

R-MSICS

Pratyush Ranjan, DO, MS, DNB, MNAMS

ASG Eye Hospital, Varanasi



INTRODUCTION

The manual small incision cataract surgery (MSICS) evolved in 1980s after phaco became popular. Dr Richard Kratz was the first surgeon to think of scleral incision & “sclera-corneal” tunnel which improved wound healing & decreased post operative astigmatism, Dr Girard further

improved it²⁻⁴. Various shapes of incision were described to further reduce the post operative astigmatism. Dr Sanger introduced frown incision the current favorite in 1991⁵. The capsular opening technique also evolved from “can opener” to most preferred, continuous curvilinear capsulorhexis described by Dr Howard V Gimbel⁶. Similar innovations in nucleus delivery lead to wide options available to us now⁷.

The R-MSICS or The Ranjan’s Modified Manual Small Incision cataract surgery is developed by yours truly by a continuous active innovative process. R-MSICS has done away with all unnecessary steps, enabling it to be performed in less than 2 minutes with excellent visual outcome. The post operative astigmatism can be further reduced by using Ranjan MSICS Marker, which also helps in doing MSICS topically making it a truly refractive surgery.

Modifications :

1. No Superior rectus bridle suture : Its only benefit is stabilization of globe during surgery which can easily be achieved by any good toothed forceps or Ranjan MSICS Marker.

The complications of superior rectus bridle suture are dreaded and include globe perforation, muscle bleed/laceration, post surgery ptosis and diplopia. A dull aching pain after surgery is common and is attributed to bridle suture.

2. No Conjunctival flap : No conjunctival flap is created and no cautery is done. The initial incision of triplaner sclera-corneal tunnel is applied over the conjunctiva & sclera together in a single stroke. Many ophthalmologists prefer “No Flap” technique and outcome is comparable with MSICS with bridle suture¹³

The advantages & disadvantages of it are described below.

Advantages :

1. Precious limbal stem cells are preserved.
2. Cautery induced complications like scleral melt & induction of post operative astigmatism due to tissue shrinkage is completely avoided.
3. Active bleed at the conjunctival site and preserved episcleral tissue help in quicker healing.
4. Shortens surgery time – helpful in anxious patients.

Disadvantages

1. Incomplete cutting of conjunctiva along incision due to drag.
2. Bleeding may disturb the beginners in tunnel making.

3. Construction of sclero-corneal tunnel

Construction of sclera-corneal tunnel is similar to the conventional MSICS method.

The Ranjan MSICS Marker (RMM)(Fig 1) is designed to make topical flapless MSICS with greater astigmatic control a reality. It is designed to help in three critical steps of MSICS through its three different components¹⁵.



- 1) The 360° Serrated edges at the base: It fixes the globe during tunnel making obviating the need of superior rectus bridle suture, obviating the need for peribulbar block & post surgery eye bandage. (Fig:2)



- 2) Tunnel Marker: It helps create perfect frown shaped 6 mm incision, 2 mm away from limbus. The measured location, length & shape of incision will help surgeons to reproduce their results. (Fig: 3)



- 3) Corneal axis marker: It helps plan incision on steeper axis, taking care of pre existing astigmatism. (Fig: 4)



The Tunnel & Corneal axis marker reduces post surgery astigmatism by placing least astigmatic incision in Koch astigmatic funnel on the steep angle taking care of both pre existing & surgery induced astigmatism.

The 0° & 180° meridian is marked using bubble marker in sitting position. Using pre operative keratoscopic data (K1 & K2), steep meridian of the patient is identified. After draping is done, the corneal axis marker is then aligned with pre marked meridians on the patient's cornea and steep meridian is marked. The RMM is then rotated to align tunnel marker axis to steep axis of cornea. A perfect frown shaped incision of 6mm length, 2 mm away from limbus is created using tunnel marker as stencil. The tunnel is created by stabilizing the globe by mildly pressing the RMM on the globe, the serrated edges at the undersurface provides excellent grip obviating the need for toothed forceps or superior rectus bridle suture.

4. Side port construction :

A triplaner side port of 2.2 mm is created using keratome micro surgical blade. A 2.2 mm side port enhances maneuverability, especially during the use of Eutrata forceps & reverse simcoe cannula. It is also astigmatically neutral.

