

## BIO 4432 – Human Anatomy

### Resource #2

The concepts this resource covers are the topics typically covered during this week of the semester. If you do not see the topics your particular section of class is learning this week, please take a look at other weekly resources listed on our website for additional topics throughout the semester.

**We also invite you to look at the group tutoring chart on our website to see if this course has a group tutoring session offered this semester.**

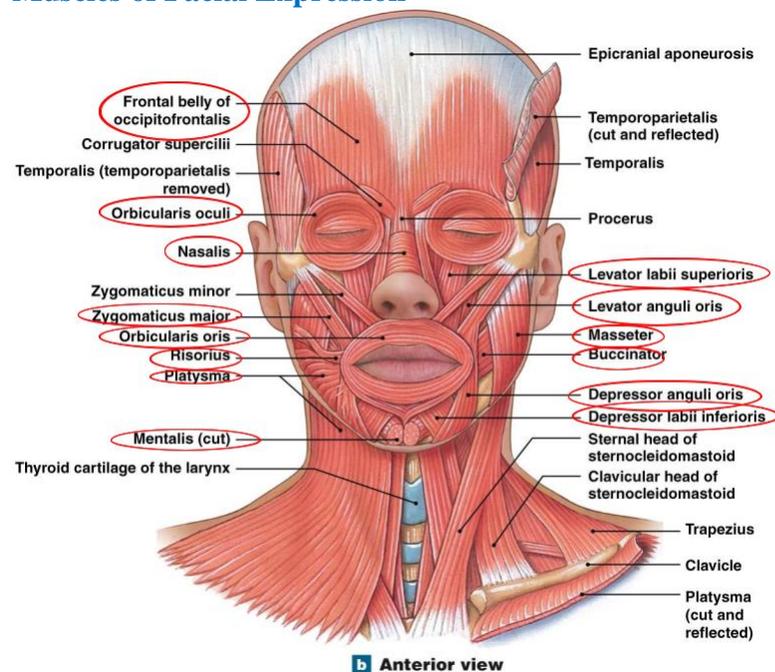
If you have any questions about these study guides, group tutoring sessions, private 30 minute tutoring appointments, the Baylor Tutoring YouTube channel or any tutoring services we offer, please visit our website [www.baylor.edu/tutoring](http://www.baylor.edu/tutoring) or call our drop in center during open business hours. M-Th 9am-8pm on class days 254-710-4135.

**Keywords: axial musculature, muscles of facial expression, muscles of the neck and back, pectoral girdle, extraocular muscles**

Week Three: 02/07 – 02/11

### Topic of the Week: Axial Musculature

#### Muscles of Facial Expression



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All muscles of facial expression are innervated by **CN VII** (facial nerve).

**Occipitofrontalis** – raises forehead and eyebrows

**Orbicularis oculi** – closes eye ONLY!  
**Zygomaticus major** – elevates angle of the mouth

**Levator labii superioris** – elevates upper lip

**Nasalis** – wrinkles nose

**Risorius** – pulls corners of mouth laterally

**Orbicularis oris** – presses lips together

**Buccinator** – holds teeth to cheeks  
**Depressor anguli oris** – pulls corners of mouth down (frowning)

**Mentalis** – protrudes lower lip and elevates chin skin

**Platysma** – tenses skin of the neck

#### Muscles of the Tongue and Pharynx

Follow this link for Dr. Acland's video covering the tongue muscles:

<https://aclandanatomy.com/MultimediaPlayer.aspx?multimediaId=10528427>

**Innervation:** all muscles of the tongue are innervated by CN XII (hypoglossal)

EXCEPT palatoglossus which is innervated by CN X (vagus).

- **Genioglossus** – CN XII

- Hyoglossus – CN XII
- Palatoglossus – CN X
- Styloglossus – CN XII

Another innervation exception is stylopharyngeus. All muscles of the pharynx (pharyngeal constrictors) are innervated by CN X except for **stylopharyngeus** which is innervated by CN IX (glossopharyngeal).

## Muscles of the Neck and Back

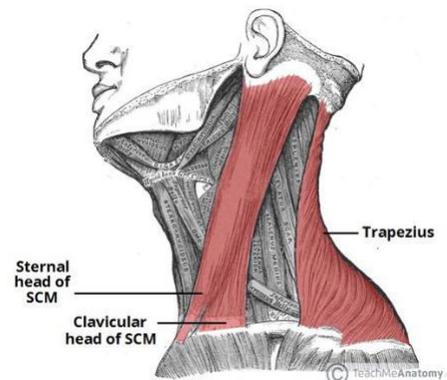
### Sternocleidomastoid

Origin: clavicle and manubrium of sternum

Insertion: mastoid process

Action: contraction of one → rotation of the head towards the opposite side; contraction of both → flexion of cervical spine and head

