Original Article

DOI: 10.7860/JCDR/2023/61713.17604

Ophthalmology Section

Comparative Study of Surgically Induced Astigmatism in Manual Small Incision Cataract Surgery

DNYANOBA MUKUND DARADE[1], JAYSHRI HARIHARRAO PENDAMKAR[2], BHAGYASHREE SURESH WANGIKAR[3]

ABSTRACT

Introduction: Various types of incisions have been adopted and applied in Manual Small Incision Cataract Surgery (MSICS) with the primary objective to attain minimum postoperative Surgically Induced Astigmatism (SIA).

Aim: To evaluate and compare the postoperative visual acuity and to determine SIA in Batwing incision and Frown incision in MSICS.

Materials and Methods: The present study was a prospective, cross-sectional, interventional, comparative descriptive study in which a total of 380 patients aged 40 years and above with senile, uncomplicated cataract, undergoing MSICS were included. Patients were randomly divided into: Group B (Batwing incision), and Group F (Frown incision). Patients were compared on 6th week postoperatively for Uncorrected Visual Acuity (UCVA), Best Corrected Visual Acuity (BCVA) and SIA (performed using SIA Calculator Version 2.1). The data was collected in terms of demographic, clinical and biochemical characteristics that were expressed as range, mean and median and subjected to statistical analysis to obtain results.

Results: In group F, total 04 (2.11%) patients showed no astigmatism, 115 (60.53%) patients showed 0-0.5D of SIA, 64 (33.68%) were seen with 0.5-1D of SIA and 07 (3.68%) patients with 1-1.5 D SIA, no patient showed SIA more than 1.5 D. In Group B 01 (0.52%) patient showed no SIA, in 61 (32.11%) 0-0.5D of SIA was seen, in 79 (41.58%) patients 0.5-1D of SIA was seen and 45 (23.68%) patients had presented with 1-1.5D of SIA while 04 (2.11%) patients with more than 1.5D of SIA. In group F, average preoperative astigmatism preoperatively was 0.55±0.36D and average astigmatism at six weeks postoperatively was 0.46±0.33D. In Group B, average preoperative astigmatism was 0.49±0.39D and average astigmatism six weeks postoperatively was 0.54±0.40D.

Conclusion: The present study showed the superiority of Frown incision over Batwing incision in terms of less SIA and improved postoperative unaided visual results.

Keywords: Best corrected visual acuity, Batwing incision, Cataract, Frown incision

INTRODUCTION

According to World Health Organisation (WHO), 19.34 million people are bilaterally blind due to senile cataract accounting for 43% of all blindness [1,2]. The number of people affected due to cataract (leading cause of blindness) in India is approximately 3.8 million people who become blind as was reported by Minassian DC and Mehra V [3]. In developing countries like India, blindness due to cataract appears to be one of the biggest issues, with respect to human morbidity, financial forfeiture and social problem. One of the most common surgical procedures that is performed in ophthalmology is that of cataract surgery which is regarded as the most economical surgical intervention with respect to enhancement of the quality of life of an individual [4,5].

The universally accepted standard surgery for cataract is phacoemulsification which is often available to those patients who can furtively afford it. Phacoemulsification entails a substantial investment when compared to manual Extracapsular Cataract Surgery (ECCE). Few of the other disadvantages of this method includes availability of technical support, longer learning period for new cataract surgeons to excel and the presence of advanced mature cataracts that are more challenging to remove with phacoemulsification along with higher complication rate [6].

Hence, to overcome such challenges of phacoemulsification, substitute cataract surgical techniques such as the MSICS have become widely accepted and popular in the developing countries. MSICS produces brilliant results at a lesser expense and approximately less surgical time than phacoemulsification and ECCE. This technique is easy to learn and also is safer for advanced mature cataracts and has become a popular and widely accepted technique for cataract surgery in India [6]. Some of the advantages of MSICS includes shorter time span, less expensive, less dependent on, easy to learn and adapt, requires minimal instrumentation, can be performed in all settings and less chances of posterior segment complications like nucleus drop, posterior capsular rent etc., [7]. Additionally, scleral incision wound delivers better healing, early wound stability, visual rehabilitation, reduced postoperative wound infection and endophthalmitis and no suture-related complications in suture-less MSICS [8].

