

# Anatomy and Anaesthetic Eye Blocks

## Selection of Safe Technique.

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October 2015

Two recent reports of globe perforation have prompted this review of the anatomical factors and details of technique which contribute to increased risk of injury. The first incident was associated with an Asian orbit and an infero-lateral trans-conjunctival technique, and the second was multiple supero-medial globe perforations from a medial canthal injection technique which came to us for repair. The relative safety and technique of the sub-Tenon's eye block will not be included in this review.

**The "Asian" globe and orbit.** The average transverse diameter of the globe is 24 mm, with an average space between the globe and the orbital walls of about 8mm each side and 5 mm above and below. In many Asian ethnic groups there is a reduced orbital volume and an increased incidence of myopia resulting in not only less room around the globe, but also an increase in the incidence of staphyloma, thus increasing the risk of globe perforation.

**Globe position in the orbit.** The depth of the globe within the orbit can be assessed by observation or more accurately with a Hertel exophthalmometer or CT scan. On average the Asian globe is set 2 mm deeper in the orbit. A deep set eye is more at risk of perforation if the needle is advanced at an angle.



**Distortion of the anatomy.** Clear mental visualisation of the unseen anatomy is needed for safe injections. Anything which distorts the anatomy, such as everting the lid or pressure on the globe, impairs this visualisation.

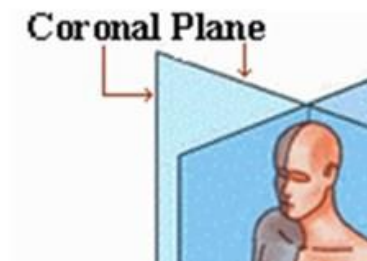
**Assessment of the patient's anatomy** prior to an anaesthetic eye block. Assess globe size using the A scan if available, history of myopia or surgeon's opinion. Assess the depth of the globe in the orbit by looking from the side and assess the space between the globe and the infero-lateral walls of the orbit by pressing through the lower lid. Then make a judgement about the safest anaesthetic technique.

**Avoid sharp needle injections if  
there isn't much room.**

**Injection site.** For infero-lateral injections choose a site which is as close to the bony orbit as possible and is equally inferior and lateral. It is a common error to place the needle too medially, increasing the risk of damage to the inferior rectus muscle. For medial injections insert the needle between the skin of the medial canthus of the eyelids and the caruncle.



**The angle of insertion of the needle.** For infero-lateral injections start with the needle at right angles to the coronal plane and advance until the needle tip is past the equator of the globe, and only then angle it if necessary to avoid hitting the lateral wall of the orbit. For medial canthal injections, orient the needle at right angles to the coronal plane. It is important to realise that the most comfortable and natural orientation of the needle and syringe is towards the operator's midline rather than to the side. This means that for some positions of the operator and patient, such as a right-handed operator, positioned at the head of the patient, doing a patient's left eye, the needle will tend to be oriented towards the globe.



**Depth of needle advancement.** The tip of the needle only needs to be at a depth between the equator and posterior pole of the globe. In a patient with an anterior globe this may be only a few mm beneath the skin. Deeper in the orbit, the muscle bellies and vessels are larger and more likely to be damaged. This applies especially to medial canthal injections where the needle should be no longer than 13 mm.

**In summary,** a good understanding of the anatomy, quality training and careful attention to technique will reduce the risk of errors.