- In last class we discussed the bony framework of orbit and important landmarks on and in between different walls of the orbit .

- Close anatomical relationship of optic nerve and other cranial nerves at the orbital apex means that lesions in this region may lead to a combination of
  - > visual loss from optic neuropathy and
  - > ophthalmoplegia(dysfunction of ocular movement) from multiple cranial nerve involvement

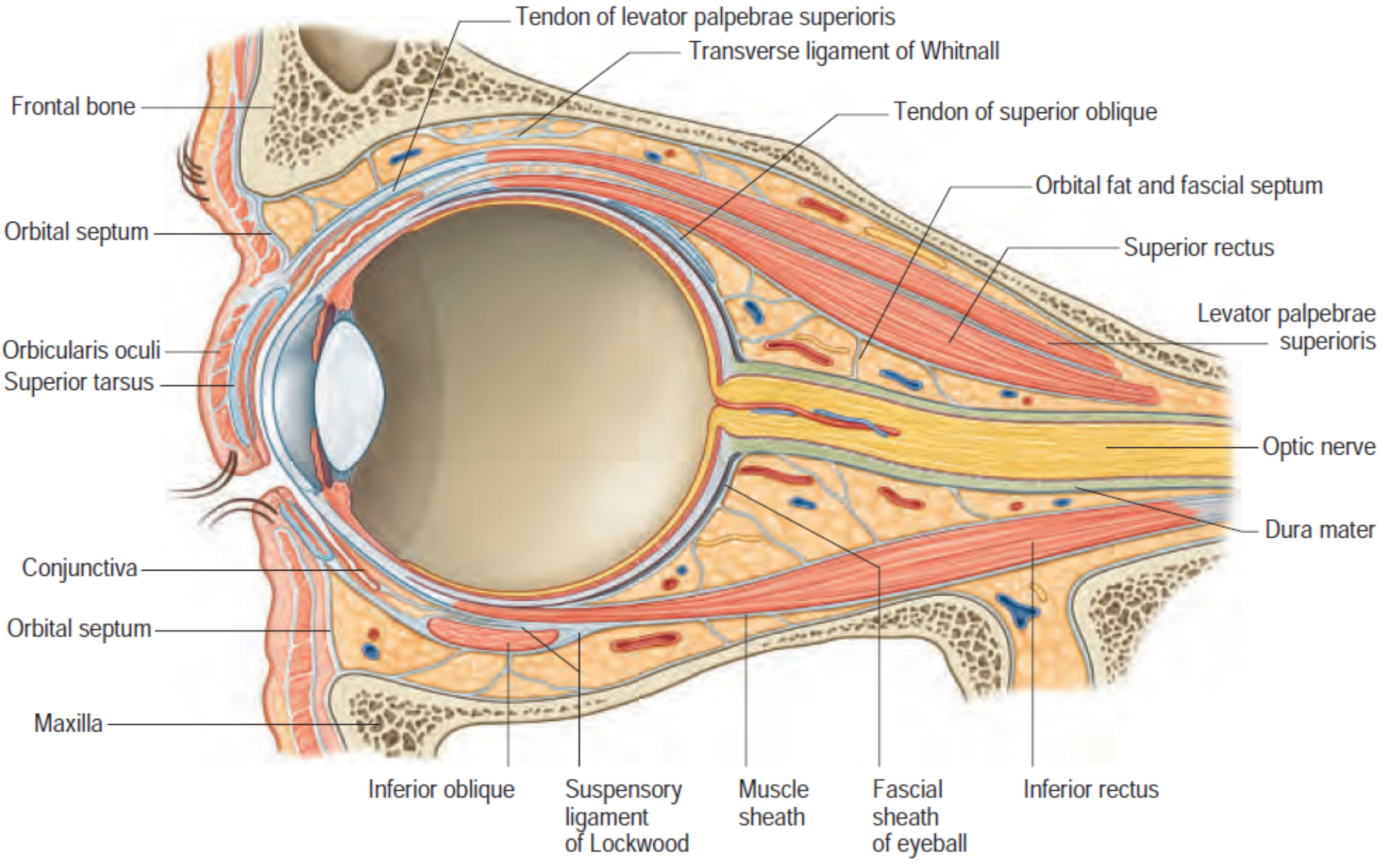
- Today we would try to finish the fibrofatty tissue orientation within the orbit and then we will discuss the extra ocular muscles , their direction of pull which can help us understand action of different extraocular muscles .

