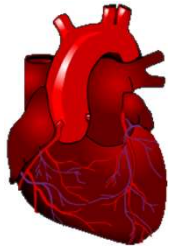
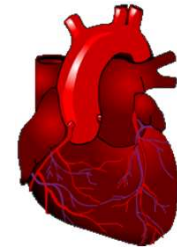




Systematic Anatomy



Locomotor system - Part 5



Introduction of myology

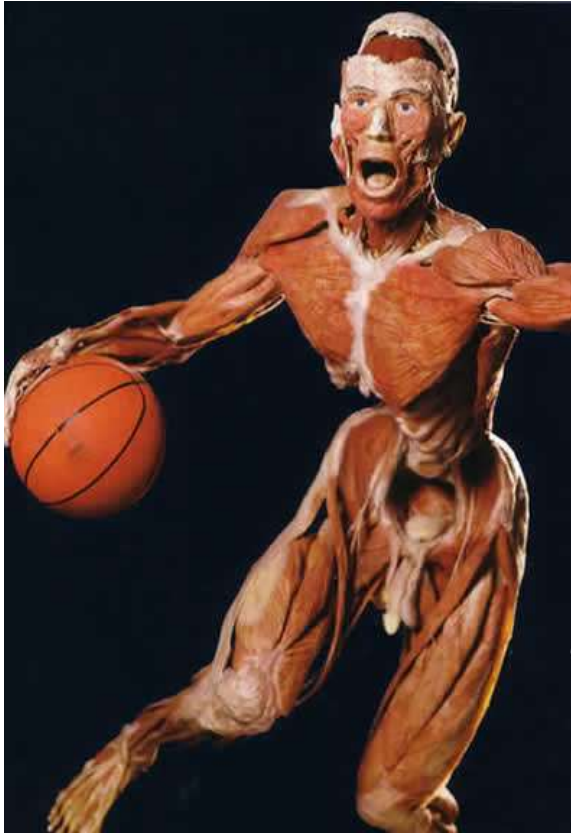
The muscles of head, neck and trunk

Dr.& Prof. Hongqi Zhang (张红旗)

Dept.of anatomy & histoembryology

Email: zhanghq58@126.com

Copy Right- Hongqi ZHANG-Department of Anatomy-Fudan University



Myology

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Real-life Popeye's 31in biceps are the world's biggest

Meet the latest entries into Guinness World Records



From Egypt, Arm circumference 69cm, exercised for 10 year, 1.4kg chicken, 0.5kg steak or fish, Enter the Guinness World Record.

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General description of myology

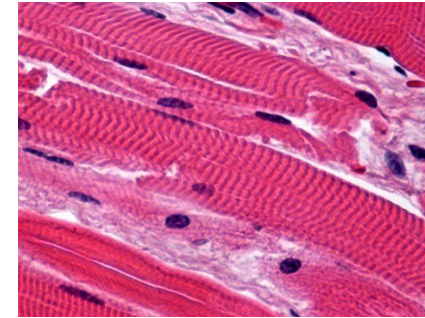
- ◆ The skeletal muscles are the muscles attached to the bone, fascia or skin.
- ◆ Muscles occupy about 40% of body weight.
- ◆ More than 600 muscles in the whole body
- ◆ Each muscle possess a definite shape, structure, location, blood supply & nerve innervation.
- ◆ Each muscle is regarded as a living organ.
- ◆ **Necrosis** (lost blood supply), **Paralysis** (lose nerve innervation), **Developed** (do much exercises) & **Atrophy** (don't use for a long time).

Classification of the muscle according to structure



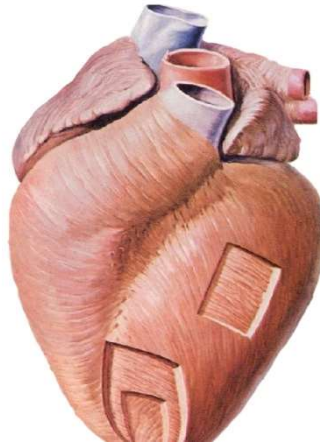
Skeletal muscle
(attach to bones)

**Voluntary
muscle**



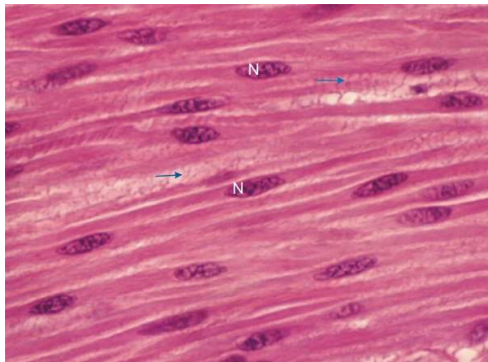
Striated muscle

(Alternating light & dark pattern)



Cardiac muscle (in heart)

**Involuntary
muscle**



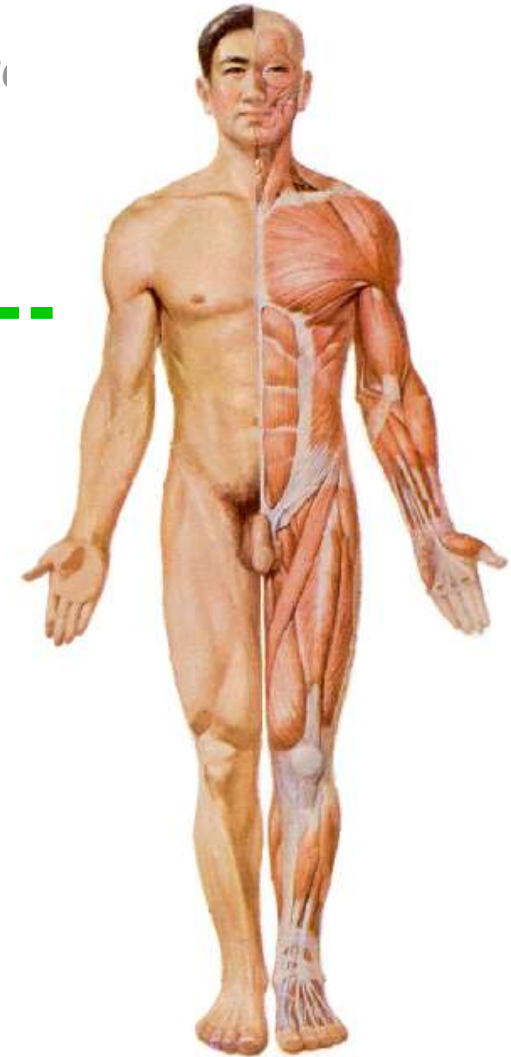
ji Z



Smooth muscle
(in wall of vessel & viscera)

Classification of the muscle according to position

atomy-Fu



◆ Head muscle

◆ Neck muscle

◆ Trunk muscle →

Muscles of back
Muscles of thorax
Diaphragm
Muscles of abdomen
Perineal muscle

◆ Muscle of upper limb

Muscles of shoulder.
Muscles of upper arm
Muscles of forearm
Muscles of hand

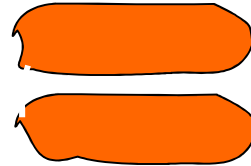
◆ Muscles of lower limb →

Muscles of hip
Muscles of thigh
Muscles of leg
Muscles of foot

Classification of muscle according to shape

Classification

- Long muscle
- Short muscle
- Broad muscle
- Orbicular muscle



Short m.



Broad m.



Orbicular m.
Like annual ring

Long muscle



Biceps

Unipennate

Bipennate

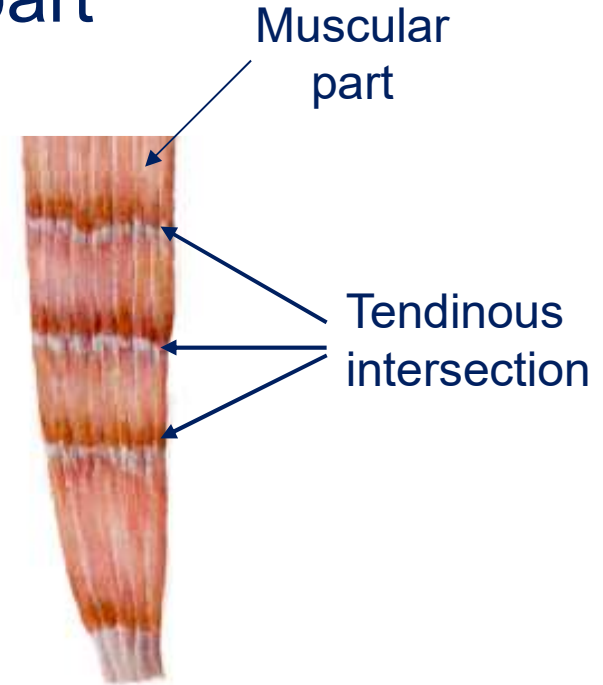
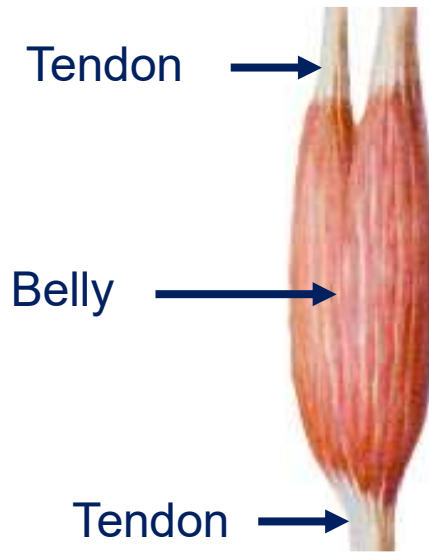
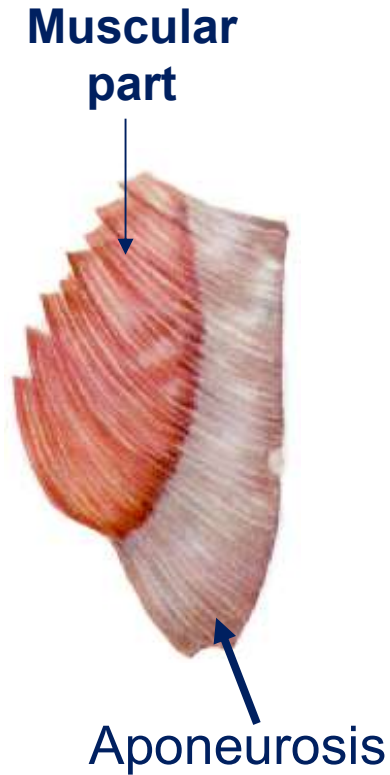
Multipennate

Digastric
muscle

Rectus
abdominis

Multibelly m.

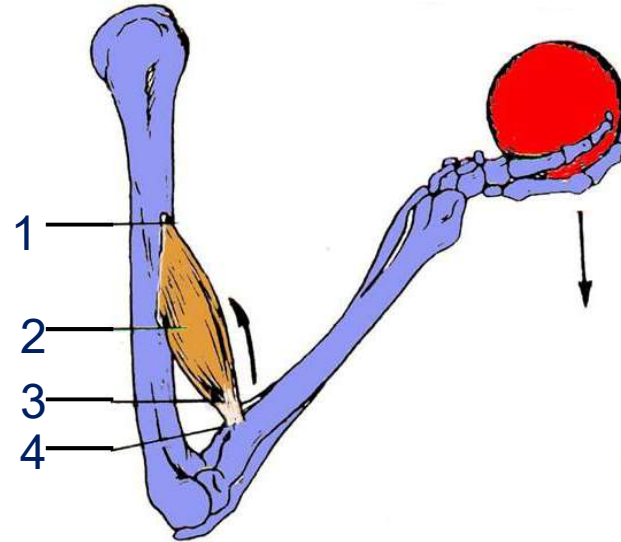
Muscular part & tendinous part



Belly-contractive
Tendon-don't contract

Muscle attachment

- 1-Origin
- 2-Belly
- 3-Tendon
- 4-Insertion



Usually muscle distribute paired
Muscle works as functional groups
Extensor & flexor
Pronator & supinator
Abductor & adductor
Medial rotator. & lateral rotator

Nomenclature of muscles

◆ **Shape:**

Deltoid, trapezius

◆ **Size:**

Major, minor, longus, brevis

◆ **Location**

Pectoralis major,
Intercostal muscle

◆ **Points of attachment**

Sternocleidomastoid m.

◆ **Orientation of fiber**

Rectus, oblique, transverse

◆ **Relative position**

Lateral, medial. internal & external

◆ **Function**

Adductor, flexor, extensor. pronator



Movement of muscle

◆ How to analyze the motion of the muscle

According to origin & insertion of the muscle

Pass the number of joints.

