

Manual Small Incision Cataract Surgery (MSICS)

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What is MSICS?





https://vimeo.com/507636516/6217dbf3af



- Phacoemulsification is the preferred cataract surgical technique worldwide
 - > High cost limits its use in low resource countries
- Worldwide there is a growing need to provide high volume, high quality, low cost cataract surgery
- Sutureless manual small incision cataract surgery
 - Lower capital investment cost, lower equipment maintenance cost and lower cost per case
- It may be faster and better suited than Phaco for advanced and mature cataracts which are typical in underserved settings



Why learn MSICS?

- > Phaco surgeons will benefit from learning this technique
- > Principles of MSICS overlap with Phaco
- > MSICS can be valuable to Phaco surgeons in complicated cataract cases
 - preferable option to ECCE conversion
- > New/Overlapping Skills for the Phaco surgeon to adopt:
 - > Mastery of large self sealing incision
 - Manual nuclear elevation and expression
 - Manual cortical aspiration



A Prospective Randomized Clinical Trial of Phacoemulsification vs Manual Sutureless Small-Incision Extracapsular Cataract Surgery in Nepal

SANDUK RUIT, MD, GEOFFREY TABIN, MD, DAVID CHANG, MD, LEENA BAJRACHARYA, MBBS, DANIEL C. KLINE, MD, WILLIAM RICHHEIMER, MD, MOHAN SHRESTHA, MA, AND GOVINDA PAUDYAL, MD

American Journal of Ophthalmology, 2007;143:32-8

Prospective, randomized comparison of 108 consecutive patients with visually significant cataracts.

CONCLUSION: Both phacoemulsification and SICS achieved excellent visual outcomes with low complication rates. SICS is significantly faster, less expensive, and less technology dependent than phacoemulsification. SICS may be the more appropriate surgical procedure for the treatment of advanced cataracts in the developing world.

Phaco vs. MSICS: AJO 2007

- > Temporal Clear corneal Phaco with foldable IOL
- > SICS with rigid PMMA IOL
- > No statistically significant differences between UCVA and BCVA at 6m
- > More corneal edema in Phaco group but all corneas clear by 3 weeks PO



MSICS Steps

- > Block
- Conjunctival Peritomy
- Sclerocorneal incision
- Paracentesis
- AC entry with keratome
- Capsulotomy
- > Enlarge internal aspect of incision
- > Nucleus prolapse

- > **Deliver nucleus**
- Cortical clean-up
- > Implant lens
- Remove viscoelastic
- Reposit conjunctiva



Sclerocorneal Wound



Scleral Groove – 2 mm posterior to limbus Uniform, perpendicular to surface 6mm in cord length

Tunnel Forward

Razorblade, crescent blade, bevel up, round tip Uniform thickness, follow the contour of globe 1 to 2 mm into cornea Create "funnel shape" Internal incision is wider ~8mm





Sclerocorneal Wound Construction



https://vimeo.com/507296037/a0ff5e9365



MSICS Complications Wound Construction





MSICS Complications: Buttonhole

Button Holing

https://vimeo.com/507300299/8b39de157d



MSICS Complications: Early Entry





https://vimeo.com/507301573/b93c765f13

Paracentesis

- > 1.5 to 2.0 mm length
- > 2 to 3 clock hours
 - Away from funnel
 - (to the right)
- Parallel to iris plane self sealing

Paracentesis

Uses of Paracentesis

- Cortex wash in closed chamber
- Sub incisional cortex removal
- > Reformation of AC at the end

https://vimeo.com/507303206/705cb3168f



AC Entry, Extend Internal Incision

> Keratome

- > Anterior most extent of tunnel
- > Dimple sign
- > After entry, keep blade parallel to iris plane
- Internal incision bigger than external incision



https://vimeo.com/507306109/8c9c0c776b



Capsulotomy





Can Opener Capsulotomy

- Good for beginners
- Good if poor visualization
- > Difficult capsulorrhexis
- Mature cataract
- > Small pupil
- > Calcified or fibrotic anterior capsule
- > Grade III & IV nuclear sclerosis



Can Opener Capsulotomy

- > Preferably done under visco-elastic
- > New sharp cystitome or bent 26G needle
- > Multiple small tears or punctures
- > Circumferential to the equator
- Clockwise or counter clockwise direction
- > 10-15 punctures in each quadrant
- Diameter of 6.5 mm

