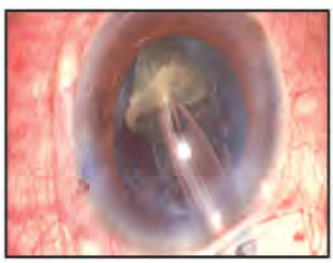
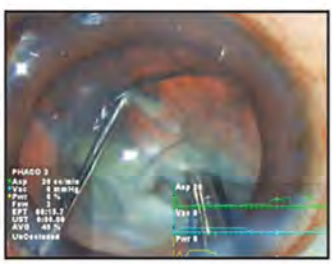
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# *Do's & Don'ts in*
# Phaco Surgery
## Text and Atlas





**Navneet Toshniwal**

*Forewords*
**Amar Agarwal**
**Majed Husni Al-Zoubi**

JAYPEE

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CHAPTER

# 4 Trench

## INTRODUCTION

- Trench is the first step for stop and chop or divide and conquer technique in nucleus management.
- Phaco tip is generally in bevel up position in this step.
- Adequate energy according to density of nucleus is needed.
- Length and depth of trench depend on size and hardness of nucleus.

### Observations (Fig. 1)

- Difficulty in entry of phaco tip before start of trench.
- Eccentric placement of the phaco tip.
- Phaco tip is in bevel up position.

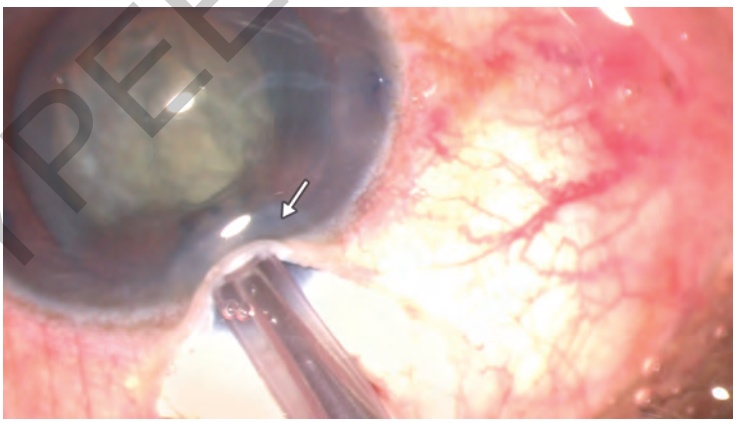


**Fig. 1**

### Result

Descemet's membrane can get detached.

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***Do's***

- *Phaco tip should pass three-dimensional (3D) center of incision.*
- *Angulation of the phaco tip should be parallel or near parallel to iris plane.*
- *Phaco tip should enter in bevel down or bevel side way in straight tip.*

## Observations (Figs. 2A to C)

- Phaco tip is stucked at incision.
- Phaco tip touches the iris.
- Exposed part of phaco tip is more without sleeve; it means that sleeve is tucked at incision site.
- Shallowing of anterior chamber is due to no irrigation of fluid.