Pass the direction of joints.



Supplementary structures of muscle

- ◆ Fascia
- ◆ Synovial bursa
- ◆ Tendinous sheath
- ◆ Sesamoid bone

Copy

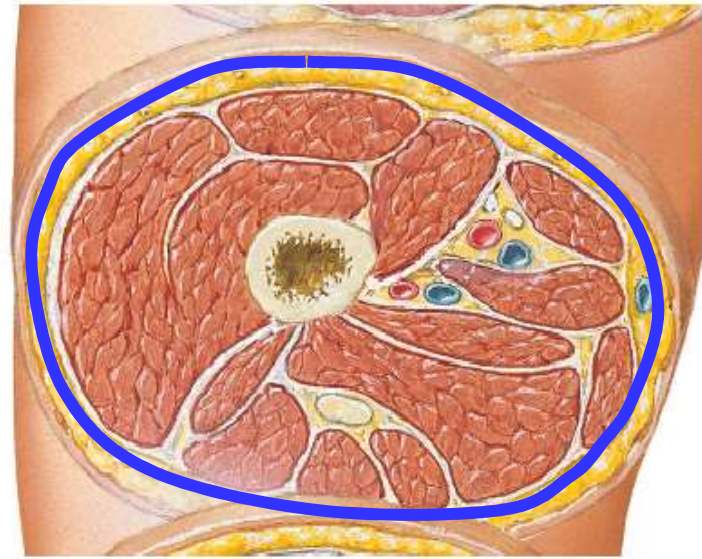
Accessory structure of muscle-Fascia

Superficial Fascia

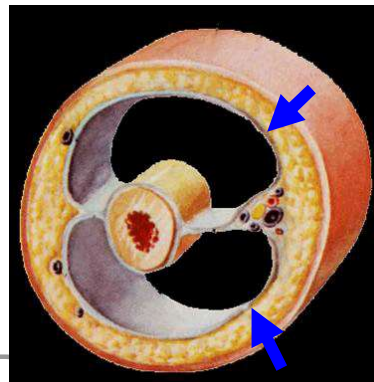
Fat, superficial vein,
lymph vessel, connective T.

Deep Fascia

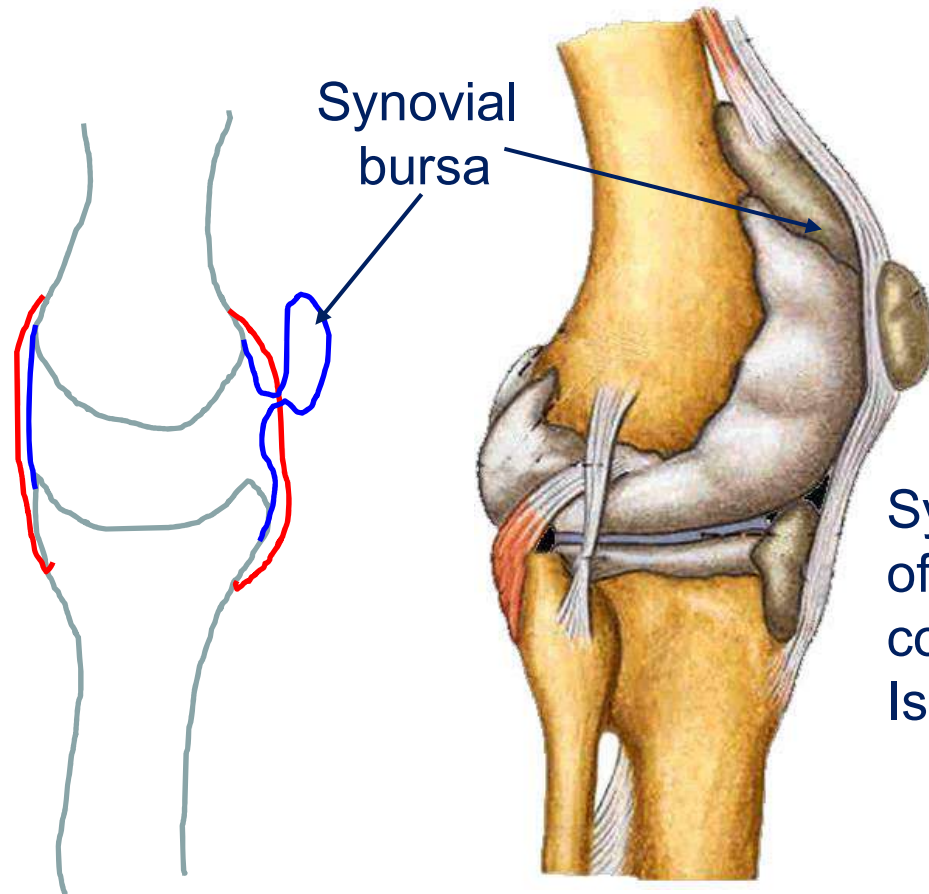
Dense connective T.
Muscular septum
Blood vessel, nerve
Sheath



Right Thigh
Middle cross section



Accessory structure of muscle- Synovial bursa



Synovial bursa is a extension of articular capsule, in which it contain fluid. like a water pad Is between tendon and bone.

Accessory structure of m.- Sesamoid bone

Sesamoid bone generally is located within the tendon, which functions as a pad and make tendon bearing friction

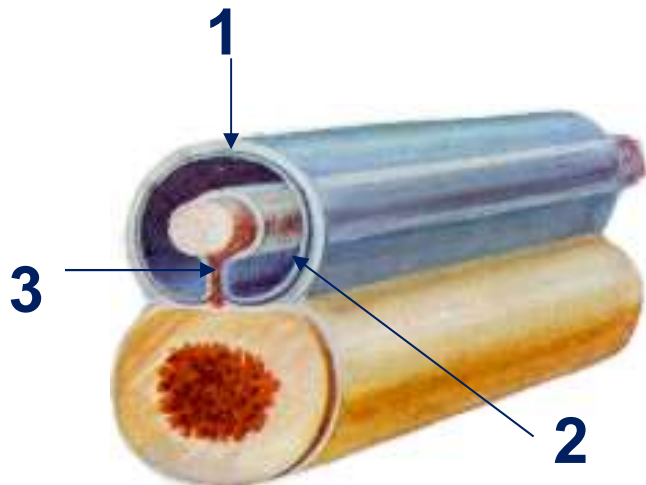


Sesamoid
bone

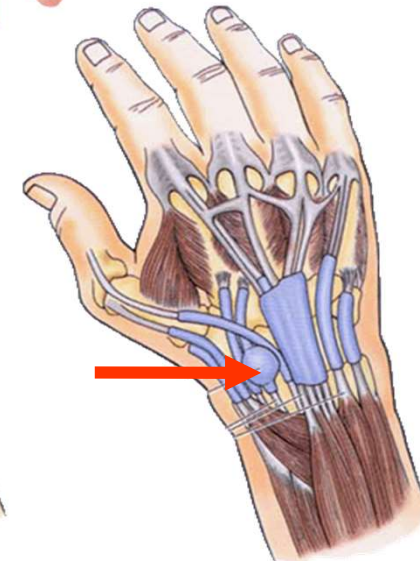
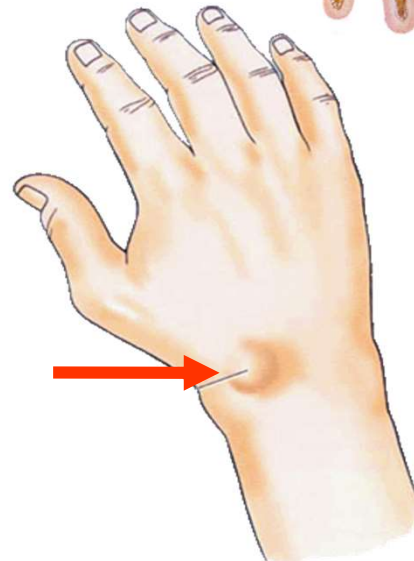
Accessory structure of muscle- tendinous sheath