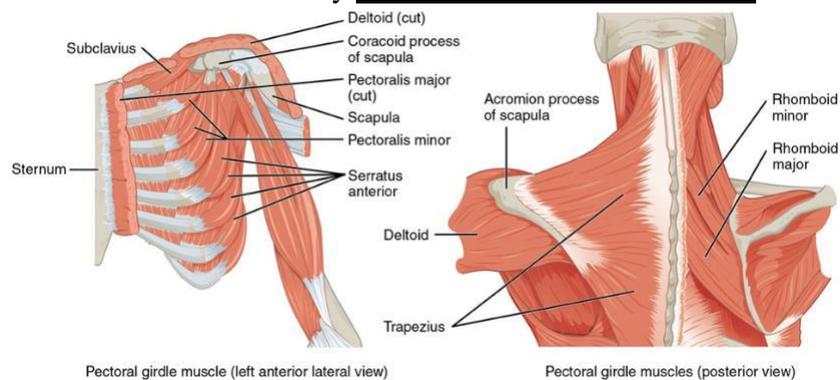
Innervation: CN XI – accessory



This image was taken from teachmeanatomy.com.

### The Pectoral Girdle

All superficial back muscles are innervated by **ventral rami of spinal nerves.**



Pectoral girdle muscle (left anterior lateral view)

Pectoral girdle muscles (posterior view)

This image was taken from pressbooks-dev.oer.hawaii.edu.

### Pectoralis minor

Origin: ribs 3, 4, and 5

Insertion: coracoid process

Action: draws scapula anteriorly

Innervation: medial and lateral pectoral nerves

### Serratus anterior

Origin: ribs 1-9

Insertion: ventral border of scapula

Action: draws scapula anteriorly

Innervation: long thoracic nerve

### Trapezius

Origin: external occipital protuberance, spinous processes of thoracic vertebrae

Insertion: acromion of scapula and clavicle

Action: elevation, depression, adduction of scapula; extension of head

Innervation: CN XI – accessory

### Levator scapulae

Origin: transverse processes of cervical vertebrae

Insertion: medial upper aspect of scapula

Action: elevates scapula

Innervation: dorsal scapular nerve

### Rhomboid major and minor

Origin: upper vertebral column

Insertion: medial aspect of scapula

Action: retract scapula and rotate pectoral girdle down

Innervation: dorsal scapular nerve

### Latissimus dorsi – not pectoral girdle

Origin: vertebral column, iliac crest, and ribs

Insertion: intertubercular groove of humerus

Action: adducts, extends, and medially rotates humerus (also, think pull-ups!)

Innervation: thoracodorsal nerve

**Knowledge checkpoint 1:** The nerve that innervates this muscle is injured. What movement is affected?



*This image was taken from Acland's Atlas of Anatomy.*

### Abdominal Wall Muscles

**Anterior (listed superficial to deep):** rectus abdominus, external oblique, internal oblique, transversus abdominus

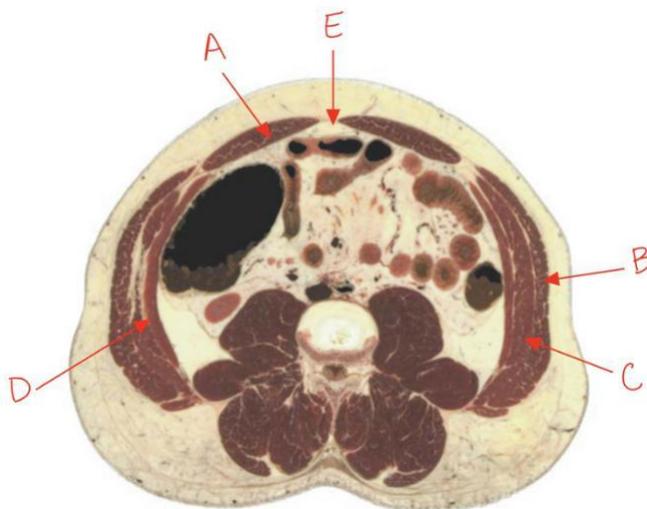
- All innervated by ventral rami of intercostal nerves
- Function to increase intra-abdominal pressure

**Posterior:** psoas, iliacus, quadratus lumborum, and iliopsoas

Iliopsoas

- Origin: lumbar vertebrae
- Insertion: lesser trochanter of femur
- Action: hip flexion
- Innervation: femoral nerve

**Knowledge checkpoint 2:** Label the indicated muscles on this axial cadaveric image.



This image was taken from Dartmouth Anatomy.