Canopener capsulotomy

https://vimeo.com/507306906/1381af0876



CCC Advantages

- Facilitates "in the bag IOL"
- Easy and safe aspiration of peripheral cortex
 - > No "tags" of capsule
- In case of posterior capsule rent IOL can be implanted over the rhexis margin
- Less stress zonules
- Chances for posterior synechiae formation is less



https://vimeo.com/507307713/39ed048839



Linear Capsulotomy



See

https://vimeo.com/507308252/1d6d51caa3

Nucleus Prolapse into AC

Nucleus Prolapse

- Soft Cataracts
 - > Hydro delineation
- Hard Cataract
 - > Bimanual Technique
- > Hyper Mature Cataract
 - > Nucleus Prolapse with Simcoe Cannula



https://vimeo.com/507310778/a415a79283



Nucleus Prolapse into AC

In can opener capsulotomy

No need for any hydro procedures

Mechanical Prolapse

Done with the help of Sinskey hook





Hydroprolapse into AC

In CC capsulorhexis

> Hydro-prolapse

Inject fluid

- Press downward on distal pole while injecting
- This causes the opposite pole of the nucleus to pop out of the rhexis margin
- > Rest of the nucleus can be dialed out of the bag

Nucleus prolapse

https://vimeo.com/507314165/d27df872d1



Hydrodissection



https://vimeo.com/507314449/5f8b0b1c9f



Nucleus Extraction



- > Simcoe I/A canulua -
- > "Fish Hook"
- > Phaco fracture

I and A Cannula [Simcoe]

Thin wall cannula. Tubing: Inner diameter 1 mm (.04 in); outer diameter 2 mm (.08 in), .30 mm aspiration port. 5 per box.





Nucleus Expression with irrigating vectis

- > Mechanical + Hydrostatic forces
- > 5mm wide Vectis with 1 or 3 forward irrigating ports
- > With gentle superior concavity
- > Attached to a 5cc syringe
- > Attached to I. V line



https://vimeo.com/507315018/276d951ab8



Nucleus Expression with irrigating Vectis

- > Visco above and below the nucleus
- > Upper layer shields the endothelium
- Lower layer pushes posterior capsule and iris diaphragm posteriorly

Advantages

- Single instrument
- > A. C well formed
- > Protection of corneal endothelium

Avoid placing Vectis posterior to the iris





Nucleus Expression with Viscoelastic

> Most atraumatic

> Best protection for corneal endothelium

> ? Incision size bigger



https://vimeo.com/507315310



Difficult Nucleus Delivery

Inadequate size of the tunnel can lead to

- Endothelial damage
- Iris sandwich when 6 o'clock iris gets trapped between the Vectis inferiorly and nucleus superiorly

Do not hesitate to enlarge the tunnel



https://vimeo.com/507315645/8744f27e15



Removal of cortex and epinucleus



https://vimeo.com/507315973/509073f293



IOL Insertion

- > Cohesive viscoelastic in the bag and chamber
- > Place a 3-piece IOL in the bag or sulcus
 - One piece IOL's may not stay in the bag depending on size and configuration of capsulorrhexus
 - > 1 PC IOL Potential for UGH syndrome
- > Use Simcoe through paracentesis to remove all viscoelastic



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https://vimeo.com/507316350/482e1f8685



Wound Closure

- > Hydrate edges of the main wound and paracentesis
- +/- Intracameral antibiotics: Vigamox
- > Close conjunctiva with cautery or Sub conjunctival antibiotic injection



Optimize your odds

- > Think about "never" events. Wrong eye, wrong patient, wrong IOL, wrong medication...
- We are accustomed to working within systems that prevent "never" events from occurring. In your new, temporary setting, try to understand what safeguards are (or are not) in place.
- > The variables of a less familiar operating environment necessitate a very deliberate and methodical approach when starting out. Slow down.



Optimize your odds

- Proper patient selection and room set up:
 - In the beginning, only select patients with good dilation, wide palpebral fissures, moderate density cataracts and no other ocular pathology (i.e. no PXF or corneal opacities).
 - Make sure you are comfortable. Optimize seat/table height and microscope position. The case will take longer than you think.
 - > Make sure the patient is comfortable and has gone to the bathroom!
 - \succ Never be afraid to cancel a case on the table if it looks too difficult.
 - > PUT epinephrine in your irrigating fluid and use NSAIDS pre-op.
 - > Use Trypan Blue dye.



MSICS in **HCMC**



Fastest MSICS?

https://youtu.be/W1eegfRAG1Y



Thank you!





References

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