Tendinous sheath

- 1 - Fibrous sheath
- 2 - Synovial sheath
- 3 - Mesotendon



Cyst

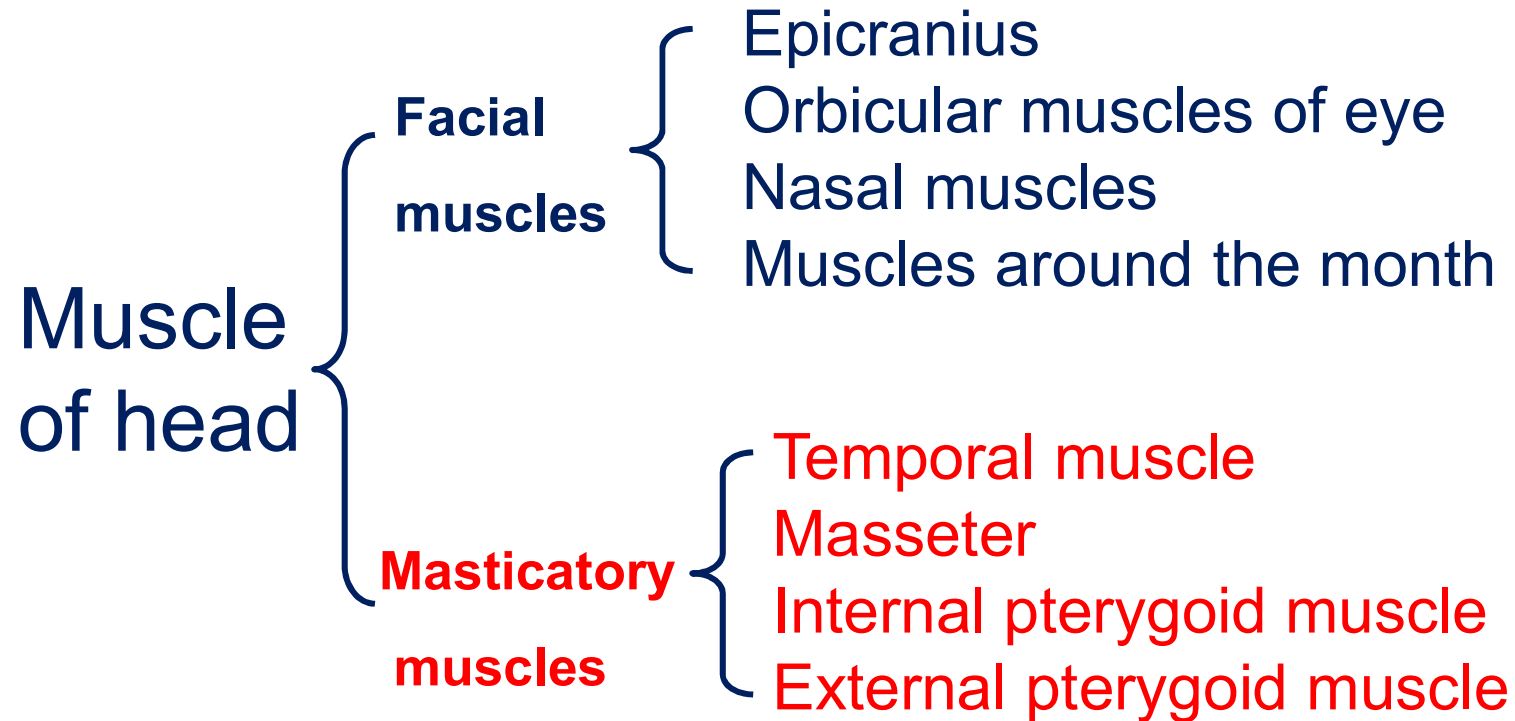


Synovial cyst of wrist

Function of the skeletal muscle

- ◆ Movement
- ◆ Heat production
- ◆ Body support
- ◆ maintenance of posture

Muscles of the Head



Facial muscles

Epicranial muscle

Occipitofrontal muscle

1-Frontal belly

5-Occipital belly

2-Epicranial aponeurosis

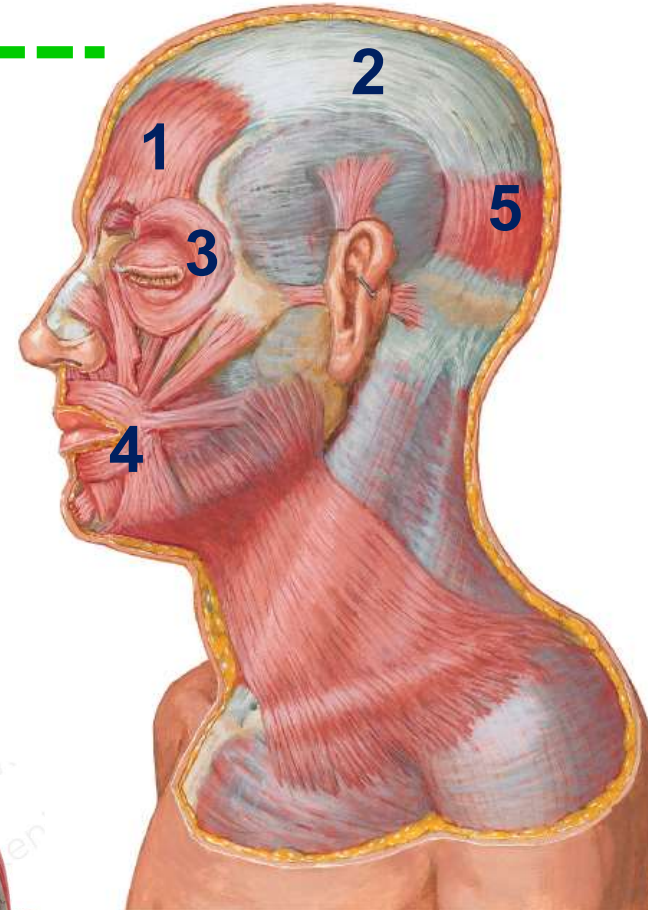
Muscle around the eye

3-Orbicularis oculi

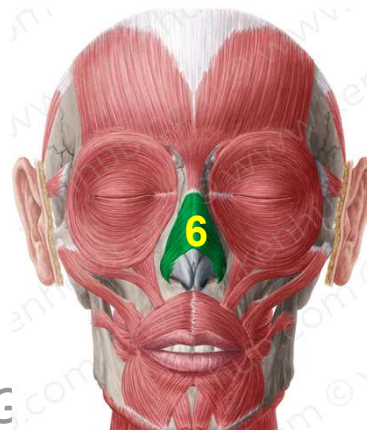
Muscle around the eye

4-orbicularis oris

6 Nasal muscle

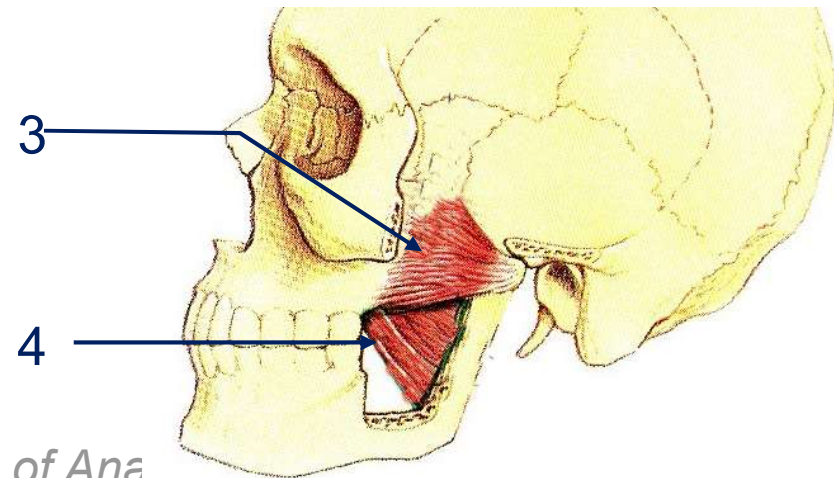
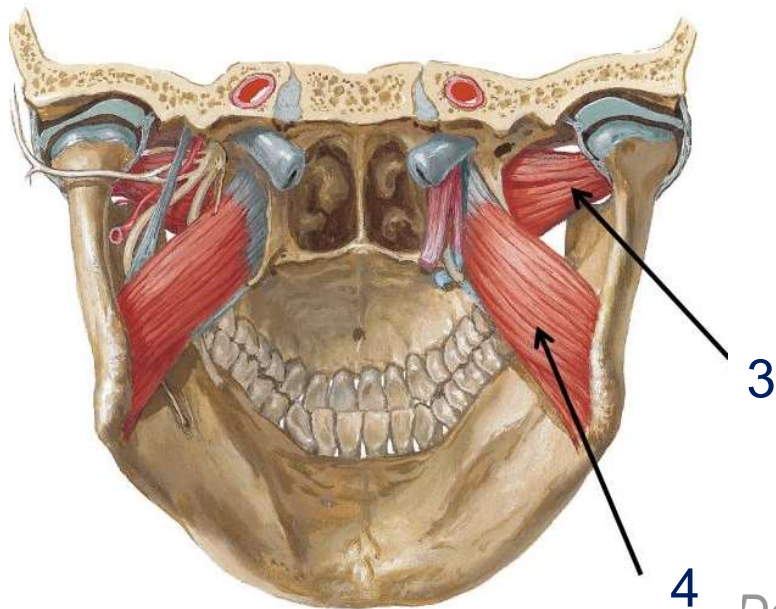
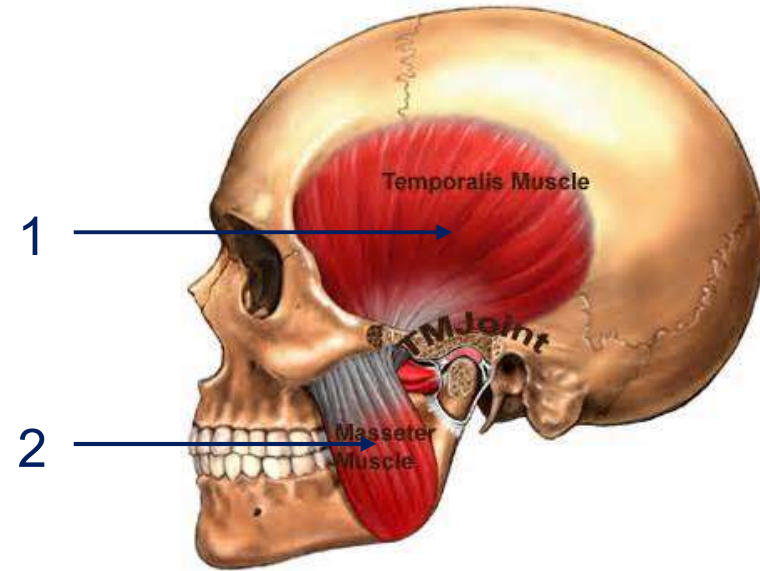


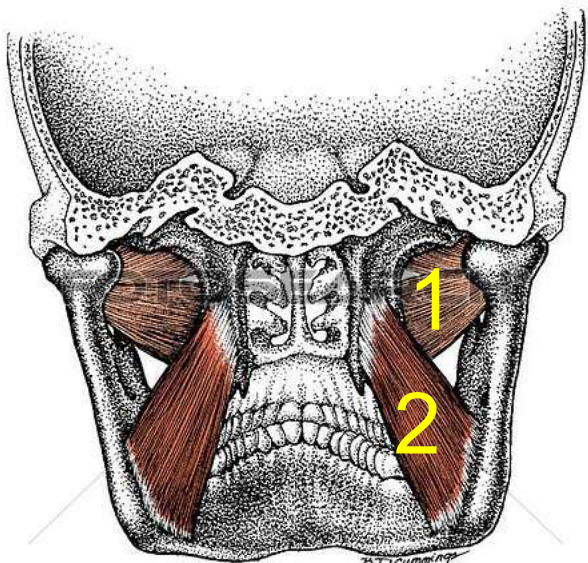
**Muscles of facial
Expression lateral view**



Masticatory muscle

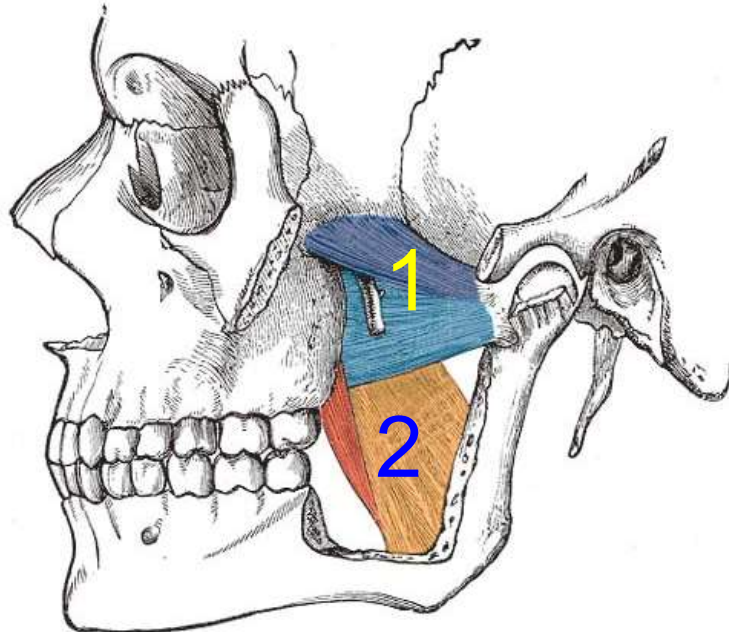
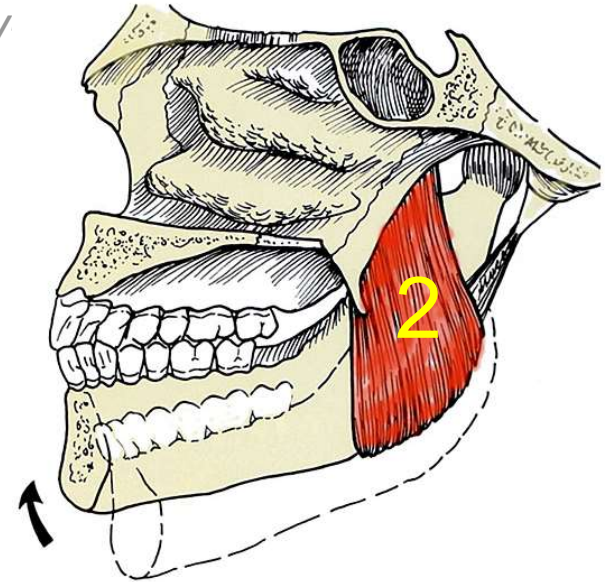
- 1-Temporal muscle
- 2-Masseter
- 3-Lateral pterygoid m.
- 4-Medial pterygoid m.









mm103015 www.fotosearch.com

1-Lat. pterygoid m.
2-Med. pterygoid m.

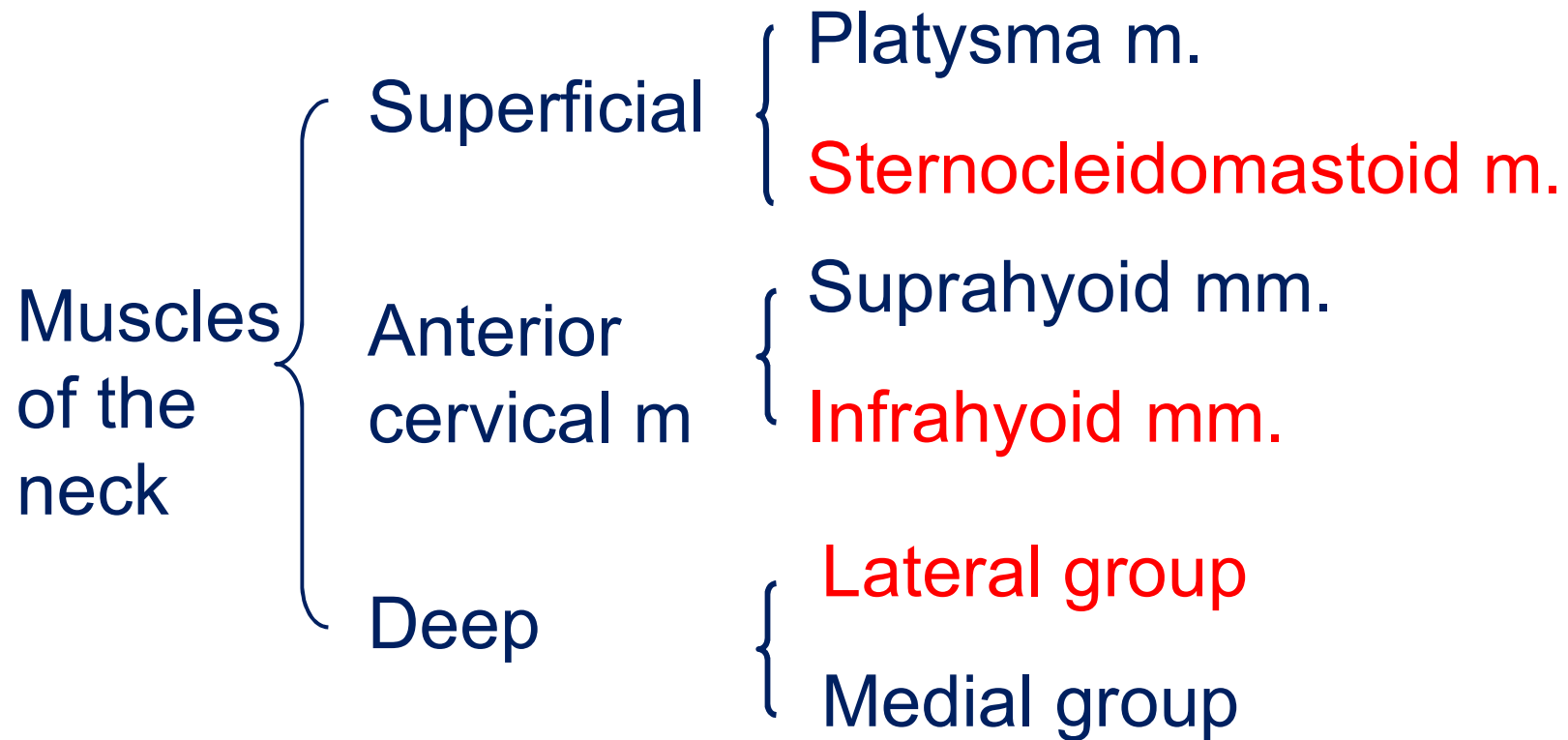


-  Superior head of the lateral pterygoid
-  Inferior head of the lateral pterygoid
-  Deep head of the medial pterygoid
-  Superficial head of the medial pterygoid

