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Original Research Paper

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BIOMETRIC CORELATION IN PAEDIATRIC AMETROPIA.

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ABSTRACT

Aims- To study biometric corelation in ametropic paediatric patient.

Material and method- it is a prospective observational study was conducted in 644 eyes of 322 patients, who were presented with refractive error in tertiary centre in central India from a period of January 2018 to June 2019. They were included after taking consent from guardians. To rule out anterior segment pathology, slit lamp examination was carried out and best corrected visual acuity is recorded. Auto-refractometry and retinoscopy was performed to know refractive status of eye. Keratometry, a scan, pachymetry also done. All procedures and investigation were done by the same surgeon.

Result-A highly significant association of refractive status with subjective correction, K Max, K Min, pachymetry and axial length was scrutinized ($p<0.05$) The corneal curvature was positively correlated with axial length whereas the negative correlation was observed between corneal curvature and central corneal thickness.

Conclusion- These biometric findings have crucial implication in refractive surgeries, also useful for fitting contact lenses and assessing, diagnosing as well as managing other abnormal corneal conditions.

KEYWORDS : corneal curvature, axial length, myopia, hypermetropia, astigmatism.

INTRODUCTION-

Ametropia is defined as state of refraction wherein the parallel ray of light coming from infinity are focused either in front or behind the sensitive layer of retina in one or both the meridian. It is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. [1] which represents a large economic burden, particularly in developing countries. These are components of ametropia- corneal power, Anterior chamber depth, Crystalline lens power & Axial length. The prevalence of ametropia and its association with ocular biometry seems to be increasing which makes this subject a priority area in current ophthalmological and optometric research Studies on association between refractive error and ocular biometric are inconclusive as McBrien and Millodot[2] found greater vitreous depth, greater anterior chamber depth, and less crystalline lens thickness in early adult-onset myopes than in emmetropes. Grosvenor and Scott!" [3] found greater corneal power in early adult-onset myopes. Bullimore et al. [3] reported greater vitreous depth in early adult-onset myopes than in emmetropes. Some studies have reported higher ACD readings in myopes and lower readings in hyperopes, [4,5] while Warrier et al [6] and Wickremasinghe et al [7] found no association between refractive errors and ACD in their population-based studies with large sample sizes. Despite numerous studies done there still lots of question remain in relation of ocular biometric corelation.so in these studies we tried to intend in examination corelation of ocular biometry with different type of refractive status.

METHODOLOGY-

In this study, total of 322 paediatric cases were recruited. So total of 644 eyes were examined upon. This study was carried out, over a total period of 18month after taking clearance from institutional ethical committee. Both the sexes - male and female, were included for this study. It is prospective observational study. The cases belonged to tertiary centre in central India. detailed history has been taken from patients and guardians using a predesigned proforma. anterior segment pathology rule out with slit lamp examination and visual acuity was recorded on Snellen's test type chart with unaided & best correction. To know refractive status of eye Auto-refractometry and retinoscopy was performed under cycloplegic drugs (cyclopentolate/ Tropicamide plus) and along with this fundus examination was done by Direct and Indirect Ophthalmoscope to rule out any posterior segment pathology. Then, post mydriatic test (PMT) was performed and best corrected spectacles were provided. Keratometry to measure corneal curvature, A-scan done to measure axial length of eyes, Central corneal thickness was also measured with the Sonomed 300AP+ Pac scan after 2 min of instilling paracain drop and with help of probe. It is a painless and brief test Follow up was done for the same in every 6 months up to final visits. To achieve high accurate value, all procedures were done by single observer.

DISCUSSION-

Age plays an important role in progression of myopia. As the age increases, there is flattening of cornea.[8] This study included patient belonging to 5 to 16 years of age with mean age of 11.78±2.77 years. Maximum patients in presents study were males 189(58.7%) and rest 133(41.3%) were females (table 1). Similarly, **Lam CA et al (1999)** in their study included 142 school children between 6 to 17 years of age. Of them 75 were males and 67 were females.[9] TouzeauO **et al (2003)**, study show Subjective spherical equivalent showed the strongest correlation with the axial length (rs)=0.82, $p<0.001$) [10]. Subjective spherical equivalent, central corneal thickness, axial length, anterior chamber depth, and anterior corneal radius showed a strong correlation between both eyes (rs) [INF'=0.94, $p<0.001$). Similarly, in our study subjective spherical equivalent show strong correlation with axial length, central corneal thickness and corneal curvature ($p<0.001$), and cylindrical equivalent show significant correlation with corneal curvature ($p<0.001$) i.e. With steepening in corneal curvature (K max increases), axial length increased and thinning in central corneal thickness (inverse correlation) and vice versa. **Mainstone JC** et al (1998) found that Corneal radius of curvature was positively correlated with axial length ($r = 0.367$, $p = 0.0298$). Axial length was found to decrease as hyperopic refractive error increased ($r = 0.753$, $p = 0.0001$) [11]. Similarly, our study

observed statistically that longer axial length has steeper corneal curvature and thinner central corneal thickness while that shorter axial length has flatter corneal curvature and thicker central corneal thickness ($p<0.01$).

Table 1- Gender-wise distribution of cases of ametropia in paediatric age groups (n= 322).

Gender	No. of patients	Percentage (%)
Male	189	58.7%
Female	133	41.3%
Total	322	100%

Figure 2: Gender wise distribution of cases of ametropia in Pediatric age groups

Table 2- Correlation between subjective correction, corneal curvature, axial length and central corneal thickness in paediatric ametropia(n=644).

Spherical correction with	Pearson		Spearman rho	
	Correlation	P value	Correlation	P value
K Max	0.24	0.001	0.21	0.001
K Min	0.21	0.001	0.18	0.001
AXL	0.48	0.001	0.34	0.001
Pachymetry	0.25	0.001	0.22	0.001

Table 3- Correlation between corneal curvature, axial length and central corneal thickness in paediatric ametropia (n=644).

K max with	Pearson		Spearman rho	
	Correlation	P value	Correlation	P value
AXL	0.44	0.001	0.41	0.001
Pachymetry	0.21	0.001	0.20	0.001

CONCLUSION-

These biometric findings have crucial implication in refractive surgeries, also useful for fitting contact lenses and assessing, diagnosing as well as managing other abnormal corneal conditions.

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