- The orbit contains a complex arrangement of connective tissue that forms
  - > a supporting framework for the eyeball and also
  - > influences ocular rotations and
  - > compartmentalizes orbital fat .

- Certain regions have anatomical and clinical significance, including the
  - > orbital septum,
  - > fascial sheath of the eye,
  - > 'check' ligaments,
  - > suspensory ligament and
  - > periosteum.

- The notion that orbital connective tissues function as extraocular muscle pulleys and influence ocular motility has recently gained widespread acceptance

Contents of the orbit - sagittal section



ORBITAL SEPTUM

- Is a weak membranous sheet, attached to the orbital margin where it becomes continuous with the periosteum .

- It extends into each eyelid and blends with the tarsal plates and, in upper eyelid, with the superficial lamella of levator palpebrae superioris.

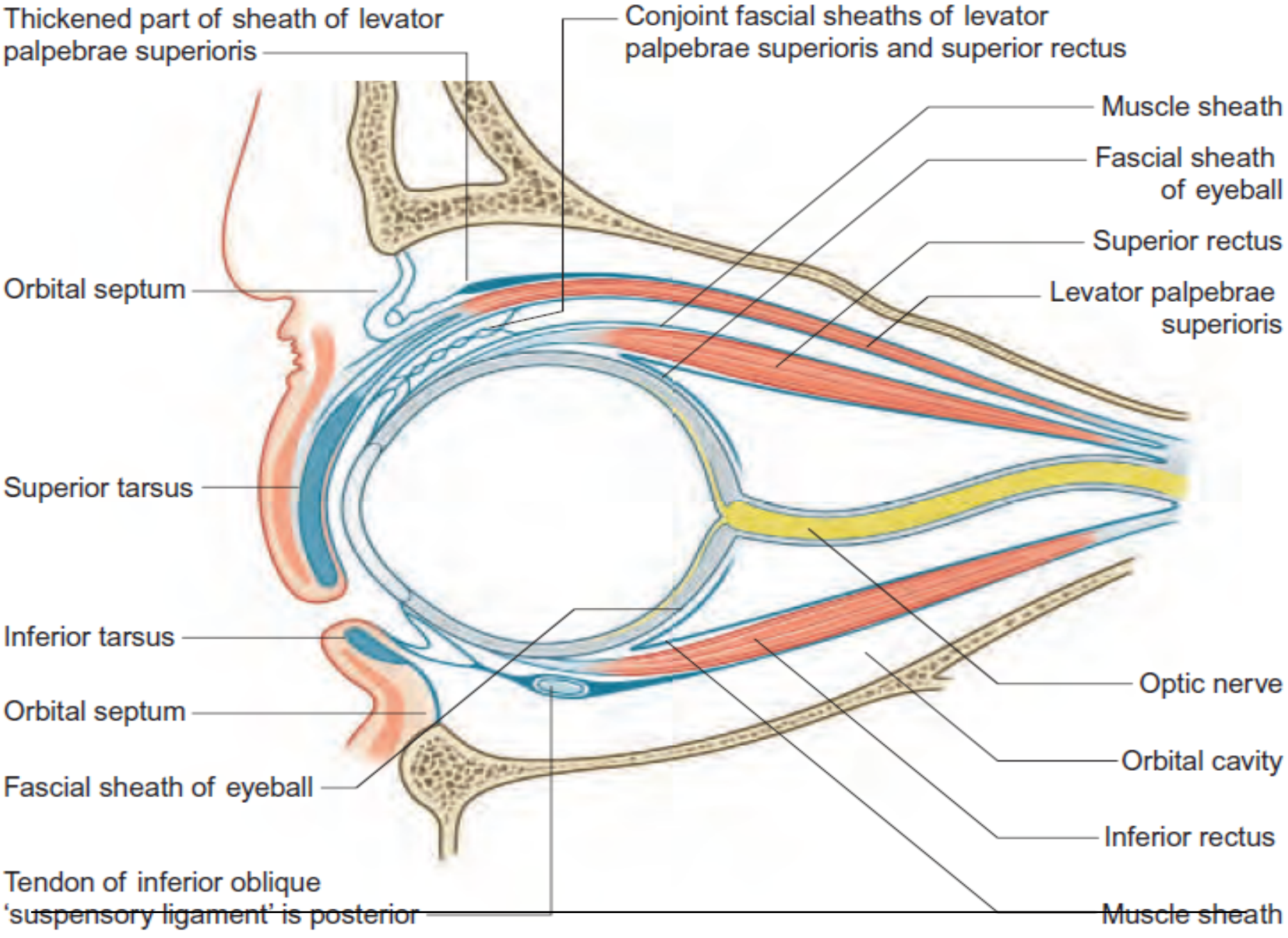
- Is thickest laterally, where it lies in front of lateral palpebral ligament.
- It passes behind the medial palpebral ligament and nasolacrimal sac, but in front of the pulley of superior oblique.

