



INFLUENCE OF INCISION SHAPE ON SURGICALLY INDUCED ASTIGMATISM IN SMALL INCISION CATARACT SURGERY

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**ABSTRACT** **Aim-** To study the effect of incision shape viz. straight and frown, on surgically induced astigmatism in manual small incision cataract surgery. **Method-** This Prospective interventional study conducted on 100 patients of senile/ pre senile cataract, after clearance from IEC. SICS through 6.0 to 6.5 mm incision was performed by the same surgeon and same technique. Eyes were randomly (simple randomization) assigned to either of the two groups: Group A- 50; frown incision Group B- 50; straight incision All the cases were recorded in a predesigned proforma approved by IEC. **Results-** The average surgically induced astigmatism following straight and frown incisions was found to be -1.23D and -1.02D, respectively. The uncorrected visual acuity of 6/18 or better was achieved in 74 % and 78 % in straight incision and frown incision groups, respectively. **Conclusion-** The average surgically induced astigmatism is less in the frown incision as compared to the straight incision in manual small incision cataract surgery.

**KEYWORDS :** Surgically induced astigmatism, SICS, Frown incision, Astigmatism

**INTRODUCTION**

Post operative astigmatism is one of the main determinants of uncorrected visual acuity following cataract surgery. (1) The Surgically induced astigmatism (SIA) is unavoidable and depends on several factors such as incision length, placement of incision, wound configuration etc. The shape of incision in Manual Small Incision Cataract Surgery (SICS) influences SIA. (2) The two commonly used incision shapes are frown and straight type. (2)

**Methodology**

Prospective interventional study conducted on 100 patients of senile/ pre senile cataract, after clearance from IEC. SICS through 6.0 to 6.5 mm incision was performed by the same surgeon and same technique. Eyes were randomly (simple randomization) assigned to either of the two groups: Group A- 50; frown incision, Group B- 50; straight incision. All the cases were recorded in a predesigned proforma approved by IEC. Exclusion criteria: Patient with associated ocular pathology such as corneal ulcers, Patients with intra-operative and postoperative complications, Patient having astigmatism > 1.5 D, Patients who could not complete all the scheduled post operative visits, Mean age of patients in group A was 62.46 ± 6.8 years and that in group B was 63.50 ± 5.3 years, Routine pre-operative evaluation was carried out including BCVA, Anterior Segment examination, GAT, slit lamp indirect biomicroscopy, Corneal astigmatism was measured by automated keratometer (ZEISS Visuref 100): KH(Horizontal), KV(Vertical) and axis, Post-operative follow up was carried out on post op day 1, 15, 30 and 45.

Surgically Induced Astigmatism (SIA) was calculated using a software called 'SIA Software' for a given set of pre- and postoperative keratometric data.

**Observation**

**Table 1: Average Preoperative, Postoperative and Surgically Induced Astigmatism**

Incision Type	Pre OP AST	Post OP AST (DAY45)	SIA
Frown	0.17 ± 0.66D	-0.85 ± 0.56 D	1.02± 0.49D
Straight	0.35 ± 0.56D	-0.88 ± 0.70 D	1.23± 0.45 D



**Graph 1:** Average SIA at different intervals (Cylinder Regression Profile)

**Table 2: Post operative Visual Acuity in group A**

VISUAL ACUITY	GROUP A (FROWN)	
	Uncorrected	Corrected
6/18-6/6	37 (74%)	46 (92%)
6/60-6/24	11 (22%)	4 (8%)
>6/60	2 (4%)	0 (0%)
Total	50 (100%)	50 (100%)

**Table 3: Post operative Visual Acuity in group B**

VISUAL ACUITY	GROUP B (STRAIGHT)	
	Uncorrected	Corrected
6/18-6/6	34 (68%)	41 (82%)
6/60-6/24	14 (28%)	8 (16%)
>6/60	2 (4%)	0 (0%)
Total	50 (100%)	50 (100%)

**DISCUSSION**

SIA following cataract surgery is one of the most important determinants of the uncorrected visual acuity. Attempts have been made to minimize SIA in MSICS by modifying various parameters including, the shape of incision.



**A. Frown incision**

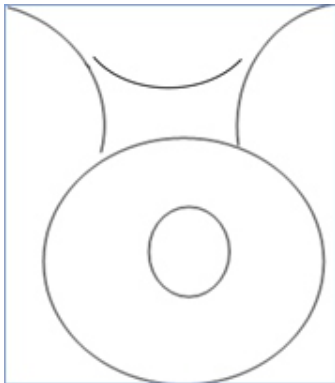
(No Wound Sagging)

The relative increase in astigmatism in Group B i.e. straight incision is due to the proximity of the incision to the optical centre resulting into comparatively more vertical corneal instability due to wound sagging.<sup>(3,4)</sup>

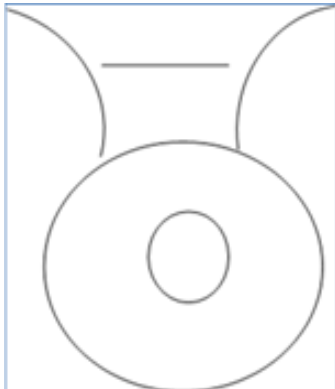


**B. Straight incision**

In Group A (Frown incision group), lesser amount of SIA was due to the location of the incision. Most part of the incision fell in the astigmatic neutral funnel.<sup>(5)</sup>



**Frown incision in incisional funnel**  
(Astigmatic Neutral Funnel)



**Straight incision in incisional funnel**

In group A, 37 cases (74%) could achieve an UCVA of 6/18 or better. While in group B, 34 cases (68%) could achieve an UCVA of 6/18 or better. In Group A (frown) average SIA was  $1.02 \pm 0.49$  D and in Group B (straight) mean SIA was  $1.23 \pm 0.45$  D post-operatively after 45 days. The comparison between the mean of the two groups using 'unpaired t test' was statistically significant indicating that group B had more SIA.

**CONCLUSIONS**

The UCVA was better in frown incision as compared to straight incision group. This is due to less SIA in frown incision group.

The difference between SIA observed in frown and straight types of incision is statistically significant. This information can be used to customize incision shape to induce required astigmatism to correct pre operative astigmatism.

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