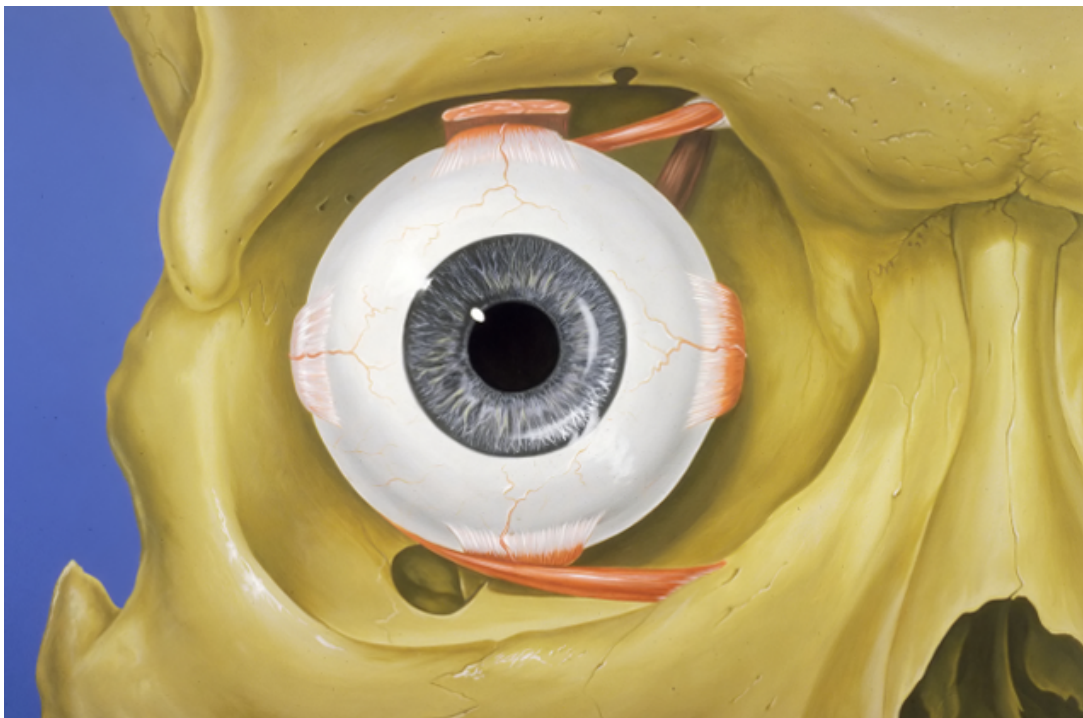


Extraocular Muscles – Basic and Clinical Anatomy

[See online here](#)

All the muscles controlling the movement of the eye are known as the extraocular muscles of the eye. The orbit, or eye socket, holds the eye and its muscles, nerves, and blood vessels. There are six extraocular eye muscles. These muscles contract to rotate the eye up, down, and side to side.



Extraocular muscles

Extraocular muscles are present in the retrobulbar space (behind the eyeball) and are responsible for coordinated movements of the eyeball.

Extraocular muscles: Rectus & Oblique group of muscles

1. Rectus muscles

- a. Medial rectus
- b. Lateral rectus (CN VI)
- c. Superior rectus
- d. Inferior rectus

2. Oblique muscles

- a. Superior oblique (CN IV)
- b. Inferior oblique

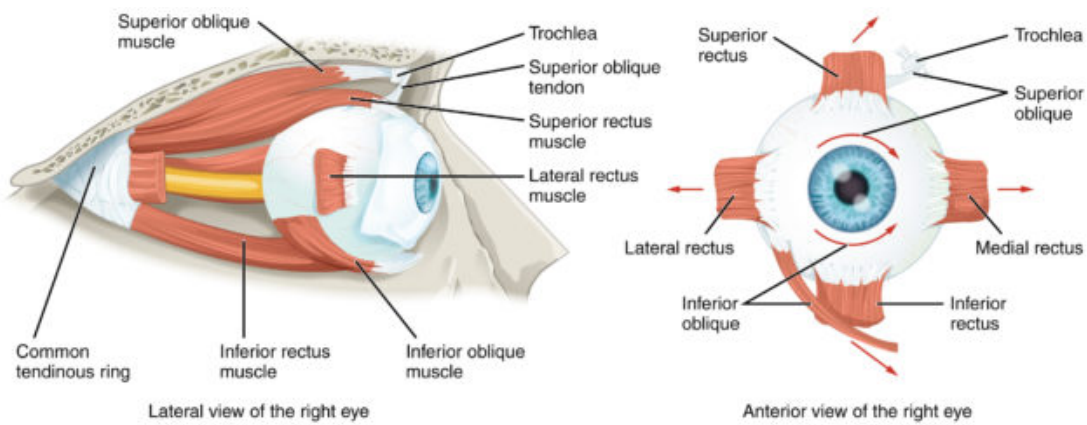


Image: "Extraocular muscles" by OpenStax, License: [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/)