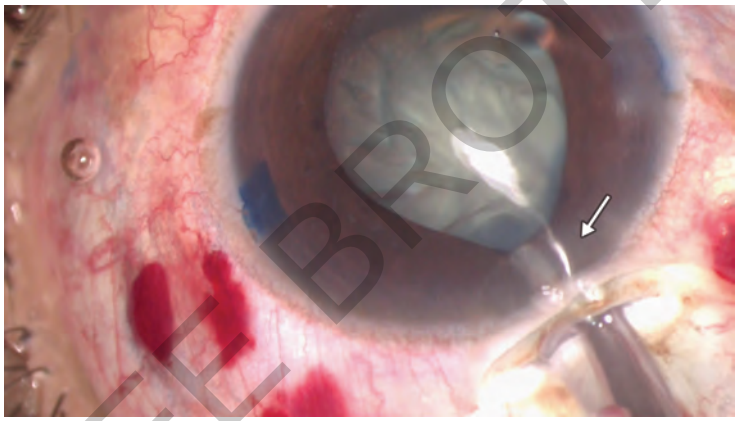


**Fig. 2A**

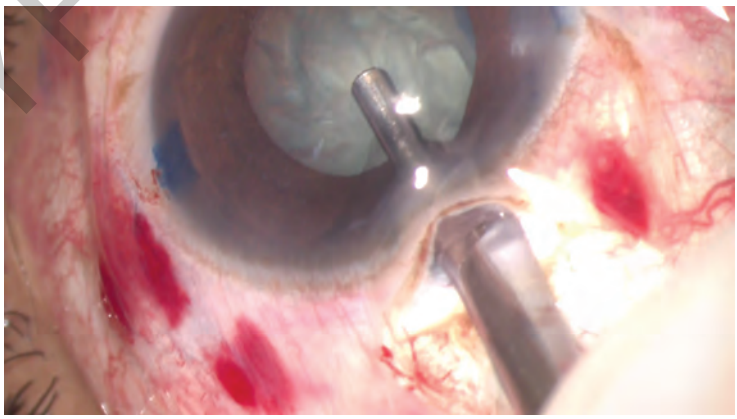


**Fig. 2B**

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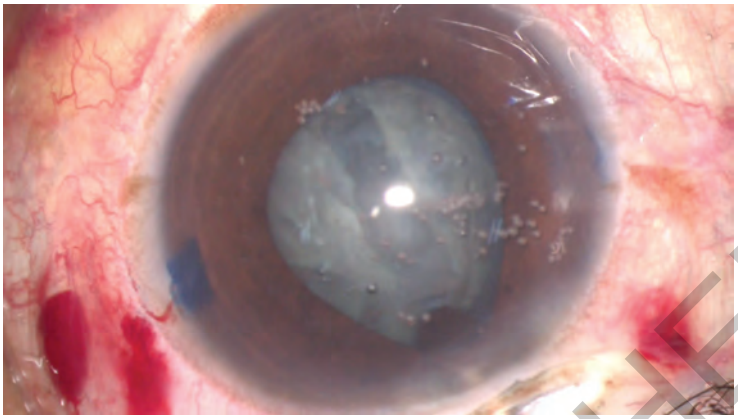


Fig. 2C

## Results

- Mechanical injury to cornea and iris can occur.
- Cornea or iris can get burned.

## Do's

- *This situation can occur due to:*
  - *Pre-existing shallow anterior chamber.*
  - *Deep plane of incision.*
- *Entry of phaco tip through the incision should be smooth, with adequate speed, and 3D center of incision.*
- *Phaco probe should pass parallel to iris plane and sometimes quick movement is necessary.*
- *Angulation of introducing phaco tip at incision site is very important.*

## Observation (Fig. 3)

Iris is stucked during trench.

