists in forced expiration and stabilizes linea alba.

Rectus Abdominis Origin: from the crest of the pubis and the symphysis pubis.

Insertion: into the costal cartilage of the 5th, 6th, and 7th ribs and the side of the xiphoid process. Action: in standing position, supports organs anteriorly. By way of supporting organs and holding rib cage and pubis together, gives anterior support to the lumbar spine. With aid of gluteus maximus, keeps pelvis from going into anterior tilt.

External Oblique Abdominal Origin: from the external inferior borders of the lower eight ribs. The five superior attachments interdigitate with the serratus anticus, and the lower three interdigitate with the latissimus dorsi and their attachments. Insertion: into the anterior half of the outer lip of the iliac crest and a broad aponeurosis, which ultimately inserts into the linea alba.

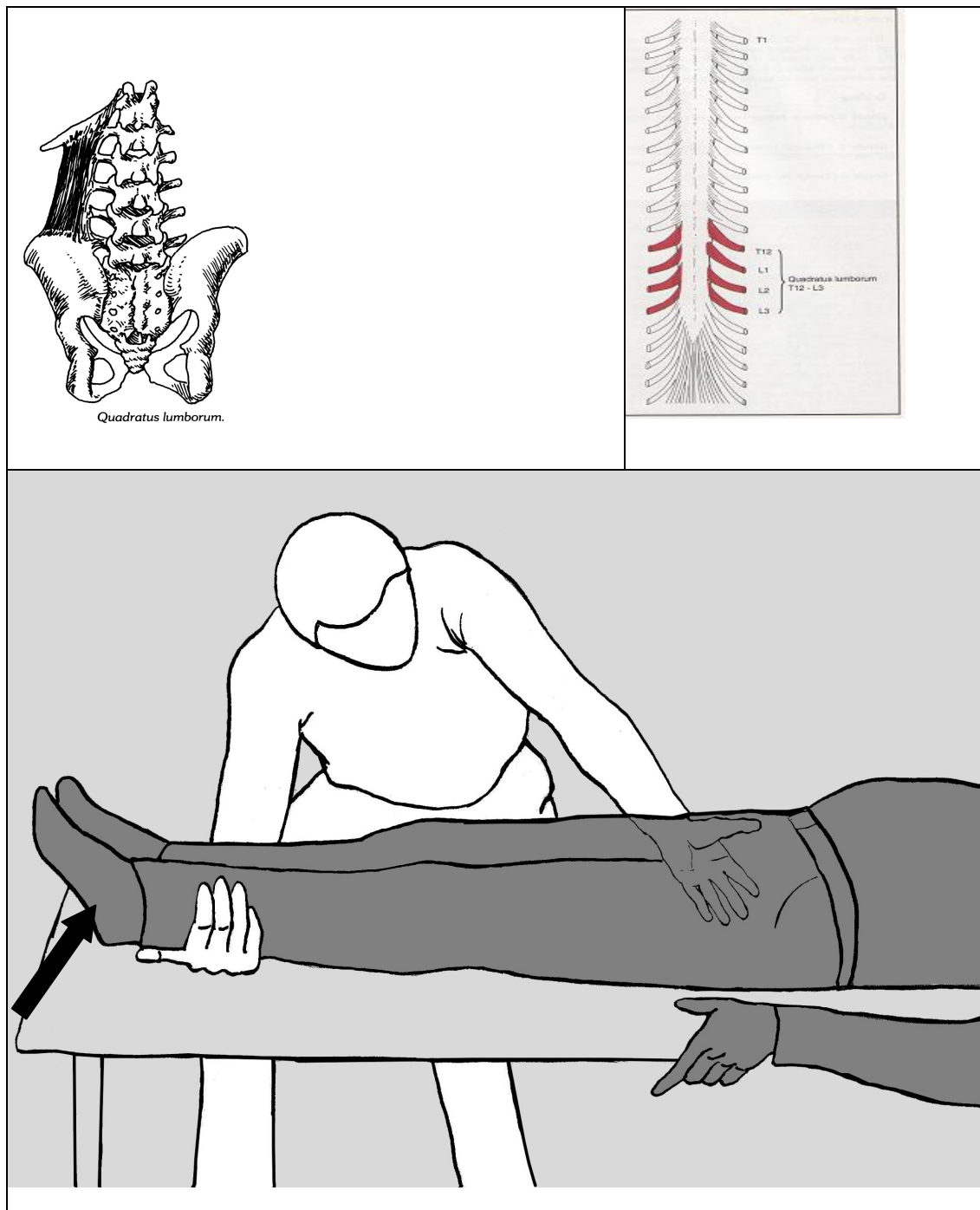
Action: anterolateral abdominal wall stability, giving support to the organs and anterior support to lumbar spine. Flexes vertebral column when acting together, and draws pubis toward xiphoid process. Assists rectus abdominis in obtaining anterior pelvic stability with the gluteus maximus. Unilateral action assists in lateral bending, or rotates the vertebral column, bringing the shoulder of the same side forward.

Internal Oblique Abdominal Origin: from lateral half of the inguinal ligament, from the anterior two-thirds of the intermediate line of the iliac crest, and from the lower portion of the lumbar aponeurosis near the crest.

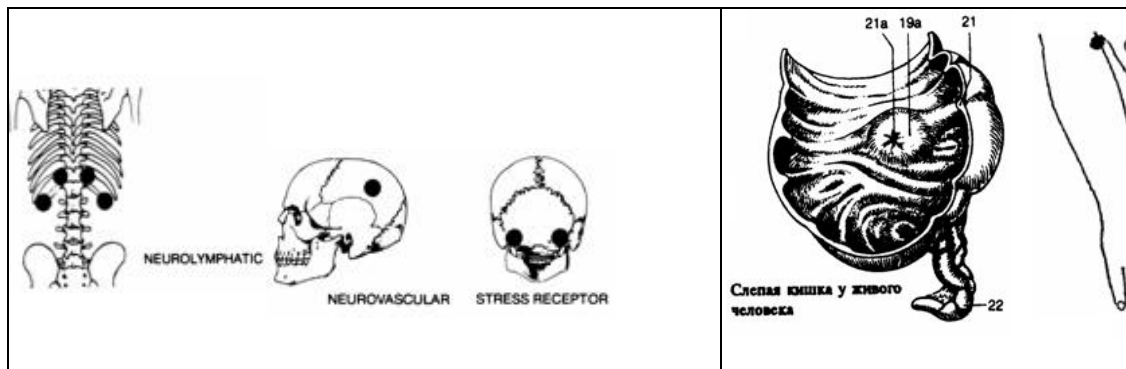
Insertion: inferior borders of the lower three or four costal cartilages and into an aponeurosis that terminates in the linea alba.

Action: compresses the abdominal contents, supporting the viscera and giving anterior stability to the lumbar spine. Aids in bringing pelvis and thorax together as well as flexing the lumbar spine when acting together. Acting unilaterally, laterally flexes the vertebral column and rotates it, bringing the shoulder of the opposite side forward.

## 15. Quadratus Lumborum







Origin: iliolumbar ligament, posterior part of the iliac crest.

