

## A COMPARATIVE STUDY OF SURGICALLY INDUCED ASTIGMATISM IN FROWN VERSUS CHEVRON INCISION IN MANUAL SMALL INCISION CATARACT SURGERY

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**ABSTRACT: PURPOSE:** To compare the surgically induced astigmatism following chevron incision versus frown incision in MSICS. **METHOD:** The study was conducted from January 2012 to December 2012. 200 patients were selected of which 100 patients above the age of 50yrs, with soft cataracts, up to grade 2 nuclear sclerosis underwent MSICS with chevron incision and the remaining matched group underwent MSICS with frown incision. For all the patients incision site was chosen based on the pre-op keratometry readings and the incision length was 6mm. Patients' keratometry readings were taken at the end of 6 weeks following surgery and surgically induced astigmatism was calculated. **RESULTS:** Post operatively, the surgically induced astigmatism was 0.75D-1.0D, in the frown incision group versus 0.5D-0.75D, in the chevron incision group. **CONCLUSION:** The Surgically induced astigmatism with chevron incision is 0.25D-0.45D less than with frown incision.

**KEY WORDS:** SIA ,chevron incision, frown incision, BCVA.

**INTRODUCTION:** In comparison to phaco,manual SICS needs a larger incision for both nucleus removal and a rigid IOL insertion, but still provides for a sutureless and convenient alternative. Manual SICS does induce some amount of astigmatism by altering corneal curvatures (i.e, by coupling effect), while phaco surgery with 3 mm incision is astigmatically neutral. Manifold studies have been done to compare Surgically Induced Astigmatism with manual SICS to phaco surgery but not much has been done to compare various techniques in manual SICS itself.

In this study an attempt has been made to analyse the role of incision shape depending on the pre operativekeratometry readings in reducing surgically induced astigmatism in manual small incision cataract surgery.

As described by Paul Koch, external incision which falls within incisional funnel induces less astigmatism. Frown and chevron incisions lie entirely within the funnel and are astigmatically more stable.

This study is done to compare surgically induced astigmatism between chevron and frown incisions.

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## **MATERIALS AND METHODS:**

### **Aims & objectives:**

1. To calculate the amount of surgically induced astigmatism in frown incision and chevron incision in MSICS.
2. To assess the BCVA in both the groups

### **INCLUSION CRITERIA:**

Visually significant cataracts –

1. Posterior subcapsular cataract
2. Nuclear sclerosis grade II – III.

### **EXCLUSION CRITERIA**

1. Hard cataracts and nuclear cataracts grade III & IV.
2. Cataract with complications like subluxated lens, pseudoexfoliation, preexisting retinal and corneal diseases.

The study was conducted at KR Hospital, Mysore from jan 2012 to dec 2012. This was a prospective study in which 200 patients with cataract, satisfying inclusion criteria were selected. They were divided into 2 groups of 100 each. Initial screening was done by Optometrists and later examined by surgeons at the hospital on the same day. Detailed evaluation of the cases was carried out by resident doctors like slit lamp biomicroscopy, tonometry, lacrimal sac syringing, fundus examination, keratometry and A-scan biometry. Pre operative emphasis was laid on keratometry and A-scan which was done for both eyes. Patients were posted for surgery on the next day and 2 experienced surgeons performed all the surgeries.

Incision site was chosen along the steeper meridian according to pre operative keratometry readings, incisions were 6mm incord length, frown and chevron shaped. The incision were taken 2.5-3mm posterior to limbus. Sclerocorneal tunnel with formation of corneal valve was made. Continuous curvilinear capsulorrhexis was done in all cases. Viscoelastics were used generously. Minimal iris handling was ensured. In-the-bag placement of IOL was done. Patients were examined on the first post operative day, at first week and at the end of 6wks. Post operative vision and refraction was performed at the end of 6wks.

Surgically induced astigmatism was calculated using scalar analysis.

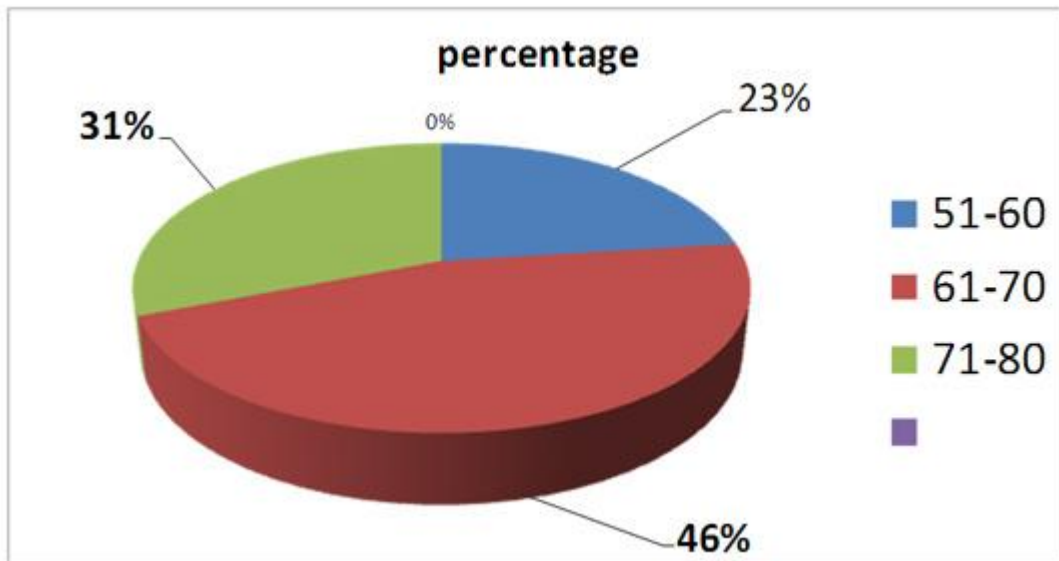
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**RESULTS:**

