

## Relationship between Central Corneal Thickness, Anterior Chamber Depth and Degree of Myopia in Adult Population in North Egypt

Faried M. Wagdy

Ophthalmology Department, Menofia University, Faculty of Medicine, Menofia University, Egypt.

[Faried.wagdy@hotmail.com](mailto:Faried.wagdy@hotmail.com)

**Abstract: Purpose (Objective):** to study relationship between central corneal thickness, anterior chamber depth, pupil diameter and degree of myopia in adult population aged between 21 and 38 years in Menofia Governate, Egypt. **Methods:** In this prospective observational study, sample of 114 eyes of 57 myopic patients aged between 21 and 38 years were enrolled in the study. Pentacam was used to assess central corneal thickness (CCT), anterior chamber depth(ACD) in this group of myopic patients that was divided into 2 groups ( Group A: refraction less than - 6.00 D) and (group B: refraction more than -6.00 D). Correlation between these three parameters and degree of myopia was statistically analysed. **Results:** Mean value for age of this adult myopic population of Menofia Governorate was  $33.80 \pm 1.20$  with 77 eyes in group A and 37 eyes in group B.mean value for entire sample for CCT, ACD was  $543.39 \pm 40.61 \mu\text{m}$ ,  $3.50 \pm 0.14 \text{ mm}$  respectively. There were mild reduction in these parameters in group B more than in group A but it was non significant ( $p$  value  $> 0.05$ ). **Conclusion:** there was no correlation between CCT, ACD and PD with degree of myopia in adult population.

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**Keyword:** Central Corneal Thickness, Anterior Chamber Depth, Myopia Menofia Governate.

### 1. Introduction

Myopia is one of the most common refractive errors and central corneal thickness (CCT) is an essential factor in assessment of myopic patients before refractive surgery to avoid postoperative keratectasia<sup>1</sup>. So it is important to investigate the relationship between this factor and degree of myopic refractive error<sup>2</sup>. Also the assessment of anterior chamber depth (ACD) is important for performing refractive surgery as eximer laser photorefractive keratectomy or phakic anterior lense (PACL)<sup>3</sup>. In addition to importance of ACD measurement in cataract surgery (biometric formulas) or in glaucoma (epidemiological studies, laser or surgical procedures)<sup>4</sup>. Study of both factors CCT and

ACD in relation to myopia is necessary before refractive surgery<sup>5</sup>.

### 2. Methods:

In this prospective observational study, sample of 114 eyes of 57 myopic patients aged between 21 and 38 years were enrolled in the study. Pentacam was used to assess central corneal thickness(CCT), anterior chamber depth(ACD) depending rotating Scheimpflug imaging technique (version: ALLEGRO Oculyzer Pentacam) was performed with the patient seated using a chinrest and forehead strap. The patient was asked to keep both eyes open and to fixate on a blue fixation target. (Figure1). Three measurements are taken for the examined eye and the average number for CCT and ACD are included in the study.

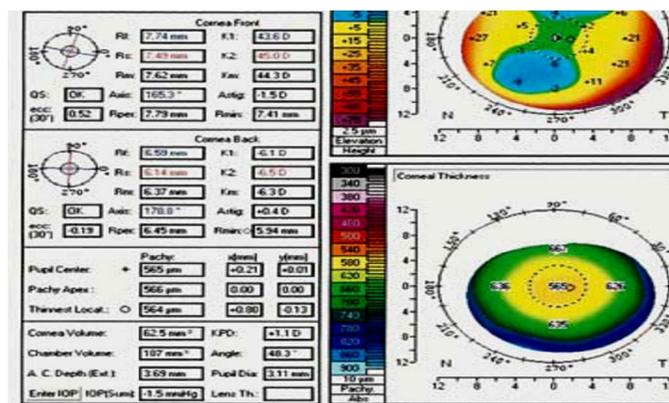


Figure 1: Pentacam printout showing CCT and ACD

The patients were divided according to the degree of myopia into 2 groups (Group A “low degree “refraction less than – 6.00 D) and (group B: high myopic degree in which refraction more than - 6.00 D). Subjects with previous ocular surgery, glaucoma or any ocular disease affecting CCT or ACD were excluded. All patients underwent a complete ophthalmological examination. The statistical analysis for both groups as regarding CCT and ACD using t-test and *P*-value was done.

