1. The blood cells formed in our bone marrows and other locations brings about immunity in our body. In order for the blood cells to be transported all through our body, our body employs its extensive vasculature (network of blood vessels). For the immunity blood cells to carry out their activities the blood vessels have to transport them all through the body. Our body immunity helps to overcome disease conditions and generates resistance to toxins and infections in our body. In the case of COVID-19(a disease condition) since there is no specific antiviral treatment being discovered, our immunity importance can’t be overemphasized on knowing that the first two patients to die from the virus in China were healthy adults but they were long term smokers. It is left for the blood vessels in our body to play a major role in ensuring our immunity is in place to help overcome disease conditions and to provide resistance to toxins and infections. Surviving with one lung is very possible in as much as the lung is in good shape. The current pandemic (COVID-19) affects the lung making victims of this virus with serious condition suffer inflamed lungs whose tiny alveoli fill with fluid and pus making them unable to effectively carry out oxygen exchange.
2. The adductor canal serves as a **passageway** for structures moving between the anterior thigh and posterior leg. It transmits the **femoral artery**, femoral vein (posterior to the artery), nerve to the vastus medialis and the saphenous nerve – the largest cutaneous branch of the femoral nerve. As the femoral artery and vein exit the canal, they are called the **popliteal artery** and **vein** respectively. In the adductor canal block, local anaesthetic is administered in the adductor canal to block the **saphenous nerve** in isolation, or together with the nerve to the vastus medialis. The block can be used to provide sensory anaesthesia for procedures involving the distal thigh and femur, knee and lower leg on the medial side. The sartorius and **femoral artery** are used as anatomical landmarks to locate the saphenous nerve. Adductor canal compression syndrome describes entrapment of the neurovascular bundle within the adductor canal. A rare condition, it is usually caused by hypertrophy of adjacent muscles such as **vastus medialis**. It is most common in young males, who may present with **claudication** symptoms due to femoral artery occlusion (more common) or neurological symptoms due to entrapment of the saphenous nerve.
3. The extraocular muscles are innervated by three cranial nerves. Oculomotor nerve (CN III) - A lesion of the oculomotor nerve affects most of the extraocular muscles. The affected eye is displaced laterally by the lateral rectus and inferiorly by the superior oblique. The eye adopts a position known as 'down and out'. The extraocular muscles are located within the orbit, but are extrinsic and separate from the eyeball itself. They act to control the movements of the eyeball and the superior eyelid.

There are seven extraocular muscles – the levator palpebrae superioris, superior rectus, inferior rectus, medial rectus, lateral rectus, inferior oblique and superior oblique. Functionally, they can be divided into two groups:

Responsible for eye movement – Recti and oblique muscles.

Responsible for superior eyelid movement – Levator palpebrae superioris.

In this article, we shall look at the anatomy of the extraocular muscles – their attachments, innervation and actions.

Levator Palpebrae Superioris

The levator palpebrae superioris (LPS) is the only muscle involved in raising the superior eyelid. A small portion of this muscle contains a collection of smooth muscle fibres – known as the superior tarsal muscle. In contrast to the LPS, the superior tarsal muscle is innervated by the sympathetic nervous system.

Attachments: Originates from the lesser wing of the sphenoid bone, immediately above the optic foramen. It attaches to the superior tarsal plate of the upper eyelid (a thick plate of connective tissue).

Actions: Elevates the upper eyelid.

Innervation: The levator palpebrae superioris is innervated by the oculomotor nerve (CN III). The superior tarsal muscle (located within the LPS) is innervated by the sympathetic nervous system.

Muscles of Eye Movement

There are six muscles involved in the control of the eyeball itself. They can be divided into two groups; the four recti muscles, and the two oblique muscles.

Recti Muscles

There are four recti muscles; superior rectus, inferior rectus, medial rectus and lateral rectus.

These muscles characteristically originate from the common tendinous ring. This is a ring of fibrous tissue, which surrounds the optic canal at the back of the orbit. From their origin, the muscles pass anteriorly to attach to the sclera of the eyeball.

The name recti is derived from the latin for ‘straight’ – this represents the fact that the recti muscles have a direct path from origin to attachment. This is in contrast with the oblique eye muscles, which have an angular approach to the eyeball.

Superior Rectus

Attachments: Originates from the superior part of the common tendinous ring, and attaches to the superior and anterior aspect of the sclera.

Actions: Main movement is elevation. Also contributes to adduction and medial rotation of the eyeball.

Innervation: Oculomotor nerve (CN III).

Inferior Rectus

Attachments: Originates from the inferior part of the common tendinous ring, and attaches to the inferior and anterior aspect of the sclera.

Actions: Main movement is depression. Also contributes to adduction and lateral rotation of the eyeball.

Innervation: Oculomotor nerve (CN III).

Medial Rectus

Attachments: Originates from the medial part of the common tendinous ring, and attaches to the anteromedial aspect of the sclera.

Actions: Adducts the eyeball.

Innervation: Oculomotor nerve (CN III).

Lateral Rectus

Attachments: Originates from the lateral part of the common tendinous ring, and attaches to the anterolateral aspect of the sclera.

Actions: Abducts the eyeball.

Innervation: Abducens nerve (CN VI).

Oblique Muscles

There are two oblique muscles – the superior and inferior obliques. Unlike the recti group of muscles, they do not originate from the common tendinous ring.

From their origin, the oblique muscles take an angular approach to the eyeball (in contrast to the straight approach of the recti muscles). They attach to the posterior surface of the sclera.

Superior Oblique

Attachments: Originates from the body of the sphenoid bone. Its tendon passes through a trochlear, and then attaches to the sclera of the eye, posterior to the superior rectus.

Actions: Depresses, abducts and medially rotates the eyeball.

Innervation: Trochlear nerve (CN IV).

Inferior Oblique

Attachments: Originates from the anterior aspect of the orbital floor. Attaches to the sclera of the eye, posterior to the lateral rectus

Actions: Elevates, abducts and laterally rotates the eyeball.

Innervation: Oculomotor nerve (CN III).

**Cranial Nerve Palsies**

The extraocular muscles are innervated by three cranial nerves. Damage to one of the cranial nerves will cause paralysis of its respective muscles. This will alter the resting gaze of the affected eye. Thus, a lesion of each cranial nerve has its own characteristic appearance:

Oculomotor nerve (CN III) – A lesion of the oculomotor nerve affects most of the extraocular muscles. The affected eye is displaced laterally by the lateral rectus and inferiorly by the superior oblique. The eye adopts a position known as ‘down and out’.

Trochlear nerve (CN IV) – A lesion of CN IV will paralyse the superior oblique muscle. There is no obvious affect of the resting orientation of the eyeball. However, the patient will complain of diplopia (double vision), and may develop a head tilt away from the site of the lesion.

Abducens nerve (CN VI) – A lesion of CN VI will paralyse the lateral rectus muscle. The affected eye will adducted by the resting tone of the medial rectus.

**Horner’s Syndrome**

Horner’s syndrome refers to a triad of symptoms produced by damage to the sympathetic trunk in the neck:

Partial ptosis (drooping of the upper eyelid) – Due to denervation of the superior tarsal muscle.

Miosis (pupillary constriction) – Due to denervation of the dilator pupillae muscle.

Anhydrosis (absence of sweating) on the ipsilateral side of the face – Due to denervation of the sweat glands.

Horner’s syndrome can represent serious pathology, such as a tumour of the apex of the lung (Pancoast tumour), aortic aneurysm or thryoid carcinoma.