The prospect of enhanced visual outcome following cataract surgery necessitates the surgeons to curtail postoperative refractive error or SIA. The correction of spherical error is attained by selecting the accurate power of Intraocular Lens (IOL) depending on the determination of exact axial length and corneal power. Corneal astigmatism being another refractive error should be managed and minimised in order to attain postoperative emmetropia. The patient needs <0.50D of astigmatism after surgery to acquire true spectacle independence [9]. There are several type of incisions that are being adopted in MSICS with the aim to keep minimum postoperative astigmatism. It is established that all scleral incisions provide benefits of early healing, faster visual restoration and astigmatism control [10].

Hence, the present study was conducted to evaluate and compare the postoperative visual acuity and to determine SIA in Batwing incision and Frown incision in MSICS. The study also focuses to compare better incision in view of less SIA and better visual outcome.

MATERIALS AND METHODS

The present prospective, cross-sectional, interventional, comparative descriptive study was conducted in Department of Ophthalmology

at a Tertiary Care Hospital, BJGMC and Sassoon General Hospital, Pune, Maharashtra, India. The study protocol was approved by the Institutional Ethics Committee (IEC) with IEC number 1119236-236. The study was conducted from August 2019 till January 2021 (18 months period). The study sample included patients who were diagnosed with cataract were selected from the outpatient department of tertiary care hospital and informed consent was obtained from them. Lens opacity for the patients was graded according to the Lens Opacity Classification System III (LOCSIII).

Inclusion criteria:

- Patient with senile uncomplicated cataract aged 40 years and above;
- Nuclear sclerosis grade 1 to grade 4;
- Patients with no other cause of defective vision other than cataract;
- Patients with no history of previous ocular surgery in operating eye.

Exclusion criteria:

- Patients with posterior segment pathology;
- Patients with other ocular pathology including complicated cataract;
- Patients with intraoperative complications (Nucleus drop, posterior capsular rent);
- Cases with premature entry;
- Cases where valve could not be formed properly either due to deep or superficial incision;
- Cases in which suture has been applied.

Sample size calculation: The sample size was calculated using the formulae:

$$N=Z^2\times P\times(1-P)/d^2;$$

Where; Z was statistic for a level of confidence (here Z=1.96 at 95% confidence interval) and P=was prevalence (in proportion of one). In the present study, prevalence of cataract among population above 40 years taken as 0.54%; d=precision (in the present study it was taken as 5%) and therefore, the final sample size for the present study was={(1.96)2×0.54×0.46]/(0.05)2=380. These 380 patients aged 40 years and above with senile, uncomplicated cataract, undergoing MSICS with PCIOL implantation were included in the sample of the study.

Study Procedure

Patients were divided in two groups, Group B receiving Batwing incision, and Group F´ receiving Frown incision. Patients were compared on 6th week postoperatively for UCVA, BCVA and SIA. All calculations for SIA were performed using SIA calculator Version 2.1. On the day of surgery the pupil was dilated with eyedrop Tropicamide 0.8%+ Phenylephrine 5%. Peribulbar anaesthesia was given and after making fornix based conjunctival flap, scleral incision was made with: a) Batwing Incision: 6-6.25 mm in size, 2 mm behind the limbus (4-4.25 mm straight incision with 1 mm wing on each end); and b) Frown Incision: 6-6.25 mm in size, 2 mm behind the limbus. These were self-sealing tunnel, and hence no sutures were applied.

Preoperative assessment was done in terms of visual acuity, K1/K2, Type of astigmatism i.e., with the rule/against the rule/no astigmatism. Postoperative assessment was also done using visual acuity, K1/K2 and Type of astigmatism i.e., with the rule/against the rule/no astigmatism.