5. Anterior Capsular opening :

No Change

6. Hydro-procedure :

Hydro dissection is performed using pearce hydrodissection cannula (26G, 35° angled with 8 mm flat blunt tip) is used. Fluid is injected at multiple sites to ensure complete hydro dissection. Once hydro dissection is successful, more fluid is injected between the anterior capsule and the lens in the horizontal meridian to “pop up” one pole of nucleus; this is the hydro-expression technique as described by Corydon and Thim in 1991¹⁶. Once a pole is lifted, more fluid is injected underneath it with simultaneous rotation using hydro cannula to prolapse the whole nucleus in the anterior chamber.

7. Nucleus delivery :

In most cases of R-MSICS, nucleus is delivered using “hydro delivery” technique. In this technique the pearce hydro cannula is used to deliver the nucleus out by cleverly coordinating four things. The nucleus is engaged on the angle of the cannula then it is slowly pulled out while depressing the lower lip and the water is egressed in bursts to push the nucleus

out like rocket being lifted by thrust created by its exhaust.

In large nucleuses irrigating vectis is used to deliver the nucleus out of the anterior chamber.

Once nucleus is delivered reverse simcoe irrigation aspiration cannula of 21Gauge is used to clear remaining lens material.

8. Intraocular Lens (IOL) implantation :

IOL implantation is done under positive pressure created by reverse simcoe cannula inserted by side port using left hand. The IOL is inserted through the main port using angled Mc Pherson IOL forceps (Mc Pe) holding the optic. Once IOL enters the anterior chamber it is tilted down so that leading haptic is directed towards the capsular bag, the simcoe cannula is used to “depress & hold” the IOL to ensure “in the bag” implantation. Once the leading haptic is successfully guided towards the bag, Mc Pe is released and it now hold the tip of the trailing haptic and now using rotation motion trailing haptic is guided into the bag, while reverse simcoe cannula facilitating the rotation movement.

After successful implantation of IOL in the bag, the margin of the side port is then hydrated to secure the anterior chamber. Depth of anterior chamber and integrity of wound (as checked by sterile cotton bud) confirms successful completion of surgery.

References :

1. Blumenthal M. Manual ECCE, the present state of the art. *KlinMonblAugenheilkd.* 1994 Nov;205(5):266-70.
2. Kratz RP, Colvard DM, Mazzocco TR, et al. Clinical evaluation of the terry surgical keratometer. *Am Intraocular Implant Soc J.* 1980;6:249-51.
3. 2. Girard LJ, Hofmann RF. Scleral tunnel to prevent induced astigmatism. In: Emery JM, Jacobson AC, editors. *Current concepts in cataract surgery: Proceedings of the eight biennial cataract surgical congress Norwalk.* Appleton-Century-Crofts; 1984. pp. 101-2.
4. 3. Girard LJ. Origin of the Scleral tunnel incision. *J Cataract Refract Surg.* 1995;21:7.
5. Singer JA. Frown incision for minimizing induced astigmatism after small incision cataract surgery with rigid optic intraocular lens implantation. *J Cataract Refract Surg.* 1991;17:677-88.
6. Gimbel HV, Neuhann T. Continuous curvilinear capsulorhexis. *J Cataract Refract Surg.* 1991 Jan;17(1):110-1.
7. Venkatesh R1, Chang DF, Muralikrishnan R, Hemal K, Gogate P, Sengupta S. *Manual Small Incision Cataract Surgery: A Review.* *Asia Pac J Ophthalmol (Phila).* 2012 Mar-Apr;1(2):113-9. doi: 10.1097/APO.0b013e318249f7b9.
8. Ye Z, He SZ, Li ZH. Efficacy comparison between manual small incision cataract surgery and phacoemulsification in cataract

patients: a meta-analysis. *Int J Clin Exp Med.* 2015 Jun 15;8(6):8848-53. eCollection 2015