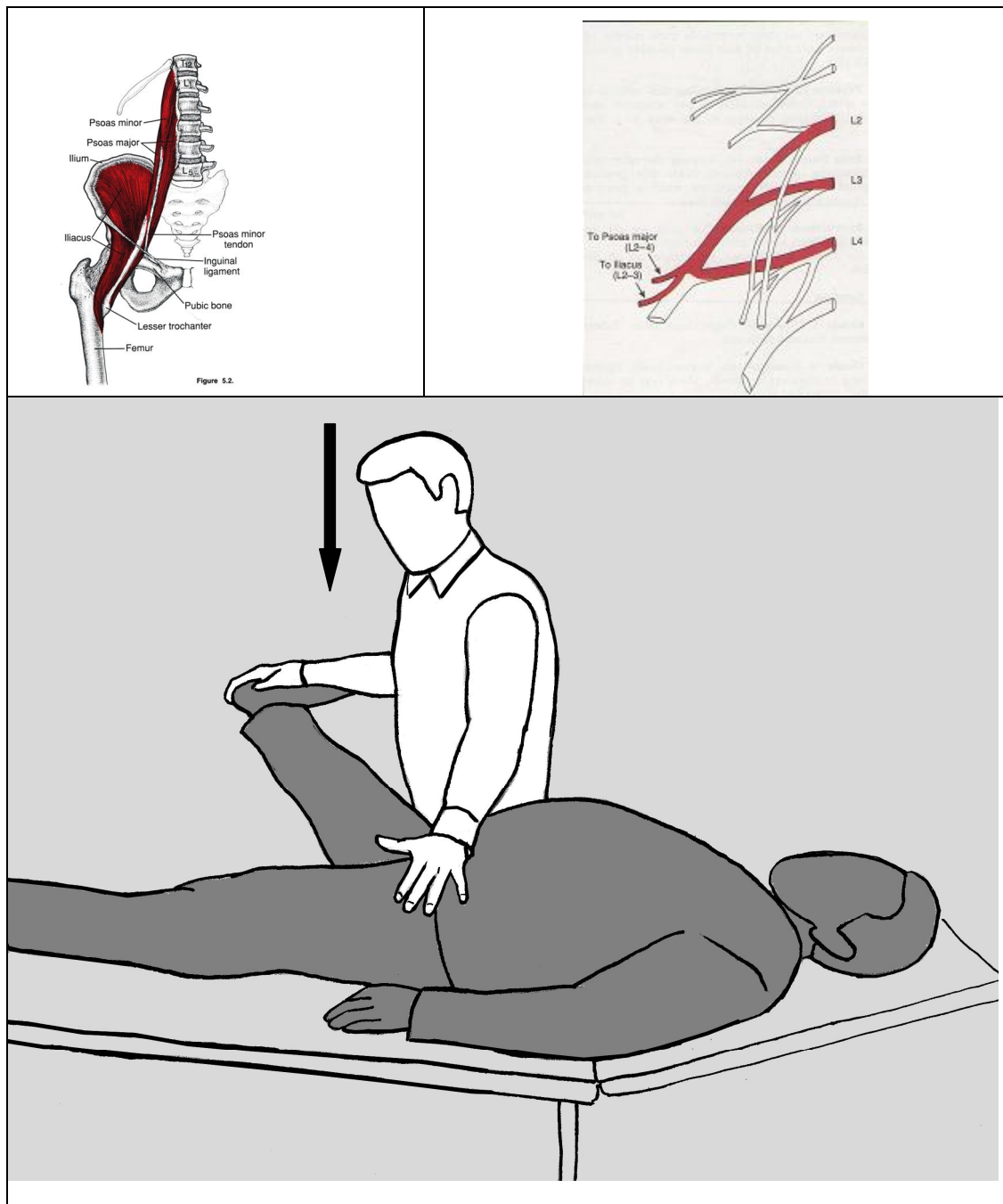
Insertion: inferior border of the last rib and transverse processes of the upper four lumbar vertebrae.  
 Action: laterally flexes lumbar vertebral column; depresses last rib; helps action of the diaphragm in inspiration. Test: The supine patient laterally flexes the pelvis in relation to the trunk. The legs stay in alignment with the pelvis to be 10° from the center line of the patient's trunk. The legs are used as levers to impart motion to the pelvis. The examiner contacts the patient's ankles by reaching under the legs. The test pressure is directed to bring the legs to the center line of the table. The examiner must observe for separation of the crest of the ilium and the thoracic cage, indicating a failure of the quadratus lumborum to hold the pelvis in a laterally flexed position with the lumbar spine.

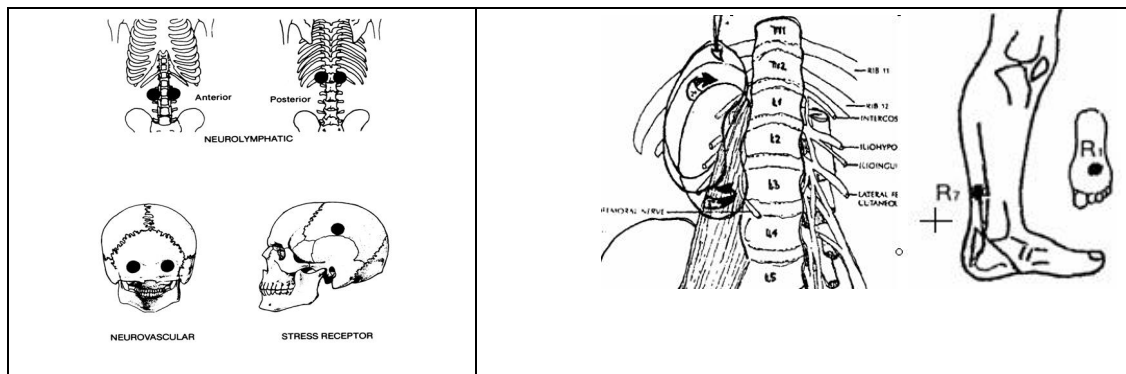
Nerve supply: lumbar plexus T12, L1, 2, 3. Neurolymphatic:

Posterior (two): at end and upper edge of the 12th

rib, laminae of T11. Neurovascular: on parietal eminence, posterior aspect Nutrition: vitamins E, C, and A. Meridian association: large intestine. Organ association: appendix.

## 16. Iliopsoas





## Iliacus

Origin: upper two-thirds of the iliac fossa; internal border iliac crest; anterior sacroiliac, lumbosacral and iliolumbar ligaments; ala of sacrum. Insertion: lesser trochanter of the femur with psoas major.

Action: with the psoas, flexes thigh; minimal activity on rotation of thigh.

Test: The supine patient places the leg in a position similar to that for the psoas test, only with greater hip flexion and abduction. The examiner makes contact at the anteromedial distal femur or at the ankle, depending on the amount of leverage required. The force is directed toward hip abduction and extension.

Nerve supply: femoral nerve, L1, 2, 3.

Neurolymphatic:

Anterior: 1" above umbilicus and 1" from midline.

Posterior: T12, L1 between spinous and transverse

processes. Neurovascular: 1-1/2" lateral to external occipital protuberance.

Nutrition: vitamins A and E, kidney concentrate or nucleoprotein extract. Meridian association: kidney.

Organ association: kidney.

## Psoas

Origin: anterior surface of transverse processes, lateral border of vertebral bodies and corresponding intervertebral discs T12 through L5.

Insertion: lesser trochanter of the femur with the iliacus. Action: flexes and gives minimal action in external rotation and abduction of the thigh. Test: The supine patient flexes and

abducts the hip with external thigh rotation. Force is directed against the anteromedial aspect of the leg in a direction of extension and slight abduction. The point of the examiner's contact on the leg depends on the amount of leverage required for the test. On most individuals, adequate leverage is achieved by contacting slightly proximal to the knee. On very strong individuals use a longer leverage, contacting at the ankle. The direction of pressure should be vectored between the activity of the rectus femoris and the adductors.

Nerve supply: lumbar plexus, L1, 2, 3, 4.

Neurolymphatic:

Anterior: 1" above umbilicus and 1" from midline.

Posterior: T12-L1 between spinous and transverse processes.

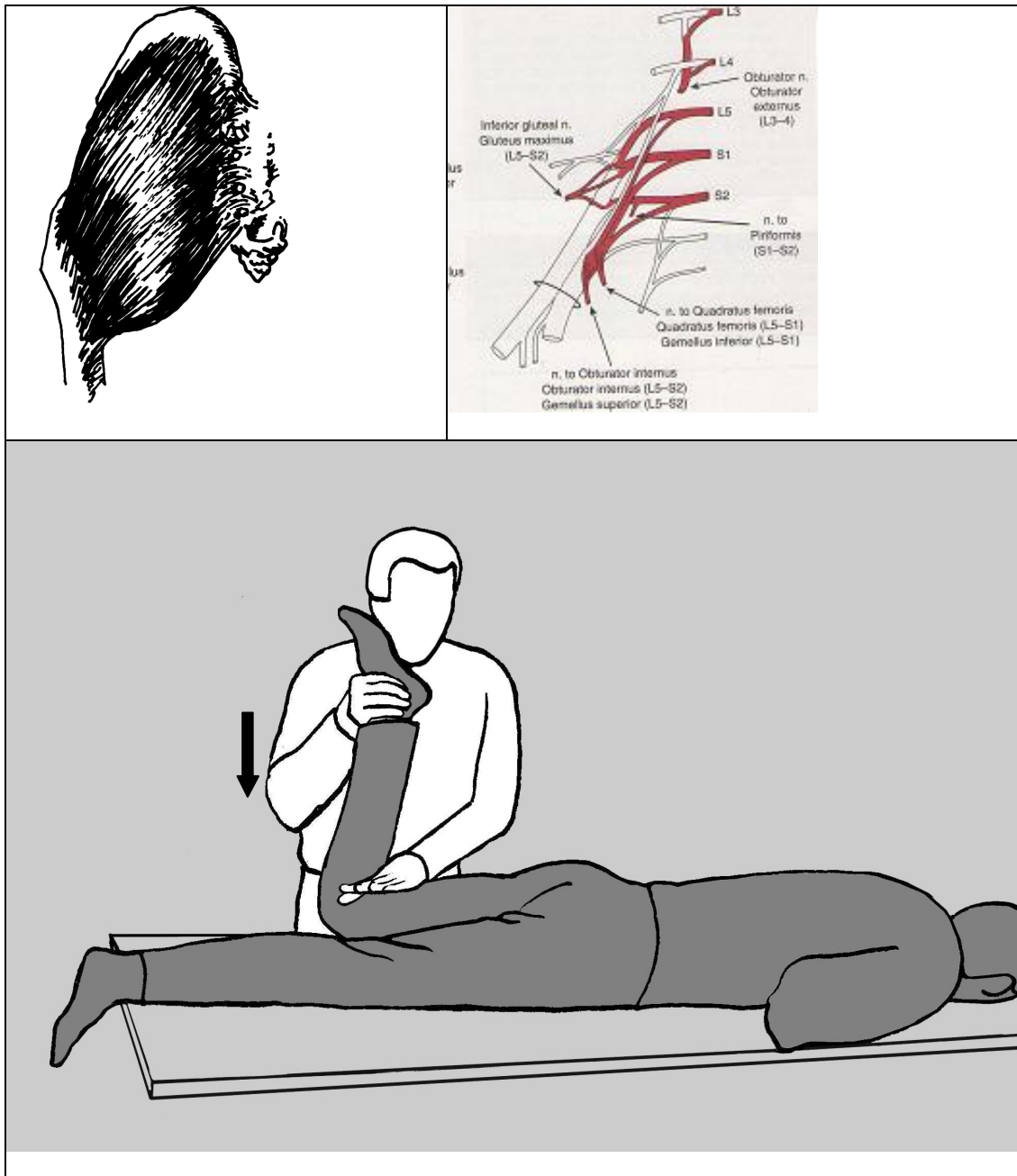
Neurovascular: 1-1/2" lateral to external occipital protuberance.