- The septum is pierced above by levator palpebrae superioris and below by a fibrous extension from the sheaths of inferior rectus and inferior oblique.

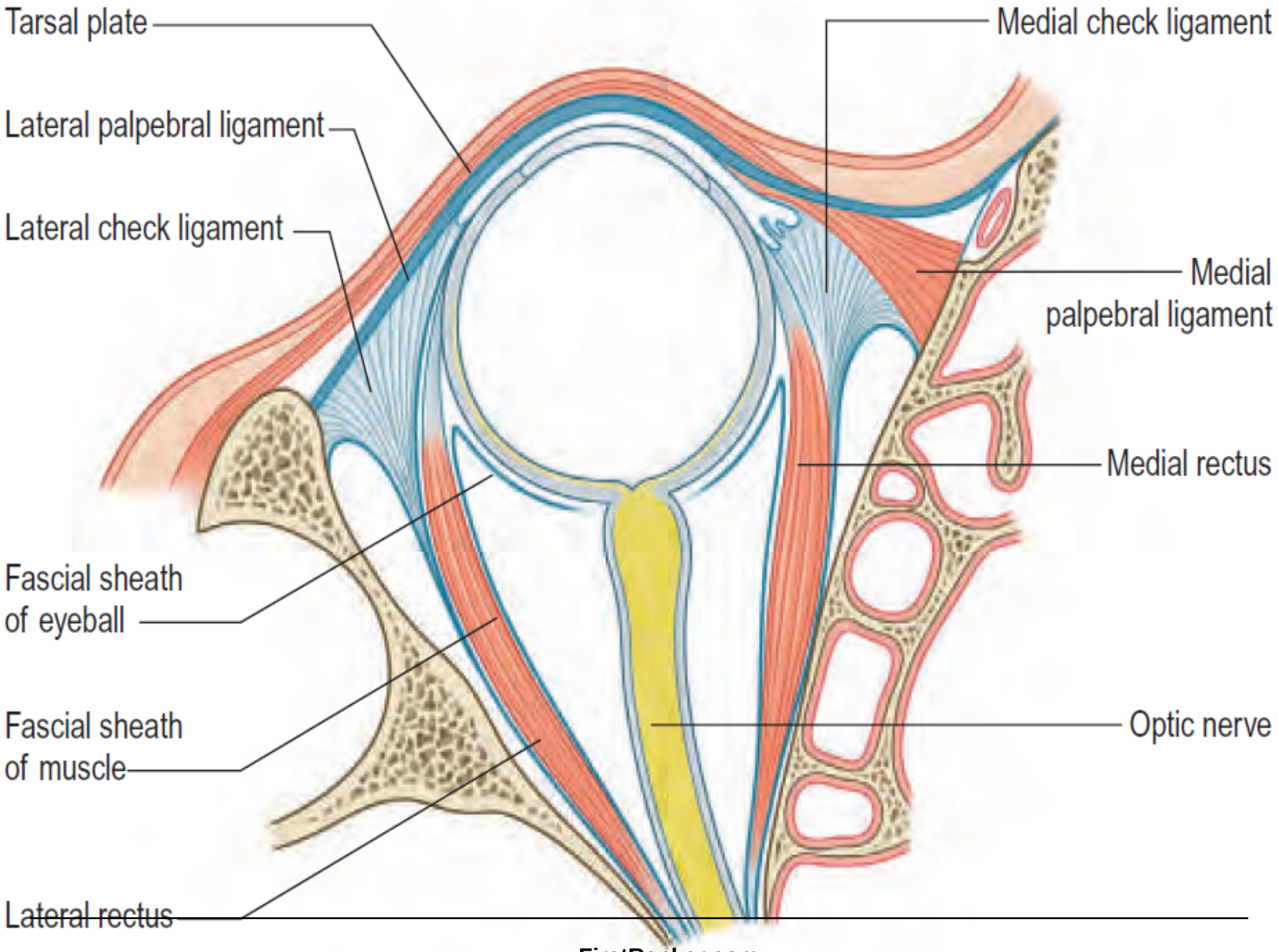
- The lacrimal, supratrochlear, infratrochlear and supraorbital nerves and vessels pass through the septum from the orbit *en route to the face and scalp.*