Function

Open and close the mouth
Mandibular joints move laterally
Side-to-side

Muscles of the neck



Platysma

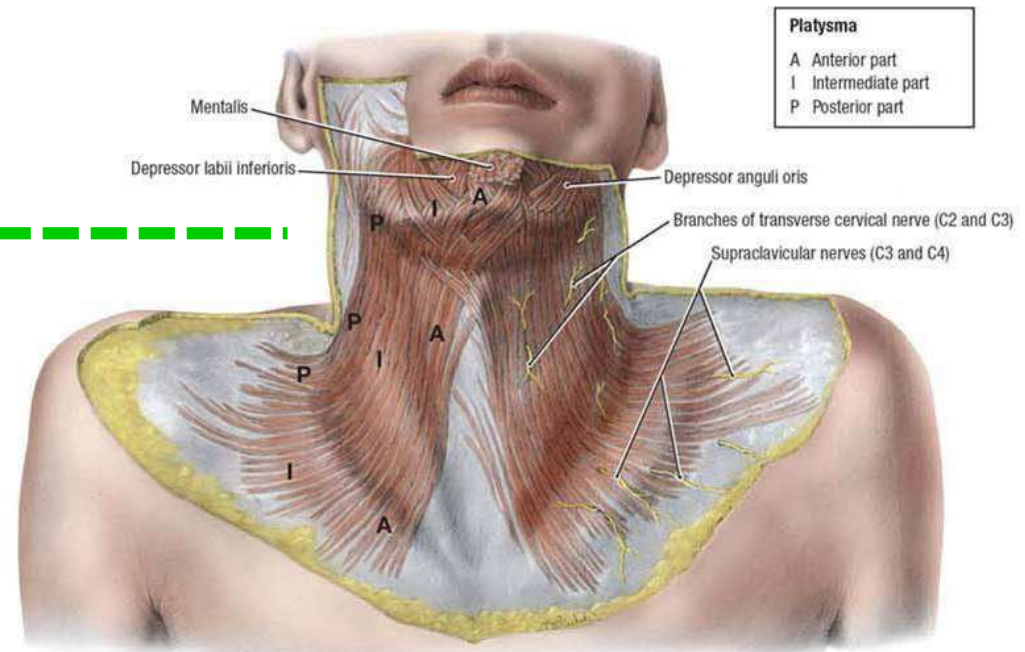
ZHANG-D

Skin muscle

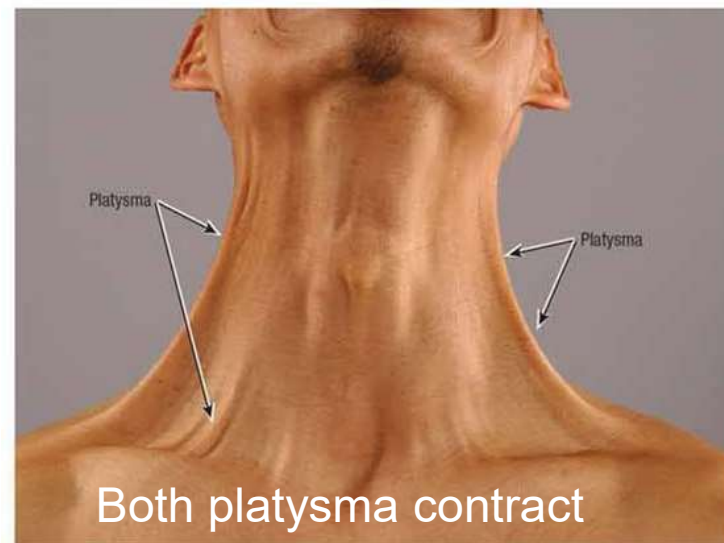
Arise from the deep fascia over the pectoralis major and detoid and **inserted into** the skin of the lower part of the face.

Action

Tense the skin of neck
Draws corners of mouth down
Assists in depressing mandible



A. Anterior View



Superficial muscles of the neck

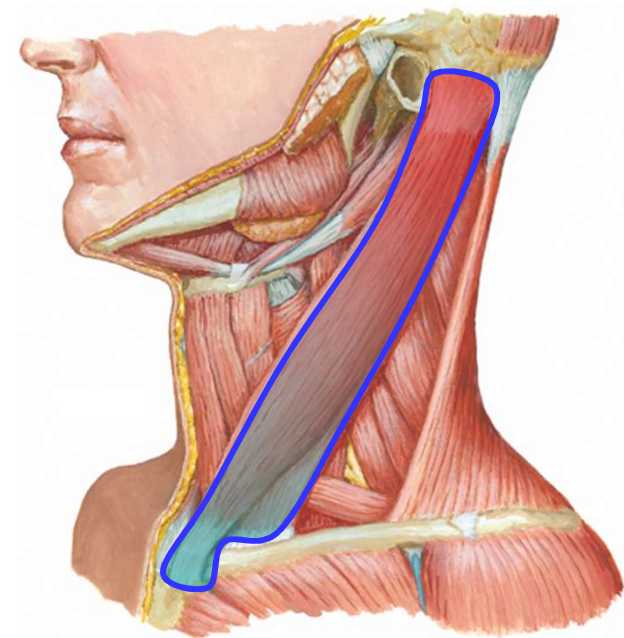
Sternocleidomastoid m.

Name from origin and insertion

A prominent visible landmark

Action- **Acting alone**: The head is inclined laterally & the face rotate to the opposite side

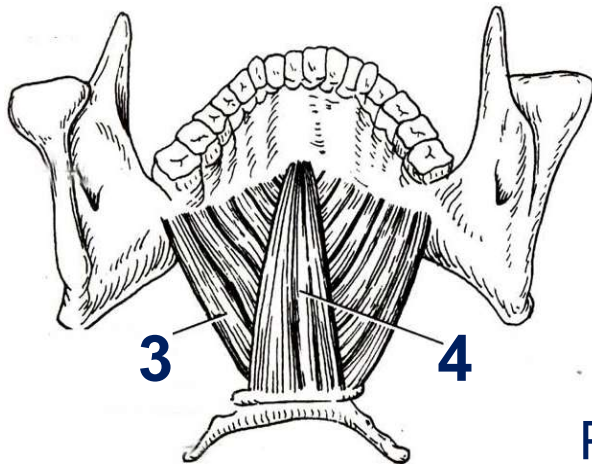
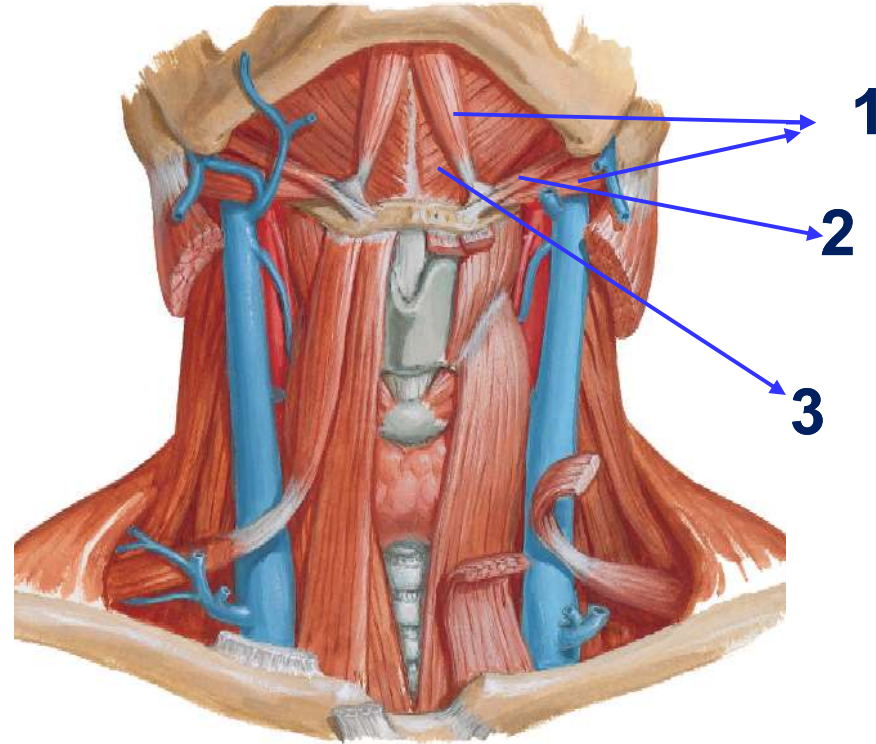
Acting together- they draw the head backward or raise the head



Muscle of neck lateral view

Suprahyoid muscle - 4

- 1-Digastric m.
- 2-Stylohyoid m.
- 3-Mylohyoid m.
- 4-Geniohyoid m.



Post.view

Pull the hyoid upward, backward & help to
Depress the mandible when the hyoid is fixed

Superficial layer

1-Sternohyoid m.

2-Omohyoid m.

Deep layer

3-Sternothyroid m.

4-Thyrohyoid m.

Length of muscle 1 = m 3 + m 4

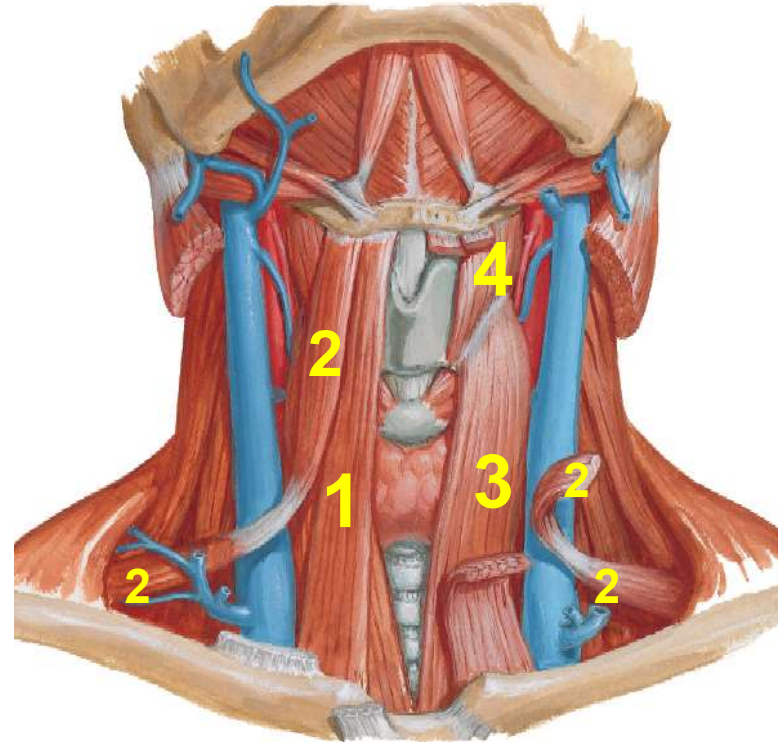
Action

1-Depresses the hyoid bone as it contracts

2-Larynx is pulled downward

3-Elevates the larynx and lowers the hyoid bone

4-it acts to depress the hyoid bone



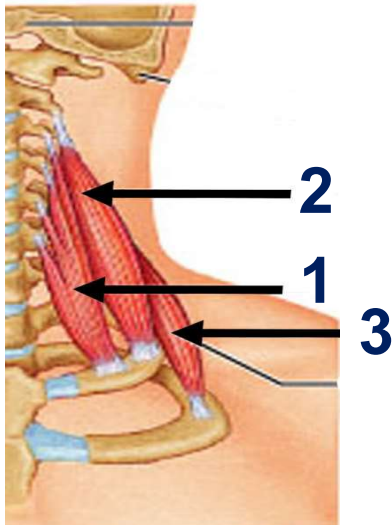
Deep cervical muscles

Lateral groups

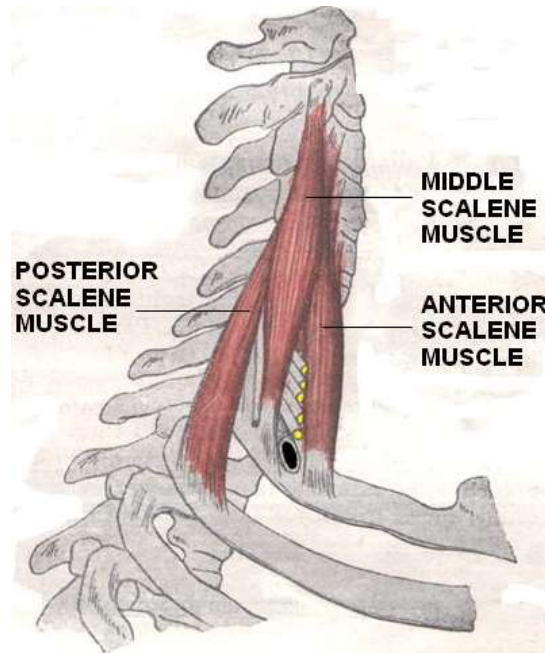
- 1-Scalenus anterior
- 2-Scalenus medius
- 3-Scalenus posterior