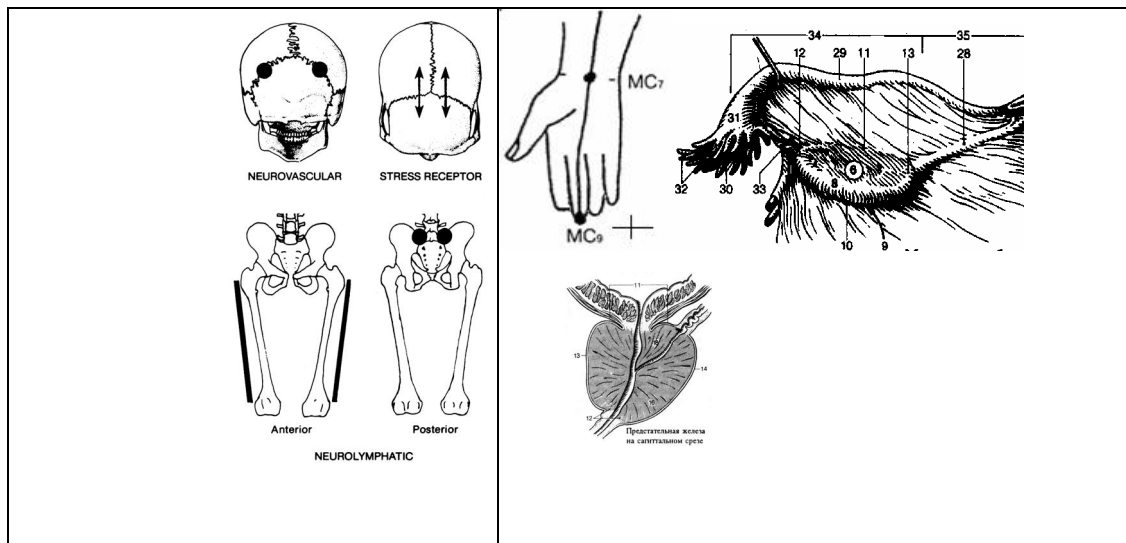
Nutrition: vitamins A and E, kidney concentrate or nucleoprotein extract.

Meridian association: kidney.

Organ association: kidney.

## 17. Gluteus maximus





Origin: posterior gluteal line of ilium, tendon of sacrospinal, dorsal surface of sacrum and coccyx, and sacrotuberus ligament.

Insertion: gluteal tuberosity of femur and iliotibial tract of fascia lata.

Action: extends hip, assists in externally rotating the thigh. Test: The supine patient flexes the knee and extends the hip. The knee flexion is necessary to help take the hamstrings out of the test. The examiner directs pressure on the distal one-third of the femur in a direction of hip flexion. Observe for adequate pelvic fixation to the trunk by the trunk extensors and oblique abdominal musculature.

Nerve supply: inferior gluteal, L4, 5, S1, 2. Neurolymphatic:

Anterior: anterolateral thigh.

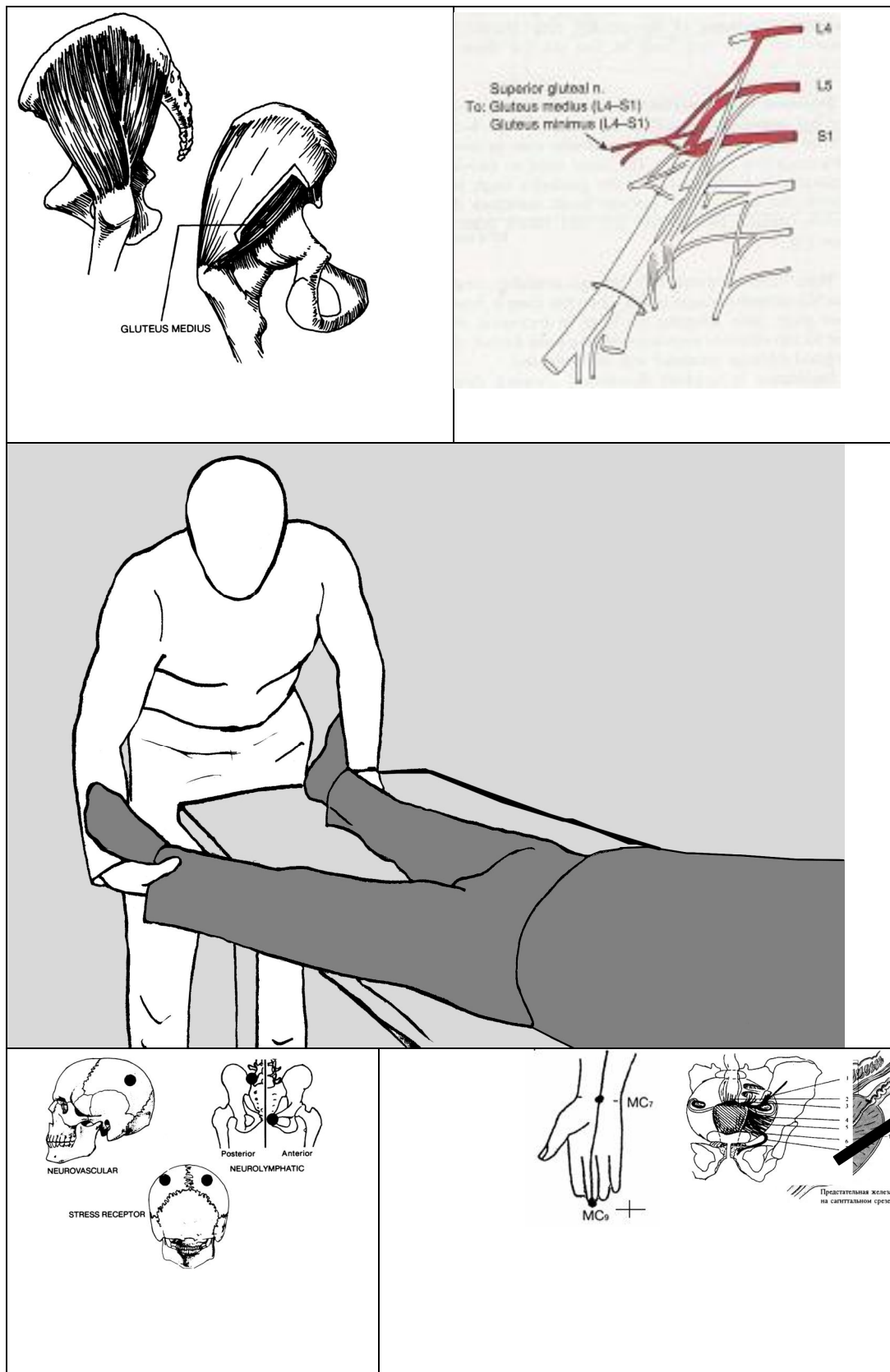
Posterior: between posterior superior iliac spine and

L5 spinous. Neurovascular: on the lambdoidal suture midway between lambda and asterion.

Nutrition: vitamin E, male or female endocrine concentrates or nucleoprotein extracts.

Meridian association: circulation sex. Organ/gland association: reproductive organs or glands.

## 18. Gluteus Medius/Gluteus Minimus



Gluteus Medius Origin: outer surface of ilium from iliac crest and posterior gluteal line above, to anterior gluteal line below, gluteal aponeurosis.

Insertion: lateral surface of greater trochanter. Action: abducts thigh and rotates it internally. With gluteus minimus is major lateral pelvic stabilizer. Aids in early activity of hip flexion.

Gluteus Minimus Origin: outer surface of ilium between anterior and inferior gluteal lines and margin of greater sciatic notch. Insertion: anterior border of greater trochanter. Action: abducts thigh and rotates it internally; assists gluteus medius in most functions. Test (both): The side-lying patient flexes the hip and knee of the lower non-tested leg for stability. The examiner stabilizes the pelvis to prevent rotation. The patient abducts the hip with slight extension, keeping the knee in extension. Pressure is directed against the knee or ankle, depending on leverage required, in a direction of adduction and slight flexion. The patient's effort to shift the pelvis indicates substitution of the tensor fascia lata or gluteus maximus muscle.