3. Levator palpebrae superioris (not an extraocular muscle)

Origin and insertion of the extraocular muscles



Image: "Eye and orbit anatomy with motor nerves and annulus of Zinn" by Patrick J. Lynch, medical illustrator, License: [CC BY 2.5](https://creativecommons.org/licenses/by/2.5/)

The **superior rectus** originates from the annulus of Zinn (common tendinous ring) and is attached to the top of the [eye](#) 7.7 mm from the limbus.

The **inferior rectus** is attached to the bottom of the eye 6.5 mm from the limbus. It also originates from the annulus of Zinn.

The **medial rectus** is attached to the side of the eye near the [nose](#) 5.5 mm from the limbus.

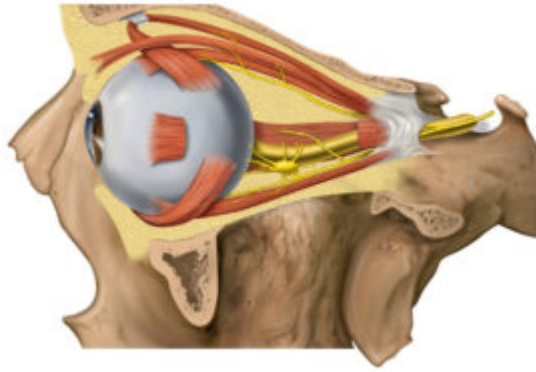


Image: "Orbit anatomy – lateral view" by Patrick J. Lynch, medical illustrator, License: [CC BY 2.5](https://creativecommons.org/licenses/by/2.5/)

The **lateral rectus** is attached to the side of the eye near the **temple** 6.9 mm from the limbus.

The **superior oblique** originates from the apex of the orbit. The apex of the orbit is just above the annulus of Zinn. The tendon of the muscle moves from behind the orbit through a pulley-like structure called the trochlea and comes anteriorly and is attached to the top of the eye at the superior and lateral aspect of the eyeball. Its tendon crosses beneath the superior rectus muscle before attachment.

The **inferior oblique** starts from the front of the orbit near the nose from the maxillary bone just behind the lacrimal space. It travels backward posteriorly and laterally in the orbit before attaching to the inferior of the globe.

Innervation of the extraocular muscles

Muscle	M. rectus superior	M. rectus inferior	M. rectus lateralis	M. rectus medialis	M. obliquus inferior	M. obliquus superior
Innervation	N. oculomotorius (III), R. superior	N. oculomotorius (III), R. superior	N. abducent	N. oculomotorius (III), R. inferior	N. oculomotorius (III), R. inferior	N. trochlearis (IV)

The extraocular eye muscles are innervated by **three cranial nerves**. The third cranial nerve, the **oculomotor nerve**, innervates all the extraocular muscles except the lateral rectus and the superior oblique muscles. The lateral rectus is innervated by the **abducens nerve (CN VI)**. The superior oblique muscle is innervated by the **trochlear nerve (CN IV)**. The levator palpebrae superior muscle is also innervated by the oculomotor nerve.

The oculomotor nerve is divided into two divisions: upper and lower division. The upper-division supplies the superior rectus muscle and the levator palpebrae superioris muscle. The lower division supplies the inferior rectus, medial rectus, and inferior oblique.

Cranial nerve IV (trochlear nerve) enters the middle of superior oblique muscle between the origin and the trochlea. Nerves of all the other muscles enter their respective muscles at the junction of the anterior two-thirds and posterior one-third.