Action

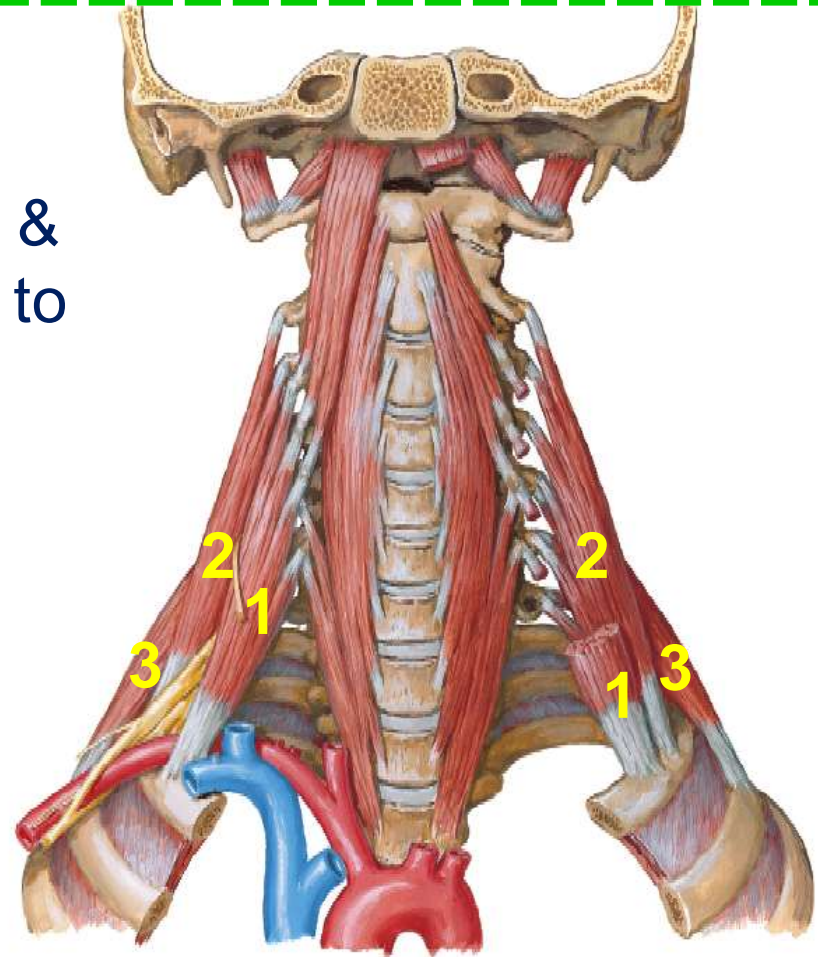
Elevate the 1st & 2nd ribs & help to inspiration



Ant.view



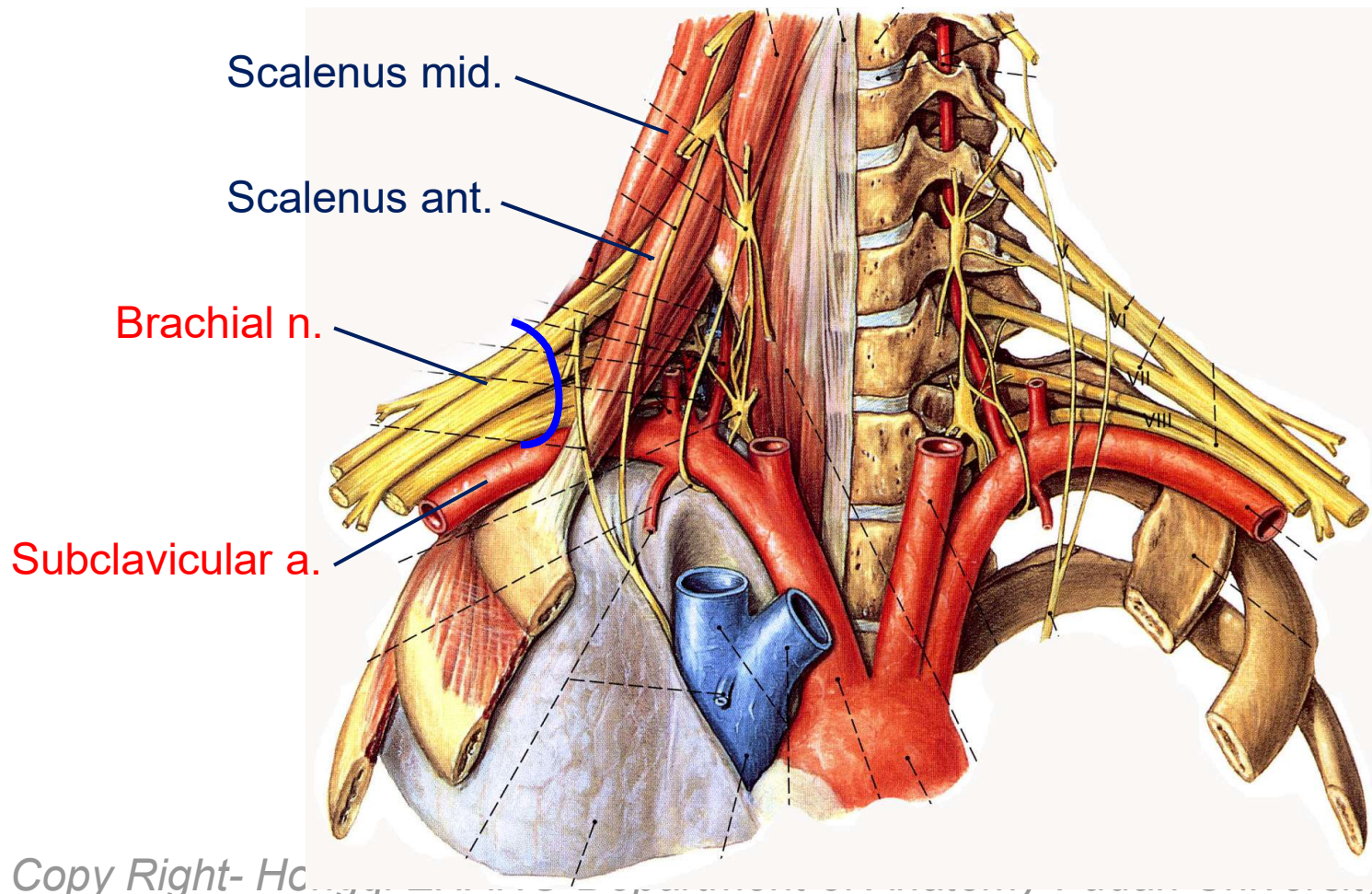
Lat.view



Ant.view of cervical muscles

Scalene fissure

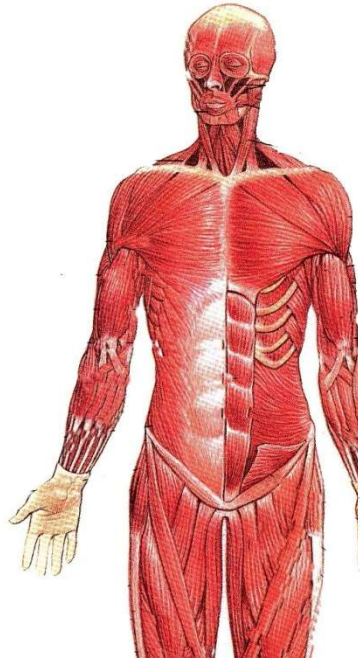
Between scalenus ant. & mid. subclavian a.
& brachial plexus pass from the fissure



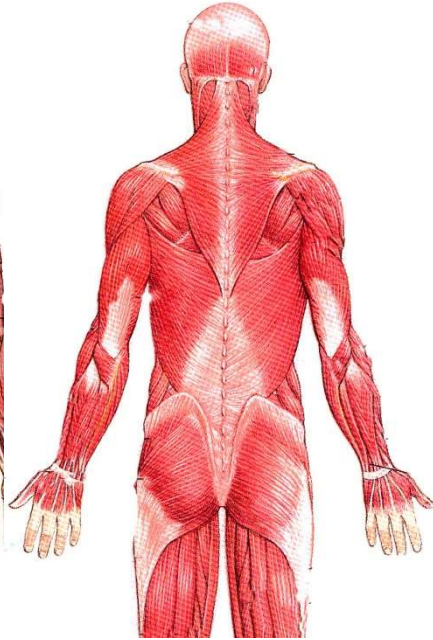
Muscle of the trunk



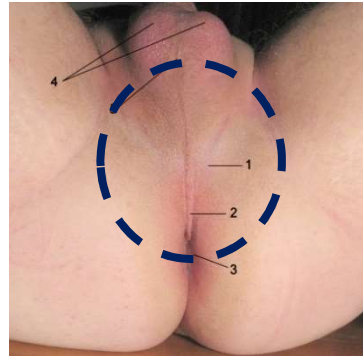
Muscles of the trunk



Thorax m.
Abdomen m.



Back m.



Perineal m.