STATISTICAL ANALYSIS

Detailed clinical history, proper general/systemic/ocular examination, Visual acuity using Snellen charts, LogMAR chart and Astigmatism Double Angle Plot Tool V132 have been used for vector analysis in the present study. The data was collected in terms of demographic, clinical and biochemical characteristics that were expressed as range, mean and median and were tabulated and subjected to statistical analysis to obtain the final results. SIA Calculator version 2.1 Software programme, IBM SPSS version 20.0 and 2022GraphPad Software was used for analysis of the data.

RESULTS

The age group included in study ranged between 50-88 years with the mean age of 69 years. A total of 185 males and 195 females were included in the study. Among the male patients, 89 received Frown incision (Group F) and 96 received Batwing incision (Group B) whereas among the females, 101 patients received Frown incision and 94 received Batwing incision. In group F, among 110 patients the right eye was operated and 80 patients the left eye was operated, while in Batwing incision group in 105 patients the right eye and in 85 patients the left eye was operated. Out of total study subjects, 215 (56.6%) were operated for right eye and 165 (43.4%) were operated for left eye. Out of total study subjects, 206 (54.2%) were operated for right eye and 174 (45.8%) were operated for left eye.

[Table/Fig-1] depicts the amount of SIA at six weeks postoperative period.

SIA (In Dioptres)	0 D	0-0.5 D	0.5-1.0 D	1-1.5 D	>1.5 D
Group F, n (%)	04 (2.11)	115 (60.53)	64 (33.68)	07 (3.68)	00
Group B, n (%)	01 (0.52)	61 (32.12)	79 (41.58)	45 (23.68)	04 (2.11)

[Table/Fig-1]: Magnitude of SIA in Frown incision and Batwing incision 6 weeks postoperatively.

While comparing between the two groups, the magnitude of SIA was found to be more in Batwing incision as compared to Frown incision [Table/Fig-2]. In Frown incision group, average preoperative astigmatism preoperatively was 0.55±0.36D and average astigmatism at six weeks postoperatively was 0.46±0.33D. In Batwing incision group, average preoperative astigmatism was 0.49±0.39D and average astigmatism six weeks postoperatively was 0.54±0.40D.

SIA	Group F	Group B
Preoperative SIA	0.55±0.36	0.49±0.39
Postoperative SIA	0.46±0.33	0.54±0.40
Average Mean SIA	0.47±0.27	0.80±0.39

[Table/Fig-2]: Average mean SIA in Dioptre (calculated by SIA calculator 2.1).
Average SIA Mean±SD:
- Group F: 0.47±0.27 at 84 degree (Frown incision)
- Group B: 0.80±0.39 at 80 degree (Batwing incision)

[Table/Fig-3] shows the mean preoperative SIA and postoperative astigmatism. Mean SIA was less in Frown incision group (0.40 D at 82°) as compared to Batwing incision group (0.71D at 80°), showing with the rule astigmatism shift. [Table/Fig-4] shows the types of astigmatism in preoperative and at six weeks postoperatively in both the groups.

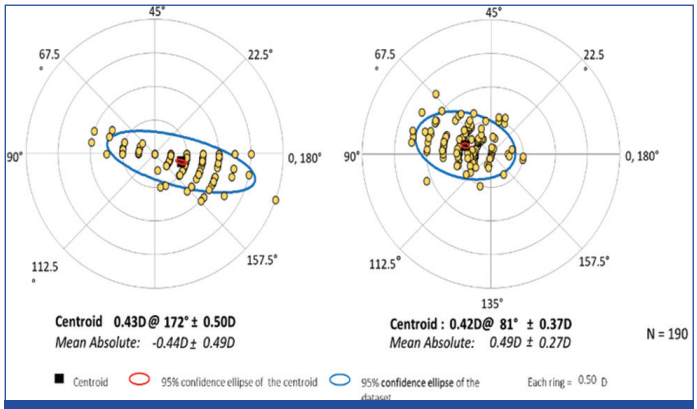
SIA	Group F		Group B	
	Magnitude (Dioptre)	Axis (Degrees)	Magnitude (Dioptre)	Axis (Degrees)
Preoperative	0.43	173	0.40	172
Postoperative	0.04	2	0.31	78
Mean SIA	0.40	82	0.71	80

[Table/Fig-3]: Pre- and Postoperative and Mean SIA as per centroid (with SIA 2.1 calculator).