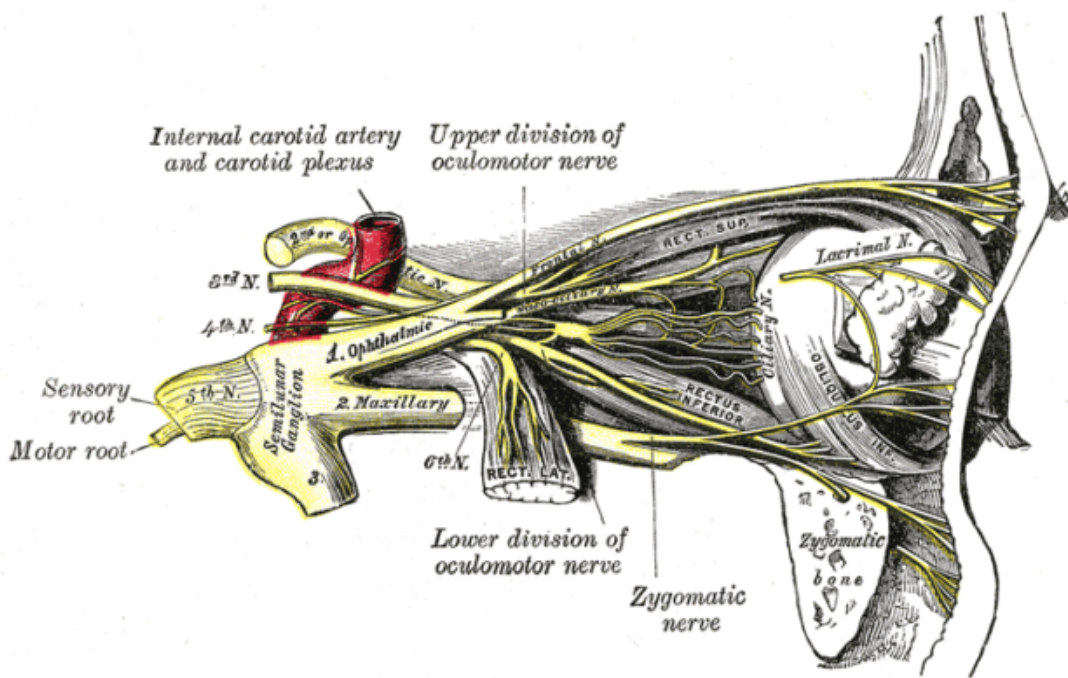


Image: "Nerves of the orbit, and the ciliary ganglion - side view" by Henry Vandyke Carter, Henry Gray (1918) Anatomy of the Human Body, plate 777, License: [Public Domain](#)

Function of the extraocular muscles

The **superior rectus** moves the eye **upwards and medially in the vertical plane**. Both the superior recti pull up the eyeball and allow the individual to look in an upward direction. Upward gaze is because of the function of the two superior recti.

The **inferior rectus** moves the eye **downwards and medially in the vertical plane**. Both the inferior recti pull the eyeball downwards and allow the individual to see in a downward direction. Downward gaze is because of the function of the two inferior recti.

The **lateral rectus** moves the eye **outward laterally in the horizontal plane**. And the **medial rectus** moves the eye **medially toward the nose in the horizontal plane**. Lateral rectus of one eye and medial rectus of the other eye contract simultaneously when an individual is looking one side.

The **superior oblique** rotates the eyeball **inward, downwards and nasally** along the long axis of the eye.

The **inferior oblique** rotates the eye **outward and upward**.

Levator palpebrae superior is the muscle of the eyelid. It **holds the eyelid up**, keeping the **eyes open**. The **blinking reflex** involves this muscle through a reflex arc.

Assessment of the extraocular muscles

Medial and lateral recti have simple actions - they move the eye in the **horizontal plane** (left and right). To test the extraocular eye muscles, the patient is asked to **follow the examiner's finger** who moves it in the air making the **figure of an H**. The superior oblique muscle points the eye down when it is looking medially and the inferior oblique muscle points the eye up when it is looking medially.

So, if a patient is looking up and to his right, he is using his:

- Right eye - lateral and superior rectus muscles
- Left eye - medial rectus and superior oblique muscles

Knowing the function and innervation of the extraocular muscles is extremely helpful for **diagnosing neurological disorders such as brain herniation, and eye motility disorders like strabismus.**

Extraocular muscles are also affected in various diseases affecting the eye, such as Graves disease, orbital metastasis, orbital trauma, and cellulitis, etc.

References

[Anatomy of the Eye](#) via aapos.org

[Extraocular Muscle Anatomy](#) via medscape.com

[The Eye Exam](#) via ucsd.edu

[Extraocular muscle function testing](#) via medlineplus.gov

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