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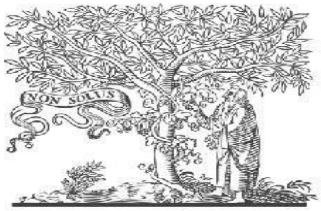

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Paper Authors **Ayub Ali, Dr. Himanshu Tripathi**

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ANANYSING PROBLEM OCCUR DUE TO DIFFERENT TYPYES OF ASTIGMATISM

Ayub Ali
Research Scholar, Sunrise University, Alwar, Rajasthan

Dr. Himanshu Tripathi
Research Supervisor, Sunrise University, Alwar, Rajasthan

ABSTRACT

Astigmatism and other forms of uncorrected refractive error are major contributors to avoidable blindness. If we don't use the most effective remedy, it might affect our daily lives and performance at work. Few research have looked at how uncorrected astigmatism affects visual and functional performance. The effects of astigmatic power and axis on visual and functional task performance were investigated by comparing Hindi and English characters. Within three astigmatism ranges (up to -1.00 D Cyl, up to -2.00 D Cyl, and more than -2.00 D Cyl), the effects of ATR and WTR astigmatism on near and distant vision and reading speed were studied. Far vision was measured using a Snellen chart, while near vision and reading speed were estimated using several reading charts and a Hindi newspaper. In order to standardize the blur correction, the order in which subjects were tested was juggled, and they were required to watch a movie (at 40 cm) for 10 minutes. Participants were given a five-minute break between each testing session so that they could regroup and get their bearings. As the astigmatic power of ATR astigmatism grew, both distant and near visual acuity deteriorated significantly ($p > 0.05$). Even moderate degrees of ATR astigmatism (as low as 0.50 DC) significantly impaired visual acuity. Similarly, when comparing uncorrected and optimally corrected far and near visual acuities, OBL astigmatism showed an overall stronger adverse effect than either WTR or ATR astigmatism. The consequences of astigmatism were more obvious while reading at lower font sizes.

Keywords: - Astigmatism, WHO, ATR, WTR, Performance.

I. INTRODUCTION

According to research published by the WHO, around 285 million people throughout the globe suffer from some kind of visual impairment. There are 246 million individuals who have low vision and 39 million who are totally blind. About 80% of those who have trouble seeing may have their condition prevented or improved. Avoidable blindness is spreading at an alarming rate, and urgent worldwide action is needed to halt it. A trained eye care practitioner can usually rectify uncorrected refractive error using standard clinical methods and a pair of glasses, and it has been argued that this is the main cause of moderate to severe visual impairment.

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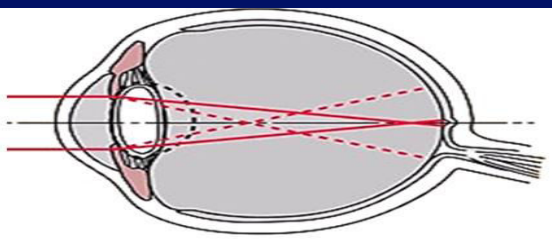

Astigmatism

Later on, "astigmatism" was suggested to describe this peculiarity by Dr. William Whewell (1794-1866), Master of Trinity College, Cambridge. This dilemma was initially identified by Sir Isaac Newton during a series of lectures he gave at Cambridge between 1670 and 1672. Newton remarked, "there are principally two centers of radiation" (or foci) when light hits a refracting surface at an angle. Newton said, "We have to to take for the sensible image some single point in that it occupies the middle of all the light proceeding from there toward the eye, and that lies approximately midway between the points 0 and 0" (the two foci). The dioptric midway between the two foci is located on this circle of confusion.

We studied the impacts of numerous features of astigmatism, from different angles, with the goal of identifying the minimal level of astigmatism that produced a loss in visual implementation. In a small percentage of cases, testing has been proven to negatively affect near- and far-sightedness, or both (Higgins et al., 1998; Chung et al., 2007; Wood et al., 20141, 2, 3).

Given the frequency of astigmatism in the population, blurred vision caused by uncorrected astigmatic ametropia is a serious problem (Fan et al., 2004; Read et al., 2007; Hashemi et al., 2011).However, there has been little study of the consequences of uncorrected spherical refractive error.

II. ASTIGMATISM

The term "astigmatism" was coined by Dr. William Whewell (1794–1866), Master of Trinity College, Cambridge, to describe this anomaly.This dilemma was initially identified by Sir Isaac Newton during a series of lectures he gave at Cambridge between 1670 and 1672. When light is incident on a refracting surface at an acute angle, Newton said, "there are principally two centers of radiation" (or foci). Newton said, "We have to to take for the sensible image some single point in that it occupies the middle of all the light proceeding from there toward the eye, and that lies approximately midway between the points 0 and 0" (the two foci). The dioptric midway between the two foci is located on this circle of confusion.

Astigmatism may be classified as follows:

- Depending on the direction,
- the contributing ocular component,
- and the refractive error,
- Astigmatism may be classified as either regular or irregular.

III. REGULAR ASTIGMATISM.

When a person has typical astigmatism, their eyes bend light in two distinct ways along parallel axes. If you have a refractive error, you may correct it using glasses.

