

# COMPARISON BETWEEN CORNEAL THICKNESS IN PATIENTS WITH TYPE ONE DIABETES AND NON DIABETICS OF THE SAME AGE GROUP

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## Introduction

Cornea is the most anterior structure of the globe and very crucial for almost all intraocular surgeries and interventions as it is the window for inside. It also represents two third of refractive power of the eye and it is the target for refractive surgery procedures. Corneal thickness is important parameter for refractive surgery and for IOP measuring to avoid overestimation and underestimation of IOP on which diagnosis of glaucoma depends. There are many factors can affect thickness like age, function of endothelium, alcohol consumption and high blood glucose level as many studies conclude that long term type 2 diabetic patients have corneal changes that affect thickness. Diabetes can affect cornea as like as retina, it causes wide range of clinical manifestation like recurrent corneal erosions, persistent ulcer, corneal hypoesthesia and endothelial changes in form of decrease in cell density and increase in polymegathism and pleomorphism. For type 1 DM, almost all patients are young who may need refractive surgery or develop glaucoma with aging so their corneal changes and impact of DM on their cornea need to be studied as there were few studies that assess corneal thickness in type 1 diabetics.

## Aim of the Work

Was to detect corneal thickness changes in patients with type one diabetes in comparison with non diabetics of the same age group.

## Patients and Methods

A cross sectional study that recruited 70eyes of 65Patients with type one diabetes who presented to the Ophthalmology Department of Alexandria Main University Hospital in period between February 2023 till the end of February 2024. The recruited eyes were subjected to full ophthalmological examination and corneal thickness was assessed using pentacam HR.

**Exclusion Criteria:**

- Patients with type 2 DM
- History of ocular trauma
- History of contact lens wear
- History of ocular surgery
- Patients with corneal scaring or other ocular surface diseases

History of diseases that affect corneal endothelium like uveitis, glaucoma and corneal dystrophy.

## Results

**Table 1:** Comparison between the two studied groups according to corneal thickness.

| Corneal thickness | Cases<br>(n = 70) | Control<br>(n = 45) | T      | P      |
|-------------------|-------------------|---------------------|--------|--------|
| <b>Thinnest</b>   |                   |                     |        |        |
| Min. – Max.       | 459.0 – 639.0     | 462.0 – 623.0       | 2.329* | 0.022* |
| Mean ± SD.        | 554.94 ± 37.76    | 538.96 ± 32.85      |        |        |
| <b>2mm</b>        |                   |                     |        |        |
| Min. – Max.       | 468.0 – 648.0     | 475.0 – 634.0       | 2.356* | 0.020* |
| Mean ± SD.        | 564.87 ± 38.02    | 548.64 ± 32.72      |        |        |
| <b>4mm</b>        |                   |                     |        |        |
| Min. – Max.       | 491.0 – 683.0     | 508.0 – 663.0       | 2.362* | 0.020* |
| Mean ± SD.        | 594.96 ± 40.25    | 578.07 ± 32.52      |        |        |
| <b>6mm</b>        |                   |                     |        |        |
| Min. – Max.       | 532.0 – 745.0     | 558.0 – 705.0       | 2.225* | 0.028* |
| Mean ± SD.        | 644.83 ± 42.31    | 628.33 ± 32.57      |        |        |
| <b>8mm</b>        |                   |                     |        |        |
| Min. – Max.       | 605.0 – 827.0     | 642.0 – 776.0       | 2.113* | 0.037* |
| Mean ± SD.        | 721.74 ± 45.41    | 706.09 ± 33.82      |        |        |

Table 1 showed increase corneal thickness significantly in all examined points across corneal surface.

**Table 2:** Relation between diabetic status and corneal thickness in cases group

| Corneal thickness | Diabetic status    |                 |                 | F      | p      |
|-------------------|--------------------|-----------------|-----------------|--------|--------|
|                   | Normal<br>(n = 46) | NPDR<br>(n = 9) | PDR<br>(n = 15) |        |        |
| <b>Thinnest</b>   |                    |                 |                 |        |        |
| Mean ± SD.        | 548.9 ± 37.64      | 570.3 ± 37.33   | 564.3 ± 36.19   | 1.851  | 0.165  |
| <b>2mm</b>        |                    |                 |                 |        |        |
| Mean ± SD.        | 558.7 ± 37.60      | 580.1 ± 37.51   | 574.6 ± 37.42   | 1.862  | 0.163  |
| <b>4mm</b>        |                    |                 |                 |        |        |
| Mean ± SD.        | 587.3 ± 38.13      | 613.4 ± 43.03   | 607.3 ± 40.98   | 2.592  | 0.082  |
| <b>6mm</b>        |                    |                 |                 |        |        |
| Mean ± SD.        | 635.2 ± 39.27      | 663.2 ± 42.24   | 663.3 ± 44.25   | 3.755* | 0.028* |
| <b>8mm</b>        |                    |                 |                 |        |        |
| Mean ± SD.        | 710.9 ± 41.58      | 742.6 ± 46.17   | 742.6 ± 47.50   | 4.203* | 0.019* |

Table 2 described the relation between grading of retinopathy and corneal thickness that showed that thickness increased significantly in peripheral cornea in PDR patients than NPDR and normal fundus patients

## Conclusion

Cornea is thicker in patients with type one diabetes in comparison with non-diabetics along the whole surface of the cornea (centrally and peripherally). Patients with PDR have thicker peripheral cornea at 6 mm and 8 mm points in comparison with patients with normal fundus and NPDR.