

Technique of Phacoemulsification in MICS

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Introduction

+ Corneal incision history

- * Changed from 10mm in ICCE decreased to 3.4-2.8mm

+ Definition

- * MICS is cataract surgery through 1.5mm or less

+ Advantages of MICS

- * Reduction of induced astigmatism
- * More closed and safe system
- * Reduction of released US energy



Indication and Patients Selection

- ✦ **Optimal elective indication:” Lens Refractive Surgery”**
- ✦ **Subluxated cataracts**
- ✦ **Post traumatic cataracts**
- ✦ **Zonular laxity**
- ✦ **Congenital cataracts**
- ✦ **Senile cataract**

Anesthesia

- ✦ **Topical by topical anesthesia**
- ✦ **Intracameral preservative- free 1% Lidocaine**

MICS Surgical Instrument

✦ *Both hands must be used*

1- MICS micro blade:

*** size 1.2 to 1.4 mm**

*** Trapezoidal incision: outer incision > internal**

2- MICS capsulorrhexis forceps:

*** Delicate forces through paracentesis**


*** Triangular tip can puncture and grasp capsule**

*** Capsulorrhexis can be done with bent needle**

3-MICS Prechoppers

- ⊕ Counter chopping without zonular stress**
- ⊕ For all types of hardness**
- ⊕ 2 divisions made perpendicular to each other dividing nucleus into quadrants**
- ⊕ Divisions make a sharp decrease in U/S energy**

4-MICS hydrodissector or irrigating fingernail

- ⊕ **Nucleus fragments manipulation + AC irrigation**
- ⊕ **Further division of nucleus fragments**
- ⊕ **Irrigating fluid port under the tip with large pore (1.0mm)  Pushes posterior capsule back**
- ⊕ **Flow rate (or free irrigation flow): 50-70 cc/min**

⊕ 5- MICS irrigating chopper

- * For chopping medium to hard cataracts**
- * Irrigation also occurs through tip undersurface**

⊕ 6- MICS aspiration hand piece

- * Bullet shaped tip is for aspiration**
- * Aspiration port diameter 0.3 mm**
- * Design works to maintain the fluid balance in A/C**

7-Intraocular manipulator

⊕ *Multifunctional:*


- * Iridolenticular synechiolysis**
- * IOL manipulation**
- * Intraocular manipulations**

⊕ *Tip is blunt, body blocks outlet preventing outflow of fluid or viscoelastic*

8- MICS Scissors

- ⊕ Used for cutting synechia, or fibrosed capsules, membranes, small iridotomies**
- ⊕ Shaft gauge 23 (0.6mm) fits to small paracentesis**

Incisions

- ✦ **2 Trapezoidal incisions of 1.2-1.4 mm in size**
- ✦ **Distance of incisions: 90° usually at 10 and 2 O'clock**
- ✦ **Capsulorrhexis with forceps or bent needle**
- ✦ **Hydrodissection:**
 - * **Gentle**
 - * **Repeated fluid egress to reduce  IOP**

Pre- Chopping (Counter Chopping Technique)

- ⊕ **After capsulorrhexis:**
 - * **Manual cut division of nucleus**
 - * **No groove prior to prechopping**
- ⊕ **Dispersive or cohesive viscoelastic is injected**
- ⊕ **Technique applicable to all cataract density grades**
- ⊕ **Nucleus manipulator round tip stabilizes nucleus**
- ⊕ **Prechopper, nucleus manipulator and hardest nucleus point must be aligned**
- ⊕ **First nucleus divided in 2 then into 4 quadrants**

Low Ultra sound (LUS)- MICS surgical steps

- ⊕ Phaco with low U/S can be performed**
- ⊕ Pre- chopped nucleus fragments is emulsified and removed**
- ⊕ Epinuclear rim is aspirated and removed with low U/S**
- ⊕ Cortical clean up using bimanual irrigation- aspiration**

Comparison of LUS- MICS with Conventional Phaco

- ⊕ A/C chamber pressure is higher in MICS**
- ⊕ Mean vacuum in MICS is higher → essential for MICS**
- ⊕ Lower percent of U/S power used in MICS compared to conventional**
- ⊕ Time in MICS is longer**
- ⊕ MICS surgery had lower percent of ECC loss**
- ⊕ Post operative flare and reaction is much lower in MICS**

Advantages of MICS

- ⊕ Fast visual recovery and improved visual outcomes**
- ⊕ Decrease in postop astigmatism**
- ⊕ Reduction in the anatomical healing time**
- ⊕ Lower rate of complications**
- ⊕ IOL insertion through microincision**
- ⊕ Laser power can be used in MICS**
- ⊕ Reduction of postoperative inflammatory reaction**
- ⊕ Reduction of endothelial cell damage**

Aspiration Parameters in Bimanual phaco (20-gouge phaco tip)

A- Case of ordinary hardness

	<i>AFR MI/min</i>	<i>Max.Asp. Pressure mmHg</i>	<i>Bottle Height cm</i>
<i>1- Trenching</i>	<i>10-20</i>	<i>30-60</i>	<i>75</i>
<i>2-Vertical chop</i>	<i>24</i>	<i>160-180</i>	<i>75</i>
<i>3- Free nuclear fragments</i>	<i>22</i>	<i>140</i>	<i>75-85</i>

B- Case of extremely hardness

	<i>AFR MI/min</i>	<i>Max.Asp. Pressure mmHg</i>	<i>Bottle Height cm</i>
<i>1- Crater</i>	<i>10-20</i>	<i>30-60</i>	<i>75</i>
<i>2- Vertical chop</i>	<i>25</i>	<i>250</i>	<i>75</i>
<i>3- Free nuclear fragments</i>	<i>22</i>	<i>140</i>	<i>80-90</i>