9. Venkatesh R, Tan CSH, Sengupta S, et al. Phacoemulsification versus manual small-incision cataract surgery for white cataract. *J Cataract Refract Surg.* 2010;36:1849Y1854.
10. Gogate PM, Kulkarni SR, Krishnaiah S, et al. Safety and efficacy of phacoemulsification compared with manual small-incision cataract surgery by a randomized controlled clinical trial: six-week results. *Ophthalmology.* 2005;112:869Y874.
11. Gogate PM, Deshpande M, Wormald RP, et al. Extracapsular cataract surgery compared with manual small incision cataract surgery in community eye care setting in western India: a randomised controlled trial. *Br J Ophthalmol.* 2003;87:667Y672.
12. Ruit S, Tabin G, Chang DF, et al. A prospective randomized clinical trial of phacoemulsification vs manual sutureless small-incision extracapsular cataract surgery in Nepal. *Am J Ophthalmol.* 2007;143:32Y38.
13. Singh P, Singh S, Bhargav G, Singh M. Necessity of conjunctival flap in manual sutureless small-incision cataract surgery. *J Cataract Refract Surg.* 2012 Aug;38(8):1501-3. doi: 10.1016/j.jcrs.2012.06.024.
14. S SHaldipurkar, Hasanain T Shikari, and Vishwanath Gokhale. Wound construction in manual small incision cataract surgery. *Indian J Ophthalmol.* 2009 Jan-Feb; 57(1): 9–13.
15. Ranjan P. Ranjan MSICS Marker: The Beginning of Topical, Flapless, Astigmatism Free MSICS Era. *DOSTimes.* March-April 2017:56-57.
16. Thim K, Krag S, Corydon L. Hydroexpression and viscoexpression of the nucleus through a continuous circular capsulorrhexis. *J Cataract Refract Surg.* 1993;19:209Y212.



1. Located in periphery of iris
2. Associated with Vitamin A deficiency
3. Feature of CRAO
4. Accumulation of axoplasmic material in nerve fibre layer
5. Ischemic infarcts of choroid
6. Senile scleral plaque
7. Myopic retinopathy
8. Epithelial opacities anterior to suture line of corneal graft
9. Anterior remnant of hyaloid artery at posterior surface of lens
10. Seen on FFA
11. Retinal hemorrhage with pale centre
12. Associated with POHS

A	C	N	I	L	E	F	K	P	S	X	C	S	G	Q	L	Z	G
Y	H	Z	N	D	C	G	Y	H	Y	F	Q	O	D	W	R	F	Z
V	E	P	B	I	T	O	T	Z	N	W	N	E	Y	Z	S	I	N
U	R	A	X	L	Q	B	N	K	S	E	V	B	Q	U	T	S	U
G	R	I	B	N	J	F	D	B	L	H	M	O	Z	X	K	C	P
X	Y	H	Q	P	G	R	O	K	M	L	I	Z	A	M	I	H	J
X	R	K	I	J	B	T	G	J	Q	N	P	S	L	V	Y	E	F
T	E	L	S	C	H	N	I	G	A	T	Z	B	T	C	L	R	W
F	D	Y	M	B	R	L	Q	U	E	Y	D	H	M	O	K	K	I
O	T	O	Q	L	E	K	V	X	Z	A	U	J	Z	T	X	H	D
C	L	M	I	T	T	E	N	D	O	R	F	B	V	T	S	U	K
R	C	W	H	D	X	O	R	S	K	Q	O	P	S	O	G	N	R
W	M	E	O	M	E	M	Y	H	I	M	S	T	Y	N	Y	T	H
P	D	L	J	R	L	Z	G	P	F	W	T	X	H	W	R	X	S
S	Q	A	D	B	H	R	M	F	L	K	E	M	T	O	V	M	K
L	M	N	E	O	R	L	E	O	P	A	R	D	C	O	W	T	P
H	F	U	R	I	S	U	T	W	N	Z	F	H	R	L	U	Q	G
R	M	K	A	Y	E	P	H	T	E	L	U	S	F	Y	X	Z	L
O	P	I	L	Z	X	O	M	L	Q	N	C	Z	O	T	F	N	X
U	N	P	T	D	Z	V	B	R	U	S	H	F	I	E	L	D	Y

The correct answers can be mailed to editorupsos 2018@gmail.com