



## Original Article

Comparative Study Between Plus And Minus  
Cylinder Prescription In AstigmatismA  
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**ABSTRACT:**

**OBJECTIVES:** To develop a base-line data for declaring the ultimate choice of cylindrical forms and considering the interference in common optometric practice as a great number of ametropic populations have astigmatic refractive error and need cylindrical correction to relieve their symptoms.

**RESEARCH DESIGN AND METHOD:** 100 patients with astigmatism of age 15 up to 60 years was carried out. Visual acuity of patient was taken using log Mar Chart at distance. Visual acuity of either eye was examined in log Mar notation. Refraction was done on these patients. Refractive error of patient was recorded.

**RESULT:** Out of 100 Patients 52% were male and 48% were female. Astigmatic patients of 15-20 years were 23%, 21-30 years were 37%, 31-40 years were 7%, 41-50 years were 16%, 51-60 years were 17%. Preference of minus cylinder was 47%. Preference of plus cylinder was 40%. Preference of both plus and minus cylinder was 13%

**CONCLUSION:** There is strong prevalence of accepting minus cylinder in Astigmatic patient Plus cylinder was accepted in young and old age patients. Clinician should not prescribe the high cylindrical power more than patient acceptance and full prescription should not be given at first visit.

## INTRODUCTION:

A state in which the optical system of the non-accommodating eye fails to bring parallel rays of light to focus on the fovea may be defined as a refractive error.<sup>1</sup> In the United States the extent of the problem of refractive error has not been evaluated, except in select populations. The National Health and Nutrition Examination Survey 1971-1972 found that among the age group 12- to 54-years 25% of the US population was myopic.<sup>2</sup> Astigmatism occurs the refractive surfaces of the optical system produces two principal foci delimiting an area of intermediate focus called the Sturm's conoid. In 1801 Thomas Young was the first to describe ocular astigmatism.<sup>3</sup> The amount of astigmatism is equal to the difference in refracting power of the principal meridians.<sup>4</sup>

Distortion of the sharp retinal image arises from the unequal spectacle magnification in the two principal meridians in a corrected astigmatic eye, representing about 1.6% distortion per diopter cylinder in the correction at spectacle plane.<sup>6</sup>

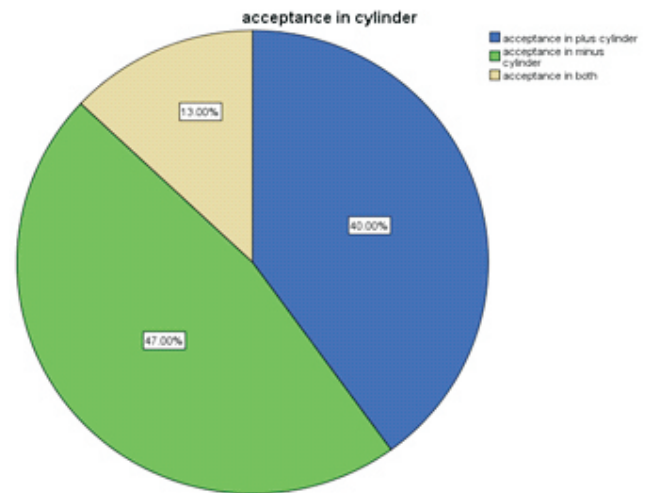
The presence of astigmatism may be associated with the presence of spherical refractive errors.<sup>7</sup> It has also been found by some investigators that the presence and changes in astigmatism is associated with increased progression of myopia.<sup>8</sup> Astigmatisms have some associations or there are some factors that lead to astigmatism such as genetics which play significant role in establishing the corneal power, visual response, stress of EOM affect corneal sphericity, and lid pressure. Some diseases like Down syndrome, nystagmus, Treacher Collins syndrome, lid abnormalities (ptosis etc.).<sup>9</sup>

The correction of astigmatism is very important to restore the vision especially when there is serious deterioration of the visual acuity, and symptoms of asthenopia and eye-strain. The astigmatic error should be corrected by appropriate cylindrical lenses which may be plus cylinder or minus cylinder.<sup>10</sup> Unocular astigmatism of low cylindrical does not cause significant amount of blur due to uncorrected axis so spherical equivalent is more comfortable than cylindrical prescription.<sup>11</sup>

## STUDY DESIGN, MATERIAL AND METHODOLOGY:

Data were collected from the patients coming the Eye OPD at COAVS, Mayo hospital, Lahore for testing eye examination / refraction. The gender and age distribution of subject at the time of testing were 15-60 years of age. The instruments used in testing were the logMAR chart and retinoscope. Simple random sampling was used to select the study sample from the sampling frame by assigning numbers to the sampling frame then numbers were randomly selected to obtain the study sample.