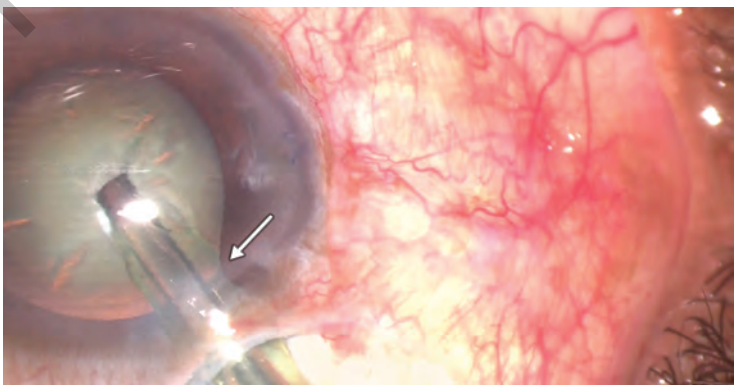


Fig. 3

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## Results

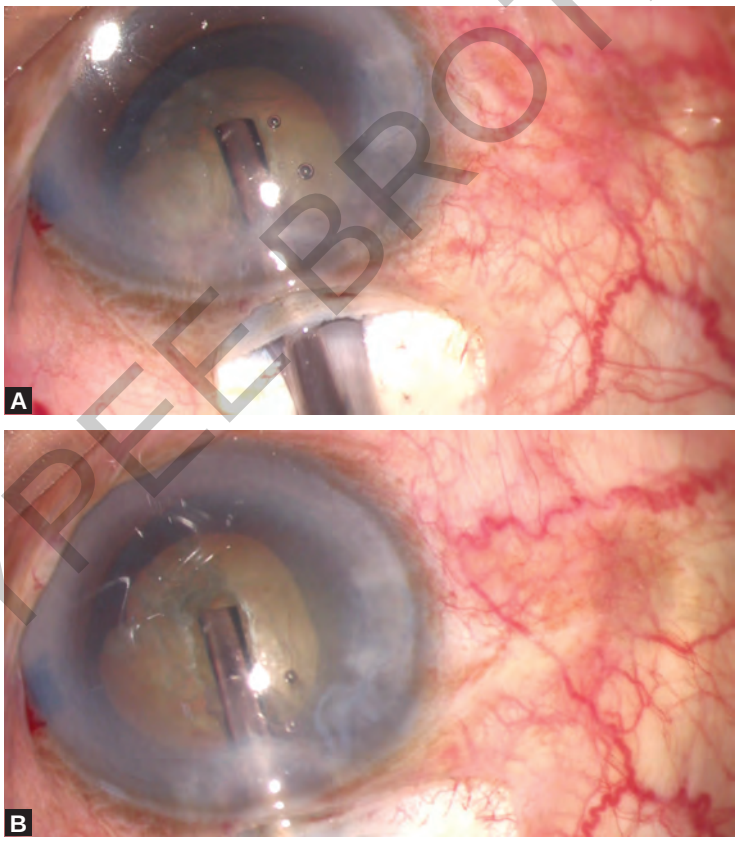
- Rubbing of the phaco probe can cause iris injury and constriction of pupil.
- Uneven anterior chamber can transmit the energy to cornea.

***Do's***

- *Phaco probe should pass through normal filled anterior chamber.*
- *Phaco probe should not pass slowly to avoid this situation.*

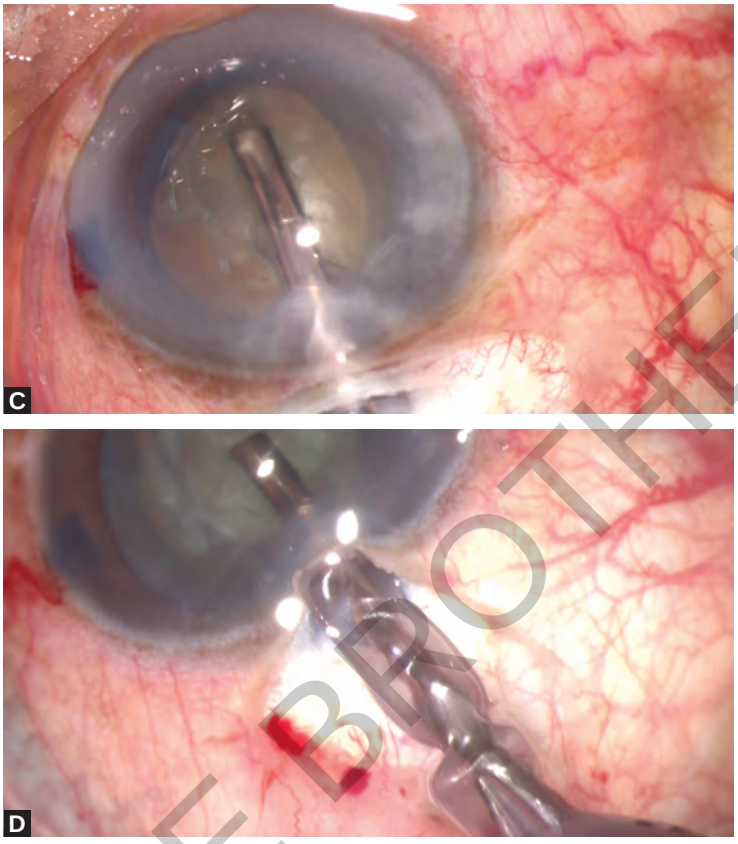
## Observations (Figs. 4A to D)

- Sleeve is stucked at incision site.
- More exposed part of phaco tip is seen.




**Figs. 4A and B**

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**Figs. 4C and D**

## Result

Corneal burn can occur due to more exposed part of phaco tip and collapsed anterior chamber.

***Do's***

*Confirm the proper entry of phaco tip with sleeve before start of trench.*

## Observations (Fig. 5)

- Air bubble is seen during trench.
- Air bubbles are due to more heat and friction between water current and viscoelastics.
- Sometimes air bubbles are passed through irrigation line of tubing.