- *Clinically, the septum is an important* anatomical reference to differentiate pre- and postseptal (orbital) cellulitis.

Orbital fascia, sagittal section



Orbital fascia, horizontal section



FASCIAL SHEATH OF THE EYEBALL

- A thin fascial sheath, the fascia bulbi (Tenon's capsule), envelops the eyeball from the optic nerve to the corneoscleral junction, separating it from the orbital fat and forming a socket for the eyeball .
- The ocular aspect of the sheath is loosely attached to the sclera by delicate bands of episcleral connective tissue.
- Posteriorly, it is traversed by ciliary vessels and nerves.
- It fuses with the sclera and with the sheath of the optic nerve where the latter enters the eyeball; attachment to the sclera is strongest in this position and again anteriorly, just behind the corneoscleral junction at the limbus.
- Injection of local anaesthetics via a cannula into the space between the fascia bulbi and the sclera (sub-Tenon's anaesthesia) has become a popular technique for many ophthalmic surgical procedures

- The fascia bulbi is perforated by the tendons of the extraocular muscles and is reflected on to each as a tubular sheath, the muscular fascia.

- The sheath of superior oblique reaches the fibrous pulley (trochlea) associated with the muscle.

- The sheaths of the four recti are very thick anteriorly but are reduced posteriorly to a delicate perimysium.

- Just before they blend with the fascia bulbi, the thick sheaths of adjacent recti become confluent and form a fascial ring.

- Expansions from the muscular fascia are important for the attachments they make.

  Those from the medial and lateral recti are triangular and strong, and are attached to the lacrimal and zygomatic bones, respectively; since they may limit the actions of the two recti, they are termed the medial and lateral check ligaments .

  Other extraocular muscles have less substantial check ligaments, and the capacity of any of them actually to limit movement has been questioned.

- The sheath of inferior rectus is thickened on its underside and blends with the sheath of inferior oblique. These two, in turn, are continuous with the fascial ring noted earlier and therefore with the sheaths of the medial and lateral recti. Since the latter are attached to the orbital walls by check ligaments, a continuous fascial band, the suspensory ligament of the eye, is slung below the eye, providing sufficient support such that, even when the maxilla (forming the floor of the orbit) is removed, the eye will retain its position.