Nerve supply: superior gluteal, L4, 5, S1. Neurolymphatic:

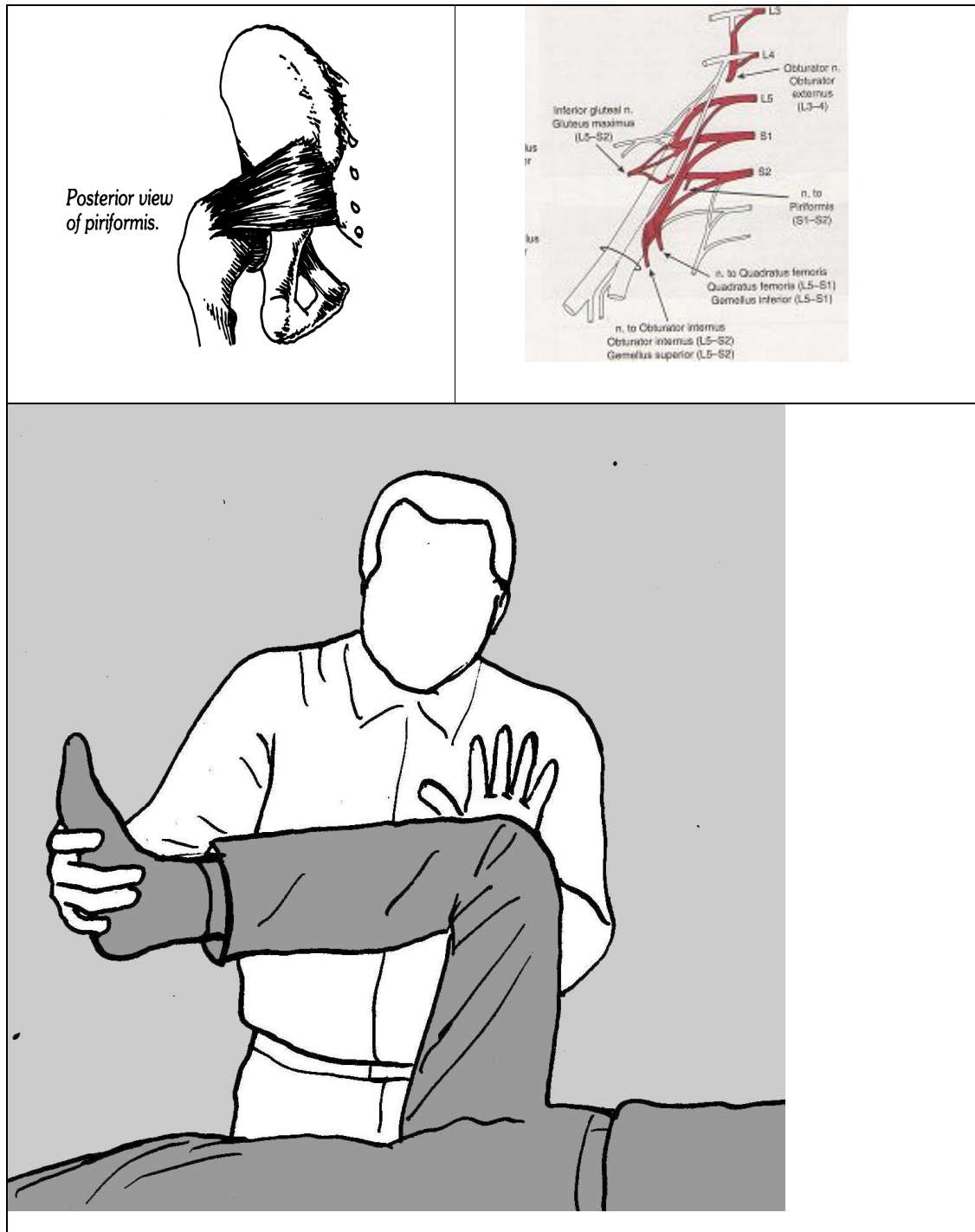
Anterior: upper symphysis pubis.

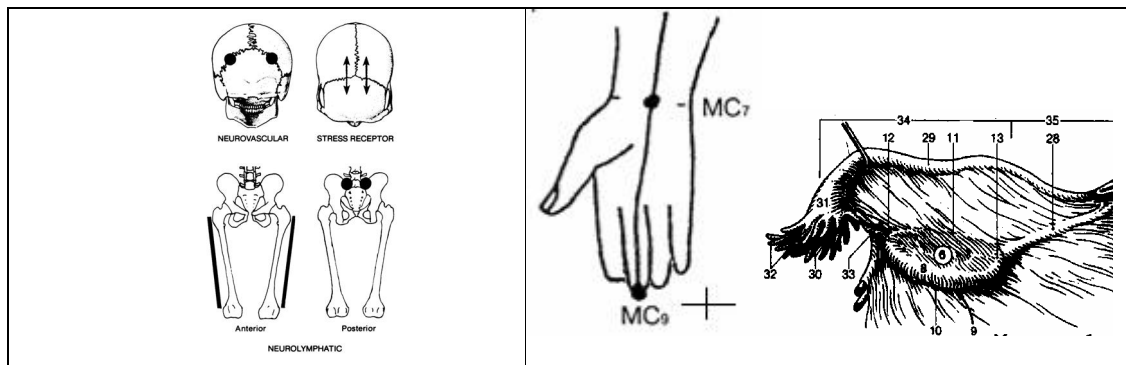
Posterior: between posterior superior iliac spine and

L5 spinous process. Neurovascular: on parietal eminence, posterior aspect. Nutrition: vitamin E, male or female endocrine nucleo-protein extracts or concentrates. Meridian association: circulation sex. Organ/gland association: reproductive organs and glands.



## 19. Piriformis





Origin: anterior surface of sacrum between — and lateral to — anterior sacral foramen, capsule of sacroiliac articulation, margin of greater sciatic foramen, and sac-rotuberous ligament.

Insertion: superior border of greater trochanter of femur. Action: rotates thigh externally, abducts thigh when limb is flexed. Test:

Sitting: The patient's knee is flexed to 90°, and the thigh is externally rotated. Pressure is directed toward the distal leg to internally rotate the thigh while the patient resists.

Prone: The patient flexes the knee to 90° and externally rotates the thigh. The thigh is stabilized by the examiner while pressure is directed to the lower leg to internally rotate the thigh.

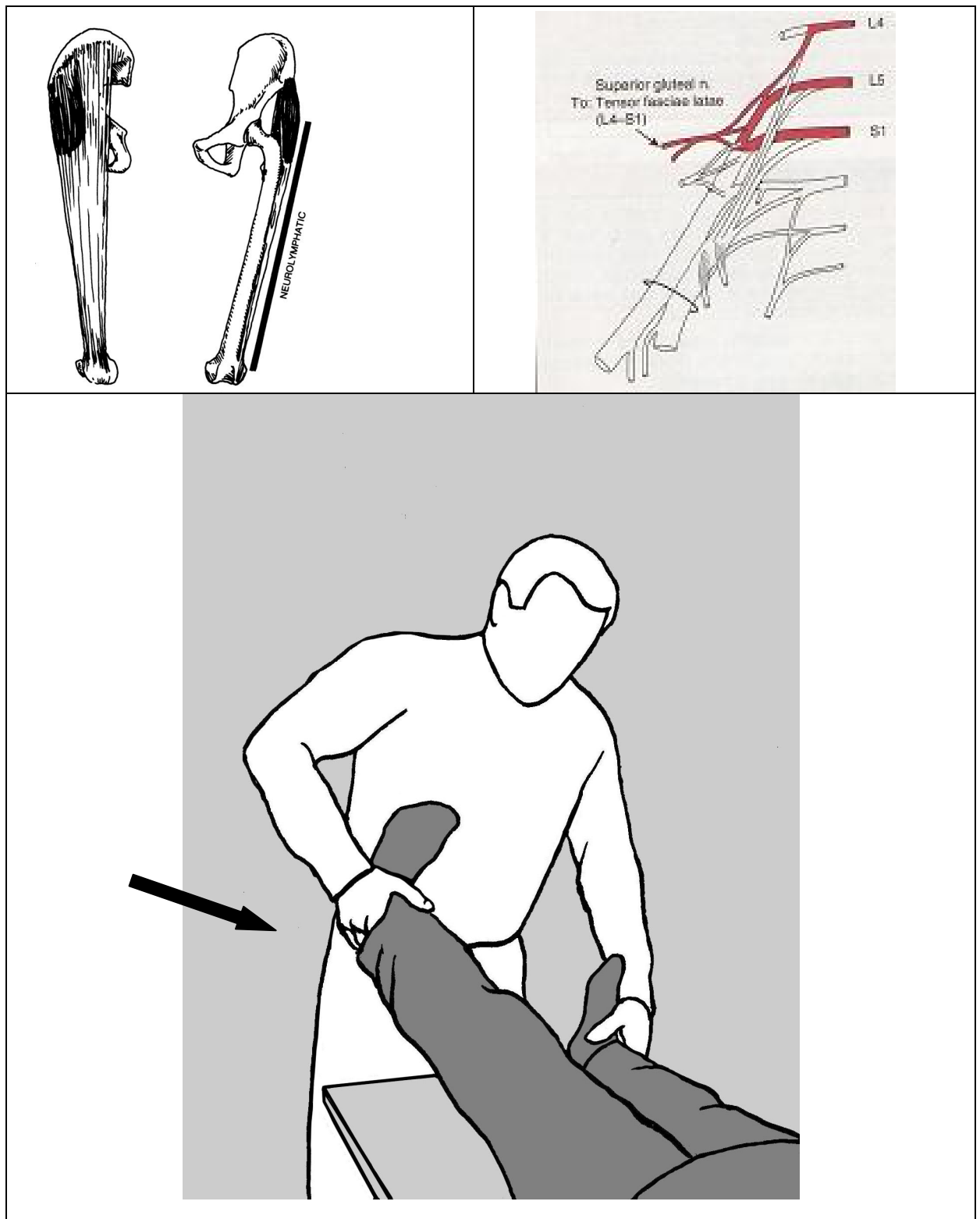
Nerve supply: Sacral plexus, L5, S1, 2.