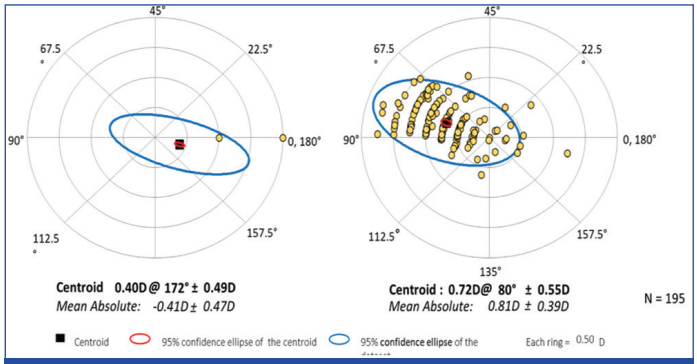
The data has been depicted in vector analysis double angle plots to enlighten the scenario more [Table/Fig-5,6].

Astigmatism type	Group F n (%)		Group B n (%)	
	Preoperative	Postoperative	Preoperative	Postoperative
No astigmatism	17 (8.94)	04 (2.11)	30 (15.79)	01 (0.52)
WTR	04 (2.11)	157 (82.63)	00	165 (86.84)
ATR	167 (87.9)	08 (4.21)	157 (82.63)	12 (6.32)
Oblique	02 (1.05)	21 (11.05)	03 (1.58)	12 (6.32)

[Table/Fig-4]: Types of astigmatism in pre- and postoperatively after six weeks in both groups.



[Table/Fig-5]: Double angle plot (DAP) of preoperative astigmatism and postoperative astigmatism in Frown incision group.



[Table/Fig-6]: Double angle plot (DAP) of preoperative astigmatism and postoperative astigmatism in Batwing incision group.

The SIA vectors in the frown incision group on the DAP [Table/Fig-5] in preoperative scenario showed more clustering near horizontal axis directing towards ATR astigmatism in maximum samples, while at postoperative six weeks its showing clustering implying a high predictive value of the centroid obtained. This indicates that making a superotemporal tunnel consistently induced shift of astigmatism towards 'With The Rule (WTR)', this is because the superotemporal tunnel causes more flattening of horizontal meridian and steepening of vertical meridian to WTR shift. This may be advantageous as most of the elderly patients who have 'Against The Rule (ATR)' astigmatism (80).

The SIA vectors in the Batwing incision group on the DAP [Table/Fig-6] in preoperative cases showed more clustering near horizontal axis directing towards ATR astigmatism in maximum samples, while at postoperative six weeks its showing clustering implying a high predictive value of the centroid obtained. This indicates shift astigmatism towards WTR, because of flattening of horizontal meridian and steepening of vertical meridian (80).

[Table/Fig-7] shows comparison of preoperative and postoperative UCVA, the postoperative visual outcome was better in group F (Frown incision group). On 'paired t- test' p-value for preoperative UCVA was 0.164 (statistically insignificant) and for postoperative UCVA (<0.0001) was extremely statistically significant [Table/Fig-8]. [Table/Fig-9] shows the comparison of BCVA preoperative and postoperative in both groups with LogMAR visual acuity charts. BCVA shows preoperative and postoperative values statistically insignificant with p-value 0.116 and 0.139, respectively [Table/Fig-10].

UCVA	Preop UCVA		Postop UCVA	
	Group F	Group B	Group F	Group B
Mean±SD	1.21±0.17	1.19±0.18	0.08±0.11	0.16±0.14

[Table/Fig-7]: Comparison Uncorrected Visual Acuity (UCVA) preoperative and postoperative in Group F and Group B with LogMAR visual acuity charts.