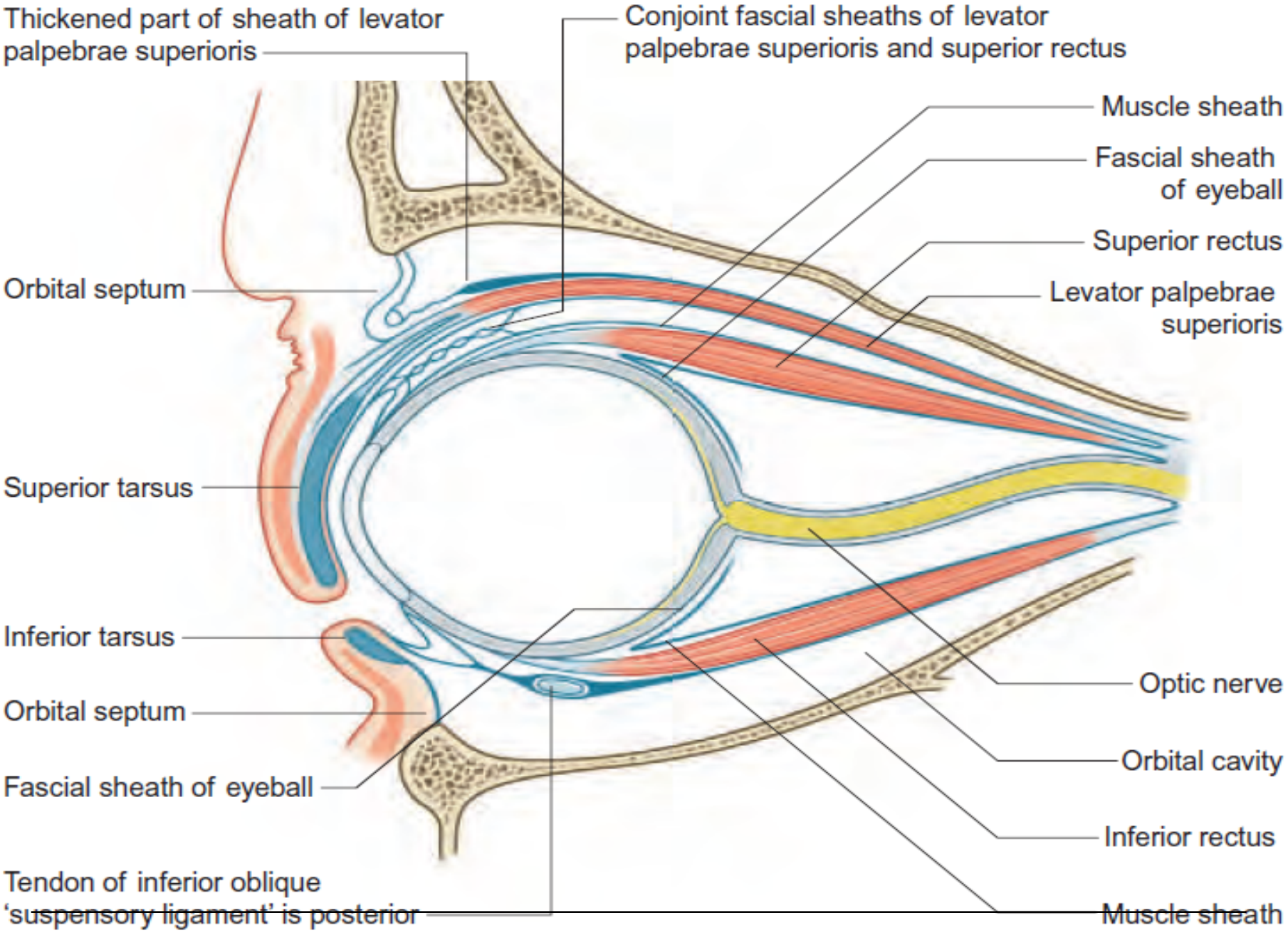
- The thickened fused sheath of inferior rectus and inferior oblique also has an anterior expansion into the lower eyelid, where, augmented by some fibres of orbicularis oculi, it attaches to the inferior tarsus as the inferior tarsal muscle; contraction of inferior rectus in downward gaze therefore also draws the lid downward.