The diaphragm is shaped like a parachute



Diaphragm

Muscles of back

Superficial muscle

1-Trapezius muscle

2-Latissimus dorsi

Deep muscle

3-Levator scapulae

4-Rhomboid muscle

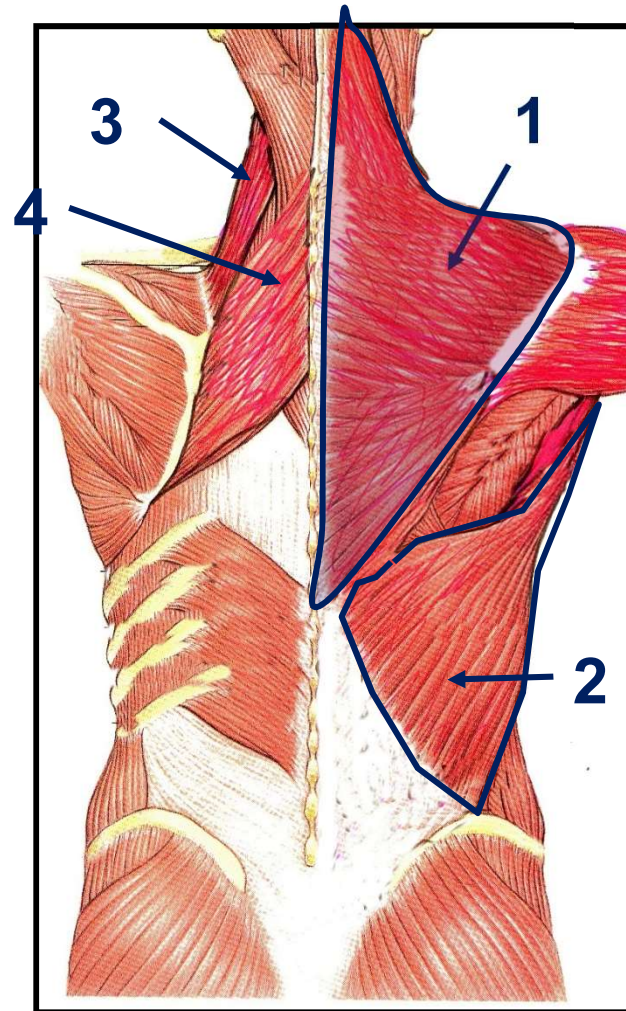
Movement of the limb

Deep muscle

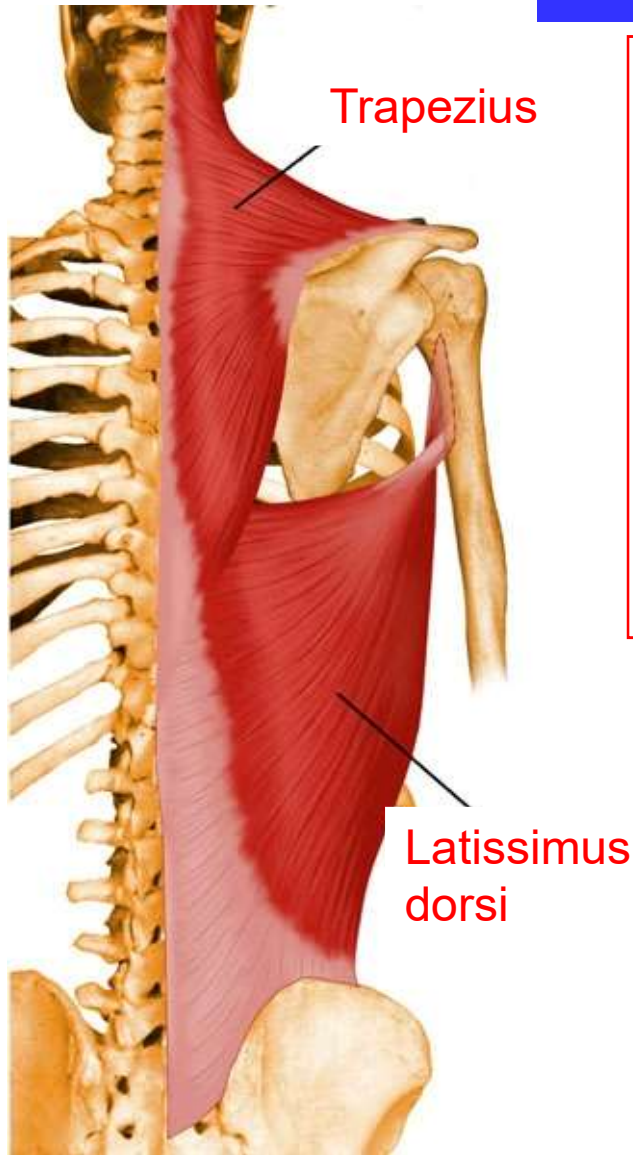
Erector spinae

Movement of

Vertebral column



Superficial muscle of back



Large triangular in neck and back

Origin: ext. occipital protuberance

Spine of 1st -7th cervical vertebra

Spine of 1st -12th vertebrae

Insertion

The lat. 1/3 of the clavicle

The acromion and spine of scapula

Action: raises, descends, retracts & rotates

The scapula & extends the head

Large wide & triangular flat m.in the back

Origin:

Spinous process of lower six thoracic C.

Thoracolumbar fascia, spinous process of

Lumbar vertebrae, iliac crest

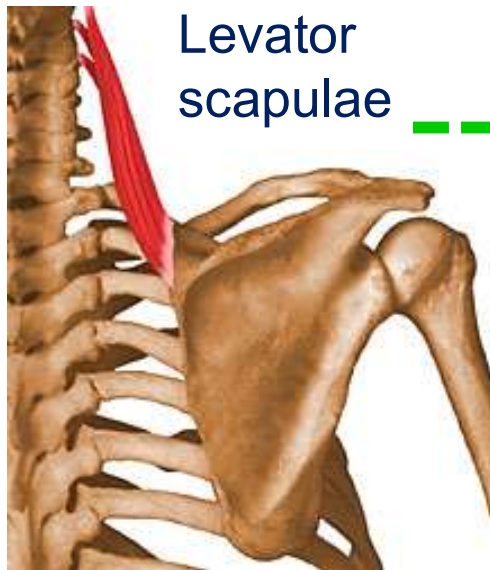
Insertion

Crest of lesser tuberosity of the humerus

Action: extends, adducts and medially

rotates humerus at shoulder joint

Superficial muscle of back



Levator
scapulae

Levator scapulae

A strap like muscle

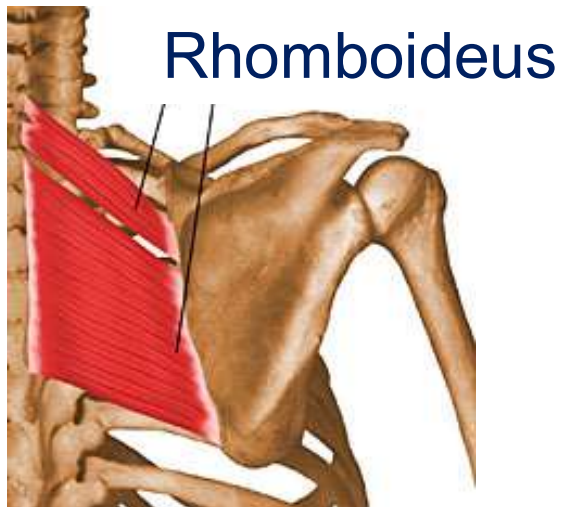
Origin: spine of 1st-4th cervical vertebrae

Insertion: internal border of scapula

Rhomboideus like a rhomboid shape

Origin: spine of C₇ & T₁₋₆

Insertion: internal border of scapula

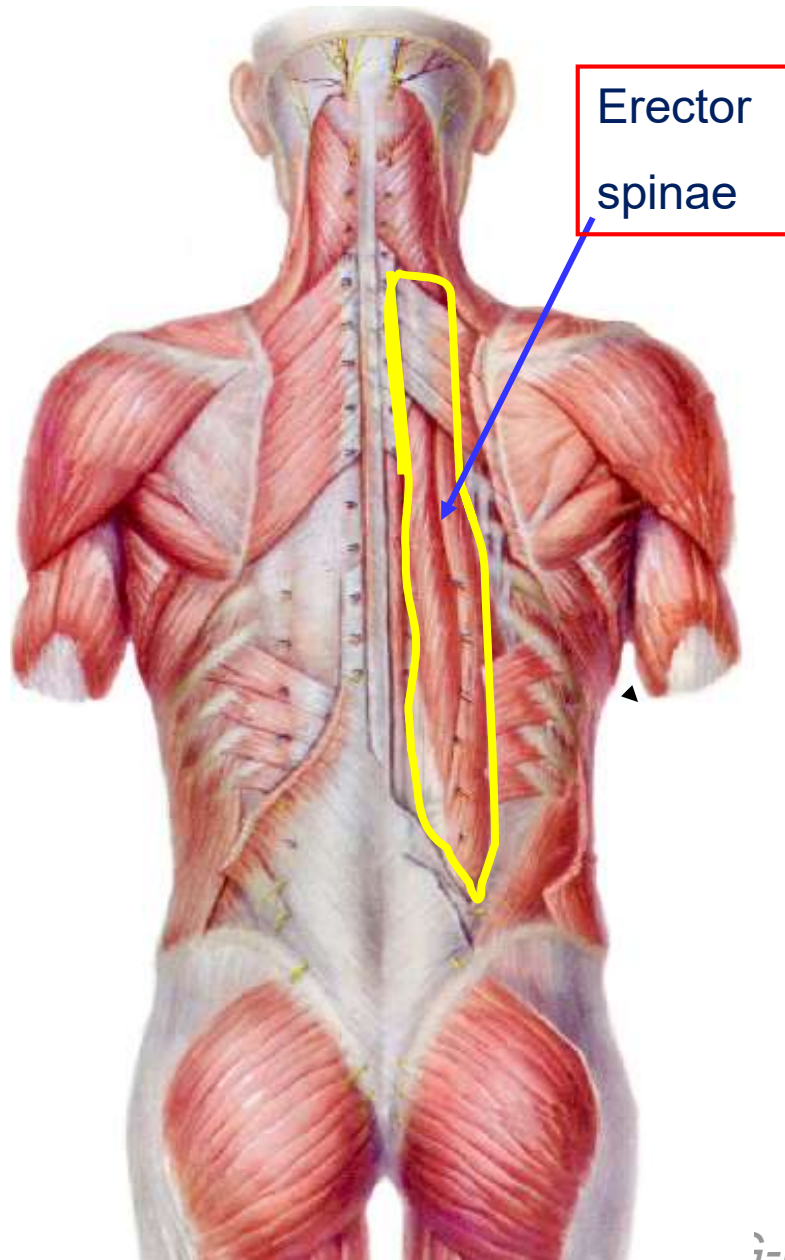


Rhomboideus

Action:

The levator scapulae elevates the scapula
It may also retract and fix the scapula with
the romboideus

Deep muscle of back



Erector spinae

It is a collecting name (groups)

Origin:

Sacrum, ilium & related ligs.

Insertion:

Ribs and vertebrae

Action:

When acting on one side it
Bends and rotates the spinal
Column toward the opposite side.
when acting on Both sides
It extends the spinal column.

Muscles of thorax

Extrinsic m.

(origin in thoracic wall,
Insertion in upper limb bone)

Pectoralis major

Pectoralis minor

Serratus anterior

Intrinsic m.

(both origin and insertion are
in thoracic wall)

Ext. Intercostal m.

int. Intercostal m.

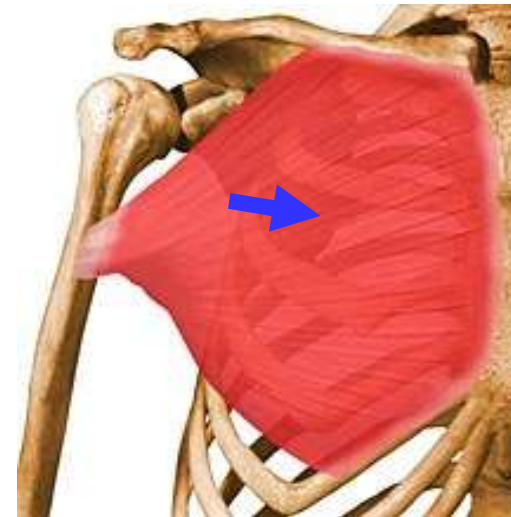
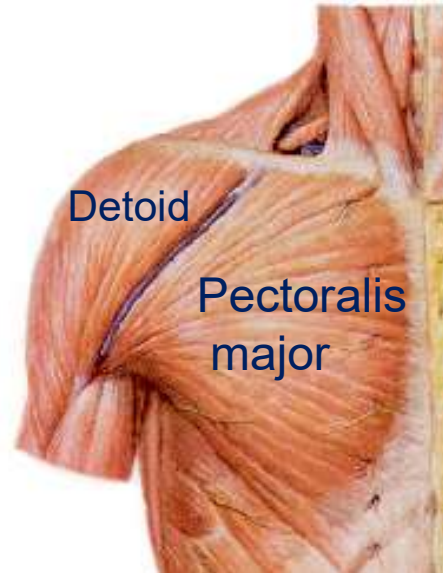
Transversus thoracis

Intercostales intimi

External intercostal membrane

Internal intercostal membrane

Muscles of thorax- Pectoralis major



Large thick fan-shaped

Origin: The medial half of the clavicle

The sternum

The upper 6 costal cartilages

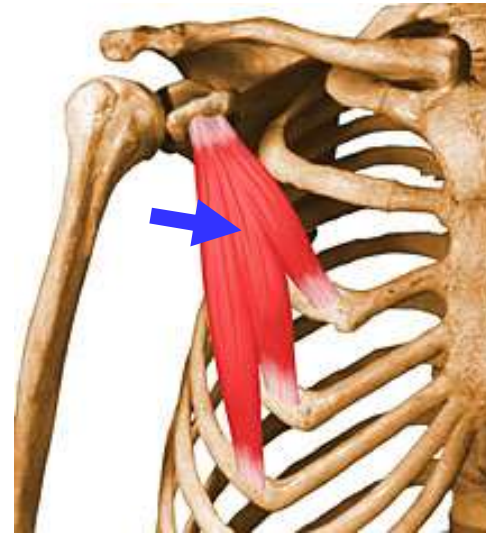
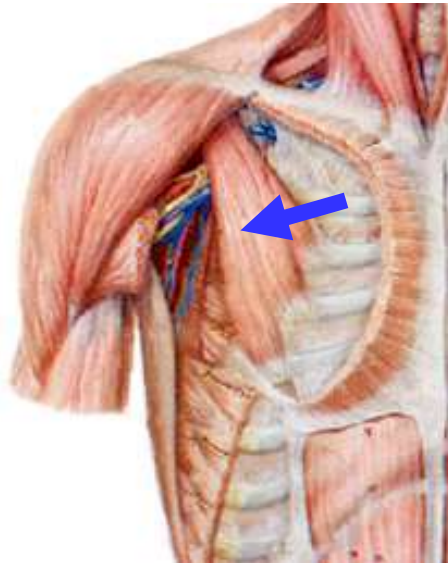
Aponeurosis of obliquus externus abdominis

Insertion: Crest of greater tuberosity of humerus

Action: Adduction, flexion & med. rotation of the arm.

