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**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1407498>Available online at: <http://www.iajps.com>**Research Article****THE OUTCOME OF USING (5.5 MM) SELF-SEALING LIMBAL  
INCISION FOR EYES WITH (1.5 – 3.0) D PRE-EXISTING  
ASTIGMATISM ON THE STEEPEST MERIDIAN**<sup>1</sup>Dr. Shakeel Ahmad, <sup>2</sup>Dr. Samra Kanwal, <sup>3</sup>Dr. Muhammad Haroon Haider<sup>1</sup>Shalamar Medical College Lahore<sup>2</sup>Dali University China<sup>3</sup>Shalamar Medical College Lahore**Abstract:**

**Objective:** The research objective is to calculate keratometry results of a 5.5 mm self-sealing incision in eyes, having astigmatism pre-existed, on the sharpest/steepest meridian.

**Methodology:** A prospective researched method was observed upon thirty-five eyes having astigmatism (with or against 1.5 to 3 D) pre-existed at Service Hospital, Lahore (October 2016 September 2017). A 1.5 mm incision, 120 degrees approximate separation each, was used for the performance of Bi-manual phaco. A third self-sealing limbal incision which was created on the steepest meridian was used for the implantation of IOL. Before operating, keratometry reading was taken for the assessment. After twelve weeks of operation, automated keratometry was recorded.

**Results:** Average pre-existing reduction against the rule astigmatism was 1.15 with SD equal to 0.33 and with the rule astigmatism was 1.47 with SD equals to 0.32.

**Conclusions:** Our research outcome reports that by placing a third 5.5 mm incision and determining the steepest meridian, the possibility of low astigmatic outcomes is achievable with/against the rule of astigmatism pre-existed in the eyes.

**Keywords:** Steepest meridian (SM), Pre-existing astigmatism (PEA), Self-sealing Limbal Incision (SSLI), Keratometry outcome, Limbal Incision (LI).

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**INTRODUCTION:**

Achieving minimal astigmatic induction after cataract surgery with the excellent refractive result is a desirable goal of every surgeon. Surgical skills, PEA, biometry accuracy, location and architecture of the incision are some of the factors affecting surgically induced astigmatism [1]. The surgically induced astigmatism is successfully controlled with the introduction of a small surgical incision using foldable IOLs. This provides an increased and fast visual rehabilitation as well as alleviates spectacle dependence after the operation. However, eyes with PEA insignificance are found with the existence of post-op astigmatism as an obstacle. In the search of finding the best possible type, width and location of the incision and what effects they have on the cornea flattening to decrease or correct pre-existing astigmatism, numerous researches have been conducted [2]. The research purpose of this study was to find out the effects of such incision, in lowering or controlling astigmatism in eyes possessing significant PEA amount, which is on the steepest meridian.

**METHODOLOGY:**

This prospective research was carried out at Service Hospital, Lahore (October 2016 September 2017). Thirty-five eyes were implanted with 5.5 mm, rigid IOL through SSLI while receiving bi-manual phaco surgery. Patients from sixty to seventy-four were taken with the mean age of 65 years. A total of 77.4% (25) eyes had against whereas 28.5% (10) had astigmatism with the rule. Eyes having any systematic disease or irregular astigmatism were not included in this study. Before the operation, PEA and SM were recorded and automated keratometry was also performed.