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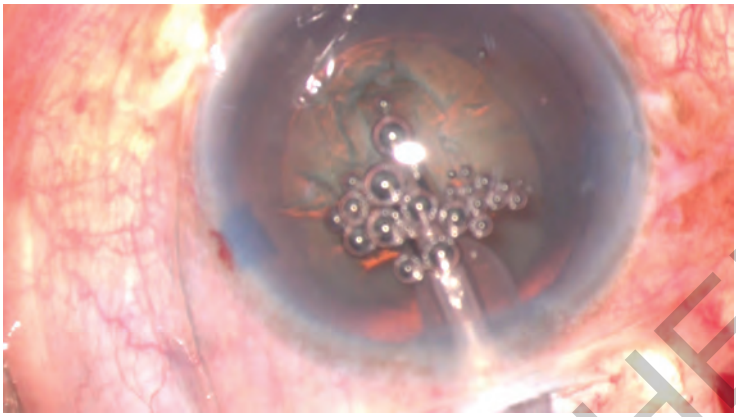


Fig. 5

## Result

Visualization of the trench is hampered which can lead to difficulty in this step.

***Do's***

- *Removal of air bubble can be done by phaco tip in irrigation/aspiration mode or with viscoelastic.*
- *Trench should be done after removal of air bubble only for proper visualization of procedure to avoid complications.*

## Observations (Fig. 6)

- Irrigating fluid seen like wave.
- Surgeon is doing trench superficially.

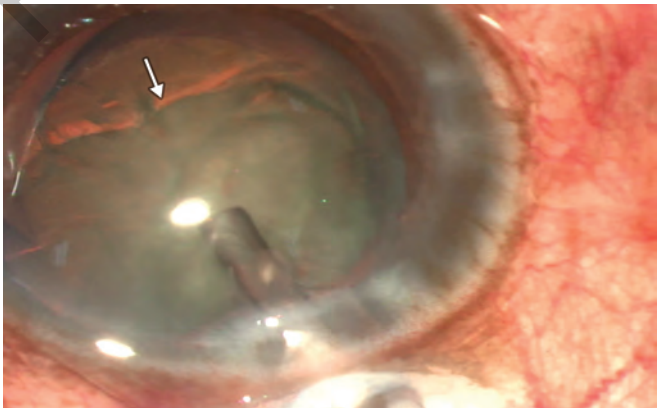


Fig. 6

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## Result

Corneal burn can occur.

***Do's***

*Trench should start by touching the nucleus.*

## Observation (Fig. 7)

Sudden entry with more energy in the nucleus material will disturb it and look like shower.

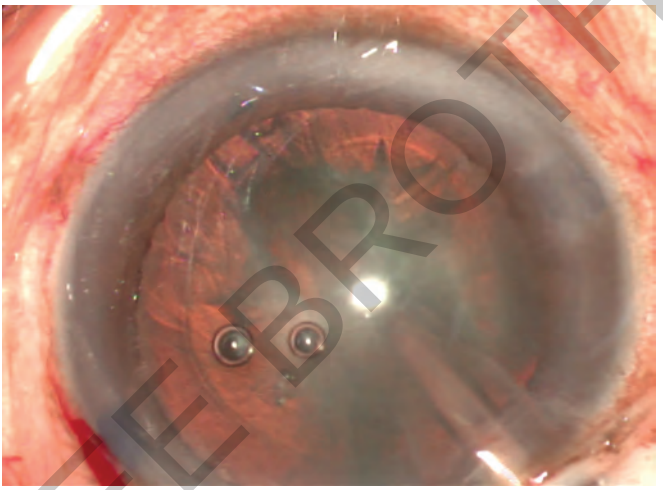


**Fig. 7**

## Result

Visualization is hampered.

***Do's***

*Trench should be done layer by layer with adequate energy.*

## Observations (Fig. 8)

- Trench started too periphery near incision.
- Wound leakage can occur.

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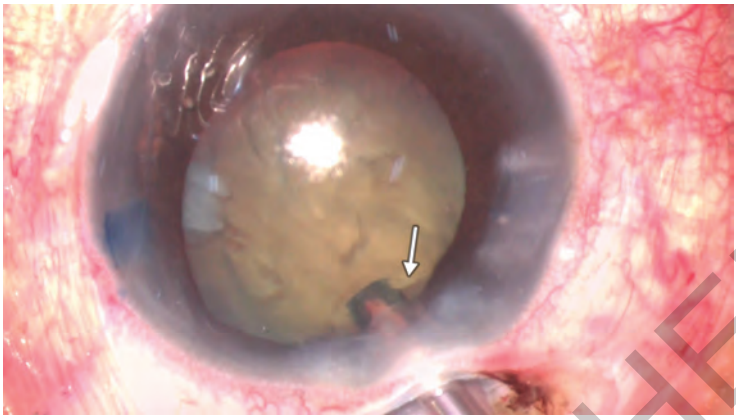


Fig. 8

## Result

Injury to cornea or iris can occur.