Neurolymphatic:

Anterior: upper symphysis pubis.

Posterior: between posterior superior iliac spine and L5 spinal pr

## 20. Tensor Fascia Lata



Origin: anterior part of the outer lip of the iliac crest, anterior border of the ilium.

Insertion: middle one-third of the iliotibial tract of the fascia lata.

Action: thigh flexion, abduction, and internal rotation. Tenses fascia lata along with the gluteus maximus, pulling on the iliotibial band and stabilizing the knee laterally. Test: The supine patient holds the leg in a position of abduction, medial rotation, and hip flexion, with the knee in hyperextension. Testing pressure is directed against the lower leg in a direction of adduction and extension. Observe that the patient does not flex the knee during the test.

Nerve supply: superior gluteal, L4, 5, S1.

Neuro lymphatic:

Anterior: anterolateral thigh bilaterally. This neurolymphatic reflex is divided into sections correlating with the sections of the large intestine. Right thigh: upper portion, cecum; middle three-fifths, ascending colon; lower portion, first portion of transverse colon.

Left thigh: lower portion, last three-fifths of transverse colon; lower middle portion, descending colon; upper middle portion, upper sigmoid colon; upper area, junction of sigmoid colon with rectum. Posterior: triangular area with apexes at L2, L4, and the crest of the ilium.

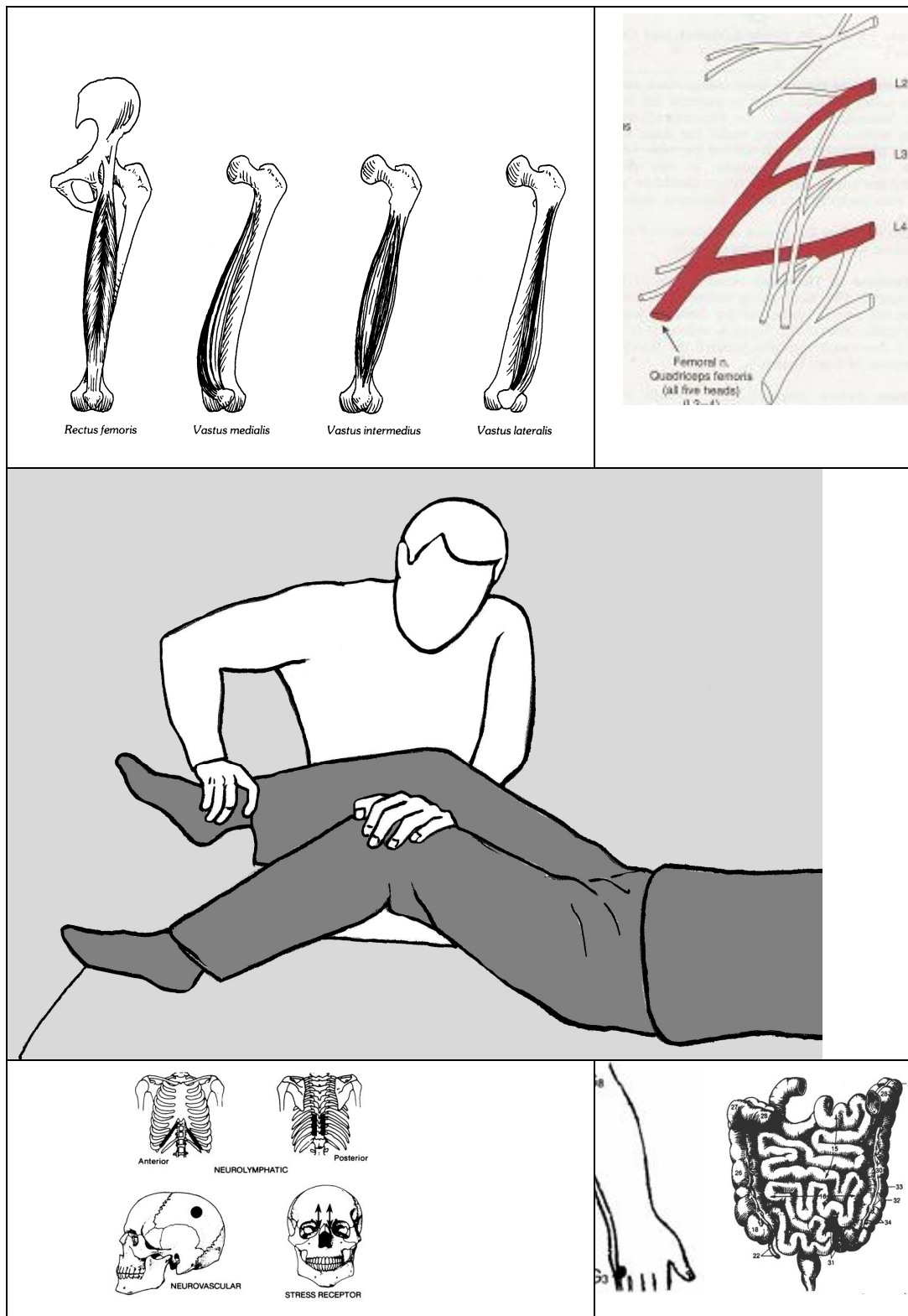
Neurovascular: parietal eminence at the posterior aspect.

Nutrition: acidophilus, vitamin D. If bilateral, evaluate for iron deficiency anemia.

Meridian association: large intestine.

Organ association: large intestine.

## 21. Rectus Femoris / Quadriceps





#### Rectus Femoris Origin:

Straight head: from anterior inferior iliac spine.

Reflected head: from groove on upper brim of

acetabulum. Insertion: upper border of patella with the ligamentum patellae extending to tibial tubercle. Action: extends the leg and flexes the thigh. Test: The examiner directs force against the anterior thigh just proximal to the knee in a direction toward hip extension, ascertaining that no thigh rotation is present and that the knee stays flexed approximately 90°. A slightly built examiner may need to hold the side of the table to provide added power in this test. The psoas is very active in this test and must be evaluated separately to make a comparison with the rectus femoris. Observation of the patient going into the test position reveals considerable information regarding his hip flexor strength.

Vastus Medialis Origin: lower half of the intertrochanteric line, linea aspera, medial supracondylar line, medial intermuscular septum, tendons of adductor magnus and adductor longus. Insertion: medial border of the patella with the ligamentum patellae extending to the tibial tubercle. Action: extends the leg and draws the patella medially.

Vastus Intermedius Origin: proximal two-thirds of the anterolateral surface of the femur, lower half of the linea aspera, upper part of the lateral supracondylar line, lateral intermuscular septum. Insertion: by tendons of the rectus and vastus muscles into the superior border of the patella with the ligamentum patellae extending to the tibial tubercle. Action: extends the leg.

Vastus Lateralis Origin: intertrochanteric line, greater trochanter, gluteal tuberosity, linea aspera, lateral intermuscular septum, capsule of the hip joint.

Insertion: lateral border of the patella with the ligamentum patellae extending to the tibial tubercle. Action: extends the leg and draws the patella laterally. Test (as a group): With the patient seated, the examiner directs pressure against the distal anterior leg just above the ankle in the direction of knee flexion. Care must be taken not to allow the patient to lock the knee in extension. If the table edge is sharp, the examiner should place his hand under the knee to cushion it. The examiner should observe for change of pelvic position during the testing procedure.

Nerve supply: femoral, L2, 3, 4.

Neurolymphatic:

Anterior: along costochondral junction of the 8th-11th ribs. Activity of this linear neurolymphatic is inverse to involvement of the quadriceps muscle divisions. In other words, for the vastus lateralis, neurolymphatic activity will be medial; for the vastus medialis, the activity will be lateral on the reflex area.

Posterior: T8-11 laminae.