UCVA	Preop		Postop		Statistical significance
p-value	<0.164		<0.0001		p-value is significant for postop UCVA (<0.05)
CI	-0.025		-0.109		
T value	1.397		8.538		
Df	189		189		
SE diff.	0.018		0.013		
	Group F	Group B	Group F	Group B	
Mean UCVA	1.21	1.19	0.08	0.16	
SD	0.17	0.18	0.11	0.14	
SEM	0.012	0.014	0.008	0.01	

[Table/Fig-8]: UCVA by paired t-test.

BCVA	Preop BCVA		Postop BCVA	
	Group F	Group B	Group F	Group B
Mean±SD	0.941±0.2	0.909±0.21	0.005±0.024	0.009±0.036

[Table/Fig-9]: Comparison Best Corrected Visual Acuity (BCVA) Preop and Postop in both groups with LogMAR visual acuity charts.

BCVA	Preop		Postop		Statistical significance
p-value	0.116		0.139		p-value is insignificant for preop and postop BCVA (>0.05)
CI	0.032		0.005		
T value	2.428		1.484		
Df	189		189		
SE diff	0.013		0.003		
	Group F	Group B	Group F	Group B	
Mean BCVA	0.94	0.91	0.005	0.009	
SD	0.20	0.22	0.024	0.036	
SEM	0.015	0.016	0.002	0.003	

[Table/Fig-10]: BCVA preop and postop by paired t-test.

DISCUSSION

Although phacoemulsification has proven to be advantageous for cataract surgeries, owing to the economic and technical reasons the procedure is limited to big cities and institutions only. Non phaco or MSICS by feature of its self-sealing suture-less incision appears as a brilliant option for managing the cataract burden in developing countries and hence MSICS with its cheaper cost serves to be beneficial. A variety of scleral incisions are being used in MSICS so as to keep minimum postoperative astigmatism. All scleral pocket incisions have the advantages of intra and postoperative stability including early healing, faster visual restoration and superior astigmatism control [7].

Almost any spherical refractive error can be corrected by replacing the crystalline lens with an intraocular lens. Work requiring stereopsis and good visual acuity may therefore become impossible. Many forms of surgery have the potential to affect refraction to some degree by causing one or more of these changes. A greater understanding of the effects of ocular incisions and suture placement on corneal astigmatism has done much to reduce inconvenient postoperative refractive errors. Patients who

are selected for cataract surgery are anticipated to have a clear vision and less dependence on spectacles. Thus, to achieve this goal, SIA has to be reduced. Modern cataract surgery aims at this modification. In the present study, astigmatism was assessed by using keratometry readings and SIA was calculated with SIA Soft Microsoft excel sheet calculator. The change in the corneal curvature is responsible for SIA and the astigmatic refractive error. Uncorrected astigmatism that is usually caused due to the length of incision and site, can cause blurred images and glare that could produce patient distress and displeasure with otherwise uneventful cataract surgery [11,12].

The mean age of the study participants in the present study was 69 years (range 55-88 years) which was in correlation with previous studies that proves cataract to be a condition occurring in people in their fifth decades of life and beyond [13,14]. Out of total study subjects, 206 (54.2%) were operated for the right eye and 174 (45.8%) were operated for the left eye. In Frown incision group, 110 patients were operated for the right eye and 80 patients for the left eye while in Batwing incision group in 105 patients the right eye was operated and in 85 patients the left eye was operated. Amplitude of SIA among two groups was found to be more in Batwing incision as compared to Frown incision. SIA Amplitude (Mean±SD) at six weeks postoperative in Frown incision group was 0.47±0.27 at 84 degree. Masket S et al., conducted a study on cataract extraction with frown incision observed that the average postoperative induced astigmatism of 0.5D at six weeks [15]. The study conducted in 2005 by Gokhale NS and Sawhney S showed that the amplitude of SIA in superotemporal frown incision group was 0.51+0.49 D [16]. These studies are congruent to the results of the present study. Gokhale NS and Sawhney S reported the mean astigmatism in manual SICS with frown incision to be 1.28 D at 29 degrees whereas the present study showed less SIA which was found to be in contrast [16]. Amplitude of SIA postoperatively in Group B after six weeks was 0.80±0.39 D at 80 degrees for Batwing incision implying minimal SIA.