### 3. Results:

As regarding the mean values and the standard deviation, the statistical analysis between them in

both groups using t-test and *P*-value was applied, mean value of CCT in group A ( N= 77 eyes ) was  $548.2 \pm 39.9$  while mean value of CCT in group B ( N= 37 eyes ) was  $533.4 \pm 40.7$  but however there was mild decrease in the mean value of CCT in group B more than that of group A but it was statistically insignificant ( *p* value > 0.05). while in the second factor ( ACD), mean value in group A was  $3.4 \pm 0.2$  mm while mean value of ( ACD) in group B was  $3.6 \pm 0.3$  mm but however there was mild increase in the mean value of ACD in group B more than that of group A but it was statistically insignificant ( *p* value > 0.05). “as in table 1 and figure 2 ”

**Table 1: Comparison of Mean value and standard deviation for the corneal thickness, AC and for both groups of myopic patients by t- test.**

Item	Group A ≤ -6.0 (n=77)	Group B > -6.0 (n=37)	t- test	Probability	Significance
Mean value for central corneal thickness (um)	$548.2 \pm 39.9$	$533.4 \pm 40.7$	1.835	> 0.05	Non significant
Mean value for AC (mm)	$3.4 \pm 0.2$	$3.6 \pm 0.3$	1.818	> 0.05	Non significant

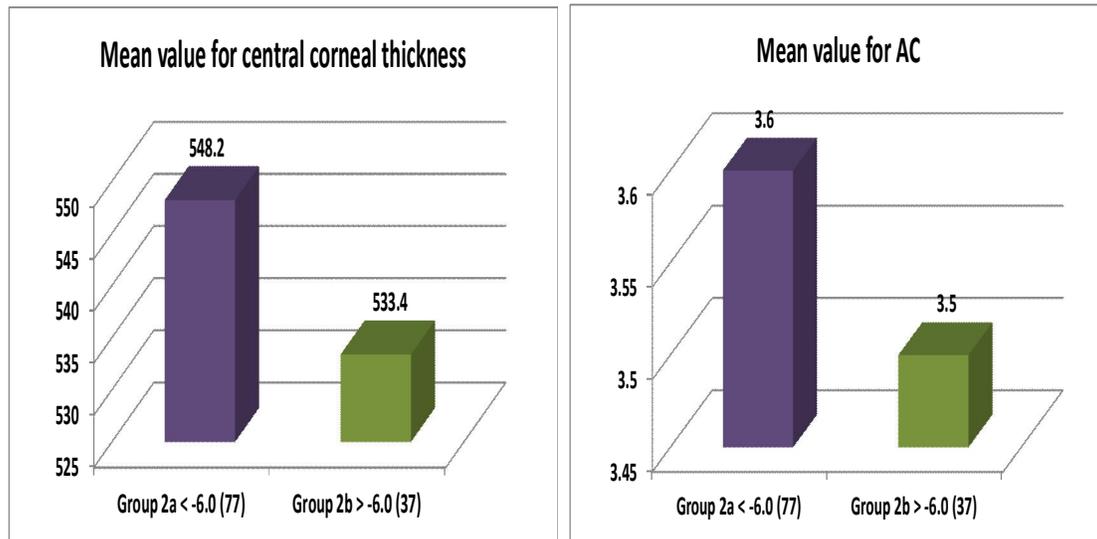


Figure 2: Mean values of CCT and ACD in both myopic groups

### 4. Discussion:

This study was done to determine relationship between central corneal thickness (CCT), anterior chamber depth and degree of myopia. The study showed no statistically significant difference in CCT either low and high degrees of myopia ( *p* value > 0.05 ) Similar results were obtained by Archana and co-workers in 2011 in their study on myopic patients with mean CCT  $544 \pm 34$  um (range 415-695 um) and mean SE of the studied group was  $-3.78 \pm 3.30$

