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1 The body’s natural barriers against disease causing intruders – for example, our skin, the mucous, and hairs in the nose and the acid in the stomach – are part of innate immune system. Adaptive immunity develops over a life time of contact with pathogens and vaccines, preparations which help our immune systems to distinguish friends from foe.

 The immune system is like the body’s personal army that works from cellular to macro level. Each cell, molecule, tissue and organ in this army plays an important role in warding off, invading pathogen, and also helps guard against internal threat like cancer

The system has two type of response: innate and adaptive.

* Until a vaccine is available our immune system will need to adapt unaided to covid 19
* The immune system is the body’s multi-level defence against potentially harmful bacteria, viruses, and other organisms.

 2. The subsartorial canal (adductor) is a narrow conical tunnel located in the thigh. It is approximately 15cm long, extending from apex of the femoral triangle to the adductor hiatus of the adductor magnus .the canal serves as a passage way from structures moving from the anterior thigh to the posterior leg.

Borders: the adductor canal is bordered by muscular structures:

* Anteromedial: Sartorius
* Lateral: vastus medialis
* Posterior : adductor longus and adductor magnus muscle

The adductor canal runs from the apex of the femoral triangle to the adductor hiatus – a gap between the adductor and hamstring attachments of the adductor Magnus muscle.

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.

Clinical relevance – adductor canal block

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.

Clinical relevance- adductor canal compression syndrome

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.

3. The muscles of the eye are Integral to its function and motion. Muscles directly associated with the eye include the extraocular muscle which controls the external movement of the eye; the intaocular muscles, which are responsible for pupil accommodation and reaction to light; and the protractor and retractors of the eyelids. Deficits in the muscle or the nerves innervating these muscles can results in functional impairment of the involved structures.

Structure and functions

The intraocular muscles include the ciliary muscle, the sphincter papillae, and the dilator pupillae. The ciliary muscle is a smooth muscle ring that controls accommodation by altering the shape of the lens, as well as controlling the flow of aqueous humor into schlemm’s canal . the ciliary muscle is attached to the zonular fibres which suspend the lens . upon contraction of the ciliary muscle , the tension on the lens is lessened which causes it to adopt a more spherical shape to focus on near objects . relaxation of the ciliary muscle has the opposite effect ,optimising distant focus . the sphincter pupillae and dilator papillae encircles the pupil and is responsible for the construction of its diameter , while the dilator muscle is arranged radially and increases the pupillary diameter .

There are three primary axes of ocular movements:

vertical, transverse, and anteroposterior. Rotation around the vertical axis results in either adduction (medial movement) or abduction (lateral movement ) of the eye. Rotation around the transverse axis enables movement of the superior pole of the eye medially (intorsion) or laterally (extorsion). The rotations around the anteroposterior axis allow the eye to adjust to tilting of the head. The medial rectus muscle is responsible for medial rotation around the vertical axis , and the lateral rectus lateral rotation . The superior rectus muscle primarily elevates the eye and contributes to the adduction and intorsion . The inferior rectus depresses and laterally rotates the eye and contribute to adduction and extorsion. The superior oblique obducts, depresses and medially rotate the eye, while the inferior oblique abducts, elevates and laterally rotates.

NERVES

The extra ocular muscles are innervated by the nerves that enter the orbit though the superior orbital fissure: the oculomotor nerve (CN 111) divides into superior and inferior branches and innervates the superior ,medial and inferior recti, the levator palpebrae superioris and the inferior oblique . it also carries presynaptic fibers to the ciliary ganglion . Sympathetic fibers of CN 111 contribute to the upper eyelid retraction by innervation of the superior tarsal muscle (muller’s muscle).the trochlear nerve (cn iv) innervates the superior oblique ,and the lateral rectus is innervated by the abducens nerve ( cn vi)

The ophthalmic nerve cn v:vi branches into the frontal , nasociliary, and lacrimal nerves. The ciliary ganglion is made up of postsynaptic parasympathetic nerve cell bodies associated with the ophthalmic nerve . The short ciliary nerves originate from the ciliary ganglion and carry parasympathetic and sympathetic fibers to the iris and ciliary body .the long ciliary nerve branch off of the nasociliary nerve and carry postsynaptic sympathetic fibers to the dilator pupillae and afferent fibers from the cornea and iris. The sphincter pupillae is parasympathetically – stimulated while the dilator pupillae is sympathetically –stimulated.