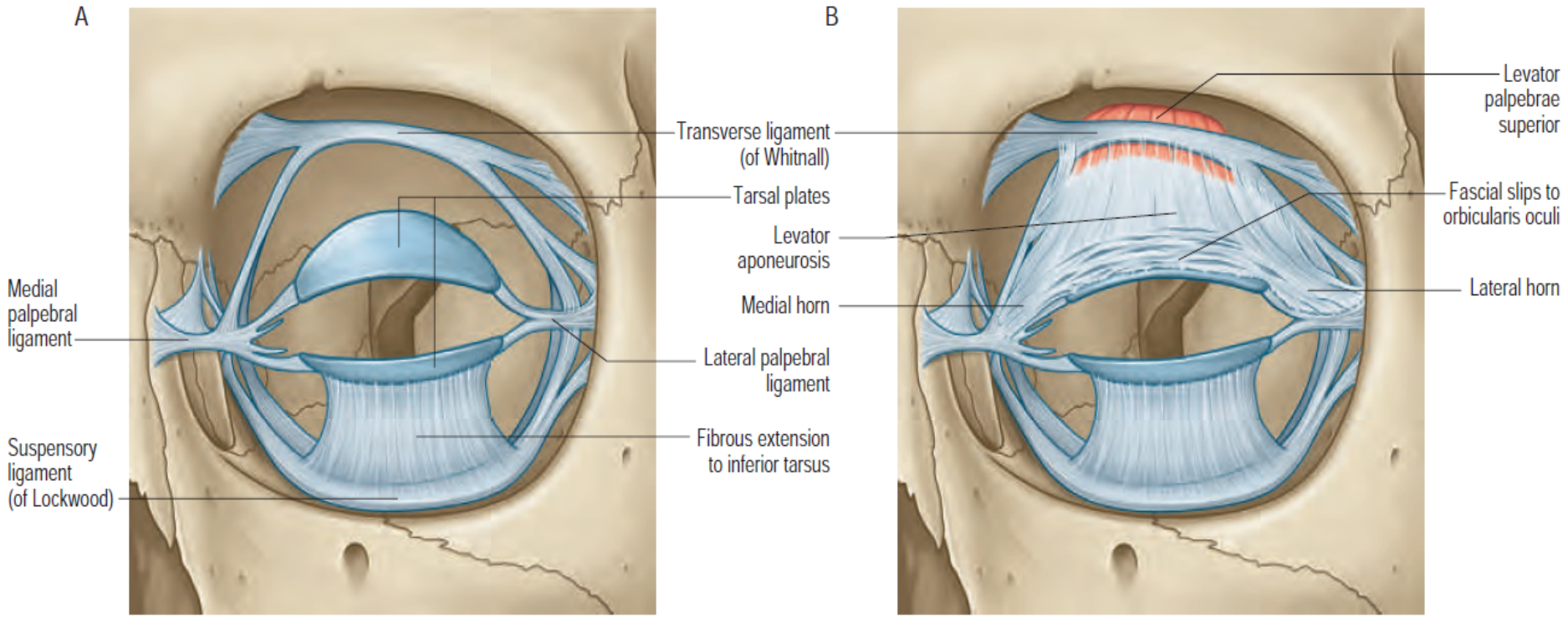
- The sheath of levator palpebrae superioris is also thickened anteriorly, and just behind the aponeurosis it fuses inferiorly with the sheath of superior rectus. It extends forwards between the two muscles and attaches to the upper fornix of the conjunctiva. This structure is of uncertain significance, but presumably plays a part in drawing the fornix upwards in gaze elevation and may act as a fulcrum for levator movements.

- Other extensions of the fascia bulbi pass medially and laterally, and attach to the orbital walls, forming the transverse ligament of the eye.

- Other numerous finer fasciae form radial septa that extend from the fascia bulbi and the muscle sheaths to the periosteum of the orbit, and so provide compartments for orbital fat. They also prevent the gross displacement of orbital fat, which could interfere with the accurate positioning of the two eyes that is essential for binocular vision.

Orbital fascia, sagittal section





Periosteum of the orbit

- The periosteum of the orbit is only loosely attached to bone.
- Behind, it is united with the dura mater surrounding the optic nerve and,
- In front, it is continuous with the periosteum of the orbital margin, where it gives off a stratum that contributes to the orbital septum.
- It also attaches to the trochlea and, as the lacrimal fascia, forms the roof and lateral wall of the fossa for the nasolacrimal sac.

Orbital fat

- The spaces between the main structures of the orbit are occupied by fat, particularly in the region between the optic nerve and the surrounding cone of muscles .
- Fat also lies between the muscles and periosteum, and is limited anteriorly by the orbital septum.
- Collectively, the fat helps to stabilize the position of the eyeball and also acts as a socket within which the eye can rotate.
- Conditions resulting in an increased overall volume of orbital fat with associated swelling of the extraocular muscles, e.g. hyperthyroidism (Graves' disease), may lead to forward protrusion of the eyeball (exophthalmos).
- Enopthalmous