

Phaco-incision and Continuous Circular Capsulorhexis

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Phaco-incision

Complete Circular Capsulorhexis (CCC)

Phaco-incision

Small incision technique - sutureless, minimizes distortion of the corneal curvature.

The classical phaco-incision is Z shaped in 3 steps:-

1. One limb - vertical gutter
2. Second limb - horizontal dissection
3. Third limb - entry into the anterior chamber

Vital statistics

1. Site of the external incision
2. Placement of the incision
3. Style of the external incision
4. Length of the external incision
5. Length of the corneo-scleral tunnel
6. Depth of tunnel dissection
7. Size of primary incision
8. Size of incision for IOL
9. Paracentesis opening

Scleral pocket incision

1.5 to 1.75 mm, posterior to limbus, usually at 12'O clock

Clear corneal incision

Just ahead of the limbal vascular arcade

Superior limbus

- Usually anteriorly placed
- Effective corneal valve incision - internal opening too anterior so more clear corneal. Shifting to temporal cornea.

Clear corneal incision

Incision is placed over the steeper meridian to correct astigmatism by flattening of the meridian.

Temporal incision - eye does not need to be turned down. It does not give rise to post operative ptosis and iris plane is parallel to microscope light, therefore red glow is excellent. This incision is more stable refractively.

The disadvantage being higher risk of complications and also uncomfortable position for the surgeon.

External incision - Frown or Straight line incision

Highly recommended incision, leading to less astigmatic shift. Length of incision is equal to size of IOL although a small entry is made for phaco.

- Thickness of the roof - about 300 microns, thin roof may lead to button holing.
- Length of the tunnel 2.5 mm for scleral tunnel, 1.75 mm for clear corneal incision
 - Too long a tunnel causes distortion of corneal dome
 - Too short a tunnel - leaking incision

Length of incision for phaco

3 to 3.4 mm, average 3.2 mm

The incision should -

- Allow easy entry of phaco needle
- Allow easy motility of phaco needle
- Minimal incision leak
- Prevent incision burns

Size of opening for IOL

Rigid style PMMA PC IOL - 5.2 mm (should be equal to the size of the IOL)

Foldable IOL - 2.5 to 3.5 mm

Paracentesis

These are secondary incisions, 0.6 to 1 mm for phaco chopper, lens hook. A limbal incision just ahead of arcade is preferable.

Comparing Scleral tunnel with Corneal tunnel incisions

	Scleral tunnel	Corneal tunnel
Indications & contraindication	C/I in bleeding disorders, collagen vascular diseases, functioning blebs.	Good for blebs, bleeding disorders, conjunctival scarring, scleritis, dry eye syndrome
Construction and tissue trauma	More difficult, time consuming and more traumatic	Less so
Astigmatic control	comparable	comparable
Risk of complications (Endophthalmitis, Iris prolapse, Flat A/c)	Very rare	More common
Risk of hyphema	Greater	Infrequent

Closure

Clear corneal incision - never let your ego come between the suture and safety.

A few things need to be avoided to reduce chances of greater astigmatism -

1. Longer incision
2. A corneal incision
3. Limbus parallel incision
4. A uniplanar incision
5. A sutured incision

A wound with a "square" configuration (length = breadth) is considered more stable.

One study suggests that -

- Induced astigmatism was minimal and comparable with both scleral tunnel and clear corneal incisions.
- Endothelial cell loss was documented to be higher with corneal incision if it is close to central area.

Achieving emetropia

Temporal clear corneal incision or a frown incision 3 mm behind the cornea is better.

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Complete Circular Capsulorhexis (CCC)

Developed by Gimbel, Neuhann and Shimizu

Diameter of adult crystalline lens is 9.5 to 10 mm, zonule free area is 6 mm

Prerequisites -

- Absence of positive pressure with use of viscoelastics, air, irrigation.
- Closed chamber technique
- 26 gauge bent needle
- Special forceps can be used under Healon.

Advantages

- In situ phacoemulsification is facilitated and ultrasonic turbulence is contained within the new capsule.
- In the bag implantation is possible.
- IOL rotation is possible with no chance of decentering caused by loops coming out of the bag.
- There is no capsular tag left that can extend up to the posterior capsule.
- In the event of PC rupture one can implant the lens over rhexis margin in the sulcus
- Chances of posterior synechiae are less.

Method

Tearing by stretching, tearing and shearing.

Size of CCC is 4-5 mm

One study shows that CCC cases require 0.44 D sph more correction than those who underwent can opener technique.

Complications

1. Shrinkage of anterior capsule opening
2. Capsular bag hyperdistension
3. Epithelial cell proliferation on posterior capsule

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