For analysing the net type of corneal astigmatism, keratometry readings were taken pre- and postoperatively which indicated that making a superotemporal tunnel consistently induced shift of astigmatism towards WTR, this is because the superotemporal tunnel causes flattening of horizontal meridian and steepening of vertical meridian to WTR shift. This may be advantageous as most of the elderly patients have ATR astigmatism [16]. The study conducted in rural south area by Hoovayya KS and Kumar A showed that ATR is the commonest type of astigmatism in patients undergoing cataract surgery [17]. Similar results were also shown by Gokhale NS and Sawhney S; Yadav HR and Rai VG; and Jaffe NS et al., which were found to be in concordance to the present study results [16,18,19].

On comparing pre- and postoperative UCVA the postoperative visual outcome was better in group F which showed 6/12 and better UCVA in 98.9% cases which was found to be similar to the study done by Gurung A et al., [20]. The present study depicted postoperative BCVA 6/6 in 94.21% (179) patients of Frown incision; and in 92.63% (176) in Batwing incision group by Snellen's visual acuity chart. In the current study, all the patients were seen with UCVA and BCVA better than and equal to 6/18 at six weeks postoperative which was in agreement to the study done by Rohatgi J et al., who found 93.3% of patients had BCVA of 6/18 or better at eight week after SICS with central frown incision [21]. The study results confirmed the superiority of Frown incision over Batwing incision in terms of less SIA and better postoperative unaided visual outcome.

Limitation(s)

The limitations of this study were small sample size, short follow-up time, use of auto keratometer for keratometry. To get better outcome; the study should be conducted with larger sample size, longer follow-up time, pentacam can be used for keratometry.

CONCLUSION(S)

Cataract surgery incision causes flattening of the cornea in the same meridian and reduces existing astigmatism if used at an appropriate site. The purpose of the study was to see the beneficiary effect of an incision placed on the steepest meridian in controlling/lowering the astigmatic outcome in eyes with pre-existing astigmatism and comparing effect of incisions at different sites. Thus, the superotemporal Frown incision exhibited superior and statistically significant results in terms of lesser SIA and better unaided visual outcome when compared with superotemporal Batwing incision. However, further studies are required and should be channelised with large sample size in order to evaluate and validate the parameters and their corresponding results.