When arm is fixed, draws the body upward.

Muscles of thorax- Pectoralis minor



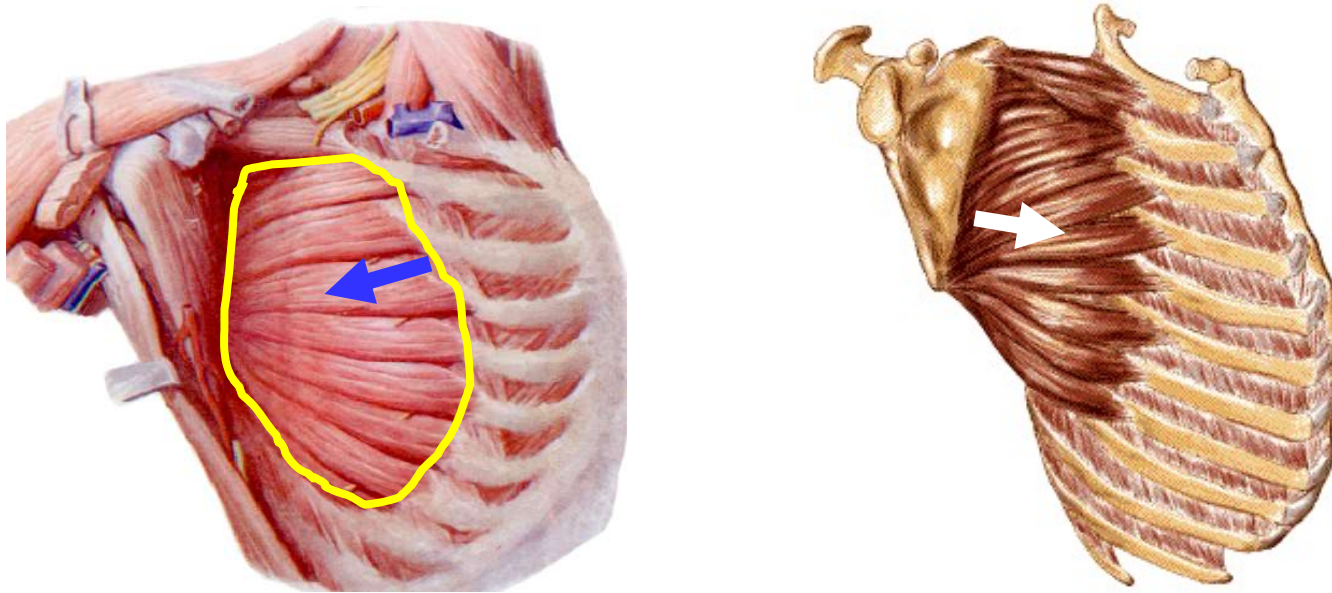
Pectoralis minor- small flat triangular m.

Origin: External surface of 3-5th ribs

Insertion: Coracoid process of scapula

Action: Stabilizes scapula by drawing it forward & downward. when the scapula is fixed, it helps the inspiration. it is also useful landmark (axilla)

Muscles of thorax- Serratus anterior



A large thin powerful in lateral part of thorax

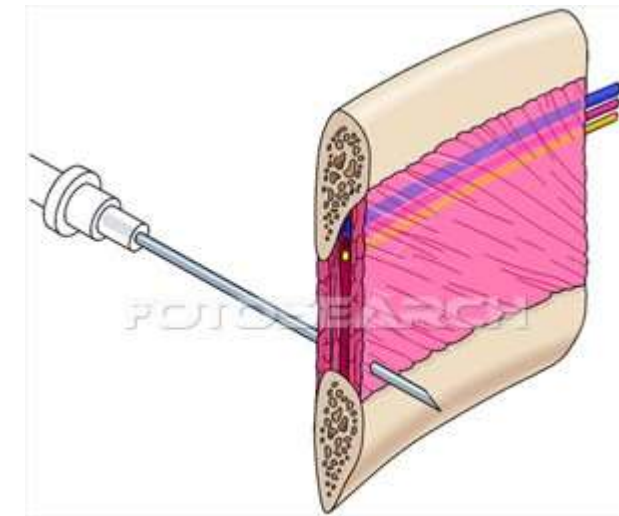
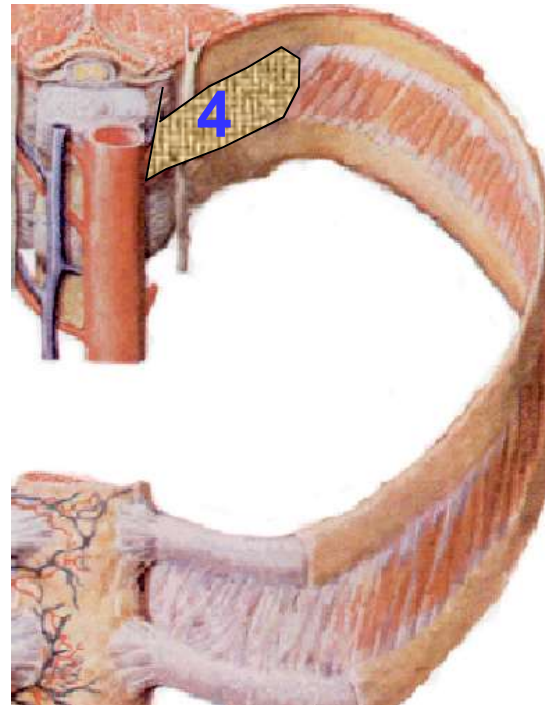
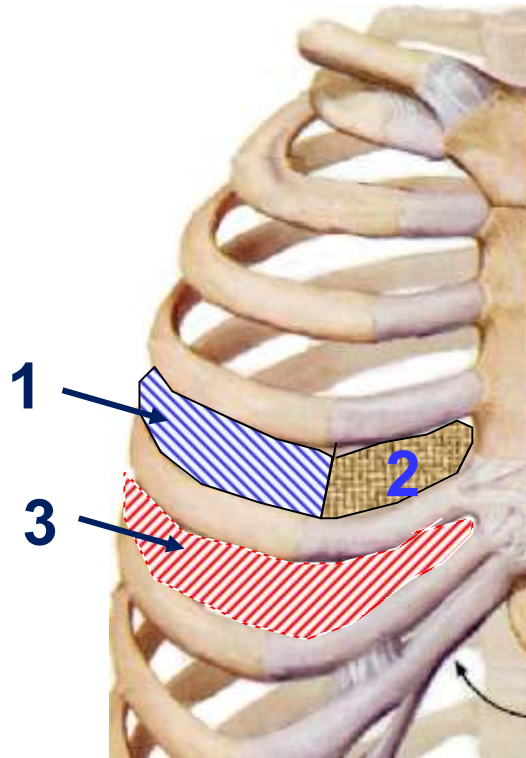
Origin: external surface of upper 8 or 9 ribs

Insertion: internal border of the scapula

Action: Holds the scapula against the thoracic wall, Pulls the scapula forwards in throwing & pushing by fixing the scapula it helps the inspiration

Co

External & internal intercostal m.

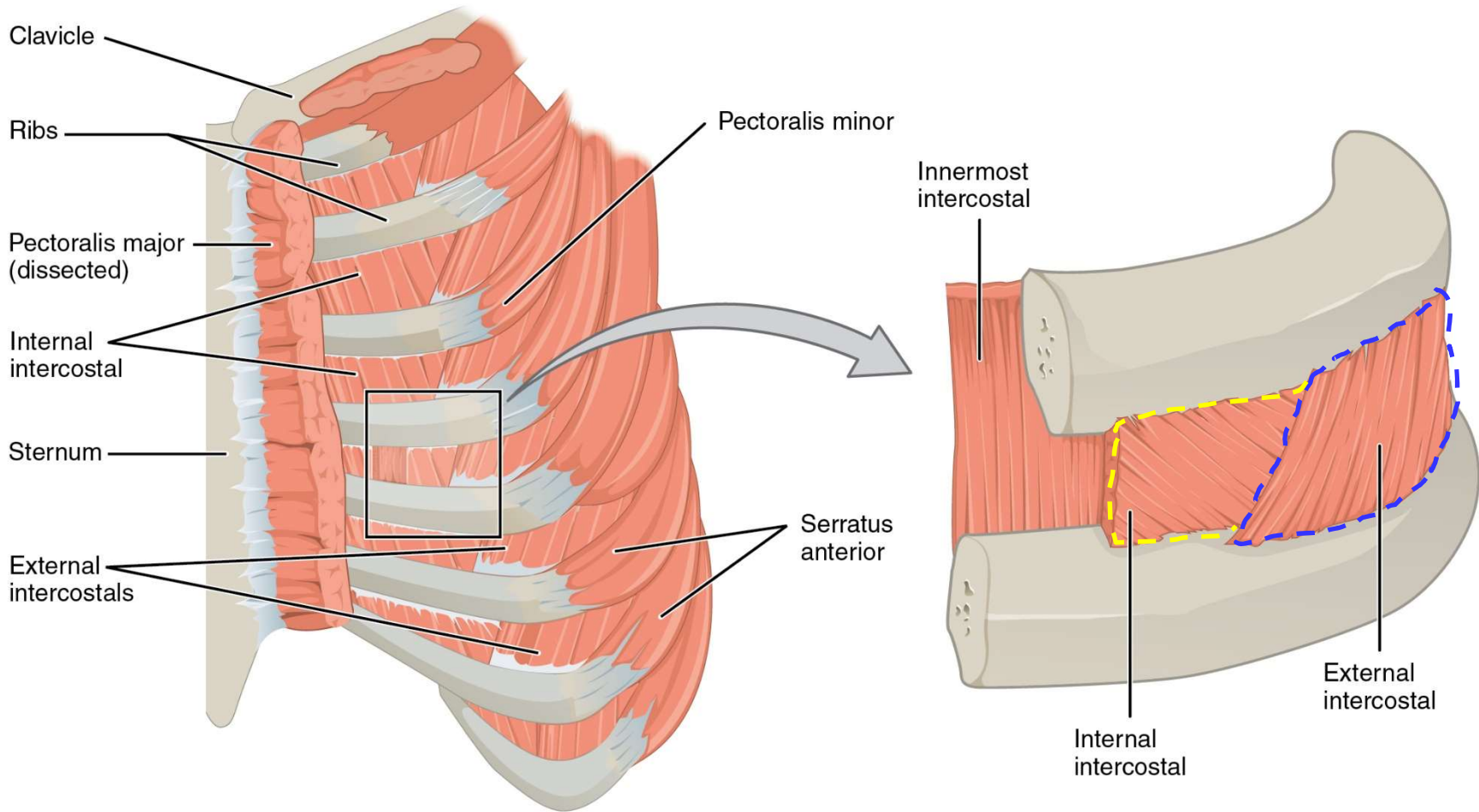


Puncture of thoracic wall

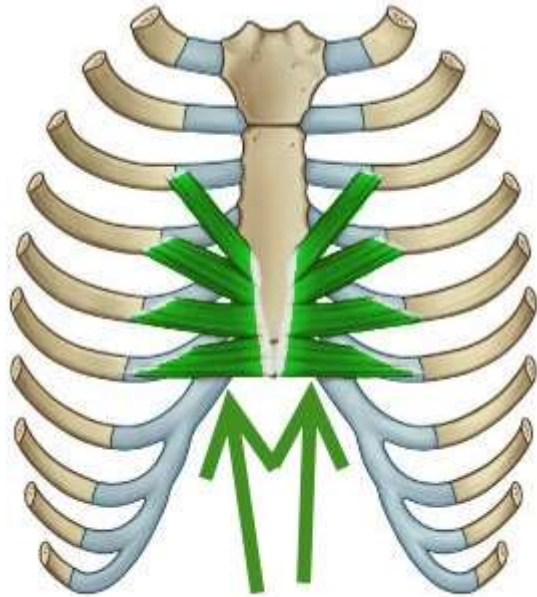
- 1-Ext.intercostal m.
- 2-Ext.intercontstal membrane
- 3-Int.intercostal m.
- 4-Int.intercostal membrane