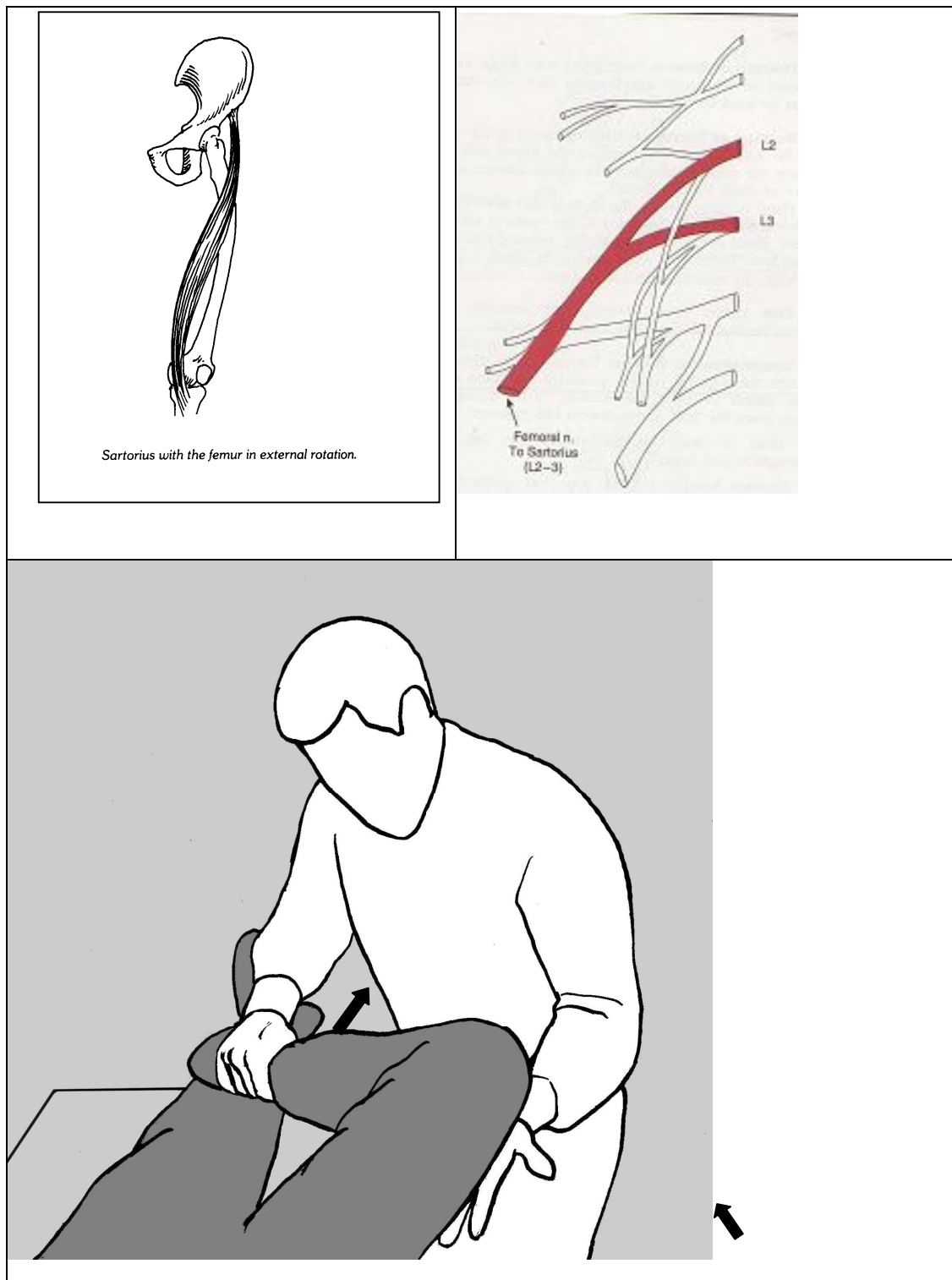
Neurovascular: parietal eminence, posterior aspect.

Nutrition: vitamin D, vitamin B complex, small intestine nucleoprotein extract or concentrate.

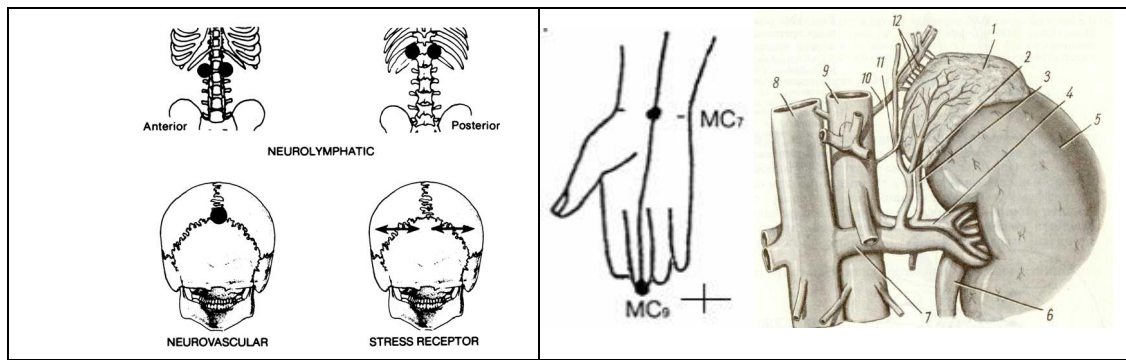
Meridian association: small intestine.

Organ association: small intestine.

## 22. Sartorius







Origin: anterior superior iliac spine, upper half of the iliac notch.

Insertion: upper part of medial surface of the tibia, near the anterior border.

Action: flexes knee and hip, rotates the thigh externally. When knee is flexed, rotates tibia internally. Gives medial support to the knee.

Test: The supine patient flexes the hip and knee with abduction of the hip. The examiner directs force against the anterolateral leg, just proximal to the knee, in a direction of hip extension, adduction, and medial rotation. With the other hand he grasps the posterior ankle and extends the knee. Nerve supply: femoral, L2, 3. Neurolymphatic:

Anterior: 2" above the umbilicus and 1" from the midline.

Posterior: T11, 12 bilaterally near laminae.

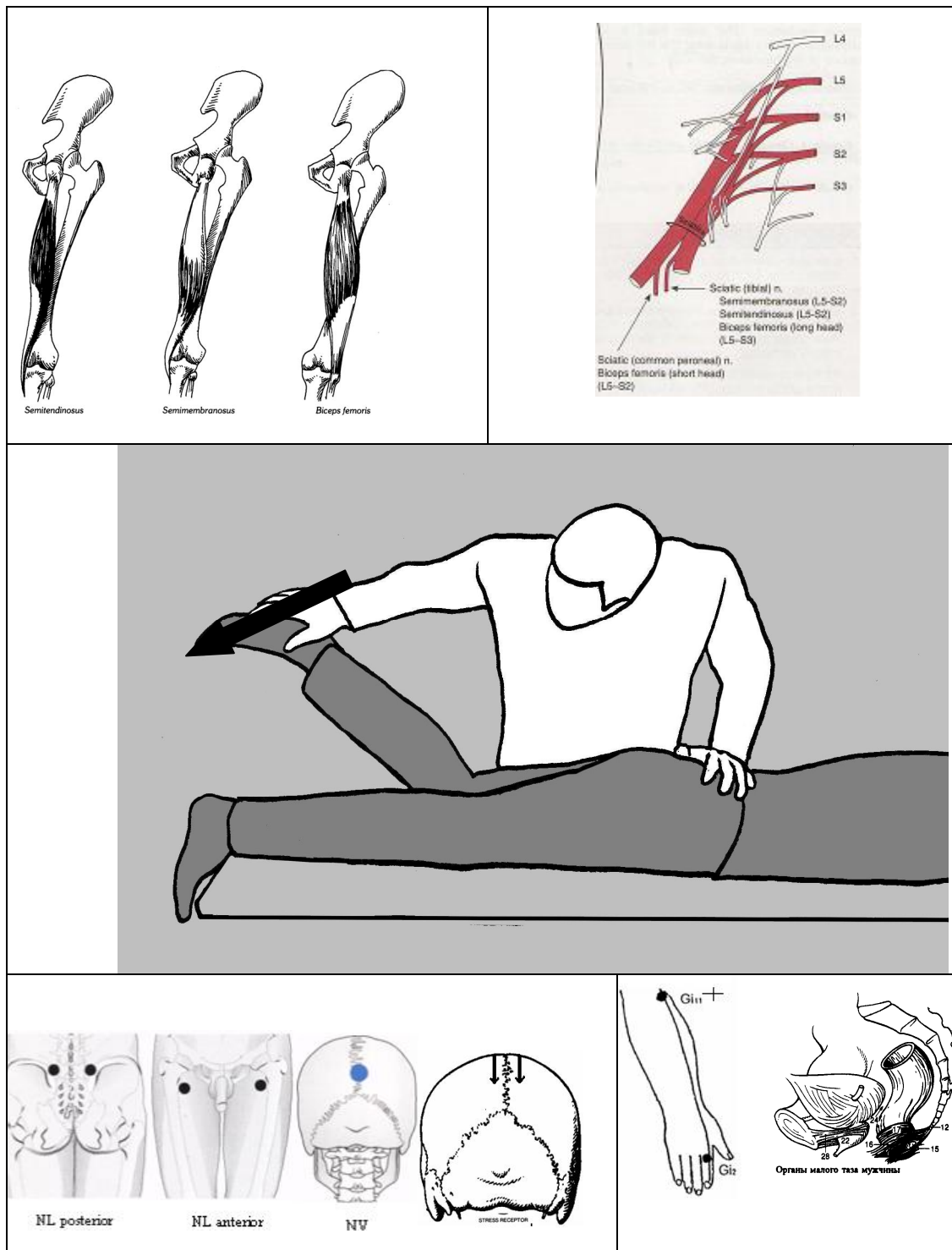
Neurovascular: lambda.

