
The Corneal Incision

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The surgeon decides on the size and shape of the corneal incision prior to phacoemulsification and it is important in the surgical outcome. The incision should provide easy access for the instruments, provide stable fluidics, allow sutureless closure of the incision, and induce astigmatism. The width, location, and shape of the corneal incision depends on various parameters that we will analyze later; the determining features are the planned surgical technique and the intraocular lens (IOL) implantation.

Phaco incisions began in 1972 as limbal incisions that were large and straight.¹ Subsequently in 1977, Kratz introduced a scleral tunnel approach. This induced less astigmatism as opposed to corneal incisions.² This has evolved into clear corneal incisions as described by Fine in 1991 with external and internal incisions of 4 mm or less, and tunnels 1.75 mm long.³ Initially, a single corneal suture was used as described by Shepherd.⁴

The development of foldable IOLs that can be injected through corneal incisions now down to 1.7 mm allow sutureless and astigmatic neutral surgery. A proper corneal tunnel that sustains the surgical stress induced by phacoemulsification and can be made watertight with incision hydration is required.^{5,6} The astigmatic advantages are statistically significant for sutureless incisions less than 3.2 mm.⁵

Recently the introduction of gluing with liquid hydrogel applied to the incision and a protective collagen shell is felt to have significant advantages in terms of closure of the incision and improvement in postoperative comfort.^{7,8}

Traumatic dehiscence post “small sutureless water tight incisions” is seen less frequently than with larger incisions, but is still occasionally reported.^{9,10}

CLEAR CORNEAL INCISIONS

There are 3 steps recommended in clear cornea: external incision, the tunnel, and internal incision. Each has to support a different degree of mechanical stress induced by surgery and allow a watertight corneal incision at the end.¹¹

The Anatomy of the Limbus

Knowledge of the limbal anatomy is required for the creation of a good corneal tunnel. The limbus has a width of 2 mm. The anterior margin is delineated by the conjunctival capillaries extending into clear cornea (corresponding to the external margin of Bowman’s); the posterior margin of the limbus merges with the scleral spur. Between the anterior and the posterior margins of the limbus, an area of blue reflex is seen corresponding to the termination of Descemet’s membrane ending in Schwalbe’s line (Figure 2-1).