REFERENCES

[1] World Health Organization. The World health report: 1998: Life in the 21st century: A vision for all: Report of the Director-General. World Health Organization; 1998; pp. 47.
[2] Foster A. Vision 2020: The cataract challenge. Community Eye Health. 2000;13(34):17-19.
[3] Minassian DC, Mehra V. 3.8 million blinded by cataract each year: Projections from the first epidemiological study of incidence of cataract blindness in India. Br J Ophthalmol. 1990;74(6):341-43.
[4] Thulasiraj RD, Nirmalan PK, Ramakrishnan R, Krishnadas R, Manimekalai TK, Baburajan NP, et al. Blindness and vision impairment in a rural south Indian population: The Aravind comprehensive eye survey. Ophthalmology. 2003;110(8):1491-98.
[5] Mohan M. Collaborative Study on Blindness (1971-1974): A report. Indian Council of Medical Research, New Delhi, India; 1987:1-65.
[6] Venkatesh R, Chang DF, Muralikrishnan R, Hemal K, Gogate P, Sengupta S. Manual small incision cataract surgery: A review. Asia Pac J Ophthalmol (Phila). 2012;1(2):113-19.
[7] Muralikrishnan R, Venkatesh R, Prajna NV, Frick KD. Economic cost of cataract surgery procedures in an established eye care centre in Southern India. Ophthalmic Epidemiol. 2004;11(5):369-80.
[8] Steinert RF, Brint SF, White SM, Fine IH. Astigmatism after small incision cataract surgery. A prospective, randomized, multicenter comparison of 4- and 6.5-mm incisions. Ophthalmology. 1991;98(4):417-23; discussion 423-4. Erratum in: Ophthalmology 1997;104(9):1370. PMID: 2052294.
[9] Warkhede P, Saxena N, Siddiqui PA. Evaluation of SICS in present perspective. IOSR J Dent Med Sci. 2015;14(4):57-60.
[10] Jauhari N, Chopra D, Chaurasia RK, Agarwal A. Comparison of surgically induced astigmatism in various incisions in manual small incision cataract surgery. Int J Ophthalmol. 2014;7(6):1001-04.
[11] Singh S, Pardhan S, Kulothungan V, Swaminathan G, Ravichandran JS, Ganesan S, et al. The prevalence and risk factors for cataract in rural and urban India. Indian J Ophthalmol. 2019;67(4):477-83. Doi: 10.4103/ijo.IJO_1127_17. PMID: 30900578; PMCID: PMC6446631.
[12] Harakuni U, Bubanale S, Smitha KS, Tenagi AL, Kshama KK, Meena A, et al. Comparison of surgically induced astigmatism with small incision cataract surgery and phacoemulsification. Journal of Evolution of Medical and Dental Sciences. 2015;4(71):12354.
[13] Chang JR, Koo E, Agrón E, Hallak J, Clemons T, Azar D, et al; Age-Related Eye Disease Study Group. Risk factors associated with incident cataracts and cataract surgery in the Age-related Eye Disease Study (AREDS): AREDS report number 32. Ophthalmology. 2011;118(11):2113-19.
[14] Fletcher AE. Free radicals, antioxidants and eye diseases: Evidence from epidemiological studies on cataract and age-related macular degeneration. Ophthalmic Res. 2010;44(3):191-98.
[15] Masket S, Wang L, Belani S. Induced astigmatism with 2.2- and 3.0-mm coaxial phacoemulsification incisions. J Refract Surg. 2009;25(1):21-24.
[16] Gokhale NS, Sawhney S. Reduction in astigmatism in manual small incision cataract surgery through change of incision site. Indian J Ophthalmol. 2005;53(3):201-03.
[17] Hoovayya KS, Kumar A. A prospective study on corneal complications of small incision cataract surgery conducted in rural hospital. Tropical Journal of Ophthalmology and Otolaryngology. 2019;4(2):86-91.
[18] Yadav HR, Rai VG. A study of comparison astigmatism following manual small incision cataract surgery: Superior versus temporal approach. Journal of Evolution of Medical and Dental Sciences. 2014;3:6430-34.
[19] Jaffe NS, Jaffe MS, Jaffe GF. Intraocular lens, In: Cataract surgery and its complications. 6th Ed. St Louis Missouri: Mosby; 1997. Pp.147-99.

[20] Gurung A, Karki DB, Shrestha S, Rijal AP. Visual outcome of conventional extracapsular cataract extraction with posterior chamber intraocular lens implantation versus manual small-incision cataract surgery. Nep J Oph 2009;1(1):13-19.

[21] Rohatgi J, Gupta VP, Sangma D. A prospective randomized comparative study of manual SICS using 6 mm frown versus 5 mm modified Chevron Incision. AIOS Proceedings, 2008.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Ophthalmology, Byramjee Jeejobhoy Government Medical College, Pune, Maharashtra, India.
2. Resident, Department of Ophthalmology, Byramjee Jeejobhoy Government Medical College, Pune, Maharashtra, India.
3. Resident, Department of Ophthalmology, Byramjee Jeejobhoy Government Medical College, Pune, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Jayshri Hariharrao Pendamkar,
Resident, Department of Ophthalmology, Byramjee Jeejobhoy Government Medical College, Pune, Maharashtra, India.
E-mail: jayshripendamkar5591@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Dec 10, 2022
- Manual Googling: Feb 13, 2023
- iThenticate Software: Feb 16, 2023 (12%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Nov 23, 2022**
Date of Peer Review: **Feb 10, 2023**
Date of Acceptance: **Feb 18, 2023**
Date of Publishing: **Mar 01, 2023**