### Highlight #1: Extraocular Muscles

There are 6 extraocular muscles:

1. Superior rectus – looks up (elevates eye)
2. Inferior rectus – looks down (depresses eye)
3. Medial rectus – looks medially (towards nose)
4. Lateral rectus – looks laterally
5. Superior oblique – depresses the adducted eye
6. Inferior oblique – elevates the adducted eye

Think **o**bliques = **o**pposite! Superior oblique looks down and inferior oblique looks up.

3 important nerves: see mnemonic!

CN VI – abducens

- Lateral rectus

CN IV – trochlear

- Superior oblique CN

III – oculomotor

- Superior rectus -
- Inferior rectus - Medial rectus - Inferior oblique
- Levator palpebrae superioris (opens the eye)

LR<sub>6</sub>SO<sub>4</sub>AO<sub>3</sub>

Lateral Rectus – CN VI  
Superior Oblique – CN IV  
All Others – CN III

Dr. Acland’s video on recti muscles:

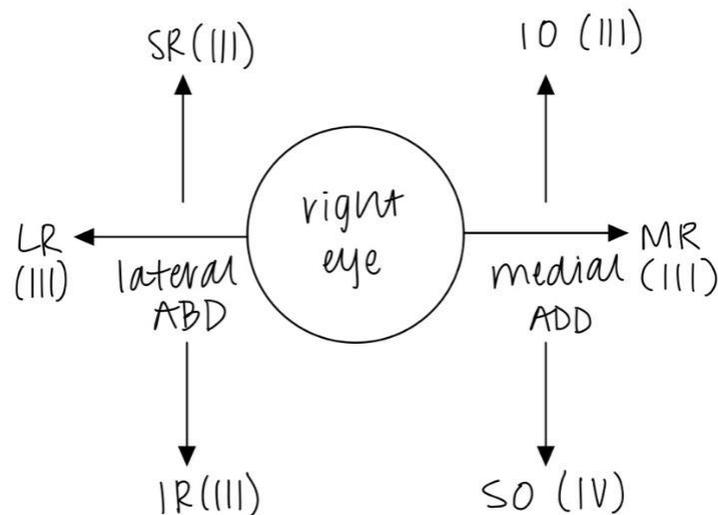
<https://aclandanatomy.com/MultimediaPlayer.aspx?multimediaId=10528551>

Dr. Acland’s video on oblique muscles:

<https://aclandanatomy.com/MultimediaPlayer.aspx?multimediaId=10528553>

**Testing the extraocular muscles:** this topic tends to be particularly confusing, so drawing this diagram may help!

When testing the extraocular muscles, you have to consider that some muscles perform similar functions (i.e., superior rectus and inferior oblique both elevate the eye). This means you will have to **isolate** the muscles from each other in order to test their functions.



*This image was drawn by me!*

These two muscles are self-explanatory:

To test the **medial rectus**, have the patient **adduct their eye or look towards their nose**.

To test the **lateral rectus**, have the patient **abduct their eye or look towards the wall**.

The superior oblique and inferior rectus both depress the eye, so to isolate them, do the following:

To test the **superior oblique**, have the patient **adduct their eye (look at nose) and then look down**.

To test the **inferior rectus**, have the patient **abduct their eye (look at wall) and then look down**.

The inferior oblique and superior rectus both elevate the eye, so to isolate them, do the following:

To test the **inferior oblique**, have the patient **adduct their eye (look at nose) and then look up**.

To test the **superior rectus**, have the patient **abduct their eye (look at wall) and then look up**.

**Knowledge checkpoint 3:** You are testing the extraocular muscles and their innervation in a patient who periodically experiences double vision. When you ask him to turn his right eye inward toward his nose and look downward, he is able to look inward, but not down.

Which nerve is most likely involved?

- A. Abducens
- B. Nasociliary
- C. Oculomotor
- D. Trochlear

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### THINGS YOU MAY STRUGGLE WITH!

1. **Testing the extraocular muscles:** draw the diagram I have above to help you learn how to isolate the extraocular muscles. Remember the superior and inferior obliques are tested

adducted and the superior and inferior recti are tested abducted. Don't forget to associate muscles with their respective nerves to help you answer clinical questions!

2. ***The innervation of intrinsic and extrinsic back muscles:*** you will go into more detail about this in the upcoming spinal cord lecture. For now, know that the skin of the back and deep back muscles are innervated by dorsal rami of spinal nerves. All other muscles are innervated by ventral rami of spinal nerves.

**CONGRATS:** You made it to the end of the resource! Thanks for checking out these weekly resources! Don't forget to check out our website for group tutoring times, video tutorials and lots of other resources: [www.baylor.edu/tutoring](http://www.baylor.edu/tutoring)!

**Answers**

1. Protraction of the scapula
2. A = rectus abdominus  
B = external oblique C  
= internal oblique  
D = transversus  
abdominus E = linea alba
3. D