diopeters ( range, +6.00 to -17.50 diopeters ) that showed no significant relation between CCT and the increase in myopic refractive error <sup>6</sup>. Also these results of CCT in relation to degree of myopia were in agreement with another study done by Manuel et al., 2011 in southeast Spain that stated that CCT was stable as no significant difference seen in adult myopic patients between 20 to 40 year- old subjects <sup>7</sup>. Also similar results were presented by one study in Iran in 2005 that was done on 224 eyes of 112

patients, mean CCT was  $540 \pm 5.25 \mu\text{m}$ <sup>8</sup> and another study in Denmark with mean CCT was  $527.7 \pm 35$ <sup>9</sup>. However other study done by Chang *et al.*, in 2001 reported thinner corneas in myopia less than -4.00 diopters<sup>10</sup>. Also statistical analysis revealed that no significant changes occurred in ACD between group A ( myopia less than -6.00 D ) and group B (myopia more than -6.00 D) with the mean value of entire myopic sample of  $3.50 \pm 0.14$  mm. Although Holladay and colleges in 1996 found that ACD did not relate to axial length of the globe at all<sup>11</sup>, results of this study were in agreement with those obtained by Mohamed *et al.*, 2000 In which ACD was 2.98 in the group with axial length less than or equal to 20 mm compared to 3.51 mm in the group with axial length of 29 mm or more and these correlation was statistically significant meaning significant elevation in ACD in myopic patients while in the same study other studied 3 groups (from 25 to 26.9 mm), (from 27 to 28.9mm) and group (29 mm or more ) showed no significant increase in ACD in relation to increasing myopia<sup>5</sup>.

#### References:

- 1- Fred Wilson, External disease and cornea – basic and clinical science course- American Academy of ophthalmology San-Francisco 2002-2003 ; 492 ).
- 2- Joo-C.K and Kim TG. Corneal ectasia detected after LASIK for correction of less than -12 diopters of myopia. J. Cataract –Refract Surgery 2000 ;26(2):292-5
- 3- Vinciguerra p, Azzolini M,Airaghi p: Effect of decreasing surface and interface irregularities after photorefractive keratectomy and laser in situ keratomileusis on optical and functional results. J Refract Surg., 1998;14:S199-203.
- 4- Olsen T, Corydon L, Gimbel H. Intraocular lens power calculation with an improved anterior chamber depth prediction algorithm.. J Refract Surg., 1995; 21:S313-319.
- 5- Mohamed Hosny, Jorge L.Alio, Pascual Claramonte, Walid H.Atia,,Juan J.Perez-Santonja: Relationship between anterior chamber depth, refractive state, corneal diameter, and axial length. Journal of Refractive Surgery 2000; 16: 336-340.
- 6- Archana Prasad, Kristen Fry, and Peter S.Hersh: Relationship of age and refraction to central corneal thickness. Cornea 2011;5:553-555.
- 7- Manuel Gracia-Medina, Jose Javier and Pablo garrido-Fernandez: Central corneal thickness, intraocular pressure and degree of myopia in adult myopic population aged 20 to 40 years in Southeast Spain: determination and relationships. Clinical Ophthalmology 2011; 5: 249-258.
- 8- Mortazavi A., K. Nasrolahi: Correlation between corneal thickness and degree of myopic refractive error. Journal of Research in Medical Sciences 2005; 1:31-33.
- 9- Lene Pedersen, Jesper Hjortdal and Niels Ehlers: Central corneal thickness in high myopia. Acta Ophthalmol.Scand.2005; 83:539-542.
- 10- Chang SW, Tsai IL, Hufr, *et al.*: The cornea in young myopic adults. Br J Ophthalmol 2001; 85:916-920.
- 11- Holladay JT, Gills JP, Leidlein J and Cherchio M: Achieving emmetropia in extremely short eyes with two piggyback posterior chamber intraocular lenses. Ophthalmology 1996; 103: 1118-1123.

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