Nutrition: adrenal nucleoprotein extract or concentrate, vitamin C, pantothenic acid.

Meridian association: circulation sex (occasionally triple heater).

Gland association: adrenal.

## 23. Hamstrings

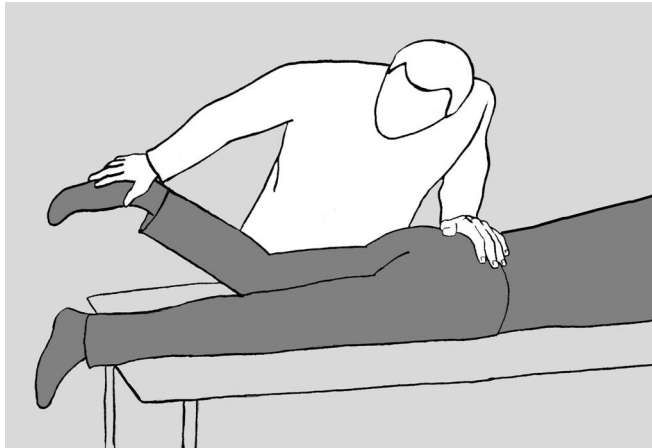


Semitendinosus — Medial Hamstring Origin: ischial tuberosity with tendon of biceps femoris. Insertion: proximal portion of medial surface of the tibia and deep fascia of the leg.

Nerve supply: sciatic (tibial branch, which develops two branches), L4, 5, SI, 2.

Semimembranosus — Medial Hamstring Origin: upper and lateral aspect of ischial tuberosity. Insertion: posteromedial surface of the medial condyle of the tibia.

Action of medial hamstrings: flexes and internally rotates the knee; extends, adducts, and internally rotates the thigh.

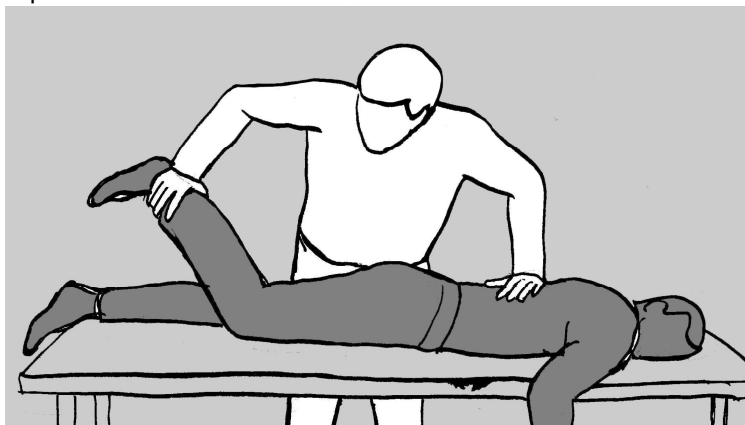


Nerve supply: sciatic (tibial branch), L4, 5, SI, 2. Test for medial hamstrings: Pressure is directed against the distal leg in a direction of knee extension, slightly laterally. The examiner should note the direction of pressure that best raises the medial hamstring tendons and minimizes the raising of the lateral hamstring tendon.

Biceps Femoris — Lateral Hamstring Origin:

Long head: ischial tuberosity and sacrotuberous ligament.

Short head: lateral lip of linea aspera, lateral supracondyle of femur, and lateral intermuscular septum.



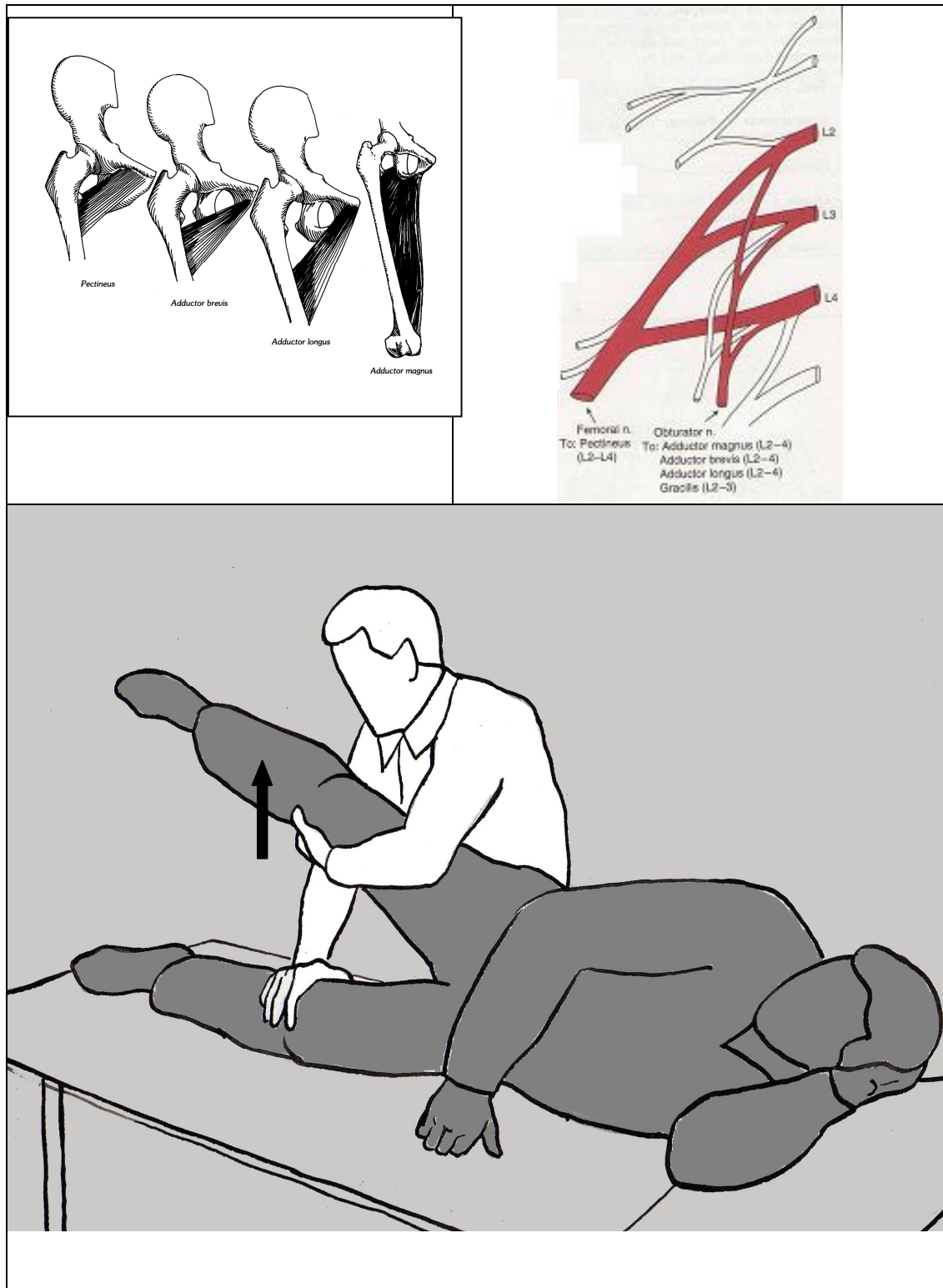
Insertion: lateral side of the head of the fibula, lateral condyle of the tibia, deep fascia on the lateral side of the leg.

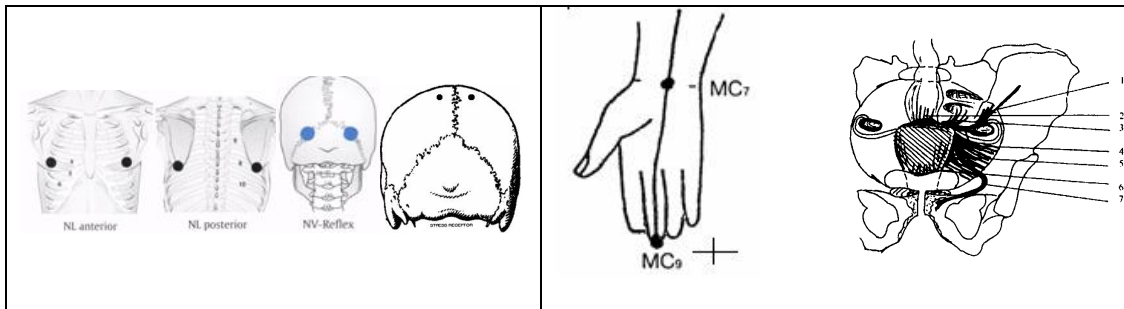
Action: flexes knee, extends thigh, externally rotates the knee joint, externally rotates and adducts thigh. Nerve supply:

Long head: sciatic, tibial branch, L5, SI, 2, 3. Short

head: sciatic, peroneal branch, L5, SI, 2. Test: During the test, the examiner should observe for the direction of pressure that best puts tension on the tendon of the biceps femoris and less tension on the tendons of the semimembranosus and semitendinosus. Observe for muscular contraction of the biceps femoris and diminished contraction of the semimembranosus and semitendinosus muscles by palpation.