***Do's***

*Trench should start little away from periphery and according to the size and hardness of nucleus.*

## Observations (Fig. 9)

- Trench is done with bevel down position.
- In this position, instead of trench hold occurs.

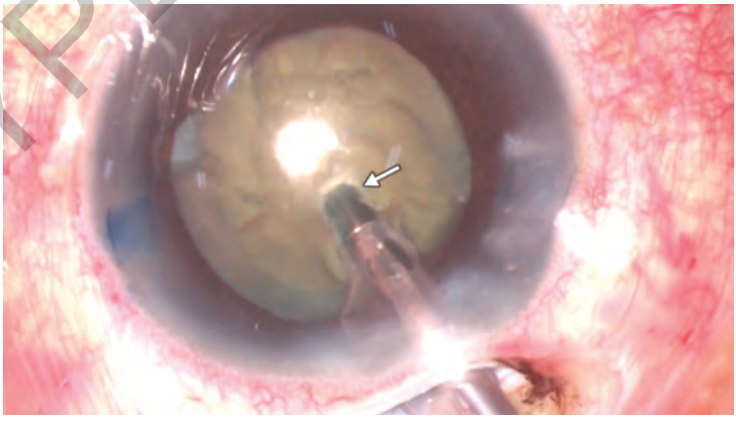


Fig. 9

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## Result

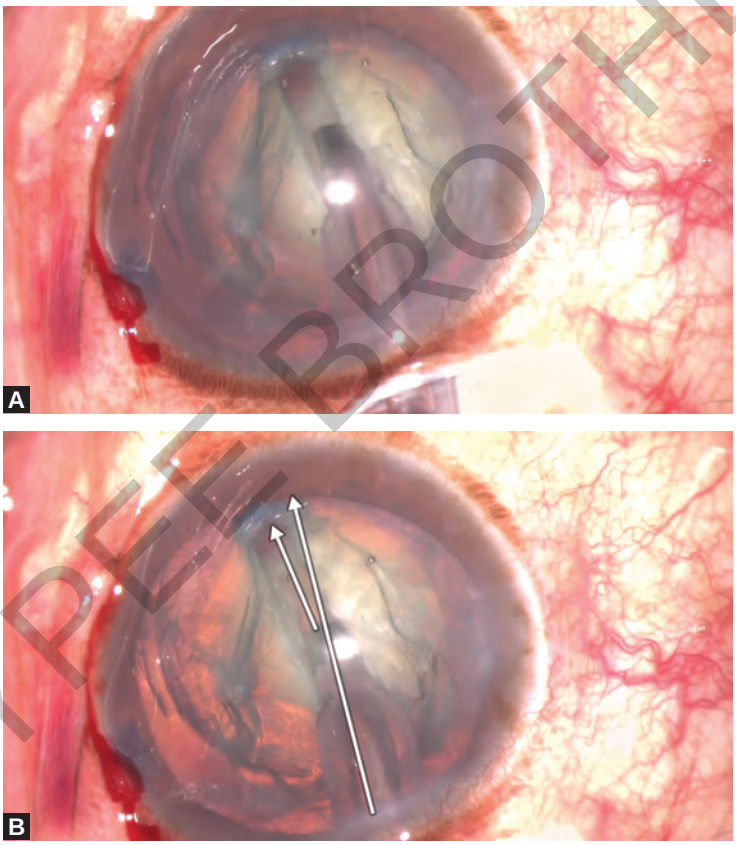
Bevel down position during trench can give pressure on zonules.

***Do's***

*Trench should be done always in bevel up position of phaco tip.*

## Observation (Figs. 10A and B)

Change of plane is seen during trench.




**Figs. 10A and B**

## Results

- Widening of trench can give difficulty for division.
- Multiplanar trench results in debulking of mass which can give rise to difficulty for further step like hold and chop.

