Three Ways of Prechop

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The authors have no financial interest in the products shown in the presentations

Phaco Prechop

“Mechanical nucleofracture performed prior to the phacoemulsification”

1992 Akahoshi, Japan
1994 ASCRS Film Festival

Divide & Conquer

U/S Energy Loss ++

Phaco Prechop

U/S Energy Loss ±
Phaco Prechop by

1992 Phaco Prechopper
   Takayuki Akahoshi

2005 Ultrachopper
   Luis Escaf, Luz Marina Melo

2010 Femtosecond Laser
   Alan Crandall, Ron Yeoh

Indication of Prechop

✓ Any Cataract

Contra-indication

✓ None

Preparation for Prechop

✓ Corneal Protection
✓ Complete CCC
✓ Hydrodissection
✓ Choice of Instrument
Corneal Protection
Fill up the anterior chamber with dispersive OVD such as Viscoat

Complete CCC
Make a complete capsulorhexis without tears or notches

Sufficient Hydrodissection
G27 Akahoshi Hydrodissection Cannula (AE-7636) attached to a 2.5cc syringe

Sufficient Hydrodissection
Cortical cleaving hydrodissection for all the cases except for the posterior polar cataract
Expose the Nuclear Surface
Fill up the anterior chamber again with Viscoat clearing the anterior cortex on the nuclear surface

**Methods of Prechop**

- **Nuclear Support**
  - Karate Prechop

**Nuclear Support**

- **Counter Prechop**

**Karate Prechop**

*Phaco Prechop without Nuclear Support*

- Soft Nucleus
- Complete CCC
- Intact Zonules

**Combo Prechopper**

Combo Prechopper (AE-4190)
The angular side blade is sharp, the rounded side blunt
Place the angular side of the prechopper blade at the center of the nucleus.

When the whole blade is inserted into the nucleus, open the blades slowly while continue to push the blades down.

When the complete nuclear division has been attained, the inner surface of the posterior capsule can be observed.

Place the closed blades into the distal end of the nucleus.
**Karate Prechop**

Open the blades to separate the distal periphery of the nucleus

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**Karate Prechop**

Place the blades into the proximal end of the nucleus

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**Karate Prechop**

Open the blades to separate the proximal periphery of the nucleus

Thus attain the complete division from proximal to the distal end

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**Karate Prechop**

Restore each bisected nuclear fragment into its original position and rotate the nucleus 90 degrees to prechop into four pieces
Insert the angular side of the blade into the proximal half of the nucleus. The direction of insertion is just downwards.

Open the blades slowly while pushing the nucleus downwards.

Repeat opening until the posterior plate is completely separated.

Insert the angular side of the blade into the distal half of the nucleus. The direction of insertion is just downwards.

When the whole blade is inserted into the nucleus, open the blades slowly while continue to pushing the nucleus downwards.
Karate Prechop
Using the blunt rounded side of the blade, ascertain that the nucleus is completely divided from surface to the bottom.

Counter Prechop
Universal Prechopper (AE-4192) + Nucleus Sustainer (AE-2530)
(Long Nucleus Sustainer: AE-2530L for myopia)

Counter Prechop
Phaco Prechop with Nuclear Support
- Hard Nucleus
- Incomplete CCC
- Weak Zonules

Counter Prechop
Make a complete capsulorhexis smaller than the IOL optic size
**Counter Prechop**

Nucleus sustainer is carefully introduced to the equator of the nucleus. It is important to support the nucleus at deep point.

**Counter Prechop**

Insert the prechopper into the center of the nucleus. The tip of the sustainer, center of the nucleus and tip of the prechopper should be aligned on the same axis.

**Counter Prechop**

Bring two instruments closer. By supporting the nucleus, open the blades repeatedly.

**Counter Prechop**

Using the two instruments, separate the posterior plate of the nucleus completely.
**Counter Prechop**
Place the closed blades to the proximal part of the nucleus

**Counter Prechop**
Open the blades to bisect the nucleus from the surface to the bottom, from proximal to the distal end

**Counter Prechop**
Restore each bisected nuclear fragment into its original position and rotate 90 degrees

**Counter Prechop**
By supporting the nucleus with a nucleus sustainer at deep equatorial portion, insert the prechopper blade into the proximal half of the nucleus
Bisect the proximal half of the nucleus completely

Insert the closed blade into the hardest core of the distal nuclear fragment by supporting with the nucleus sustainer

Bisect the distal half of the nucleus completely by repeating the opening action

Rotate the nucleus by 45 degrees for further prechop of the quadrants. Smaller fragmentation is more advantageous for the phacoemulsification of the dense cataract
Make a complete occlusion of the phaco tip to the nucleus so that all the U/S energy can be used effectively to emulsify the nucleus.

Phaco of Prechopped Nucleus

As the U/S time is very short, the incision can be self-sealed quite easily without hydrating the corneal stroma.

Benefit for the sub-2mm MICS

Summary

Nuclear Support

- Karate Prechop
  - Combo Prechopper

Nuclear Support

+ Counter Prechop
  - Universal Prechopper
  - Nucleus Sustainer

Key Point

Complete Separation

Merely making a crack into the nucleus is not enough. What is important is to attain complete division.
Prechopper can attain the complete division of the posterior plate of the nucleus.

**Manual Phaco Prechop**

- **V sign**
  - Incomplete Division

- **A sign**
  - Complete Division

Prechopper can attain the complete division of the posterior plate of the nucleus.

**Merit of Manual Prechop**

- Applicable to any cases
- No energy
- Complete division
- High cost-performance

**Demerit of Manual Prechop**

- Learning curve

Start from Karate!

**Normal Case**

Karate Prechop

Counter Prechop
Challenging Case
Deep set Eye, Shallow AC post LI, Small Pupil, Dense Nucleus, Weak Zonule
PACG with Advanced Visual Field Defect, Poor old lady living alone with single eye

Possible Issues of Ultrasound Prechop
✓ U/S energy
✓ Posterior plate management

Possible Issues of Laser Prechop
✓ Limited indication
✓ Posterior plate management
✓ Cost
✓ Efficiency

Phaco Prechop by
Hand
Ultrasound
Laser
Old and universal technique. But it requires skills and experience.

No doubt that Ultrachopper is a great tool for a dense cataract. Need to manage the posterior plate by hand.
The safest and easiest way of prechop. Limited indication. Need to manage the posterior plate by hand. Possible issue of cost/performance.