## 24. Adductors





Pectineus Origin: superior surface of the pubis between iliopedineal eminence and pubic tubercle.

Insertion: pectineal line from lesser trochanter to linea aspera.

Action: adduction, flexion, and internal rotation of the thigh.

Adductor Brevis Origin: outer surface of inferior ramus of pubis. Insertion: on a line extending from lesser trochanter to linea aspera.

Action: hip adduction, with some assistance in hip flexion.

**Adductor Longus Origin:** anterior of pubis in angle between crest and symphysis.

**Insertion:** middle one-third of medial lip of linea aspera.

Action: adducts thigh with some assistance in hip flexion.

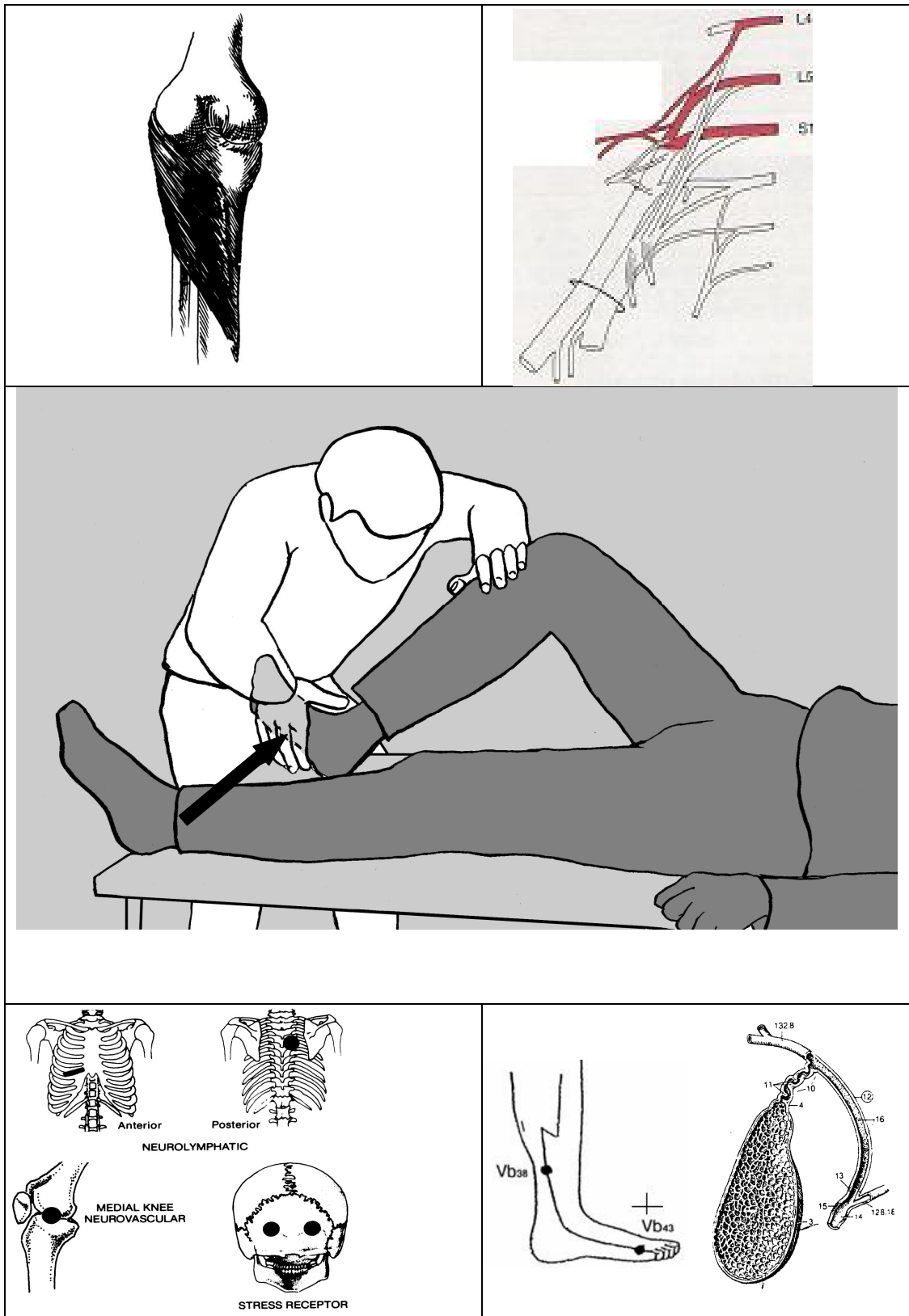
Adductor Magnus Origin:

Posterior fibers: ischial tuberosity.

Anterior fibers: ramus of ischium and pubis. Insertion: from a line extending from the greater trochanter along linea aspera, medial supracondylar line, and ending at the adductor tubercle of the medial condyle of the femur.

Action: adduction in combination with other hip adductors. Fibers arising from ischium and ramus of ischium primarily insert distally and aid in hip extension. Fibers arising from ramus of pubis insert proximally and aid in hip flexion.

## 25. Popliteus



Origin: lateral condyle of femur, posterior horn of lateral meniscus, fibular head.

Insertion: triangular area on posterior surface of tibia above soleal line.

Action: rotates the tibia internally on the femur or the femur externally on the tibia, depending upon the one fixed; withdraws the meniscus during flexion, and provides rotatory stability to the femur on the tibia<sup>2</sup>; brings the knee out of the "screw-home" position of full extension; helps with posterior stability of the knee. Test: With the patient's knee flexed to 90°, pressure is directed on the distal medial foot, with counter-pressure on the calcaneus to impart lateral rotation of the tibia on the femur. The actual testing motion is slight and can be evaluated only by observing the tibia rotating on the femur and watching for motion of the tibial tubercle. It is quite possible for the examiner to obtain foot rotation, appearing to be a weak popliteus; in fact, it may be a twisting of the tibia and fibula. Nerve supply: tibial, L4, 5, S1. Neurolymphatic:

Anterior: 5th intercostal space from mid-mamillary

line to sternum on the right.

Posterior: between T5-6 laminae on right. Neurovascular: medial aspect of knee at meniscus. Nutrition: vitamin A. Meridian association: gallbladder. Organ association: gallbladder.

## Functional muscle connections

| Muscle                    | subluxation | Fixation                 | Connected to organ  | Connected to meridian | Meridian activation time | Connected to teth |
|---------------------------|-------------|--------------------------|---------------------|-----------------------|--------------------------|-------------------|
| Subscapularis             | Th II       | Sternum                  | Heart               | C                     | 11-13                    | 2 upper           |
| Deltoid                   | Th III      | ervico-thoracic junction | Lungs               | P                     | 3-5                      | 3 upper           |
| Popliteus                 | Th IV       | C III-VI                 | Gall Bladder        | VB                    | 21-1                     | 4 upper           |
| <b>Pec Maj Clavicular</b> | Th V        |                          | Stomach             | E                     | 7-9                      | 5 upper           |
| Latissimus Dorsi          | Th VI       |                          | Pancreas            | Rp                    | 9-11                     | 6 upper           |
| Middle trapezius          | Th VII      |                          | Spleen              | Rp                    | 9-11                     | 8 upper           |
| Lower Trapezius           |             | Th XII -LI               | Spleen              | Rp                    | 9-11                     |                   |
| <b>Pec Maj Sternal</b>    | Th VIII     |                          | Liver               | F                     | 1-3                      | 5 upper           |
| Sartorius                 | T IX        |                          | Adrenal             | TR                    | 19-21                    | 6 lower           |
| Quadriceps                | Th X        |                          | Small intestine     | Ig                    | 13-15                    | 7 lower           |
| Ilio-psoas                | Th XII      | C 0-1<br>Gluteus medius  | Kidney              | R                     | 17-19                    | 8 lower           |
| Hip extensors             | LI          |                          | Rectum              | Gi                    | 5-7                      | 5 lower           |
| Qudratus lumborum         | L II        |                          | Appendix            | Gi                    | 5-7                      | 4 lower           |
| Gluteus maximus           | L III       | C I-III                  | Reproductive organs | MC                    | 19-21                    | 3 lower           |
| <b>TFL</b>                | L IV        |                          | Large intestine     | Gi                    | 5-7                      | 2 lower           |
| Piriformis                | LV          |                          | Reproductive organs | MC                    | 19-21                    | 2 lower           |
| Teres Major               |             | Th I - XII               |                     | VG                    |                          |                   |
| Neck extensors            |             | L I-II IKC               |                     | E                     | 7-9                      | 1 lower           |