The cause of normal astigmatism is not always clear. It might be spherical or refractive. Aberrations in corneal (mainly anterior surface) and lens curvature, in addition to decentring of the optical system, may account for a significant fraction of these cases. The astigmatism in the lens most likely results from the density discrepancies between the

laminated zonules.Due to the constant disparity between the two meridian lines, astigmatism cannot be considered a disease of the eye but rather a kind of refractive error. This is because the lid presses down harder on the cornea's front surface than the back, making the cornea's horizontal meridian flatter than the vertical. causing a degree of astigmatism within the average range (0.2 to 0.5 D). The vertical curvature is assumed to be larger than the horizontal curvature. Common manifestations of astigmatism consist include:

1. With the rule (WTR)

2. Against the rule (ATR)

3. Oblique astigmatism (OBL)

If the vertical curvature is larger than the horizontal curvature, a prescription with a concave cylindrical power of 1800 and a convex cylindrical power of 900 is required to correct for astigmatism; however, astigmatism is still permissible if the meridian of least curvature makes an angle of not more than 300 with the horizontal plan.

IV. IRREGULAR ASTIGMATISM

It shows up as a change in refractive index that is not constant throughout the equator. This disorder, also known as curvatural irregular astigmatism, may be present in people who have had extensive corneal scarring or who have keratoconus. The corneal condition known as keratoconus, or "conical cornea," manifests itself clinically as a progressive, uneven protrusion whose tip is slightly off-center. This results in severe myopic astigmatism, which makes adjusting for it difficult.

In instance, the development of cataracts leads to lenticular changes that generate the index variety of irregular astigmatism. The crystalline lens's angle of inclination may also play a role in the development of astigmatism.

Classification with Respect to Contributing Ocular Component the Anterior Cornea

Most cases of astigmatism may be traced back to a toricity of the anterior corneal surface. The biggest dioptric effect is due to variances in radii of curvature at the interface between the air and/or tear film and the eye, where the refractive index changes by the most. Several studies have demonstrated that chalazia, tumors, and even lid pressure may all contribute to the development of anterior corneal astigmatism.

V. CONCLUSION

Reading English text became slower with increasing power of astigmatism, even for powers of astigmatism as low as 0.50 DC, and reading rate with ATR astigmatism was slower than with WTR astigmatism, suggesting that astigmatism has a greater impact on reading rates when using English characters, which involve a greater level of complexity than that involved in reading Hindi letters.

Reading speeds in Hindi characters were also found to be affected by astigmatism and the orientation of the axis of astigmatism, with ATR astigmatism having a more detrimental effect than either WTR astigmatism, which was not significantly different from optimal correction.While comparing reading speeds with and without astigmatism using both English letters and Hindi characters, the larger percentage drop

while using Hindi characters likely reflects the increased visual complexity and higher levels of cognitive processing necessary to read Hindi characters. Importantly, we found that astigmatism as low as 0.50 DC can be problematic, which is highly relevant given the high prevalence of astigmatism in populations, and that the correction of astigmatism is even more important for those individuals reading English than Hindi text.

REFERENCES

1. Shah, Kannisha & H, Sujithra & Thansi, Amina. (2021). Comparative study of changes in corneal astigmatism after pterygium excision with conjunctival auto graft and effect of demographics on the incidence and surgical outcome. Indian Journal of Clinical and Experimental Ophthalmology. 9. 84-88. 10.18231/j.ijceo.2023.016.
2. Hasegawa, Yumi & Honbo, Masato & Miyata, Kazunori & Oshika, Tetsuro. (2021). Type of residual astigmatism and uncorrected visual acuity in pseudophakic eyes. Scientific Reports. 12. 10.1038/s41598-022-05311-x.
3. Nováček, Ladislav Viktor & Němcová, Marie & Tyx, Kateřina & Lahodová, Kristýna & Rejmont, Leos & Rozsival, Pavel & Studený, Pavel. (2021). Evaluation of Astigmatism-Correcting Efficiency and Rotational Stability after Cataract Surgery with a Double-Loop Haptic Toric Intraocular Lens: A 1-Year Follow-Up. Biomedicine Hub. 6. 30-41. 10.1159/000513894.
4. Nuñez, Maria & Henriquez, Maria & Escaf, Luis & Ventura, Bruna & Srur, Miguel & Newball, Lyle & Espaillat, Arnaldo & Centurion, Virgilio. (2019). Consensus on the management of astigmatism in cataract surgery. Clinical Ophthalmology. Volume 13. 311-324. 10.2147/OPTH.S178277.
5. Shao, Xu & Zhou, Kaijing & Pan, An-Peng & Cheng, Xue-Ying & Cai, He-Xie & Huang, Jin-Hai & Yong, yu. (2017). Age-Related Changes in Corneal Astigmatism. Journal of Refractive Surgery. 33. 696-703. 10.3928/1081597X-20170718-04.
6. Hughes, Amy & Mallen, Edward & Elliott, David. (2017). The Visual Impact of Lens-Induced Astigmatism is Linked to Habitual Axis. Optometry and Vision Science. 94. 260-264. 10.1097/OPX.0000000000001000.