- External intercostal m.
Help to inspiration
- Internal intercostal m.
Help to expiration

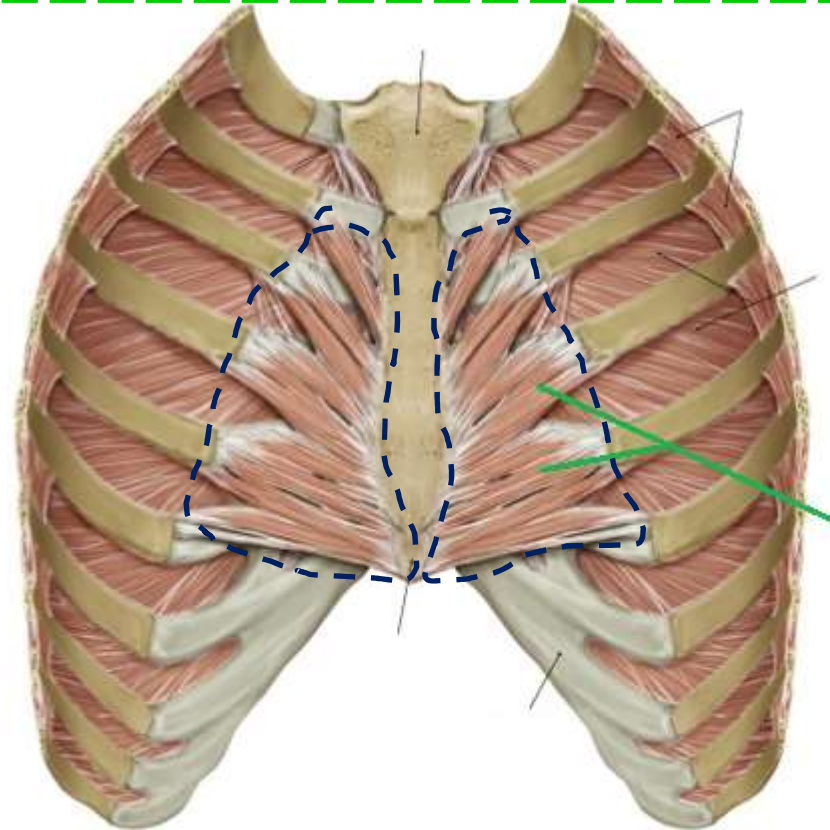
External & internal intercostal m.



Transverse thoracis



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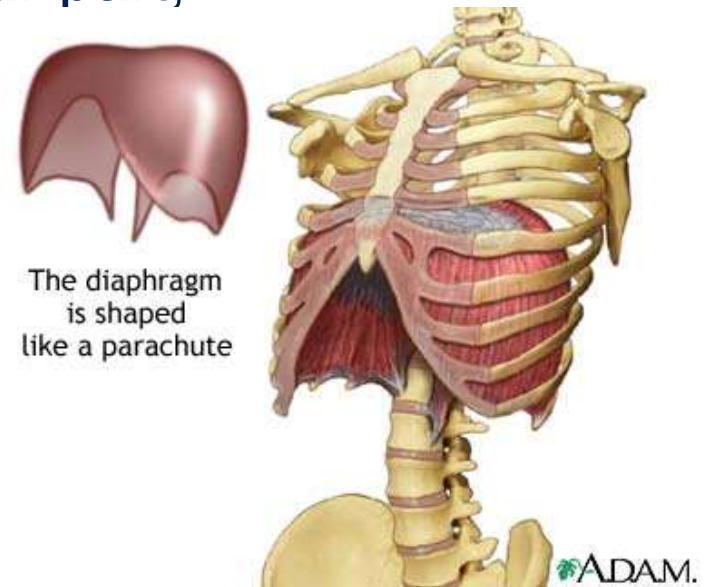


Posterior view of ant. thoracic wall

1. Locate on the int. surface of ant. thoracic wall
2. Originate from lower part of sternum
3. Insert to int. surface of 2-6 rib
4. Function: to help to expiration

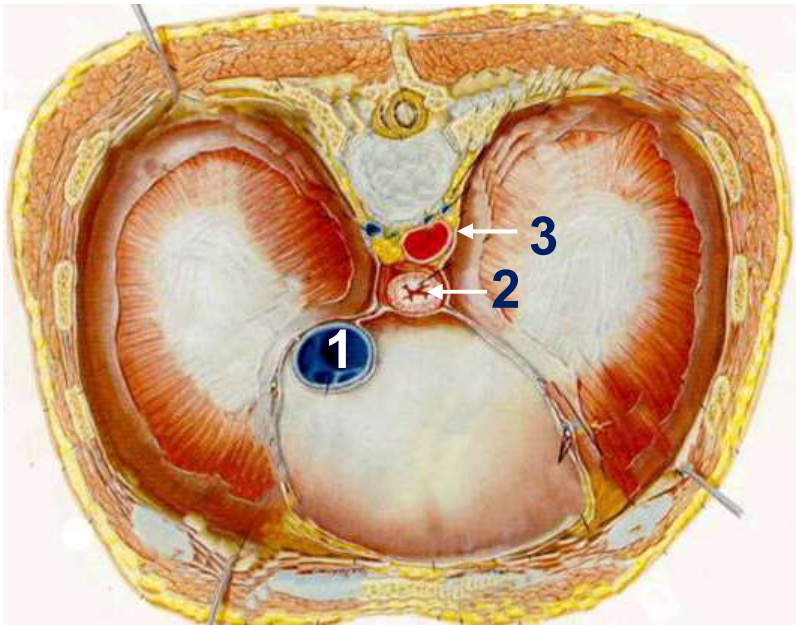
Diaphragm

1. The dome-shaped septum
2. Dividing thoracic cavity and abdominal one
3. The muscular fiber is around the central tendon
4. Sternal part costal part and lumbar part,
5. Three opening (hole)
6. Vena caval foramen
7. Aortic hiatus
8. Esophageal hiatus
9. Important respiratory muscle

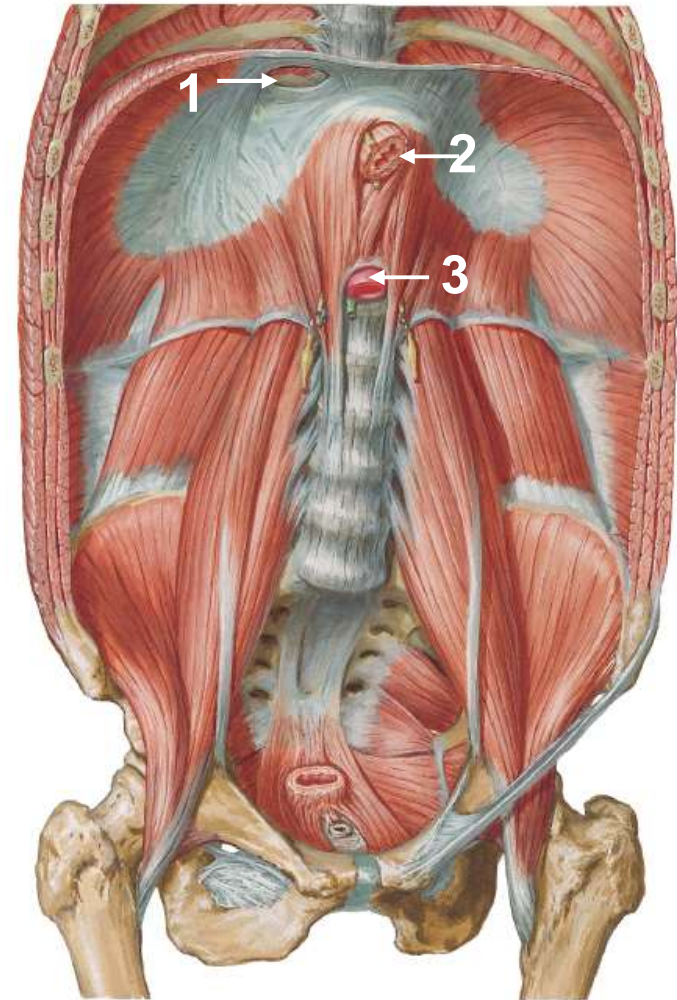


Diaphragm

- 1-Vena caval foramen (T8)
- 2-Esophageal hiatus (T10)
- 3-Aortic hiatus (T12)

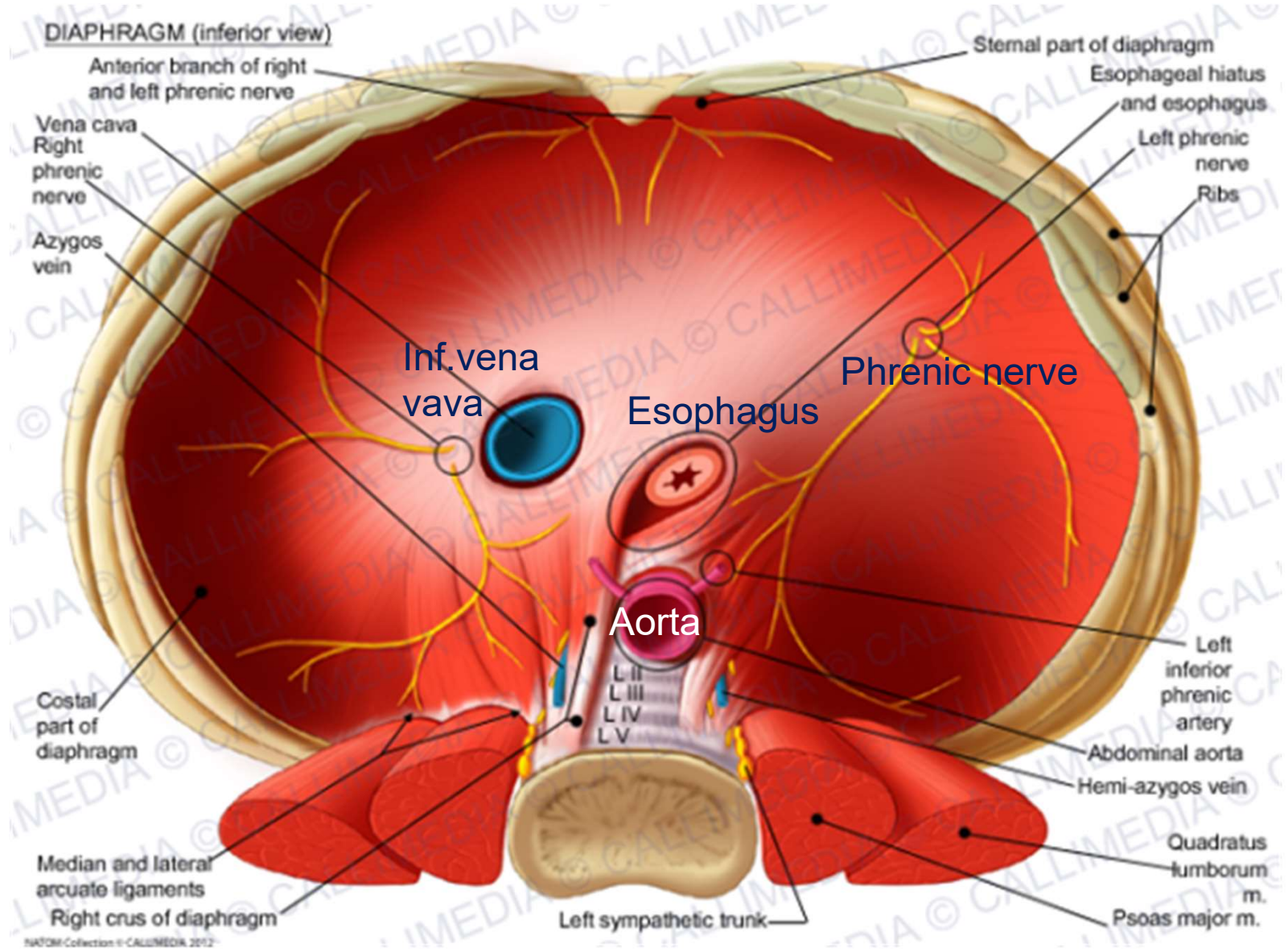


Superior view



Anterior view

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The important contents today

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- ◆ Master the shape, classification and nomenclature of muscles.
 - ◆ Master the accessory structures of muscle
 - ◆ Master name, location and function of the masticatory muscle.
 - ◆ Master the insertion, origin and function of the sternocleidomastoid & infrahyoid muscles
 - ◆ Master the distribution & function of thoracic m. and back muscles.

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See you next time!



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