## RESULTS:



**Fig 1:** Relation between acceptance in cylinder and age:

**Table.1** acceptance in cylinder \* age Crosstabulation

		Age					Total
		15-20	21-30	31-40	41-50	51-60	
acceptance in cylinder	acceptance in plus cylinder	9	11	3	9	8	40
	acceptance in minus cylinder	11	18	4	7	7	47
	acceptance in both	3	8	0	0	2	13
<b>Total</b>		<b>23</b>	<b>37</b>	<b>7</b>	<b>16</b>	<b>17</b>	<b>100</b>

**Table.2** acceptance in cylinder \* gender Crosstabulation

		Gender		Total
		Male	Female	
Acceptance in cylinder	Acceptance in plus cylinder	21	19	40
	Acceptance in minus cylinder	23	24	47
	Acceptance in both	8	5	13
<b>Total</b>		<b>52</b>	<b>48</b>	<b>100</b>

### Explanation:

Proportion of acceptance of plus cylinder was 40 percent. Acceptance in minus cylinder was 47 percent while 13 percent accepted both plus and minus.

Table.1 shows relation between age and acceptance of cylinder which results that on acceptance on plus cylinder in age 21-30 year 11% are more acceptance on plus and in age 15-20 years are 9%, and in age 41-50 year are 9%, and in age 51-60 are 8%, and in age 31-40 are 3%. Acceptance on minus cylinder is greater in age 21-30 years that is 18% and it is 11% in age 15-20 years and 7% in 41-50 years and 7% in 51-60 years and 4% in 31-40 years. Acceptance of both plus and



minus is greater in age 21-30 years that is 8% and it is 3% in age of 15-20 years and 2% in age of 51-60 years. Table. 2 shows relation between acceptance of cylinder and gender, the results reveal that 52% male and 47% female are acceptance on plus cylinder and 48% male and 51% accept minus cylinder. 61% male and 38% female patients accept both on plus and minus cylinder.

### DISCUSSION:

Astigmatism is the most common defect of the human eye most people had it since birth. In some cases, it may increase, while in other cases it less or entirely disappear. Nine-tenth of the cases of astigmatism is due to imperfect curvature of two or more meridian of cornea. The other cases of astigmatism are due to imperfect curvature of the lens or due to malfunction of the eyeball.

In the great majority of cases, the small error give rise to no discomfort, they may be accepted as physiological and do not require treatment. Blurring is more common problem of astigmatism including headaches varying from a mild frontal ache to violent explosions of pain and a whole gamut of reflex nervous disturbances such as dizziness, irritability and fatigue were also experienced.

Floor appears to tilt with cylindrical corrected glasses creates difficult adaptation for the first time users of toric glasses. When some portions of picture more clearly seen by children it would be noticed by parents that child may have astigmatism. For example lines of specific meridian appear more clearly.

When treating large amount of astigmatism, or astigmatism for the first time, the doctor may not totally correct the astigmatism but slight under correction with maximum vision prescribed for trial. To save the patient from any hindrance in comfortable clear vision, the refractive error must be corrected properly and with appropriate cylindrical correction. The aim of study is to provide symptoms free clear vision with best cylindrical correction. This study has been carried out in order to estimate the preference of astigmatic patients in accepting plus or minus cylinder Study was carried out at the clinical skill room of COAVS, Mayo Hospital Lahore. 100 patient were included in the study, and ranges from 15 to 60 years. All patients who had astigmatism were included and the refractive status was recorded. Preference of astigmatic patients in acceptance of plus or minus cylinder was found out. 100 astigmatic patients were included in the study with their age ranging from 15-60 yrs. Males were more prevalent (52%, n=52) than females (48%, n=48). Results showed patients of 15-20 years were 23% (n=23), 21-30 years were 37% (n=37), 31-40 years were 7% (n=7), 41-50 years were 16% (n=16), 51-60 years were 17% (n=17). Preference of minus cylinder is 47% (n=47) and that of plus cylinder is 40% (n=40) and that in both plus and minus is 13% (n=13)

### CONCLUSION:

This study concluded that minus cylinder is preferred among astigmatic patients. Plus cylinder is preferred when it is less than 2.00DC (0.25DC-2.00DC).

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