**AGE: 50-80 YEARS**

Age	No.of patients	Percentage
51-60	46	23%
61-70	92	46%
71-80	62	31%
Test statistics	Chi-square=16.360 p=0.00	

**Table 1: Demographic data of the study**



MALE	124	62%
FEMALE	76	38%
Test statistics	Chi-square=13.520 p=0.00	

**Table 2: Gender distribution**

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Amount of astigmatism	Patients	Percentage
0.00-0.25	26	13%
0.25-0.5	38	19%
0.5-1.0	56	28%
1.0-1.5	54	27%
1.5-2.0	26	13%
Test Statistics	Chi-Square(a)=21.200 p=0.00	

**Table 3:Pre-operative astigmatism**

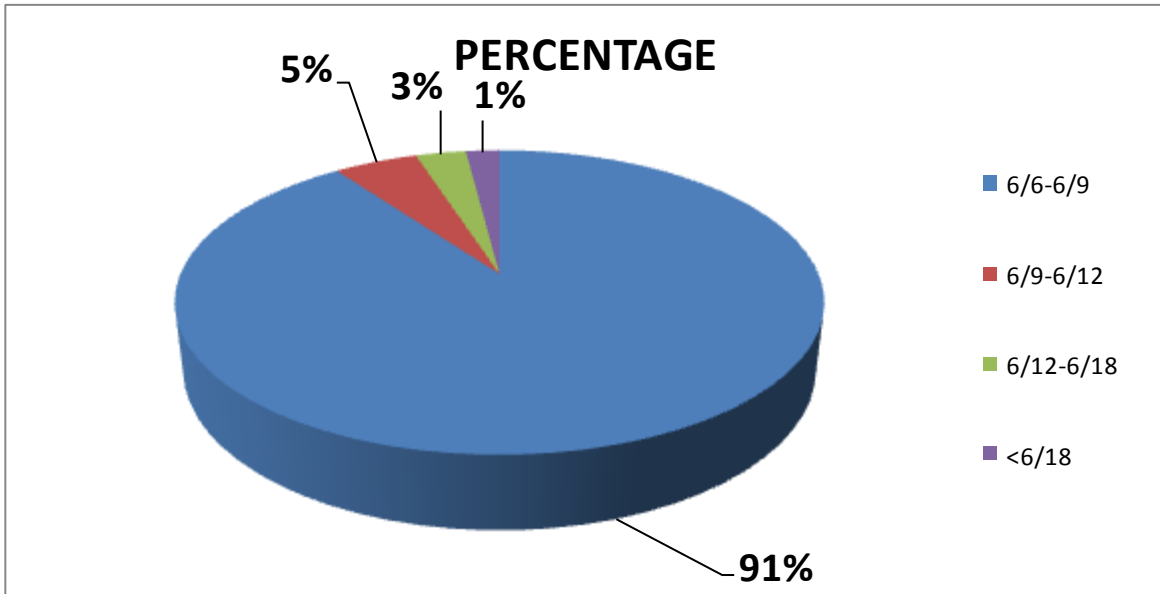
Visual acuity	No.of patients	Percentage
6/9 - 6/12	54	27
6/12 -6/18	98	49
<6/18	48	24
Test statistics	Chi-Square=22.36 p=0.00	

**Table 4:Uncorrected visual acuity at the end of 6 weeks**

6/6 - 6/9	180	90%
6/9 - 6/12	10	5%
6/12 -6/18	6	3%
<6/18	4	2%
Test statistics	Chi-Square=451.04 p=0.00	

**Table 5:Best corrected visual acuity at the end of 6 weeks**

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Astigmatism	Pre op	Post op
0.00-0.25	13	11
0.25-0.50	19	27
0.5-1.0	28	35
1.0 -1.5	27	17
1.5-2.0	13	10

**Table 6:Pre and post operative astigmatism in chevron group**

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Astigmatism	Pre op	Post op
0.00-0.25	13	7
0.25-0.50	19	14
0.5-1.0	28	39
1.0-1.5	27	25
1.5-2.0	13	15

**Table 7: Pre op and post op astigmatism in frown group**

	0.00-0.25	0.25-0.50	0.5-0.75	0.75-1.0	>1.0
<b>Chevron</b>	13	29	45	8	5
<b>Frown</b>	9	20	33	23	15
Test statistics	Contingency Coefficient=0.276 p=0.002				

**Table 8: Post-operative surgically corrected astigmatism at the end of 6 weeks**

**DISCUSSION:** Today's cataract incisions provide better control of surgically induced astigmatism, either by using temporal approach to produce astigmatically neutral surgery or by using on axis incision to induce astigmatism at the steep axis to counteract preexisting astigmatism. In the present study, an attempt has been made to show that surgically induced astigmatism can be reduced by varying the incision site and incision shape. Our study shows that chevron incision gives very little amount of surgically induced astigmatism of up to 0.75 D in a major proportion of eyes i.e 87%. 13% eyes developed SIA of >0.75 D. On the contrary, with frown incision 62% eyes developed SIA of about 0.75 D and 23% had 0.75-1.0 D and 15% had >1D (p value-0.002). The study was compared to a randomized study to evaluate SIA in patients of SICS operated by chevron and frown incision by Dr, Balwir and Dr.S.Yadav. which showed that 86% of patient showed SIA of 1.5D.

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**CONCLUSION:** It is possible to reduce the amount of post operative astigmatism significantly by choosing the incision shape. The Surgically induced astigmatism with chevron incision is 0.25D-0.45D less than that with frown incision.

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