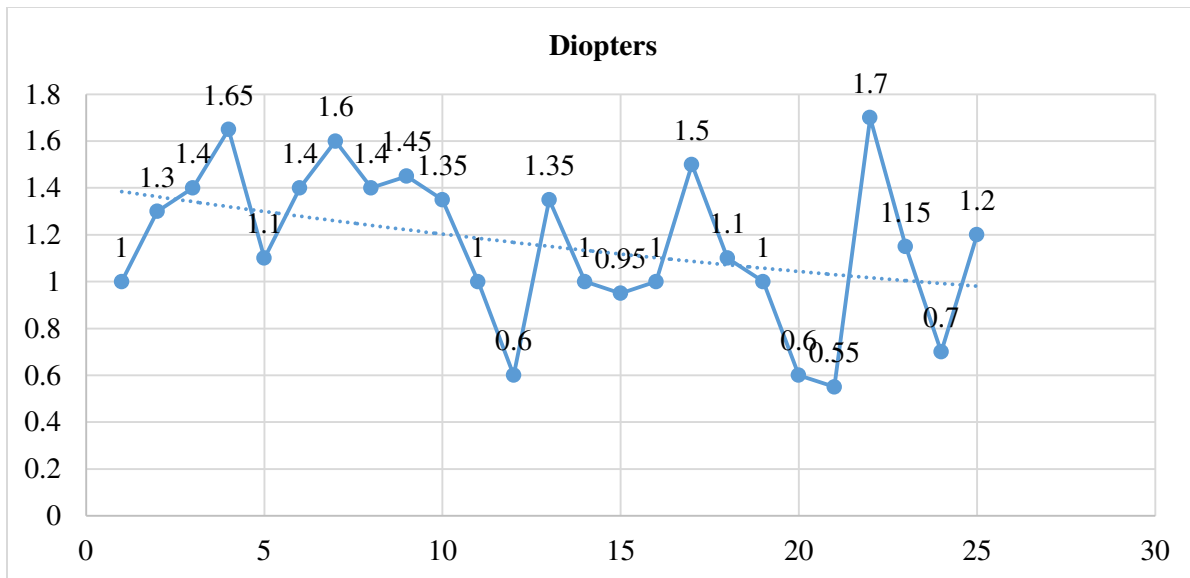
All patients were given anaesthesia (Peribulbar) before the operation. For irrigating chopper and phaco probe, 02 LIs each of 1.5 mm were placed apart at 120 degrees. Capsulorhexis was carried out and visco-elastic was used for filling the chamber. The nucleus was emulsified and then sculpted after the hydro-dissection. The cortex remained was pronounced and visco-elastic was used for the filling of the capsular bag. The third SSLI of 5.5 mm and a rigid IOL of the same size were placed on SM and in the bag respectively. The wound was then hydro-sealed after aspirating the visco-elastic. Post-operation examinations were held after 01 days, 01 weeks, and 12 weeks. All patients went through visual acuity and complete bio-microscope examination during follow up. Wound integrity was checked for any complications. Dexamethasone (0.1%) and Tobramycin (0.50%) were combined and administered for 02 hours in the first week and were reduced over four to six weeks' period.

**RESULTS:**

Post-operation examinations were held after 01 days, 01 weeks, and 12 weeks. A complete slit lamp examination was held on each visit. Automated keratometry with astigmatism amount was recorded at twelve weeks. Differences of Pre and post-operative keratometry readings were recorded to calculate the astigmatic effect. Pre-operative readings include 77.4% (25) eyes with keratometry range of PEA against the rule with 42.4 – 44.1 D (1.69 mean) astigmatism and 28.5% (10) eyes with PEA with the rule with 46.2-44 D (2.20 mean) astigmatism. The post-operative keratometry readings include astigmatism against the rule with 42.96 – 43.50 D (0.53 mean) and astigmatism with the rule with 43.91-43.16 D (0.76 mean) respectively. No complications were found in wound seals.

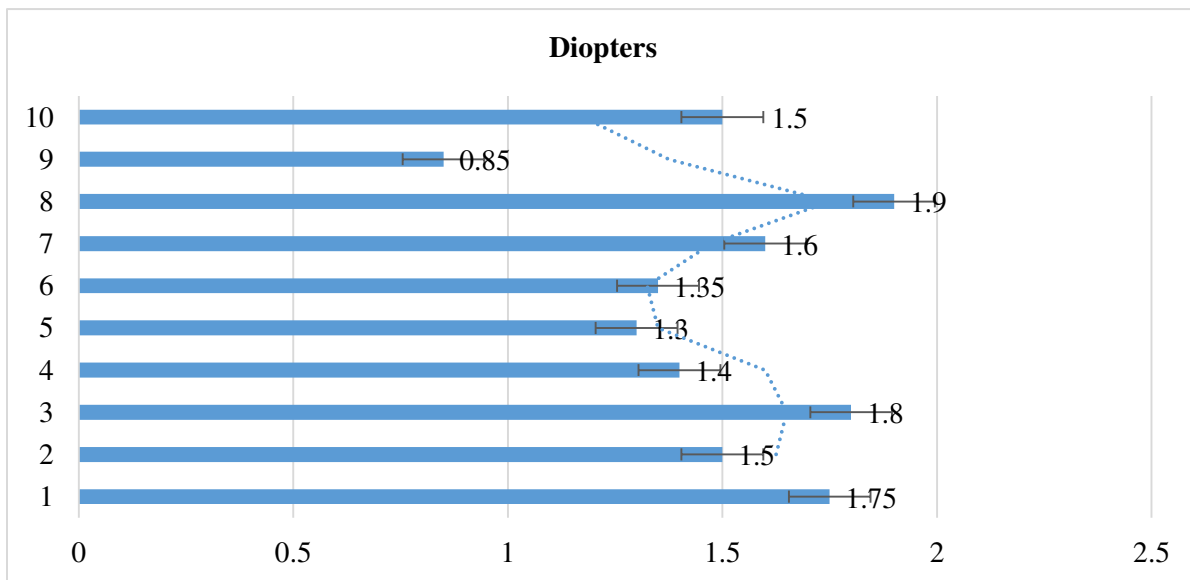
**Table – I:** Decreases in preexisting astigmatism (against the rule) 25 Patients

