

**INCIDENCE OF SURGICALLY INDUCED ASTIGMATISM AFTER SMALL INCISION CATARACT SURGERY DONE BY JUNIOR RESIDENTS- AN OBSERVATIONAL LONGITUDINAL STUDY****Dr Apurva Ranjalkar**

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ABSTRACT

Purpose: To evaluate the incidence and magnitude of surgically induced astigmatism (SIA) following small incision cataract surgery (SICS). **Methods:** A prospective observational study was conducted on patients aged 30-70 years undergoing manual SICS. Preoperative keratometry and postoperative keratometry at day 1, day 3, day 14, 1 month, 3 months and 6 months were recorded. The SIA was compared between 2 groups of patients undergoing surgery by Straight and Frown Incisions respectively. **Results:** The study included 68 patients (total 136 eyes). The mean preoperative keratometric astigmatism was With the Rule Astigmatism in 40(58.8%) and Against the Rule in 28(41.20%) patients. At 6 months postoperatively, the mean SIA in patients who underwent surgery with Straight incision was $1.49 \pm 0.49D$, while it was $0.33 \pm 0.66D$ in patients with Frown incision. Majority of cases showed against-the-rule (ATR) astigmatism.

KEYWORDS : Surgically induced astigmatism, small incision cataract surgery, keratometry, cataract surgery outcomes**INTRODUCTION**

Cataract surgery remains one of the most frequently performed ophthalmic procedures worldwide. Small incision cataract surgery (SICS) is widely practiced, particularly in developing countries, due to its cost-effectiveness and suitability in high-volume settings. However, like any extracapsular technique, SICS can induce postoperative corneal astigmatism, which may affect uncorrected visual acuity and overall surgical outcomes.

Surgically induced astigmatism (SIA) refers to the change in corneal curvature caused by the surgical incision. The magnitude and axis of SIA depend on multiple factors, including incision size, site (superior vs temporal), and wound construction. Quantifying the incidence of clinically significant SIA is essential for optimizing surgical planning and patient satisfaction.

MATERIALS AND METHODS

Study Design: Prospective observational study

Study Population: Patients aged 30-70 years undergoing manual SICS for senile cataract at Tertiary care centre.

Exclusion Criteria:

- Pre-existing corneal pathology
- Irregular astigmatism
- Complicated cataract or combined procedures
- Patient not giving consent for study

Surgical Technique:

All surgeries were performed by Junior Residents using a self-sealing scleral tunnel incision measuring 6–6.5 mm. Incision site (superior) was standardized.

Data Collection:

- **Preoperative:** Keratometry using an automated keratometer
- **Postoperative:** Keratometry at day 1, day 3, day 14, 3 months, and 6 months
- **SIA Calculation:** Vector analysis using the Alpins method

Statistical Analysis:

Mean SIA and its incidence in various subgroups were analyzed using SPSS software. A p-value <0.05 was considered statistically significant.

RESULTS

Sample Size: 68 patients (136 eyes)

Mean Age: 30 to 70 years

Gender Distribution: 54.4% males, 45.6% females

Preoperative Astigmatism: Mean keratometric astigmatism: 0.65D

Postoperative SIA:

Straight Incision Group:

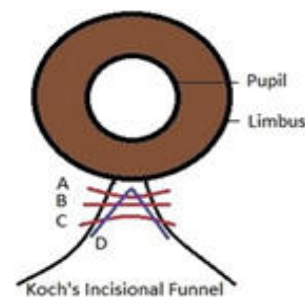
- At 1 week: $1.68 \pm 0.5 D$
- At 6 months: $1.49 \pm 0.5 D$

Frown Incision Group:

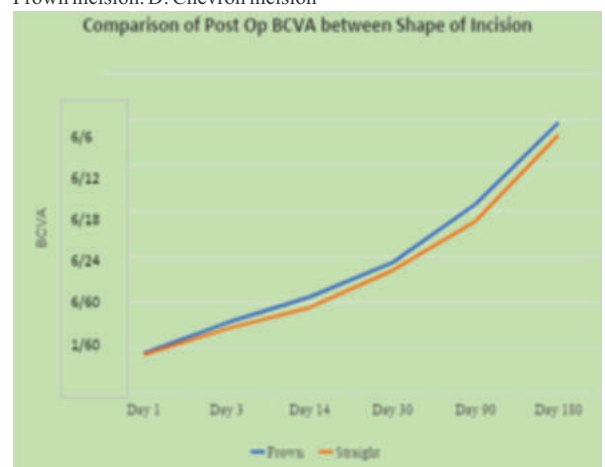
- At 1 week: $0.68 \pm 0.05 D$
- At 6 months: $0.33 \pm 0.05 D$

DISCUSSION

Our study demonstrates that SICS induces a measurable degree of astigmatism, which stabilizes by 6 months postoperatively. The incidence of $SIA \geq 1.5 D$ was significant in straight incisions compared to frown ones, corroborating findings from previous studies. Strategies to reduce SIA include minimizing incision size, placing the incision temporally, and employing proper wound architecture.



Koch's incisional funnel. A: Smile incision. B: Straight incision. C: Frown incision. D: Chevron incision



Comparison of Postoperative BCVA between Shapes of Incision.

CONCLUSION

Small incision cataract surgery is associated with a predictable degree of surgically induced astigmatism, with the magnitude influenced by incision site and size. Frown incisions are preferable for reducing SIA, thereby improving uncorrected postoperative visual outcomes.

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