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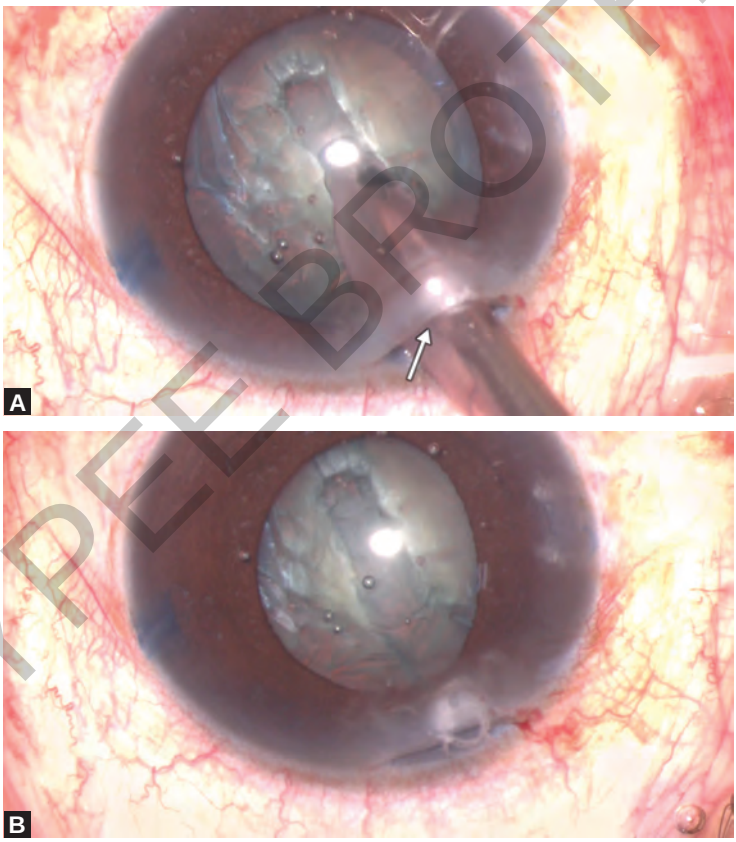
***Do's***

*Trench should be done uniplanar except in hard cataract.*

## Observations (Figs. 11A and B)

During the trench, anterior wall is many times stretched due to:

- Deep anterior chamber
- Deep socket of eye ball
- Pressure on anterior wall of incision during trench
- More angulation of phaco tip during trench
- Use of straight phaco tip.




**Figs. 11A and B**

## Results

- Corneal burn is seen due to excessive energy and more rubbing at incision site.

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- Architecture of incision can get distorted.
- Vertical stretching of wound is seen.

***Do's***

- *This is one of the disadvantages of trench.*
- *Phaco tip should pass parallel to iris plane during trench.*
- *Kelman tip is better option than straight tip to avoid such happenings.*
- *Many times, a stitch is needed to close the wound.*

## Observations (Fig. 12)

- Vertical stretching of the wound due to more angulation of phaco tip during trench.
- Long length of incision will restrict the movement of phaco tip.

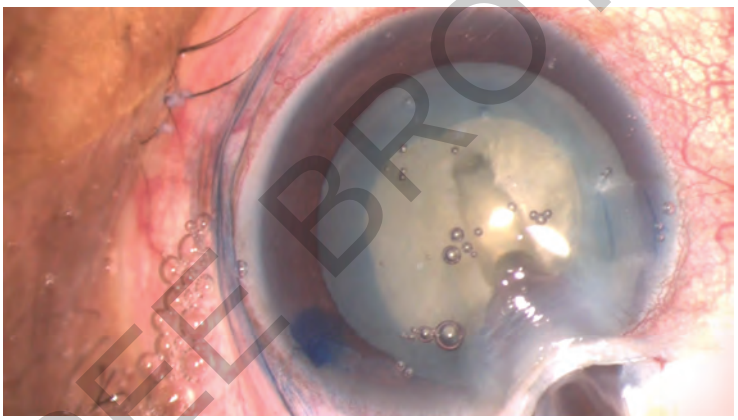


**Fig. 12**

## Result

Cornea can get hazy.