Patient	Diopters	Patient	Diopters	Patient	Diopters
1	1	10	1.35	19	1
2	1.3	11	1	20	0.6
3	1.4	12	0.6	21	0.55
4	1.65	13	1.35	22	1.7
5	1.1	14	1	23	1.15
6	1.4	15	0.95	24	0.7
7	1.6	16	1	25	1.2
8	1.4	17	1.5	-	-
9	1.45	18	1.1	-	-



**Table – II:** Decreases in pre-existing astigmatism (against the rule) 10 Patients

Patient	Diopters	Patient	Diopters
1	1.75	6	1.35
2	1.5	7	1.6
3	1.8	8	1.9
4	1.4	9	0.85
5	1.3	10	1.5



**DISCUSSION:**

The objective of our study was to find desirable refractive results post-operatively through cataract surgery. Among various factors which contribute towards such outcomes, inducing minimum surgical astigmatism is the most vital one. The dependency of Post-operative astigmatism lies on the width and site of incision and such factors. We noticed that PEA’s

negligible amount in the eyes produces successful control of surgical outcome by manipulating the incision. As supero and nasal-temporal incisions are located further away from central cornea [3 – 6], the astigmatism is induced in lesser amount when we place the incision in temporal meridian. On the other hand, we found astigmatism in abundance while superiorly placed incision because factors like eyelids

movement effected it [7, 8]. The same way, SIA is minimized by the clear corneal incision compared to scleral [9]. Pre-operative Corneal relaxing incisions are important, as studies show, as they minimize astigmatism even more [10]. Not only the site but also the width of incision holds a great importance in controlling post-operative astigmatism during induction. The degree of meridian flattening is directly dependent upon the size of the incision, the increased size of incision causes increased flattening in that meridian [2]. An incision of the size 4 to 5 mm leads to greater flattening wound comparing an incision of the size 3 mm [11 – 13]. Based on the above relationship, a 5.20 mm incision size leads to greater astigmatism amount than a 3.20 mm sized incision [14]. Nevertheless, with the use of foldable IOLs during the introduction of small incision surgery is revolutionary which produces various outcomes with PEA amount which is a complex obstacle still [15]. The work results show that an eye of more than 1.2 D pre-operative astigmatism came out with no astigmatism after the operation even an incision of the size 3.2 mm (unless a third incision was used or the incision was widened) was placed in the steepest meridian [16]. As previously discussed, significant flattening is caused in the meridian is mainly caused by the steepest meridian incision and steepening an incision in the opposite meridian. Using this concept, we placed a 5.5 mm SSLI in the eyes with 1.5 to 3 D PEA, on the steepest meridian to see the wide incision effects on neutralizing the PEA. Our research outcomes provide that a 5.5 mm incision used on steepest meridian has the possibility to achieve the low amount of astigmatism or astigmatism-free results post-operatively in eyes having 1.5 to 3 D PEA. We also observed wound manipulation to be minimum as it was used for IOL insertion only. We performed the operations with rigid IOLs instead of foldable as foldable IOLs did not show significant advantages moreover it was cost-effective too in our setup. Undeniably, post-operative capsular opacification occurrence is the only major disadvantage of using rigid IOLs but the advantage of its being cost-effective outweighs it. The sealing of the wounds was done well and carefully and no wound-related complication was noted later on.

### CONCLUSIONS:

The research outcome shows the effective use of 5.5-mm-wide Self-sealing incision for eyes with 1.5 to 3 D PEA for minimizing of astigmatism when placed on the steepest meridian. However, to ensure this astigmatic outcome's stability, a long-term follow-up and evaluation are required.

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