***Do's***

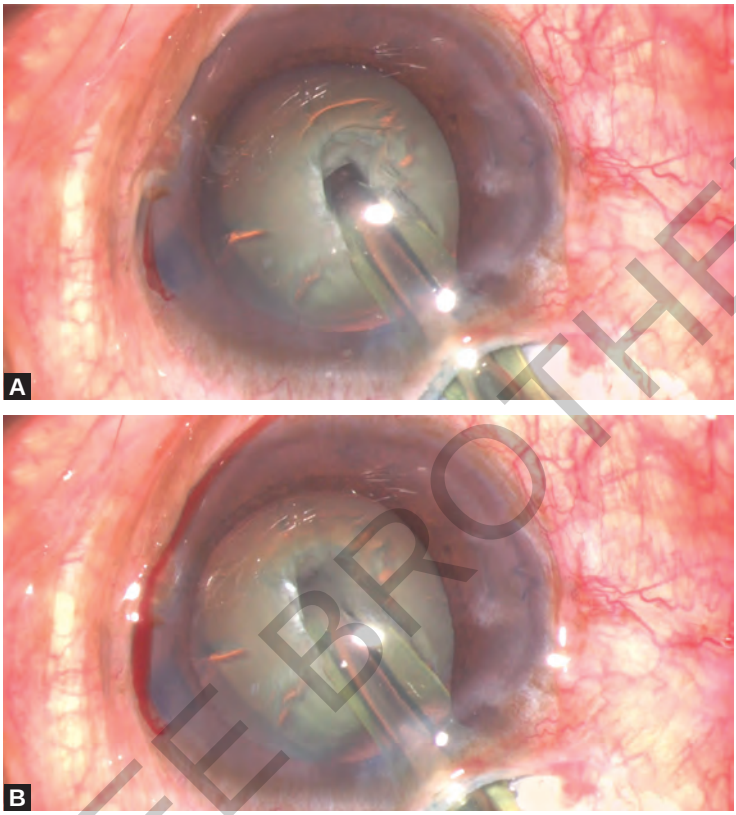
- *Adequate size of incision with respect to length inside the cornea is important for easy trench.*
- *Kelman tip is useful to avoid vertical stretching of wound.*

## Observations (Figs. 13A and B)

- Trench is going sudden deep in the layers of nucleus.
- Trench is restricted to the center which means inadequate length.
- Uneven anterior chamber as iris is seen in the wound.

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- More energy is used than needed.
- Distal end of phaco tip is not visible.




**Figs. 13A and B**

## Results

- Chances of posterior capsule rupture (PCR) with phaco tip can occur.
- Injury to iris or corneal burn can occur.

***Do's***

- *Trench should be done layer by layer and adequate length.*
- *Anterior chamber should be normal before start of trench.*
- *Angulation of the phaco tip should be parallel to iris plane.*
- *Energy used should be adequate with uniform speed.*

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# *Do's & Don'ts in*
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***Salient Features***

- Consists images of surgical steps from incision to intraocular lens (IOL) implantation, handling of the instruments, correlation or coordination of instrument with particular steps, and position of eyeball
- All the points are evaluated very efficiently with photographic images. Author is having strong feeling that photographic memory is longer lasting than video
- Navneet Hospital, Solapur is celebrating its 50th year of ophthalmic practice in Maharashtra.

**Navneet Toshniwal** MBBS MS (Ophthalmology) is the Director at Navneet Hospital, Solapur, Maharashtra, India. He did his MBBS and MS from Dr VM Government Medical College, Solapur and completed general ophthalmology fellowship at Sankara Nethralaya, Chennai, Tamil Nadu, India. In 1994, he joined his father, Dr Sham Toshniwal who is a practicing ophthalmologist since 1969 at Navneet Hospital. He started practice of phacoemulsification surgery since 1997. He attended and presented many papers, instruction courses and videos on phacoemulsification and keratoplasty procedures at regional, state, national and international conferences.

In 2002, he started a phaco training program at Navneet Hospital. Many ophthalmologists not only from India but also from different parts of the world attended this program. He is conducting instruction courses on "Basics of Phaco" and "Advanced Phaco" for doctors and paramedical people. He received the prestigious gold medal from the Indian Intraocular Implant and Refractive Society in 2009 for his teaching program. He is the first Indian surgeon who has done live phaco surgery in Jordan (Ibn Al Nafees Hospital at Irbid and King Hussein Military Hospital, Amman, Hashemite Kingdom of Jordan).

He invented three instruments like Toshniwal Prechopper, Toshniwal Chopper and Toshniwal Microcapsulorhexis Forcep. He has written two books *Simplified Phacoemulsification and Text and Atlas—Slit Lamp Biomicroscopy for Assessment in Cataract Surgery* published by Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India.

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ISBN 978-93-89188-61-5